

## Westwood Robotics - Wolverines #1757

Team 1757 is a big family with a long tradition of aiming high, doing your best, and helping each other out. The team was started in 2006, when our lead mentor, Chris – then a high school student – was fascinated by the FIRST Robotics Competition. He and his classmates, along with Westwood High School faculty advisor, Mark, formed Team 1757. The mentors and students worked hard and won the Highest Rookie Seed Award. Fast forward, ten years later, team 1757 made the headlines again. The team finished its best competitive season to date, competing at the New England District Championship in 2017. The team was among top 40 out of 200 teams in New England and was invited to attend the World Championships. In the first edition of the 2018 local newspaper, our team's success story is an attestation to our commitment to serving our core audience: our community.

Shortly afterward, we faced immense challenges. After June of last year, most of the team, high school seniors, graduated, leaving the team with only two seasoned sophomores. The two remaining members jumped into action, took various leadership roles, and started the recruitment process early. We redesigned our team website (<https://whsrobotics.org>) to make it more attractive and functional, presented the team at the high school's Student Activities Night, and performed robot demonstrations to recruit more people to our team. The recruitment process was a huge success, adding over 43 new members, one of the largest increase in the team's history. With a big group of enthusiastic but inexperienced students, we faced a new challenge: figuring out how to educate, support, and engage the new members. We focused on team development and divided the team into sub-teams: Design, Build, Programming, Finance, PR, and Fundraising. Each sub-team is led by a student leader and a mentor. Mentors and sub-team leaders meet regularly to discuss team activities and progress, and sub-team leaders work with their teams to evaluate and execute action items. We offer a friendly environment where members learn from each other and improve from mistakes.

To run a successful team, students need to gain various skills: technical, business, communication and leadership. During the off-season, a veteran mentor, Dwight, volunteered to teach students weekly CAD classes using Onshape. The Team Captain, Larry, has offered weekly programming classes for 12 weeks. A business mentor, Lucinda, guided students on marketing, fundraising, and outreach tasks. The team modified a t-shirt cannon robot, getting new members involved in robot design, electrical engineering, pneumatics, assembly, programming, teamwork, and much more. The team was able to showcase the robot to the entire school during the offseason.

During the build season, students work closely with mentors throughout the week and weekend. It was very impressive to see student Lauren, her father, and her grandfather working together to work on the robot. The engineering tradition and skills are passed down from one generation to another. Through participation in FRC, students learn hands-on skills and gain real-life experience that they can't learn from school.

In many FRC teams, mentors are essential to the team's operation and success. This year, the team not only quadrupled the size of student members but also more than tripled the size of mentors from four to fifteen. The team welcomes women mentors to encourage more girls to join the robotics team and explore the countless opportunities in the STEM world. We have five women mentors, which accounts for one-third of the total mentors. All of our mentors have technical skills, business skills, and professional experience. Most importantly, the mentors have the passion to spark students' interests in science, technology, and entrepreneurship. Dwight, a mentor, has been with the team for more than 11 years. Another mentor, Chris, who helped start the team in 2006 as a high schooler, came back to mentor the team after earning a Robotics Engineering degree from WPI. Lucinda, a business and technical mentor, has helped out FLL teams for more than eight years. In order to better spread the message of FIRST, expand our team's outreach, and promote STEM education in the community, the team decided to form a 501(c)(3) nonprofit organization. With business experience, Catherine, a mentor, stepped in to help the team. Through all the hard work, in less than a month, Westwood Robotics officially became a 501(c)(3) nonprofit organization in 2017. The team started a crowdfunding initiative this year to raise the awareness of our team and encourage support from the community. The community has been very supportive of the program, donating over \$1500 to a good cause.

Team 1757 has a long history of helping other FIRST teams and promoting STEM education in the community. Mentor Lucinda co-led a committee that crafted an alliance between MIT alumni and FIRST. She was the organizer of pit tours with the MIT Club of Boston at FRC events at Agganis Center from 2010 to 2012. She co-founded the

first FLL team in Westwood, MA. in 2009. Since 2010, Mentors Dan, Elizabeth, and Lucinda have organized introductions to creating FLL teams every couple of years. These events have attracted lots of interests from families in the community. As a result of their hard work, more than 20 FLL teams have been formed in Westwood since 2009. One of the FLL teams competed at the state level for 4 years since 2014. The team competed in the National Championship in 2015 and in 2017.

Most FLL team members moved up to join our FRC team. Team 1757 members become mentors of FLL teams and share their experiences with novices. In 2016, a former member, Ryan, mentored a rookie FLL team - a group of Webelos scouts. In 2017, our team ran a FLL Research Night early on in the season to help mentor both new coaches and students. Of the teams who attended the event, two won research project related awards in their qualifiers. Team 1757 also ran a scrimmage for local teams which featured all three aspects of the FLL competition. Several of our team members worked closely with individual FLL teams, some of which moved on to the state competition. Our team members volunteered as referees at two FLL qualifier competitions last year.

Our team members are always looking for ways to reach out, give back, and promote STEM education throughout our community. We engage schools and the community through the District Bulletin, Principal's Newsletters, and social media sites and newspapers. In the 2017 competition season, former Superintendent of Westwood Public Schools, Dr. Antonucci, and the Principal of Westwood High School, Mr. Bevan, attended our District events to support the team. We brought excitement to the town when the team competed in the District Championship.

Our team members offered free Lego Robotics classes to children at the Westwood library and participated in the Science Fair at Westwood elementary schools. This year, subteam leader Josh, along with 5 team members are offering an 8-week Robotics Mini-course at the Sheehan school. Members have also started a Hack Club and ran Hackathons to promote computer science with Westwood students. Our team members have taught robotics and programming courses in summer camps since 2012. The team formed a close collaboration with our sponsor, US STEAM Academy, to provide STEM education to children in the community. Our team members help out as teaching assistants or instructors for STEM classes offered by US STEAM Academy. The students who attended STEM classes from US STEAM Academy are equipped with robotics, engineering, and programming skills. Team members apply the skills they have learned to build the robot. Our team will consistently have more new members joining the team each year as a result of this collaboration. In 2017, Westwood Day (the town's community fair), the team worked with US STEAM Academy to showcase robots, drones, steam engines, and electric cars. Children were able to control the robots and had hands-on fun with all of the gadgets. We could see the excitement in children, proving that STEM can be fun. We demoed last year's competition robot, and many children were fascinated by what the robot could do. This event attracted more than 100 families to our booths and raised the awareness of FIRST, robotics, and STEM education.

With our extensive experience in FRC and our technical expertise, we not only help out our community but also teams outside of our town. This year, we are helping a rookie team 6803 Hai-Panda in Shanghai, China with strategies and robot design. Our mentor visited them in Shanghai in January to provide technical support and guidance. Right now the rookie team has 11 team members and 6 mentors and is well positioned to apply for the Rookie All-Star award.

Although Team 1757 is in a small town, we have a big dream. We strive to inspire young people to become the next generation of scientists, engineers, entrepreneurs, and inventors. Just like building a pyramid, our team has consistently laid the foundation for future success.