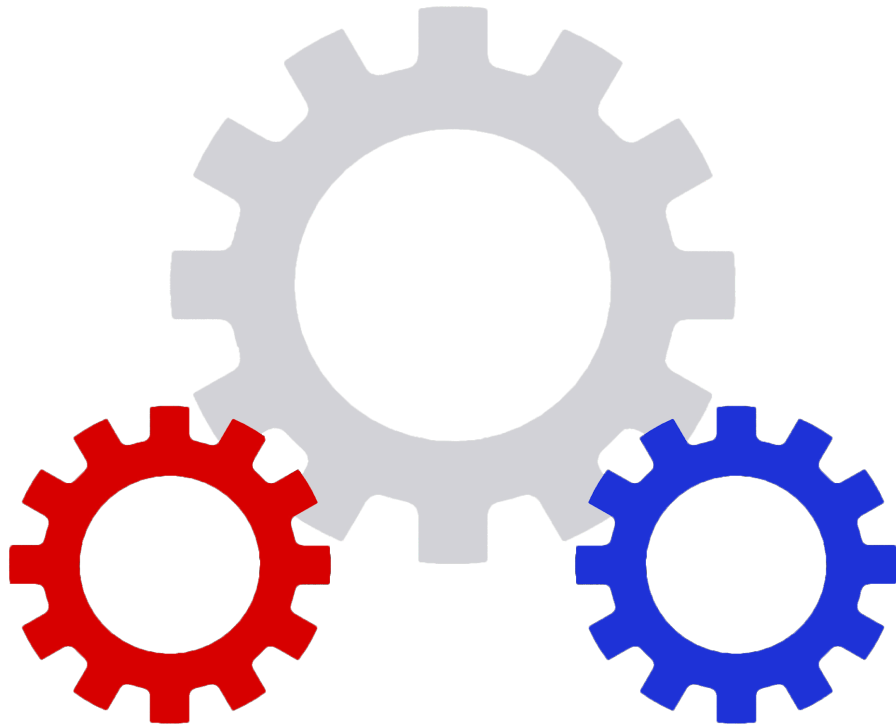


The WorBots 4145

2022 - 2023 Business Plan



Cultivating a Culture of STEM in Worthington, Ohio

ENGAGE, INSPIRE, IMPACT



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Executive Summary

Mission Statement

Our mission is to cultivate a culture of STEM in Worthington, Ohio through:

- ⚙️ **Engaging** the community through our STEM and non-STEM outreach
- ⚙️ **Inspiring** future generations of lifelong STEM learners through our constantly improving cohesive K-12 pathway while increasing retention and diversity in STEM fields
- ⚙️ **Impacting** our community through giveback activities and contributing to the workforce with our growing internship programs

WorBots Core Values

- | | |
|----------------|--------------------|
| ⚙️ Innovation | ⚙️ Initiative |
| ⚙️ Education | ⚙️ Teamwork |
| ⚙️ Inspiration | ⚙️ Professionalism |

