FTC Action Plan

1.0 Executive Summary

1.1 Team Mission Statement (taken from business plan for TIPS Inc.)

Team #9721, the Green Mountain Gears, aims to develop life-long skills, habits and attitudes in problem solving that the members will apply to real-world problems that make the world a better place and that create businesses, wealth and jobs.

1.2 FIRST Description (taken from template)

The mission of FIRSTis 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 (taken from template)

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, History

Coach Paul Fitzgerald established team #9721, The Green Mountain Gears, for the 2015 season when one of the members of the FLL team #3958, Ethan Behr, was old enough to participate. The coach hoped to build a system of connected teams, from Jr. FLL through FTC, so that the older kids would be able to mentor younger kids and so that the younger kids would be able to have role models. This type of program took inspiration from club swim teams where kids from ages 4-18 are on the same team. This type of model is not well suited for schools, which partition kids into age specific cohorts that are geographically separated from one another.

The team wanted to be competitive on a national level, which they knew would take years of experience and training. During the first year, the team built their robot entirely from legos, because most of the team also did FLL and because it reduced costs. The final robot had a design that allowed it to dump balls into a goal and to be driven down a ramp. The team spent a lot of time learning robotC and how to use a remote control to drive their robot. The team successfully participated in the Vermont State Championships but did not win any matches. The team was supported by an FTC Rookie Grant and by the UVM Rookie grant to cover the FTC registration costs and the championship tournament costs, respectively.

During the second year, the team purchased a Tetrix Team kit and built the robot almost entirely of materials from the Tetrix kit. This robot was four wheel drive using chains and sprockets to drive the robot. It was also able to drive up a ramp and hang from a cross bar using a winch and a robot arm, with servos, to place the winch hook. The team learned to construct chains of different lengths, how to tune and control servos. The team learned the basics of Android Studio in order to modify the template Java programs to drive and operate the robot. The team successfully participated in the Vermont State Championships and won their fifth match. The team received a FIRST transition grant to cover the costs of the ZTE phones.

This year, the team constructed the robot frame from wood. This dramatically reduced costs and increased the skills of the team as they learned to use a power miter saw, a drill, Kreg Jig, Hack Saw, wood saw and a variety of clamps. The team also integrated VEX robotics parts into their robot to make the trigger for their catapult. The team learned to use an encoder to control the rotations of the motors during tele-op phase.

1.5 Team Organizational Structure

The team has five members, which is all that can fit into our current space. The team members have been together for five years on other FIRST teams and on Odyssey of the Mind teams.

1.6 Team Relationships

Our team is run through the non-profit Teams of Innovative Problem Solvers, which also runs 12 Jr. FLL teams across three schools, and an FLL team. The team meets in the living room of our coach.

2.0 Team Impact

Over the past year, the Green Mountain Gears have promoted FiRST at the Champlain Valley Maker Fair, at the UVM Maker Fair and at the Tech Jam.

2.1 Team use of Resources

Green Mountain Gears have presented at local events to promote an understanding of FIRST

2.2 Team Future Plans

The team plans to expand next to add at least two new members to create multiple working teams. These new members will be on the older end of the team's age range to better balance the age of the team.

The team plans to purchase new equipment for next year, including: an ultra-large 3D printer, a brazing torch, a MIG welder, a metal chop saw a band saw and all of the requisite safety equipment.

The team plans to move to a different location to allow for easier access to equipment and more work space.

The team plans to have each member of the team have a PC laptop in order to run Android Studio and PTC Creo.

The team plans to meet over the summer to learn new fabrication skills for working with metals.

