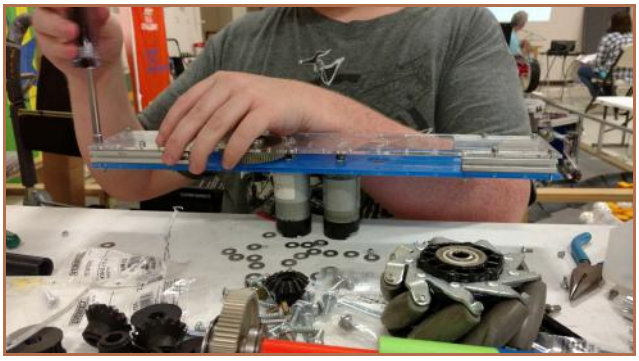
Date	Location	Start Time	End Time	Week #
September 14, 2018	AvaLAN Wireless	2:00 p.m.	6:00 p.m.	2
Meeting Goals: Discuss Brainstorming Ideas, Continue assembly of drive train				
Team Members in Attendance:				
Ian, Megan, Brooklynn, Joel, Kye				

Tasks	Reflections
Robot Hardware - Collector/Dispenser - Sorter	**Ian**: Our brainstorming phase officially ended today, and our concept testing phase began! I started by assembling a rectangle of REV extrusion, with the plan of tying latex surgical tubing between two of the sides. The tubing would be under tension, and the idea was that balls would cause the tubing to flex out of the way, whereas cubes would not. This concept was based on a tennis ball hopper, which has small metal rods on the bottom to allow balls to be picked up quickly by simply placing the hopper over the ball. Unfortunately, I didn't finish this concept before our freshly laser cut acrylic side plates arrived.
Robot Hardware - Drive Train	**Megan**: The team met for our first official Friday meeting after kickoff. We began organizing and getting all of the parts for the drive train ready to be built as soon as our laser cut plates we designed came in. **Ian**: I spent the rest of the meeting working on assembling the drive train. However, a roadblock was discovered. The set screws that retain the pinion gears on the motors were too long, and thus caused an interference with the larger 80 tooth gears. I measured the set screws and determined them to be 1/8" long. Next, we looked on McMaster to see if shorter set screws were sold in the thread we needed. The shortest set screw McMaster carries in 5-40 (the size of the set screws on the pinions) is 3/32", which would *just* resolve the interference. After this issue was cleared up, I created a list of every length of extrusion we would need for the drive train, so that we could cut them over the week.

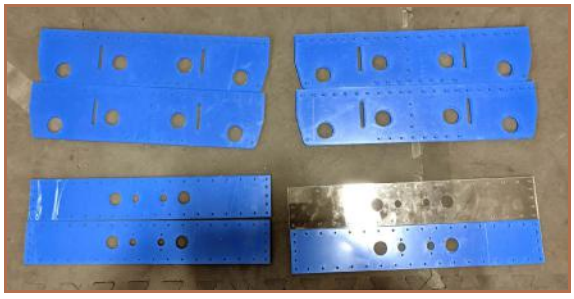
Subsystem Distributing	**Megan**: Most of the meeting was spent discussing all of the ideas mentioned on our Saturday and Sunday brainstorming sessions. This year, we decided to try something new, and instead of narrowing it down to one design per subsystem, we would let team members create proof of concepts for multiple designs to try and decide which one might work the best. **Kye**: During today's meeting, we discussed ideas we had come up with during our brainstorming sessions. We also discussed who would fill the roles for the subsystems.

