

MEETING LOGS

ABOUT

At the end of each meeting, we record the date, time, agenda, accomplished, lessons learned, and parts to order. We also assign a reflection to two students in order to record progress and important thoughts. Keeping detailed logs of each meeting is a crucial part of our team, as it allows us to keep track of progress and record important information. Remembering and learning from the past is an extremely important part of any organization, and we have found that if things are not recorded, they are easily forgotten.

MEETING LOGS

DATE	START TIME	STOP TIME
9/7/19	8:00 am	4:00 pm

ATTENDANCE	AGENDA
Ema, Michael, Madelene, Kinsley, George, Gray, Isabel	

STUDENT 1	REFLECTIONS
<u>Madelene</u>	At the kickoff hosted at Nex Gen Academy, the challenge was released along with the field for the year. We stratigized all morning then broke for lunch. We decided this game would rely more heavily on speed rather than strategy. We decided at the kickoff that the best wheels to use for the game would be mecanum wheels. We broke for lunch and after the workshops began. I was given the opportunity to teach a workshop. My workshop was about how to properly use power tools. I taught 2 sessions and my teammates, along with members of other teams attended. The audience seemed like they enjoyed it very much and teaching the workshop helped me become a better public speaker, especially as I had to improvise a few things that I had lost my note cards for.

STUDENT 2	REFLECTIONS
<u>Kinsley</u>	The FIRST season kickoff went from 9:00 AM to 4:00 PM at Nex Gen Academy. We got opportunities to plan our match strategies on the field; so we could plan for what we'd do in the future. We also got to learn new things (about FIRST), and support other teams with our presence. We had an opportunity to attend classes hosted by the other teams that attended. We brainstormed what we'd do for the challenge and came up with a good plan. We also had a potluck there, where everybody brought some goodies. Our team brought cupcakes. They had green frosting, too.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Saw the challenge for the first time! - Analysed the game - Came up with some strategy - Madelene taught a safety class		

MEETING LOG

DATE	START TIME	STOP TIME
9/8/19		

ATTENDANCE	AGENDA
	- Analyse the game - Discuss different designs

STUDENT 1	REFLECTIONS
Isabel	Today we analyzed the game and went over all of the rules. We listed all of the ways to score, calculated what our goal score would be, and listed our objectives. I also presented my design idea to the team. After talking about it we decided that it may be too complicated and there is probably a simpler design that would accomplish the same thing. After we discussed some specific designs, we decided that it may be more efficient to discuss the general requirements that we wanted of the mechanisms, so that we could think of specific designs that fall under those requirements. See fig. x

STUDENT 2	REFLECTIONS
Gray	At this meeting, I learned further detail about the game rules and we discussed designs for our robot. I had learned many interesting designs and was narrowing down which would be the best in my mind. Thinking of ideas wasn't as easy because of all the requirements your robot must meet.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
	Actually fill out meeting logs at meetings	

MEETING LOG

DATE	START TIME	STOP TIME
9/12/19	6:00pm	8:00pm

ATTENDANCE	AGENDA
George, Madelene, Michael, Isabel, Kinsley, Gray, Jenna, Ema	- To finalize on the robot design - To make a list of parts needed for the robot

STUDENT 1	REFLECTIONS
Gray	I had learned a very efficient design for our robot. As I thought about the design, I had visualized how it would play in the tournaments and I really thought the design would play well in the tournaments! I was happy to hear that this design was the final design because I thought it was the design that I thought was the best. It was pretty simple but also a smart design.

STUDENT 2	REFLECTIONS
Isabel	At our last meeting, we decided that today we would decide on our “first version design” (we want to make sure that we are not “married” to our first design, and that if we find we need to change or redesign our robot, we will be able to) Initially I had thought of a claw design because I thought it would be hard to pick up the block in autonomous with a flywheel intake, but after I saw another team prototype an intake that was able to pick up the block in autonomous, I decided to present my design with a flywheel intake instead. I really think that it will be important to be able to pick up the block from all angles, and a flywheel intake does that very well. So I presented my design idea (see fig. x) and the team at first did not understand how it worked and thought it might be too complicated, but after explaining the design a little more the team liked it and we decided to use that design in our “first version.” After we decided on a design, we listed out some parts that we needed to order for the next meetings in order to start building.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Came up with a robot design for our first competition (see fig. x) - Came up starter list of parts to order (see fig x)	We need to have an assigned photographer	

MEETING LOG

DATE	START TIME	STOP TIME
9/15/19	3:00 pm	6:00 pm

ATTENDANCE	AGENDA
Madelene, Kinsley, Gray, Michael, Jenna, Isabel, Tytus,	• Talk more about mechanism design • Begin building chassis • Meet with new mentor and sponsor

STUDENT 1	REFLECTIONS
Madelene	Today I taught a few of the other members how to cut with tools. We cut the channels with our band saw, and then we cut the steel axles with our steel blade hacksaw.

STUDENT 2	REFLECTIONS
Michael	I used a bandsaw to cut the parts for the chassis. When I cut with the bandsaw, I thought It was fun and cool.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• New members learned how to use tools • Cut channels for chassis • Met with a representative from leidos to talk to her about FIRST (she is going to be a new mentor!)	• More focus • Project management • Start writing agenda with specific tasks on white board	

MEETING LOG

DATE	START TIME	STOP TIME
9/19/19	6:00pm	8:00pm

ATTENDANCE	AGENDA
George, Kinsley, Gray, Madelene, Isabel, Jenna, Ema	• Finish building chassis • Assemble field kit • Go over team roles and timeline • Go over team meeting schedule

STUDENT 1	REFLECTIONS
Jenna	I learned that you can use cheap nail polish to seal screws in place, and I mostly did just that. We put together the wheels and put them on the robot. The field is now a practical tool we can use, which is useful in making sure that the robot can actually do what we want it to do, rather than theoretically doing what we want it to. I think that as we get more practice using the tools and materials we will be able to move more efficiently.

STUDENT 2	REFLECTIONS
George	I really think that our robot is starting to come together and is taking form. I am also very glad that we have a field to practice on. I am really happy about my role and I am excited about what I can do for the team. I think that we need to add more meetings, and longer ones.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Attached the andymark plates to the mecanum wheels and the hubs to the plates • Attached the wheels to axles on the chassis • Finished setting up the field	•	•

MEETING LOG

DATE	START TIME	STOP TIME
9/22/19	3:00pm	6:00pm

ATTENDANCE	AGENDA
Jenna, Ema, Michael, Isabel, Madelene, Gray, Kinsley, Tytus	• Finish Assembling Chassis • Start on the mechanisms

STUDENT 1	REFLECTIONS
Ema	The other team members worked on the field and the chassis, and I worked with one of our mentors, James, on setting up the flywheel intake. We discussed how the pieces would need to be arranged and if we would need more to fit the wheels properly, and we set up the basic parts that would attach to the robot to form the intake. We didn't have the proper wheels yet, as they were coming in the mail, so James and I used stealth wheels as stand-ins.

STUDENT 2	REFLECTIONS
Kinsley	We worked on the field more, and we are almost finished with the chassis! We attached the channels, wheels, and a motor to test out, to see how it would roll. But we accidentally attached the wrong size hub to the motor. We had to make a small adjustment and order a hub adaptor, otherwise it went well.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Attached the channels of the chassis together and mounted 1 corner of the motor, sprockets, and chain • Set-up half of the field's perimeter • Started on the flywheel intake	• More focus on our tasks • Better communication for specific parts when building the robot	• 3/8" screws • 1 1/4" screws • (4x) .770" to .625" hub adaptor

MEETING LOG

DATE	START TIME	STOP TIME
9/26/19	2:00pm	8:00pm

ATTENDANCE	AGENDA
Madelene, Isabel, Gray, George	• Finish chassis • Start on intake • Start on vertical slides

STUDENT 1	REFLECTIONS
Isabel	Today I started on the intake. For each side of the intake, we decided to connect two aluminum plates with aluminum spacers, and then use bearings that press fit into the large center hole on the plate's hole pattern. Then there are 2 shafts, complete with collars and shaft spacers. One shaft connects to the front of the chassis with more bearings and collars, and has a sprocket on the bottom beneath the chassis' channel and a sprocket in between the two plates. That shaft connects (through the chain and sprocket) to the other shaft that has another sprocket sitting between the two plates; this shaft also has a compliant wheel attached to the bottom of the shaft, which sits below the two plates (see fig.). The major things I had to do was cut about 2" off of the 2 aluminum plates, and cut about 1" off of the shaft. I also initially used the wrong size of aluminum spacers, and then I misplaced them, but I finally got them on right. After that I finished assembling half of the intake, and by the time I got that done it was time to clean up. I am super proud of how fast we're moving! Along with about ¼ of the intake completed, we started on the vertical lift and re-mounted two of the motors for the drive-train. Initially, the two back motors were behind the wheel connected by a chain and sprocket, but we found that we were losing too much space on the chassis channel by mounting the drivetrain motors directly on it, so we decided to mount the motors above the wheel by adding a small piece of channel and mounting the motor on top of that (see fig).

