

Walnuts & Bolts

FRC Team 6643

2023-24 Business Plan

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Executive Summary

Mission

The mission of Walnuts and Bolts is to create a positive change in Racine by introducing to the youth opportunities and possibilities made available through STEM. As a student-led organization, fostering STEM opportunities in the community and teaching members the importance of curiosity, teamwork, and work ethic is important. These factors allow members to develop leadership and cooperation skills throughout their years on the team. These skills are hoped to be carried on past high school and applied in future professional settings.

Brief Team Information

Walnuts & Bolts is a FIRST Robotics team founded in 2016 by students at Walden III High School interested in creating more STEM opportunities for students. The team has participated in FIRST Robotics for over 8 years and is now working on expanding these opportunities past the high school level. They hope to encourage students of all age groups to engage in STEM-related activities.

Team Location

Team Walnuts & Bolts can be found at Walden III Middle and High School in Racine, WI. There, our team has a designated classroom where all robotics building, testing, and planning is done.

Awards

- 2024 Wisconsin Regional *Spirit Award*
- 2024 Mukwonago Off-Season Competition *Judges Award*



2024 Team

- 20+ Walden High School participates
- 2 Racine Unified District educator mentors
- 3+ parent helpers

Team 6643 2024-2025 Plan

Due to the impact of COVID-19, Team 6643 spent the past few years focusing on financial stability and recovering from the change in district regulation. This deflected the team's primary goal of increasing student interest. Currently, in a more sustainable state, the team is working towards strengthening the robot manufacturing and designing processes and developing more proactive methods of member training and community outreach. The team aims for substantial expansion in school & STEM education, financial planning, and mass media.

2024 Sponsors

Sponsor Name	Main Activity	Sponsor Name	Main Activity
Wisconsin Department of Education	Management agency focusing on public education in Wisconsin	Summit Credit Union	Credit union for personal and business banking
Harbor Freight	Economical tool and equipment retailer	PlaneWorks LLC	Aircraft repair and design
Baxter	American multinational healthcare organization	Kiwanis Club	Global organization of volunteers geared towards community engagement
Hack Club	Non-profit network for high school computer coders	Educators Credit Union	Credit union for personal and business banking
PPG	Global supplier of paints and coatings	WE Energies	Delivery of electricity and natural gas
FIRST Wisconsin	Provides access to FIRST programs in Wisconsin	Noelle's Treasure Box	Non-profit charity organization
Blackbaud Giving Fund	Non-profit organization for donors and charity connecting		
Modine	Focuses on thermal management		

Individual Donations:

Amy Bigna

John & Peggy Moore

WarriorBots Team 6421

MORE Robotics Team 1714

FIRST Inspires

About FIRST Inspires & its Mission

In 1989, the global non-profit organization FIRST Inspires was founded to grow young students' interest and participation in robotics. FIRST Inspires programs are designed to give easy accessibility to innovation-based projects to students, serving as motivation to pursue career and educational opportunities in STEM fields. Participation in FIRST programs, which can range from students 4 -18 years old, can serve as a stepping stone to developing confidence, communication skills, and critical thinking.

The mission of FIRST Inspires is to create the future generation of STEM leaders through the process of discovery and innovation challenges. FIRST aims to develop a culture of equity, diversity, and inclusion for all age groups as well as the communities surrounding these programs.



For more information about FIRST Inspires: <https://www.firstinspires.org/>



Dean Kramen

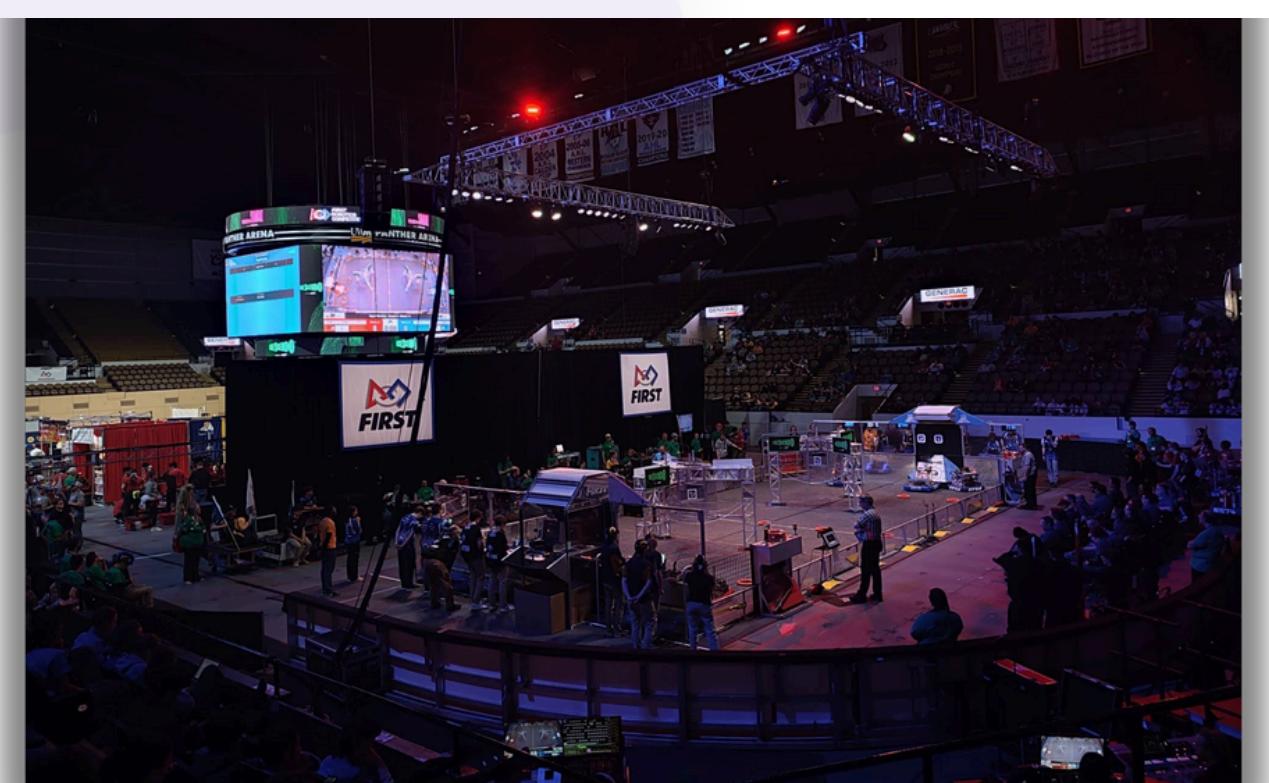
Dean Kramen, founder of FIRST Inspires, is an inventor and entrepreneur who focuses on technology and science.

