L.A. Matheson Secondary

Team 6485

2018 - 2019 Business Plan

CONTENTS:

Mission Statement

L.A. Matheson team 6485 plans to continue our journey building a team of students and mentors who will become engaged in rich and meaningful learning opportunities centered on STEM. We want to encourage our students to expand their learning in the areas of math, science, technology, engineering, business, desktop publishing, media studies, and computer design. We want them to become independent, self-motivated, and critical learners who become active participants in their own education and possess the skills and attitudes to develop innovative solutions to real world problems.

We will work together to bring robotics to our school and to ensure that the program flourishes for years to come. We will strive to bring together staff and students from many subject areas and grade levels to collaborate towards a common goal of designing a robot to complete a specific task to be outline on reveal day. We hope that a robotics program at Matheson will help students apply the skills they learn in the classroom to a larger scale project where they collaborate with one another to explore and develop an interest or passion in STEM (Science, Technology, Engineering, and Math). The skills and attitudes that are fostered within our team members will benefit them in the many years to come and help them rise beyond the limitations of the socio-economic world they live in. We want them to persevere and to develop the communication and interpersonal skills that will enable them to succeed in whatever path they choose to pursue.

We hope that over the next few years our team will evolve and grow from a small team of students and staff focused on building a robot to complete a particular challenge, to a being a strong team of leaders who are a valuable part of the school and local communities and who serve as role models for students at our own school and within our feeder schools, thereby inspiring other students to get involved in STEM related and extra-curricular activities. In three years, we have made tremendous strides in the cohesiveness and strength of our team. We strive to create an environment where members have fun and collaborate to learn about STEM and robotics. But also, focus on developing interpersonal relationships and developing skills in areas that are completely new to them.

SHORT TERM GOALS

- Build a competition worthy robot using the kit of parts that will compete in competition to successfully complete a specific task(s). Our aim is to make it to the elimination rounds and potentially pick be picked by a team in the top 8.
- Develop a system for recruiting new team members that represents the diversity of our school – gender, grade, cultural, learning ability, and interests
- Continue to work with a mentorship team of diverse backgrounds and skills (e.g., engineering - mechanical, engineering-software, business, building)
- Establish regular meetings and work sessions in the Computer Lab and in the workshop where we can train our students on various topics (e.g., building, programming, robot design).
- We work in a shop outside of the school with two industry mentors. We would love to one day have an area in our own school where we can work. Currently we have a 8 x 8 space and access to the cafeteria area afterschool for driving purposes.
- Build awareness of our robotics program throughout our school and community by taking opportunities to showcase our program, hopefully by demonstrating what our robot can do.
- Utilize social media to create our online presence, to spread awareness of our team and our team's mission, and chart our progress and challenges. – website, twitter, blog
- Develop relationships with other teams from within Surrey and the rest of the Lower Mainland. Now that we are in our third year, we want to take a more active leadership role in the FIRST community. Possibly mentoring new Rookie teams, starting a Lego league at one of our elementary feeder schools.

We know we will love this as last year we were able to support other teams at the FRC competition. In addition, we are working with Christine and Baron to introduce Lego Mindstorms to students from grade 4 – 8 within our local community of North Surrey.

