



BOCA RATON, FL • 4-H SCIENCE & TECHNOLOGY CLUB
FIRST FRC TEAM # 3932 • DIRTY MECHANICS
WWW.DIRTYMECHANICS.ORG

Entrepreneurship Business Plan

Team 3932 Mission Statement

Team 3932 “The Dirty Mechanics” is an award winning competitive robotics team focused on building a strong community & making a better America through the fun use of Science, Technology, Engineering & Math (STEM).

Organized through the Boca Raton 4-H Science & Technology Club, the Dirty Mechanics are a true community team with members from public, private & home schools in the Boca Raton area; this diversity is its strength. Team 3932 demonstrates robots at community events to help raise awareness as well as to recruit members, volunteers at FLL events, & is working to expand FIRST to Africa. Our local community service project is Boca Helping Hands, a food bank & charity where we volunteer to collect & distribute food.

In Team 3932's short existence, 97% of alumni have gone on to higher education, & 90% chose STEM courses of study in college. Alumni have earned over \$570k in scholarships & grants, including scholarships through the FIRST Scholarship program. Students see this as an attainable goal!

Over the last few years Team 3932 hasn't only grown in students & mentors, but in its ability to train team members in all aspects of the design & build process, as well as the strategy of competition. We've tripled membership & doubled the number of girls on the team. We continue to strive towards a 3:1 student/mentor ratio. We've achieved our goal of having a year-round program through off season mentoring in CAD, programming & build projects to encourage team members to get more involved & more proficient in designing, programming & building robots.

Team Origin

In response to a need for community FRC team in the Boca Raton, Florida area, 3932 was founded fall 2011. Children of team founders had previously been involved in robotics at their schools. Yet, when school teams disbanded, families sought new teams for their children.

Not finding suitable options, families started their own team. Organized under the Boca Raton 4-H Sci & Tech Club, Team 3932 was born. Dirty Mechanics became a true community team. Members come from various high schools & home schools in the Boca Raton area; this diversity is one of its strengths. It provides a chance for motivated local high school students, who do not have a school team, to participate in robotics endeavors.

Our founders are:

- Ms. Ellen Ferguson, Financial Operations, Organizer
- Mr. David Ferguson, Technical Leader
- Mr. J. D. Potts, Technical Leader and Team Coach
- Mr. Joel Middlebrooks, Technical Leader

Location: St Andrew's School, Bldg #14, 3900 Jog Rd, Boca Raton, FL 33434

Team 3932 has 42 students & 22 mentors. The team currently is comprised of 6 different schools & 5 home schools from the community. We've more than doubled amount of girls & tripled our total number of team members since our launch. More engineers & alumni join each year, adding experience & backup to current mentors. We focus on a goal of maintaining a 3:1 student-mentor ratio which gives more hands-on training. Team has a very high participation rate, often over 50% a night during build season and a very low attrition rate of less than 2%. **(Please see Team Statistics on next page)**

Through one of our sponsors, St. Andrews School, we have a small, but stable workspace. Current challenges to participate include student schedules at various schools, mentor work schedules, obtaining parts, & limited shop space. We have had financial challenges, we've lost & gained sponsors & have had challenges with fundraising. Although team members pay for their own travel expenses, some food donations are provided.

Team Statistics

- 42 motivated enthusiastic students
- 6 different schools and 5 home school groups
- 22 dedicated mentors
- 26 generous sponsors
- And support of parents and families!

Team Member Statistics

St. Andrew's School	13
Olympic Heights High School	11
Spanish River High School	7
Home Schools	5
Boca Raton High School	4
West Boca High	1
Stoneman Douglas	1

Girls	14
Boys	28

Seniors	4
Juniors	17
Sophomores	13
Freshman	8
TOTAL	42

Team Mentors

Our team of 22 adult mentors are not only experienced in engineering and robotics, but are also dedicated to working with the kids on the team. Our founders continue to work with the team although their children have graduated and attend college. Mentors range from chief software architect, robotics engineer, EE integration expert, retired software programmer, to FRC alumni as two 2016 graduating seniors are attending local colleges. Our mentors and coaches bring a well-rounded skill set to the Dirty

Mechanics:

