

## 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
- Feature assembly
- Programming for elevator & claw
- Full robot integration

### 6 Week 6

- Driver Team Training & Practice
- Open House! Fri, Feb 16
- Robot Sealed in Giant Bag on Tue, Feb 20 - awaits first competition



# 3100 Lightning Turtles

## Weekly Newsletter

### Build Season Week #4 - Feb 3, 2018

Team Sponsor/Family Open House: Fri, Feb 16 - 3:15p - 6:00p - Sibley HS Tech Ed  
Attending Competitions: Duluth Regionals (Mar 8-10) & LaCrosse Regionals (Apr 5-7)

#### **\*\*To all our Sponsors & Supporters\*\***

**We have raised \$17,600 so far against our budget of \$24,750. We're \$7,150 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/](http://www.team3100.com/sponsors/)**



We've made major progress this week! A quick reminder - our robot needs to grab cubes the size of milk crates, lift them up and place them precisely, drive autonomously and complete tasks for a period of time.

Not only did we finalize our cube claw fabrication and assembly this week, we also completed a significant portion of our cube transport elevator and made our final design decision for our end of match feature to maximize on points.

# OUR NEW PIT SETUP!



A Huge THANKS to Skyline Exhibits (Bill Dierberger, Betsy Vance and Craig Snider) for the donation of the amazing trade show display that the Lightning Turtles will use this season for their pit (robotic work area) at upcoming competitions.

Craig Snider from Skyline demonstrates how to set up the pit display.



Courtesy of our Signature Sponsor

**Skyline®**





# BRINGING THE ELEVATOR TO LIFE

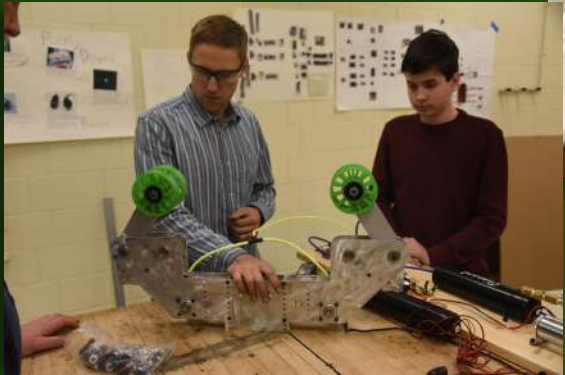
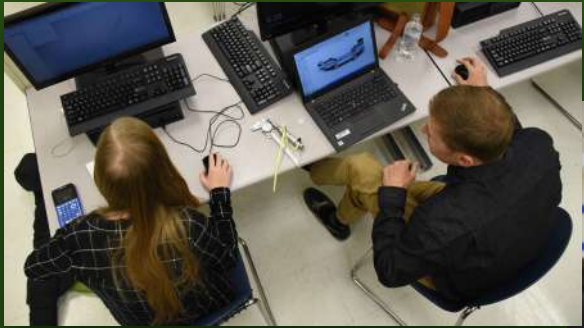
As part of the Power Up competition, we have to pick up, raise and deposit Power Cubes – as high as 6.5 feet. We've built a classic elevator design to provide us with both a compact starting configuration & lots of height.



Many Members  
of the Team  
Work to Finalize  
the Cube-Lifting  
Elevator.



# CREATING OUR CLAW



## A BIG THANKS TO THE FAMILIES WHO FEED US!

- Hallonquist
- Halsey-Nyhus
- Jacobs
- Elskamp
- Cognetta-Price
- Welanders-Pettyjohn
- Orman
- Herschbach
- Vanasse
- Sisk
- Johanson-Turnage
- Fromm
- Killion



# ISD 197 SUPERINTENDENT VISIT

Superintendent Olson-Skog joined the Lightning Turtles during their build session on February 1<sup>st</sup> to learn more about the First Robotic Competition challenge for 2018 and how the team is using their 6-week build season (ends Feb 20) to strategize, prototype, design, fabricate, assemble and program their robot.

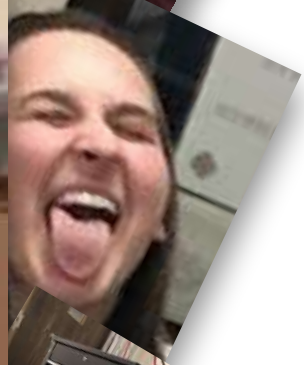
Mr Olson-Skog even took a turn at driving the early drivetrain & maintained his perfect driving record....

**Superintendent Olson-Skog  
- Robot Driver**

<https://youtu.be/zKmyXz0A53o>



# TEAM FUN!





**Interview:**  
With Rookie, *Henry*

**Q: Why did you join robotics?**

A: Similar to my friend, Charlie's reason for joining, there wasn't a robotics team at my middle school, and I joined Sibley's team instead. He was actually the one I joined the Lightning Turtles with.

**Q: What is your favorite thing about being on the team?**

A: Getting to interact with high schoolers and learning about new things that are considered above my level.

