2018-2019 *FIRST*® Tech Challenge

Engineering Notebook Guidelines

ROVER RUCKUS

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What are the *FIRST* ®Tech Challenge Engineering Notebook Guidelines?

The purpose of the *FIRST* Tech Challenge Engineering Notebook Guidelines is to:

- Provide an added resource for teams to create successful and effective engineering notebooks to be used throughout the *FIRST* Tech Challenge Season.
- Expand on the guidelines provided in [Game Manual Part I](#).
- Providing award winning examples.

This guide focuses on the skills and ideas needed for developing the following general goals:

- Creating a successful and effective engineering notebook
- Provide tips for mentors and coaches to guide students to best use the engineering notebook.

This guide would not be possible without the contributions of time, ideas, and resources provided by the following people:

- Jill Wilker, *FIRST* Tech Challenge Judge Advisor
- Dee Tomczak, *FIRST* Tech Challenge 2015 World Championship Think Award Judge
- Gigi Johnson, *FIRST* Tech Challenge 2015 World Championship Think Award Judge
- Marlene Lynn, *FIRST* Tech Challenge 2015 World Championship Think Award Judge
- Team 365, *FIRST* Tech Challenge 2015 World Championship Think Award Finalist
- Team 4250, *FIRST* Tech Challenge 2015 World Championship Think Award Finalist
- Team 5037, *FIRST* Tech Challenge 2015 World Championship Think Award Finalist
- Team 6134, *FIRST* Tech Challenge 2015 World Championship Think Award Finalist

Engineering Notebook Overview

What is an Engineering Notebook?
One of the goals of *FIRST* and *FIRST* Tech Challenge is to recognize the engineering design process and the journey that a team makes. This journey includes the phases of the problem definition, concept design, system-level design, detailed design, test and verification, and production of the robot.

Throughout the process of designing and building a robot, teams will come across obstacles, lessons learned, and the need to draw ideas out on paper. This is where teams use an engineering notebook. These notebooks track a team from the beginning of the season and throughout the competition season. Judges review a team's engineering notebook to better understand the journey, design, and team as a whole.

The engineering notebook is a documentation of the team's robot design and records the time spent doing research, outreach, team meetings, and plans for growth. This documentation should include:

- Sketches
- Discussions and team meetings
- Design evolution
- Software development
- Processes, obstacles
- Each team member's thoughts throughout the journey for the entire season

A new notebook must be created for each new season.

Engineering Notebook Questions

This journey goes beyond recording the day-to-day "here's what we did" or just listing "we met today". It explores questions like:

- What is the agenda today and what are our goals?
- Why are you meeting?
- What decisions did your team make in forming the team, creating the robot, writing the program, the outreach projects, etc.?
- Why did you make that choice when building your robot, coded the software that way, chose that group of individuals to outreach to, etc.?
- What was the impact on your team, robot, or community when you made that decision?
- What is the next step?

Engineering Notebook Formats

Teams may record their season with either handwritten, electronic, or online documents. There is no distinction made between handwritten and electronic engineering notebooks during Judging; each format is equally acceptable. Only one copy is needed per team.

Electronic or Online: Teams may use electronic or online programs to create their engineering notebook. For Judging, teams must print out their engineering notebooks and place them in a binder, no larger than 3 in (7.62 cm) and no more than 2 binders.

Handwritten: Teams can choose from spiral-bound, laboratory, or documentation notebooks available through their school or local office supply store. Teams can also use loose-leaf paper and place them in a three-ring binder no larger than 3 in (7.62 cm). No more than 2 binders or notebooks.