- Electrical Engineering
- Structural Engineering
- Software Engineering and Programming
- Machine and Model Engineering
- Accounting
- Architecture
- Information Technology
- Biology
- Law
- Business
- Graphic Design
- Video & Photography
- Marketing

Team Sponsors

FRC Team 3932 has been fortunate in receiving the operating funds, facilities, and fabrication of special parts as well as parts and tools from various sources. FRC Team 3932 has benefited from the generous support of its 2016-2017 sponsors:

- St. Andrew's School
- Rotary Club
- Canon
- KD Construction
- State of Florida
- Aerojet Rocketdyne & Education Foundation of PB
- Tyco-Johnson Controls
- Citrix
- Henderson Machine
- BBM Structural Engineers
- Action Auto-ID
- Slattery & Assoc Architects
- CJM Construction
- FPL
- Lockheed Martin
- SRHS Foundation
- Learning Circle
- Coldwell Banker–Lisa Byrne
- Hirsh Arthritis & Sports Medicine
- Dow Family
- Runner's Edge
- Modernizing Medicine
- Sussman Family
- Powers McNalis Teebagy Luongo
- M K Morse Co
- Rugworks

Team Sponsorship Details

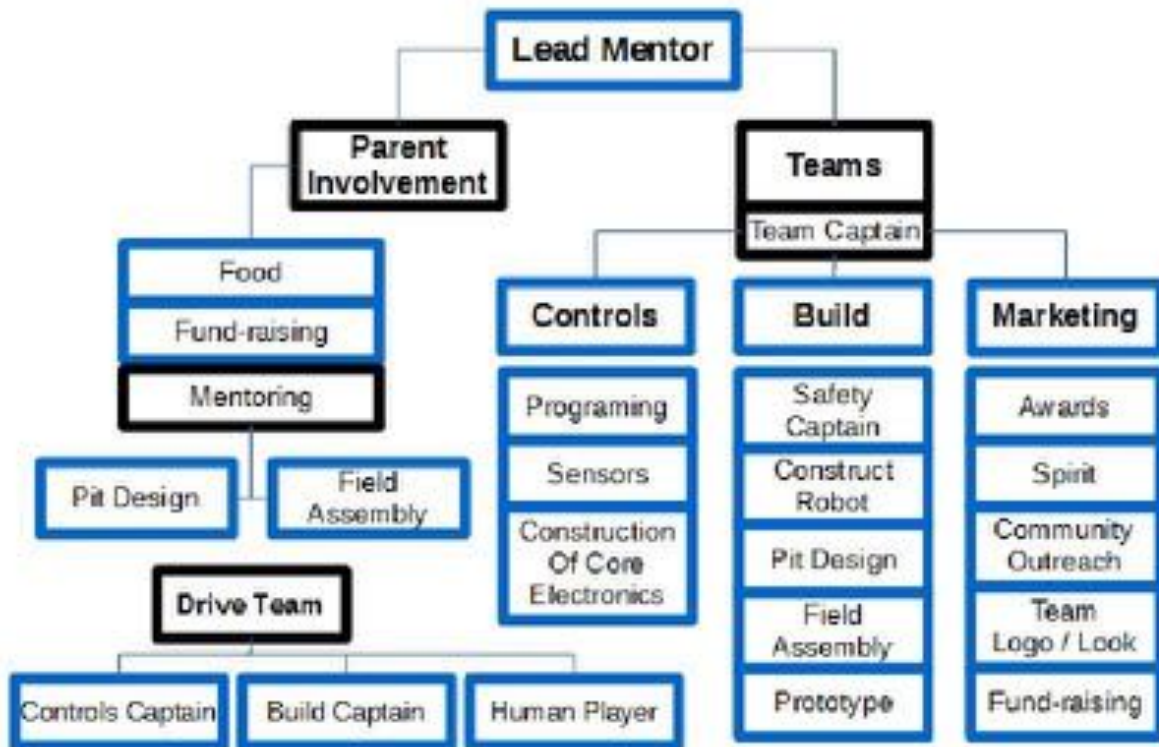
FRC Team 3932 has been fortunate in receiving the operating funds, facilities, and fabrication of special parts as well as parts and tools from various sources. FRC Team 3932 has benefitted from the generous support of its 2017 sponsors:

- **St. Andrew's School** Boca Raton, made donations, provided mentors and has graciously provided a workroom and meeting rooms for the design and construction of the robot. The FRC Team 3932 Robotics Facility is a workroom of about 2000 square feet with electricity, water, wi-fi, and maintained restrooms.
- **Rotary Club** Boca Raton, made club donations and provides scholarships to their RYLA Youth Leadership Conference.
- **Canon** Boca Raton, made a corporate donation, provided mentors, S FL FRC Regional sponsorship and volunteers, printed game manuals and team books.
- **KD Construction** Boca Raton, made a corporate donation.
- **State of Florida**, donation for registration fees.
- **Aerojet Rocketdyne & Education Foundation of PB**, corporate donation
- **Tyco-Johnson Controls**, corporate donation
- **Citrix**, corporate donation, sponsorship of S Florida Regional and provided volunteers
- **Henderson Machine** Boca Raton, generously fabricated special aluminum panels, pulleys, rollers and other customized mechanisms for the robot at no charge to FRC Team 3932.
- **BBM Structural Engineers** Boca Raton, made a corporate donation, and provided lead build mentors.
- **Action Auto-ID** Boca Raton, made a corporate donation and provided mentors.
- **Slattery & Associates Architects** Boca Raton, made a corporate donation and provided mentors.
- **CJM Construction** Boca Raton, made a corporate donation.
- **Florida Power & Light (FPL)** made a corporate donation and our team alum won their inaugural FIRST FRC \$20,000 Scholarship.
- **Lockheed Martin** Boca Raton, corporate donation.
- **SRHS Foundation** Boca Raton, donation
- **Learning Circle**, made a corporate donation.

- **Coldwell Banker Real Estate - Lisa Byrne**, donation & mentor.
- **Hirsh Arthritis & Sports Medicine**, corporate donation and server equipment.
- **Dow Family**, donation and parent volunteers
- **Runner's Edge**, Boca Raton provided discounts on T-shirts and imprinting.
- **Modernizing Medicine**, Boca Raton provided mentors.
- **Sussman Family**, donation
- **Powers McNalis Teebagy Luongo**, donation and provided mentors.
- **M. K. Morse Company** Boca Raton, provided tools.
- **Rugworks**, made a corporate donation.

Organizational Structure

Dirty Mechanics Team Organization



Funds are raised through sponsors, fundraisers, donations of money, time and equipment. In 2012, our co-founders established a dedicated bank account with TD Bank under Palm Beach County 4-H Association that monitors all bank statements. For 2015, the State of Florida 4-H has established an IRS Group Exemption, so Palm Beach County 4-H and our club can finally accept direct donations.

Ms. Ellen Ferguson, Mr. Joel Middlebrooks and Mr. J. D. Potts have check-writing authority for the account. They are responsible for depositing all donations and other income used for team operating expenses. The financial officers welcome independent auditors from any donor to review our financial operations.

Organizational Structure, continued

Team 3932 has been fortunate in receiving operating funds, facilities and fabrication of special parts and tools all because our students, mentors and parents work to find and engage sponsors.

Through our community activities, demonstration, and dirtymechanics.org website, we continue to attract new members and sponsors for current and future seasons. Any funds raised and not applied toward 2017 FIRST objectives and principles will be applied to 2018.

Team Fundraising

The Team is depending on strong community support for the goals of this ambitious team in this challenging program. Students continue to increase the amount they personally fundraise.

2016-2017

A Fall coupon book fundraiser raised \$3,600 for 2017 STEAMWorks. We continue to develop more ideas for fundraising. Ms. Amy Dow and Ms Erica Wolgalter, parent volunteers did a great job in their first time organizing this year's fundraising efforts! We also had an opportunity to sell raffle tickets for our longtime sponsor, The Rotary Club and raised \$2,750 for the club in a week!

2015-2016

A Fall coupon book fundraiser raised \$2300 for 2016 Stronghold. We are to develop more ideas for fundraising. Ms. Daria Wels, a parent volunteer continued to help organize this year's fundraising efforts and is working with new parent volunteers as her son graduates this year.

2014-2015

A Fall coupon book fundraiser raised \$2000 for 2015 Recycle Rush, and a 5 Guys Hamburgers fundraiser in March 2015 raised \$100 for the coming season. Ms. Daria Wels, a parent volunteer helped organize this year's fundraising efforts.