Brainstorming ideas discussion

Brainstorming ideas discussion



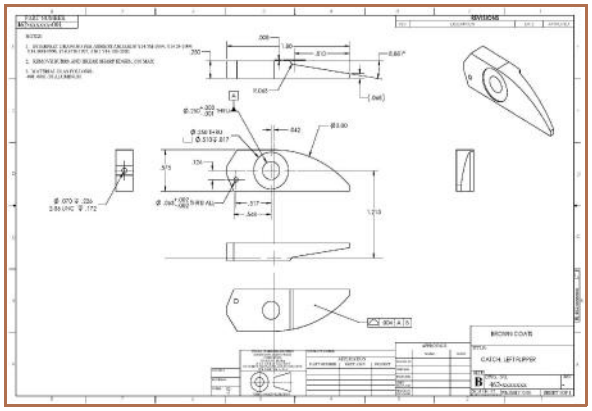
Drive train assembly



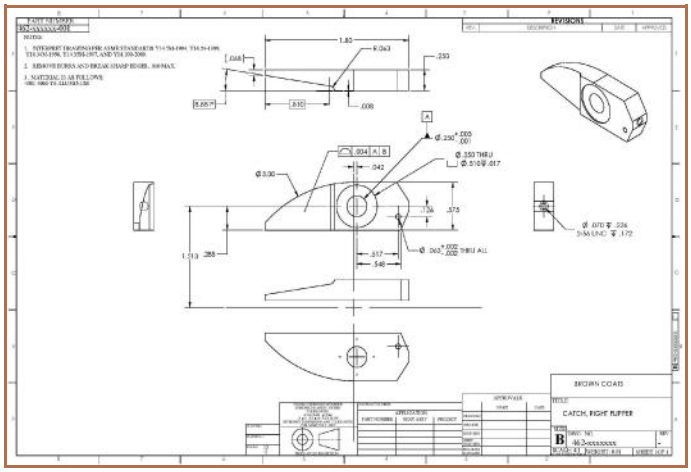
Custom cut acrylic side plates

Date	Location	Start Time	End Time	Week #
September 15-17	Joel's Home	Varies		2
Meeting Goals: Work on designing latch in CAD				
Team Members in Attendance:				
Joel				

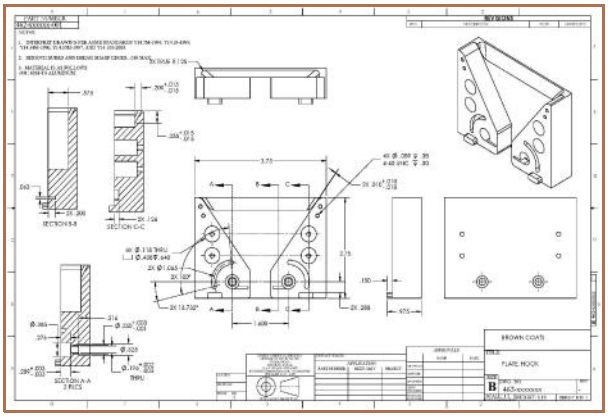
Tasks	Reflections
Robot Hardware - Landing/Latching Mechanism - Latch	We thought of many different designs for our latch on the robot, but the one we came to was the most impressive. I thought of this idea while I was playing with a carabiner that was laying in a random place. And I thought how the carabiner would only allow an object to pass through the flap one way. We also realized that the carabiner had only one flap, when ours needed two. Our idea needed to detach as easily as it attached. Our idea also needed room for driver error, so we design V slants that would guide the lander hook to the flaps Our first design was just to show how the latch would look. We made the V slants a lot thicker because we realized they were too thin. Then we came up with our next design that showed how the latch would work. Lastly we came up with the final design that we have now. So first we thought of how thick it would need to be to hold up a 42 pound robot so we made the frame about half in inch wide and about 3 inches long. We then added a sketch on to the frame that was in the shape of a ramp and extruded it and mirrored it to the other side, it would help guide the latch down to the center where the flaps would be. After we got the ramps done we added a hole in the middle of the ramp and mirrored that. I then modeled the flaps that would grab the latch and made mirror and made them overlap. I cut holes in them then lined them up with the holes on the frame. Since this model was just meant for showing what the final version would sort of look like, I didn't build it to work. So after the holes were lined up I made a tube come from the frame's holes to where the flaps holes would be. I had it printed a few days later and my dad bought the two screws for the flaps to swing on. (Keep in mind that this is the first version and was not meant to do anything yet.)



Left catch flipper



Right catch flipper



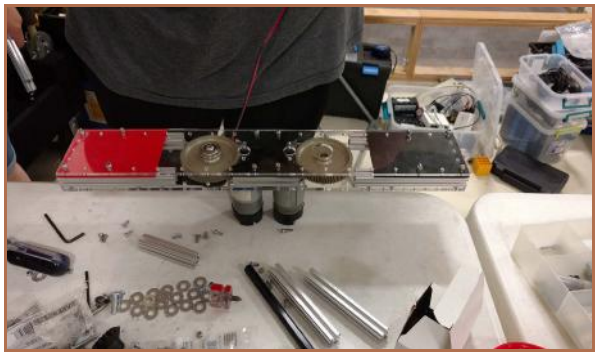
Plate, hook

BROWNCOATS
Team 7842 Engineering Notebook - Rover Ruckus

Date	Location	Start Time	End Time	Week #
September 21, 2018	AvaLAN Wireless	2:00 p.m.	6:00 p.m.	3
Meeting Goals: Drive Train assembly continues, Begin Proof of Principles and Prototypes				
Team Members in Attendance:				
Ian, Megan, Brooklynn, Joel, Kye, Jalynn				