The passion that Kramen had for creating educational opportunities led students to discover the interest and excitement in STEM. These factors which are now the foundation of FIRST Inspires (For Inspiration and Recognition of Science and Technology).

The FIRST Robotics Competition

The FIRST Robotics Competition (FRC) specifically focuses on high school students and their ability to build and program a robot. This robot is set on a game field to perform specific tasks alongside other robots with the same objective. In this game field, teams participate in a series of matches to score a certain amount of points.

Each year, thousands of teams involving high school students, coaches, and mentors are given six weeks to design, build, and program a robot that meets the competition's requirements and completes the game objective.



Team 6643 Overview

History

Walnuts & Bolts was established in 2016 and went to its first competition in 2017. In competing in the competition as a rookie team, the team ended up placing in the top half of the FIRST Wisconsin Regional. This opened many doors for this team and allowed for the growth of STEM education in Racine. Since then, they have strived to provide opportunities for students to gain knowledge and hands-on experience in the FIRST Robotics field.

Members teach young students around the community how to use assorted tools, program, build, wire, and fundraise. Our mentors and leadership encourage members to learn through training, self-study, mentor guidance, and student teamwork.

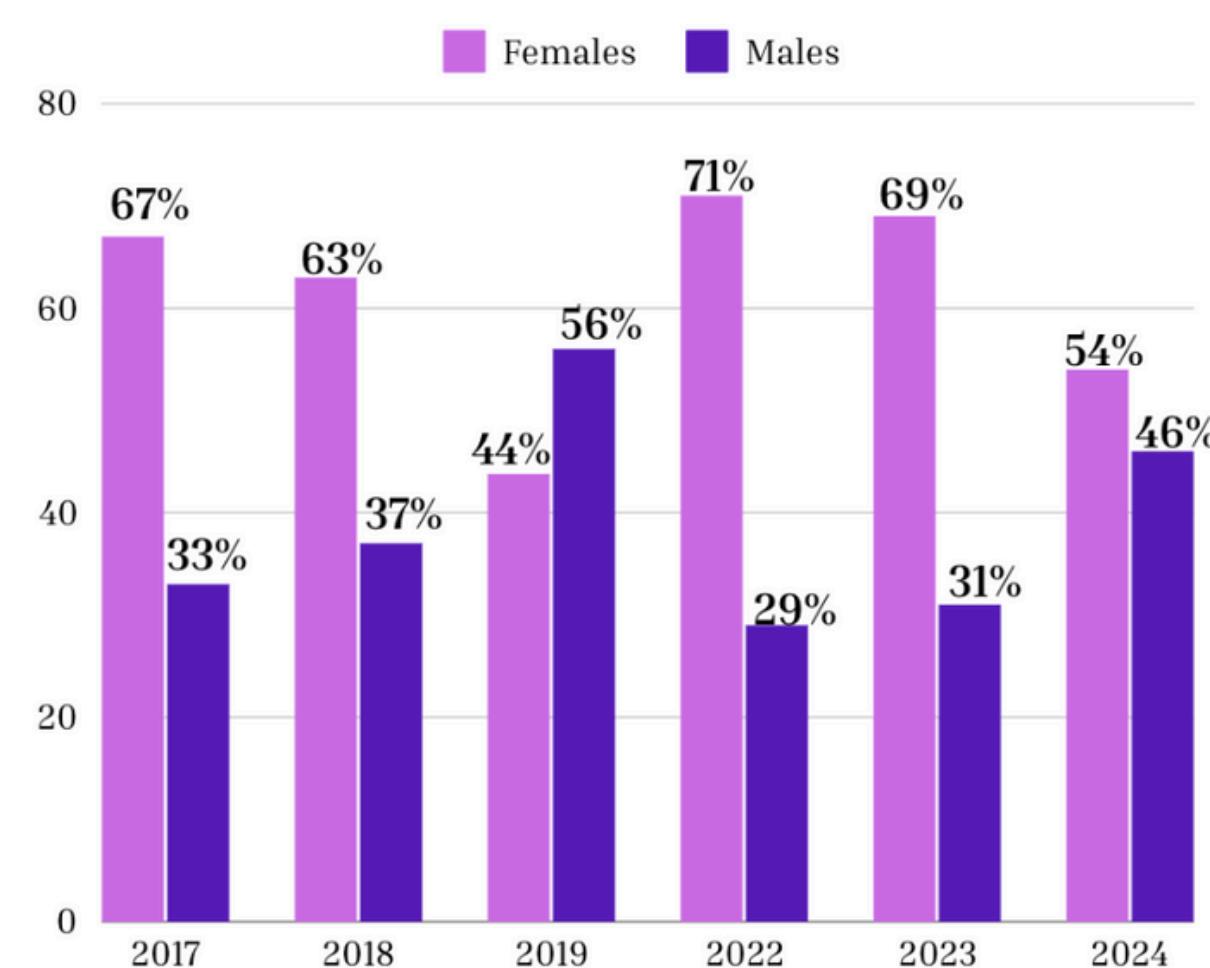


2024 Statistics

Gender diversity is an important aspect of recruitment and team growth for Walnuts & Bolts. This allows for active participation and social equity amongst all team members and promotes a welcoming working environment.

Figure 1 shows the recorded team constituency by gender and its change over time. Since the establishment of Team 6643, females have overwhelmingly dominated the team population between the years 2017, 2018, 2022, and 2023, where the amount of females surpassed 50%. However, in 2024, the ratio between the two genders decreased, where the amount of members for each gender approximately reached the 50% mark. Within the 2024 -2025 season, Team 6643 hopes to increase the member number as well as maintain the equal gender constituency.

