The WorBots 4145

2023 - 2024 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
- ☆ Education
- ☆ Inspiration

- Initiative
- Ъ. Teamwork
- Professionalism

Team Summary

Founded in 2012, the WorBots are dedicated to cultivating a culture of STEM in Worthington, Ohio by engaging, inspiring, and impacting our community. Starting with a single team of less than twenty students and local STEM opportunities limited to the high school level, we set our sights on a FIRST pathway inspiring youth and impassioning them about STEM education. We have since developed the Worthington FIRST Pathway, including over 100 students across 3 FLL, 1 FTC, and 1 FRC team. We start and fund every Worthington FIRST team to ensure students in these schools have a sustainable access point to STEM, and we provide student mentors who serve as role models and share STEM concepts and the FIRST Core Values—serving as role models for STEM-focused youth in our community.

Beyond the Worthington FIRST Pathway, we share a STEM fervor throughout our small community through connecting youth with STEM hands-on. Through nearly fifty events annually, we allow STEM knowledge, energy, and confidence to flourish. In Worthington, through Columbus Crew Games, local library events, Worthington Market Day, tours, demonstrations, and many other events, STEM and FIRST are now ubiquitous. We also focus on using STEM to impact the world around us from printing face shields at the height of the Covid-19 pandemic to annually donating LEGO kits to Nationwide Children's Hospital.

Within our FRC team, we are focused on skill development and growth. Every single student is committed to STEM and community impact. Whether it is a student's first year in FIRST or their tenth, we ensure that their ideas thrive on the WorBots. Every interested student is an included student on the WorBots. This policy has driven our team through twelve successful seasons and continues to drive Worthington STEM students into the future.





Team Description

Rookie Season	2012		
Location	Worthington, Ohio		
School Affiliations	Worthington Kilbourne and Thomas Worthington High School		
Team Demographics	34 Team Members ☆ 17 Female ☆ 17 Male ☆ 14 New ☆ 19 Returning		
Mentors	 11 Mentors \$\$\$\$\$\$\$\$\$\$\$\$\$\$ 5 Alumni \$		
Team Organization	 Fabrication Fabrication Design Scouting Scouting Scouting Graphic Design Graphic Design Business Vision Finance Electrical Marketing Pneumatics 		

WorBots Team Structure





Operational Plan

Recruitment

For the WorBots, a crucial part of cultivating a culture of STEM in Worthington, Ohio is making *FIRST* involvement opportunities loud within our community. We amp up kids in Worthington through demonstrations at Care After School (CAS) programs, local elementary school science days, Worthington Science Day, and Worthington Market Day—invigorating youth about STEM opportunities now and ahead of them. We also run events such as elementary and middle school workshop tours, workshops and local libraries, and engineering and design challenges, connecting youth with interactive STEM opportunities hands-on. These events bring the majority of our feeder pathway students to *FIRST*.

For recruitment to the high school level of our program, we partner with Project Lead the Way (PLTW) and Entrepreneurship Business Academy (EBA) teachers as well as the chairs of each department to connect interested students with opportunities through *FIRST*. In Project Lead the Way classrooms, we present the connections between classroom knowledge they're gaining and opportunities through *FIRST*. In Entrepreneurship Business Academy (EBA) classrooms, we discuss the administrative aspects of *FIRST* and skill development that is applicable to their future careers in business administration, sales, or marketing. Department chairs coordinate advertisements in all classes throughout our schools. Less-directly, we have posters throughout both schools, appear regularly in the student/staff newsletter, and participate in student new segments.

Training

The WorBots are dedicated to ensuring that every student has the opportunity to learn and succeed on our team. As new members join the team, they begin our rookie training program, often referred to as "rookie 'bots." New members select a subteam of interest, though this may be changed at any time, and temporarily break into rookie subteams—lead by the student leads of the corresponding WorBots subteam. Further, we pair each new student with a returning student, ensuring that all team members are connected and that they can ask questions as they arise.During a six-week period, the rookie subteams work to develop CAD, fabrication, programming, public speaking, and formal writing skills as they produce an FRC-style robot and sustainability presentation in partnership with student leadership and mentors. Each skill is developed through a series of "crash courses," focusing on specialized skills. Through this program, we ensure that prior experience or coursework does not serve as an impediment for STEM-interested students.

Contribution Recognition

Recognizing members of our team as well as mentors who make an outstanding contribution to our team is vital to our team sustainability. In order to recognize outstanding students and mentors, we design specialized awards which we present at team dinners. We also provide awards such as "Rookie of the Year" and "Future Lead" at our end-of-year banquet—celebrating dedication and commitment throughout the season. We nominate involved student leaders and mentors for the Dean's List Award and the Woodie Flowers Award respectively. At the annual Worthington *FIRST* Pathway Celebration, we recognize the contributions of each student involved in the Worthington *FIRST* Pathway—FLL through FRC.

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 and mentoring.
- Recruiting and training team members to ensure strong succession and adequate preparation.
- 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.
- \Leftrightarrow 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 3:30PM to 7:30PM and Saturdays from 10:00AM to 4:00PM. The focus is work necessitated by member-specific subteams, and consistent attendance is expected. 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.

