

MECHALODON'S 25625



SPONSORS



MOTTO: "IF IT ISN'T ON FIRE, IT'S PROBABLY FINE."

Table of Contents

Who We Are	1
Coaches/Mentors	2
Our Team Plan	3
STEM Connections	4-6
Budget/Recruitment	6-7
Engineering Process	8
Our Season So Far..	8-10
The Evolution of Our Robot	11-15

WHO WE ARE?

Anna (8th)
Builder, Driver, S+ Class Painter
Romig Middle School



Erin (11th)
Team Captain
South High School



Daniel (12th)
Driver, Builder
South High School



Indira (8th)
Driver,
Lead Programmer/(2) S Class Painter
Romig Middle School



Spencer (8th)
Head Driver/Builder
Northern Lights ABC



Phoebe (8th)
(3) Driver, Builder, (2-2) S Class Painter
Romig Middle School



Sebastian (9th)
**Builder/
Multi-tasker / Programmer (2)**
Service High School



Mr. James (11th)
Team's Coder x Programmer/ (2) Driver
Frontier Charter School



Cormac (8th)
Builder/Driver
Romig Middle School



Coaches



Coach Heather - Heather is the technical coach for the FTC team. Heather is also a spectacular worker who always seems to know what she is doing, and is a lovely person to work with and be on a team with. She keeps the team on track with building and puts together the jumbled team ideas. She made all of the team hats and they look amazing! She taught us the process of building the robots and helped us figure out how to fix the many different problems that arose with building the robot.

Coach Tanya – The best coach ever!!! We can usually find her hanging outside the lab windows helping our FLL team. She is extremely excited that the FLL team gets to share in all the excitement of FTC and that Dimond Robotics students are learning to be leaders and most of all teachers. Tanya is a wonderful person who somehow manages everything from making sure that we have everything we need to build our robot to helping us prepare for judging. To be honest we have no idea how she does it all.

Mentors

Dimond Robotics

A special thank you to Dimond Robotics for creating our community team.

Ψ Lynx 3825

Avery S (Programming)
Chander (Build)
Hunter (build)
Kanna (business)
MJ (build)
Avery D (build)
Luke (build)
Riley (Programming/Build)
Ryan (Build)
Shamus (Build)

Δ Lynx 3208 - Max (build)



Our Team Plan

Our team's main goals are, getting upgrades to manufacture for our Robot: Kibble, creating more Autonomous Modes for Kibble to park then shoot, and factoring any extra adjustments such as speed status for Kibble so our team can excel at the FTC State competition.

What we want to learn this season:

Erin (CAP) - She would like to learn more programming as it never been her strong suit yet;

Indira - She would like to learn advance skills to drive Kibble increasing her other current prostate as a driver;

Anna - She would also like to learn the advance skills driving Kibble similar to Indira, more building techniques to upgrade Kibble, and knowing EVERY SINGLE base about the robotics all-around;

Phoebe - Similar to CAP, she also would like to learn the programming techniques vamping herself as more of the one of a kind programmers on the team

David - He would like to learn the all-around missionaries for Robotics, like Anna but more about the FTC Rules both in-state and World League professional as THE guy on our team;

Spencer - He would like to learn the components that makes Kibble - Kibble, really understanding- how each of its piece connects to one and another;

Sebasitan - He would also like to learn the all-around statistics for programming, driving, and building Kibble at the exact time;

Mister James - He would like to learn more on the coding techniques specifically which type of new codes can innovate more advantages to Kibble for shooting and motion;

Cormac - She would like to learn how this Robotic season will be so she can do her best providing for the team in her special way that the rest of us do not know yet still pertaining the driving, building, and possibly programming;

We make sure everyone gets a chance to learn different things from our CAP, builders and programmers looking out for people who are ambitious to work on anything with Kibble; teaching the step by step process we behold to upgrade Kibble.

Some steps we are taking this season to reach our goals are adding more Autonomous modes to increase Kibble`s skills to shoot or park at various parts on the Robotics Field.

We know our team is improving through our communication skills bonding together enabling us to gain more feasible contractions to add for our Kibble on the building scenarios. One thing

How do we decide what to work on each week or each meeting?

Our team make sure everybody gets a chance to learn different things simply calling their name out asking if he/she can help with a specific job normally they are not the brightest at, sharpening those thin skills all of us can improve with each others' optimism, encouragement and our coaches, Ms. Tanya & Ms. Heather guiding our journey way past success!