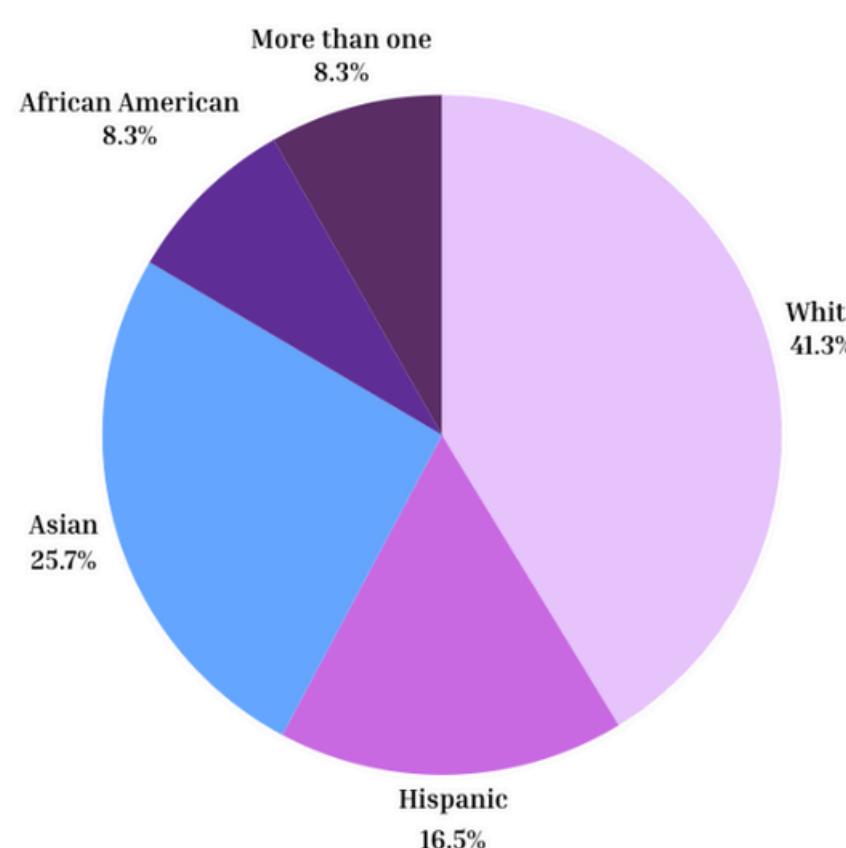
Figure 1: Walnuts and Bolts Gender Ratio



The students of Walnuts & Bolts represent several diverse backgrounds that consist of 4 or more ethnic groups. Regardless of differences, team members enforce an open and comfortable space for sharing interests, talents, and cultural backgrounds.

Figure 2: Walnuts & Bolts Ethnicity Ratio

2024



In Figure 2, a pie chart is shown to display the percentages of the team's main 4 ethnic groups: White, Hispanic, Asian, and African American. The pie chart also shows members who belong to multiple ethnicities. The white ethnic group is currently the team's highest ethnic group with the lowest being African American and "other." Team 6643 is currently working on recruiting more members with diverse backgrounds to provide all students an equal opportunity to participate in FIRST Inspires.

Team Membership

Membership on Team 6643 is a year-round commitment. Students participate in a build season (January - March), summer season (June - July), and off-season (September - December), where each season has a set of varying activities and objectives. It is important that students and parents are given the information and training needed for full participation on the team.

Team 6643 hosts various informational meetings and open houses for parents and students during the school year. If a student is interested in joining, they are given a *Member Handbook* that contains regulations and expectations that members are required to follow.

Once it has been read, the handbook is signed by the student and the parent and then returned to a team mentor. Once this form is returned, the student will join a communication platform and be regularly updated on upcoming training days, meetings, and upcoming events.

**Walden High School
FIRST Robotics
Team 6643**



Student Handbook

Team Structure

Walnuts and Bolts is led by team mentors, consisting of industry professionals, teachers, parents, and community members. These professionals help guide and teach students leadership and members through team management and goal execution.

Nonetheless, this organization is primarily student-led. Students are given the main responsibility of delegating meeting times and events, maintaining business relations, and addressing improvements for the team. Leadership, ranging from 3-5 students, communicates with one another to make these decisions.

The agenda then set by leadership is then passed on to the group sub-leaders, who plan their tasks according to the given deadline. Leadership as well as sub-leaders have weekly meetings as well as meeting with all members to ensure efficient communication and flow.

Figure 3: Team Structure



Sub-Groups

These sub-groups include Design/Fabrication, Electrical, Programming, Business/Media/FIRST Awards, and Strategy/Scouting. Members of the team are given the freedom to explore different sub-groups throughout the season to assist in finding their adequate sub-group. They are then given tasks by either leadership or their subgroup leaders to complete during the season. Parents often visit the team's workspace to help on large projects with team members as well.

Design/Fabrication

Uses CAD software to design the drivetrain and other mechanisms on the robot, as well as make part drawings to use for fabrication. Once all the fabrication is done making the parts, the sub-group works in collaboration to assemble the robot.

Electrical

Wires the robot and creates any pneumatic systems needed. Their job is to take the mechanical systems designed and fabricated by the mechanical team and make them controllable.

Programming

Writes code in Java to control the functions of the robot, integrating data from sensors including encoders, limit switches, and vision systems to give the robot awareness of its surroundings. Software Robot is responsible for ensuring the robot performs responsively in both Autonomous and Tele-operated (remote-controlled) modes.

Business/Media/FIRST Awards

These members are responsible for most of our fundraising efforts by contacting sponsors, applying for grants, and managing our budget. Members of this subteam also manage our team media, photographing and taking videos of all team events and competitions; promote our program through our website, the local newspaper, and various social media sites; and design our team apparel. This sub-group also develops and documents all needed materials for FIRST awards available for the team at the competition level.

Strategy/Scouting

Develops competition strategies during the build and competition season. Members are expected to fully understand the game rules, follow FRC forum posts, contribute to discussion during strategy meetings, and deeply analyze strategies that other FRC teams are employing. During the competition, along with the drive coach, the match strategist uses a strategy developed by the sub-team to plan out our matches. Scouting supports our match strategy and pick-list creation by using software to collect, process, and utilize data about teams at our competitions.