- For two years, we have relied on the chassis from the Kit of Parts. We would like to explore the possibility of creating our own custom chassis. The problem we don't know any CADD.
- Take the time to learn to use CADD or other Drafting software like Solid Works to aid in the design of our robot. After build day, we will carefully analyze the challenge and determine what parts of the challenge we want to focus our energies on. Unlike our rookie year, we challenge to reach high and go for the parts of the game that make the most difference to an alliance. Whether it be climbing or reaching higher scales and balls, we want to go for it. Our motto, better to fail trying then to aim low and achieve mediocrity.
- Train the drive team at every opportunity, using robots from previous years if necessary.
- Recruit mentors to work with the students – teachers, industry tradesmen, university students, programmers, business executives, etc.
- Continue to develop our team identity (Name and Logo), for marketing and promoting our team
- To work harder to find sponsorship from companies working within the trade industries. This was the first year we were able to actually garner support.
- Encourage team members to attend workshops offered by the local FIRST representative, to watch the various webinars, and to network with schools from across Canada.
- Work with students to develop team roles and positions that will help the whole team function more effectively and ensure that all members make a valuable contribution and can have the opportunity to grow as learners and showcase their expertise
- Hold a Parent/Student/Mentor meeting and have the leaders of our team and future FIRST alumni, come out and present, and talk about the program, answer any questions, and guide us through the process of having new members join our robotics team.
- We recognize that eventually we will not be able to count on the FIRST community to help cover our financial costs. We need to make our program sustainable by applying for various grants, doing fundraising, and seeking out potential sponsors and mentors that will invest time and funds to support our program in the years to come. Creating donor letters and target list.
- Learn from the challenges we experience this year to develop a stable foundation on which our program will continue to grow and flourish
- Teach our team members the time management, organization, and collaborative skills that will allow them to succeed in all areas of life
- Encourage our students to pursue post-secondary education and training in technological fields such as trades, engineering, sciences, math, and robotics.
- Inspire students see themselves as productive members of a team where their expertise, involvement, and commitment are valued and sought after
- Foster collaboration between students in various areas of our school: trades, science, math, business, and media studies.
- To do outreach in our school and community, fostering the idea that learning about STEM can be fun and rewarding.
- Continue in our quest to develop the involvement of women in STEM as well as in our robotics program.
- Continue in our efforts to involve special needs students with our LEGO club and LEGO Boost Programming.
- To show our appreciation to FIRST, we hope to proudly represent them at the Tech BC Summit

- To introduce younger students within our own school and from our feeder elementary schools to robotics and other computer technology
- Ideally, we would love to form a second robotics program at our school where elementary students come to our school to participate in a program that is run by our team of students.
- To create a leadership team of veteran members who will become team mentors to assist new members in their first year(s)
- Seek out opportunities for our students to connect with industry and to acquire scholarships and work experience opportunities
- To acquire long term funding and sponsorship to ensure that our team can continue to expand. We don't want our program to collapse when the FIRST Rookie or Microsoft funding runs out. Potentially we would create a tiered system of donations where sponsors receive different tokens of appreciation based on their level of support. For instance, getting a certificate or team photo, displaying sponsor logos on our website, shirts, banner, and robot.
- Expand the team to a minimum of 20 – 30 dedicated members each year.
- Have senior students mentor junior students, thus passing on experience and knowledge. Thereby ensuring we are never at ground zero again.
- Put more of the daily management systems into the hands of the students
- Encourage more teachers and school community members to engage in fundraising, construction, and programming activities.
- Continue to develop our knowledge of robotics during the off season
- Create a part of the team focussed on the various FIRST Awards
- Consider attending or participating in multiple events
- Invest in a second robot that can be used for prototype development and training purposes.
- In later years, consider mentoring new Rookie teams.
- Eventually create a summer robotics program for elementary students in the local area.
- We would love to be able to offer some scholarships for students graduating from our team who are pursuing education in STEM or teaching.

Part 2: Expected Size and Makeup of Team

Our team is in the initial stages of being formed. But we already have incredible interest in the team across multiple grade levels, learning levels, cultures, and genders.

- Here is an overview of the proposed composition:

    - Lead Mentor: Vicki McKay – programming and administrative
    - Community mentors – from DCT Delta Custom Tools – Frank Rehlinger, Stewart McKay, Andrew Lui, and Andrew Wiebe
    - Students – 15 (potentially up to 20)
        - Of which a minimum of 1/3 will be female
        - Balance of senior and junior students, ideally a minimum of 2 from each grade
        - Representative of our school diversity: cultural groups (including aboriginal / first nations, southeast Asian, Caucasian, Spanish), variety of academic levels including special needs, ELL students, and students coming from different socio-economic backgrounds

- Goal is to continuously have a team that is reflective of our school population and local community. We will strive to do everything we can to ensure our team grows in size and diversity in the years to come.

We will work together to build parental, school, and community support. To achieve this we will ensure that at least 50% of the team will be representative of students who be returning next year to mentor new students who join the team.

- How (or by what methods) will your students be recruited to the new team:
    - We will encourage our team members to recruit under-represented groups; specifically our female students and ethnic groups
    - We will encourage students to get involved in non-robotic opportunities that will support our FRC team. For instance, fund-raising, media and web design, marketing, graphic design, as well as textiles. All those involved will benefit from this form of cross-curricular participation. This will inevitably expose all of our students to the exciting world of science and technology, causing a shift in the school culture by enhancing awareness of FIRST robotics.