STEM Connections



Alaska Museum of Science & Nature



Dr Krossen - President



Dr Yesner - Collections Manager

Special thank you to the Alaska Museum of Science & Nature which has given our team a home and an inside look at this year's theme of Archeology.

International Brotherhood of Electrical Workers (IBEW) Local 1547

Two STEM Community members we have met this year were Kato and Hardy, from the IBEW electrician squad.

They taught us what specific steps you need to take to be an official electrician covering wiring basics, traffic lights, telecommunications (inside offices), and many other tactics to access this type of career. They open Apprenticeship opportunities beginning at age 16+ and greater vocational options once you finish high school with your diploma, said by one of the employees sharing with our team. Minimum wage ranging 20\$-60\$ on average dilated by education and experience matching your chosen electrical career alongside the IBEW. Our team used this current knowledge to envision any open careers supporting our talented talents to the world!

The IBEW visited our "laboratory," at the museum and stopped by our pits to check our wiring during league meet 1.

Some of my teammates received a direct line to the IBEW's Main Office given by our coach, Ms. Tanya. Our team keeps in touch with our mentors or sponsors through phone lines, Ms. Tanya or Ms. Heather beholding any cryptic info that us as students cannot get access to unless through them or have one of their personal contacts.

Something that was pretty inspiring that we learned from the IBEW was the likely-hood of just doing robotics as we are doing right now, can grant us many technological career paths out there; almost like a, "cheat code," that gives an inevitable contribution to any resume or portfolio you make.

We let them know of our progress throughout the season with photos and thank you's in person. We shared with one of the IBEW electricians how our robot works and our main goal we want with Kibble (Launch shooting style & Autonomous Shot modes). Instead of telling us how to do things they gave us insight for a new idea gathering balls without us doing it using a miniature conveyor belt.

We asked them questions about their work and job entertainment they do to understand how specifically they work at their projects, ending with a men's handshake gesturing gratitude and thanking them for the time staying to share their input about their jobs and entail our robots to us.



We try our best to maintain these relationships by writing down our contacts or keeping in mind about whom we met and chat to be aware we made a new friendship and mentorship which can help us in our YOUNG LIFE.

What We've Gained



The most important thing our team has learned from our STEM partners first knowing the penalties and programming techniques for the FTC League demonstrated by Avery S. & Riley from Team 3825 (Avery the strong, intelligent man who is bald at all times & Riley the strong intelligent man who wears glasses proving he is top tier nerd all the way positive!). Before getting down to the programming, we must know what can be allowed for any robot to do and not first in motion, then programming demonstrating how to power on and off in code using 'caps lock' on the 'on/off' function .

Mister`s POV After joining the Team - Connecting with real engineers changed the way how I thought about robotics in a positive definition first thinking it was more for the younger youth (middle school and under) than someone my age who is close to graduate high school not providing much of a benefit both as an elective and basic interest that can actually help me in life.

Simple advice we would give to a rookie team finding mentors or community help, start by thinking what are you truly interested in either as a hobby or career and ask teachers or instructors if he /she would know anybody who endured your chosen career or hobby at all.

Budget

<u>Description</u>	<u>Cost</u>
Donation -	2,500.00
Season Registration -	-325.00
Qualifier 1 Registration -	-50.00
Qualifier 2 Registration -	-50.00
State Registration -	0.00
New batteries, controllers, GoBilda, Mechanum wheels -	-1,500.00
Half the cost of Season Elements -	-438.78
Electronics Kit (Reused) -	0.00
Driver kit (Reused) -	0.00
Total =	+136.22

This season, we were able to get a sponsorship that paid for our entire season costs and added \$136.22 to The Lynx Initiative's general fund, which pays for other teams that have not raised enough money, like other FTC teams or FLL teams.

Recruitment

Almost half of our teams are girls this year and 6 out of 9 are new to robotics. We let kids know if their school does not have a robotics program that they can join one of our teams.



Our Outreach Goals

- Our team's main goal when it comes to outreach is, learning as much resources from our presenters that show up to our Robotic Practices and introducing our FLLs about the robotic insight on our parts.
- We would like to reach Elementary school students for an insight for both FLL and FTC League operation, Middle school students for full insight of FTC, and businesses describing their input about how our program is.
- We think it is important to show people robotic aspects because it creates more ingenuity for us young students to understand advanced technology that some adults may not have a chance to dive deep with back when you all were our ages changing more on this world.
- Our outreach activities can help other teams or the FIRST Community envision a greater perspective for volunteers to help/join special events any team or FIRST can provide to the outside community to explore much more for what Robotics **our way** is about.
- One thing our team did this season to help others learn about robotics was setting up a booth over at the Loussac Library Grounds June last summer stationed along the other booths, handing out flyers and doodads to guests walking across our area.