Team Summary

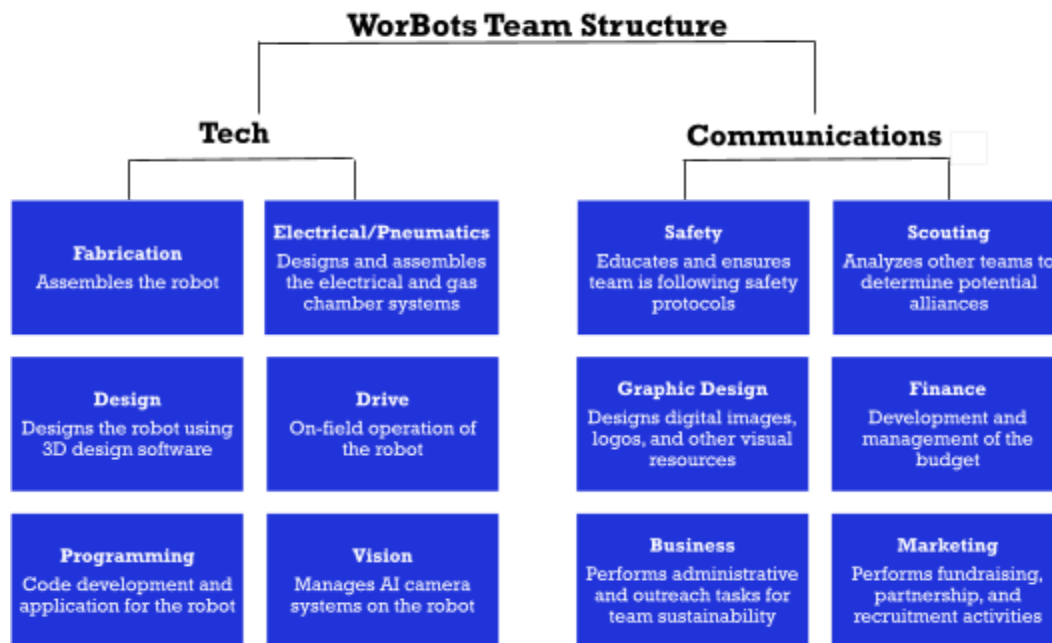
Founded in 2012, the WorBots have grown from a small team with less than twenty members to a pathway program encompassing five FIRST® teams with 36 students in FRC. We connect both high schools within our district, allowing us to leverage STEM, business, and art programs from Thomas Worthington and Worthington Kilbourne. Since our founding, our focus has been providing STEM opportunities to those in Worthington. As such, we have started teams for younger students — three FLL and one FTC — which we have sustained through funding and mentorship since their inception to provide consistent opportunities for Worthington students. To further fulfill our mission, our team is consistently expanding our involvement in giveback and outreach. This season, we have added to our seasonal giveback activities — Turn for Troops, Habitat for Humanity, and a food drive — with a LEGO drive for the holidays in partnership with our FLL teams. We have also completed forty-two outreach events this year.





Team Description

Rookie Season	2012
Location	Worthington, Ohio
School Affiliations	Worthington Kilbourne and Thomas Worthington High School
Team Demographics	36 Team Members ☼ 15 Female ☼ 21 Male ☼ 21 New ☼ 15 Returning
Mentors	11 Mentors ☼ 5 Alumni ☼ 3 Employees of Sponsors ☼ 3 Parents of Alumni
Team Organization	<ul style="list-style-type: none"> ☼ Fabrication ☼ Design ☼ Drive ☼ Programming ☼ Vision ☼ Electrical ☼ Pneumatics ☼ Safety ☼ Scouting ☼ Graphic Design ☼ Business ☼ Finance ☼ Marketing

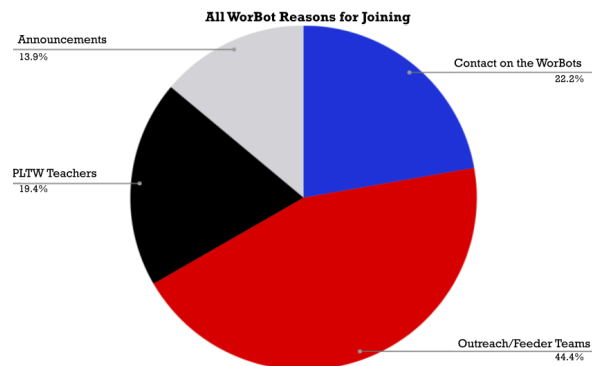
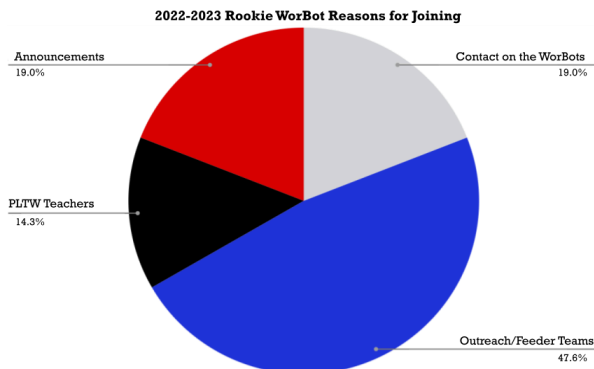