3.0 Sustainability
3.1 Team Action/Implementation Plan

Action Plan			
Strategy	Actions	Responsibility	Completed
Develop lower cost robot frame using new techniques and skills	Purchase equipment such as mitre saw, drill press, hack saw, wood saw, clamps, Kreg Jig, “L” frames, wood and PVC	Mentor	1/15/17
	Practice using equipment to develop skills	team	1/25/17
	Build robot frame using new techniques and materials	team	1/25/17
Integrate CAD directly into design, build and presentation	Develop CAD Skills to create new parts	team	10/14/16
	Develop CAD skills to import CAD files from other sources	team	10/14/16
	Develop CAD Skills to make drawings	team	11/10/16
	Expand constraint vocabulary (mechanism constraints) to make more useful designs (animations with physics feedback)	team	not completed
Promote FIRST	Present at Champlain Valley Maker Fair	team	9/3/16
	Present at Tech Jam	team	10/16/17
	Present at UVM Maker Fair	team	11/10/16
	TV Interview with FOX	team	
	TV interview with WCAX	team	
	Newspaper interview with SevenDays	team	
Fundraising	Participate in Webinar through Global Innovations	Mentor	12/20/16
	Apply for Grants, such as Best Buy Grant	Mentor/TIPS	Pending
	Make Strategic Partners to Support Team	TIPS Board of Directors	Pending
Mentor Jr. FLL teams through TIPS	Learn songs to help with sorting legos	team	pending
	learn songs to help with identify lego parts	team	pending
	learn builds to support kids working on those builds	team	pending
	learn techniques to facilitate group work	team	pending

3.2 Team Financial Statement

Item	Budget Amount	Actual Cost	Reason
Expenses			
FTC Registration	275	275	Required
Vermont FTC Registration	275	275	Required
Update Electronics Kit	300	318	Improve Consistency
1/2 Field Kit	300	0	Practice robot
Other Robot Materials	500	1447	Develop Robot, new skills
Supplies	340	0	Presentation, Team Building
Domain Name	16	16	Showcase work
website rental	28.6	28.6	showcase work
Monies			
Initial Payment, $200 per family	1000	1000	
Final Payment, $208 per family	1040	pending	
Balance		1040	

3.3 Team Fund Raising Opportunities

The team is part of a 501.c3 non-profit and the team is able to receive charitable donations. However, the team has not made specific efforts to get sponsors yet. Coach PK participated in the Global Innovations fund raising webinar in December. This webinar stated that most corporate donations are done in December and that we need to develop a system to meet with potential corporate sponsors and then ask them for monies for specific purposes with the goal of making the support an annual activity.

3.4 Team Risk and Opportunity Analysis

Risk 1-Retainment
Our team is composed of a small number of members that have been together for five years. These members hold a tremendous amount of experience and knowledge of one another and should a single member stop participating, it would impact the team dramatically. We are beginning to thinking that we need to increase our numbers so more people hold more experiences and knowledge.

Risk 2-Time
Our team is composed of a small number of very busy kids that attend three different schools. Very few of the kids have attended every practice and we had a small amount of time to meet this year because FLL want late and FTC is planning to go early. The team lost about a month of build time, as a result. Since the builds are still new to the team, the loss of time makes it even harder to complete activities. We are beginning to thinking that we need to increase our numbers because we do not have fully participation at most meetings.

Risk 3-Space
The team currently meets in our Mentor's home. This makes it difficult to expand the size of the team because there is not enough space for everyone to work. We cannot easily move to a large space without the ability to store lots of equipment.

Opportunity 1-Non-Profit Status
The team became part of a non-profit this past year. This means that the team can receive corporate donations and apply for grants directly. These monies are necessary to get equipment to expand the training of the team.

4.0 Outreach and Recognition

4.1 Outreach

The team promoted FIRST at the Champlain Valley Maker Fair

The team promoted FIRST at the Vermont Tech Jam

The team promoted FIRST at the UVM Scholastic Maker Fair

4.2 Recognition

2017 Vermont Regional Programming Award

2016 Vermont State FLL Champions
2016 Vermont Regional Global Innovations Award Winner (FLL)
2016 Global Innovations Award Semi-Finalists (FLL)
2016 Vermont State Odyssey of the Mind Champions

2015 Norwich Qualifier FLL Champion
2015 NH/VT Regional FLL Robot Design Award

2014 Norwich FLL Qualifier Runner-Up
2014 NH/VT FLL Judges Award
2014 Vermont State Odyssey of the Mind Champions
2014 Vermont State Odyssey of the Mind Ranatra Fusca Creativity Award

2013 VT/NH Qualified for VT/NH Regionals at Dartmouth

5.1 Photos and Other Sources

5.2 Team Contact Information

Lead Mentor Paul Fitzgerald, pkeenanfitzgerald@gmail.com

Team Website: http://tipsvt.org/FTC/