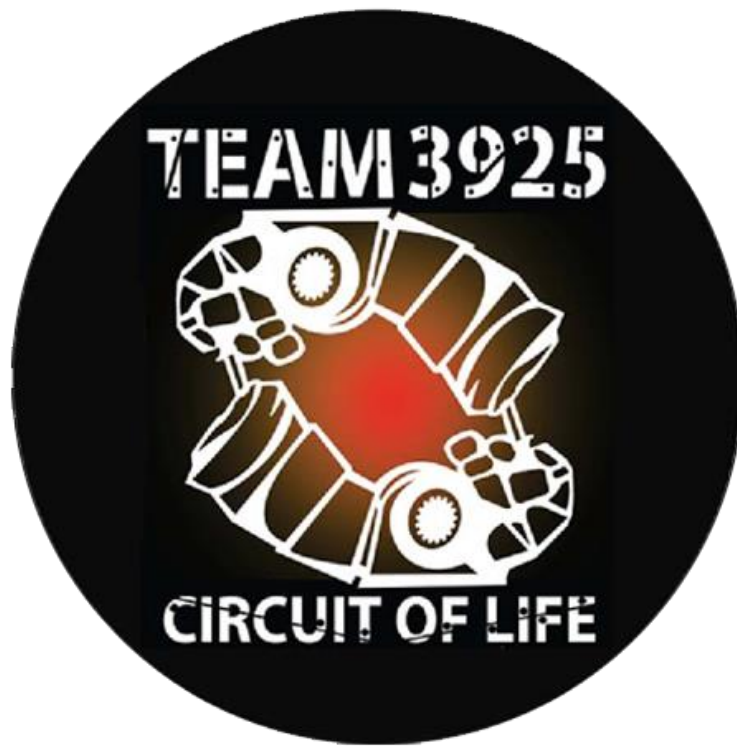


Business Plan

2015 - 2016



Team 3925 The Circuit of Life
Ventura County Robotics
2 N Catalina St, Ventura, CA 93001

TABLE OF CONTENTS

- I. Executive Summary
- II. Team Overview
- III. Team Management
- IV. SWOT Analysis
- V. Team Impact/Outreach
- VI. Future Plans
- VII. Action/Implementation Plan
- VIII. Team Budget & Financial Statement
- IX. Sponsor Benefits
- X. Team Fundraising Opportunities
- XI. Team Contact Information

APPENDIX A. RoboRunner Background and Curriculum

I. EXECUTIVE SUMMARY

Mission Statement:

The driving force of our Team is our diversity, inclusion and community outreach. Team 3925, Circuit of Life, is an FRC Robotics team focused on spreading the awareness of the STEM (Science, Technology, Engineering, and Mathematics) program. We are a diverse group of about 70 students from six different schools and are committed to our community and each other. Our team is student led, with help from private industry mentors in the fields of engineering, education, and business. We have witnessed what FIRST Robotics can do for us in the present, as well as our future careers. These successes have made us committed to helping each other succeed, while spreading the message of FIRST to our family, neighbors, community and especially to future FIRST Robotics students.

Being from different schools, including cross-town rivals, we overcame any rivalries and invited all students, regardless of GPA, physical or learning disability to join us, which we have continued to this day. This underdog group has thrived and now we help to host a regional competition in our very own city. We have also been instrumental in helping to start two other teams in the area and are mentoring younger students.



II. TEAM OVERVIEW

Team History:

We started in 2011 with 13 members. After being approached by a few students, Mrs. Velma Lomax became our mentor-teacher and the following year, Robotics course work became part of a class for credit. We competed with our first robot in 2012 and won the Rookie All Star Award advancing us to World Championships. By that time the Team was 40 strong and kept growing to now 74, representing every high school in the district, offering Applied Arts credit for graduation, and also A-G UC approved elective. The class is also a Capstone Class for the Manufacturing and Robotics Career and Technical Education pathways.

For several years, the Robotics host high school tried to muster enough interest to offer an AP Computer Science course without any success. One year after we started team 3925 and with the help of Mrs. Velma Lomax, a course was offered, filled and now we have two courses with a waiting list.