Leadership Selection

All selection to official leadership positions on the Walden Robotics team occurs through a nomination and interview process. The candidates will be interviewed by current Student Leadership and an adult mentor. Each interview will be 5-10 minutes in length, depending on the position and interview schedule. After all candidates have been interviewed, student leadership will discuss and select a suitable lead for each leadership position based on many factors, including:

- *Experience*
- *Dedication and contributions to the team*
- *Technical competency, where applicable*
- *Leadership, management, and organizational skills*
- *Ability to serve as an outstanding representative of the team*
- *Ability to complete duties listed in the position's job description*
- *Interview performance and substance*

Team Code of Ethics

Core Values

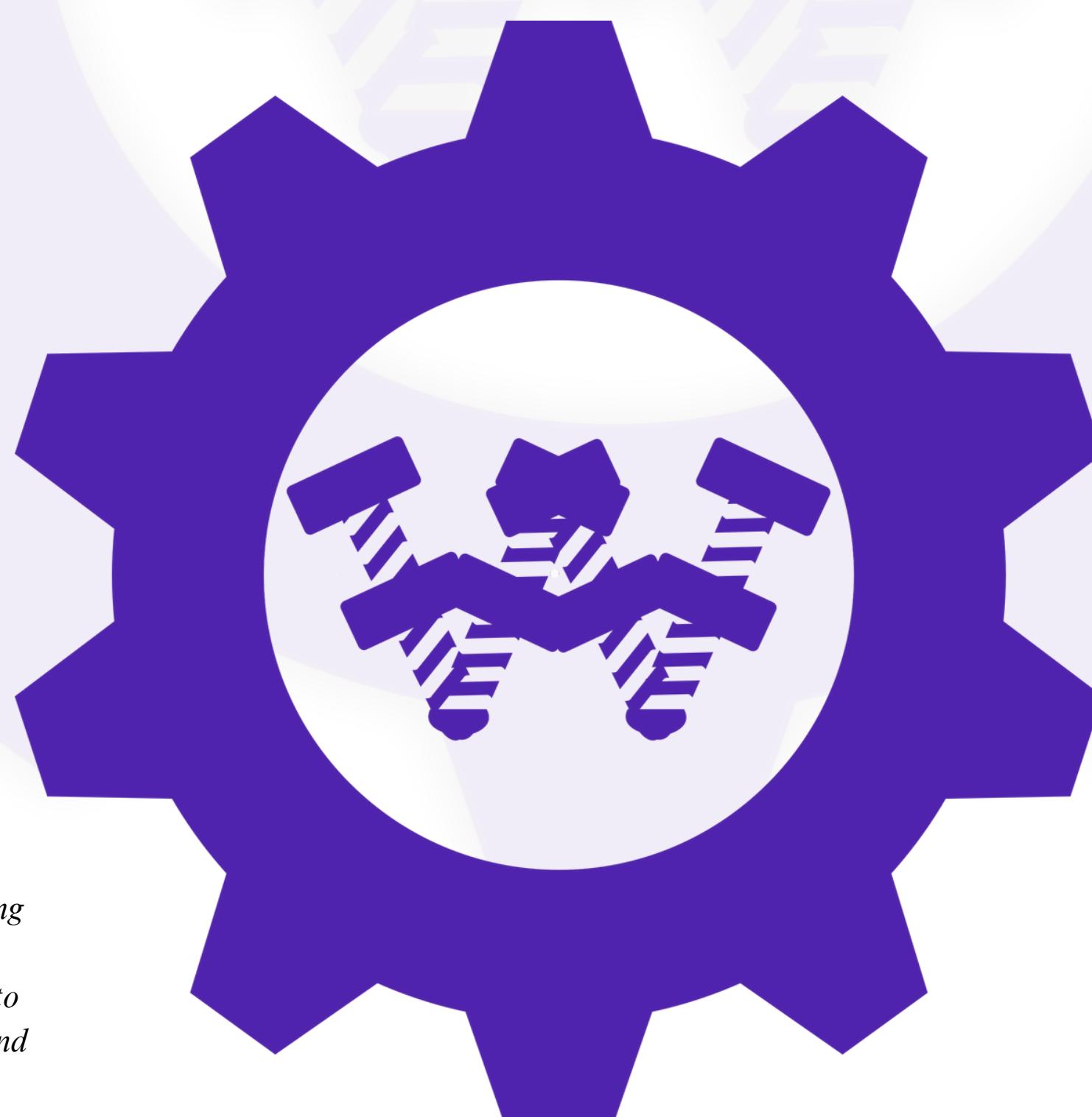
Students and members work together to define the Core Values that help shape the culture and vision that is the key to Walnuts and Bolt's success.

Gracious Professionalism & Coopertition

Walnuts & Bolts promotes Gracious Professionalism as one of its core values at all levels of competition. Team members are taught to always help and display acts of esteem towards other members and teams. In other words, gracious professionals learn and compete relentlessly, but treat one another with respect and kindness and help when needed.

Teamwork

When working on Team 6643, every member has a role and consults with the needed members to achieve the most desirable results. This ensures that tasks are being completed effectively and with active participation from all members



Commitment & Communication

We believe that to align with the goals and mission of FIRST Inspires, members should have a level of commitment that positively helps to elevate the team. A continuous effort to communicate with members is also necessary. This ensures all members follow the goals of the program as it is a stepping stone for its sustainability. In addition, it helps to inspire future generations to also align with the vision of FIRST Inspires.

Creativity & Innovation

We are open to listening and incorporating imaginative ideas to solve problems. Students are given the creative freedom to create solutions and learn through trial and error.

Fun

Team members should be given an enriching experience while simultaneously learning the skills needed to be successful in STEM fields. Participating in FIRST is a learning experience and members should have the right to enjoy it.

Vision

We see our team in the next few years as a guide for young students through the world of STEM careers and opportunities. We hope that all members that participate in this program use the skills and confidence gained as a stepping stone for greater opportunities in their careers. This program is designed to expand past Walden III Middle & High School, where FIRST programs can be established in communities around Racine.

Students across Racine can demonstrate their skills in technological sciences and business communication learned through their participation in FIRST Robotics.



Goals

Short Term Goals

- Ensure students understand the basic usage of tools and robot development
- 100% of students attend a 4-year college.
- Host STEM-related events at schools and community facilities
- Create a more efficient and robust robot for the 2024-2025 season
- Obtain the necessary budget for the 2024-2025 season.

Long Term Goals

- Creating a production hub for the FIRST groups in Racine, WI
- Gaining recognition as a Science, Technology, Engineering, and Mathematics sport in the school district
- Encouraging alumni to return and assist FIRST Robotics teams
- Creating a stronger community connection through outreach
- Creating a coalition for the FIRST Robotics Competition, FIRST Lego League Challenge, and FIRST Lego League Discover Teams

Success Measures

- ***100% of Walnuts and Bolts members attend a 4-year college***
-Graduating seniors have attended schools including Harvard, Stanford, Columbia, UW Madison, and MSOE.
- ***87% of members pursue a career in STEM***
- ***50% of graduating members return to assist Walnuts and Bolts in their off-and-build season***

Program Benefits

All members that participate in FIRST Robotics benefit through learning experiences and communication training. As students develop the skills needed, the outreach efforts done by Team 6643 help expose the community to the vision and learning targets of FIRST Inspires and gain interest in STEM activities.