- Students will be recruited for the team through:
    - Information sessions at lunch time and after school
    - Announcements on the PA system, posters, the school's weekly TV show (Matheson on the Move), and with flyers attached to the report cards or sent home with students.
    - Demonstrating our robot within the school, at local elementary schools, and at school and community events
    - Demonstrate robot at school pep rally and promote our FRC as a team with the right to be recognized alongside our athletic teams.
    - Word of mouth between students.
    - Survey teachers for a list of recommended students – talent, interest, personal need
    - The robot we will create this year will be displayed in the school and the team will give students and teachers a demonstration similar to what would have been performed at FRC competition in Calgary. We hope that seeing the final product as well as what is expected at competitions will encourage not only students, but also teachers to join the team next year.

- We want to develop a system that tracks and recognizes contributions of individual team members. This will help us assign responsibilities and positions of leadership, and determine recipients of achievement awards, service awards, and scholarships. We want to ensure students are recognized for the various things they do on the team including design, construction, programming, driving, marketing, fund raising, mentoring, etc.

- Team Roles – Here are some of the main leadership positions we envision having:

    - Team Captain
    - Team Manager – Organization of team, recruitment, and financial planning

    - Marketing Head
    - Sponsorship and Fundraising head
    - Build Captain
    - Lead Programmer
    - Awards Team Leader
    - Leader of Community Outreach – Feeder school and local community

School Mentors.
- We wish to continue working with Ms. McKay in the role of our lead mentor

Parent Mentors
- Unfortunately, as with many inner-city schools, we suffer from limited parental involvement. Once we have recruited our team members, we will have to work very hard to find parents to help mentor our students.
- Our intention is to survey parents to find people who have expertise to offer in the areas of robotics, applied skills, programming, engineering, business, marketing and promotions, and fund raising.
- We are also hopeful that our parents will be able to help out with
  - o Providing meals and refreshments for our team members during working sessions
  - o Helping us to reach out to potential financial donors / supporters
  - o Work at businesses that can help offset our costs for parts, marketing, and clothing
  - o Drive students to and from training sessions
  - o Supervise students at work sessions
  - o Putting us in contact with potential industry mentors.
- It is our intent to use the school website, mail outs, and phone system to reach out to the entire population
- We intend to make a request to our PAC (Parent Auxiliary Committee) to provide some financial support to either offset our travel costs or to recognize student involvement and team membership (ie. Team t-shirt or jacket)

Business Mentors / Financial Sponsorships

- Our lead teacher is co-owner of a metal fabrication company in a major industrial area near our school. Her father is willing to offer the support of the company as well as solicit neighboring businesses to lend their support. This will include
  - o Scrap material
  - o Assistance constructing, welding, laser cutting components
  - o Expertise in understanding purpose of kit parts and design of robot components
  - o Tours of their facility
  - o Provide students with an opportunity to work with company employees to custom make and machine parts for the robot

- We will also have students contact local businesses to see if there are industry people equally willing to lend their knowledge and technical expertise. We will generously offer to recognize their support of our program by displaying their company identity on our robot, within our social media components, and on our t-shirt and banner.

- As a relatively new team we are slowly becoming more comfortable in contacting local companies in the surrounding areas to help find businesses that may be in a position to help with funding our new robotics program. We are hoping that our FIRST representatives and mentor school can provide us with tips and ideas how to approach potential sponsors.

- Hopefully parents will approach theirs and family members' employers for financial support.

- We will continue to revised our Sponsorship Letter/Package to present to local companies, for their support. We will promote the benefits of the program, and how businesses and individual mentors can

be of help to the team. We intend to include information about our team, what the goals of our team are, what kind of assistance we are most in need of, our proposed budget. We want potential donors to have a clear picture of how they can help us, where their money will be going, and how big of an impact they could potentially have on our program.

- In addition to money sponsorship, we want to solicit in-kind donations, including materials, building supplies, manufacturing services, transportation and food services,

- In addition, student team members will be expected to make cold calls on local businesses on weekends and professional days.

- Furthermore, we intend to update all those involved through social media using Twitter, Facebook and our team blog.

