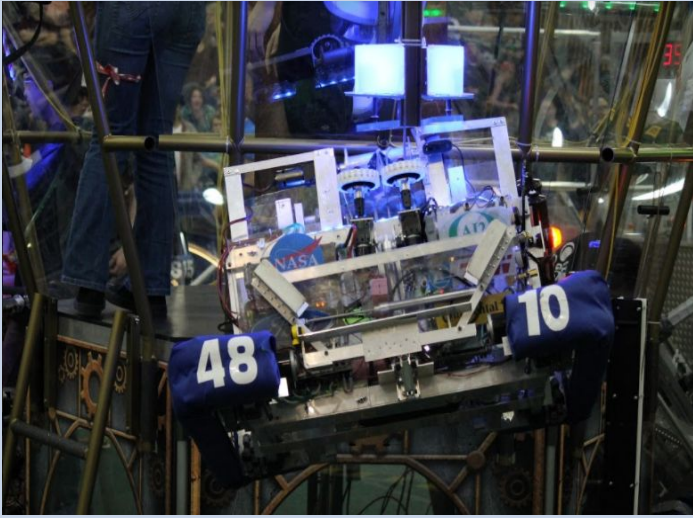


# I.AM. ROBOT Team 4810



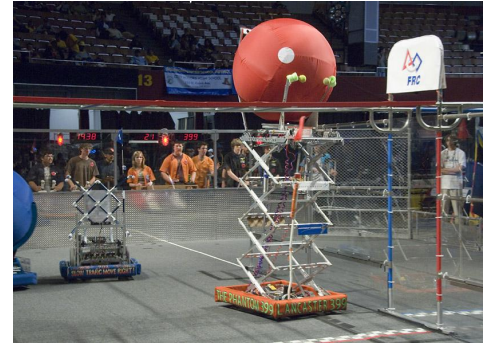


# What is FRC?

FIRST Robotics Competition

# What is First Robotics Competition (FRC)?

- Non-profit organization
  - Excitement of a sport with the rigors of science and technology
- High-school students and Mentors work together
- Worldwide kickoff: the game is announced.
  - Teams right away start the six- week process.
- Every year the game and rules are different
- The messages of FIRST are crucial for the team's success



# Messages of FIRST

- Master STEM skills
  - Experience through sub-groups
- Learn and use sophisticated software and hardware
  - Using advanced software systems to code and design
- Design, build and compete with a robot
  - 100% student based with minimal assistance
- Improve teamwork, interpersonal, and communication skills
  - Outreach projects and team building activities
- Cooperate and form alliances with other teams during competition
  - Strategize and plan
- Understand and practice Gracious Professionalism™
  - Respecting our mentors, teammates and proper competition etiquette





# What is the IAM Robotics Team?

How We Operate





# The International Academy of Macomb (IAM)

- Macomb County magnet school made of 18 Macomb County school districts.
  - ▷ Highly motivated college-bound students
- Follows the International Baccalaureate Program (IB)
- Promotes critical thinking and worldwide point of views

# Awards

- **2013:** Grand Blanc Competition: Rookie All-Star Award
- Troy Competition: Silver Medalist, Rookie All-Star Award
- State Championship: Michigan All-Star Rookie Award
- World Championship participant
- **2014:** Troy Competition: Entrepreneurship Award
- Centerline Competition: Ranked 3rd
- **2015:**
- Bedford Competition: Gracious Professionalism Award
- **2016:**
- Waterford Competition: Ranked 9th - Quarterfinalists
- Troy Competition: Ranked 10th - Semi-finalists, Creativity Award
- Invited to State Championship
- **2017:** Southfield Competition: Entrepreneurship Award
- State Championship
- **2018:** Troy Competition: Design and Creativity Award
- World Competition Qualifiers

# FRC 4810

Members are mostly from IAM and a few from Dakota High School

- ▶ This will be our sixth year competing and we are ready to succeed!
- The team has flourished to 45 members and around 12 mentors.
- We need financial support, building supplies, tools, or even donations of food or meals.