Students can benefit in the following ways:

- Students gain hands-on experiences through robot design and manufacturing, learning how to use basic machinery in wire management and building
- Teaches students how to work in a group to work towards a common goal, helping them in a professional and academic setting
- Serves as a network platform where students can meet with STEM professionals who share similar interests and are introduced to internship and scholarship opportunities
- Confidence and motivation increase as a result of commitment to recognition and achievement
- Students are engaged in their community through regular volunteer and outreach events



Schools benefit from FIRST Robotics seeing as it:

- Exposes students to math, science, engineering, business, finance, fabrication, and engineering
- is a stepping stone towards increasing STEM education
- Creates more engaged and independent students
- The large form of recognition
- Creates independent student bodies



Community organizations and businesses also greatly prosper from supporting FIRST Robotics programs. Assisting teams that participate in this program can:

- Create a pipeline for future employees and interns
- Provide volunteer and team-building opportunities for employees
- Serve as a platform for recognition in the community

Community Impact

Functions

Walnuts & Bolts participate in 2 off-season competitions (MROC & TWIST) and 1 season competition (FIRST Wisconsin Regional) throughout the year. Off-season competitions all contain the same gameplay as the official FIRST Regionals but are more informal and hosted by FIRST Robotics teams. Competitions are often funded through sponsorships or grants given by the FIRST Robotics team hosting the competition, allowing all teams to participate! Walnuts & Bolts hopes to receive the necessary funding to compete in more regionals and off-season competitions in the 2024-2025 year.

FIRST Wisconsin Regional

This competition is an official competition hosted by FIRST Inspires. In this competition, 45-55 teams spend 3 days competing with each other to score points with their robot through a series of matches. The top 3 teams that win the “playoff” matches will attend the FIRST championship held in Texas.



TWIST

TWIST is an off-season competition hosted by FIRST Robotics Team 6421 WarriorBots. This competition has the same gameplay and regulations as the Wisconsin Regional. Regardless, it requires all members competing on the robot playing field to be females. This encourages female robotics students to engage in driving the robot, which is typically a male-dominated field.

Mukwonago Off-Season Competition

This is an off-season competition with the same gameplay as the Wisconsin Regional. Hosted by FIRST Robotics Team 930, 30 teams come together for 2 days and compete through various matches to win the “Winner Team” title. Teams are also interviewed by competition judges for the possibility of an award.



Potential Competitions for the 2024-2025 year:

- Midwest Regional
- Sussex Week 0 Scrimmage
- Lazer Lights presented by Lazer Lights (Off-Season)

Community Impact

Projects

Aside from competing, Walnuts & Bolts also hosts various outreach events or fundraisers at the Walden III school building and in the community. These events are planned and executed by student leadership in an attempt to increase youth leadership and communal relationships. Many of these events include fundraisers, youth educational stations, and field trips, allowing students to experience STEM opportunities beyond the classroom setting.

- **8th Grade Recruitment (May 2023 & 2024)**

- *Recruitment event for Walden III 8th graders where students get introduced to all sub-sections of robotics through stations*

- **Gateway Fab-lab Field Trip (June 2023)**

- *Members were given a tour of the Gateway Technical College Fab-lab where college students can design and develop 3D print creations. Members had the chance to create their 3D prints to take home*

- **STEM Learning at Fratt Elementary (July 2023)**

- *Stations were organized for Fratt Elementary's extended learning program where students were taught basic robotics functions and coding*

- **WorkSpace Tour with FRC Teams WarriorBots & MORE Robotics (August & September 2023)**

- *Members from Team 6421 WarriorBots toured Team 6643's workspace and Team 6643 members visited the workspace of Team 1714 MORE Robotics*

- **DeltaHawk Field Trip (November 2023)**

- *Members were given a tour of DeltaHawk Engine company and introduced to their workspace. Internship recruitment for members*

- **Tape the Teacher on the Wall (January 2024)**

- *Team 6643 hosted a Tape the Teacher on the Wall fundraiser to engage students & raise money for the 2023-2024 season.*

- **Advocacy Day (February 2024)**

- *Student leadership traveled to Madison, WI to advocate for FIRST Robotics team funding along with other teams. Leadership members talked with State Representative Greta Neubauer and State Senator Robert Wirch*

- **Robotics Open House (May 2024)**

- Robotics members opened up their workspace to the community and allowed people to enter and explore the world of robotics and all its subsections

- **Passion's Project**

- Every year, a pool of 20 students in the Racine Unified School District are chosen to participate in the Passion Project, celebrating students' passion. This year, a Team 6643 member was nominated, and the team hosted a booth to give an introduction to robotics through the passion project event