Two students, Jillian H. and Caleb S. wrote an essay for a 3D printer contest and won an EKOCYCLE 3D printer for the team!

2013-2014

Team 3932's Wreath Fundraiser was a success and raised over \$700 to benefit the 2014 FRC Aerial Assault Challenge. A parent volunteer Mrs. Sharon Stephenson organized the fundraising effort. Team members did a great job and our top sellers were Myles B., Andrew F. and Timothy M.

DIRTY mechanics

FRC Robotics Team #3932
Fundraiser for the 2015 Season!



Support the Dirty Mechanics and
SAVE \$40 at Publix*

along with coupons for stores & restaurants
including discounts on subs, pizza, movies,
and many others!

*Valid at most Publix locations. Terms and conditions apply.



Team 3932 is a community based team. Working under the Boca Raton 4-H Science and Technology Club, highly motivated, local high school students make up FIRST FRC Team 3932 - "The Dirty Mechanics."

Engineers in hardware, software, and structural design, along with adults with various other backgrounds, mentor the students.

We are always looking for additional mentors or sponsors!

Please email us at
BocaFRC@gmail.com
Or visit our website at
DirtyMechanics.org



Every dollar counts! Our entry fees for our two regional competitions are \$5,000 and \$4,000. We also use additional money for equipment and building materials to construct our robot.

Fundraiser Contact: Daria McNalis
\$20 ea Cash Only 561-479-8198





Classic

Victorian



25" \$20
 28" \$25
 Spray - \$15 ↗



25" \$25
 28" \$28
 ↖ Spray - \$20



Scan to See a Video About FRC!



Candle
 Centerpiece
 \$19.99

Door
 Hanger
 \$1.75

Checks made payable to
 Palm Beach Cty 4H Assoc./
 Boca Raton Robotics Club

DirtyMechanics.org
bocafrc@gmail.com

Fundraiser Contact:
 Sharon Stephenson
sharwithall@gmail.com
 954-295-2225

DIRTY mechanics

Support our Robotics FRC Team 3932, The Dirty Mechanics

Eat at



FIVE GUYS®

BURGERS and FRIES

Wednesday, March 4, 2015

Between 4-8 pm

Must mention "Dirty Mechanics"

Where: Five Guys Burgers and Fries,

located in Glades Plaza, near Glades and Butts Road
2240 NW 19th Street, Boca Raton, FL 33431
Phone # 561-368-8384.

What:

This is a fundraiser. Five Guys will donate to our team 15% - 25% of whatever they sell to any person **who says that they are there to support Robotics Team - Dirty Mechanics**

Who:

The Dirty Mechanics Robotics team is a community team composed of students from 7 different Boca Raton area private and public high schools, including several home schooled students. **St. Andrews School in Boca Raton** gave the Dirty Mechanics a home on their campus and have become their Platinum Sponsor and Strategic Partner.

Nothing extra to buy or sell. Just come out and have a good time with your friends eating a great meal and meeting the robotics team!!

(Caution: Five Guys uses peanut oil and has open boxes of peanuts)

DirtyMechanics.org

facebook.com/dmrobotics



Relationships

Team 3932 has a strong relationship between students & mentors, Palm Beach 4-H, sponsors, such as Canon America, & community partners. Team members & mentors have engaged community & parent support. As a result 3932 was able to spread out non-technical responsibilities so mentors could spend more time with students on designing, building & programming the robot. More mentors & FRC alumni have joined & bring valuable expertise. Mentors made a commitment to having a year round program. This has allowed students to receive training in a variety of areas & they've learned to work together as a team without the pressure of the competition deadlines. New students have been able to have a head start on understanding the program.

Demonstrations in the community, schools, & for sponsor events keep the community & sponsors engaged. Our community programming workshops, and FLL volunteer efforts & demonstrations engage & inspire FLL students to move into FRC.

Our team mentored the Advent Lutheran school FLL team with their FLL project this season, helping them prototype a strap-on arm bird feeder from a Lego prototype to 3-D printed creation that had a cup for birdseed and a perch for the birds. Check out the picture in our Community Outreach section!

Working with sponsor Citrix, we've helped start & mentor two FLL teams in Agogo, Ghana. We provided FLL supplies & had a "Go to Meeting" video conference at Citrix's Corporate Headquarters with children in Ghana. Team members coached Ghana students to get their robots moving in real-time! We were able to help them build a working robot from parts in 2.5 hours.

