BENZENE BOTS

Foundation Submission 4384

Building bonds in our community and connections with each other through OCCRA and STEM.

Contributors:

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About Benzene Bots

Our team officially began at International Academy East in 2012 as The Exiles, later changing to Benzene Bots. The name change was due to the leadership's passion for chemistry, and because of the similarity a hex bolt has to the chemical benzene.

Through losing our workshop and getting a new head coach last year, we took this adversity to focus more heavily on preparing underclassmen in STEM this year. We are using OCCRA and this training to not only increase member retention but lower the impact something like getting a new coach would have, since the underclassmen will be prepared.

Now, we have 40 students from International Academy East, Troy High School, and Athens High School. We have 10 girls compared to one from last year. We have 25% seniors, 5% juniors, 16% sophomores, and 54% freshman this year. All students who wish to be on the robotics team are required to participate in OCCRA.

Our Mission

The mission of Benzene Bots is to not only inspire students interest in STEM, but to prepare students for the work world and equip them with the skills to be successful, being a consistent resource every stage of the learning process.

OCCRA History

We have been a part of OCCRA since 2012, and our history with OCCRA has been very successful. We have won OCCRA once, and have been to the finals multiple times. We also have many judges awards throughout the years.

Team Structure

To efficiently manage our team, we are organized into two different groups: Business and Technical. In Technical, we have 4 sub-groups, Design, Fabrication, Electrical, and Programming. We have leads for each sub-group, and for Technical as a whole. In

Business we have two leads who run both sub-groups and the students in those groups.

Technical

- The **Design** group is responsible for leading brainstorming sessions and 3D modeling, as well as prototyping mechanisms for all three of the robots.

- The **Fabrication** group makes the mechanisms and subsets for the competition robot. They also supervise the team in the completion of the robot.

- The **Electrical** group works to bring various systems to make our robots come to life. They are responsible for the wiring and control systems, as well as the integration of pneumatics.

- The **Programming** group is responsible for writing the code for all of our robots. They work to debug systems and also create our control systems.

Business

- The **Awards & Outreach** group works to organize award submissions for OCCRA and FIRST and they organize outreach events to promote STEM in the community. They teach the team presenting skills.

- The **Sponsors & Communication** group works to promote the team in order to be a resource to other teams, attract sponsors and mentors, and to show the community more about our team. They use social media such as Instagram to accomplish this. They also do the team graphic design and monitor the team communication.

Competition Timeline

Our general timeline for OCCRA begins with a week of brainstorming. New members get their first taste of reading the rules and figuring out what can and cannot be done to be successful in the game. We then have discussions about drive type, mechanisms, strategies, and general thoughts on the game, ending with a game plan on what mechanisms to prototype and what drive to build. This season OCCRA is run by underclassmen, split into sub-teams and mentored by the senior members, or leaders of the team. We are finding that this is the best way to prepare these students for the future, and that the upperclassmen learn by teaching the underclassmen. This plan was developed to retain members. Underclassmen are now more involved and prepared for the FIRST season. This greatly increased our committed member count. We plan to finish our OCCRA robot a week before the competition begins, so that we have 5 days to practice with our drive team. Also throughout this whole process, strategy meetings are taking place to ensure that ideas are always shared and discussed, especially regarding how to benefit from the rules.

Student Leadership

Leaders are expected to take responsibility for all the projects that the team undertakes. They are responsible for organizing their groups, and making sure that our tasks are accomplished. They make most of our team decisions, working overtime to finish projects and work with the mentors. The majority of the leadership responsibility is usually taken by our drive team because they are the students who often show the most commitment to the team.

Why OCCRA?

We treat OCCRA very seriously at our school, making it mandatory for all students who

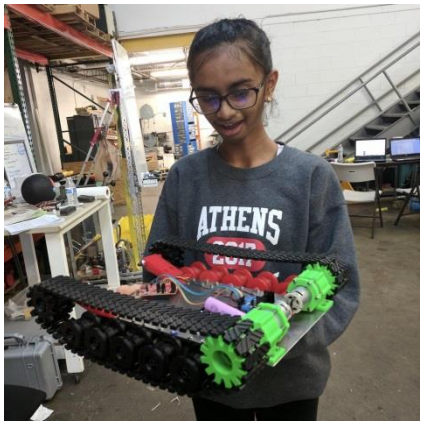
participate in robotics. OCCRA began as an introduction to robotics for new students but morphed into a serious training program that has improved the students understanding of STEM significantly, and has created students equipped for the work world.