### Strengths

- Gaining mentors with *FIRST* experience
- Team consisting of students from all over Macomb
- Dedicated and hardworking students
- Own building

### Weaknesses

- Rigorous IB workload
- Funding
- New team construction
- More underclassmen than upperclassmen

### Opportunities

- Well-rounded students
- Securing sponsors
- Trained mentors
- Visiting schools
- Community Outreach

### Threats

- Keeping mentors
- Keeping build site
- Return in sponsors
- New team members

# Giving Back to the Community

- We are thankful for sponsorships but we also give back
  - ▷ Volunteering locally
  - ▷ Mentor Elementary Lego Robotics Teams







# FRC Game 2018

FIRST Power Up



# FRC 2018 POWER UP

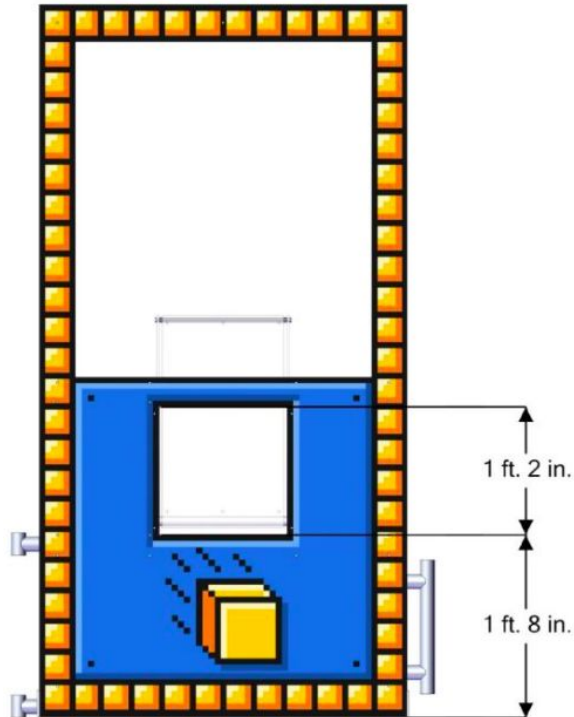


- Teams trapped in an 8-bit video game
- Two alliances with three teams per alliance
- 15 second autonomous - 2 minute and 15 second teleoperated

Using the yellow power cubes, the objective of the game is to have ownership of the switch and the scale for as much time as possible. During the game you can exchange power cubes for temporary power ups. The final objective is to climb the scale in order to face the boss.



# POWER UPS

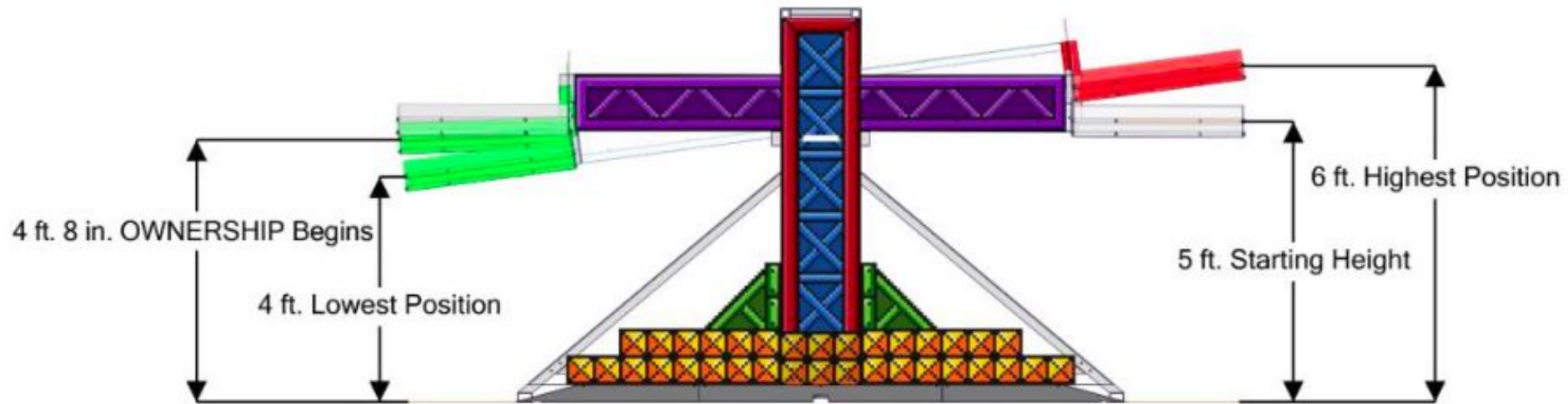


Force: gives the alliance ownership of the Switch, Scale, or both for a limited period of time