Early on, FIRST Robotics was not well known in Ventura County. One way we have spread the message is through a student-designed and student-led program called RoboRunner. This a 12 week STEM education curriculum, that “runs” STEM knowledge to six community centers, Boys and Girls Clubs, PEAK and ASES after school enrichment programs and schools in transportable boxes. Our Team, under the direction of their President, created this curriculum to offer the education and explanation of STEM skills to students that may not otherwise have that opportunity. The curriculum focuses on robotics and spatial relationships and therefore excites the students about future participation in FIRST. The beauty of the program is that the curriculum is literally in boxes, with complete instructions ready to go at any given time. We aspire to expand our curriculum to other FIRST teams.

Team Mentors:

We have created a very sustainable team with training occurring at each level of education. Our incredible mentors from companies such as Haas, Sessa, and others from local industries help to encourage us in the processes of Robot Design, Manufacturing, Electrical Wiring, and Programming. These mentors are very important to us because we take pride in the vast amount of knowledge they possess and their ability to instruct us with that wide range of skills. The program could not survive without our mentors. They come from parents of students as well as corporate sponsors and local businesses.



Team Sponsors:

Team 3925 prides itself on creating strong ties with the local community. Our sponsors include local universities, regional, and national businesses with operations in STEM related fields. We target STEM industries and have won sponsorships from The Institute of Electrical Engineers, Haas Automation Inc., Amgen, Qualcomm, and College of the Canyons. In addition we do many presentations to groups in order to create strong ties with in the community, businesses, and local and regional education centers



III. TEAM MANAGEMENT

Team Membership Expectations:

- Actively Participate in a team
- Attend class twice per week
- Minimum 10 hours of community service/events with our team
- Increased participation during build season (coming to class more than twice a week)