**Q: What are your favourite activities outside of robotics?**

A: Hockey, Football, Tennis, Soccer, and Chess



**Interview:**

With Veteran, *Madi*

**Q: What got you involved in robotics?**

A: I was good at math and my parents thought it would be a good idea, in 5th grade I joined an all girls team in middle school, in which I was actually the youngest

**Q: Have you always been interested in this sort of thing?**

A: When I was really little no...I was in dance and acting and stuff like that. But, when I joined my team in 5th grade, I was hooked and have been doing it since

**Q: What do you believe is the best thing about being on the team?**

A: The fact that we can be exposed to this engineering-type stuff while we're still in high school since we need more people like this in the world

**Q: What do you plan to major in?**

A: I am actually undecided still, but being exposed to the things we do in this activity has really helped me to see what I like and what I'm good at.

**Interview:**

With Rookie, *Jack*

**Q: Why did you join robotics?**

A: I had joined similar programs in the past and was interested in doing something like this with more people, and it is also more complex.

**Q: How has robotics affected you?**

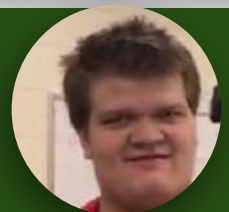
A: I have learned a lot about how to use tools in the metal and wood shops, and I have met new friends here too.

**Q: What are your personal aspirations for your future on the team?**

A: My biggest goal is that when the current student lead of fabrication graduates, I can take his place.



Oops - last week we interviewed Charlie (above) but accidentally matched his interview with Henry's face. We're sorry Charlie!



**Interview:**

With Veteran, *Karl*

**Q: What made you decide to join robotics?**

A: I joined because growing up I played with legos, built things. Robotics seemed so cool to me....I saw people that **created** these insanely complicated robots, and that appealed to me my sophomore year

**Q: What was the best advice you have received while on the team?**

A: Ben said that just because you're working hard doesn't necessarily mean you're working well or at your best.

**Q: What are you thinking for college/career?**

A: Mechanical engineer or machinist..I feel torn because I like the aspects of both, and I don't want to dedicate myself to just one. So, I'm still deciding, but I'm not sure which way to go yet.

**Q: What has been your favorite moment while on the team?**

A: I don't necessarily have one, but just in general the friendships I've made, the things I've learned...I've just had fun! It's just been a fun experience.

# CAD - Computer-Aided Design



How do the Lightning Turtles design their robots?

This year we are transitioning into fully CAD (Computer-Aided Design) our robots. This entails 3D modeling every single part that will go onto the robot. After the team decides the goals we will focus on and prototype some models, the design team gets to work and start drawing up the various parts of the robot. What this allows us to do is understand how each part of the robot will function and how it all works together. The robot has 4 main parts that we designed: The claw, elevator, ramps and electrical board.

The Claw allows the robot to pick up Power Cubes from any angle off of the ground and works with the elevator to deliver them at any desired height. We designed it so that the actuating intake allows for a wider range to pick cubes up from as well as being able to use the powered intake wheels to reorient cubes to better handle them.

The Elevator moves the Claw to 3 main heights to allow it to pick up and deliver cubes effectively, these being the floor, the top of the switch and the top of the scale. This allows us to score in any of the options on the field. One of the design constraints we had while making this was that before the start of the match your robot has to be under 55" tall, but after the round starts this restriction goes away. In order to score on the scale with an elevator, your robot has to place a cube from the ground, to an area that is over 84" tall! With these limitations in mind, we designed a foldable elevator. This works by having two stages on the inside that move up and down with the claw. Before the match, the elevator is tucked inside itself, but when the match starts they extend upward to the needed height.

The Electrical Board was designed with the help with the electrical team. It allows us to plan out where all of the electrical components will go. We made it so that there are two levels so that we can easily access important parts of the robot wiring while also keeping the wires and cables for other things managed and neat.





# Thanks to our 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.



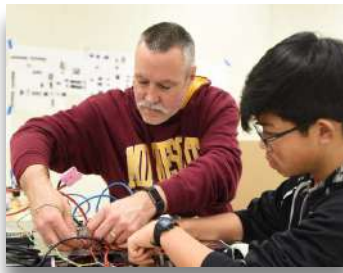
**Dan Halsey-Lead Non-Engineering Mentor**

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.



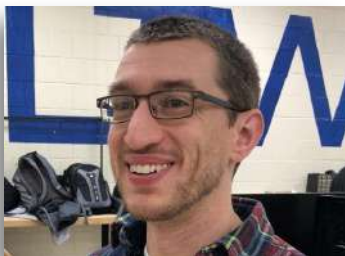
**Mike Shea-Engineering Mentor**

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.



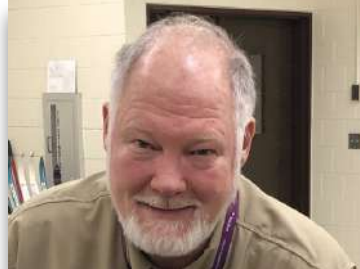
**Kayla Claasen-Engineering Mentor**

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.



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or contact Doug Sisk – Tech Ed Teacher at Henry Sibley High School

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