Part 4: Strategic Planning Process / SWOT Analysis

Within our business plan is a very detailed discussion of the challenges that we will likely face as a young FRC team. Here is a summary of the strengths, weaknesses, opportunities, and threats that will guide our team in determining the type of fundraising and sponsorship efforts we need to focus our attentions on in hopes of initially developing our program and make it sustainable in the years to come.

Strengths:	Weaknesses and Challenges:
- Computer and CADD labs - Separate workspace of shop connected to lab for construction of robot - Large area where practice field can be built and utilized - Interest level of our students in terms of both robotics and programming - Diverse population - Strong relationships with our feeder elementary schools - Mentor school and FIRST representative willing to support our efforts - School open on weekends to help alleviate stress of late nights during build phase - Competition Days - Opportunity to share travel expenses and chaperone costs with other schools.	- Recruiting team members who will put in the time and effort to see this project through to the end. - Ensuring mentors and coaches follow through with their initial commitments. - Students and teacher mentors lack experience with construction of robots and the programming of them. - Develop clearly defined roles that enable members to make a significant contribution to our success. - Our students do not all possess effective time management, organization, and collaboration skills - Many team members come from low-income families - Motivating our parents to get involved and support their children's involvement - Securing funding to ensure our program is sustainable in the years to come
Opportunities:	Threats:
- Fundraising activities to be planned and hosted by our team members - Recruiting trained industry mentors that will provide guidance and help us overcome our challenges - Utilize social media to promote our program within the school and our local community. - Soliciting financial and in-kind donations from local groups and businesses. - Create our team identity - Apply for additional grants that will support our program in the years to come - Create a tiered system for donations where sponsors receive different tokens of appreciation based on their level of support. - As we do not have access to equipment in our own school, we are excited to continue our involvement with industry mentors in a metal fabrication and machining shop. - Encourage students to get involved in non-robotics opportunities	- Loss of teacher mentors - Keeping students engaged and motivated to overcome challenges and not drop out. - Budget shortfalls - Students won't return for year 2 - We won't have the funding structures in place to sustain our program when Rookie grants run out.

Part 5: Team Challenges and Success

We are still a new team and are sure there will continue to be many challenges that could potentially impact our road to success, and growth as a team. We apologize that some of this is repeated from our previous SWOP Analysis.

- Coach continuity and commitment.
    - We are looking to have additional mentors from our school staff and administration and to work together to establish a clear understanding of supervisory times and mentoring responsibilities.
    - We plan to have one main mentor to oversee the whole team, and several others with specialty skills to assist in different parts of the team and build process. We would love to find a mentor with the knowledge of CADD.
    - Furthermore, we want to involve students in as much of the process as possible so that in effect they can train new mentors if and when the need arises.

- Many of our students have no previous experience working with robots, either in terms of kit parts, design and development, and programming. Consequently, there will be a lot to be learned by most members of the team.
    - We will be highly dependent on our lead and industry mentors to provide us with the necessary knowledge to compete at FRC.
    - To help solve this problem we are looking to professional mentors, the FIRST webinars, and self-teaching methods such as books and internet sources.
    - Tap into available FIRST mentorship and online resources.
    - We will be encouraging all team members to take part in training meetings
    - Conducting extensive pre-season training meetings to teach students basic skills, and introducing the FRC program so they won't be overwhelmed when we hit build season.
    - Providing drivers with an opportunity to learn coding and experiment with LEGO MindStorms.

- Students and mentors must be recruited and maintained throughout the season without the benefit of in-school alumni history. We may struggle with keeping our students motivated to persevere and see the project through.
    - Break larger tasks into more manageable chunks
    - Not fall into the trap of trying to have our robot do too much
    - Recognize and reward our team members for their involvement and accomplishments
    - Promote the program within the school and community. Many of our students are unaccustomed to praise and recognition
    - Many of our students are accustomed to working independently and struggling on their own, so we want to incorporate team building and bonding activities to promote an effective team structure.
    - Fostering a welcoming environment where students can contribute ideas, and students and mentors can work together to overcome obstacles and reach goals

- We will potentially lack funds for our program to function.
    - New financial sponsors and mentors must be secured without the benefit of previous connections. We plan to establish a Fundraising Sub-team devoted to fundraising efforts in the community. They will also be tasked with finding industry mentors. We will prepare a sponsorship letter and identify potential partners in the business community. We will target select partners in our first year, in anticipation of a much broader sponsorship campaign in year 3.
    - The plan is to create a more cohesive donor package or flyer that includes information about our team, what the goals of our team are, what kind of assistance we are most in need of, our

proposed budget. We will make use of the resources in the FIRST Fundraising Toolkit to help guide us. We want potential donors to have a clear picture of how they can help us, where their money will be going, and how big of an impact they could potentially have on our program.