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).



Subteam Roles

Fabrication: During the design process, the fabrication team works to develop a plan for what is necessary on the robot to best succeed in the seasonal challenge. As they begin to prototype, they are responsible for transferring ideas into material form and communicating with the Design team in order to make necessary modifications before the final produced CAD and build. During the build process, the fabrication team works in partnership with our design team in order to actuate all CAD produced.

Design: In partnership with the fabrication team, the design team transfers ideas developed from team planning meetings into an initial CAD model, which is then used for prototyping and making necessary alterations until a final design is concluded upon. Prior to the final build of the robot, they lay out all of the parts and provide rigid documentation of all metrics relevant to the composure of the robot.

Programming: The programming team is responsible for overseeing the production of code necessary for both the autonomous and driver-operated periods of the competition. They partner with the fabrication and design teams in order to finalize a strategy, which they actuate. They also focus on ensuring high quality performance by partnering with the drivers to maximize scoring and minimize issues.

Electrical and Pneumatics: The electrical and pneumatics subteams are responsible for ensuring that the robot is able to effectively operate. They design and assemble the electrical and chamber systems for the robot seasonally, and they manage upkeep at competitions and as the need arises.

Drive: The drive team is responsible for driving the robot at competitions and communicating with other teams about the capabilities, strategies, and limitations of our team seasonally. At community events, they drive the robot safely to highlight capabilities and represent our team well.

Vision: The vision team 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. They are also responsible for determining the vision-focused components of the robot.

Safety: The safety team is responsible for maintaining safe and proper operation of the team. They monitor the implementation of safety procedures such as use of safety glasses, tied back hair, non-loose clothing, and closed-toed shoes. They also document all injuries and safety-related events in the workshop and at competitions.

Graphic Design: This team is responsible for producing all team imagery including t-shirts, buttons, stickers, business cards, and pens. They are also responsible for upholding all of all of the branding standards in partnership with the marketing team and making revisions alongside team leadership.

Business: The business team is responsible for the management of team sustainability through team information tracking, recruitment, and managing community involvement. They also partner with all team leadership to oversee communication and policies. They produce award submissions and business plans.

Scouting: The scouting team collects information regarding the performance of teams in matches and presents it to drivers before each match, ensuring that the team is well-informed for matches.

Finance: The finance team develops and maintains a budget with the business team and the robotics boosters and tracks the progress of the rainy day fund for the team.

Marketing: The marketing team coordinates all fundraising initiatives and track income from these events. They also maintain corporate sponsor relationships each season. They run recruitment efforts to ensure sustainability in conjunction with the business team.

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 $FIRST^{\mathbb{R}}$ 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.



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 2023-2024 Crescendo 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

2023-2024 Income	
Sponsors	\$27,000.00
L3 Harris	\$2,500.00
Lake Shore Cryotronics	\$5,000.00
The Electric Connection	\$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	\$1400.00
Chipotle	\$1000.00
City BBQ	\$400.00
Other	\$17,700.00
Private Donations	\$4,000.00
Wolfpack Gymnastics Invitational	\$3,000.00
CORI Concessions	\$700.00
Team Fee	\$4,000.00
Total Income:	\$40,100.00

2023-2024 Expenses		
Greater Pittsburgh Regional	\$3,000.00	
Buckeye Regional	\$3,000.00	
Miami Valley Regional	\$6,000.00	
Robot	\$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	\$25,400.00	
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 these 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 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	Weaknesses
 Financial accessibility Recruitment Sponsor retention Community outreach Strong FRC relationships 	 Minimal teacher involvement Community giveback Social media presence (outside of Instagram)
Opportunities	Threats
 School board relationship Local business relationships Feeder pathway Mentorship from sponsors 	 Longevity of our training program New lead mentor

Strengths

The WorBots have developed a program designed to ensure that all students have access to STEM through $FIRST^{\mathbb{R}}$. 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.

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 that our head coach is new to coaching. To help him manage new tasks, student leadership is increasing the amount they manage operationally.

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 2023-2024 season, our goals are as follows:

- ☆ Retain sponsors from the 2022-2023 season
- \Leftrightarrow Start two new feeder programs
- ☆ Mentor all four feeder programs
- ☆ Qualify for the *FIRST*[®] Championship
- \Leftrightarrow Complete two new giveback activities
- \Leftrightarrow 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	 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	 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	 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	 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	 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	 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	\$35,000 rainy day fund available consistently at the end of each season.
Mature partnerships with businesses, schools, and educational institutions.	Four years	 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	 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	5 consecutive seasons of equal membership between schools.
Serve our community through giveback activities.	Three years	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 61943. 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 $FIRST^{\mathbb{R}}$ 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 even 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 $FIRST^{\mathbb{R}}$ 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 $FIRST^{\mathbb{R}}$ and how to get involved regardless of their age range, and it gives us an opportunity to promote the $FIRST^{\mathbb{R}}$ 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 2023 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 *Eclipse* 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	Jon Baird jbaird@wscloud.org
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 <u>W9</u> and <u>$501(c)(3)$</u> Authorization forms are located on our website.