Engineering Notebook Requirements

1. Teams may not present more than two notebooks at a competition.
2. The team number and team name must appear on the outside cover of the engineering notebook. **Engineering notebooks will not be considered without this information.**
3. Attach a summary page to the front cover of the engineering notebook. The summary should be one page and include a concise narrative about the team, school, or organization with bulleted highlights of the team's season. The team summary page should also include the team number and a list of pages in the engineering notebook the team would most like the Judges to consider.
4. The engineering notebook must be divided into multiple sections, including:
   a. An Engineering Section that includes

got robot? FTC 5037 Engineering Notebook — Cascade Effect

4. During the discussion with the team it became readily apparent that some form of omnidirectional drive train would be advantageous for our scoring ability. This drive would allow us diagonal and horizontal movement across the field. Having already implemented a functioning holonomic drive on our Ring It Up robot, we plan on using it as a platform in pursuit of testing holonomic drive platforms in general. Some capabilities we need to test include:
   driving uphill, pushing, and autonomous accuracy

As per mission operandi, the inability for mecanum wheels to effectively move diagonal eliminates them as a drive platform, leaving us with the more exotic options to explore.

Among the more interesting discussed drive platforms are spindle and swerve. Swerve drive as a platform may offer us a significant boon to both autonomous accuracy and defensive driving, allowing us to essentially lock in a direction and go.

Methods of powertrain where discussed. The two most viable opti ons for swerve at the moment seem to be a short length of speedometer cable be tween the motor and the wheel, and 22.5° bevel gears, with one pair integrated into the drive wheel. - Matthew

Include spaces where photos should be placed.
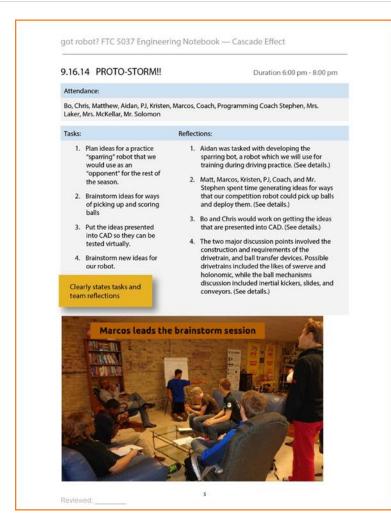
Number each page.

Reviewed: _____   8

the robot design processes (required).
   b. A <u>Team Section</u> that includes information about the team and outreach activities (required).
   c. And include one or more of the following (not required, but check requirements for specific awards).
      i.   A business plan
      ii. A strategic plan
      iii. A sustainability plan

Engineering Notebook Tips to Help your Team Stand Out
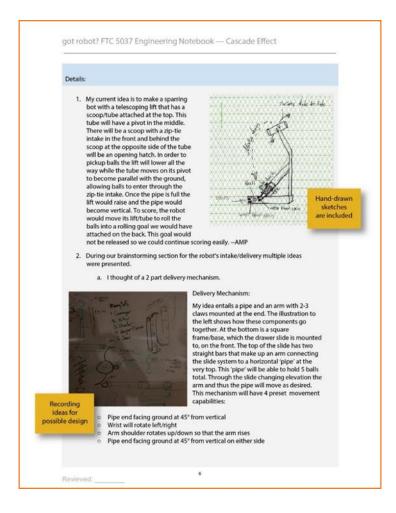
1. Every notebook is a work in progress, forever changing and developing. Judges do not want to see a "final" copy notebook; they want the real thing complete with misspellings, stains, worn edges and wrinkled pages. Just remember to keep it real!
2. Document EVERYTHING.
   a. Include the time after you finish your build and all the way up to competition, as well as between competitions. If your team plans on competing in multiple events for the season, what are you doing to improve your performance? What are your outreach efforts? How is your team investing its time between the competitions? ***Do not stop using the engineering notebook once the robot is complete.***
   b. Ask yourself questions like:
      i.   What worked, what didn't? Do not be afraid to include your failures. This is about your journey toward success. When something didn't work, how did you problem-solve?
      ii. What changes are you planning on making?
      iii. How has your robot changed over the course of the season?
      iv. How do you plan to fund your way to each event?
   c. The documentation should include enough detail for another person to look at your notebook and be able to build your robot from it.
3. Summary narrative page should be used as a way to impress the Judges without the team being in the room.
   a. When crafting your summary narrative, make sure you highlight what makes your team stand out. Remember to keep this short, as you would want Judges to have more time diving into the pages of your notebook that you have tabbed for them.
   b. Remember, Judges only have a limited amount of time with each notebook. When tagging the pages you would like them to review, keep in mind that more tabs means that they will have less time to spend on each page. **Think, quality over quantity**.
4. Engineering notebooks should be organized enough that someone unfamiliar with your team (for example a potential sponsor) can understand your team and your journey.
   a. Be clear when dividing the notebook into sections.
5. Start the team section of the notebook by introducing each team member and mentor with a brief biography of their name, age (or school year), role on the team, interests, and reasons for joining a *FIRST* Tech Challenge team.
   a. The Team Section is also a good place to discuss and show team activities that are done throughout the team's season. These can include what your team outreach efforts include, team building activities, or more.
   b. Pictures with the bios would serve as a great visual for the Judges to get to know each member of the team.

