



IT'S REALLY  
*not* ABOUT  
THE ROBOTS

## HOW WHITE MOUNTAIN'S ROBOTICS PROGRAMS ARE INSPIRING COMPASSION, COURAGE, AND CURIOSITY

Step into any given robotics class at The White Mountain School or a Northern Horizons Team 7416 meeting, and you will encounter a joyous symphony of power tools, buzzes, clicks, and whirrs. Tiny Sphero robots roll around in self-contained plastic shells, not unlike the astromech droid, BB-8, from the most recent *Star Wars* films. LEGO® robots glide across tabletops completing tasks on pre-programmed routes. Murphy—the six-foot and 101-pound robot created from scratch by Northern Horizons for their inaugural competition season in 2018-2019—towers over all the rest and, despite its size, can deftly navigate corners, delightfully spin in a circle, and accelerate quickly with the flick of a wrist. Despite looking like toys, each of these robots are complex machines and the product of untold hours of hardware and software development by White Mountain students.

Students can engage with robotics at White Mountain through one of the two courses the School offers, or as part of Northern Horizons, which participates in the FIRST Robotics Competition (FRC). Each year, teams competing in the FRC have six weeks to build a robot from scratch to compete in a series of tasks and games, which are different from year to year. Although White Mountain students have participated in other robotics competitions since as early as 2013, joining the international FRC network in 2018 was made possible in large part due to the launch of White Mountain's new Inquiry, Innovation, and Impact Lab (I<sup>3</sup> Lab).

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As one would expect, learning about robotics entails learning about coding, physics, electrical engineering, fabrication, and other STEM-related topics. However, it's the surprising and often moving lessons related to White Mountain's values of compassion, courage, and curiosity that make the School's still relatively new, but growing robotics programs so unique.

### Learning Compassion Through "Gracious Professionalism" and "Coopertition"

Throughout their inaugural 2018-2019 season, Northern Horizons brought home several district and regional awards, and the team was nominated for the prestigious Rookie All Star Award at the New England District Championship. Although the wins made the season memorable, ask any member of the inaugural team about their favorite moments, and they are each quick to highlight the camaraderie and connections made through the FRC. These connections were made possible by the culture established by FIRST Robotics, which emphasizes the values of "gracious professionalism" and "coopertition." The former encourages participants to "learn and compete like crazy, but treat one another with respect and kindness in the process," while the latter emphasizes "competing always, but assisting and enabling others when you can."

"It was really amazing seeing the support we got as a new team from the FIRST community. Sometimes you're competitors and working against each other, and sometimes you're working with each other. Still, it's always a community, and everyone helps each other," explains Phoebe Ross '21, a day student who decided to come to White Mountain primarily because of its robotics programs. "Everyone is especially supportive of those who are less experienced, like our team.

We received so much help from everyone, and if there was something we could help others with, we did."

"When we originally built Murphy, he had these big actuators that could lift him off the ground over two feet. We thought we were geniuses for adding them. But at our first competition, before our first practice match even began, another team pointed out that the motors used to power the actuators were very illegal and would get us disqualified. That team, Orange Chaos, invited us into their own 10'x10' pit and kicked their own team and robot out and put Murphy in and with their set of tools and organized system and mechanics helped us problem-solve how to get the motors off of the actuators quickly. It was our first glimpse of how this community lives gracious professionalism," recalls Nicholas "Nickel" Carlson '20. "At any other robotics competition, we would have been laughed at and sent home for overlooking something so huge. At FIRST, we were taken in and taken care of and the focus of everyone was to see if they could help us, a rookie team, get up and running again. At FIRST, it's really not about the robots; they just happen to be the medium that brings us together. But FIRST is really about bringing people together and teaching them how to work together as a team, as well as with other teams and schools."

### Courageously Stepping Out of the Comfort Zone

Mariama "Lemon" Lemon '20 and Mohammad "Amin" Arabzada '20 both say that they would never have thought that robotics would be something they could participate in, much less excel at.