What was your favorite outreach event, and why did it matter to you?

- (Mr.) - To be honest, I have never went to any outreach event yet which means I totally never joined the 25625 Mechalodon Team or other teams before this season (Joined late this season), but I can say that it is really nice they support and show themselves to the community through going BIG like REALLY BIG, especially remembering Mrs. Tanya is a coach for at least five teams.

Mechalodon Engineering Process

Understand and Define the Problem:

Develop a clear mission or design statement to guide the project.

Leverage Experience:

Draw inspiration from Dimond Robotic designs to generate new ideas.

Collaborate and use a decision matrix to evaluate options and identify the most functional solutions.

Set Parameters:

Thoroughly understand and adhere to game rules.

Define and prioritize overall team goals.

Brainstorm:

Organize into sub-teams to generate and develop ideas.

Use sketches to visually represent concepts.

Present ideas to the group for feedback and refinement.

Achieve Consensus:

Make an informed and collective decision on the design direction.

Create Prototypes:

Design prototypes using **CRAYON (or marker) aided drawing - (CAD)** .

Build and test prototypes to evaluate functionality and effectiveness.

Build and Iterate:

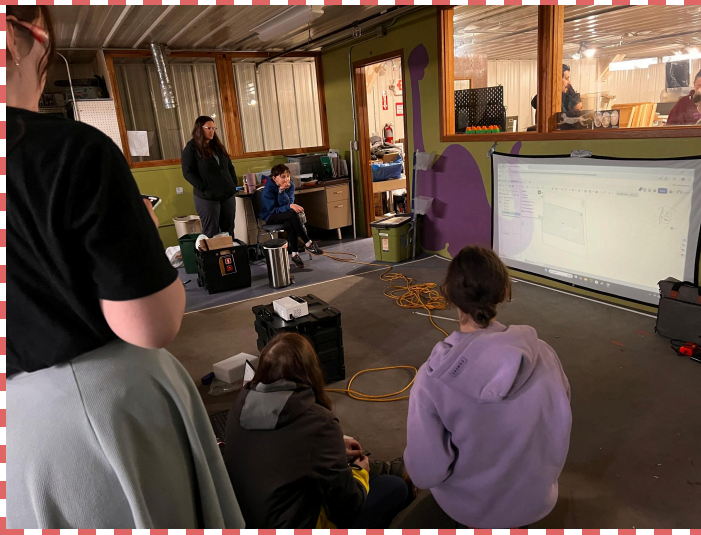
Construct design elements and rigorously test their performance.

If an element meets the desired outcomes, it is finalized as a success.

If it falls short, return to the brainstorming stage, make adjustments, and repeat the process until the desired results are achieved.

Our Season so far...

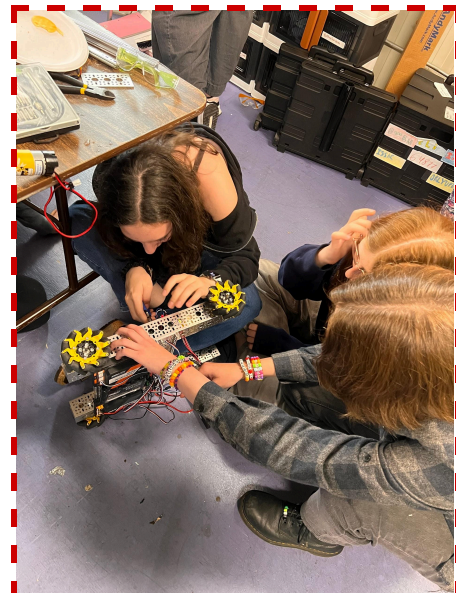
During the off season, we met every 2nd Sunday afternoon of the month. Because most of our team is new we watched kickoff videos from previous seasons and had "mock kickoffs" where we discussed design and strategy, then watched the Worlds competition to see how our thoughts compared with the top teams in the world. We also recruited friends to join our team.