Tasks	Reflections
Robot Hardware - Drive Train	**Ian:** Over the week, I designed small plates to act as shims between the horizontal plates on the drive train, as some of those plates were 1/8", rather than the intended 3/16" (we ran out of 3/16" material). We 3D printed those plates before the meeting, and they worked perfectly. We won't need them once we move to metal plates, but they were important to retain the proper spacing for the bearings with thinner material. Additionally, we received the shorter set screws during the week. We confirmed during the meeting that these new set screws would work, and they did! This resolved every issue presented to us last week, and armed with the freshly cut extrusion, assembly commenced. Assembly was relatively pain-free, at least up to the point where we stopped today. We finished a quarter of the drive train this meeting (one wheel), which allowed us to test if the very basic concept was sound. The custom gearbox worked very well (if a little loudly), and the adjustable tensioners were fantastic. I'm extremely excited to continue work on assembly!
Robot Hardware - Collector/Dispenser - Sweeper Intake	**Joel:** Today Megan and I added two extrusions on the sides of the frame that was already built. We also added a plastic board to the extrusion to help the tube intake to sift the spheres from blocks and switched the motors from a 20. to a 60. and to a 40. Later we switch the plastic backboard to a polycarbon-like piece and added two extrusions to the side of the backboard for infinite adjustment.

Robot Hardware - Collector/Dispenser - Sweeper Intake (continued)	**Megan:** On Friday September 21st at our weekly meeting, I decided to start looking at filtering blocks from balls with a sweeper intake. I took a 3D printed roller and mounted it to an axle, which I put on two Tetrix beams. On the roller, I added zip-ties covered in latex tubing. After that, I added a backboard behind the rollers, tall enough to allow the cubes to go under, but not tall enough to let the balls go under it. So instead, they would hit the backboard and shoot upwards, towards some sort of hopper. I had to re-adjust the backboard several times. Sometimes it was too tall, and other times it was too close to the ground. Once I finally got it to the right height, I realized that it was too flexible, and I would need to add something to make it much more rigid. I'd originally used zip ties on the sides to connect it to the Tetrix beams, but to add more rigidity, I added two pieces of REV extrusion on each side of it, and one cross beam that connected the two pieces. I then added zip ties to connect the backboard to the REV extrusion. At the end of the day, I was still having problems with making it consistent with how it sorted, but I decided I would continue experimenting at our next meeting.
Engineering Notebook - Write-ups - Display board	**Jalynn:** Today, I finished putting together the outreach entries for the engineering notebook. I also worked on the write-ups we needed to begin putting together the display board. I went through all the outreach entries and took the first paragraph of each to use as a summary. Then, I created the labels for the boards and experimented with the different fonts and colors to make sure our boards catch people's eyes at a competition.