STUDENT 2	REFLECTIONS
Gray	I got to do a lot of things and learn how to use new tools! I got to experience my first time using a miter saw, and a band saw! I got to cut the chassis slightly shorter for the intake. George and I were cutting 80'20 to use for the lift. After we cut the 80'20, we started to work more on the lift. We got some of it done! In the end we made lots of progress on the robot!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Rebuilt chassis (oops)	•	• (x2) 12" shaft



• Attached two motors • One fourth of the intake completed • Began assembly of the vertical lift		
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MEETING LOG

DATE	START TIME	STOP TIME
9/28/19	3:00pm	7:00pm

ATTENDANCE	AGENDA
Madelene, Isabel, Gray, George, Kinsley	- Continue on intake - Continue on vertical lift slides - Mount last two motors for drivetrain

STUDENT 1	REFLECTIONS
George	This meeting we finished mounting the motors and worked on the linear lift. We were having trouble finding room for the motors so we put them on the bottom of the robot by cutting a half circle on the chassis. It worked well so we did the other one and now we have a fast very fast robot. I'm happy with the results and think we have a great robot in the making. I also helped make the linear lift we were having trouble getting them to slide well we found out all we had to do was loosen them. After that they started to slide well. We also ran into another problem we didn't have the pulleys we needed to finish the lift so we had to stop working on the lift.

STUDENT 2	REFLECTIONS
Madelene	I built the linear lift with the help of Gray and George. However, we ran into problems when the slides continually stuck together. After fixing it for what seemed like the thousandth time, we realized we could not continue building the slides, as we had never bought the pulleys that came separate with the kit. While we were working on this, Isabel was working on the intake system. The intake uses compliant wheels that suck in the stones and deliver it to the other side of the bot. However, we miscalculated the size of the wheels and instead of needing 4" compliant wheels, we need them to be smaller. We have measured again and ordered 3" compliant wheels

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Finished about ½ of the intake - Made progress on the vertical lift slides - Mounted last two motors for drivetrain	Look at what is included in a kit before ordering it	(x2) Rev linear slide v2 pulleys (x3) ¼ ID side mount pillow blocks (x2) 15mm extrusion - Rev surgical tubing (x4) Servocity aluminum beam - More aluminum standoffs



MEETING LOG

DATE	START TIME	STOP TIME
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9/29/19	3:00pm	5:30pm
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ATTENDANCE	AGENDA
Gray, Kinsley, Tytus, Michael	- Mount motors for vertical lift - Assemble servo blocks - Change gears out on vex servo

STUDENT 1	REFLECTIONS
Tytus	When I got to the meeting I immediately got put to work. I spent most of the day cutting metals, using the miter saw, I cut three pieces of metal and put them on the robot. At the end of the day we accomplished so much but we still had a lot to do

STUDENT 2	REFLECTIONS
Michael	When the meeting started, I was the first one there and I looked at the robot because I was not there at the last meeting. I helped get all the tools out and set them up. Most of the people came but we were waiting on Isabel and Madelene. Once they came, Madelene left and then Isabel, Gray, and me started building the servo mount. There was a problem on trying to put on the piece that goes on top of the servo. We put it on though, and I also cut a hole for the motor to go in to. When coach Russ was using the dermal (fix) the thing kept on breaking. Then closer to the end Isabel was trying to put on the chain(fix). I tried to help but I didn't figure it out. Eventually Isabel put it on and then we cleaned up and left.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Mounted two more motors on the chassis which will be controlling the vertical slides - Assembled three servo blocks, two for the foundation and one for the mano - Started on switching the gears out on the vex servo for more speed	Better communication about what needs to be done on a mechanism	(x2) 3" compliant wheels (x1) 80/20 extrusion (1x) Plastic chain

MEETING LOG

DATE	START TIME	STOP TIME
10/3/19	2:00pm	8:00pm

ATTENDANCE	AGENDA
George, Isabel, Gray, Kinsley, Jenna, Ema, Michael	- Start on roller claw mechanism - Finish slides - Continue on intake

STUDENT 1	REFLECTIONS
Kinsley	We started on the roller claw, and got it halfway done in a time of 6 hours. All 9 of us (5 coaches, too!) are so impressed with how much progress we are making so quickly! We also worked on the intake some more, which is currently almost done. Our intake currently has two wheels to swallow the block inside our robot. When it is swallowed, it will go up a ramp made of metal we installed. Then the roller claw takes the block, and puts it at a desired position or place.

STUDENT 2	REFLECTIONS
Ema	While most of the other members worked on the roller claw and fitting the metal ramp onto the robot, James and Jenna and I worked on getting the sliding parts for the vertical lift working properly. Initially, they were sticking, so we had to remove some unnecessary screws that were inside the vertical lifts. We ran into a problem, that the lift could slide in a direction we didn't want it to, and promptly fixed it. James and I then partially set up the lifts by attaching pulleys and readying things up until the point where we would need to attach the lifts to the robot.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Roller claw ½ way done' - Intake almost done	We need to be gentle with the slides and fragile robot parts	- Shaft spacers - D-shaft hubs 9/64 drill bit - Volt Meter - Sandwich bags

MEETING LOG

DATE	START TIME	STOP TIME
10/5/19	3:00pm	7:00pm

ATTENDANCE	AGENDA
Isabel, George, Gray, Kinsley	• Finish roller claw • Finish vertical slides • Start on electronics plate

STUDENT 1	REFLECTIONS
Isabel	Today we finished the roller claw. However, we ran into some problems: the block would not slide up into the claw because the screw heads were too big and would get caught on the block, so we had to replace them with lower profile screws and even file down two of the screws which were being especially problematic. After that, it all worked pretty well in our testing with the servo tester! We are still having trouble with the slides and do not exactly know what to do. Every time we assemble them, they jam up when sliding the smallest amount. We have tried loosening the screws within the slides, but nothing seems to work. Hopefully we will figure that out in the next few meetings; we still have a lot of work to do! We also talked about where to mount the electronics and how to mount them, but we want to wait on that until a few more things are mounted. Another thing we talked about was the possibility of tilting the intake wheels because in testing we found that there is a very high chance that the block will hit the plate inside of the robot if the wheels are level. The wheels are very grippy so it does not allow the block to go up the ramp of the plate. One last thing we talked about was having a little arm controlled by a servo to hold the block in place once inside of the robot because the intake wheels are too far out to do so.

STUDENT 2	REFLECTIONS
Gray	Today, many things happened including finishing the roller claw, improving the slides to not getting stuck, and learning from a mistake! We all learned to not cut fast on the miter saw because the metal that was being cut flew across the room and a few of the teeth on the blade broke during the process of a fast cut. We later tried to improve the lift. Improving the slides was a big relief to all of us! They were working better than originally but we still were trying to figure out an efficient way to make them slide smoothly. We later finished the roller claw which was achieving! Finishing the roller claw was accomplishing and when we hooked it up to a servo it ran very well! The claw also had a very tight grip on the stone which was good to see. This day was filled with learning and big accomplishment.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
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• Finished roller claw (it works well!)	• When cutting metal, you must cut very slowly	• Intake sprockets • Set screws • 7/32 nut driver
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MEETING LOG

DATE	START TIME	STOP TIME
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10/6/19	3:00pm	7:00pm
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ATTENDANCE	AGENDA
Kinsley, Gray, Isabel, Michael, Tytus, Jenna, Ema	• Mount servo to roller claw • Finish slides • Mount plate for block to slide on within the robot • Mount two foundation moving servos • Strengthen chassis

STUDENT 1	REFLECTIONS
Jenna	So we finally got the vertical slides to, you know, slide, which was pretty great. It taught me that sometimes the instructions on building kits are not always the best way to build something. The block is still getting stuck going in and so I think that we will have to bend the ramp that feeds it in more. I am worried that if we lift up the piece it'll be too steep to actually work at all. However, it can't stick out too much either. We angled the wheels on the intake down, which should help make the ramp part easier to make work. The robot also probably needs to be a bit more stable, because it seems like if you added too much weight the chassis would bow downwards. The roller claw is working well, but we really would need to finish assembling all the pieces in order to fully assess its efficiency.