Operational Plan

Recruitment

The WorBots take a multifaceted approach to recruiting team members each season. Our primary means of recruitment comes from our partnership with the Project Lead the Way (PLTW) program in our schools; these teachers allow us to present in their classrooms and promote our program. Alongside our PLTW partnership, a large portion of our rookie team members seasonally come from outreach events such as activity and involvement fairs, feeder teams, STEM fairs, and local competitions. Supplementary to these sources, our team appears in announcements and newsletters, individually recruits students, and communicates with the business program to reach a broader non-technical audience. At the beginning of the season, we produce a recruitment plan outlining seasonal needs for each subteam and corresponding method revisions.



Training

The WorBots have developed and refined a training program we run prior to the start of the season that involves students regardless of their experience with PLTW or feeder programs. Our training model involves pairing rookie and returning students to foster communication, technical skill, and confidence in new students as they move into the build season. The program has evolved from all of the new members concentrating on building one large robot to crash courses in various skills applicable to fabrication specialties, which are then applied to multiple rookie robots as returning members provide guidance. Programming rookies work to develop basic code for the robots before they are built, and modify it when the fabrication rookies are done with their crash courses. In conjunction with this training technique, rookie team members work to build an off-season competition robot to ensure that all students are engaged. This season, we developed a business-specific training program that builds skills such as formal writing, presenting, communication, phone calls, and emails. The training is capstoned by a sustainability, marketing, and operations presentation, which is a collaborative effort between new and returning members of our business sector.



Expectations

All team members are expected to uphold and emulate our mission of cultivating a culture of STEM in Worthington, Ohio through exemplary professionalism within their communication and work, as well as significant contribution to their subteam, team fundraising efforts, and team outreach events. All team members must adhere to safety rules and communicate safety information to the appropriate leads and mentors when warranted. Members are expected to maintain strong academic standing. Furthermore, team members are expected to pay the team fee unless they have discussed a scholarship with the team mentors.

Officers are in charge of either a specific branch of the team (presidents) or administrative oversight (secretary and treasurer). They are responsible for communicating with the subteam leads, mentors, and boosters. Their role is to ensure that all of the aforementioned parties are operating cohesively. They oversee and approve all major operations on their respective sectors of the team.

Leads are defined as those in charge of a specific subteam. They are expected to ensure proper communication at all times with other leads, team officers, and mentors. They are further expected to maintain consistent attendance and punctuality, as they have a time-intensive role and serve as models for new team members to emulate. When working with all team members, they are expected to maintain good teaching practices and prioritize education.

Mentors are expected to follow the mentor description provided by *FIRST*[®]. They provide a knowledge base for the team and support students throughout the build season as well as through off-season endeavors. Mentors supplement the learning process — they do not produce any work such as code, parts of the robot, designs, business plans, or award documents (excluding Dean's List).

Contribution Recognition

For the WorBots, it is of the utmost importance that we recognize the outstanding contributions of our dedicated students and mentors; as such, we submit Woodie Flowers essays and Dean's List submissions to acknowledge them. At competition dinners, we recognize our members through a student award series run by team leads to highlight events throughout the season. At the end-of-season banquet, leads and mentors discuss and distribute awards such as Rookie of the Year and Future Lead to commend members of the team for their commitment to excellence on the team.



Subteam Roles

Fabrication: Works with the design team to determine the components of the robot needed for the game. They transfer the design from CAD models produced by design to the prototypes and final robot.

Design: Works with the fabrication team to consolidate team ideas into a CAD file that corresponds with the team strategy for the seasonal competition. They lay out the parts of the robot prior to the final build.