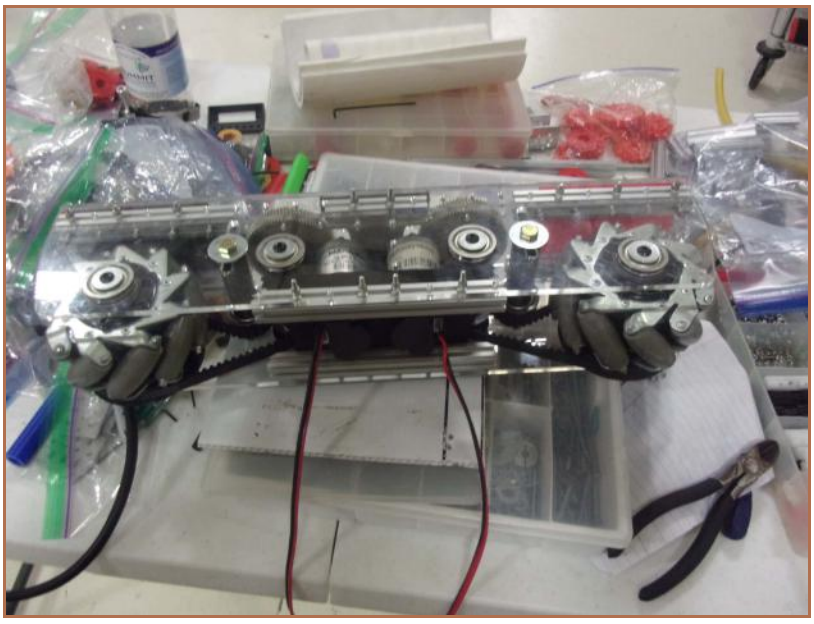
Drive Train Assembly

Prototype of Sweeper Intake

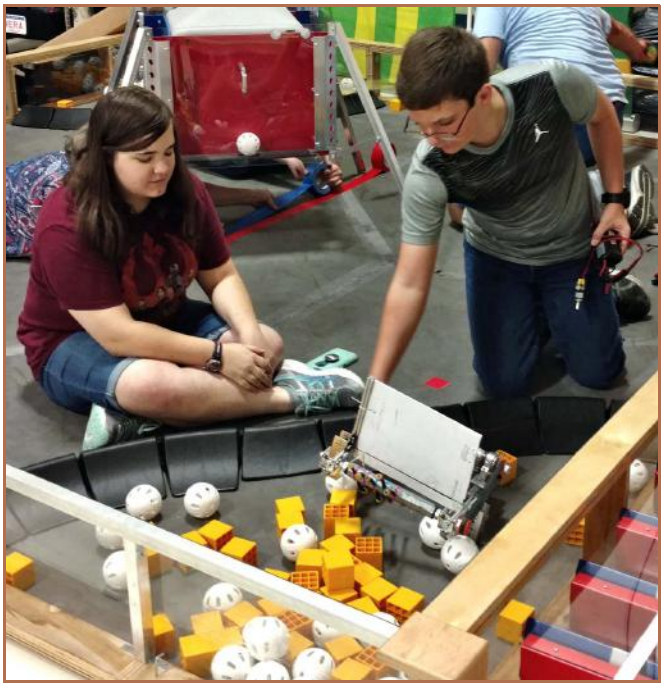
BROWNCOATS
Team 7842 Engineering Notebook - Rover Ruckus

Date	Location	Start Time	End Time	Week #
September 22, 2018	AvaLAN Wireless	2:00 p.m.	6:00 p.m.	3
Meeting Goals: Drive Train assembly continues, Continue Proof of Principles and Prototypes				
Team Members in Attendance:				
Ian, Kye, Brooklynn, Megan, Joel				

Tasks	Reflections
Robot Hardware - Drive Train	**Ian:** Assembly of the drive train continued today. The first half was completed uneventfully during the meeting. After this, assembly started on the second half of the drive train. This is where problems occurred. I had been concerned about using acrylic on a drive train (even just temporarily), primarily because acrylic is a fairly brittle plastic that cracks relatively easily. While we were assembling the upper section of the drive train (where the motors are mounted, and where the first stage of the gearbox is housed), the motor mount plate cracked. It didn't shatter, as the cracks were mostly localized to the bolt holes for the motors. However, that was still a very concerning place for cracks to occur. Our temporary fix (which seems to be holding for now) was to apply super glue over the cracks, in hopes that the cracks would not be able to spread any further. Assembly of the side continued briefly before the meeting was over. The top section was ready to have the first gearbox stage placed within, and to be covered with the top plate.
Robot Hardware - Collector/Dispenser - Sweeper Intake	**Megan:** Joel and I continued adjusting the sweeper. We cut off all off the zip-ties and then added new ones. We did this a couple of times and adjusted the length of them, and then we put the latex tubing back on. We were having trouble with the zip-ties filtering the cubes from balls. To mention, the backboard we were using to hopefully push the blocks underneath, would sometimes be too tall, and sometimes be too close to the ground. So, we spent the rest of the meeting making slight adjustments to it. At the end of the meeting, we almost got it working, however, it still wasn't super consistent, so we were going to try to make some more adjustments at our next meeting, and perhaps change some things around.