STUDENT 2	REFLECTIONS
Michael	This meeting, I mounted the servo onto the roller claw. I learned how to use the drill press safely. I expected it to be more difficult to use than it actually was. I had fun building the claw, but I put too many screws into it by accident. When I finished Isabel noticed it was wrong, and I was going to adjust it, but then I had to leave. I'm excited to start programming soon.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Mounted servo to roller claw • Cut out the plate for block to slide on • Mounted 15mm extrusion to the chassis • Finished assembling (figured out) the slides • Started on angling the wheels on the intake	• We should have a robot stand so that the robot doesn't fall over when on its side	• (x4) 12" x 1.5" Pattern Plates • Rev servo

MEETING LOG

DATE	START TIME	STOP TIME
10/10/19	2:00pm	8:00pm

ATTENDANCE	AGENDA
Gray, Kinsley, Michael, Ema, Jenna, George, Isabel	• Finish intake • Mount and string vertical lifts • Strengthen chassis • Mount block platform

STUDENT 1	REFLECTIONS
Kinsley	We managed to mount the vertical lifts onto the chassis! We also got to the start of applying some string onto them to move them upwards when the winch is powered on. The strings are attached to the winch, and it will happen when the robot is powered on. We as well worked some more on the intake. About the intake, actually, we mounted our block platform to the chassis! Basically what the block platform is, it is a ramp made out of thin metal. There are two “arms” on the sides that shape the metal like a wide T-shape. The wheels then vacuum the block, so that it goes up the platform smoothly.

STUDENT 2	REFLECTIONS
Michael	We mounted the vertical lifts onto the chassis and added string to them. Which I think helps it stay on track when they go up. We also worked on the intake. I don't think I helped with that. The intake will pick up the block and put it on the robot. The block is on a platform that is on the robot so the block is being rolled up into the robot.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Mounted some 15mm extrusion to strengthen the chassis • Mounted block platform	•	•

MEETING LOG

DATE	START TIME	STOP TIME
10/11/19 (extra meeting)	12:00pm	3:00pm

ATTENDANCE	AGENDA
Isabel, Jenna, Gray, George	• Finish Intake • Mount Vertical slides

STUDENT 1	REFLECTIONS
Jenna	Today I mounted the vertical slide to the robot and started stringing it. It took a while because I had to get it to stop sticking, but it turns out that it was just a loose screw that had somehow fallen into it. There weren't any screws missing from anything though, so I assume that it didn't belong to anything. I took pictures of the strings so that we could recreate them later. The string seems to stretch a little, so I think that as we continue we will have to replace it with something stronger. We finished the intake, which is exciting since it was causing problems before. It runs smoothly now, and I don't expect any additional issues from it.

STUDENT 2	REFLECTIONS
George	Today we worked on mounting the vertical slides and finishing the intake. Isabel worked mainly on the intake with Gray and Coach Russ. The intake can pick up the stones very well, and I can't wait to see it in action. Gray and I worked on the slides while Jenna strung them.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Mounted one vertical slide • Finished intake		•

MEETING LOG

DATE	START TIME	STOP TIME
10/12/19	3:00pm	7:00pm

ATTENDANCE	AGENDA
Gray, George, Isabel	• Mount both vertical slides • Fix block platform • Mount 1 more chassis reinforcement • Start mounting roller claw

STUDENT 1	REFLECTIONS
Isabel	Today we mounted the vertical slides and fixed the block platform. We mounted the vertical slides by threading a screw through the chassis and into the bottom of the stationary stage of the vertical lift. Then we added a side bracket which attaches to the side of the stationary stage of the vertical lift and then to the chassis. I wonder if our current mounting is sturdy enough. Also, the block platform was scraping the ground, so we attached a bar inside of the chassis, which served as extra reinforcement for the chassis and held the stone ramp up a little bit so that it would not scrape the floor. I am still a little worried about the stone coming in through the intake, and I hope that the angle of the wheels reduces enough of the friction.

STUDENT 2	REFLECTIONS
Gray	Today we did many things such as mounting both vertical slides, we had worked on our plate for the block, strengthened the chassis, and worked with the roller claw! Mounting the vertical slides felt like a big achievement and made further progress on our robot! We fixed the plate to our robot by bending the angles so that they wouldn't scrape the ground. We also strengthened the chassis! We originally used a piece of 80'20 to mount it but caused an absurd amount of friction against the plate. so we had replaced the 80'20 with a smaller piece that worked a lot better! I mostly worked on a limit switch for the roller claw. I had to make an angled piece for it to mount on. We used the bandsaw to cut the piece the size that we liked, then we used a hacksaw to cut off the sides of the t shaped piece. The coach saw what we were cutting and offered me to use an oscillating saw! I took the offer of using it to experience something new! I used it and it didn't go as well as I hoped. It was very shaky and my cut was uneven. Fortunately I fixed the cut with a hacksaw.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Mounted both vertical slides	•	•



• Reinforced chassis by adding a bar across it • Modified the block platform		
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DATE	START TIME	STOP TIME
10/13/18	3:00pm	7:00pm

ATTENDANCE	AGENDA
Isabel, Michael, Gray, Kinsley, Jenna, Tytus	- Start on horizontal slide - Mount roller claw - Explore servo holder idea - Explore electronics board - Finish mounting limit switch on roller claw - Add guides on robot plate for stone

STUDENT 1	REFLECTIONS
Tytus	I was working on mounting a piece of metal to the robot. I was working on it with a tool, and came to find out that we were using the wrong tool, at this point we were mad and had to take the screws off, then I had to put on new ones. In the end we were able to successfully mount the piece!

STUDENT 2	REFLECTIONS
Kinsley	We built the horizontal slide to put on top of the vertical ones, to let the roller claw extend outwards. We also have some string in between the winch and the vertical lifts, to make the lift slide upwards when the winch is powered. Most times, we either put it too tight, too loose, or we put the string too short in some areas. So, it definitely took a few tries to get it right. We also figured out it wasn't strong enough, so we will order some stronger threads soon. Later that meeting, we came across an issue. The vertical lifts are kind of stair-stepped, so it can be taller in one spot or another. The main issue, the alliance bridges our robot can go under for extra points is 14 inches tall. One part of our vertical lift is 14 1/2" inches tall. We'll sort this out!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
- Built horizontal slide and attached roller claw to it - Added guides for stone when within robot - Almost done with limit switch		1/4" to 6mm shaft adaptor - Servo wire extensions - Grounding strap - Stronger lift string - Metal sprockets and chain

MEETING LOG

DATE	START TIME	STOP TIME
10/17/19	2:00pm	8:00pm

ATTENDANCE	AGENDA
Gray, Isabel, George, Kinsley	• Mount Horizontal Slide w/ roller claw • Assemble dead wheels • Restrung vertical lifts • Cut vertical lifts and add 1 stage

STUDENT 1	REFLECTIONS
George	Today we worked on the vertical lift we had to restring the lift and cut it down. We were testing the lift to see if it fit under the 14" skybridge. They barely fit under the bridge so we took apart the lifts and cut them down and added a fourth stage. I also helped restring the lift and add the pulleys. So it turns out we had strung the lift totally wrong so I had to restring the lifts. Once I had restrung the lifts me, Gray, and Madelene assembled the pulleys and attached them to the robot but we did not tie the string to the pulley and hope to do that next meeting.

STUDENT 2	REFLECTIONS
Isabel	Today we realized that our vertical slides were JUST under the 14" skybridge, and in the case that our lift does not go down all the way, it would run into the skybridge, so we decided to take both lifts apart, cut each stage, and add one more stage in order to get back the extension length. Today I mainly worked on mounting the horizontal slides with the roller claw. It was simple to put together the horizontal slides, and even to mount the roller claw to the horizontal slides, but mounting the horizontal slides to the robot was not as easy. Because we only have one bar (15mm extrusion) to mount to, I had to think of a robust way to mount it. We had these little cubes that do not bend in any way, unlike some of our brackets, so I decided to use those, but it can be hard to tighten certain types of screws because of how close the two screw heads are. I finally realised that we have button head screws and those can be tightened much easier in tight spaces. Once I switched to those everything else went relatively smoothly. I also built a small plate to strengthen the mounting even more (see fig). Near the end of the meeting the horizontal slide was finally mounted.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Mounted the horizontal	•	•



slides with the roller claw • We cut all stages of our vertical lift and added 1 addition stage		
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DATE	START TIME	STOP TIME
10/19/19	3:00pm	8:00pm

ATTENDANCE	AGENDA
Isabel, Madelene, Gray, Kinsley, Michael	• Replace chain and sprocket for intake • Fix stone guides • Mount foundation movers • Think about mounting electronics • Figure out where dead wheels will go • Strengthen horizontal lift attachment

STUDENT 1	REFLECTIONS
Madelene	This was my first meeting back in a few weeks so I was very eager to build. I began fixing the stone guides because the stone was not lining up with the roller claw. However I did not get very far, since in order to remove the screws the robot has to be flipped over and too many people needed to fix things on the upside of it. We also found that there wasn't a whole lot of space to mount dead wheels, so we will need to be creative with them. We really want to use them because we think it will greatly increase our accuracy during autonomous. We also strengthened the horizontal lift attachment (roller claw was and horizontal lift leaning because of weight, added another bar and brackets to strengthen attachment)

STUDENT 2	REFLECTIONS
Michael	So for the horizontal slide it was not stable or strong enough so we built some stuff to strengthen it. We also mounted two servos to move the foundation but the bolts and nuts were hard to reach so it was hard to attach. I don't remember what else we did.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Mounted the servos which move the foundation • Figured out where dead wheels will go • Strengthened the horizontal slide attachment (added a bar and some brackets)	•	• Side shield material • Rev servo wire extensions • T-shirts

MEETING LOG

DATE	START TIME	STOP TIME
10/20/19	3:00pm	7:00pm

ATTENDANCE	AGENDA
Madelene, Gray, Jenna, Ema	- Continue to work on chain and sprockets for intake - Fix stone guides - Mount electronics - Assemble dead wheels

STUDENT 1	REFLECTIONS
Madelene	Mounting electronics was a little difficult and we spent a lot of time trying to find space. We had them mounted to the _____ by the end of the meeting! Not much progress was made in fixing the stone guides since everyone needed to work on the robot right side up. Chain in for intake won't bend enough for our angle We began mounting the dead wheels but it was hard to get the screws out of omni wheels, since they were so small. We also had to print more pieces for it to work.