- **Turtle Best Friends! (May 2024)**

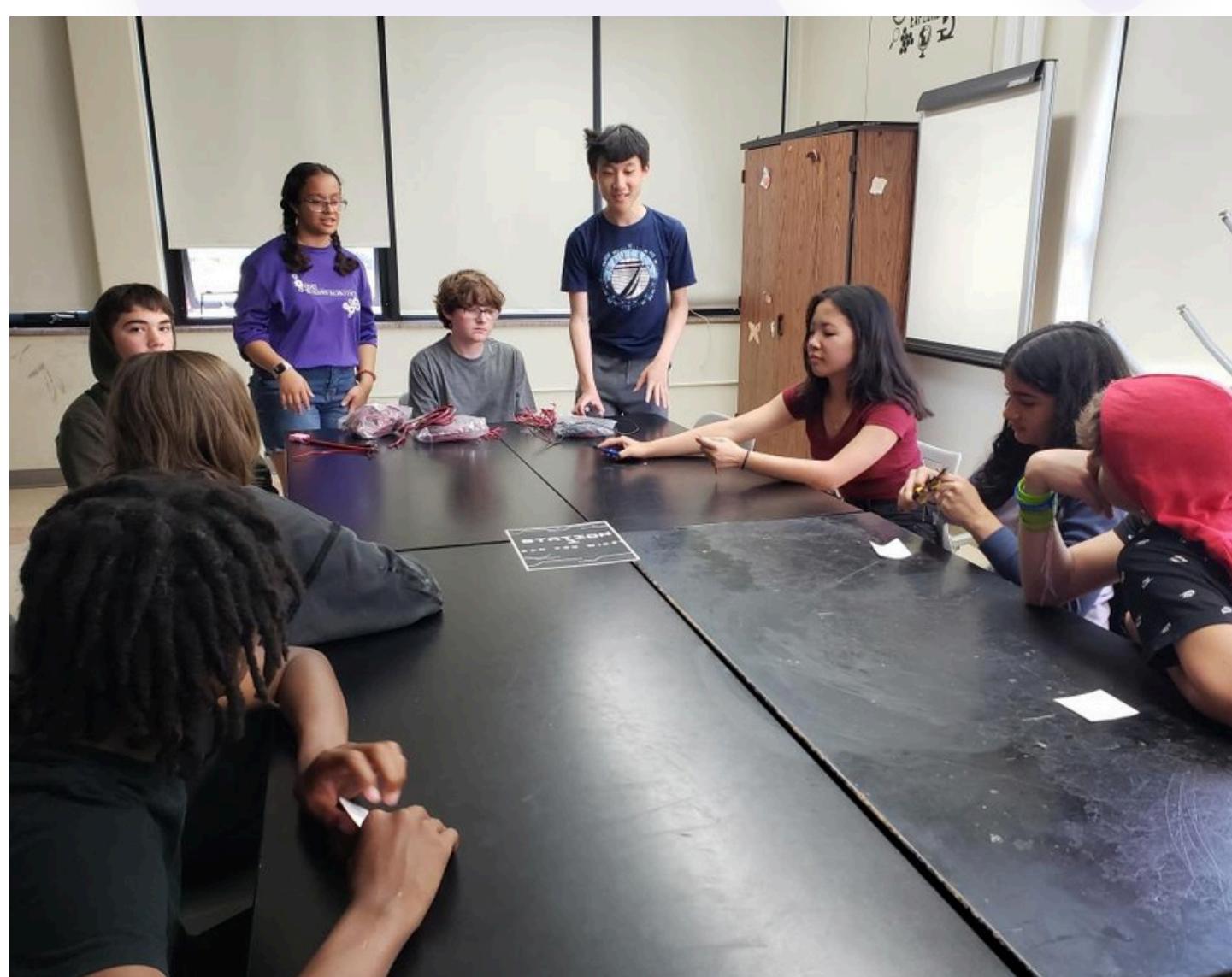
- During Walden III's student carnival, Team 6643 members sold 3D printed turtle and dragon "best friends" along with other 3D prints. Opportunity for students to learn about 3D printing and support the high school robotics team (fundraised over \$400)

- **Cinderella Prop Making (May 2024)**

- Walden III's theater performed Cinderella for the school community. Walnuts and Bolts helped create a clock with moving hands that assisted with Cinderella's "midnight" scene

- **Kiwanis Robot Demo (July 2024)**

- Student leadership visited the Kiwanis Club (a 2024 sponsor) and gave a brief overview of the robotics program, an update about recent events, and showcased the 2024 robot



8th grade recruitment with Walden 8th graders



Gateway Technical College field trip to the Fab-Lab



**Tour of workspace with Team 6421
WarriorBots**



**Tour of workspace with Team 1714
MORE Robotics**



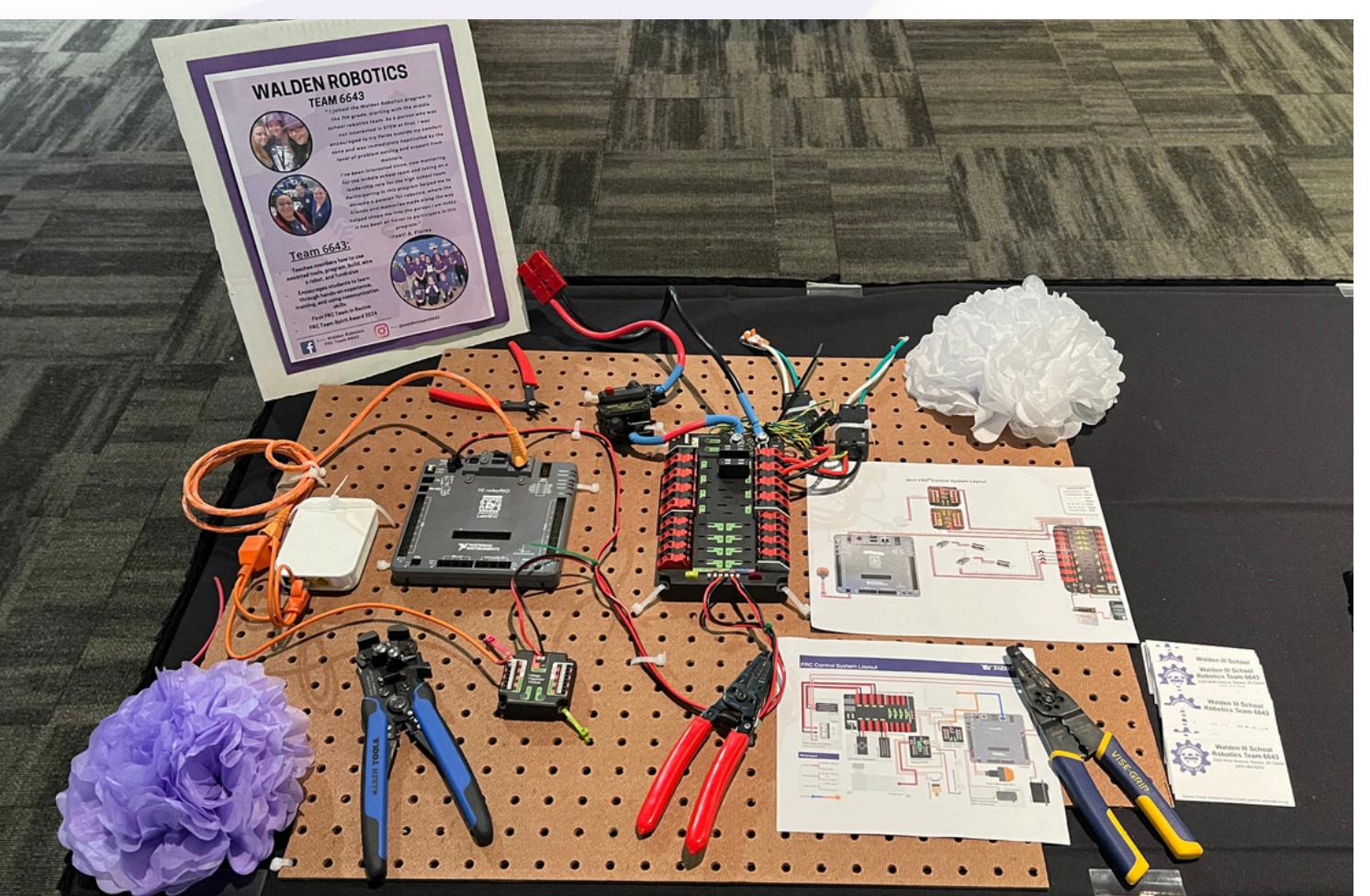
**STEM stations with Fratt
Elementary students**



