

MANTACHIE HIGH SCHOOL
TEAM CYBERDINE -
#14800



ENGINEERING NOTEBOOK

I. Introduction

Team Cyberdine is a FIRST Tech Challenge (FTC) team. We design, build, and program robots to perform challenges that are released every year by FIRST (For the Inspiration and Recognition of Science and Technology). Our team name is Cyberdine based off the company that created the "Terminator".

As a team we take the FIRST core values of Gracious Professionalism very seriously. When competing as a Gracious Professional we are able to learn and compete together while still being able to treat our fellow competitors with respect and kindness. We strive to exhibit this valuable asset not only when helping and meeting new teams at competitions but also towards our teammates while in team meetings. Most importantly we use this outside of robotic competitions to people who know nothing about FIRST.

II. Team Organization

In order to properly organize the work, we have to do, we have certain sub-teams with specific jobs to help our team to be ready to compete. While we have these three sub-teams which include Design and Construction, Programing, and Presentation, we all work together and help with each individual sub-team.

The design and construction teams consist of Captain Caleb Murrell, Brandon Kemp, Blake Moore, and Mac Gentry. This team is responsible for designing and turning their design into a robot that will perform most efficiently in the competition environment.

The programing team consist of lead programmer Mason Ruffin, and WillRilee Barber. This team is responsible for programing the robot's movement in autonomous mode as well as the driver operated mode.

The presentation team consist of all team Cyberdine members. This team creates the engineering notebook as well as inform the judges about our story and how we overcame challenges along the way of this year's competition season.

III. Team Goals

In the beginning we held a team meeting discussing and choosing goals we are striving to complete. We have goals for the entire team as well as goals for sub-teams.

a. General goals for Team Cyberdine

- Uphold FIRST's core values
- Respect ourselves and others in all that we do
- Share knowledge and help others
- Help improve in our contribution to FIRST robotics

b. Goals for Design and Construction

- Have a competition ready robot by November 22nd
- Complete a design by October 31st

c. Goals for Programing

- Have an autonomous mode program completed by December 1st
- Have a program completed for all moving parts of the robot during the man controlled period by December 1st

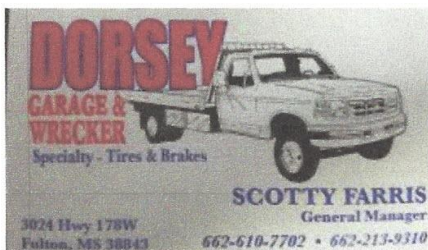
d. Goals for presentation team

- Be knowledgeable of all parts of robot to explain to judges
- Finish engineering note book a week before each competition

IV. Sponsors

Team Cyberdine has attracted a couple of new sponsors for this 2019-2020 robotics season. These sponsors include:

TVA Grant



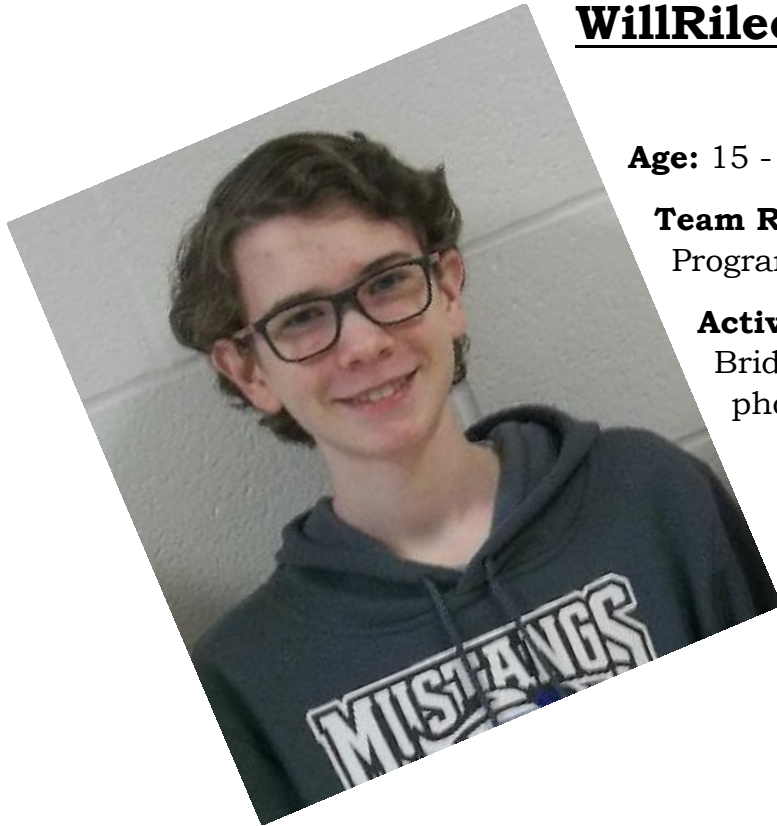
Dorsey Garage

#14800 - TEAM CYBERDINE

MEET THE TEAM...



TEAM BIO'S



WillRilee:

Age: 15 - 9th grade

Team Role: Lead Designer & Apprentice Programmer

Activities: Competing with the school Bridge Building Team & Helping dad fix phone screens and trucks

Reason for Joining: I wanted to try something new.

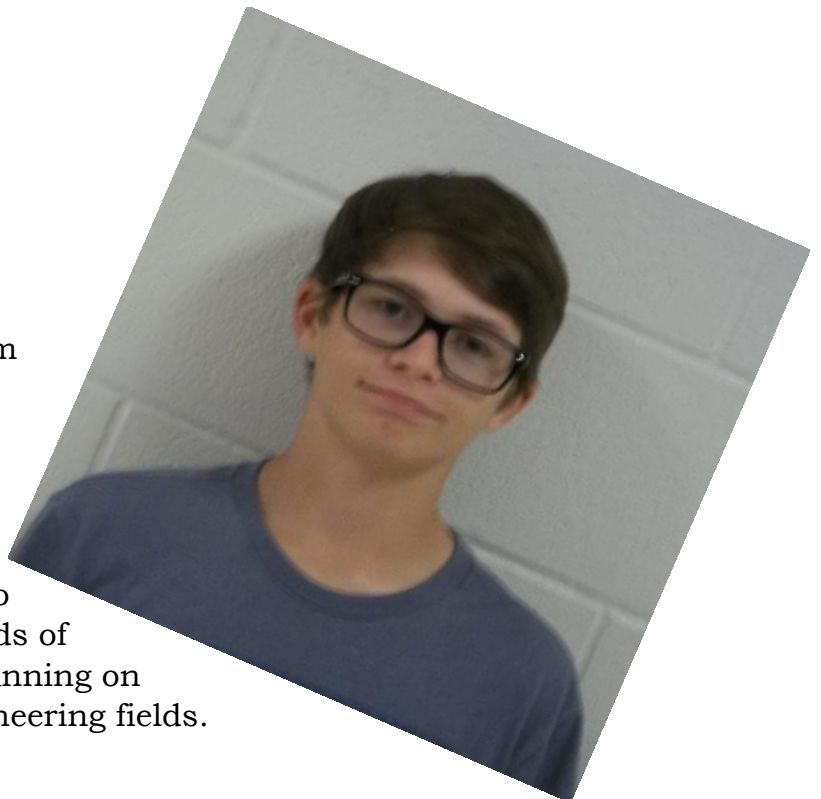
Mac:

Age: 16 - 11th grade

Team Role: Photographer, Notebook, Design & Build Team

Activities: Competing with the school Bridge Building Team, Playing Baseball and Bowling for the school teams.

Reason for Joining: I wanted to learn more about different fields of engineering because I am planning on majoring in one of the engineering fields.





Brandon:

Age: 17 - 11th grade

Team Role: Design & Build Team, Outreach & Media

Activities: Competing with the school Bridge Building Team, Band & Track.

Reason for Joining:

I am thinking about becoming an engineer and wanted to learn more about electronics.