Levitate: gives a robot a free climb

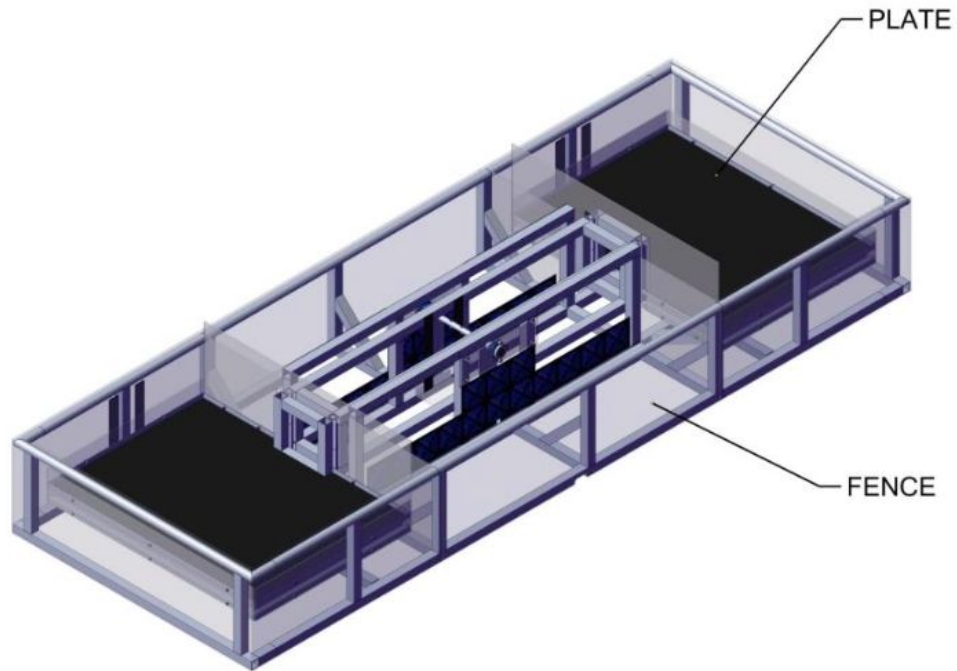
Boost: doubles the rate points are earned for a limited period of time

# SCALE

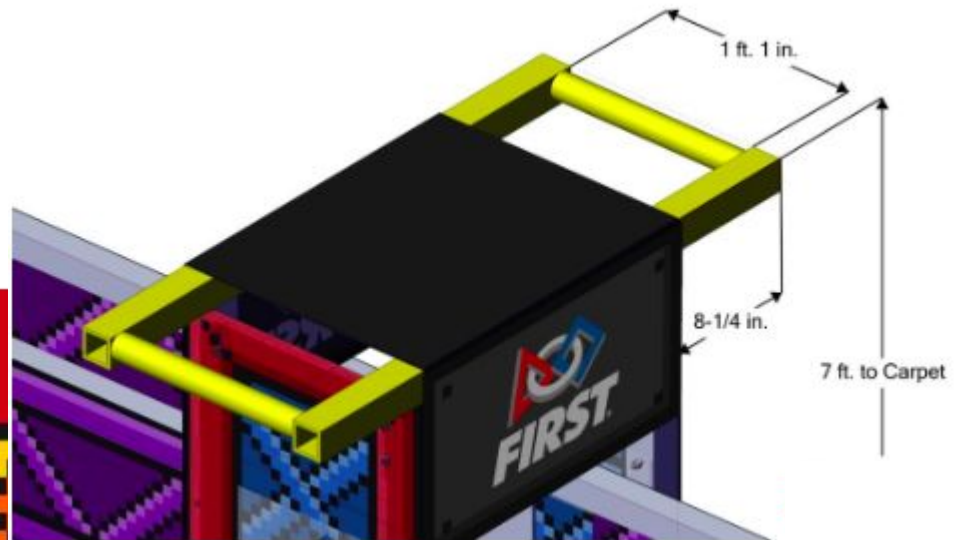
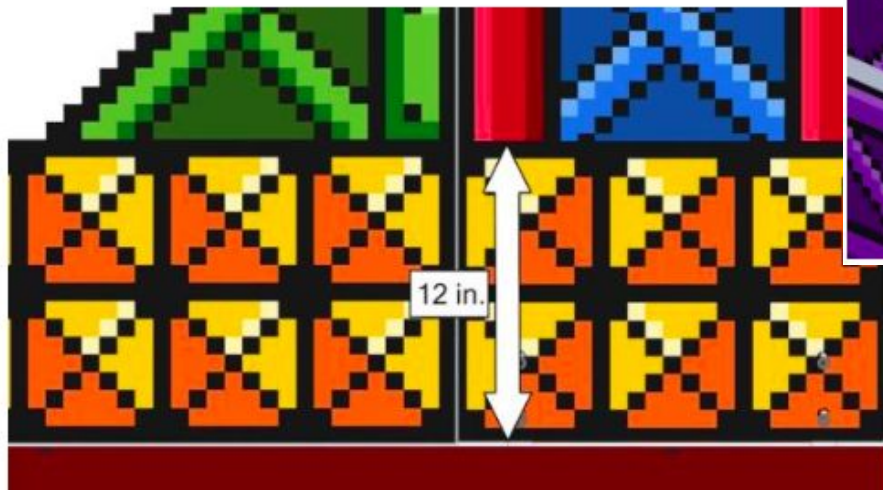