**Introductory presentation by
DeltaHawk Engines**



**Taping Walden III's 6th grade
English teacher**



**Showcasing standard electrical
panel at the Passion Project event**



Student Leadership with State Representative Greta Neubauer



Student Leadership with Senator Robert Wirch



Open house showcasing



Cinderella “Midnight” Clock



Turtle best-friend fundraiser



Robot demo with the Kiwanis Club

Marketing Strategy

Walnuts & Bolts focuses primarily on youth-focused and STEM education organizations and adjusts marketing as needed. This is to ensure all marketing approaches align with the core values of Team 6643 and FIRST Inspires.

Targets & Goals

- **Walden III Students**
 - Join the team, ignite interest in STEM fields, commitment, and active participation in robotics
- **Elementary School Students**
 - Develop critical thinking & communication skills, encourage curiosity & innovation, spark an interest in STEM fields
- **Alumni**
 - Update them on team events & activities, maintain support, spreading FIRST Robotics programs to their new communities
- **Parents**
 - Ensuring that they are regularly updated on events & activities, supporting the team through sponsorship and mentor assistance, maintaining good relationships with the team
- **Public**
 - Advertising FIRST programs & explaining their benefits, supporting STEM education, create opportunities for students of all backgrounds

Methods

- **Website (team6643.carrd.co)**
 - Host basic information on the team & contains our donation form for any potential sponsors
- **Chief Delphi Blog. (<https://www.chiefdelphi.com/t/frc-6643-open-alliance-build-thread-2024/446098>)**
 - Bi-weekly posts during Walnuts & Bolts build season informing other teams of the robot building status
- **Facebook page (@Walden Robotics)**
 - Posts all events and outreach projects done during the build and off-season for companies and Racine community members
- **Instagram (@waldenteam6643)**
 - Posts all events and outreach projects done during the build and off-season and geared towards FIRST Robotics Teams
- **Handouts & Flyers**
 - Used as a direct source of media for Walden III students or local companies in Racine, WI
- **Newsletter**
 - A newsletter is posted every month and discusses activities completed during that month as well as future events planned for the team

FLL Team 44401

The FIRST Lego League Challenge (FLL) is a sub-section of FIRST Inspires for students ages 9 -14. In this program, students are given an “innovation project” prompt (varies by year) that involves the solving of a common issue or obstacle in the team’s community. FLL students work together to research, plan, and innovate a solution to this real-world problem, which is later presented to a panel of judges.

In addition, students are also required to design, build, and program robots using a standard robot building set. This robot is then set inside a “gameplay” mat which contains Lego-built missions that the robots are programmed to complete for scoring points.

Participating in this program grants students exposure to practical, real-world STEM applications and cooperative skills.



During the FLL season (August - December), team members from FRC who have participated in FLL Team 44401 return to mentor the team. They guide them through project management and robot strategizing for competition preparation.



High school robotics members at the FLL kickoff in August



High school robotics members at the FLL competition to support middle school members

Resource Requirement & Budget

2024-2025 Budget

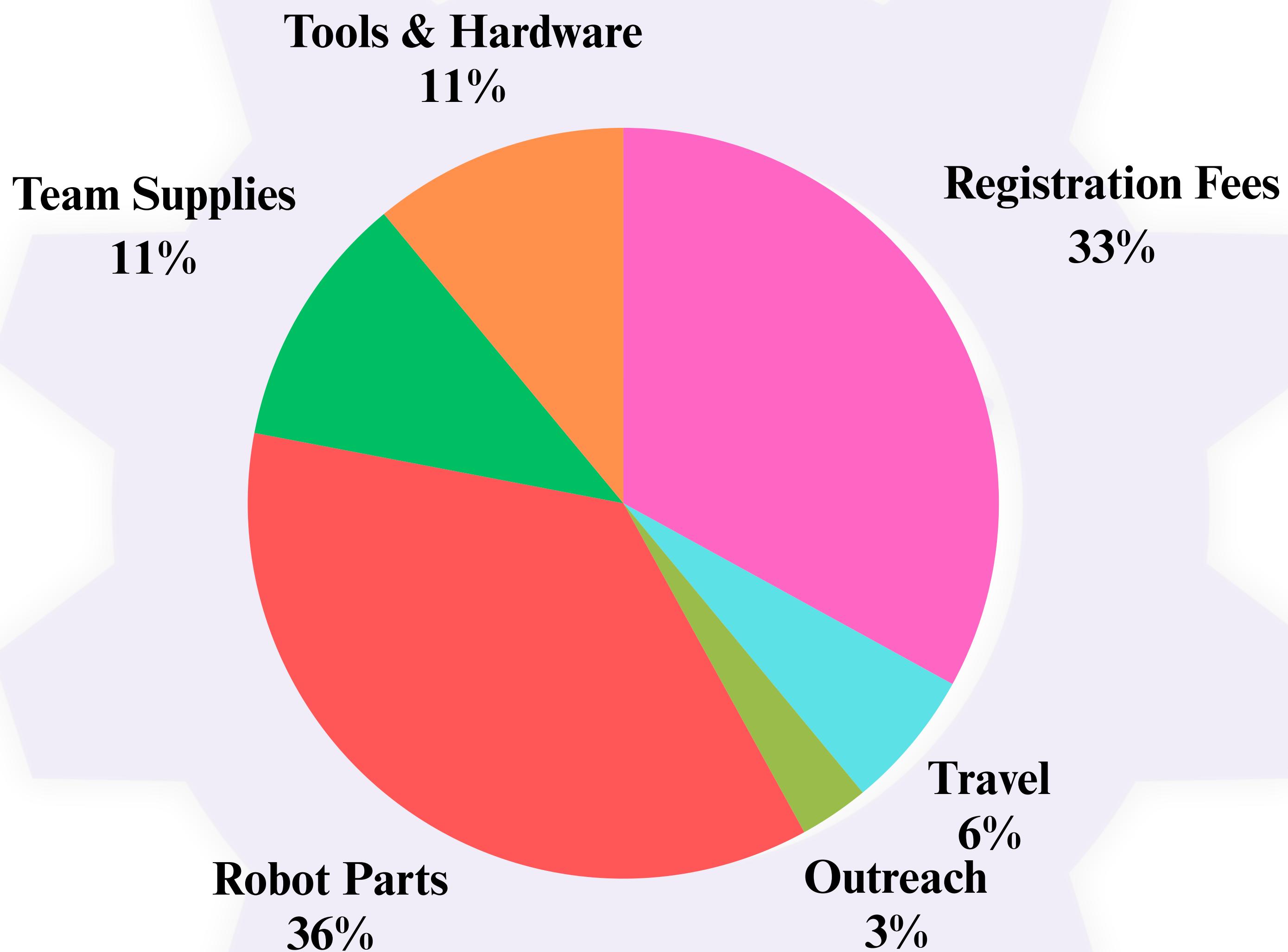
Category	Price
Registration	\$10,300
Materials	\$2,138.67
Electronics	\$1,344.98
Transportation	\$500
Aesthetics	\$500
Miscellaneous	\$500
Legal Payments	\$330
Total	\$16,493