- o Solicit in-kind donations, including material and manufacturing services, transportation and food services, in addition to monetary sponsorship.
- o Many of our team members will come from low-income families and will not be able to pay anything to be a part of the program. This means our reliance on Rookie grants from FIRST and Microsoft will be crucial to the success of our program. We will have a plan where parents can apply confidentially to have the team help defray their individual costs if needed.
- o Opposed to paying for a bus, we use public transportation, as well as walking onto the ferry.
- o Find enough sponsors to support us into year three and four with the help of a fundraising committee

- There is the potential for budget overruns. To help avoid this we have constructed a budget based on information for our FIRST rep and from what other FRC teams have submitted in the past. Thankfully, some materials will be donated to us by local industry companies. We are committed to sticking to our budget as closely as possible.

- As we are a relatively new team we do not have to experiences that older teams have. We haven't had the opportunity to make mistakes; therefore we don't have a chance to correct from past mistakes. In addition, we do not have the inventory of spare parts, and although we would love to buy new lime wire, or new OmniWheels, it would require a year long effort in fundraising. We would also not be able to afford repairs or spare parts. We plan to analyze our process and problem solve as necessary. We will rely on networking with experienced robotics teams from other schools to help us avoid some of the pitfalls and to troubleshoot difficulties that come our way.

- **Safety is always a concern, particularly in the shop when using equipment and tools**
    - o Provide both mentors and students with hands on in regards to how to use equipment and tools safely. There has been suggestion that each team member be required to write and pass a safety exam before being allowed to work on the robot.
    - o Ensure that mentors or other staff member has first aid certification and can assist if accidents were to occur. Personal Protective equipment (safety glasses)
    - o Make viewing of work safe videos and website mandatory.
    - o Ensure that students wear safety glasses and proper clothing.
    - o Ensure that students use proper lifting techniques
    - o Encourage students to report unsafe conditions or malfunctioning equipment.
    - o To continue to increase our efforts to promote safety at our FRC events through posters, buttons, and working at the safety glasses stations in the arena.

How Success will be measured:
- Tracking attendance as an indicator of student commitment and interest
- Creating to-do lists for sub-teams, and monitoring their involvement, completion, and progress on a weekly basis. It will be crucial that each team member be tasked with reporting back to the entire team.
- When reflecting on our students' involvement, hopefully we find that they are independent workers who come to us for guidance when needed. That they are capable of working effectively as individuals and as part of a team. We should see evidence of them mentoring and teaching each other and offering assistance and encouragement as it is needed. Student will hopefully be proud of their accomplishments and anxious to share their process with people not involved in the program.

- Conducting an end-of-year survey so students, mentors and parents can provide comments and feedback on the direction of the organization. This will help us build a plan for the following year.
- Hopefully, we will have successfully built a robot that was able to compete at the regional level
- We will assess the extent to which our team stayed intact with members persevering and not bailing out on the project. We will note how many members commit to returning in year two.
- Look at the books and establish if we ran out of money or if we had funds to carry over into year 2.
- In the years to come we will be able to follow the paths of our students to see if the program had a significant impact on their futures: graduation rates and in the education and career programs pursued by our students.
- How FRC Team 6485 is perceived by our community and school. Is it generally seen as being cool or is it only for academic nerds? We have noticed that other the years as we've grown so has the school spirit in regards to STEM.
- By participating in our team, members will acquire a wide variety of skills: business skills, technical skills, interpersonal skills, programming skills, design skills, and artistic skills.

Part 6: Financial Plan / Budget.

In this section we will outline where we are getting our funding from and what we estimate our minimum expenses will be for our Rookie year while we establish our program. Much of this will be based on example budgets provided to us and advice from our FIRST rep and mentor school.