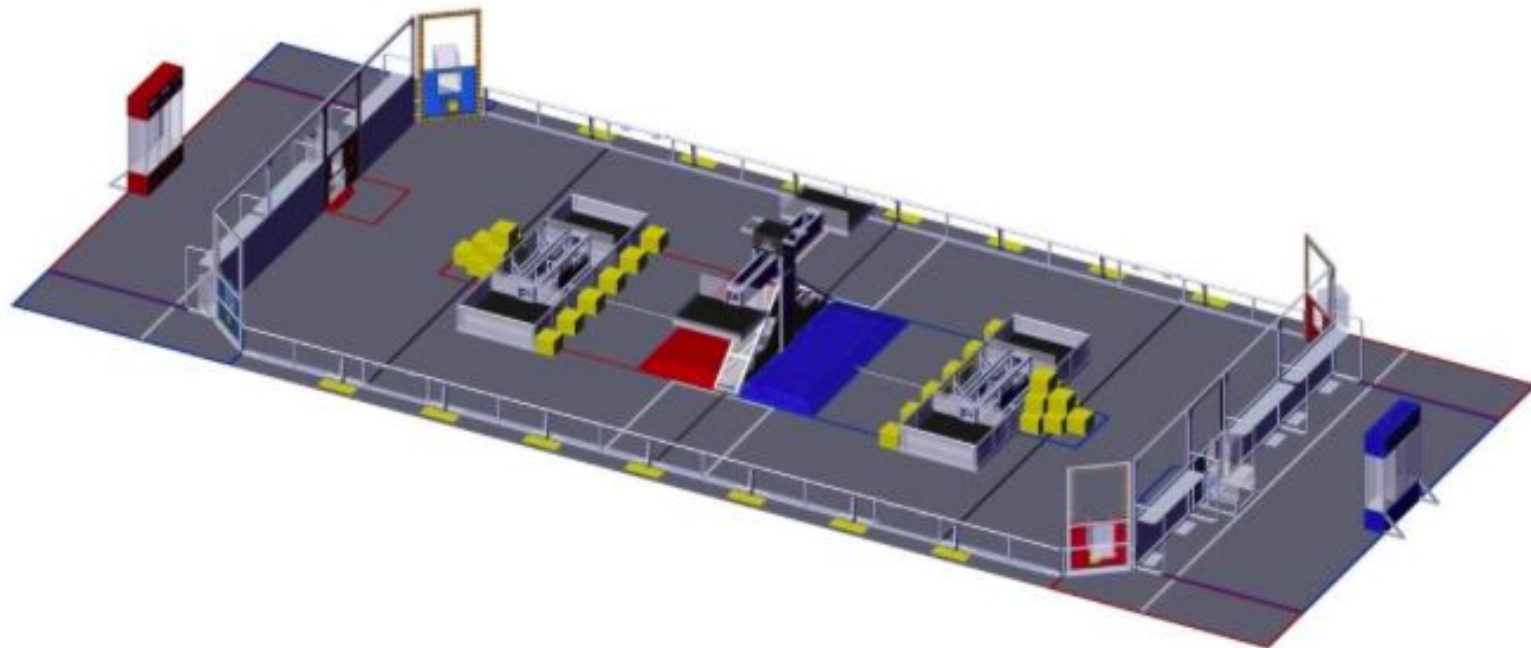
# SWITCH



# CLIMBING



# GAME FIELD





# Strategy and Scouting

One of the Ways to Success

# Our Strategy

- A kick-off event on the very first day of the FRC Season
- Whole team discussion on Strategy
- Priorities
- Auton and Teleop Discussions
- Overall Game Strategy





# Scouting

- Watch a robot and take notes on the robot's performance throughout the match.
- We scout because it provides our team with accurate data which is used to help us decide alliance partners.
- After qualification rounds, the top 8 teams will each pick two additional teams to join their alliance (total of three teams per alliance).
- The data collected throughout qualification will help our team decide what other teams we want to form an alliance with.



Name \_\_\_\_\_ R or B Team # \_\_\_\_\_

Match # \_\_\_\_\_

**Autonomous**

F M N

Cross Line

Shot (LB or HB)- kPa:

Gears: \_\_\_\_\_

**Teleoperated**

Chute or Pickup

High Boiler: \_\_\_\_\_

Low Boiler: \_\_\_\_\_

Gears: \_\_\_\_\_

**Climbing**

Can it Climb? (Yes or No)

Did it make it? (Yes or No)

Stay On (Yes or No)

**Qualitative Comments:**



*Autonomous*

Can it move across the line? Yes or No

Can it shoot or place a gear?

Yes or No

-If Yes, what position?