Alex:

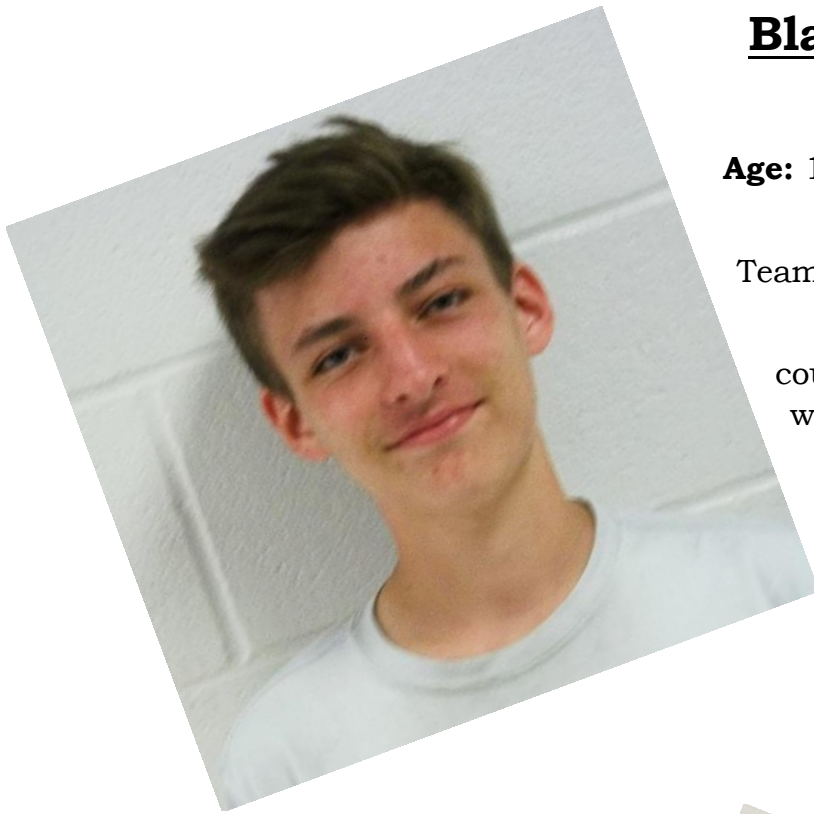
Age: 15 - 8th grade

Team Role: Apprentice Programmer

Activities: Creating Masks; Learning about networking & anything computer related.

Reason for Joining: I joined because I wanted to learn more about the programming.





Blake:

Age: 17 - 12th grade

Team Role: Design & Build Team

Activities: Running cross country & track, welding, and working with electronics.

Reason for Joining: To learn more about electronics

Caleb:

Age: 17 - 11th grade

Team Role: Design & Build Team

Activities: Competing with the school Bridge Building Team & Playing in the high school band.

Reason for Joining: I am planning on majoring in computer science and this competition would give me a good background.



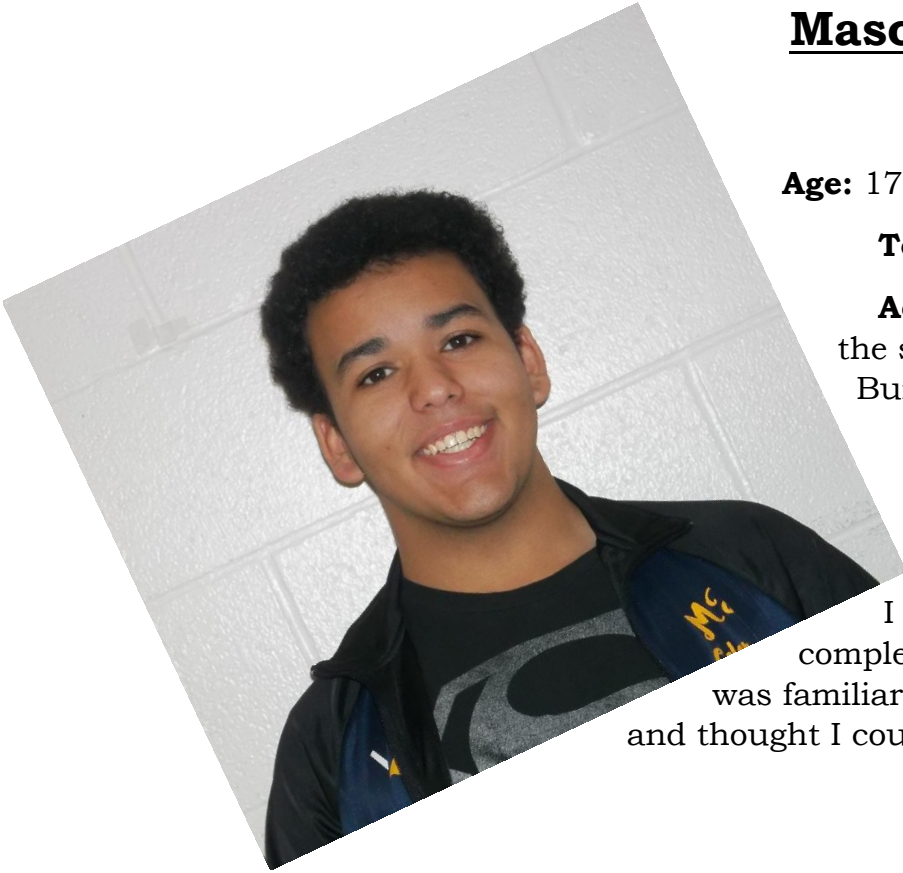
Mason:

Age: 17 - 12th grade

Team Role: Lead Programmer

Activities: Competing with the school band & Bridge Building

Reason for Joining: I heard team Cyberdine members talking about needing a programmer and I volunteered and I have completed the Hour of Code so I was familiar with block programming and thought I could help.



Mentors

Name: Mrs. Cooper

Age: 52

Role on Team: Mentor/Advisor

Interests: Bowling, Coaching, Bridge Building, Reading, Crafting

Reason for Joining: I had several students approach me last year with an intense interest in starting a robotics team. Some are looking at this as their career path, others because different aspects of robotics were of interest to them. Knowing that coding/programming and robotic engineering is a growing 21st century career necessity, I feel that involving students in the FIRST competition will not only prepare my students for these tech careers, but will also give them skills which will be invaluable in any occupation.



Name: Mrs. Dunaway

Age: 41

Role on Team: Mentor

Interests: Reading, Cooking, Singing

Reason for Joining: I believe that the future generations will need to know more about technology and programming, so what better way to help the future than to get our students involved in Robotics.

The skills the students will learn from this process no matter how far they progress will never be lost and can improve their future in many ways.



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OUR PROCESS...



MEETING SUMMARIES & PICS

CONTINUED from page

~~9-16-19~~

1

Roles:

Construction

Caleb Murrell
Mac Gentry
Brandon Kemp

programming

Caleb Murrell
Alex Moore

Design

Will Riley



Team members

Mac Gentry
Brandon Kemp
Caleb Murrell
Will Riley Barber
Blake Moore

ordered sides and extra parts from
AndyMark.

Began organization of last gears
parts.

Discussed building low-cost perimeter field.

