



# THE BODY ELECTRIC

## **Team 1389's 2025 Sustainability Plan**

**A guide for FRC teams**

**It is at the core of FIRST and our team to ensure the success of every team. Many face challenges in creating long-lasting teams. Some struggle with low membership while funding is an issue for others. To address this, Team 1389 has compiled steps that we take to secure the sustainability of our team that could be helpful to others.**

**Mission Statement:**

We represent Team 1389, The Body Electric, from Walt Whitman High School. Our team is focused on growing personal knowledge and sharing our robotics experience by educating new team members and working with the next generation of *FIRST* leaders. We strive to spread STEM knowledge, provide community service, and ensure teamwork and sportsmanship throughout our community.

Our plans this year strongly prioritize sustainability through various avenues. Whether through Tech & Tinker, sponsorships, school STEM days, or fundraising, we continue to create opportunities to educate the younger generation, throughout our community, about the wonders of STEM.

Our team leaders and mentors take every opportunity to teach novice students about engineering and robotics. Students are encouraged to experiment, test, and make mistakes so they can learn and make our team stronger.

**Team History & Growth:**

Team 1389 was founded in 2004 in Bethesda, MD by six students who had a passion for learning about engineering and robotics. There were two mentors, and the members had little knowledge about how to run a team. Through support from other established teams, Team 1389 gained knowledge and guidance to build very capable robots and has grown into a large veteran team.

Furthermore, team outreach and recruitment have led to the rapid growth of The Body Electric over the past few years. Currently, the team has 57 students and eight adult mentors.

We have encouraged fellow students to join the club to further their interest in STEM, business, organization, and more. The team hosts an open-lab night in pre-season that lets prospective members observe our process and get a feel for the workspace. Our school's Clubs Night is also a valuable way to generate interest and find new members. We operate one of the larger booths, showing off our previous year's robot, and explaining the team and the mission of *FIRST* to any interested students. Members from each subteam are available to discuss anything, from electrical to business, with prospective members to ensure that they can find a place where they can be successful and grow on our team. We recruit roughly 60% of our new members from Clubs Night while the other 40% join the team through word of mouth.

In the next two years, we are putting a greater emphasis on recruiting more females and members of minority communities to our team. We want our team to have as broad an impact as possible which means being able to introduce people to STEM who would not regularly have the opportunity to participate in such hands-on engagement in STEM.

## **The Importance of Organization for Sustainability**

Over the last three years, the team has had a heavy focus on sustainability. Whether that means facilitating an efficient team structure or ensuring an organized lab, we are working to optimize the information team members learn to make our team environment more productive.

### **Organizational Structure:**

Our team consists of mentors, student leadership, and general members. Mentors oversee our work and guide our decision-making. They help organize and facilitate important team events such as kickoff and safety training. Four of our mentors share their extensive knowledge regarding engineering and *FIRST* competitions. On the business side, we have four mentors who teach us to communicate effectively, plan outreach events, and raise money. They correspond with team members through in-person meetings and announcements, team discord chats, and leadership meetings.

The team is divided into 5 subteams: Mechanical, Programming, Electrical, Integration, and Awards/Outreach. Each subteam has one or two student leaders. The leads work with mentors to make attainable design and scheduling decisions. A main focus of our student leaders is to teach their teammates in grades below them to ensure that the team can be successful for years to come, by teaching critical elements of each specific subteam. Team members (including student leadership) are encouraged to participate in every part of the team. Individuals who are on

technical subteams are also involved in awards, fundraising, community outreach and sponsor outreach throughout the year.

Similarly to how we fundraise, all of our students help to recruit new members. Although The Body Electric has expanded greatly since its founding, we continue to seek out new members, mentors, and sponsors to compensate for the natural turnover of graduating members and to continue creating opportunities for people interested in STEM within the community.

### **Risk Analysis:**

Our leadership team systematically reviews risks and opportunities beginning with our kick-off meeting at the start of build season. We routinely weigh the risks of each design option, reviewing opportunities for success as well as weak points. This in-depth risk analysis allows us to create the most efficient ratio between the dedicated resources (time, effort, materials, etc.) spent on a component or feature and its value. This starts on kick-off day by listing all possible game approaches: prioritizing scoring coral vs algae or deep cage vs shallow cage. We ensure that all voices and experience levels are involved in these discussions. We narrow down those possibilities and organized them into a layered system of design goals (primary, secondary, and tertiary) that we have in our design and implemented in our robot's modifications throughout the season.