STUDENT 2	REFLECTIONS
Ema	Jenna and I worked on stringing the vertical lift for most of the time. Towards the end we worked on trying to find a solution to the problem with the chain for the intake. The intake has to be tilted at a specific angle, but the chain couldn't work with that angle. We had a plastic chain that was the right size, but if we ran it with the angle, the chain would break apart and wouldn't work. We tried a stronger, metal chain, but the chain that we used could only have its length changed in a margin of two links, so it was either too large or too small. Eventually, we decided to purchase a universal joint so the problem would be solved.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
- Mounted the electronics ~1/2 through the assembly of the dead wheels - Almost done with fixing the stone guides		- Weather stripping - Nuts and bolts for permanently mounting expansion hub

MEETING LOG

DATE	START TIME	STOP TIME
10/24/19	2:00pm	8:00pm

ATTENDANCE	AGENDA
Madelene, Isabel, Gray, George, Ema	- Continue replacing chain and sprockets on intake - Mount motor for horizontal slides - Finish assembling dead wheels - Mount servo to move and hold stone within robot - Reinforce vertical lift attachment - Add weather stripping to battery mount

STUDENT 1	REFLECTIONS
Gray	Today I had done many things such as helping to fix the intake, help work on the dead wheels, and learning to splice wires! Last meeting we had come up with an idea to order a part called "Universal Joint". Since the intake is slightly bent we had trouble attaching the chains to the sprockets. Since universal joints allow a straight shaft that eventually bends to the angle you need, it was ideal for this situation. We had tried them on the intake and they worked well! The dead wheels were very hard to work with because something would always end up problematic. For example, the wheel would keep hitting a nut. We filed the nut and that mostly fixed the issue! It was accomplishing to mount the dead wheels! Towards the end of the meeting, I also got to splice wires for the expansion hubs. It was fortunately very easy to do! All you have to do is strip wires with a pair of strippers and grab a tool that is designed to splice them together. You match the wires by color and then squeeze for each wire you put in the connectors!

STUDENT 2	REFLECTIONS
Isabel	Today the chain and sprockets were replaced on the top portion of the intake and they seem to work well! In order to make the angle of the intake wheels work better, we added a universal join, so that the two axles are in the correct orientation without stressing the intake. We also mounted a servo which moves the block to the back of the robot once the intake has brought it in, and holds it in place so that the roller claw can pick it up. Today I added weather stripping to the battery holder so that the battery is firmly held in place. After that I worked on mounting the motor that runs the horizontal slides. Lastly I worked on the dead wheels which we are still running into problems with. The nuts keep hitting the wheel because our 3D printer did not print the hub and the spacers to the precise dimensions that we needed. So we keep having to file the nuts down. The robot is definitely coming together!



ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Finished replacing chain and sprockets for the top portion of intake • Added a universal joint to the intake (allow for the wheels to be at an angle) • Mounted motor for horizontal slide • Mounted servo to move and hold stone within robot • Added weather stripping to the battery mount	•	•

MEETING LOG

DATE	START TIME	STOP TIME
10/26/19	2:00pm	8:00pm

ATTENDANCE	AGENDA
Madelene, Isabel, Gray, Kinsley, George	• Finish replacing chain and sprockets on on intake • Continue assembling dead wheels • Find thingiverse file for phone mount

STUDENT 1	REFLECTIONS
George	Today we finished replacing the chain and sprockets on the intake. We had to replace the chain and sprockets because they just kept popping off because they were too weak and under too much stress. We got new sprockets but ran into a problem with the new sprockets. The sprockets were touching the ground of the playing field. The robot's weight caused it to sink slightly so that the sprocket was touching the ground. Next meeting we will have to move the whole system up so that they don't hit the floor. We also worked on the dead wheels and installed the actual encoders on them, but the dead wheels still have to be mounted to the robot and programmed, so we decided to drop them for our first tournament and continue working on them for our second qualifier because time is starting to run out, so we must start prioritising.

STUDENT 2	REFLECTIONS
Kinsley	NOTE: We finished replacing the chain and sprockets on the intake. We had to replace them because the old chain and sprockets were too weak and actually popped off when under too much stress. However the new sprockets touch the ground when placed on the field. The robot's weight causes it to sink slightly on the playing field matts and so the sprockets are touching the floor. Next meeting we will have to move the whole system up so that they don't hit the floor. We also worked on the dead wheels and installed the actual encoders on them, but the dead wheels still have to be mounted to the robot and programmed, so we decided to drop them for our first tournament and continue working on them for our second qualifier because time is starting to run out, so we must start prioritising.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Finished replacing chain and sprockets on the bottom portion of the intake • Made some progress on the dead wheels	•	•



Started designing mounting of side shields		
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MEETING LOG

DATE	START TIME	STOP TIME
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10/27/19	2:00pm	8:00pm
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ATTENDANCE	AGENDA
Madelene, Ema, Isabel, Jenna	• Reinforce vertical lift • Finish fixing intake • Set up phones • Make scouting sheets • Make Packing checklist • 3D print phone mount

STUDENT 1	REFLECTIONS
Madelene	While waiting for our turn for space on the robot, Isabel and I worked on making scouting sheets within google docs and google forms. We made 2 versions so that the scout team will be able to pick their favorite one. While doing this, we also made a packing checklist so that we will be organized and dont forget anything for competition While we worked on those sheets, Jenna worked on fixing the intake so that the sprockets on the bottom of the robot would not hit the ground. When Ema left I took over her job of supporting the lift. By the time we had to leave, I finished drilling the holes for the support beam.

STUDENT 2	REFLECTIONS
Ema	I worked with Renzo on a way to reinforce the vertical lift system. We decided on adding a cross bar that attached to the stationary part of the vertical lift and down by the motor, effectively creating a triangular area of support to the column. I spent quite a bit of time figuring out where it should go, what we needed to drill to get it to fit, etc. Eventually I transferred the job to Madelene when I needed to leave.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Almost done reinforcing vertical lift • Finished fixing the intake • Set up the phones to control the robot • Made scouting sheets • Made a packing checklist for White Mountain • 3D printed the phone mount	•	• Alliance flag replacements from Andymark

MEETING LOG

DATE	START TIME	STOP TIME
10/28/19	11:00am	4:30pm

ATTENDANCE	AGENDA
Madelene, Isabel, Gray, Kinsley	• Start mounting phone • Make stone stop • String horizontal lift • Continue wiring • Finish reinforcing vertical lifts

STUDENT 1	REFLECTIONS
Gray	Today we did various things such as mounting the phone, making the stone stop, stringing the horizontal lift, reinforcing vertical lifts, and wiring. Mounting the phone took a lot of filing. Originally the phone would fit very tightly to the point we would have to tug it out. So I had been filing it and it certainly fit in better! The stone stop was a very precise piece to make. We kept having the sand the metal down so it could fit inside of the holder for the actual stopper. We eventually did it and it looks nice and stylish! A couple other teammates were working on stringing the horizontal lift. Madelene worked on reinforcing the vertical lifts today. The reinforcement that had been done was to prevent it from being shaky and wobbly as it went upward.

STUDENT 2	REFLECTIONS
Isabel	Today we started on the stone stop, which is what stops the stone within the robot so that the roller claw can pick it up. Madelene also finished reinforcing the vertical lift so that when the lift is up, it does not wobble as much. Today I set out to mount the phone mount, but ended up spending most of my time filing down our 3D printed phone mount because the phone fit way to tight within it.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Started on stone stop (stops the stone from flying out of the back of the robot) • Finished reinforcing vertical lift • Started phone mount • Started stringing horizontal lift	•	• Chain break

MEETING LOG

DATE	START TIME	STOP TIME
10/29/19	11:00am	8:00pm

ATTENDANCE	AGENDA
Madelene, Gray, Kinsley, Isabel, George	• Finish stone stop • Finish stringing horizontal lift • Continue wiring • Switch around large and small sprockets on intake • Make capstone

STUDENT 1	REFLECTIONS
George	This meeting I worked on the capstone. First I cut off the top pieces with an oscillating saw then I covered the holes with green tape and put our team number on it.