We also hope to receive the FIRST Rookie Grant. These will sustain us to get started, and we plan to continue seeking out Sponsorships from other companies and fundraising within the team to make sure we have the funds we need to continue through our third year, and build for the future.

Hopefully we will have a balance to carry over for other expenses or to start next year.

Please note that some tools and material may be already available at no cost through community partnerships and in-kind donations such as scrap metal, food, printing, office supplies.

Funding Sources:

First Canada Robotics with Microsoft	$2000
RBC Wealth Management	$2000
School PAC	$1000
GM Canada	$4000
Fundraising Activities	$1000
Industry Sponsorship	$1000
Student Fees / Parents	$3500
Total Revenues	$14 500

The team members will be involved in raising funds for the team.
- Fundraisers such as chocolate sales, donut sales, pizza days, bake sales, yard work services, photo booths, robotics camps, operating concession at school events and games.
- Students will be charged some fees to benefit them individually, such as t-shirts, hotel fees, etc.

Minimum Expenses:

First Regional Competition (including kit)	$6800
Additional Robot Purchases	
• Additional robot parts and materials	$2500
• Aluminum Extrusion	$500
• Building materials for practice field	$350
• Tools to supplement already existing inventory	$500
Marketing and Team Spirit	
• Team Apparel (T-shirts and / or jackets)	$800
• Banner for pit area	$200
• Items to trade with other teams	$200
• Brochures	$200
• Team Computer or iPad	$1400
• Office Supplies	$200
Travel Expenses – Victoria Competition	
• Transportation	$1300
• Hotel costs - $115/night X 5 rooms X 4	$2300
• Food Costs for group meal(s)	$1200
• Shipping – zero as we hope to take robot with us	
Unanticipated Expenses and carry over to next year	$800
Total Estimated Expenses	$19 250

We would love to be able to offer some scholarships for students graduating from our team who are pursuing education in STEM or teaching.

Part 7: Community Outreach Growth Plan.

This is our rookie year, and we will focus on promoting our team within our school and within our surrounding community. Our team will work hard to do community service that will increase awareness of STEM but also increase awareness and growth of the FIRST programs.

Some ideas we have include:
- Host robotics workshops to groups from our local elementary schools. This could be done after school, on weekends, on professional days, at Spring Break, or in the summer with a focus on LEGO MindStorms and the FIRST LEGO LEAGUE (FLL).
- Demonstrate our robot in action at school and community events.
- Contact local media outlets (radio, print, and TV) to have them promote our program and the incredible things that our students are achieving. Our Punjabi teacher has generously offered to promote us on a live radio talk show.
- Students will be encouraged to participate and help out at community events such as local festivals such as Diwali and Vaisakhi, Terry Fox Run, Race for the Cure, MS walk. Student will be tasked with researching and finding local community events and groups that may need help. This will also help out students get the mandatory work or volunteer hours needed for graduation.
- Our team will become a good neighbour and clean our school grounds and surrounding streets on a regular basis. This will promote a positive image within our community.
- In the spring, after the competition, our team will tour our local elementary schools and show off what our robot can do. Hopefully they will inspire students from our feeder schools to get involved when they make the step up to high school in the years to come. Some of the schools might be motivated to

create teams of their own. The members of our team could then mentor these younger students in preparation for their own robotics competitions. This will promote STEM and help us recruit member for our own team.

- We will also be informing and educating teachers and trustees within our school board of the importance of STEM and its' application in the construction of our robot.
- We will also use our Marketing Plan to promote the team, and inform as many people as possible about the program.
- We will involve ourselves in STEM related programs to inform all of the benefits and how much fun STEM programs can be.
- In the years to come, hopefully we will have the opportunity to sponsor and mentor Rookie Teams in our area.
- Continue our leadership in the school by working in the school store, helping the school's Spirit Squad, and Yearbook.

Part 8: Team Contact Information

- Main Contacts:
    - Vicki McKay
      LA Matheson Secondary
      9484 – 122 Street, Surrey, BC, V3V 4M1

      Phone: 604.588.3418
      Email: mckay_v@surreyschools.ca

- Team Meeting Information – Wednesdays at lunch and Fridays after school 3:15 – 5:00 pm in pre-season, and during the build season, we will extend the sessions till 7pm and come in on Saturdays or Sundays so that we can be rested and more productive.