got robot? FTC 5037 Engineering Notebook — Cascade Effect

9.16.14 PROTO-STORM!!   Duration 6:00 pm - 8:00 pm

Attendance:

Bo, Chris, Matthew, Aidan, PJ, Kristen, Marcos, Coach, Programming Coach Stephen, Mrs. Laker, Mrs. McKellar, Mr. Solomon

Tasks:	Reflections:
1. Plan ideas for a practice "sparring" robot that we would use as an "opponent" for the rest of the season.	1. Aidan was tasked with developing the sparring bot, a robot which we will use for training during driving practice. (See details.)
2. Brainstorm ideas for ways of picking up and scoring balls	2. Matt, Marcos, Kristen, PJ, Coach, and Mr. Stephen spent time generating ideas for ways that our competition robot could pick up balls and deploy them. (See details.)
3. Put the ideas presented into CAD so they can be tested virtually.	3. Bo and Chris would work on getting the ideas that are presented into CAD. (See details.)
4. Brainstorm new ideas for our robot.	4. The two major discussion points involved the construction and requirements of the drivetrain, and ball transfer devices. Possible drivetrains included the likes of swerve and holonomic, while the ball mechanisms discussion included inertial kickers, slides, and conveyors. (See details.)

Clearly states tasks and team reflections

Marcos leads the brainstorm session

Reviewed: _____   5

6. Start a fresh page in the engineering section at every meeting. The date, and start and stop times should be recorded when starting a new page.
    a. Include highlights from the meeting. What did you talk about? What did you do? What did you plan and accomplish during your time together?
7. All designs and changes to the robot should be recorded directly into the engineering section of the engineering notebook. Try to include all details and sketches. Notes and calculations should be done in the notebook, NOT on loose paper.
    a. A Judging panel is always interested to see a unique design or playing strategy. On the other hand, a design without the substance to support its reasoning is not viewed as highly. Remember to explain the *underlying science, math, and strategies your team is using as well as why you are doing what you are doing*.
    b. Pictures or sketches of the robot designs, electrical wiring diagrams, or even software development are recommended as part of a thorough documentation.
8. Think about including your software development. This does not mean including the entire code, rather we encourage you to describe your code.
9. Written entries must be in permanent ink – not pencil.
10. Entries should be made by every team member, initialed, and dated. Judges like to see entries from more than one team member. It is not against the rules for one student to own the engineering notebook. However, showing that your team has multiple members sharing the responsibility showcases how your team is thinking about the sustainability of your team.
11. Use both sides of a page. Never leave any white space: "X" out or crosshatch all unused space, and initial and date. For electronic engineering notebooks, consider printing on both sides of the paper.

12. To insert pictures or outside information into the notebook, tape the picture into the notebook and outline with permanent ink, to note that it was there in case it falls out. Put the corresponding page number on that inserted page

13. If there is an error, draw a single line through the incorrect data. Do NOT erase or use correction fluid. All corrections should be initialed and dated.