Hosting mock kick-offs

Tracking Progress -

- **September 6** - FTC Kickoff
- **September 7** - Strategy Session, building the drive base
- **September 14** - Building the drive base, discussing whether to use an intake or player load
- **September 21** - Starting the teleop code, working on bumpers
- **September 28** - Brainstorming on the ball launcher and holder, starting design
- **October 4** - Working on the ball holder, testing out different wheels for the launcher
- **October 5** - Working on mounting the launch ramp and wheels
- **October 11** - Working on mounting the launch ramp and wheels
- **October 12** - Working on the lever to push balls into the flywheel
- **October 18** - Finishing up the launcher and ball holder, driving practice
- **October 19** - Mounting and labelling power button, wire management, working on autonomous mode, driving practice
- **October 25** - Replacing the old mecanum wheels with new, better ones
- **October 26** - Working on autonomous mode, driving practice
- **October 29** - First league meet at West High



- **November 2** - Talking about the first meet, discussing game strategy and how to avoid fouls, driving practice
- **November 8** - Working on our targeting
- **November 9** - Expanding autonomous mode options, driving practice
- **November 14** - Second League Meet at Dimond High
- **November 16** - Added a webcam, started working on AprilTag detection
- **November 23** - Driving practice, working on autonomous
- **November 30** - Driving practice, our flywheel motor's axle disconnected from the pressed-on drive gear, so we had to replace the entire motor
- **December 5** - Third League Meet at East High
- **December 6** - Working on our presentation board and our engineering portfolio
- **December 7** - Working on our engineering portfolio and presentation board
- **December 12** - making the flywheel use velocity instead of power
- **December 21** - working on teleop and portfolio



The Evolution of Our Robot

How We Got Our Design

The Design Problem We Set Out to Solve

A problem our team tried to solve when starting to design our robot, Kibble, was to understand the mixtures for which piece connects to another without forcing nor breaking any material each moment.

Brainstorming

Ideas that some of our starter members of the team wanted to create, is a robot not too difficult to make but suits the competition requirements very well.

Deciding which idea to build

Our starter members chose which idea to build based on the search results from Ms. Heather's laptop showing Rev Robotics Hardware in-store.

Drawing, sketching, and prototypes before building

Before building, both starters members and a few new members came together to input each of our ideas into one outcome for Kibble's creation.



Testing & Changes

Once we built Kibble 1st Model, the main 3 we tested and changed along the way were the flywheel to shove the balls through the aluminum hub wheel, our angled silver flat surface allowing our ball to shoot out curving to its trajectory, and the top-notch, programming Kibbles Teleoperation adjusting how many ticks our shooting style shall take (.30ticks) so each ball can pass through the aluminum hub wheel equivalently.

Help during our design process

During our design process, we got taught and helped from Ms. Heather, Ms. Tanya and Team 3825 captured Kibble's aesthetics legally before we put it to our personal FTC Game Field.

The hardest part of making our idea work

The challengingest part towards making our ideas work is the simplicity having none, being necessary to take a close look at what we are installing to Kibble both builders and programmers.

What Makes Kibble Innovative

Our team's robot design is special compared to what other teams built because our foundation consists of a great amount of cardboard covering the important ball cycle ingredients, which engages with our flywheel thrusting the balls forward-through the aluminum wheel.

The part of our robot we are most proud of.

The biggest thing our team takes the most pride in is adding a bunch of Autonomous Modes with similar coding factors improving our chances to help our team's partners in the Robotic League Meets.

Things I benefited from we figured out along the way.

(Mr.) - One thing I figured out in my own way that benefited the team was establishing a cycle for what the main goal would be each practice to work on either questioning CAP or Ms. Heather to see if they may need anything finished before I begin the extra developments for the team through programming.



Do we reusing materials or combining ideas in a creative way?

Absolutely! We always look through our stash of miscellaneous materials once occupied for the past FTC seasons and add or remove those materials from Kibble creating it fresh.

How does our design help our robot play this season's game better?

Our team's design can help Kibble play better this season by adapting it to adverse situations starting with its defensive and offensive play ramming into other robots partially to help our alliance partners in League Meets score at least a quarter or half underpinned to the game timer.

If we could name our most creative feature, what would we call it?



We would call our most creative feature for Kibble, O_N_P_O_I_N_T. Describes our best shooting skill, shifting straight to where we want Kibble to aim, only needing to adjust the aluminum wheel power function to augment the height probabilities!!!

How well Kibble Actually Works

Typically Kibble works the way we plan it majority of the time. Though, sometimes during the League Meets the controller to control Kibble gets randomized out of pocket creating rookie mistakes for the First Qualification rounds.



When Kibble is best during a match?

When Kibble starts following its programmed obligations, its best motives are shooting, driving strafes, and acts on the assigned Autonomous Mode without skidding, shooting curved balls, or not reading its proposed programs.