Programming: Works to develop code to operate the robot as dictated by the necessities of the game and the design of the robot. They are responsible for the autonomous portion of the robot and work with the drive team to determine controls.

Electrical and Pneumatics: Works to ensure that all electrical and pneumatic systems are operational and on the robot.

Drive: Maneuvers the robot at competitions and events the team attends during, before, and after the season.

Vision: Manages the AI vision systems on the robot and works with the system used for the season to maximize success when the robot is operating autonomously.

Safety: Ensures that all team members are informed of proper safety procedures and have access to safety equipment such as safety goggles and earplugs.

Graphic Design: Produces designs and media cohesive with the team brand to promote the team on social media, in the schools, and at events.

Business: Monitors team sustainability, runs administrative efforts, plans outreach events, produces award submissions, and creates business and actions plans.

Scouting: Collects information regarding team performance for the WorBots and those we compete with to analyze trends and determine potential alliance partners.

Finance: Develops and maintains a budget with the business team and the boosters.

Marketing: Performs fundraising activities and maintains corporate partnerships through communicative efforts to ensure successful team operations. Runs recruitment efforts to ensure sustainability in conjunction with the business team.



Safety

The WorBots work to maintain safety on our team through implementing strict documentation of safety certifications, accessible safety resources, and injuries. In addition to maintaining documentation for our team, our safety team produces resources such as kits, posters, checklists, and report forms to maintain consistency each year and support the growth of other teams.

Preseason and Postseason

Before and after the start of the competition season, the WorBots prioritize the following:

- ⚙ Working to promote the Worthington Robotics Program through outreach events and mentoring feeder teams.
- ⚙ Recruiting and training team members to ensure strong succession and adequate preparation for the build season.
- ⚙ Documenting strengths, weaknesses, opportunities, and threats of the whole team as well as efforts to maintain continuous improvement.
- ⚙ Preparing for off-season events, documenting lessons learned, and filling gaps that would otherwise exist with the lack of seniors.
- ⚙ Acquiring sponsorships for the coming season.

It is an expectation that team members are consistent with their attendance and contributions regardless of if the meetings precede or follow the beginning of the build season.

Build Season

During the build season, the team meets Monday through Thursday from 3:30 p.m. to 7:30 p.m. and Saturdays from 10:00 a.m. to 4:00 p.m. The focus is work necessitated by member-specific subteams, and consistent attendance is expected. While the strategic goals remain a focus, short-term goals are emphasized during this period.

Communication

The WorBots' team members are expected to communicate with one another and the mentors using the team Discord. Leads, officers, and mentors communicate important whole-team and subteam specific information here. Additionally, we communicate meeting information through Instagram and Twitter, and we developed a whole-team calendar available through our website along with subteam-specific calendars run by corresponding leads to communicate important dates.



Finances

Corporate Fundraising

The WorBots officially begin the fundraising season during May each year. Members of the marketing team research companies, prioritizing not only potential monetary sponsors, but service and parts sponsors that reduce expenses. As part of our fundraising efforts, we connect with companies through three common interests:

- ⚙ Supporting the community
- ⚙ Building a pathway for future employment
- ⚙ Increasing public awareness of their company

The WorBots initiate this process by sending letters and emails as well as cold calling companies, with the goal of securing an in-person meeting. At an initial meeting, members give a brief presentation of the *FIRST*[®] program, team accomplishments, and sponsor benefits. Sponsor benefits include 501(c)(3) tax deductions, and the aforementioned common interests. Sponsor benefits vary based on level.



Triple Diamond

\$25,000+

*Inclusion in team name (**COMPANY** WorBots) to be announced at all competitions each time the team is introduced, and all previous benefits.*



Diamond

\$10,000

*Branded banners displayed at all competitions, Name and logo displayed **prominently (in largest font)** on team shirts and in all marketing and informational material, and all previous benefits.*



Platinum

\$5,000

Name and logo displayed on team shirts and in all marketing and informational material, and all previous benefits.



Gold

\$1,000

Name and logo displayed on team shirts, and all previous benefits.