Business or Strategic Plan

Identify the purpose for a business plan for your team. This is unique for every team and may touch on one or more of the following needs:

- Direction the team wants to take.
- Outlining team goals.
- Type of outreach team wants to focus on.
- Creating a team budget.
- Fundraising needs.
- Seeking out sponsors.

The business plan can act as the backbone and guiding force for your team. By mapping out where you plan to go during the season (starting with who and what your team is all about), the goals you want to achieve and what you need to do to reach them, your team will be able to stay on track throughout the season. This is a

living document and may change based on challenges that may arise through the season, lessons learned, or new opportunities. Plan on revisiting this document a few times throughout the season to see if your team is on track of if a new direction is being taken, and adapt your business plan.

Your strategic plan may also include milestones. Some examples could be:

- A short term goal such as competing in at least two events this season.
- A longer term goal such as making it to a regional championship and fund-raising the costs.
- A very long term goal such a plan to create and foster additional *FIRST* Tech Challenge teams.

Ask yourself:

- What are your team goals?
- Are you planning to use the business plan to organize your funding strategies?
    - How much money does your team need to get started and for what? (such as a budget)
    - How much money does your team need to sustain it for multiple years?
    - How much money does your team plan to raise through fund-raising efforts?
    - How much money does your team expect raising through grant opportunities?
    - How much money or in-kind donations do your team plan to raise through sponsorship?
    - How will you promote a business or organization if you receive a sponsorship? (Logo on team t-shirts and flare, or some other way?)
- Are you planning to use the business plan to seek out sponsors?

A strategic plan or business plan is a document that describes how an organization will define, prioritize, and develop the ways that it will achieve its goals. It helps the organization (in this case, your team) choose a course of action and a measure by which to decide about how they will gather and use resources. That information can be shared within the team to keep everyone focused. It can also be shared with parents, school administrators, sponsors, and other groups to describe the team's purpose and impact.

Make sure to identify what must be purchased, such as tools and major components, not only simple categories like parts, travel lodging, and other things. It should include the budget, the fund-raising plan, and a contingency plan, if the team does not reach their fund-raising plan, and what they will do if they have excess. For multiple team organizations, show who is doing what and how the money raised is divided.

See an example in our Appendix D: Sample Business or Strategic Plan.

A Sustainability Plan
This plan can be integrated into the business or strategic plan. This plan explains how the team plans to grow and stay competitive when students graduate from the program. This may include plans to recruit sponsors, new mentors, or team members.

When considering including a sustainability plan, ask yourself:

- How does your team plan to continuing past this season?
- Are you training younger team members in key roles as members graduate out?
- Are there plans for recruiting new members? What are they?
- Does your team have a plan to recruit more mentors?
- How are you fund-raising the costs of next season? Registration? New parts?
- How are you and your team leaving a legacy that will last beyond just this season?

See an example in our Appendix D: Sample Business or Strategic Plan – Sustainability

Notebook Examples

Scanned copies of award-winning engineering notebook (both electronic and handwritten) examples are posted on the *FIRST* Tech Challenge Team Management Resources website under engineering notebook resources. We recommend teams to look over these great examples of what the Judges will be looking for when reading through the engineering notebooks. Please remember, each engineering notebook reflects the team creating it. Although these samples are great references, the method and format used for these teams may not fit your team. These are examples that may *inspire* your team when starting your engineering notebook, but should not be used as the sole template for your notebook.

Award Categories that Require the Engineering Notebook

The chart below provides a quick overview of the engineering notebook requirements by award:

Engineering Notebook Requirements by Award	
Inspire Award	• Team must submit an engineering notebook. The engineering notebook must include an engineering section, a team section and a business or strategic plan. The entire engineering notebook must be high quality, thoughtful, thorough, detailed and well organized.
Think Award	• Team must submit an engineering notebook. The engineering notebook must have an engineering section that includes entries describing underlying science, mathematics, and game strategies. • The engineering notebook must show the team has a clear understanding of the engineering design process, with pictures or drawings and details documenting all stages of robot design. • Notebook must recount the team's journey, experience and lessons learned throughout the season. • Engineering notebook must be organized and follow the formatting guidelines provided by *FIRST* and include a summary page. Note: teams should review the engineering notebook resources published in the Team Management section of the *FIRST* website.
Connect Award	• Team must submit an engineering notebook. The engineering notebook must include a business OR strategic plan that identifies their future goals and the steps they will take to reach those goals. Some things the plan could include are fund-raising goals, sustainability goals, timelines, outreach, and community service goals.
Rockwell Collins Innovate Award	• Team must submit an engineering notebook. The engineering notebook must include an engineering section that documents the design process and how the team arrived at their design solution.
Design Award	• Team must submit an engineering notebook with an engineering section that includes detailed robot design drawings. • Team demonstrates industrial design principles, striking a balance between form, function, and aesthetics.
Motivate Award	• Team must submit an engineering notebook. The engineering notebook must include a business OR strategic plan that identifies their future goals and the steps they will take to reach those goals. Some things the plan could include are fund-raising goals, sustainability goals, timelines, outreach, and community service goals.

Control Award	• The Team must submit an engineering notebook. The engineering notebook must include an engineering section that documents the control components.

Read the full Awards Descriptions in Game Manual Part I here.

Additional Engineering Notebook Resources

For more information and suggestions, check out the following resources:

Mentor Manual – there is a section on the engineering notebook, as well as appendices that include: engineering notebook samples (with tips on why they were successful), information on writing a business or strategic plan, and more.

FIRST Tech Challenge Example Engineering Notebooks – under the Engineering Notebook section of the *FIRST* Tech Challenge Team Resources webpage there are four full engineering notebooks from teams. Check them out for ideas.

FIRST Tech Challenge Fundraising Resources – Fundraising Guide, Budgets, Sponsor Presentations, etc.

Fundraising Toolkit – lots of information and example business, strategic, and sustainability plans, including sample budgets.

Judges Manual – review for information on how Judges evaluate the engineering notebook.

Appendix A – Resources

Game Forum Q&A

http://ftcforum.usfirst.org/forum.php

Anyone may view questions and answers within the *FIRST®* Tech Challenge Game Q&A forum without a password. To submit a new question, you must have a unique Q&A System User Name and Password for your team.

Volunteers that apply for a specific volunteer role will receive an email from FTCTrainingSupport@firstinspires.org with their username and password to the forum. You will receive access to the forum thread specific to your role.

FIRST Tech Challenge Game Manuals

Part 1 and 2 - https://www.firstinspires.org/resource-library/ftc/game-and-season-info

FIRST Headquarters Pre-Event Support

Phone: 603-666-3906
Mon – Fri
8:30am – 5:00pm
Email: Firsttechchallenge@firstinspires.org

FIRST Websites

FIRST homepage – www.firstinspires.org

FIRST Tech Challenge Page – For everything *FIRST* Tech Challenge.

FIRST Tech Challenge Volunteer Resources – To access public Volunteer Manuals.

FIRST Tech Challenge Event Schedule – Find *FIRST* Tech Challenge events in your area.

FIRST Tech Challenge Social Media

FIRST Tech Challenge Twitter Feed - If you are on Twitter, follow the *FIRST* Tech Challenge Twitter feed for news updates.

FIRST Tech Challenge Facebook page - If you are on Facebook, follow the *FIRST* Tech Challenge page for news updates.

FIRST Tech Challenge YouTube Channel – Contains training videos, Game animations, news clips, and more.

FIRST Tech Challenge Blog – Weekly articles for the *FIRST* Tech Challenge community, including Outstanding Volunteer Recognition!

FIRST Tech Challenge Team Email Blasts – contain the most recent *FIRST* Tech Challenge news for Teams.

Feedback

We strive to create support materials that are the best they can be. If you have feedback about this manual, please email firsttechchallenge@firstinspires.org. Thank you!

Appendix B: Engineering Notebook Self-Assessment

For team use only – NOT to be handed in.