STUDENT 2	REFLECTIONS
Kinsley	NOTE: We had the large sprocket and the small sprocket in the wrong orientation, which was actually slowing the intake down, so we had to switch them to speed it up as intended. Finished stone stop which does not allow stone to move within robot Strung horizontal lift but we have to move the motor because the string is hitting the 15mm extrusion and may snap. We also have to restring it. Today we strung it has a cascading lift, but soon realized for horizontal slides, it is best to string them as continuous lifts. We also need to move half of the stringing to the other side of the slides so that the strings wont get tangled Finished capstone

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Finished stone stop • Strung horizontal slide (but have to redo) • Switched large and small sprockets on intake • Finished capstone	• Do your research before you build something (attached sprockets wrong)	•

MEETING LOG

DATE	START TIME	STOP TIME
10/31/19	11am	5:00pm

ATTENDANCE	AGENDA
Isabel, Gray, Kinsley, Madelene, Jenna	• Restrung horizontal slides • Remount motor for horizontal slides • Attach handles to carry the robot by • Continue wiring • Mount “arms” to servos for foundation movers • Mount phone

STUDENT 1	REFLECTIONS
Madelene	Isabel got started by attaching handles to the robot. In previous years picking up the robot from a safe place has always been a problem so we thought adding handles would be a great idea!

STUDENT 2	REFLECTIONS
Jenna	The robot is a lot more easy to pick up and move now that we have added handles to the robot. Now we don't have to worry about breaking anything by picking it up from the wrong places. Everything is starting to work together better now that we have the horizontal lift working. We spent some time personalizing the robot and its cart, so now anybody could tell that it belongs to us. I added nailpolosh to some of the stringing so we won't have to worry about our very cool knots slipping out of where they are supposed to be.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Redid the stone stopper to be smaller and adjustable • Restrung the horizontal slides (It works!!) • Remounted the motor for the horizontal slides • Attached handles to the robot • Mounted “arms” to the servos that move the foundation • Mounted the phone • Mounted question cubes to	• Take your time and do things right the first time	•



intake!		
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DATE	START TIME	STOP TIME
11/2/19	9:00am	8:00pm

ATTENDANCE	AGENDA
Jenna, Tytus, Gray, Kinsley, Isabel, George, Madelene, Michael	• Finish setting up phones and expansion hubs • Make configuration file • Program and test TeleOp • Make team number plate • Fix vertical lift stringing

STUDENT 1	REFLECTIONS
Michael	When I came Isabel showed me some of the programing that she did and explained to me what it did. After that I helped Isabel test the robots programming and some of it worked so we went back and fixed it. We tested it a couple times more and I think it ended up working. After that we put the robot on the field. It was really fast but right was left and left was right. After a while Isabel fixed it and all the other mechanisms worked so that was nice.

STUDENT 2	REFLECTIONS
Isabel	Today I finished setting up the phones and renamed one of the expansion hubs because we have two. Then I hooked up each motor to the battery directly and tested which way each motor ran on our robot when given a positive speed value, so that I knew what motors I needed to reverse in our teleop program. I made a chart and recorded whether each motor needed a positive or negative speed in order to be turning the way we want it to. I then made the configuration file on the robot controller phone for all of the motors, and two of our servos. Yesterday I watched some tutorial videos on android studio and wrote a TeleOp program from scratch, so all I had to do today was change the direction and powers of the motors in the code. After I made some small changes, we put the robot on a block and tested the code. It ran, but some of the wheels were not running correctly: for example, when all of the wheels were supposed to be going forward, only the front right, left right, and rear left wheels were turning. After rewriting the code, I got all of the wheels to run, but strafing and turning were inverse. After changing some negative and positive values, I got the turning right, but the strafing was still inverted. After much testing I could not figure out why, so I completely rewrote the mecanum wheel code, and after some small changes here and there, I finally got it working correctly. We also tested the horizontal slide, the vertical lift, and the intake motors, which all worked well!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING



• Finished setting up phones and expansion hubs • Programmed and tested TeleOp • Made team # plate • Fix vertical lift stringing	•	•
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MEETING LOG

DATE	START TIME	STOP TIME
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11/3/19	9:00am	8:00pm
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ATTENDANCE	AGENDA
Gray, Kinsley, Michael, Isabel, Madelene, Tytus	• Finish wiring • Start on autonomous • Finish mounting team number plates • Work on engineering notebook • Work on judges presentation • Start on pit and robot checklist

STUDENT 1	REFLECTIONS
Tytus	Today was a day mostly spent programming. Isabel did the programming for the autonomous, Gray and Ema worked on making the number plates, we worked on the engineering notebook and the judges presentation, some people worked on the pit, and others on the robot checklist. Also, we finished wiring the robot.

STUDENT 2	REFLECTIONS
Gray	Today was accomplished with many things. We had mounted the number plates that mount to the side of our robot, we had started programming autonomous, worked on the engineering notebook, worked on the judges presentation for our competition, started on the pit, and a major accomplishment was finishing wiring! The number plates we mounted were fun to work on! As we worked on them I learned how to tap using a drill bit specialized for tapping. It was a good thing to learn how to do for the future! Isabel worked on programming autonomous. She had made lots of progress for it and did a great job! We had worked on the engineering notebook and the judges presentation as well. It wasn't as easy as you'd think though. We'd have to go back and rewrite lots of words. For example we had used an excessive amount of ands. Other teammates were working on the pit and robot checklist. The work they had done looked good to me! We then finished wiring! During the process of wiring I had learned how to solder wires together. It wasn't that hard and it was pretty fun! The wires were all assorted correctly and everyone who wired did a good job on the wires!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
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MEETING LOG

DATE	START TIME	STOP TIME
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11/7/19	10:00 am	11:00 pm
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ATTENDANCE	AGENDA
Madelene, Isabel, Gray	- Get ready for competition -pack - Work on autonomous

STUDENT 1	REFLECTIONS
Madelene	We spent the whole day mostly finishing small random tasks along with packing for the trip. Isabel spent most of her time programming autonomous while I reset the field. We stayed later than everyone else to try and finish our autonomous for the red side. We plan on finishing the autonomous for the blue side at the competition, it should be fairly easy since all we have to do is inverse values.

STUDENT 2	REFLECTIONS
Gray	Today we mainly focused on packing for our White Mountain qualifier and trying to improve our autonomous! Our goal for our autonomous was to move the foundation and park under the skybridge. We had finished our red autonomous and hope to make a successful blue autonomous at our qualifier!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
- Packed for White Mountain - Got autonomous for the red side working		

MEETING LOG

DATE	START TIME	STOP TIME
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11/15/19	10:00am	5:00pm
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ATTENDANCE	AGENDA
Isabel, Madelene, Gray, Kinsley	• Fix the wheels so they drive straight • Replace the set screw hubs with clamping hubs so they won't slip • Lift the intake sprockets so that they stop dragging on the ground • Fix the intake stops so they won't cave in • Recode the blue side autonomous

STUDENT 1	REFLECTIONS
Isabel	Today we got a lot done before our unexpected qualifier; we were not expecting to compete this weekend, but we got a message from the director of NMFTC asking us to compete as a team had dropped out, making it an unofficial event. Even though it threw off our schedule, and we're not completely ready, we decided to go so that NMFTC could have an official first tournament as a new region! Our biggest problem in our last qualifier, which was just last weekend, was that the robot was not driving straight. We figured it was a combination of two problems: our intake sprockets at the bottom of the robot were barely touching the floor, and the hubs on both the wheels and drivetrain sprockets were constantly loosening. As a matter of fact, at the competition, we used some candy wrappers and wrapped the set screws in them to keep them from backing out, which worked well as a temporary solution. However, we knew we needed to fix them for good, so we got hubs that clamp onto the shaft, instead of relying on a tiny set screw. We also noticed we have .25" bores on the motors which are 6mm; .25" is just a tad larger than 6mm, but enough to cause issues. So we replaced all of the hubs with better clamping hubs, and with the correct size bore. This should help with slippage. Next we fixed the intake sprockets by taking it apart and shaving off some material from the sprockets and shaft. This got the intake a couple millimeters off the ground, however we are still worried about it in the case that it slips back down. We also fixed one of the intake stops, so that it would not cave in when hit too hard. Lastly, I re-coded both red and blue autonomous. I was initially just going to recode the blue side, but when we ran the red side, it was way different than before because we fixed the way the robot was driving. So I ended up re-coding them both, and actually taking out one of the unnecessary movements, simplifying it a bit, which is always good with autonomous. Currently, everything is working quite well and we are super excited for this tournament. We are jumping in the car at about 3:00am to pick some of the team up and to get to Alamogordo by 8:00! It'll be a long day for sure!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
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• Replaced the hubs on the wheels and sprockets to clamping hubs • Raised the intake • Fixed the stop that caused the intake to cave in • Recoded the red and blue autonomous • Got the robot driving straight!	•	•
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MEETING LOG

DATE	START TIME	STOP TIME
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11/24/19	10:00 am	8:00 pm
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ATTENDANCE	AGENDA
Gray, Isabel, Madelene, Michael, Jenna	• Work on the engineering notebook • Work on the judges presentation • Work on new claw

STUDENT 1	REFLECTIONS
Madelene	Today I worked on finishing up the notebook before the next competition, which is 13 days away! Jenna and I also worked on fixing the Judge's presentation since our last one was too long. We also were able to add pictures from the competition to the notebook since we had the idea to save all the pictures as soon as they were taken onto a slack channel!

