Lessons Learned
By FRC Team 6854 - A.B. Lucas Viking Robotics

Team 6854, the A.B. Lucas Viking Robotics, had an amazing rookie year and a large part of that success is due to the wisdom passed on from other teams. Knowing how helpful that advice was, we would love to share some lesson we have learned. Throughout our first year, our team was faced with many different aspects of the FIRST Robotics Competition such as business and outreach, finances, the build and much more. They all presented their own unique challenges as the season progressed and we had to learn how to overcome them and become more efficient in our work.

What our students had to say: *"I used to think robotics clubs was for smart people with lots of experience in engineering and coding. After joining, however, I realized there were a lot of different tasks and roles in the club and there was more than just building a robot that was needed, such as making the website, collecting sponsors and promoting the team."*
"I used to think robotics was just older guys who had lots of experience in building various robotic machines and coding with no real objective. After participating, I now understand there was no need to be intimidated, and we are all just children who enjoy learning about and contributing to the creation of a robot. Robotics is also a great way to train the mind and encourage development of independent as well as teamwork skills! :D"

We had many challenges in the area of business and outreach. As a rookie team, we struggled to know exactly what to include in our business plan, as well as how to best format information about our team. We were able to use examples from other teams to build a basic outline, and with some help had a comprehensive business plan. It was really important that we asked for help given that we didn't have much experience. It is crucial that new teams take advantage of the resources available to you.

We found increasing our web presence to be a challenge as well. We did not have as much of an online following as we would have liked due to the infrequency of our posts. Next year, we plan to be more present online and encourage any new teams to do the same. Being present online is a great way to stay in touch with our sponsors, new team members, and the community. In business we also had difficulties contacting potential sponsors in a memorable and meaningful way. We were able to reach out to many companies in our community, however, we were inefficient and started far too late. By the time we had contacted most of these businesses the season was mostly over and we didn't hear back from a large part of the companies. Next year we would start earlier and focus our efforts on fewer companies, but spend more time in contact with them as well as contact them in person.

What our students had to say: *"A challenge I faced this season was helping with our outreach online, as I didn't know that much about programming a website or using Twitter. I managed to do some basic stuff on our website, and shared some things on Twitter."*

We experienced a multitude of challenges in the build season, much like any FIRST Team. As a rookie team we were very anxious to get building, and though we did spend close to two weeks on our design, we felt that we could have prevented some issues with further investigation into our design and how it was to be constructed. We had to halt our build for a few days after discovering a flaw in our design, and also made improvements to our design at a competition. While both worked out in our favour, it would have been much simpler to have had a well designed robot from the beginning of the build. It would have saved time and the result

would have been a more seamless design. Ultimately, we feel that the design process should not be rushed and would advise any rookie team to prioritize design.

At the beginning of our build we created a very rough timeline of what tasks we wanted to have done and when. We did not add a lot of detail and due to the lack of detail in the plan, it became very easy to get off track. As a rookie team we also did not realize just how quickly the six weeks would pass, and did not manage our time well. The majority of our work happened in the last three weeks of the build season. To avoid these issues we recommend every new team have a detailed timeline as well as detailed goals. If you get off schedule, reevaluate and create a new schedule that will be attainable. It is a great way to keep your team accountable and organized.

What our students had to say: *"Our design process should be more thought out so we don't run along unexpected problems we need to solve. The parts for our design should also be ordered as soon as build season starts so we have time to start building and order more of what we need as soon as it runs out."*

Like any team, we faced challenges surrounding the budget for our robot. Our original design was quite costly, and we did not have the resources to create that design, so we modified our design to fit our budget. The design concept stayed the same but the parts were changed to low cost alternatives. This was not overly difficult, however, it was challenging to create a design that meets the challenge and is affordable. We would recommend new teams plan for their minimum possible budget and shop around for parts. Teams need to do as much fundraising as possible prior to the start of build season. Once students are building the robot, there will be no time left for raising extra funds.

As part of the build we had to program our robot, and we found coding had a lot of challenges as well. Our programming team was unfamiliar with Java, and while they did a great job, it was difficult for them to program in a language they were unfamiliar with. They spent a lot of time practicing on their own time, which helped them improve a lot. Future teams should try and purchase or borrow a robot kit early in the season so they can learn to program before the build season.

What our students had to say: *"When I started FIRST I had lots of programming experience but no programming experience in Java. In order to program the robot I took an online Java basics course at codecademy.com."*
"A challenge I experienced this season was coding our autonomous mode. This was resolved by persevere[nce] and teamwork."

Team 6854 had a great deal of personal growth throughout the season as well. Many students were faced with the challenge of balancing school, robotics and many other extracurriculars. Robotics could be all consuming during the height of the season, and time management was key. Without proper organization, it would have been easy to fall behind in school, resulting in falling grades. It would have also been easy to pass over other responsibilities and extracurriculars to keep up with robotics. Our team members all feel that having a planner, planning ahead, and prioritizing is key to personal success during build season.

Throughout the year, a large majority of Team 6854 was challenged to improve their interpersonal skills. Talking with sponsors, to judges, and to other team representatives helped

them to build confidence in themselves. It is very important that new teams encourage students to be involved with public relations - even if it is something they are not comfortable with!

Thanks to the wisdom of other FRC Teams, Team 6854 had an amazing season. Though we had lots of help, we still learned many lessons throughout the year first hand. Through the FIRST Robotics Competition Season, aspects such as business and outreach, finances, and the build all provide opportunities to grow and strengthen our knowledge and we are so very excited to be able to share with the 2019 Rookie Teams.

What our students had to say: *"I think it's a great club to join and just have fun with, whether you actually take part in creating the robot or try to find sponsors on the business side it's an amazing experience"*

"This team is an up-and-coming team which I foresee has a great future ahead of it. You get to build a robot, build relationships, and build skills."

Good luck in your first *FIRST* season!