

Our 2018 Build Season by Week

1 ✓ Week 1

- Kickoff
- Strategic Design
- Prototyping - claw & elevator

2 ✓ Week 2

- Prototyping - cont'd for claw
- CAD Design for Elevator
- Drivetrain designed / fabricated / assembled
- Preliminary design review

3 ✓ Week 3

- Prototyping - cont'd
- Drivetrain programmed for autonomous
- CAD Design for claw
- Fabrication for elevator

4 ✓ Week 4

- Prototyping - cont'd for end game feature
- CAD Design cont'd
- Elevator assembly
- Fabrication for claw
- Claw assembly

5 ✓ Week 5

- End Game Feature Fabrication
- Working robot assembly
- Full robot integration

6 Week 6

- Programming for elevator & claw & final game feature
- Driver Team Selection, Training & Practice
- Open House! Feb 16 4p-6p
- Eagan HS Scrimmage Feb 17 9a-4p
- Stop Build Date: Feb 20



3100 Lightning Turtles

Weekly Newsletter

Build Season Week #5 - Feb 11, 2018

Team Sponsor/Family Open House: Fri, Feb 16 - 3:15p - 6:00p - Sibley HS Tech Ed
Robotics Scrimmage at Eagan HS: Sat, Feb 17 - 9a - 4p
Attending Competitions: Duluth Regional (Mar 8-10) & LaCrosse Regional (Apr 5-7)

****To all our Sponsors & Supporters****

We have raised \$18,750 so far against our budget of \$24,750. We're \$6,000 short and those funds are needed to ensure our students can travel to our out-of-town competitions in Mar/Apr.

Please donate today at www.team3100.com/sponsors/

COME TO OUR OPEN HOUSE!

Friday, February 16th from 4:00 PM to 6:00 PM
(Snacks provided!)

3:15p-4:00p - Henry Sibley HS Students & Faculty
- please feel free to stop by Warrior Hall immediately after school on Friday to meet the Team and Mentors

Open House Schedule:

4:00p - 4:45p Main Presentation

- Team Introductions (Students/Mentors)
- Thanks to each of our Sponsors!
- Robot Build Season Recap - Hear from each of the Student Division Leaders -
 - Computer-Aided Design
 - Fabrication
 - Electrical / Programming
 - Business / Media
- Build Season Recap Video
- Regional Competitions - Duluth (Mar 8-10) & La Crosse, WI (Apr 5-7)

4:45p-4:55p Break

4:55p-5:30p 2018 POWER UP COMPETITION ROBOT REVEAL!

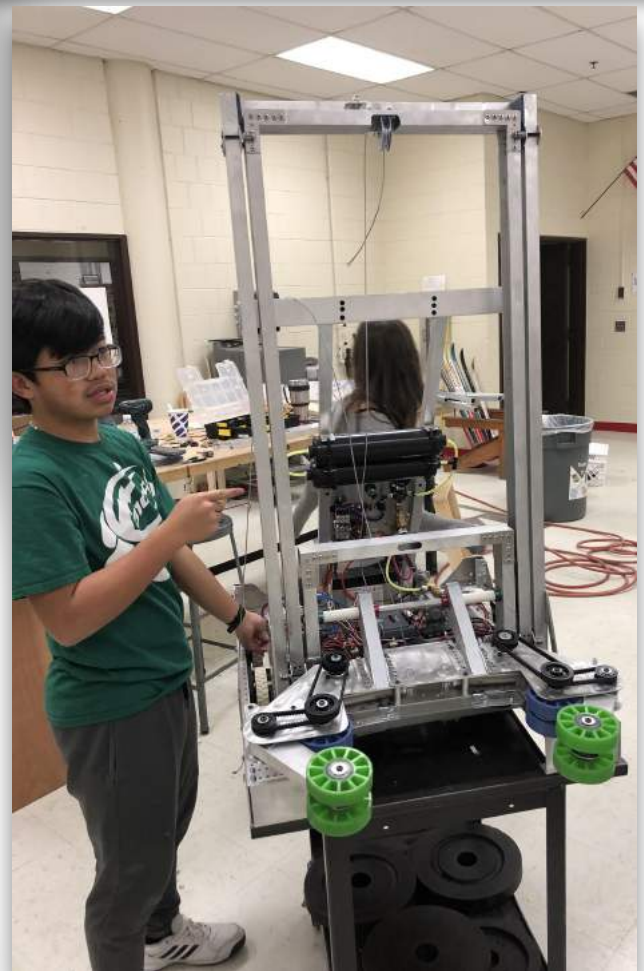
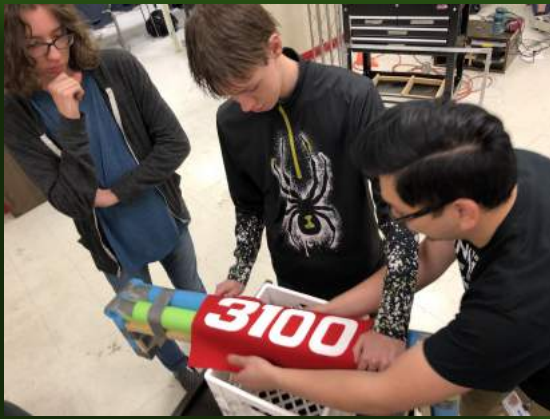
- Robot Reveal
- Working Demonstration of the Team/Robot Competition Capabilities
- *Short Teach-out* - the Mechanical Features of our Robot
- Competition Strategy & Autonomous Mode Capabilities