Silver

<\$500

Company sticker to be displayed on WorBots robot during all exhibitions and competitions, Recognition in our end of year publication.

Once a new sponsor has been acquired, the WorBots invite them into our workshop for a tour and to meet our members. It is essential that we express our gratitude for their contribution and have them see our team in action.



During the 2021-2022 Rapid React season, the WorBots had seventeen corporate sponsors and five private donors. Our sponsors Lake Shore Cryotronics and ATS Automation both met with us in our shop to see our progress as a team and provide professional advice in 2022. In 2023, they visited our shop again for a shop tour and discussed internships with our team members.

One of our focuses is maintaining sponsor relationships seasonally. To ensure this, we maintain contact and communication through email updates, sponsorship renewal letters, and in-person meetings. Sponsor relationships are further strengthened through team alumni acting as interns.

Income and Expenses

2022-2023 Income	
Sponsors	\$27,500.00
L3 Harris	\$2,500.00
Lake Shore Cryotronics	\$5,000.00
The Electric Connection	\$500.00
DHL	\$500.00
ATS Automation	\$10,000.00
JP Morgan/Chase	\$2,000.00
Safelite Grant	\$2,000.00
AEP Grant	\$5,000.00
Restaurant Fundraisers	\$900.00
Chipotle	\$600.00
City BBQ	\$300.00
Other	\$17,700.00
Private Donations	\$4,000.00
Wolfpack Gymnastics Invitational	\$3,000.00
CORI Concessions	\$700.00
Team Fee	\$4,000.00
Worthington City Schools (World's Only)	\$6,000.00
Total Income:	\$46,100.00



2022-2023 Expenses	
Miami Valley Regional	\$6,000.00
Buckeye Regional	\$3,000.00
Greater Pittsburgh Regional	\$3,000.00
FRC Championship	\$6,000.00
Robot <i>(including shipping and unused parts)</i>	\$7,000.00
Team Meals	\$3,000.00
Practice Field	\$1,000.00
Team Merch	\$1,000.00
Feeder Programs	\$1,400.00
Total Expenses	\$31,400.00
Net Income	\$14,700.00

Financial Plan

The WorBots work to ensure financial sustainability by building a reserve fund in the event that sponsorships are not seasonally retained and, therefore, cannot fund all necessary seasonal costs. To maintain this fund, we work to add a total net income between ten and twenty thousand dollars. To ensure that we fall within this range, we maintain sponsor relationships throughout the season with invitations into our shop, emails updating our sponsors during the season, annual presentations, and post-competition summaries, including photos, discussion of any awards won, our ranking, and match videos. Internships with two of our key sponsors, ATS Automation and Lake Shore Cryotronics, connect them with our alumni.

To decrease team expenses, the WorBots work to build relationships with parts and service companies; these sponsorships provide free or reduced costs for plastics and aluminum or waterjet cutting and CNC milling services, as we do not have the capability to do either in our workshop space. Some of these sponsors joined us at our kickoff event, allowing them to see what the team would be working on for the season as well as meet our team members.

Our largest non-sponsorship fundraising effort is the Wolfpack Gymnastics Invitational. Each January, the WorBots assist the Worthington Kilbourne gymnastics team in the hosting all-Ohio meet through setup, tear-down, timing, and scoring through the event. Additionally, the WorBots run a concession stand throughout the



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Cultivating a Culture of STEM in Worthington, Ohio

two-day event. We further fundraise through restaurant fundraisers such as Chipotle and City Barbeque as well as corporate match programs.

While each student is expected to participate in the fundraising activities, the team offers scholarships and provides transportation to competitions for those in need. We ensure every student has an opportunity to be part of the WorBots no matter their financial means

In the past three seasons, the aforementioned methodology has resulted in a fund able to sustain operations for over one season without any revenue, and two seasons when team fees are accounted for as a constant source.



Strategic Plan

Strategic Planning

Before each season, the WorBots discuss successes and challenges from the previous season. These are compiled into lists to guide our off-season team development. Outcomes of the previous season also help us determine our strengths, weaknesses, opportunities, and threats as well as next steps to maintain sustainability.