Notebook Formatting		
Present?	**Item Description**	**Comments/Goals for Improvement**
	Required: Cover page, including Team name & Team number	
	Optional: Creative cover, Team photo, etc.	
	Required: No more than two binders	
	Optional**:** Neat organization, neat presentation of information	
	Optional: Page Numbers	
	Optional: Table of Contents	
	Optional: Section dividers, clearly labelled	
	Optional: Entries made on both sides of the paper	
Notebook Sections		
Present?	**Item Description**	**Comments/Goals for Improvement**
	Required: Team Summary page	
	Required: Engineering Section	
	Engineering Section documents the design, build, & testing stages of the robot	
	Includes code development process (not just the code)	
	Required: Team Section (deeper dive of Team Summary page)	
	Optional: Outreach Section	
	Optional: Awards and Recognition Received Section	
	Required for some awards: Business Plan OR Strategic Plan OR Sustainability Plan	
	Required for the Control Award: Control Award Content Sheet found in Game Manual Part I (check with event on how this sheet will be collected)	
	Optional: Budget section (if not included already)	
Notebook Quality		
Present?	**Item Description**	**Comments/Goals for Improvement**
	Team growth and development is documented	
	Team leadership and organization is documented	
	Team failures and struggles are documented	
	Every Team member contributes to the Notebook	
	Every meeting has at least one Notebook entry	
	Entries include pictures, drawings, and text as applicable	
	Notebook is an accurate representation of the Team and journey	
	Notebook documents changes in the robot plan, including **_WHY_** the change was made	

For more info and to view example Notebooks, check out the *FIRST* Tech Challenge Team Management Resources webpage.

Gracious Professionalism® - "Doing your best work while treating others with respect and kindness - It's what makes *FIRST*, first."

Appendix C: How to Write a Business/Strategic Plan

How to Write It

Forbes recommends a five step approach to developing your strategic plan:

Determine the current status of the Team – being honest, assess the current state of the Team. Are you a Rookie Team? Are you a five-year Veteran Team with more than half the Team brand new to *FIRST* Tech Challenge? Whether Rookie or Veteran, brainstorm the following: what do you know, what do you need, and what are your season goals?

Identify What Is Important – after you brainstorm a list of goals for the season, narrow it down to one to three that are manageable within this one season. Identify which ones can be achieved the following or later seasons.

Define What You Must Achieve – With your goals in mind, determine what you need to do to accomplish those goals. Don't forget that you also need to build a Robot, compete with it, fundraise, and keep an Engineering Notebook, at the very least. Your goals and the steps needed will be in addition to or work with these tasks.

Determine Who Is Accountable – this is where it will be good to identify Team Roles and the role of the Mentors in supporting Team members at accomplishing the goals.

Review – review the plan once it is written. Refer back to it whenever making a big Team decision, and do a thorough review at the end of each season/before the next season.

Additional Resources

FIRST Fundraising Toolkit – Team-created instructions and examples, including:

- Business Plan Instructions
- Business Plan Webinar

Appendix D: Sample Business/Strategic Plan

The following is a plan crafted for a fictional Team.

Cover Page

FIRST Tech Challenge Team ####

Robo Innovators

Portland, ME

Make your cover page professional and attractive. Use borders, your team logo, a picture of your team, school name, etc.

Contents

1.0 Executive Summary
      1.1 Team Mission Statement
      1.2 *FIRST*® Description
      1.3 Program Summary
      1.4 Team Origin, Description, and History
      1.5 Team Organizational Structure
      1.6 Team Relationships
2.0 Team Impact and Goals
      2.1 Team Use of Resources
      2.2 Team Future Plans
3.0 Sustainability
      3.1 Team Action/Implementation Plan
      3.2 Team Financial Statement
      3.3 Team Fundraising Opportunities
      3.4 Team Risk and Opportunity Analysis
4.0 Outreach and Recognition
      4.1 Outreach
      4.2 Recognition
5.0 Resources

1.0 Executive Summary

1.1 Team Mission Statement

To inspire ourselves and others to develop a life-long love of learning and engagement in our community by building a strong Team that is known and respected throughout Portland and beyond.