5:30p-6:00p Wrap Up and Q&A with the Team



FINISHING UP ASSEMBLY

After Long Days Of Fabricating, Prototyping, Testing, Failing, Redesigning, Testing & Eventually Succeeding - Our Elevator, Claw, Bumpers, and Drive Train are finalized & assembled!



We have put so much thought, effort, and even emotion into making our robot the absolute best that we can make it. It's a beast and we have high expectations it'll perform well at competitions.

TEAM FUN!



Interview:

With Rookie, *Grace*

Q1: What drew you to the team?

A1: *I'm trying to get a feel for what I like and don't like. And I'm trying to find out what I'm good at, while find friends with the same interests as me. So...I joined!*

Q2: Have you been interested in robotics-related things for a while?

A2: *I've always been around it a lot because most of my family is full of engineers, and I help my dad out a bunch with fixing stuff.*

Q3: What is the best thing about being on the team?

A3: *That's a hard one...there's so much good stuff that happens here! Being a part of something that might benefit me*



Interview:

With Veteran, *Joe*

Q1: Why did you join robotics?

A1: *When I came to Sibley, I was really looking to make some new friends and meet new people, and it seemed like the perfect opportunity*

Q2: What do you like about working with people on the team?

A2: *From leading my own group comprised of mostly rookies I've learned a lot of patience and assessing people's skills to give them jobs I know they can do well on their own*

Q3: What do you plan to do for a career?

A3: *My personal career plan is to join the United States Army after high school then go into trade school to become an electrician*

Q4: What is your favorite part of the robot?

A4: *My favorite part of the robot would probably be the claw because of how professionally done the fabrication on it looks and how nice everything turned out*



Interview:

With Veteran, *Corbin*

Q1: What got you interested in robotics?

A1: *My friends decided to join the team, so I decided to join with them.*

Q2: How has being a part of the team affected you?

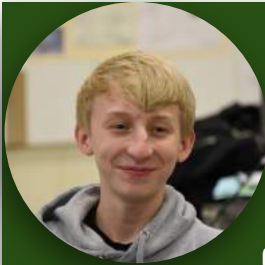
A2: *I've learned many skills revolving around developing engineering expertise.*

Q3: Advice for people considering joining the team?

A3: *Try to make new friends, it's a really important part of being on the team.*

Q4: What was the most exciting event you've experienced at a meeting?

A4: *Passing the robot driving test.*



MEET OUR NEW MEMBER!

Gabe

I used to be on FRC Team 3883, then I switched to a school that didn't have robotics...and when I came to Sibley, I decided to become a Lightning Turtle.



Q1: How did you hear about the team and what made you decide to join?

A1: *My friend told me there was a team, I came to watch at a meeting, and I joined because it looked cool!*

Q2: How do you hope to benefit from being on the team?

A2: *To open my mind to new opportunities for learning how to work with metal, wood and electrical stuff and I hope to put it together for a potential job in the future*

Q3: Do you plan to come back to the team next year?

A3: *Yes, yes, yesyes, yesyesyes....*

The Summation of Fabrication

So, you've heard us mention fabrication over and over, but what is it exactly? Fabrication is the process of taking stock materials (like sheets of aluminum, rectangular box tubing or even plywood) and cutting and shaping it into the exact part we need for our robot.

Our robot is comprised of over 70% custom fabricated parts -- parts made by members of the fabrication division either from hand-drawn or CAD (our preferred method) designs. The parts typically have to be made to extremely precise specifications in order to fit properly with other fabricated or stock pieces on the robot. And if we make it wrong or miscalculate? Some fabricated pieces can be further modified to correct the issue or we start all over with stock material.

So what types of tools do we use to fabricate?

In the wood shop --

Table saw - used to cut large sheets of plywood down to the exact size pieces we need to prototype mechanisms for the robot

Belt / disk sanders - when a prototype wood part is just a little too large and needs to be minimally altered, the belt and disk sanders are used to quickly alter the dimensions

Compound miter saw - don't we all wish our prototype wood parts were 90-degree cuts, but robots and mechanisms just aren't all square. The miter saw gives us precise angle cuts across 2x4s and other stock lumber

Plunge-cut laser drill press - it gives us a precise downward-only hole cuts through wood or metal using drill bits. Cross-hair lasers shining onto the material we're cutting help guide us. Our robot has bearing holes and hundreds of screw and rivet holes across many surfaces and many were drilled with the drill press.