STUDENT 2	REFLECTIONS
Gray	Today I worked on our new and improved claw! It was near done which I was excited for! We also worked a lot on our Judge's presentation because in our previous tournament we went above our time limit. Along with all the changes we decided that we should practice our part that we present to the judges so we could shorten the time and sound more professional. We worked on important skills such as memorization, eye contact, and enunciation.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Shortened judges presentation • Added pictures to notebook • Almost done with new claw	• Improved presentation skills	•

SCRIMMAGE LOG

DATE	START TIME	STOP TIME
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11/30/19	12:00	4:00
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ATTENDANCE	AGENDA
Michael, Gray, Madelene, Isabel, Kinsley, Ema	• Play in multiple skystone matches • Identify deficiencies in new changes

STUDENT 1	REFLECTIONS
Madelene	3 teams participated in the scrimmage. Gear Masters, Neutrons, and us. Since we only had 3 robots, the scrimmages were a little lopsided. We scored really well and learned a lot. We mainly learned our pulley caps could break very easily if the lift were overextended. We need to therefore put limit switches on the lifts to prevent them breaking.

STUDENT 2	REFLECTIONS
Gray	The scrimmage was a good learning experience. We had learned a few things such as that our pulley caps are not very durable and a potential solution for that could be mounting limit switches on our lifts. There were only 3 teams that attended the event so some matches were 2 teams against 1. We let our drivers practice as well as other team members! I got to drive the wheels and the intake to our robot in some of the matches and it isn't as easy as it seems. We also taught Ema how to coach! She did really well at it! We also gave Kinsley some Human Player experience. She was a good Human Player!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Identified needed design improvements • Identified strategy changes	•	•

MEETING LOG

DATE	START TIME	STOP TIME
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12/2/19	1:00 pm	6:00 pm
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ATTENDANCE	AGENDA
Gray, Kinsley, George, Isabel, Ema	• Driver practice • Work on judge's presentation

STUDENT 1	REFLECTIONS
George	I had been on vacation for a week and came back and was very impressed with all the progress the team had made. I loved the new claw and I think it is much better than the roller claw. This meeting we worked on and finished the end caps on the vertical lifts and did a lot of driver practice. The new caps work great and don't break like the old ones. I think that driver practice is very important because we have not had any all season. I am really excited to see how well we do at Socorro. We had to fix almost nothing that practice and I am really encouraged by all the progress the team has made.

STUDENT 2	REFLECTIONS
Gray	Yesterday, we did a few things such as finishing working on the lift caps, adding a potential slow mode, strategizing, and driver practice! The new lift caps are a more efficient design because our original caps kept breaking as we extended our x lift out. The new design will also allow us to go about $\frac{1}{4}$ of an inch per stage. From lots of practice we learned moving the foundation is not easy at all. We decided that we should try and make a slow mode to easily move the foundation and it was slower but we couldn't strafe in slow mode. We also talked about strategy and good ideas for our matches. We decided that ramming into the blocks was not a good idea because it would make it harder for us to intake them. Another big priority we needed to figure out was alignment when placing the stones. Our solution to this issue is to line the wheels up with a certain spot on the foundation. After all the strategizing, we practiced the strategies and wanted to see how they would work out on the playing field. Our strategies worked pretty well and we got a good amount of practice!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS	THINGS TO ORDER FOR NEXT MEETING
• Improved driver accuracy and efficiency	•	•

MEETING LOG

DATE	START TIME	STOP TIME
12/12/19	12:30pm	8:00pm

ATTENDANCE	AGENDA
George, Gray, Isabel, Jenna, Madelene	• Work on new intake • Work on the judge's presentation

STUDENT 1	REFLECTIONS
George	This meeting we took off the intake and are planning on improving it by adding a second pair of wheels onto the intake. We think it will work much faster than the old one and I for one can't wait to see it in action. We are making the intake different so that the intake can pick up the block from any angle. We are also planning on improving the lifts by getting more powerful motors and adding an extra slide.

STUDENT 2	REFLECTIONS
Jenna	So we decided to redo the intake, since it's been the thing that most regularly needs repair and maintenance and even broke once during a match. It functioned, but was susceptible to a lot of wear and tear while being used. It was difficult to try to turn the whole robot upside-down between almost every match to check and adjust the intake. We are instead building a design with two wheels and is angled differently. This will reduce the time it takes to line up the robot to intake the block, reduce the time it takes to actually intake the block, and reduce the amount of times that we'll have to perform maintenance checks. I also spent much of my time fixing the judge's presentation and editing

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Took off old intake • Started on new one	•	•

MEETING LOG

DATE	START TIME	STOP TIME
12/14/19	6:00pm	10:00pm

ATTENDANCE	AGENDA
Isabel, Gray, Kinsley, Titus, George	Work on new intake

STUDENT 1	REFLECTIONS
Kinsley	

STUDENT 2	REFLECTIONS
Isabel	Today we worked on the new intake; we found that we could implement a very similar design to what we had before, except direct drive and with four compliant wheels instead of two. The assembly of the two sides of the intake went quite well. The hard part was figuring out how to mount them. We went through a few iterations before settling on a press fitting two bearings on each side of a thick aluminum plate and attaching that directly to the inside of the chassis. On the other side we did not have room for this so instead of attaching the custom made pillow block to the inside of the chassis, we attached it to two supports under the ramp! It is very sturdy and we are all really excited to test it out!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
Got the new intake mounted		

MEETING LOG

DATE	START TIME	STOP TIME
12/19/19	1:15 pm	7:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, George, Jenna, Madelene	• Explore button making possibilities • Re string lifts

STUDENT 1	REFLECTIONS
Madelene	I ordered a button maker and it arrived in the mail. I brought it to the meeting today and we started working out designs for possible buttons we can have it for state. We have yet to buy a hole puncher the appropriate size. Our Y lift cord is beginning to look frayed so I made a replacement string we can use when it breaks.

STUDENT 2	REFLECTIONS
Gray	Today we tinkered around with a new button maker that Madelene had brought for us!! We were making numerous designs for the buttons that we could use for state. We also restrung our vertical lifts because our old string was very worn out and frayed. Madelene also worked on making replacement strings for the vertical lifts just in case a very bad situation were to ever happen, such as the string snapping in the middle of a match or during practice.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Re strung vertical lift • Made some button designs	•	•

MEETING LOG

DATE	START TIME	STOP TIME
12/20/19	1:15 pm	7:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, George, Jenna, Madelene	• Change out motors on the vertical lifts • Change out motors on the horizontal lifts

STUDENT 1	REFLECTIONS
Isabel	Today we were able to put much faster motors on our vertical and horizontal slides. We had some difficulty with the horizontal slide stringing and spool once we replaced the 40:1 motor with the 20:1 motor, however we figured out that it was one of the spools coming apart, which caused the string to unevenly wrap. After that, the horizontal slides were much faster and even smoother! The vertical lifts were also much faster after we replaced both motors. We are concerned, however, of the weight of the vertical lifts and horizontal slides which those 20:1 motors are lifting. When extended, sometimes the vertical lifts begin to sink, so it looks like the motors may not have enough torque.

STUDENT 2	REFLECTIONS
Gray	Today we changed out our vertical lift motors as well as our horizontal lift motors from 40:1 motors to 20:1 motors to make our lifts faster. When we tested them we had a little bit of technical difficulties at first, such as a crunching noise whenever we extended the horizontal lift. The issue was quickly resolved and after that, they worked very well! When we tested them on the field they were super efficient. Not only did the new motors help gain speed but they also made the lifts sliding motion a lot smoother. It was worth implementing this change for both of our lifts and we will use it in the future!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Changed out the motors on the vertical lifts • Changed out motos on the horizontal lifts	•	•

MEETING LOG

DATE	START TIME	STOP TIME
1/2/20	2:00 pm	8:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, George, Jenna, Madelene	• Work on the notebook • Rewire • Instal the servo amplifier

STUDENT 1	REFLECTIONS
Jenna	Today I worked primarily on the engineering notebook. We have decided to redo how we outline our various outreach events. Previously, they had all been described almost exclusively in the business plan, but nowhere else. To make the entire notebook more comprehensible and logically ordered, there is now an entire section that goes much further in detail about each event, and the business plan includes a much briefer list that states only the date, location, and type of outreach event. The actual outreach section, rather, also discusses specific interactions, activities and the total impact of each, along with the general success at each.