In addition to risk analysis for our robot, we reflect after competitions and the end of the season to improve for the future. We learn from past missteps and grow from them each season to become a more successful team. For instance, this

season we faced issues with reliability in our arm system. It would be successful one minute, then the next it would not be effective. This issue took longer to solve than expected, so we had to use time that we had previously allocated for the programming team, to make adjustments. From that experience, we aim to start troubleshooting earlier on in the build so that similar issues do not arise again. Learning from our mistakes is a valuable tool and engaging in practices that mitigate those risks pushes our team further.

Our strengths as a team are diversity of thought, communication, low mentor-to-student ratio, and high technical expertise. Our team's large member base fuels our team's diversity of thought, enabling the team to collaborate across experience levels and come up with innovative solutions. Beyond our programming, electrical, and mechanical subteams, we also have members dedicated to community outreach, communications, fundraising, and awards, thereby ensuring our team is broad and thorough. To ensure communication across our subteams we have our integration subteam, simulating the principles of systems engineering, dedicated to facilitating understanding and compatibility across all components of the robot. Among our other strengths is the level of technical skill we have. This is thanks to a number of factors, including knowledgeable and enthusiastic mentors, and the educational support we receive through Project Lead the Way (PLTW) engineering classes and resources available to us at Walt Whitman High School.

*Risk Analysis for Team:*

<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>- Access to and training in a variety of hand tools and machines</li> <li>- CAD knowledge and experience</li> <li>- Strong budget earned through donations and fundraising</li> <li>- 4 technical mentors</li> <li>- 4 business mentors</li> <li>- Access to workspace 5 days a week with power tools</li> <li>- School programming and engineering coursework</li> <li>- Large member base</li> <li>- Diversity of thought</li> </ul>	<ul style="list-style-type: none"> <li>- No access to supplier who can help with manufacturing</li> <li>- Little experience in pneumatics</li> <li>- Lack of sufficient experience in manufacturing</li> <li>- Need for mentor(s) with <i>FIRST</i> knowledge when joining</li> <li>-Need for more consistency year to year in large sponsorship</li> <li>-need for more outreach to local businesses for sponsorships</li> </ul>	<ul style="list-style-type: none"> <li>- Rehost district and FTC events</li> <li>- Start up and aid more local FTC Team</li> <li>- Furthering student, parent, and mentor involvement</li> <li>- Improving organization of materials and resources</li> </ul>	<ul style="list-style-type: none"> <li>- Loss of lab space</li> <li>- Loss of team leaders or critical mentors</li> <li>- Chance of major injury</li> <li>- Loss of sponsorships</li> <li>-Breakdown in communication</li> <li>- Over enrollment and oversaturation of resources</li> </ul>



## Generational Knowledge:

The main way we pass on knowledge to new members of Team 1389 is through hands-on experience. Every team member starts learning the basics of mentor-led safety training. This allows people to become familiar with the tools in the lab and gain the skills needed to operate them safely. Students start with low-risk experimentation in the preseason by working on simple design challenges. Then, we move on to prototyping intakes (a constant in all robot

designs). The vast online resources for this project allow it to be relatively beginner-friendly while simultaneously being appropriately challenging and relevant to future FRC projects. This year we have decided to start a document within our team drive with

basic materials to give the team at the beginning of every season. We work with new members to write basic swerve drive code as well as create electrical board diagrams and informational slides on different components. Having access to these will allow future team members an arsenal of resources to start the season strong. We teach team members to record their successes and failures so that we

### Prototypes:



Roller Wheel  
Claw intake

Drain pipe  
Amp Shooter



Intake/Shooter

Belt Intake



can effectively learn from each other. This carries into the season so that we can look back on past robots to improve each year.

To ensure new team members grasp the more abstract concepts needed to build a successful robot, we learn from our mentors through our Fall Lecture Series. A rotating list of mentors talks about their specialty, which could be anything from programming basics to the electrical system. As we learn more, we become more focused on topics such as considerations for choosing the appropriate swerve module or the benefits and drawbacks of different gear ratios. The Fall Lecture Series is a great jumping off point for all members of our team.

### **Including Minority Voices:**

In our efforts and advertising of the team, we emphasize diversity and our value of diversity of thought. Our team is 35% female (having grown from 27% just three years ago), and they fill four out of nine lead roles. 30% of the team represents minorities. The differing perspectives and ideas of our large, inclusive member base accelerate our team. We strive to elevate that idea by showcasing the value we place in diversity throughout our member and community outreach efforts.

### **Environmental Sustainability:**

At Team 1389, we believe it is important to contribute to the movement toward a greener future. Every action we take as a team is done to create a better tomorrow for both our local and wider community. We understand that robotics as a competitive sport can often lead to unnecessary waste in the name of convenience

during high-pressure periods. As a team, we make a conscious effort to combat this through logical and well-organized recycling practices.