In the metal shop --

Mill - the mill looks a lot like the plunge-cut drill press, but it also allows you to move your metal material sideways (as well as up and down) so that the milling bit removes a channel or groove of material to meet your specifications.

Metal bending brake & shear - clamps down on a flat piece of sheet metal and then a element rotates up and bends the free side of the sheet metal to a precise angle. Shears give us precise linear metal cuts.

Metal lathe - helps create precise round and milled spindles

Plasma CNC cutter - Thanks to the federal Perkins Grant our school was able to purchase a brand new CNC plasma cutter -- this new computer-controlled tool uses downloaded CAD files created by the CAD team and gives us the ability to cut complex designs out of sheet metal and thick metal plate in a matter of seconds. Without the CNC plasma cutter, making similar parts would take days. Now our team can design and produce new parts, accurate to several thousandths of an inch, in under an hour!

CNC router - a computer-controlled cutting machine - like a hand-held router but can automatically make precise plunge and lateral cuts using CAD files.

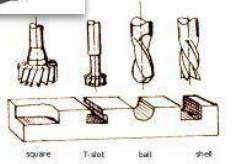
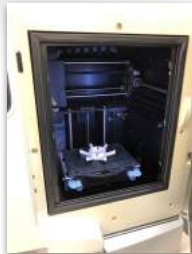
Heat guns - used to heat plexiglass so it can be bent & molded & to heat shrink wraps that cover numerous wire splices

> **3D Printer** - for custom plastic parts used on the robot.

The fabrication team is always growing and learning, but this year they've some made huge improvements. The team members are able to get one-on-one experience with mentors and hands-on training on machines used in the manufacturing industry. That ability has allowed us to cut turnaround times in half while doubling the number of skilled fabricators on our team.

Our Fab Fabricators - Ben, Joe, Thomas, Karl, Bailey, Grace, Jackson, Corbin, James & Khai -- plus Quan, Luz, Nate, Aiden, Bryson, Charlie, Henry - awe heck - just about everybody at one point during Build!

Thanks Ben - Fabrication Division Lead - for the material fabrication details!



THANK YOU, MENTORS!



Charles Nepomuceno-Lead Engineering Mentor

Charles is a mechanical engineer at Ecolab and has 14 years experience working with FRC teams as a participant and mentor.



Doug Sisk-Faculty Mentor

Doug teaches at Henry Sibley High School in the TechEd Department. He teaches courses in photography, engineering and Super-Mileage Car. This is his fourth year mentoring FRC.



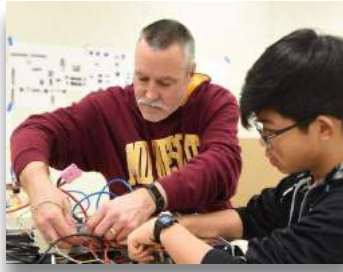
Dan Halsey-Lead Non-Engineering Mentor

Dan is an Associate Director at BestBuy.com – working on User Generated Content. This is his first year mentoring FRC.



Conor Smith-Engineering Mentor

Conor is a research chemist at Ecolab who has caught the engineering bug. This is his second year mentoring FRC.



Mike Shea-Engineering Mentor

Mike is an electrical engineer who retired from Mayo Clinic last year and started his own consulting business. This is his second year mentoring FRC and is a Gold Level sponsor of Team 3100.



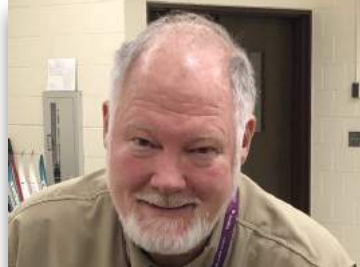
Kayla Claasen-Engineering Mentor

Kayla is a senior mechanical engineer at Ecolab. This is her fourth year mentoring FRC.



John Henderson-Engineering Mentor

John is an senior product development engineer at 3M. This is his first year mentoring FRC.



Eric Anderson-Software Mentor

Eric is a software engineer at Leidos and has over 11 years of experience in FRC software mentoring.



Carle Wenthur-Cheeseborough-Media/Business/Graphics Design Mentor

Carle is a professional photographer and brings a world of design experience to the Lightning Turtles media and design team. This is her first year mentoring FRC.



Eian Pince- Engineering Mentor

Ian is a former member of Team 3100 Lightning Turtles. This is his first year mentoring FRC.



Paige Bollinger-Brown- Engineering Mentor

Paige is a former member of Team 3100 Lightning Turtles. This is her first year mentoring FRC.



A BIG THANK YOU TO OUR SPONSORS!



Amelia Beach – Joanne and David Binder – George Halsey – Paul Nyhus – James Price – The Herschbachs – Free Bird Counseling and Consultation

Want to get in touch with us? Email 3100lightningturtles@gmail.com or contact Doug Sisk – Tech Ed Teacher at Henry Sibley High School

Want to become a sponsor? Sponsor us here! <https://www.gofundme.com/frc3100> or learn more at www.team3100.com/sponsor/

Visit our website at: www.team3100.com to find our complete season calendar