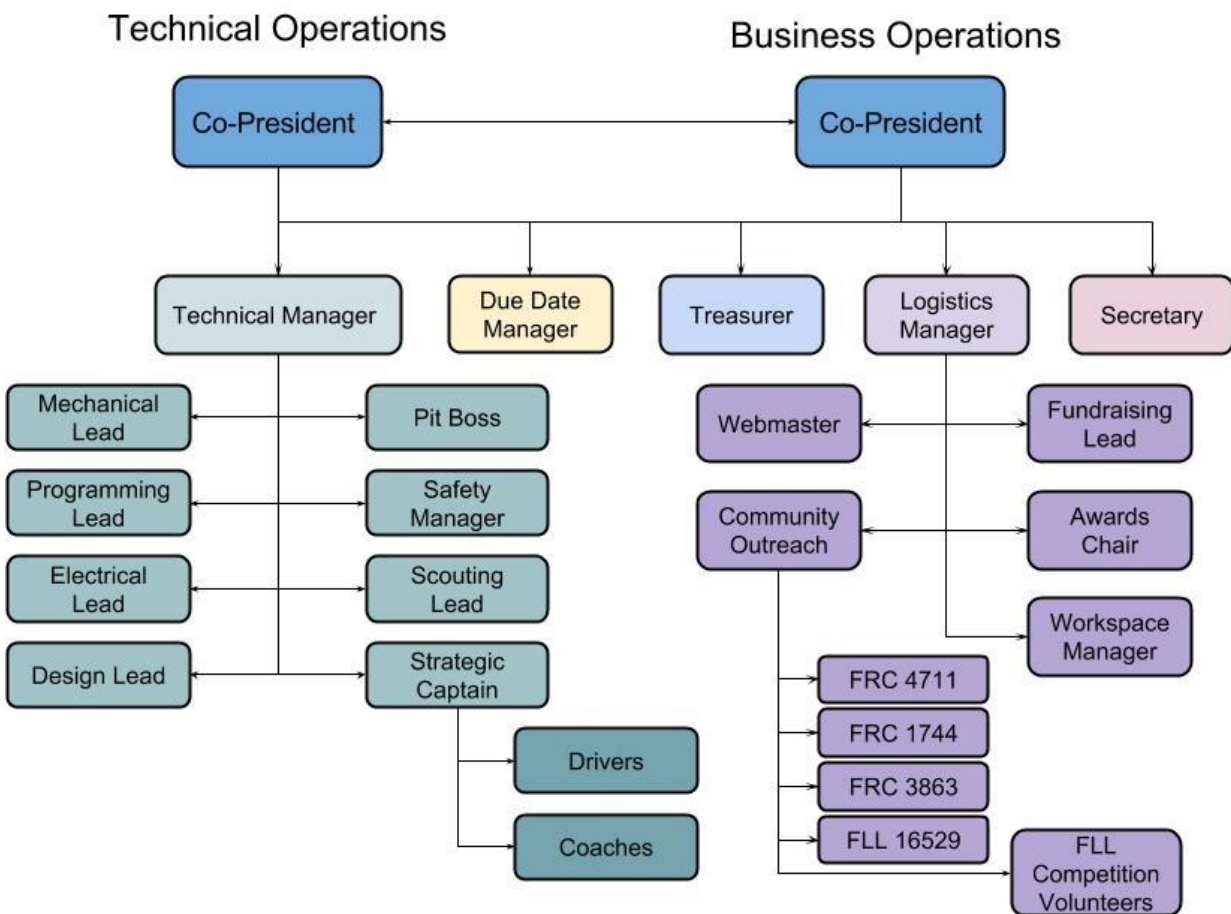


- 2.0 or above GPA without failing a core class
- No Profanity; respect for team members and mentors
- Positive, enthusiastic attitude

Team Structure:

The organizational chart below shows the various positions, which help our team, the Circuit of Life grow and thrive. Each position shown here has a team of students supporting that individual. Certain mentors will oversee and advise each department.

Team 3925 Organizational Chart



IV. STRATEGIC PLANNING PROCESS / SWOT ANALYSIS

FIRST principles are demonstrated weekly as our team educates and recruits future team members. On School of Choice Night, a few teammates demonstrated past robots to incoming Freshmen and their parents. Community service is a key part of our weekly duties, and future members are recruited regularly at the Boys and Girls Club as well as after school programs catering to elementary, middle, and high school students. The team regularly attends FLL competitions, and has mentored FLL Team 16529, along with a FRC Team 4711 and helped FRC Team 1744. We perform this community service and mentorship in hopes that we can successfully invite future talented members to our team for many years to come.

One of the concerns we have is the lack of specific curriculums in our own program. We are planning to develop this in the near future.

V. TEAM IMPACT/OUTREACH

Several years ago FIRST Robotics was relatively unknown in our community. Now young students ask about the program and look forward to participating. One of the ways we have spread the message of FIRST is through a student-designed and student-led program called RoboRunner. This is a 12 week STEM education curriculum, that “runs” STEM knowledge to six community centers, schools, presentations, and city activities in transportable boxes. The Circuit of Life team, under the direction of their President, created this curriculum to offer the education and explanation of STEM skills to students that may not otherwise have that opportunity. The curriculum focuses on robotics and spatial relationships and therefore excites the students about future participation in FIRST. The beauty of the curriculum is that it is literally in boxes, with complete instructions ready to go at any given time. (See Appendix A).

As previously mentioned, this team visits several after school programs, including Boys and Girls Clubs, PEAK and ASES after school enrichment programs, FLL tournaments and mentors a FLL and a FRC team. The team also teaches young students about character, integrity and the importance of the future. We show them how they can improve and discover inner abilities they may not have realized they have. Our outreach has also gained the Team valuable mentors and parent volunteers.

Even though the team is large, every student plays a part in its growth and success and has the opportunity to be a part of the FIRST experience. Each team member attends one or both regionals, in Madera and Ventura.

VI. FUTURE PLANS

The future of FIRST Robotics in Ventura is bright. From the original thirteen students we have grown to a team of 74, started another FRC team, Team 4711, and mentored a FLL Team. Within the next three years, plans are to start teams at Rio Mesa High School in our neighboring town of Oxnard, one at a high school in Simi Valley, a high school in Moorpark, and a FLL team is already scheduled to start next year at a Middle School in Ventura. Ventura will continue to host the Regional Competition and looks forward to expanding FIRST in our region.

Students will continue to volunteer at the ASES, ASSETS and PEAK after school programs, while expanding the number of volunteer opportunities at local community centers. They will continue the *RoboRunner* curriculum and motivate future robotics participants. This community service is part of the class/team requirements and has helped put a face to FIRST. Gaining new sponsorship and cultivating existing ones is a required element for team participation as well.

Students recently created a new program called RoboFUN Birthday. They entertain and teach a fun mini-RoboRunner curriculum at birthday celebrations. Now

parents can book an educational birthday party celebration for their children led by teen mentors.

Additionally week long summer camps in 2016 have been requested by local enrichment programs.



VII. ACTION/IMPLEMENTATION PLAN

Team 3925 expects to accomplish these goals by continuing with its strong business plan, which includes expanding the role of student leaders and aspiring student leaders. These members encourage and assist in building the curriculum, in making strong personal connections with community leaders, as well as transporting students to and from the volunteer community centers. This fosters relationships within the community, attracting mentors, sponsors and future participants.