Drive Train Assembly

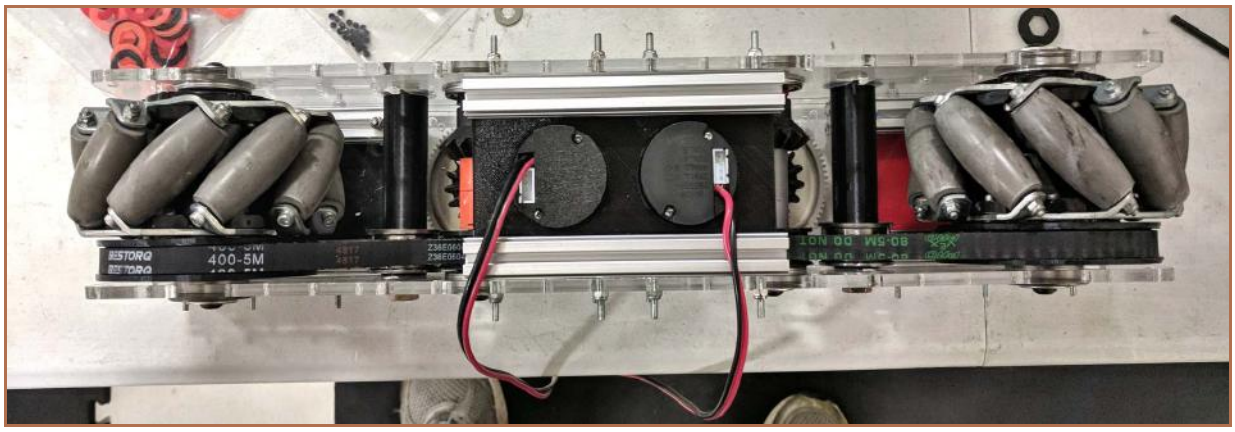


Megan and Joel testing the Sweeper Intake

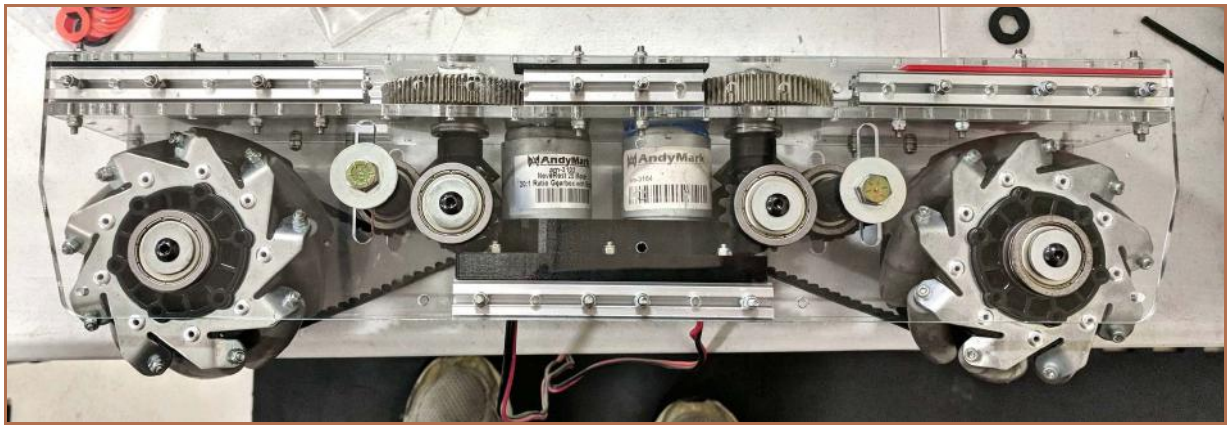
Date	Location	Start Time	End Time	Week #
September 24-27, 2018	Home	Various	Various	4
Meeting Goals: Continue assembling drive train				
Team Members in Attendance:				
Ian				

Tasks	Reflections
Robot Hardware - Drive train	**Ian:** Over the week, I worked on the second half of the drive train, as well as the overall assembly. Beyond the cracking problem we had on Saturday, this side went together very well, with no major problems to speak of. After the second side was assembled, I started attaching the two sides. This went less favorably than I would've liked, but it did highlight some problems that could easily be fixed with revisions to the plates before being cut out of aluminum. The primary issue was that the extrusion cross-pieces were attached by just one screw on each side. This meant that the extrusion could rotate in place, and that it wasn't extremely sturdy. The sides flexed out from each other, and the sides moved up and down substantially. As a temporary fix, I used a 17" piece of extrusion bolted into the top plate with 4 screws to tighten everything up. This worked well enough to allow me to test the drive train. It worked! Strafing seemed far more consistent and even, relative to our previous drive trains. It was fast, but not uncontrollably so. We should now be able to fulfill our "one point by October 1st" goal.