SWOT Analysis

Strengths

- ⚙ Financial accessibility
- ⚙ Recruitment
- ⚙ Sponsor retention
- ⚙ Community outreach
- ⚙ Strong FRC relationships

Opportunities

- ⚙ School board relationship
- ⚙ Local business relationships
- ⚙ Feeder pathway
- ⚙ Mentorship from sponsors

Strengths

The WorBots have developed a program designed to ensure that all students have access to STEM through *FIRST*[®]. To do this, we offer scholarships to students who cannot afford team fees. We exponentially increased our recruiting efforts within our second school by presenting to all of the PLTW classes and ensuring that business students learn about the non-technical aspects of the team. Part of this also comes from our outreach events, which have inspired many students and community members to get involved with STEM. Furthermore, we have strong relationships with both sponsors and FRC teams that help us to succeed.

Weaknesses

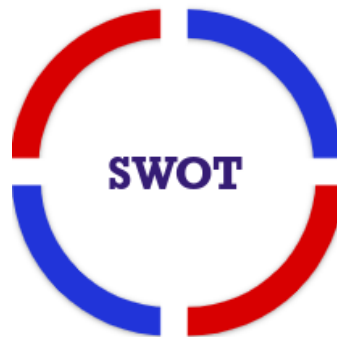
One of the WorBots' current weaknesses is involvement from teachers within our school. While we have made efforts to improve this through presenting to TWHS PLTW classes, most of our team's mentors do not work at Worthington Schools. Along with this, we have a low number of mentors, which we are trying to combat by contacting returning sponsors to engage them through mentorship. Furthermore, we have limited presence on almost all social media platforms, and we are looking to expand seasonal participation in giveback activities.

Weaknesses

- ⚙ Minimal teacher involvement
- ⚙ Community giveback
- ⚙ Social media presence

Threats

- ⚙ Longevity of our training program
- ⚙ Heavy reliance on the lead mentor





Opportunities

The WorBots have many opportunities to further expand our program. One area is our relationship with our school district. We have worked to expand our partnership through meetings and presentations, and we are looking to continue expanding this relationship as both high schools are re-done to ensure that STEM opportunities in Worthington continue to grow. Through our consistently-growing feeder pathway, we are expanding beyond our FRC level and encouraging young students to expand STEM knowledge.

Threats

The WorBots seasonally identify threats in order to ensure that we are sustainable. One of our biggest identified threats is a longevity of succession planning because members typically reach leadership positions within their last year on the team, causing seasonal rotation of leads. To mitigate this, we are maintaining our training program and implementing more meticulous documentation practices to ensure that team members are prepared each season and we don't face seasonal knowledge loss. Another identified threat is the large number of tasks our head mentor handles. To mitigate this, we are working with our sponsors to acquire new mentors and consultants for our subteams.

Season Goals

At the beginning of each season, in response to documented lessons learned, the team mission, and reasonable progression, the WorBots work to develop seasonal goals. These goals are referenced throughout the season to ensure that the team continuously improves. For the 2022-2023 season, our goals are as follows:

- ⚙ Retain sponsors from the 2021-2022 season
- ⚙ Start two new feeder programs
- ⚙ Mentor all four feeder programs
- ⚙ Qualify for the *FIRST*[®] Championship
- ⚙ Complete two new giveback activities
- ⚙ Develop a more cohesive team brand

Long-Term Goals

With the mission of cultivating a culture of STEM in Worthington, Ohio, the WorBots have developed specific goals and paired them with indicators of success to ensure consistent team development and impact on our community. These goals are worked toward through various events, program revisions, projects, and meetings; then, the success is documented in our outreach plan. This plan analyzes each event in terms of measurable results, reach, and growth from previous seasons — allowing us to regularly improve upon and audit our work on the team and in our community.