VIII. TEAM BUDGET & FINANCIAL STATEMENT

FINAL STATEMENT:

INCOME STATEMENT TEAM 3925 - CIRCUIT OF LIFE YEAR 2015-2016 SEASON

Income:

Team member donations	2,860.00
Local Community Fundraising	943.60
Corporate Sponsors	23,660.00
Grant - VC Innovates	5,000.00

Total Income	\$32,463.60
---------------------	--------------------

Expenses:

Robot Materials	3,045.00
Tools/equipments purchased	5,000.00
Travel Expenses	3,083.00
Registration Fees (Regionals)	9,000.00
Class Expenses	1,679.40

Total Expenses	\$21,807.40
-----------------------	--------------------

Net Income	\$10,656.20
------------	-------------

IX. SPONSOR BENEFITS

Our Sponsorship Program

100% of all donations go directly to team activities. Team 3925 welcomes all donations of funds and/or merchandise of any amount.

Our sponsorship program consists of:

\$100-\$499 Cub Sponsor

Business Name on Website

Invitation and Recognition at Robo Roll-Out

\$500-\$999 Tazbot and Karel Sponsor

Company Logo on Website

Certificate of Appreciation

Invitation and Recognition at Robo Roll-Out

\$1,000-\$2,999 Bold Maurice Sponsor

Company Logo on Website

Certificate of Appreciation

Invitation and Recognition at Robo Roll-Out

Framed 8 x 10 competition photo signed by students

Sponsor gift bag

Company logo on the 2016 Team T-Shirt

Company logo on pit banner

\$3,000+ Golden Simba Sponsor

Company Logo on Website

Certificate of Appreciation

Invitation and Recognition at Robo Roll-Out

Framed 8 x 10 competition photo signed by students

Sponsor gift bag

Company logo on the 2016 Team T-Shirt

Company logo on team pit banner

Company logo on robot

Team 3925 Promotional Booklet



X. TEAM FUNDRAISING OPPORTUNITIES

Our team members fundraise by writing letters, speaking at service club meetings, and applying for grants from educational institutions. We have corporate sponsors, such as GeneHaas Foundation, AMGEN, Qualcomm, CACT (Centers for Applied Competitive Technologies), Rotary Club of Ventura, Burr Financials, Inc., IEEE Robotics & Automation Society, and Sessa Manufacturing. We also have educational sponsors, such as College of the Canyons, California Community Colleges, and hundreds of proud parents, neighbors and friends who support our team each year. The treasurer keeps track of all funds and accounts for each amount being spent properly in its correct category.

In 2016, team 3925 launched a new event called “Robo Roll Out”. This is a fundraising event that invites sponsors, family members and community members throughout Ventura County to come and see what the FIRST program is all about.

XI. TEAM CONTACT INFORMATION

Website: <http://team3925.com/>

Team Email: team3925col@gmail.com

Facebook: Robotics Team 3925

Twitter: https://twitter.com/CircuitofLife_/

APPENDIX A.
RoboRunner Background and Curriculum
By Caitlyn Fastenau



STEM (Science, Technology, Engineering, Math) and ROBOTICS!

Background

The FRC 3925 Robotics Champion Project: RoboRunner relies on the voice of teens as leaders and mentors for younger students, working in non-competitive, hands-on informal educational settings encouraging spatial awareness and collaboration. Spatial skills in particular were chosen based on research into the reasons for reduced participation in STEM and Robotics. Lack of exposure to spatial skills appears to be the most significant reason students are choosing to participate in Robotics.

Research demonstrates that over the next decade the world will need a large talented diverse workforce in the STEM fields (Science, Technology, Engineering and Math); women and minorities remain very underrepresented in science classes and STEM fields. Experience supports the research that many STEM programs are happening too late. Earlier exposure in elementary school or middle school will benefit student confidence and excitement.

The State of California Department of Education's INNOVATE State Blueprint for STEM (2014) emphasizes that "STEM is Everywhere" and "every learning ecosystem" should be used. Robotics Champion Curriculum is a Teen Mentor learning ecosystem that other FRC teams can incorporate into the business plan.

One of the persistent gaps in cognitive skills is in spatial skills, specifically on measures of mental rotation (example Purdue Spatial Visualization Test) – which correlates with three stations included for RoboRunner. Other curriculum elements/stations address additional recommendations. The Robotics Champion program has been designed using PDSA rapid cycles for best outcome (PDSA—Plan, Do, Study, Act). The FRC Teen Mentors have built on small successes and now are expanding widely into the community.

