



2015 Oakland County Competitive Robotics Association

Notre Dame Preparatory High School - Team 33 - Foundation Award

Team Overview

For 21 years, Team 33, the Killer Bees have been participating in Competitive Robotics in Oakland County. Since the beginning of OCCRA, our team has been entirely student managed and executed; everything from planning agendas to designing and fabricating the robot. Our OCCRA team is open to all NDP students, demonstrating the passion and devotion to learning that has become a Killer Bee standard. By making OCCRA optional, every team member can achieve a balance in their extracurricular activities, allowing all students to broaden their skills and interests. Team 33 emphasizes active involvement by all team members, new and experienced, during the OCCRA season. Rookie team members shadow experienced members to learn how to build robots. This way, every member has an opportunity to create a tangible impact on the success of the team and hone in their skills.



Team Communication

At the start of the season, the student team leaders created goals for the OCCRA team. The most important goal is to increase involvement in OCCRA, especially in our freshman and sophomore classes. In addition to the “Weekly Buzz” emails for our FIRST team, we send out mass emails specifically for OCCRA. These provide a list of dinner plans, dates and locations of upcoming competitions, and any changes to our weekly meeting schedule. The use of this system has greatly increased attendance, participation, and engagement at meetings and competitions.

Design Process and Team Structure

Our team is structured to work side-by-side with NewBees, allowing us to have a coherent approach to creating a robot in an efficient manner while teaching new students. Upperclassmen provide knowledge and experience while underclassmen bring a new perspective and a passion for learning; the two groups naturally cooperate very well. Our design process began by deciding the major functional objectives we would like the robot to accomplish. From there, experienced upperclassmen modeled our robot in CAD using Autodesk Inventor. New teammates were shown the basics of using shop tools and they applied this knowledge while disassembling the robot from the previous year. We began by fabricating the robot in various sub-teams: chassis, shooter, intake system, & electrical. However, no member is completely defined or limited by their sub-team job. For example, a teammate can help to build the robot’s shooter one day and learn how to wire the next. Each sub-team has a specific student to oversee the subsystem. We use collaborative project management principles to ensure the project is done on time. We begin each meetings with a group discussion

about each sub-team's daily goals and recent accomplishments. At the end of the meeting, each sub-team reports on their goals, accomplishments, and identifies the next steps. This keeps all members on the same page throughout the build season. In addition to this we use Google Docs to create a running list of our goals each week. Due to our relatively relaxed team structure we are able to easily cooperate and overcome problems without much difficulty.

Safety First

Safety is a priority on Team 33. Student team leaders enforce rules for all students with special attention to clothing and hair that could create a hazard. Skirts and lanyards are discouraged, and safety glasses are required when operating machinery. Mentors demonstrate the proper technique for shop and hand tools and experienced students provide reinforcement of these techniques. Students are also always encouraged to ask questions and get help if they feel unsafe operating any equipment. During the OCCRA season, the Killer Bees build in a classroom 80% of the time. At the end of every meeting, tools are neatly packed away, tables are cleaned, and floors are swept. Even though it seems simple, this daily routine teaches students about workplace expectations and safety when sharing a space. Assuring the safety of every member is very important to the Killer Bees, and emphasizing safety on the team more prominently is one of our many goals for the upcoming year.

Mentor Involvement

During the OCCRA season, mentors encourage students to develop and expand their leadership skills. Students coordinate meetings, lead design discussions, fabricate and build the robots and initiate outreach events. Mentors are involved with the game design, operation and logistics of the competitions. Our lead mentor, Jim Zondag, the head referee, builds the field and leads the game design committee. In addition, Julia Green provides technical and logistical support at the OCCRA competitions. We love seeing them support us and appreciate how they make OCCRA possible. Our faculty liaison, Susan McGinnis, is also a key part of OCCRA at Notre Dame Preparatory High School. As our supervisor, she coordinates snacks, champions for our team, and spreading her love for robotics throughout the school. Miss McGinnis recruits new members for the OCCRA team as she uses VEX robots to teach a class named "Science of Technology". This has fostered more excitement about robotics within our school community.

Community Outreach

Team 33, the Killer Bees, makes a consistent effort to reach out to our Oakland County community and share our passion for STEM with others. This year, we placed a special emphasis on encouraging young girls to pursue STEM activities such as OCCRA. We have worked with over 200 upper-elementary Girl Scouts in the last 3

years helping them earn the Product Designer Badge. By showing them fun and accessible careers in science and technology, we hope to inspire more young girls to explore robotics. Team 33, along with FIRST teams 2834 and 469, co-hosts the annual Bloomfield Hills All-Girls Competition, an event at which teams reach out to the Girl Scouts in our community.

In addition, the Killer Bees led a national campaign to add “Robotics” as an extra-curricular option on the college Common Application. Killer Bees and all OCCRA seniors can use their OCCRA experience to show college admissions officers how their learning goes beyond the classroom.



OCCRA League Outreach

In addition to making a concentrated effort to positively affect our Oakland County community by giving back to various organizations throughout the year, we consistently provide tools, expertise, and students to help other OCCRA teams when in need. Students were able to use what they had learned about electronics, programming, design, and fabrication to teach other teams. This not only creates a community of collaboration and professionalism amongst teams, but also the ability to assist others.

OCCRA Awareness at School

The Killer Bees have risen to the challenge of promoting OCCRA to our school, parents, and community. We have worked with our administration to make the school more positively aware of robotics by displaying team awards in hallways and at open houses. Our school “follows” our team Twitter and Facebook, and re-tweets/ re-posts our team accomplishments to the entire K-12 school community. The Killer Bees strive to sustain our OCCRA program through recruitments efforts at our school’s club exposition nights and open houses. This fall, we demonstrated our OCCRA robot, and prospective members were able to interact with the machine and speak with current students. This experience is valuable in recruiting new members. Because of these efforts to promote OCCRA within our school, we are able to consistently maintain our program year after year.

Team 33 makes a concerted effort to positively represent the OCCRA organization, its sponsors, and our school in everything that we do. The Killer Bees are extremely grateful to the Oakland Schools Education Foundation which makes this organization possible each year and for the opportunity to apply our knowledge in engaging, real-world applications.