STUDENT 2	REFLECTIONS
George	This meeting we worked on the engineering notebook and wired the robot. We rewired the robot today because we got new motors for our lifts and got a servo amplifier. The servo amplifier will help our intake, foundation movers, horizontal lift, and claw they will move faster and run better.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Worked on the notebook • Re-wired • Installed the servo amplifier	•	•

MEETING LOG

DATE	START TIME	STOP TIME
1/9/20	12:00 pm	8:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, George, Kinsley	- Skystone autonomous - Work on notebook

STUDENT 1	REFLECTIONS
Gray	Today we were working on our new skystone autonomous, and working on the engineering notebook! I improved the intake analysis section. We also fine tuned our autonomous programs that we are going to use for our upcoming qualifier in Sandia Park. One of them senses and delivers both skystones and parks, and the other one senses 1 skystone delivers it, then places it, moves the foundation and then parks. Fortunately, our autonomous has been performing very consistently and would pick up both skystones 85% of the time!

STUDENT 2	REFLECTIONS
George	Today me and Gray worked on the Engineering Notebook because we needed to finish some stuff before the competition. I worked on the foundation mover analysis and explanation. As Gray and I worked on the notebook Isabel worked on the skystone autonomous I think it is really good and will help us a lot in Sandia Park.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Got skystone autonomous working quite consistently - Updated the notebook's design section		

MEETING LOG

DATE	START TIME	STOP TIME
1/21/20	1:00 pm	6:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, Felix	• Measure and take pictures of old lifts/robot • Take x and y lifts off • Cut new lifts • Organize shop

STUDENT 1	REFLECTIONS
Gray	Today we welcomed a new member to our team! His name is Felix! We gave him a brief tour around our workshop and showed him this year's challenge, Skystone. We explained to him what the overall experience of FIRST is like, What competitions will be like, our robot design and how it works, our engineering notebook and what its purpose is, our judge's presentation and what its purpose is, and how our team is structured! We also worked on taking our lifts apart as well as measuring the positions of everything and how we can make our new lifts the same way. We also worked on taking apart our current phone mount. For autonomous, we decided that a claw would be more efficient to pick up the stones than going head on with our intake. The reason we took our lifts apart is because we have ordered these very nice ball bearing slides that we hope will perform a lot better on our robot. When I tried sliding them, I was very impressed with the linear motion that they provided. The result they provided impressed everyone and we are excited to install them! We worked on cutting them and to see how they would be cut. First we used the miter saw, but it didn't go well because of all the metal shavings it made and the ball bearings spilled out. Next we tried the bandsaw. It had worked a lot better and the bearing stayed in place. Since the length we cut it removed the dent that prevents the ball bearings from spilling out, we had used an awl to create another dent and it was successful! After making a few, we figured out that lubricating WD-40 in them makes them very fast. After that result, We decided to lube all of them up with the WD-40.

STUDENT 2	REFLECTIONS
Isabel	Today we got to welcome our newest member Felix to the team! We showed him the challenge video and our engineering notebook, and explained our robot, how competitions worked, and how we structured our team! After we welcomed him, we measured our old lifts relative to the rest of the robot to make sure everything gets put back in the same place once the new lifts are installed. We then took the old lifts off and started looking at mounting the new ones. Unfortunately we found the new lifts to be just a tad too tall, which would prevent us from passing under the skybridge. We then had to figure out how to cut them, which was hard since they have ball bearings in them. After cutting one of them and ruining it as we realized we cut off the stop that kept the ball bearings in, we decided to try to cut it on the other side that had the stop on the outside slide, which we could then make our own stop on by



	dimpling it with an awl. This worked very well, and we were able to cut about half of them. We also reorganized our shop and added extra storage shelves.
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ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Measured and took pictures of old lifts/robot - Took x and y lifts off - Cut new lifts - Re-organized shop	Analyze before taking action	More long robotics slides (we ruined one oops)

MEETING LOG

DATE	START TIME	STOP TIME
1/22/20	8:30 am	6:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, Felix, George	• Mount dead wheels • Work on notebook • Mount new lifts

STUDENT 1	REFLECTIONS
George	This meeting we started mounting the new lifts and they seem to be really good and I can not wait to see them on the playing field. We also changed the position of the battery container so we could fit the new lifts in. We will be putting eight slides on each side and this should make us able to stack 14 stones high. The new lifts are called ballbearing lifts and are very smooth and should really help us in our competitions. I work on the notebook I work on the robot design section and filled out meeting logs. We plan on installing dead wheels on the robot which will make our autonomous program much, much, better.

STUDENT 2	REFLECTIONS
Felix	Today we finished cutting the new lifts. We mounted them on the robot and we are able to stack 14 blocks with the new lifts and they are really fast. We changed where the battery compartment was and moved it. Now we will have room to put a claw on the robot which will be very useful and much quicker than the intake. I'm excited to see the robot all put together.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Measured and took pictures of old lifts/robot • Took x and y lifts off • Cut new lifts • Re-organized shop	• Analyze before taking action	• More long robotics slides (we ruined one oops)

MEETING LOG

DATE	START TIME	STOP TIME
1/23/20	1:00 pm	7:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, Felix, George, Madelene, Jenna, Ema, Tazz,	• Start stringing lifts • Meet with Chris Forsythe for AZ judging • Welcome new member, Taz! • Disassemble horizontal slides

STUDENT 1	REFLECTIONS
Madelene	Today we devoted the beginning of the meeting time to unwiring our old horizontal lift and fixing the Vertical lift. We were confused about the logistics of stringing the new lift cascading as the diagram we were viewing did not have as many stages as ours does. Isabel and I both tried to make a new diagram digitally, mine with cad and her on Google, however, she finished her design first. We had unplugged the cords from the horizontal lift and had to rebind all the other ones that had come undone, this meant a long time of painstaking testing. Then shortly before Chris Forsythe arrived, our newest member Tazz arrived with his mother to the meeting. We talked with them about our team until the rest of the members arrived to talk with Chris. Chris talked to us about the differences between how New Mexico judging as opposed to anywhere else, because of the newest judges that would be rating us. To stray from confusion the NM judges were given a checklist. Chris gave us insight into the best ways to answer those questions from a judge advisor standpoint.

STUDENT 2	REFLECTIONS
Gray	Today a numerous amount of things happened such as making a plan for how to string our new vertical lifts cascading, Unwiring our old horizontal lift, having a meeting with New Mexico's judge advisor, Chris Forsythe, and introducing another new member, Tazz! We had realized that for our new vertical lifts, the pulleys are very close to each other. Since we are stringing our vertical lifts cascading, we have to have the pulleys on the top of the lifts, and screws on the bottom. Isabel had created a diagram to figure out how we want to string them! We then decided to unwire our horizontal lift for the time being. We took photos of the original way we wired them and labeled all the mechanisms wiring positions so that we know how to wire them in the future. After that, we met with the judge advisor, Chris Forsythe! He told us tips and tricks for our presentation and notebook on how we can get very prestigious awards like Inspire award and the Think award! He gave our team a very thorough explanation and told us to use things like visuals in our presentation, to use tabs that stand out in our notebook, use more volume in our notebook, create a separate notebook meant for the code to autonomous and teleop, He also gave us very valuable tips like to be aware of the type of judge's you will get, and how to



	negotiate with them! We also welcomed Tazz! We showed him around our workshop and explained our team to him! We also let him look in our engineering notebook because he said he has had experience working on it.
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ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Started creating a plan for stringing new lifts - Met with Judge Advisor - Got useful info for notebook and presentation	- Improve on presentation - Improve on engineering notebook	

MEETING LOG

DATE	START TIME	STOP TIME
1/23/20	1:00 pm	7:00 pm

ATTENDANCE	AGENDA
Isabel, Gray, Felix, George, Madelene, Jenna, Ema, Tazz,	• String vertical lifts • Start on autonomous claw

STUDENT 1	REFLECTIONS
Tazz	Today was my first day joining the team. I kind of just got to know everyone and got a tour of the enigma workshop. I mostly just observed the team and got to know our robot. We also met with a judge advisor and presented to him to receive some tips we could use in our presentation. He also told us some key things we should have in our engineer notebook to make it the best it could be. I also got to know a bit about our teams history and just overall got to know everyone briefly. What I took from today was that I'm glad I found a place on the enigma team because everyone's super nice and the energy is amazing.

STUDENT 2	REFLECTIONS
George	Today we had a new member join our team! Tazz seems super awesome and I think he will fit right in on our team. We started on the new claw for autonomous. It will swing down and grab the skystones we plan on having a 4 stone auto. We also started stringing the lifts today.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Started creating a plan for stringing new lifts • Unwired some mechanisms • Met with Judge Advisor • Got useful info for notebook and presentation	• Improve on presentation • Improve on engineering notebook	•



MEETING LOG

DATE	START TIME	STOP TIME
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1/24/20	12:00 pm	7:00 pm
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ATTENDANCE	AGENDA
Isabel, Gray, Felix	• Finish autonomous claw • Start on odometry pods

STUDENT 1	REFLECTIONS
Gray	We worked on our claw that will specifically assist us in autonomous with speed and consistency. We cut and used lots of aluminum beams and super glued weather stripping to them. Today we also started working on our odometry pods and designing how we want to mount them, and spring them! We also spray painted our new side shields for our team numbers black.