We have a very low percentage of juniors this year, and it poses a risk to the future of our team. In order for our robotics team to remain sustainable, we must rely on the future leadership of both the juniors and the sophomores, which is something we haven't done in the past. For example, those who created prototype ideas had the opportunity to see their ideas come to life as they lead the creation of their ideas. Our current seniors are taking the time to train the underclassmen, and OCCRA has proven to be the best route for ensuring team sustainability after the seniors graduate this year. The students who step up in OCCRA and take on great responsibility are considered as leaders for next year's season.

OCCRA and STEM Awareness and Outreach

Benzene Bots are dedicated to raising awareness about OCCRA and STEM at our school, with parents, and in our community. We worked with our school administration to display our awards in a showcase at school and on our cafeteria wall. This creates a positive image for robotics and STEM. Also, we had participated at the school Club Fair promoting and recruiting for our team, demoing the robot, and building awareness about OCCRA and robotics. We also used the Freshman Orientation as an opportunity to educate students at our school about OCCRA, STEM, and the applications of business in robotics. Our discussion of scholarship opportunities and the benefits of joining a high school robotics team at our Parent Educational STEM Night not only increased our team participation, but also the positive outlook from our community on robotics.

EKGAR



EKGAR is a special project our team began this year. EKGAR is an acronym for Every Kid Gets A Robot, and it is a robot that has many capabilities, like building and programming that extends beyond any other robot for kids on the market. EKGAR is geared for a high school audience, and comes with a manual. According to the U.S. Department of Education there are 15.1 million high schoolers in the United States. Compared to the amount of students in high schools around the country, only a fraction of them are on robotics teams. We created EKGAR to begin to fill this gap. We wanted to enable anyone to purchase these robots, so we found a high quality way to manufacture it for only $40 dollars. Our goal is to complete 25 this season, and to host two EKGAR Training Camps to inspire STEM in our community, which will add to our intended outreach.

Benzene Buddies

This year, we began tutoring for elementary school aged students with our qualified high school students. Once a week at Martell Elementary School we help the students with their homework and projects for 45 minutes. The rest of our 90 minute time we teach STEM lessons, such as lessons on programming, electrical, building, science, math, and more. This not only excites our local community in STEM, but educates them and gives them the skills to be successful.

Selfridge Airshow

A student who mentors the FTC team Pixelbotics went to the Selfridge Air Show in August with The Fighting Pi and The Hammerheads. They demoed the FTC robot as well as talked to the community about STEM, fostering young students

passion and giving parents information to start their own Jr. FLL, FLL, or FTC team, as well as how to purchase LEGO Mindstorms, and which products would be best for their children.

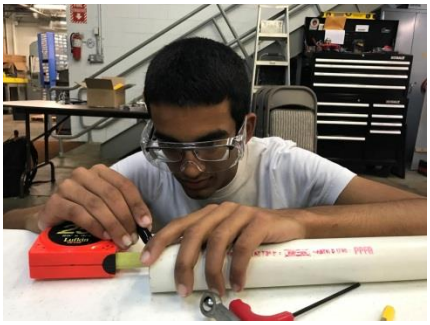
Mentoring

Our students mentor Jr. FLL, FLL, and FTC teams, and influence the future of STEM significantly.

Future Leader Skills Camp

An upcoming event is our Future Leaders Skills Camp with Team #123 Cosmos. The students will rotate through 5 different stations in Presenting, Building, Programming, 3D Design, and Writing. These skills will inspire the elementary and middle school aged kids in STEM and business, and encourage their proficiency in their academics. This will also give students a base of knowledge (skills) to promote their pursuit of a future career in a STEM related field.

Safety



The safety of our team members and mentors is critical. Students and mentors are required to wear safety glasses and handle all machinery with the utmost care. Safety topics are covered in offseason training for all members and all machinery usage as well as power tool usage is supervised by experienced mentors. We do not allow food in the workshop under any circumstance, and we have a safety manual the students adhere to.

Team Communication

Benzene Bots students and mentors use Slack, a online platform for team collaboration and communication. We found that this was the most effective mode of communication. The different channels in Slack help all the team members focus on their sub-groups, and the Team Lead Channel boosted productivity significantly. The Team

Announcements and General channel ensures that everyone on the team knows what is going on, and that no one is excluded. For parents we send out email updates on our current training, competition details, and upcoming events.