How does Kibble help our alliance partners?

This helps our alliance partners congregate with our team to create an effective strategy to win that Qualification round. The majority of the time, our team shoots and the partners park, reverse, or both teams shoot, but us first because we have an Autonomous Mode that will enable our partner to take our sweet spot to shoot at if they need it.

What makes our design strong or reliable?

Specifically, what makes our design strong and reliable are Kibble's mass converted into kilograms and bulky grip tires that can absorb the impact from the metallic gears on Kibble.

If it breaks, what's usually the reason, and how fast do we fix it?

If Kibble ever had a material that got disassembled, the usual reason could be another robot ramming into us breaking down the shooter range starting at the flywheel to the angled silver surface near the end. This piece particularly should be a quick fix only needing an Allen-Key plus a tiny new nut and bolts if the slated object has been wrecked or merely destroyed.

One thing we learned about making your robot more consistent.

One thing we have learned about making Kibble more consistent is innovating ideas to Kibble so it can be still active a long way without stressing about it not being used when we are upgrading it constantly and consecutively.



Managing Risks

- Risks our team took with this design were...

First: Trouble shooting our Wheel Drifting Cycle - Everytime we stop driving Kibble with our team`s controller, Controller Drift occurs where Kibble turns to the right (specifically) without us moving the [R]Joy-Stick to turn and reverse driving backwards with the same Joy-Stick, later finding out the FR (Front Right) wheel`s conical or acorn lug nut was scraping against the metal on Kibble.

Second: Inspiration All Around - We had a special guest around our team`s age but a younger boy who wanted to drive Kibble really badly, according to CAP she let him drive Kibble the way he wanted while we were working on the programming stuff. Eventually one of our opponents (WITH RESPECT) asked us if we can help fix their Robot`s Autonomous Mode position, of course we helped them no regrets to set it up but as soon as we got done, one of our teammates got HIT and a cut on his right-side foot from Kibble driven by the younger boy on accident. Therefore the younger boy and our team learned that if anyone goes inside the Robotics Field, DO NOT MOVE NOR TURN ON AUTONOMOUS MODE FOR ANY ROBOT!!!;

Third: A New User - One of us programmers on the team had to wing it with a coding technique inventing a great chance to damage the current codes we have on, "Rev, Hardware Client,

Fourth: Flywheel Set.Velocity - After resolving the Drifting Cycle issue, we ran into a (using code [set.velocity]) Flywheel complication where the appropriate setting for its acceleration apparently was too short, only allowing the artifacts to reach at least 2" underneath the goals which never was like that before.

What went wrong the first time we tried it, and how did we fix it?

The first time the starter members tried Kibble that slowly went wrong goes back when we first built Kibble on the first go but the ramp and angled silver surface did not want to be snugged on tight with it, so we modified the ramp instead of being cardboard, it is aluminum with a clear frame sticking underneath it and the angled silver surface got swapped to a different polygon (still containing the angled silver surface) that can be screwed with an Allen-Key on both side of Kibble`s arms holding the polygon.

Testing our robot before competition.

We test Kibble before a competition by reassuring we have backup parts if the battery or Kibble materials gets tampered enough, all gears are tight and secure driving Kibble and angling it too, and a review on the coding aspects for Kibble, the ones we plan to use are a go.

Do we have any backup plans or replacement parts ready to go?

Absolutely! After realizing our Drifting Cycle contraction, we plan to set up a personal readiness kit to be prepared for all the materials we need to fix Kibble 10000%!!!

What we learned from failing that made our design better?

Something our team learned from failing to reenact a better design was the wire management process. It looked too mixed up to the point we had to disentangle EVERYTHING and restrand all the wires back to one strand per line, until Ms. Tanya told us, " We do have some black coils if you guys want some?" out of relief we accepted Ms. Tanya's offer, retaining the black coils to be wrapped around the wires and telling her, " YOU SAVED US!!!" Both bursting Ms. Tanya and Ms. Heather the joyful laughter.

What We Learned

- Something our team knows now about designing that we did not know before was, making stakes for our robot, Kibble allowing it to escalate up and down similar to an elevator or escalator.
- If we could redesign at least one part on Kibble again, we would change the intake material to be aluminium and shoving it through rather than dropping the artifacts into the intake.
- Our design on Kibble shows our team's value through creativity and teamwork the most, expressing everybody's opinion on how Kibble looks in a fun positive POV that matches our team's personality.