Research Recommendations

1. Spatial skills are developed, so give lots of opportunities and exposure
2. Encourage use of construction toys, fitting items together, following complex instructions and diagrams
3. Use handheld models

This is the basis for this project. We provide an opportunity for hands-on learning in a fun environment—using shapeology, tangrams, nuts, bolts and screws, aerodynamics of airplanes and robot paper plane launcher, smart robot, paper rockets, spaghetti construction towers, dynamo generator car, aerodynamic drone and tin can cable car. In addition we teach construction and interpreting diagrams, and working on a tin can robot (basic foundations and skills are built upon in successive sessions). The curriculum builds spatial concepts and adds problem solving in working on the robot which establishes success and confidence in a supportive learning environment. (The goal is confidence with spatial problem solving). STEM is really in every field and every career as innovation, technology and communication advances.

The Curriculum

The curriculum is designed for 12+ sessions or can be presented in a Discovery Day format involving all or some of the activities. Additionally the curriculum is now in trial development for one-week summer camps for local enrichment programs. (See photo examples of after school enrichment programs, school programs, Boys and Girls Clubs, Boy and Girl Scouting events and a pilot for summer camps). Additionally, birthday parties are led by Robotics Teen Mentors.

A big part of learning a skill set and building a foundation, is understanding what parts are available, what they are called, what they are used for and how they can be used in different ways in construction and machine design. Each station is designed for 2-4 maximum students which encourages hands-on interaction. The activities encourage teamwork, collaboration and communication with peers and the teen mentors who model the desired behaviors. The small number of students at each station allows for individual discovery plus evaluation of differing strategies.

Nuts and Bolts

- Learning the basics, knowledge and discrimination
- Learning head markings, grade and material, nominal size range, mechanical properties and working with multiple nuts matching the screws and to the specific function, working with screws with self-drilling point, threads, bolts, cap, wing

Shapeometry and Spatial Rotation

- Build from picture/instructions, reasoning
- Tangrams for older students, discrimination, dimensional, abstract and quantitative reasoning

Building Spaghetti Towers

- Supplies and creative problem solving as a team
- Manipulative skills and basic mechanical engineering skills
- Working out solutions, changing the approach

Aerodynamics

- Paper planes, paper plane robot launcher, paper rockets—addressing construction of launch device, different composition and supplies
- Complexity—folding planes based on diagrams, understanding aerodynamics and design and how that impacts on drag and lift—certain creases, folds that must be firm and sharp to allow plane to cut through the air
- Achieving greater distances; differences in materials – indirectly gravity, point of balance, weight distribution. The robot plane launcher teaches concepts of mechanical wheel and axle, pulley and gear with design of the plane central as well

Brain Teasers and Puzzles

- Problem solving, perseverance, abstract and quantitative reasoning skills, students are encouraged to talk openly while working to share their reasoning and strategy. Research demonstrates that talking through a problem and listening to others verbally discuss will help students become more intentional about thinking and increase understanding of concepts

Construction Challenge

- Manipulation and part-to-whole concepts

Smart Robot

- Learning algorithms, loops and conditionals, beginning code concepts

T-shirt Launch Full-Size Robot

- Concepts connecting to learning robotics, driving the robot
- Demonstrates the capability of the FRC students

Tin Can Robot Cable Cars

- Pulley system, reverse switch, energy, gears

Dynamo Generator Car

- Generator and electricity, DC current

Tin Can Robots

- Putting it all together, working together as a team, problem solving over several sessions, interacting with peers and teen mentors

#1 RoboRunner: STEM Project--Design/Pilot 3-4 months

Plan, Do, Study, Act (PDSA)

Plan: Research STEM, spatial skills are the focus of the project in support of girls joining robotics as example of STEM--robotics discovery Junior First Lego League (JrFLL), First Lego League (FLL), First Robotics Competition (FRC). Ideas reviewed with Robotics mentors and math/science teachers. Plan promotional banners for community sites, for events and for Robotics team to use at competitions. Build project for sustainability—collaborate with Robotics Team 3925, Girls STEM Club and Girl Scout Ambassadors. Specifically Robotics team officers will be engaged to continue the project for community hours and to support the Robotics alliances. Design and test skills in a box—RoboRunner Spatial Skills in a box “Robotics on the Run”

Do: Participate with Robotics Mentors and Students, work in small groups on concepts of aerodynamics with paper planes and introduction of tin can robots. Used primarily at Boys and Girls Clubs in 5th graders (trial group), added community groups. Successfully completed tin can robots, students worked in groups of 4 due to cost of the robot supplies. Learned design and graphics to significantly reduce costs of banner stands (two purchased) for project and Robotics team (donation to the team). Purchased supplies, donated to Robotics Team 3925 for ongoing community service. Some robot kits to be used for outreach and event.