From pre-season until the end of the build season, we receive approximately 70 boxes. We make sure that the packaging from all of these boxes is disposed of correctly at local recycling centers. We make a point to categorize and



organize all items being disposed of to increase convenience and efficiency for our local sanitation workers.

The most sustainable option is the one we already have. This means we must take care of our tools to ensure that they last for many more robotics seasons. We ensure that all team members are trained on how to take care of tools by keeping them clean and teaching them to notice any possible mechanical difficulties that need to be addressed.

We also reuse materials year to year - meaning that we dispose of a minimum amount of items. This includes batteries, scrap metals, and plywood. In regards to plywood and metal, we use pieces to their full capacity, often taking apart old prototypes and in some instances robots. When these materials are no longer usable to our team, we donate them to a local metal reconciling center along with any other unfixable tools.



When working long hours in the lab, food waste becomes a key aspect of our day-to-day waste management. Over the years, we have set up an organized system by which team members and their families volunteer to bring in home-cooked meals for all students. This means that we mitigate potential waste that could come from ordering fast food every day.

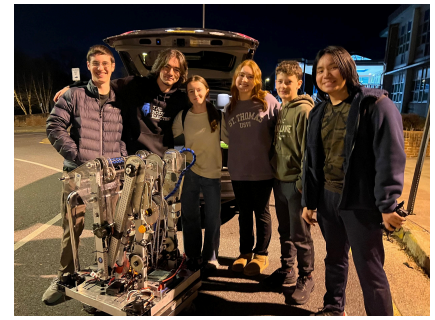
### **Marketing:**

Our team's focus on branding has allowed us to have consistent designs across our advertising, communications, and other public-facing material. These tools include logos, letter templates, symbols, fonts, colors, and more all dedicated to cementing a standard aesthetic of Team 1389.

This appearance plays a major part in the promotional work we have done this season, particularly for our fundraisers. We have held 4 fundraisers this season. This includes donations from families, Tech & Tinker day camps, concessions at competition, and partnerships with local businesses. These events were entirely self-promoted with flyers, school-wide announcements, posters, and member outreach all of which were consistently upheld to branding standards.

Our promotional work extends to social media, particularly Instagram. On this platform, we have consistently documented team events and progress as a means of leaving a visual and public record of this season. Further, we have used the platform to build awareness of our team in the Walt Whitman High School community and as a way of maintaining connections with past alumni and fellow FRC teams. (follow us @frc.team1389)

We also participate in yearly events that promote both our team and *FIRST* values. We demonstrate our robot at various elementary schools, middle schools and community STEM days to explain its mechanisms and design. These events promote the mission and encourage participation in We continue to do this throughout the season. We walk them through the engineering process from planning to design, and fabrication through operation. Some of our current members first heard of the club through these demonstrations so we are excited to educate the



next generation of *FIRST* leaders and new members.

### **Financials:**

The team actively recruits sponsorship and partnerships with local companies and businesses. Through these partnerships, the team can engage with our community as well as improve our build space. Christopher's Hardware, Minuteman Press, Capital Orthodontics and Mamma Lucia are four local businesses that donated in kind. All monetary funding went directly into raw materials for the robot.

We recognize our sponsors by including their names and logos on all of our team branding. For example, they are displayed on the front page of our website, on

the backs of our t-shirts, and the event signage. In addition, we also invite them to events so they can see the impact that their contribution is making.

Not only do we have sponsors providing for us, but Team 1389 fundraises throughout the year within our community. Our most successful fundraiser this year was Tech & Tinker. This was a team member-led day camp for students in third through fifth grade. We taught them about the process we use to design our robot and applied that to STEM challenges. We encouraged collaboration and creativity through hands-on projects like building rockets and designing circuits.

Another successful fundraiser this year allowed team members to tap into their family and friend network to raise money for the team. We utilized the website GiveButter to extend our reach to our team members' wider networks. A large portion of our funding also comes from corporate matching funds through parents' companies. Through this fundraiser, we managed to generate a record-breaking fundraising profit for our team. As a team, we intend to continuously increase our online presence and embrace new technologies to address our financial goals.

At the beginning of the year, the team asks each family to donate to the operation of the Body Electric. However, if a family finds this amount to be a financial burden, we have funds set aside to assist. We do this to ensure that every student with an interest in STEM can be a part of the team.

We make sure funds are properly spent by holding frequent discussions regarding our order lists, and having several people review the lists each time we

have to create a new one. The adult mentors help ensure that the money is being spent responsibly and that we aren't buying in excess.