Our sponsor St. Andrew's School has been inspired to develop a robotics program as part of their Vision2020 strategic plan. They built experiential classroom space with room for FLL tables & robot building. We hope to continue to work with them to build the program & mentor more students in the future.

Deployment of Resources

Community Outreach

3932 is actively engaging our community to spread the FIRST message.

(see tab for more info)

- Reaching 110,000+, we marched & demonstrated our robots in 3 Boca Raton Holiday parades with **four** robots in 2016, distributing FIRST flyers & candy, winning 3rd place in '13 to the delight of the crowds of kids of all ages!
- Reaching 4050+, we have demoed & presented at local school, community, FLL & sponsor events to the delight of kids, parents, & sponsors.
- At Boca Helping Hands, food bank & soup kitchen, we have volunteered 100+ hours & collected 350 lbs of Thanksgiving basket food & 188+ lbs of cereal from our cereal drives in in 3 years.

Sponsors

- We are inspiring our sponsor St. Andrews School to develop robotics programs & they have just built experiential learning robotics classrooms designed by experienced FIRST architects.
- We have also inspired our sponsor Citrix to work with us to help fund and start an FLL program at the YIST School in Agogo, Ghana to grow FIRST internationally!

FIRST

- We volunteer at FLL and FRC events and continue to mentor FLL teams
- Starting a petition for the Christa McAuliffe Commemorative Coin Act
- Producing a series of Bumper tutorial videos to assist FRC teams
- We have also reached out to a school in Nassau, Bahamas who is enthusiastic about starting a new FRC team!

Skill Building

Our adult mentors try to provide a 2:1 or 3:1 student to mentor ratio to improve hands-on learning to quickly develop student robot building and programming skills.

Scholarships

We have encouraged our seniors to apply for scholarships, edit essays, and provide references. In 5 years, our seniors have received over \$570K in FIRST and team-related scholarships!

Future Plans

We will continue to build strong ties with our current and future sponsors. In the near future, we will continue demonstrations at sponsors workplaces and school campuses. We will sustain the spreading of FIRST through community service as well as allowing our sponsors to see exactly what their donations are inspiring - the technical leaders, inventors and entrepreneurs of tomorrow through our spectacularly innovative robots!

Our mentors are committed to continue our year-long program to build our team's skill set earlier and have students prepared and ready to engage in FRC's six week build cycle.

Each year we present for our Rotary Club and they continue to fund us. They have provided spots for our team members each year at their RYLA Conference to develop leadership skills. We just received an additional donation due to our work in selling raffle tickets right before Regionals.

We hope to continue work with our sponsor Citrix to become a mentoring team to the two FLL teams at YIST school in Agogo, Ghana near one of their technical centers in Africa for FIRST international reach! Their community outreach VP has been invaluable with her connections acting as the catalyst for this effort.

We have inspired our host sponsor, St. Andrews School, to develop robotics programs. As part of their Vision2020 plan they built an experimental classroom for FLL tables and robot building. Team members hope to mentor in these programs.

We are excited about the opportunity to help a school in The Bahamas start a FRC team! We are looking forward to developing a relationship with them and be a first time mentor to an FRC team!

Our team will continue to polish the series of Bumper tutorial videos we are releasing on our YouTube channel and website. After seeing teams struggle with bumpers at inspections and on the field, we realized we had expertise in this Robotics area and could help other teams with our knowledge and tips on building bumpers and bumper covers.

We will continue to volunteer & mentor local FLL teams as well. Many members got their start in FLL and it is a great source to recruit talented motivated robotics team members!