Act: Finalize curriculum boxes including overall background design, research recommendations, skills for each box, contents (for each presentation and for restocking) and teen mentor instructions. Design an event that takes what we have learned over 3-4 months at Community Centers. The event will be focused on girls (Girl Scouts) and will combine all spatial skills boxes and activities as stations plus additional fun demonstrations. Evaluate the event stations to guide RoboRunner and Robotics team. This will help in future collaboration with Boys and Girls clubs and Scouting during the 2015-2016 school year.

Study: Students with varying abilities to serve as a leader and mentor of younger students, better serve the students with a more organized curriculum (instructions, contents of box and specific concepts to be shared for each meeting or station), 5th graders really enjoyed working on the tin can robots and were successful. Also able to engage the younger students with basic spatial hands-on discovery and they are already very excited to participate next year. The goal of the project was to create excitement for STEM related activity. Activities are valuable but need to add summary of concepts and why each station is important. Supply costs—the tin can robots are expensive. Can they be purchased in bulk? Tin Can Robots require a soda can but the student mentors should not be “promoting” sodas which is unhealthy. Add more activities or curriculum stations. Reduce number of students at each station to maximize hands-on and interaction with the teen mentors.

#2 RoboRunner: STEM Project--Discovery Day

Plan, Do, Study, Act (PDSA)

Plan: Set up 3 hour event for Girl Scouts with teen mentors from Robotics Team, Girls STEM club and Ambassador Girls Scouts. Set up at Arnaz Program Center to allow for demonstration of small scale and large scale robots. Unlike pilot at community centers with 4 students to 1 teen mentor the event will alter the ratio to 2 students per station and each student will work on their own robot. Stations: Hour of Coding, Smart Robot demonstration and interaction, Nuts and Bolts, ShapeOmetry Challenge, Aerodynamics of paper plane and robot plane launcher, Brain Teasers and Spatial Rotation, Construction Zone, Robot Launcher for T-shirts, Demonstration of Tin Can Cable Cars across the room, Dynamo Generator Car and each Girl Scout to build their own Tin Can Robot.

Do: Volunteers and volunteer training for spatial skill stations, acrylic painting and sealing 100 soda cans for event and future community sessions. Evaluate timing for building tin can robots all in one session (trial with more than one session and 4 students working on one robot), set up event schedule, T-shirts for launching “ToGetHerThere” and patch/pin “Year of the Girl”. Build and test the additional demonstration robots. Add Dreams to Reality session for Girl Scouts. Plan evaluation for the event including girls, adult leaders and teen mentors with suggestions for ongoing spatial skills sessions. Make building Tin Can Robots the highlight of a series of sessions or single day.

Act: The RoboRunner spatial skills boxes and Tin Can Robots will be used for Robotics outreach to Boys and Girls clubs, Community Centers and Boy and Girl Scouts based on the project experience. The background research and materials for each skill set plus instructions for the mentor are ready to go. All Banner Stands (2), all spatial skill boxes containing the games and materials, painted tin cans and 60 Tin Can Robot kits for teams of 4 are donated to Robotics Team 3925 as part of the design for sustainability. FIRST Robotics has a national alliance with organizations including Boys and Girls clubs, and Boy /Girl Scouts so this is a national and local connection. Teen mentors are key and come from Robotics Team 3925, Girls STEM Club and Ambassador Girl Scouts.

Study: Observation during the event. Most of the girls were in 4th and 5th grades. Each Girl Scout was provided her own robot to build from start to finish. During the pilot 4 students worked together to collaborate, interpret instructions and problem solve with one teen mentor. When confronted with their own robot the Girl Scouts needed more teen mentor support. This event demonstrated that the emphasis on the group approach is best and teaches the skills necessary to work successfully as a team and especially working with each other's strengths. Evaluations overall very positive. Supports the plan to focus on Tin Can Robots—none of the girls had any experience with nuts and bolts or robots. 68% of the Girl Scouts would consider Robotics in the future and 96% rated the event as awesome.