Left Middle Right

Description of Shooter:

Description of Gear:

*Teleoperated*Shooter:

Low Goal:

How fast can it release balls? \_\_\_\_\_

Percentage Accuracy: \_\_\_\_\_

High Goal:

How fast can it release balls? \_\_\_\_\_

Percentage Accuracy: \_\_\_\_\_

Hooper Container Size:

Gear:

How does it obtain? Chute or Floor

How long to receive one gear? \_\_\_\_\_

How many cycles can it run in a game? \_\_\_\_\_

How long is one cycle? \_\_\_\_\_

Can it securely hold a gear? Yes or No

Climbing:

Can it climb? Yes or No

Can it stay on? Yes or No

How fast can it climb? \_\_\_\_\_

Success rate? \_\_\_\_\_

Drivetrain:

What type of chassis? \_\_\_\_\_

How many wheels? \_\_\_\_\_ Type? \_\_\_\_\_ How fast? \_\_\_\_\_

How does it turn? \_\_\_\_\_

# 2017 Process

## Pros:

- Good mentor and student collaboration
- Efficient schedule
- Successful
- Training sessions

## Cons:

- Slow software
- Limited amount of time

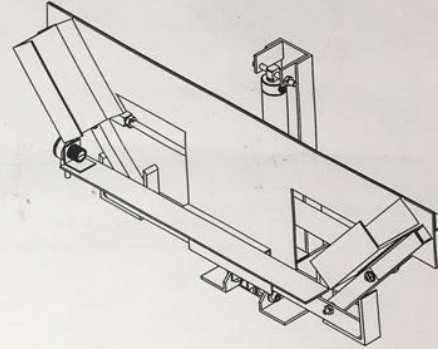
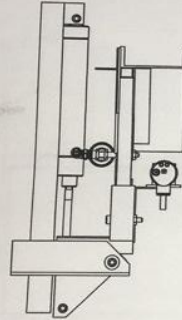


# Our Design

Robot Designed in One Week

Machining Operations Required:	
Milling	<input type="checkbox"/>
Lathe	<input type="checkbox"/>
Hand Drill	<input type="checkbox"/>
Other Hand Tools	<input type="checkbox"/>
Finishing	<input type="checkbox"/>