Goal	Time	Indicators of Success
Develop a high retention of students from elementary school to high school robotics programs.	Five years	<ul style="list-style-type: none"> ⚙ At least 80% of elementary school robotics program students join FRC teams. ⚙ All feeder team students have the opportunity to connect to WorBots annually
Expand the presence of <i>FIRST</i> within Worthington and Worthington Schools.	Two years	<ul style="list-style-type: none"> ⚙ Every school has an FLL/FTC team. ⚙ Run or participate in at least 3 whole-community events seasonally. ⚙ Run or participate in events at all schools — regardless of feeder team status.
Develop a training system that improves team succession and consistently gain new members.	Three years	<ul style="list-style-type: none"> ⚙ Returning students feel prepared to enter each season. ⚙ 90% rookie retention. ⚙ At least three students per subteam obtained and retained.
Mature our relationship with the SWE Next group within both schools.	Two years	<ul style="list-style-type: none"> ⚙ 10 members join from that program. ⚙ 2 or more events with them annually.
Develop cohesive team social media and website branding and management.	Two years	<ul style="list-style-type: none"> ⚙ 500% increase in social media engagement. ⚙ Communication is consistent on all social media. ⚙ Have consistent graphics in all media and publications.
Develop a resource library for incoming team members to prevent information loss.	Yearly effort	<ul style="list-style-type: none"> ⚙ Have all produced resources available through the website. ⚙ Document all technical changes to ensure sustainability.
Sustain and grow the rainy day fund to ensure team sustainability.	Two years	<ul style="list-style-type: none"> ⚙ \$35,000 rainy day fund available consistently at the end of each season.
Mature partnerships with businesses, schools, and educational institutions.	Four years	<ul style="list-style-type: none"> ⚙ Retain machine shop and sponsor relationships ⚙ Have 5 members of the Worthington City School Board in our shop annually. ⚙ Reach groups beyond our small community and maintain means of doing so.
Maintain long-term development data and statistics.	Yearly effort	<ul style="list-style-type: none"> ⚙ Have all statistics available in the master folder. ⚙ Have statistics for each season.
Strengthen partnership at TWHS to retain members from both schools.	Five years	<ul style="list-style-type: none"> ⚙ 5 consecutive seasons of equal membership between schools.
Serve our community through giveback activities.	Three years	<ul style="list-style-type: none"> ⚙ 4,145 hours of active community outreach work.



Outreach and Feeder Teams

FIRST[®] LEGO League

The WorBots have proudly started three *FIRST[®]* LEGO League Teams: FLL 44451, FLL 44452, and FLL 57154. Since their inception, we have provided student mentors for each of the teams weekly, providing guidance on both technical skills and *FIRST[®]* Core Values as the students progress throughout the build season. We also offer shop tours and robot demonstrations to engage students in *FIRST[®]* and promote ongoing pathway membership.

FIRST[®] Tech Challenge

The WorBots have started one *FIRST[®]* Tech Challenge team: FTC 16284, the 8-Bit Bandits. We provide student mentors to guide the students through the engineering design process, marketing, and the Core Values. We have seen high retention rates from this program, with twenty-five percent of our team members coming from this program, which we promote through shop tours and program demonstrations.

CORI Invitational

Each year, the WorBots host an FRC off-season invitational sponsored by the Center of Robotics Innovation (CORI) in conjunction with the PAST Foundation. This event brings together over thirty teams from Central Ohio and the surrounding area to compete in the competition for one last time. CORI engages Worthington community members, students on our feeder teams, prospective rookies, and school board officials as they see *FIRST[®]* in action.

Shop Tours

Seasonally, the WorBots invite students from our middle schools, elementary schools, SWENext chapters, and feeder teams to join us in our workshop to learn more about *FIRST[®]*. This provides students with an opportunity to learn about *FIRST[®]* and how to get involved regardless of their age range, and it gives us an opportunity to promote the *FIRST[®]* pathway in Worthington.