Potential Funding

Organization	Credit	Notes
Grant	\$4,000	Tentative
Grant	\$3,000	Tentative
	Total after potential funding	\$9,492.65

23-24 Income

To ensure that Team 6643 is maintaining financial stability, all purchases are documented in a spreadsheet & inputted into a pie chart at the end of the season. Within the year 2023-2024, a total of \$18,028 of operating costs was needed, which aligned under the following categories:



Revenue

- Corporate Donation: 41%**
- Non-Profit Donation: 19%**
- Fundraising: 17%**
- Other: 6%**

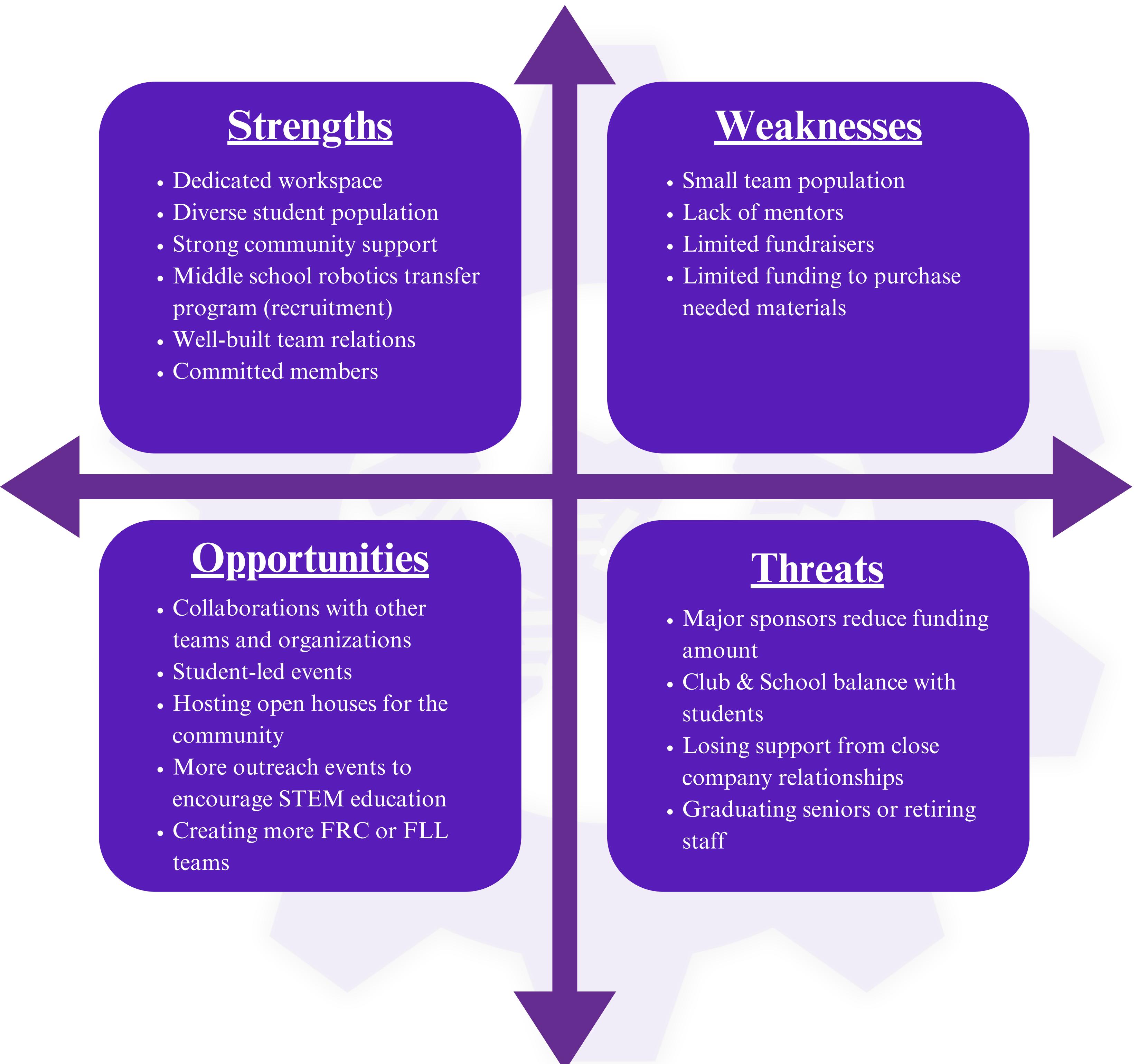
Any income is recorded and divided into 4 categories: Corporate Donation, Non-Profit Donation, Fundraising, and Other. This is to analyze successful methods of income and areas of needed focus.

Sponsorship Program

Starting in 2024, Team 6643 developed a sponsorship program that allowed companies to receive compensation for their donation gifts and efforts. Public schools typically qualify as Section 501(c)3 nonprofit organizations. Gifts may qualify as a charitable deduction for federal income tax purposes.



SWOT Analysis



Contact Information

Team Contact

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2340 Mohr Ave, Racine, WI 53405
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Mentor Contact

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