1.2 FIRST Description

The mission of *FIRST* is to inspire young people to be science and technology leaders, by engaging them in exciting Mentor-based programs that build science, engineering and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.

FIRST was founded in 1989 to inspire young people's interest and participation in science and technology. Based in Manchester, NH, the 501 (c) (3) not-for-profit public charity designs accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and math, while building self-confidence, knowledge, and life skills.

1.3 Program Summary

FIRST Tech Challenge is designed for students in grades 7-12 to compete head to head, using a sports model. Teams are responsible for designing, building, and programming their robots to compete in an alliance format against other Teams. The robot kit is reusable from year-to-year and is programmed using a variety of languages. Teams, including coaches, Mentors and volunteers, are required to develop strategy and build robots based on sound engineering principles. Awards are given for the Competition as well as for community outreach, design, and other real-world accomplishments.

1.4 Team Origin, Description, and History

The Robo Innovators began in 2012 as an afterschool program for four girls very interested in learning about robotics. Eager to share the experience, once the Team was registered with *FIRST* Tech Challenge, they opened the Team up to interested parties and the Team quickly grew to twelve. Team Mentors included two parents and the high school physics teacher. Currently the Team has 15 members from grades 7-12, both boys and girls.

In 2013 the Team attended the Massachusetts State Championship and the robot had a good showing on the field. They were honored with a nomination for the Motivate Award.

In 2014 the Team again attended the Massachusetts State Championship. The Team won the Think Award and the robot was selected to be part of a Semi-Final Alliance.

1.5 Team Organizational Structure

The Team is managed by the physics teacher and a parent volunteer. In addition, there are three technical Mentors from local businesses who coach the students on engineering principles, computer programming, and construction. Team members take on the responsibility of managing the Team, deciding roles, and completing project tasks, including fundraising.

1.6 Team Relationships

2014 Sponsors: Swell Middle High School, Eden Electrical Corp, and Wilson's Metalworking.

Swell Middle High School provides funding for all after school clubs and organizations. In addition, they allow the Team to use a school computer, space in the shop to store the robot, to work on the robot, and use of the shop tools.

Eden Electrical Corp provides two Mentors and annual funding for the Robot materials.

Wilson's Metalworking also provides Mentor support and funding in the amount of $600 annually.

2.0 Team Impact and Goals

2.1 Team Use of Resources

Robo Innovators have taken their robot to local events, providing information about the program, Team, and inviting guests to touch or drive the robot.

2.2 Team Future Plans

In 2015 the Team plans to start a second *FIRST* Tech Challenge Team to allow more students access to the creative process of building a robot and the rewarding experience of being on a Team. In addition, the Team is planning to run a summer robo camp for children ages 6 – 12 to encourage more students to get involved in robotics at a young age.

3.0 Sustainability

3.1 Team Action/Implementation Plan

The Team has identified the following actions for growth and sustainability:

Strategy	Actions	Responsibility	Planned Completion
Transition six Team members into a leadership/Mentoring role to support the new Team	• Develop a leadership training program • Select and develop Team members to transition to a Mentoring role for the new Team.	Team Mentors	January 2015
Prepare the Team to transition to Java	• Develop training materials to teach the Team Java programming language	Technical Mentors	June 2015
Raise funds to support the start of a new Team and Robo Camp initiative	• Craft amended budget • Strategize a fundraising plan • Identify and implement one large fundraiser • Identify and implement a small, long-term fundraiser	Fundraising Committee	March 2015
Robo Camp	• Develop budget • Develop Marketing plan to recruit campers • Outline schedule for the camp.	Outreach Committee Mentors	January 2015
Identify six sub-committee members to become Leadership committee members by the end of the season.	• Identify six members • Develop targeted training to prepare them for the roles	Leadership Committee	April 2015