Robot Demonstrations

The WorBots bring our robot all over Worthington. At Worthington Market Day, Science Day, Freshmen Day, STEM fairs, activities fairs, elementary schools, playgrounds, school board meetings, and many other places, we have showcased our program by demonstrating the capabilities of our robot and letting attendees interact with robotics hands-on.



STEM Nights

At science fairs and STEM nights throughout the year, the WorBots volunteer to present about STEM through interactive activities and robot demonstrations. This engages young students in robotics and encourages them to get involved with STEM.

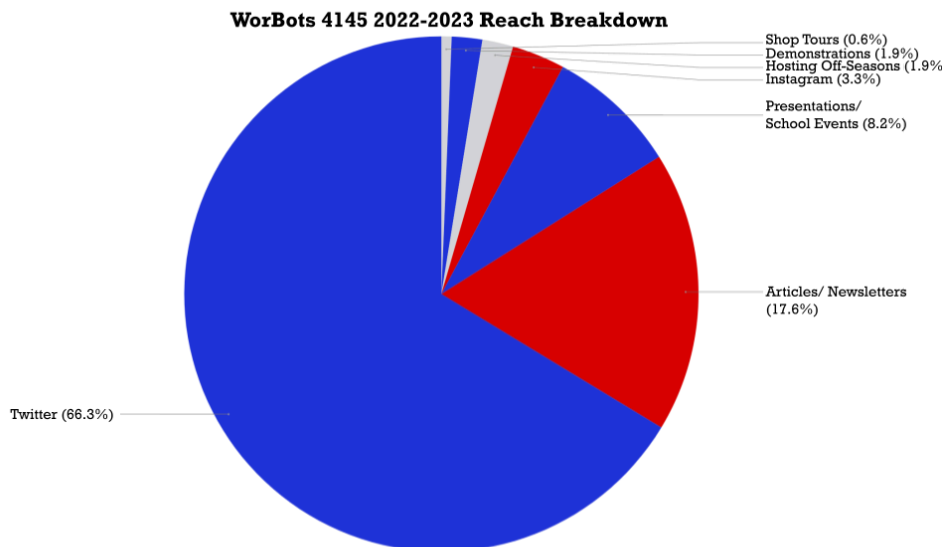
Worthington School Board

The WorBots consistently build upon our relationship with our school district. We rely heavily on STEM teachers to promote our program to their students and ensure that we have open communication with both the board and teachers in our schools. Each fall, we formally invite the Worthington school board, superintendent, and principals from both high schools to join us at the CORI Invitational. As a result of our close relationships and in an effort to further promote the STEM programs in our schools, the Worthington School administration has provided financial support for the WorBots to attend the FRC World Championships each year we have qualified.

For the 2022 season, we ran a robot reveal event for our district. This brought board leaders into our space to hear from our business team about the importance of Worthington STEM and see our robot *Mercury* in action for the first time. This meeting led to a second discussion about expanding into elementary schools and coach stipends. As the discussion about re-doing the high schools was underway, we spoke at a school board meeting on the importance of STEM education.

Giveback Activities

The WorBots seasonally work to give back to our community. We participate in Turn for Troops, an event at Woodcraft, where our team turns pens on lathes and writes letters for veterans on Honor Flights. We also participate in Habitat for Humanity and run annual food drives. This season, we joined our FLL teams to run a LEGO drive for children at Nationwide Children’s Hospital for the holidays.





Contact Information

Website	https://worbots4145.org/
Team Email	worbots4145@gmail.com
Social Media	Instagram: @worbots4145 Twitter: @worbots4145
Lead Mentor	Tom Karns tkarns@wscloud.org 614-783-4620
Team Meetings	Worthington Kilbourne High School 1499 Hard Road, Columbus, OH 43235
Sponsorship Information	Checks should be made payable to: Worthington Robotics Boosters Worthington Robotics Boosters is a 501(c)(3) organization dedicated to furthering the <i>FIRST</i> [®] program in the Worthington Schools. Donations are tax deductible. Our W9 and 501(c)(3) Authorization forms are located on our website.