STUDENT 2	REFLECTIONS
Felix	Today we finished our autonomous claw which will work really well and be able to get up to 5 stones! We also started on our odometry pods and spray painted the side shields.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Started creating a plan for stringing new lifts • Unwired some mechanisms • Met with Judge Advisor • Got useful info for notebook and presentation	• Improve on presentation • Improve on engineering notebook	•

MEETING LOG

DATE	START TIME	STOP TIME
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1/28/20	12:00 pm	7:00 pm
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ATTENDANCE	AGENDA
Isabel, George, Felix	• Mount horizontal slides • Finish odometry pods • Work on field perimeter

STUDENT 1	REFLECTIONS
George	This meeting we worked on mounting the horizontal lifts and built some of the new field perimeter. Isabel and coach Russ worked on the horizontal lifts and Felix and I worked on the perimeter. The lifts look really good and they look really cool.

STUDENT 2	REFLECTIONS
Felix	In this meeting we worked on the new field perimeter and also worked on the new horizontal lifts. I like these lifts because they look really good and they are less bulky. The field perimeter also looks very nice.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Started creating a plan for stringing new lifts • Unwired some mechanisms • Met with Judge Advisor • Got useful info for notebook and presentation	• Improve on presentation • Improve on engineering notebook	•

MEETING LOG

DATE	START TIME	STOP TIME
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2/5/20	12:00 pm	7:00 pm
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ATTENDANCE	AGENDA
Isabel, George, Felix, Gray	• Mount odometry • Start new capstone mechanism • Make new capstone

STUDENT 1	REFLECTIONS
Felix	Today we mounted the dead wheels and finished installing all the upgrades. We started on wiring and had to do some soldering. It was my first time soldering and I really enjoyed it. Also we met with a guy from roborave and got some useful information.

STUDENT 2	REFLECTIONS
Isabel	Today we were able to mount the odometry in between our new side shields! We mounted them with the extra Long Robotics Slides and sprung them with zip ties! We also met with a man from roborave, who explained his program to us; we also introduced him to FTC and we both agreed that the our two programs should collaborate at some point!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Started creating a plan for stringing new lifts • Unwired some mechanisms • Met with Judge Advisor • Got useful info for notebook and presentation	• Improve on presentation • Improve on engineering notebook	•

MEETING LOG

DATE	START TIME	STOP TIME
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2/6/20	12:00 pm	7:00 pm
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ATTENDANCE	AGENDA
Isabel, George, Felix, Gray, Jenna, Ema, Kinsley, Micheal Guests: Gear Master,	- Have a FTC meet up - Try out our new lifts and test

STUDENT 1	REFLECTIONS
George	This meeting we planned a FTC meet up but our robots lift's busted before we got on the playing field. We didn't get to play against the Gear Masters unfortunately. We worked on the lifts and when the broke we strung one side and are going to string the other side tomorrow. We had a lot of fun hanging out with the Gear Masters.

STUDENT 2	REFLECTIONS
Kinsley	Today we had a meetup/scrimmage with Team #10348 Gear Masters. Meeting up with them at our workshop space and bonding with the team was a lovely experience. We were almost ready to test our robot and get it on the competition field, but our lifts had busted and had quite a few flaws afterward. Despite the unfortunate situation, our team will never give up and we plan to fix the lifts soon!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
- Finished stringing new lifts wired some mechanisms - Got useful info for notebook and presentation	- Improve on presentation - Improve on engineering notebook	

MEETING LOG

DATE	START TIME	STOP TIME
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2/7/20	10:00 am	3:30 pm
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ATTENDANCE	AGENDA
Isabel, Gray, Felix	- Repair lifts - Work on notebook and CAD

STUDENT 1	REFLECTIONS
Gray	Today I had started to learn CAD. It's a very useful skill in life to have for the future to implement in jobs like mechanical engineering, and more. I hope to get really good with CAD in the future! We also were working on our lifts after an unfortunate breakdown happened. Since we've strung our lifts cascading, all the 3d printed pieces had too much force being used on them and they gave out and all snapped. We solved this problem by replacing those parts with custom made oak wood pieces. We hope they work well!

STUDENT 2	REFLECTIONS
Felix	Today we finished repairing the lifts and also we worked on the notebook and CAD. The robot is coming together quickly!

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
Fixed the breaking lifts	- Improve on presentation - Improve on engineering notebook	

MEETING LOG

DATE	START TIME	STOP TIME
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2/9/20	2:30pm	5:30pm
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ATTENDANCE	AGENDA
Ema, Michael, Jenna	• Work on notebook and CAD • Work on presentation

STUDENT 1	REFLECTIONS
Jenna	Today we sat and finished up the judge's presentation. The idea is that we really want to try to highlight our strengths really well while also hitting all the criteria necessary for our target awards. We filled in the design parts of each section and subsystem of the robot. We also reformatted a whole bunch of it so that it flowed more easily, was more easily readable, and key points were repeated and memorable for the judges. The only thing that really needs to be done now is putting the videos in. At the end of the meeting we assigned individual slides to different team members so everyone has something to say during the presentation and knows what it is.

STUDENT 2	REFLECTIONS
Ema	

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Finished presentation	• Improve on presentation • Improve on engineering notebook	•

MEETING LOG

DATE	START TIME	STOP TIME
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2/10/20	12:00 pm	7:00 pm
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ATTENDANCE	AGENDA
Isabel, Gray, Felix	• Work on presentation • Work on notebook and CAD • Install new mecanum wheels

STUDENT 1	REFLECTIONS
Isabel	Today we installed the new mecanum wheels and I finished up the new capstone mechanism! The new capstone mechanism works the same way the other one did, we basically made it lower profile and moved it to the center of the horizontal slides so the capstone could be placed directly onto the last stone within our robot! We were also able to test the new mecanum wheels, and they work great! Much better than the andymark ones.

STUDENT 2	REFLECTIONS
Felix	Today we finished installing the new mecanum wheels, we tested the wheels and they were very smooth and didn't sound like a shopping cart! Also we finished the capstone mechanism which is very nice and low profile.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Installed new mecanum wheels • Got some CAD done • Capstone mechanism done	• Improve on presentation • Improve on engineering notebook	•

MEETING LOG

DATE	START TIME	STOP TIME
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2/11/20	3:00 pm	8:00 pm
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ATTENDANCE	AGENDA
Isabel, Gray, Felix, George	• Work on presentation • Work on notebook and CAD • Install new motors • Finish new lifts

STUDENT 1	REFLECTIONS
George	Today I learned how to do CAD. Gray showed me how to use Fusion 360, the program we are using for CAD. We also finished installing the new motors and I hope they will stop the lifts from sinking. We also finished the lifts we took off 2 stages so that it would sink less and be less weight.

STUDENT 2	REFLECTIONS
Gray	Today we did a lot of CAD for our robot. We accomplished things such as making our new linear lifts in CAD, and I taught George how to use CAD. We also installed our new motors for our vertical lifts. The specs on these motors seemed very promising and we hope they have the speed and torque to hold our lifts.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
• Installed new motors • Got some CAD done	• Improve on presentation • Improve on engineering notebook	•

MEETING LOG

DATE	START TIME	STOP TIME
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2/16/20	1:00 pm	8:00 pm
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ATTENDANCE	AGENDA
Isabel, Gray	• Wire the robot • Test new changes • Work on notebook and CAD

STUDENT 1	REFLECTIONS
Isabel	

STUDENT 2	REFLECTIONS
Gray	Today I worked on CAD and got to see the process of wiring the robot. We have tested all of our new changes and they all worked pretty well! In CAD I accomplished making our horizontal slides, and foundation movers. We also tested some very fast motors for our lifts to see if they had the torque to lift it. Unfortunately, these motors didn't have enough torque to lift the motors and we had to switch back.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
•	• Improve on presentation • Improve on engineering notebook	•

MEETING LOG

DATE	START TIME	STOP TIME
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2/17/20	1:00 pm	8:00 pm
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ATTENDANCE	AGENDA
Isabel, Gray, George, Felix	• Wire the robot • Test new changes • Work on notebook and CAD

STUDENT 1	REFLECTIONS
George	Today I worked mainly on CAD and the notebook. We finished wiring the robot and we got it on the field and Isabel and Gray practiced with it and it works really well. I can not wait for the state competition to see it compete.

STUDENT 2	REFLECTIONS
Felix	Today we had to change out the pulley caps and also we had to replace a bad wire that goes to our vertical lifts which took a while, also we worked on CAD.

ACCOMPLISHED/MILESTONES	TEAM IMPROVEMENTS/LESSONS LEARNED	THINGS TO ORDER FOR NEXT MEETING
•	• Improve on presentation • Improve on engineering notebook	•