3.2 Team Financial Statement

Item	Budget Amt.	Actual Cost	Category	Rationale/Explanation
Expenses				
Registration	275.00		Registration	*FIRST* Tech Challenge registration fee (required).
Parts & Supplies	700.00		Robot Supplies	Annual parts and new technology
Kit of Parts	1500.00		Robot Supplies	For the new Team

Sub-Total	2475.00			**Projected total expenses for the 2015 season.**
Monies				
Rollover Amount	1700.00			Money left over from the previous season
School Allocated Club Funds	425.00		Income	Annual amount
Wilson's Metalworking	600.00		Income	Annual sponsorship amount
Eden Electrical Corp	500.00		Income	Annual sponsorship amount
Car Wash	300.00		Fundraiser	Planned Team fundraiser with ideal amount raised.
Sub-Total	3525.00			**Anticipated amount of money coming in throughout the season. Actual amount may be lower/higher, but it's best to over-plan ways to raise money.**
Bottom Line				
Credit/Deficit	**1050.00**			Current money still left/Money owed that still needs to be raised (marked in red)

3.3 Team Fundraising Opportunities

Fundraiser Idea	**Projected Income**		**Category**	**Notes**
Pizza & Dodgeball Fundraiser	500.00		Fundraiser	One large event, and if the pizzas are donated, we could potentially double our profit.
Shirt Sales	300.00		Fundraiser	Small, on-going fundraiser that can continue year after year.

3.4 Team Risk and Opportunity Analysis

We have outlined the following concerns that might impact our current goals and strategies:

Risk 1 - Advance to the East Super-Regionals: While we will work with our Mentors and resources toward this goal, we cannot guarantee our success, especially since we cannot control the other Teams and their robots. However, we hope that by learning Java programming right away, as outlined in section 3.1, we will be able to get started on our goal.

Risk 2 - Start and Mentor an *FIRST* Tech Challenge Team: We cannot guarantee that a second Team is viable for our school. We have a dozen students who have expressed interest, but until the school and the students''

parents approve, we cannot move forward with the second Team. Mentors and Team members have been building leadership capabilities and documenting the progress of our Team for over a year. We hope that this will prepare us to Mentor the new Team to success. Our fundraising and leadership plans are also outlined in 3.1 and 3.2 and we think this will convince the school and parents we are prepared to start and support this Team.

Risk 3 - Implement Robo Camp: We feel strongly that there is an interest and a need in our community. We have no guarantee that the camp will meet the full desired enrollment of 20 campers, but we have a plan for promotion in the works as outlined in 3.1, so we think we are prepared.

Our Team has identified the following opportunities that we plan to take full advantage of:

Opportunity 1 - Fundraising – Eden Electrical Corp has provided funding for robot materials for our Team for the past two years. We plan to approach them with our idea to start a second Team and see if they will be willing to sponsor that Team as well. The two Mentors who work at Eden Electrical feel strongly that the company is willing and able to do so, we just need to finalize our proposal and present it to the CEO. If we are able to do so, we will continue to have a budgeting surplus, even with the new Team, which ensures our Team longevity.

Opportunity 2 – A new T-shirt business has opened up and we think if we approach them and ask them to partner with us on T-Shirt sales that they will agree as a way to promote their business. The owners are young and liked the idea, we just need to finish our formal proposal. Having a long-term fundraiser will be really useful for budgeting purposes each year.

4.0 Outreach and Recognition

4.1 Outreach

Currently the Team attends a lot of local events, such as the First Night and 4th of July celebrations, and showcases the club and the robot. We are excited about starting Robo Camp which will be our first foray into running our own event.

4.2 Recognition

- Think Award, Massachusetts State Championship, 2014
- Swell Middle High School Club of the Year, 2013 and 2014

5.0 Resources

5.1 Photos and Other Supplemental Materials

For more information about the Team and our outreach, please check out the following materials:

- Team brochure (insert URL)
- Team Engineering Notebooks (insert URL)

5.2 Team Contact Information

Lead Mentor: Jesse Teacher, email address
Lead Mentor: Ricky Parent, email address
Team Email address
Team website: insert URL
Team Instagram page