Drive train assembly



First half of assembled drive train

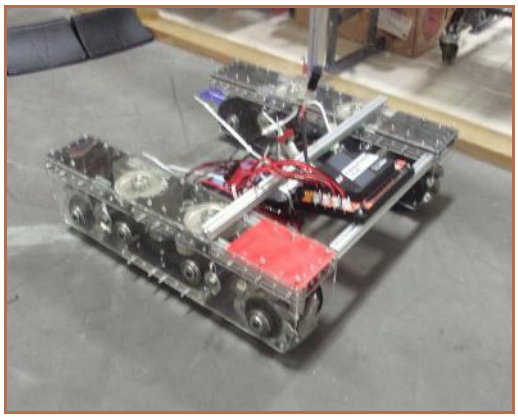


BROWNCOATS
Team 7842 Engineering Notebook - Rover Ruckus

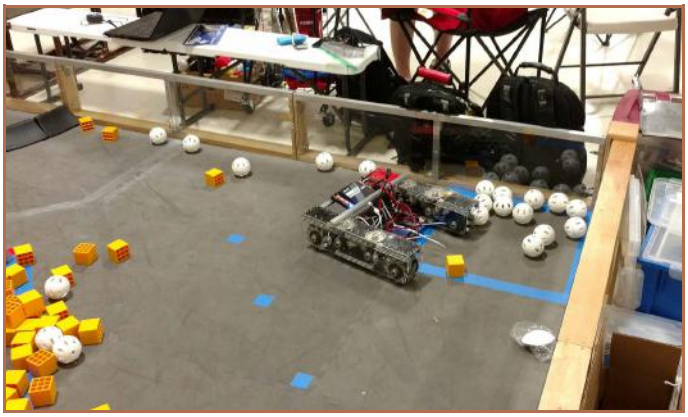
Date	Location	Start Time	End Time	Week #
September 28, 2018	AvaLAN Wireless	2:00 p.m.	6:00 p.m.	4
Meeting Goals: Score 1 point, Begin building landing/latching arm				
Team Members in Attendance:				
Ian, Megan, Joel, Kye, Jalynn				

Tasks	Reflections
Robot Hardware - Drive Train	**Ian:** We officially completed our 1 point by October 1st goal! Our newly assembled drive train was able to push elements around on the field, as well as partially park in the crater for end-game. Having accomplished this, we discussed any changes we might want to make prior to cutting the plates out of aluminum. We thought of three major points. The first was cutting holes in unused parts of the plates to save space (commonly referred to as pocketing), as 3/16" aluminum is very heavy and strong. Second, we decided to add holes in the middle of the plate for cable routing from the motors. Our previous solution was to run them under the side plates and zip-tie them to the extrusion. However, the ground clearance of those plates is fairly low and this put the cables uncomfortably near the ground. Finally, I decided to cut square holes (slightly over 15mm large) in the corners of the plates. This will allow me to mount the rear piece of extrusion more securely, by tying that piece into the top section sandwich of each drive train side. We used a similar strategy to increase rigidity in our drive train last year, which it did very successfully.
Robot Hardware - Landing/Latching Mechanism - Lift	**Megan:** On Friday September 28th, I decided to begin pursuing a telescoping lift for the hanging mechanism. We also talked about using it as a dual purpose arm, for both the hanging and scoring mechanisms. So, what I did was create two mirrored cascading lifts made out of REV Extrusion. Once I'd connected the extrusion pieces together with the plastic sliders from the REV kit, I took two smaller pieces of REV extrusion and connected the two lifts together: one beam on top and one beam on the bottom.

Robot Hardware - Landing/Latching Mechanism - Lift (continued)	**Megan:** I haven't decided what I'm going to use for string (or if I'd like to try belts or something else instead) or how I'm going to motorize it. Because our robot will probably be at least 30 pounds, (judging from our past iterations of Vera) I think I'm definitely going to use something other than string, as I'm worried it might snap or stretch too much from the weight of the robot. As for the claw, Joel has been working on a proof of principle for it, and once he's finished with it, I'll start looking for ways to use his claw on the lift.
Engineering Notebook - Display boards	**Jalynn:** At today's meeting, I began to print out the display board entries and labels I made last week. I had to make a couple size changes before we got them just right, but in the end they turned out perfect. Kye and I also printed out the outreach photos for the display boards, so we can start putting together the boards at the next meeting.



Assembled drive train



Assembled drive train

Two mirrored cascading lifts for landing/latching