2016-2017 Dirty Mechanics 3932 Financial Statement

Income	Donations	\$27,000.00
	Coupon Book Fundraiser	3566.00
	TOTAL INCOME	\$30,566.00
Expenses	Tournament Fees	\$9,600.00
	Robots	5,000.00
	Robot shipping	1,800.00
	Development Stations	4,000.00
	Shop Tools	1,000.00
	Shop Materials & Metal	2,000.00
	Office Supplies	500.00
	Pit Shelving Materials	250.00
	Snacks for Tournament	200.00
	U-Haul Rental	300.00
	Travel Room & Meals	2000.00
	Playing Field Materials	600.00
	Marketing Expenses:	
	Parade Materials	300.00
	Banners	160.00
	Flyers	300.00
	Buttons	150.00
	Giveaway Imprinted Shop Rags, Foam Wrench Hats, etc.	200.00
	TOTAL EXPENSES	\$28,160.00
Net Income	For Future Expenses	\$2,406.00
Note:**	Hopeful 2017 FRC Championship (Currently Unbudgeted)	\$22,000.00

Risk Analysis (SWOT)

Strengths

The Dirty Mechanics team is composed of **experienced mentors** and **enthusiastic students** that make our team competitive, visible in community and attractive to new members. As a community team, we attract students from a **diverse group** of 6 schools and several homeschools. Generous donations by sponsors, such as our new sponsor, Canon, have enabled us to fund many expenses for tournaments. We have a **large amount of sponsors**. Reduced sensitivity to the influx of sponsors. We have also successfully pursued the production of our **bumper tutorial video** instructing other FRC teams on bumper building tips and techniques.

Weaknesses

We have three classrooms at Saint Andrew's School, but we always need to expand our building space. We are at **full capacity**, therefore we will not be able to accept more than **43 team members**. Finding enough **dedicated mentors** to accommodate our growth is also an ongoing challenge.

Opportunities

Winning the 2016 South Florida Regional competition enabled us to go to the FRC Championships. By expanding our **community service** to assist Boca Helping Hands, the Boca Holiday Parade, and other organizations and events we have become more visible.

- Saint Andrew's School has been inspired to **develop a FIRST FLL** program
- Our sponsor Citrix helped us start **two FLL teams in Ghana**.
- We also have expanded our reach to Nassau, **Bahamas** in which one of our mentors is working with a school to create another FRC team.

Threats

Our biggest threat is **team sustainability** within different groups of the team such as the marketing team in which we only have 4 students who will be leaving within 2 years. We also have a large number of **new students this year** we will have to train to build, design, and control the robot for the tournaments.

Team Graduates

- 97% of Dirty Mechanics graduated high school and went on to higher education.
- 90% are enrolled in engineering fields of study and many received scholarships.
- Most 3932 alumni continue to mentor and volunteer with FIRST
- **Scholarships:**
 - \$570,000+ in FIRST & Team-related Scholarships & Grants
 - Erin F., won a 4-year full tuition FIRST scholarship to attend Worcester Polytechnic Institute (WPI)
 - Nick M., earned 1 of 5 FIRST scholarships to Embry-Riddle Aeronautical University
 - Timothy M., won 1 of 5 FIRST scholarships to Embry-Riddle Aeronautical University
 - Nick C., earned 1 of 5 FIRST scholarships to Embry-Riddle Aeronautical University
 - Myles B., won the inaugural FIRST FPL Nexterra scholarship for the college of his choice
 - Daniel R. earned the George Snow Foundation Rotary Scholarship to attend UCF
 - Charlie B., Joshua S., Timothy M., Myles B. won 4-H scholarships
 - In addition, many of our team members won engineering and other scholarships and grants



Team Achievements

2016:

- **FRC Championship Archimedes Division (12th of 75 teams), St. Louis**
- **Regional Winner, Woodie Flowers Finalist (Mentor - David Ferguson), S Florida Regional**
- **Entrepreneurship Award, Orlando Regional**
- **Finalist, Mission Mayhem (offseason)**

2015 Season:

- **Finalist, Mission Mayhem (offseason)**
- **SemiFinalist, Panther Prowl (offseason)**

2014 Season:

- **Regional Winner, S Florida Regional**
- **FRC World Championship** participant, St. Louis
- **4 Completed Truss Pass Match, S Florida Regional**
- **Semifinalist, Orlando Regional**
- **Florida State FLL Outstanding FRC Supporter Award**

2013 Season:

- **Semifinalist, S Florida Regional**
- **Judge's Award & Daily Safety Award, S Florida Regional**
- **Semifinalist, Orlando Regional**
- **Judge's Award & Daily Safety Award, Orlando Regional**

2012 Season:

- **Quarterfinalist, S Florida Regional**
- **Highest Rookie Seed Award, S Florida Regional**
- **Rookie Inspiration Award, S Florida Regional**

Photos