Rev	Date	Description
A		Released for Machining



SOLIDWORKS Educational Product. For Instructional Use Only

Assembly ~ (1) Required PER BOT

Material: ASSEMBLY  
Stock: SEE BOM

#### Workflow:

Assigned to:	Step Required:	Initials
	Drawing Released	
	Material Available	
	Material Cut	
	Piece Tagged as WIP	
	Machining Complete, Qty: _____	
	Quality Inspection Complete	
	Piece Tagged as Complete	
	Piece Placed in Complete Bin	



FIRST

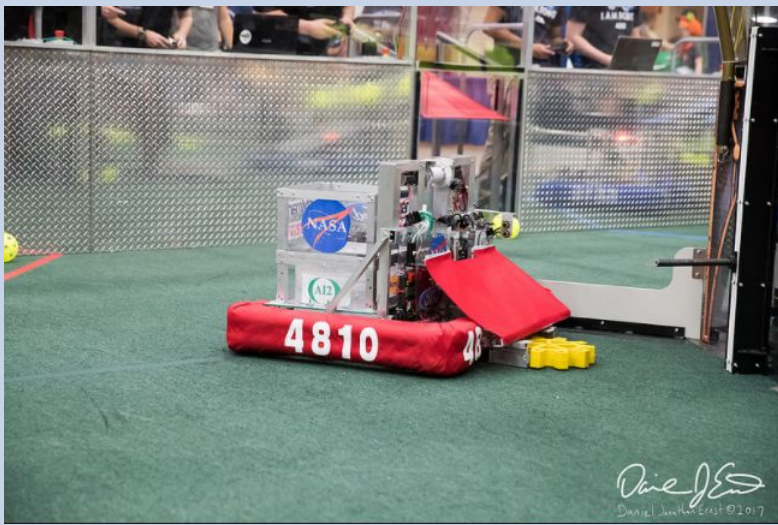
4810

International Academy

Drawn By:	AHZ
Drawn Date:	1/27/17
Drawing Scale:	1:2
Robot System:	Gear Claw
CAD System used:	SolidWorks
Part Name:	claw assembly
Drawing Number:	200-000

# 2018 CAD Goals

- CAD division contribute more directly to the design of the robot than members of any other group.
- The CAD group begins designing a 3D model of the robot
  - ▷ About a 1 week process
- Then given to the machining group to be made into actual parts for the robot



# Build

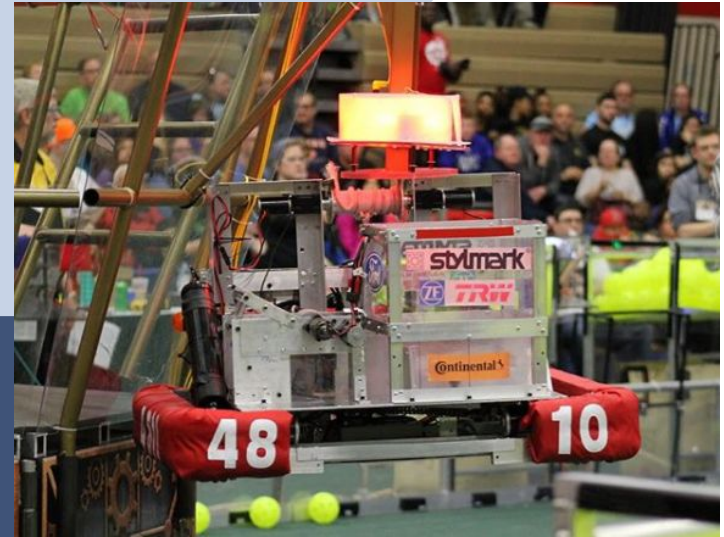
Robot in Four Weeks







	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan
WEEK	Work Day	Finish day	Hard Stop Date		Wk2	Wk3
Kickoff						
Brainstorming						
Top 10 designs						
Evaluate/Eliminate designs						
Test Kit and Data Collection						
Design Related Component						
Strategy Related Component						
Human Play of game						
Design Finalized (Drive)						
Order/Build (Drive)						
Primary Mechanism Prototyping						
Primary Mechanism Engineering						
Order/Build ( Primary Mechanism )						
Secondary Mechanism Prototype						
Secondary Mechanism Engineer						
Order/Build (Secondary Mechanism)						
Final Mechanical Assembly						
Electrical Board Design						
Pneumatic Schematic						
Electrical Board Construction						