"During my freshman year, I saw how many of my friends were involved with robotics and how much fun they were having. I wanted to join, but I had never done robotics before and always thought



that because I was a dancer I didn't have anything to contribute. But Nathan [Northern Horizons' coach] encouraged me to join and told me: 'Anybody can do robotics. So what that you're a dancer? That adds a new perspective.' With his encouragement I gave it a try and I've done it since my sophomore year," says Lemon who, in addition to doing hardware and software work, also manages the team's website and social media. "When I come into the I<sup>3</sup> Lab, I like hearing all of the ideas around the room and hearing people talk about what they care about. You can tell people really care here about what we're doing and working together to get it done. It's an extra-collaborative place."

"I signed up for Intro to Robotics this fall after seeing Northern Horizons bring Murphy to morning meeting last year. I wanted to know how to build something like that. The class has been amazing and we made a robot that came in fourth place out of thirteen in an informal competition with WMSI [White Mountain Science, Inc.]," says Amin. "This course helped me realize that nothing is impossible. Last year, I thought I would never be able to build a robot [at White Mountain] because I thought to learn how to would definitely

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FIRST is all about the **connections** you make with other schools and building a foundation for **collaboration**, and this is our way to help build interest around robotics and STEM in the North Country.”



take a year or more, and I'm a senior. But in three months of taking this class, from not knowing anything about robots, I have been able to build a robot that I was proud of and programmed myself. Taking this course was the biggest challenge and success that I've had in my time here.”

### Inspiring Curiosity in Others

The students involved in White Mountain's robotics programs frequently work to share their creations and the knowledge and joy behind them with the broader communities of Littleton and Bethlehem. This past fall, First Horizons brought Murphy to a Halloween “trunk or treat” event, where the robot used its lift to hand out candy. A few weeks later, in November, students enrolled in the Intro to Robotics course set up stations around the Bethlehem Public Library and introduced young children and their parents to some basic coding principles and taught them how to control both the Sphero robots and Murphy.

“The kids in Bethlehem loved seeing something that we built in six weeks move and function, and they wanted to know how they could build a robot, too,” says

Nathaniel Clement '20, another one of Northern Horizons' original members. “I got a lot of questions from the kids, and one of them was ‘So, will this be an option for me when I'm older? Can I do this, too?’ and that's why we do things like this, to get more people interested in STEM in the North Country.”

In the interest of advocating for STEM and robotics in the North Country, Nathaniel and Nickel traveled to Washington, D.C., during the summer of 2019 to participate in the FIRST National Advocacy Conference and meet with members of Congress on Capitol Hill. The pair, along with Coach Nathan Carlson, met with both of New Hampshire's senators, Sen. Maggie Hassan and Sen. Jeanne Shaheen, as well as with Rep. Ann McLane Kuster, who represents New Hampshire's 2nd Congressional District. Among other things, the students stressed the need for support of the Title IV Part A flexible block grant, part of the bipartisan Every Student Succeeds Act (ESSA). The grant provides public school districts with funds that can be used to improve STEM programs and invest in technology for education, among other priority areas.

“Because White Mountain is a private boarding school, we wouldn't benefit from the grant. But it would help other schools in the area like the Profile School in Bethlehem, or Littleton High School get more STEM or robotics programs,” explains Nathaniel. “We've talked to students at both of those schools who are interested in starting a robotics team, but they just don't have the funding or space to start one. So to have the chance to help advocate for them in D.C. was a really amazing experience. In the meantime, our FIRST team is open to students anywhere in the North Country. That's why we're called ‘Northern Horizons’ and not ‘The White Mountain School Robotics Team,’ or something like that. FIRST is all about the connections you make with other schools and building a foundation for collaboration, and this is our way to help build interest around robotics and STEM in the North Country.”

*The informal, North Country-based competitions mentioned in this story are made possible through collaborative partnerships between White Mountain, WMSI, Profile School, and Hanover High School.*

To keep up with Northern Horizons' progress during the 2019-20 competition season, visit [robotics.whitemountain.org](https://robotics.whitemountain.org) or follow the team on Facebook, Twitter, or Instagram.