# Benefits of Sponsorship

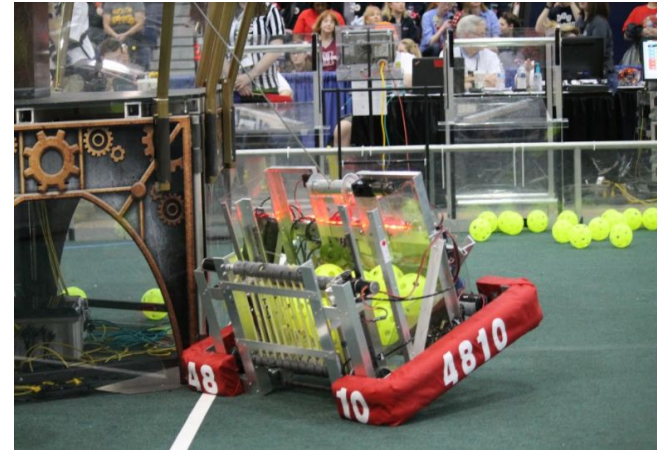
# Benefits to Corporate Sponsor

- Creating a relationship between students and your business
- Direct impact in student education
- Implementing marketing and awareness of your business
- Creating well rounded citizens in the community
- Creating positive marketing opportunities
- The corporation can work aside students interested in the company
- Allows cooperation to teach their messages and objectives to students
- Enhance critical time management skills
- Creating a unique partnership between students and adults
- Provides student-run robotics demonstrations for corporate meetings and events



# Benefits to Students and Community

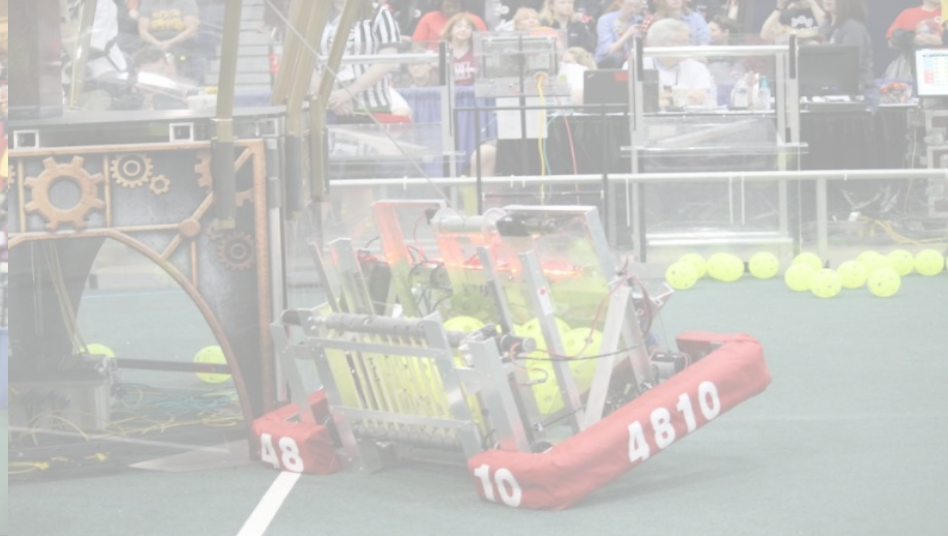
- Inspires a desire for scientific learning
- Teaches necessary STEM skills
- Creates unique learning environment
- Provides opportunities for disadvantaged students to develop STEM skills
- Develops interdisciplinary skills between subjects
- Makes science and technology comfortable and accessible
- Creates a role model relationship with mentors
- Breaks down gender, race, and culture barriers
- Builds lasting relationships across all four grades
- Teaches teamwork and self esteem
- An alternative competitive environment than the normal athletic environment
- Teaches creativity and problem solving
- Highlights the success in winning and where it can lead students





# THANK YOU





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