CONTINUED on page

SIGNATURE

Mac Gentry

DATE

9-16-19

WITNESSED BY

Brandon Kemp

DATE

9-16-19

BOOK NO. _____

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W e n d e s d a y 18

2

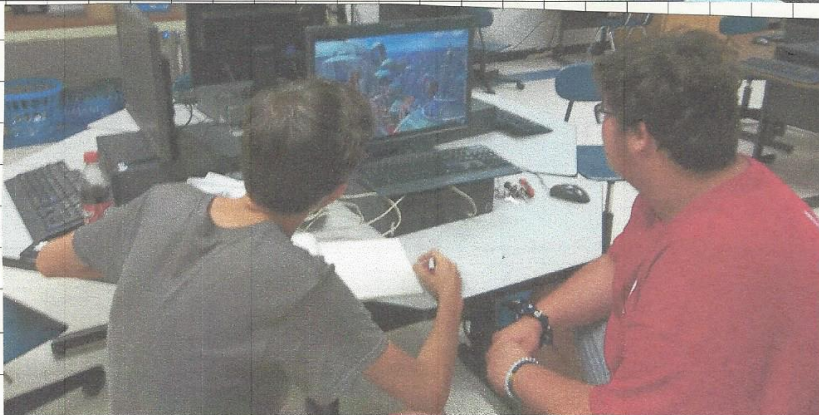
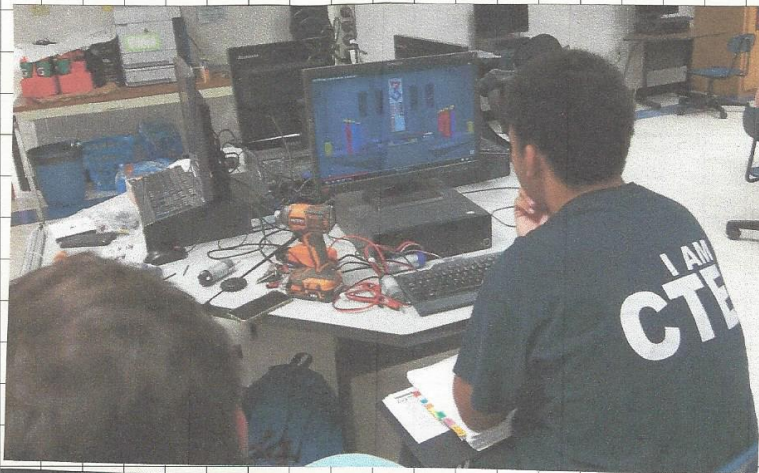
Attendance

Web Murrell

Brandon Kemp

Corey Johansen

- Design team downloaded FreeCAD
- Added Alex Moore to programming
- Added social media with groups of Brandon Kemp and Corey Johansen
- Watched the Kickoff video
- Talked about building a practice arena
- Fundraising ideas
 - Doghouse Sales
 - Socks
 - Tattoos for Football / Basketball games
- Looked at Qualifiers
- Discussed which Qualifiers to go to



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SIGNATURE Web Murrell

DATE 9/18/19

WITNESSED BY Brandon Kemp

DATE 9/18/19

BOOK NO. _____

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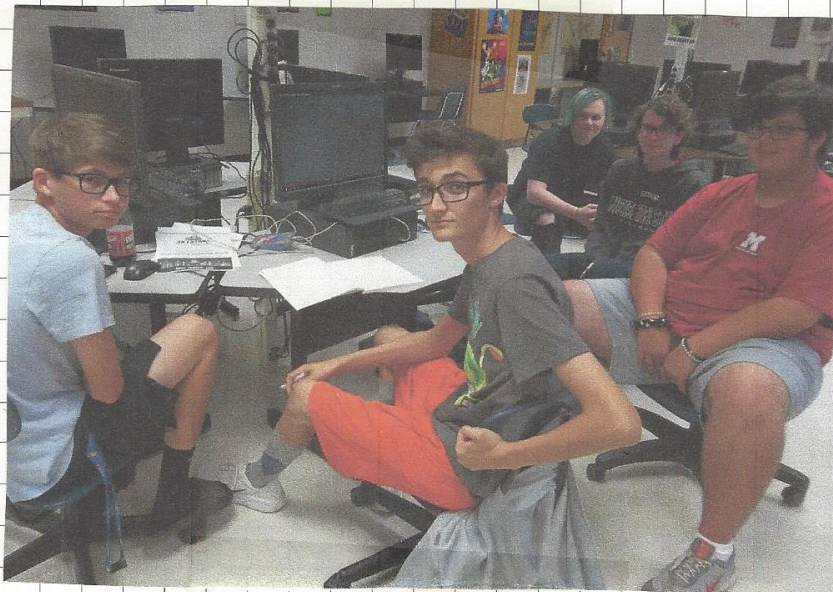
Wednesday

3

Attendance

Caleb Murrell
Brandon Kemp
Max Gentry
Will Riley
Alex Moore

- Corey left the team
- Downloading Freecord
- Rest of team members watched Kickoff video
- Going over game rules
- Going over game manual
- Dates for practice



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SIGNATURE Caleb Murrell

DATE 9/25/19

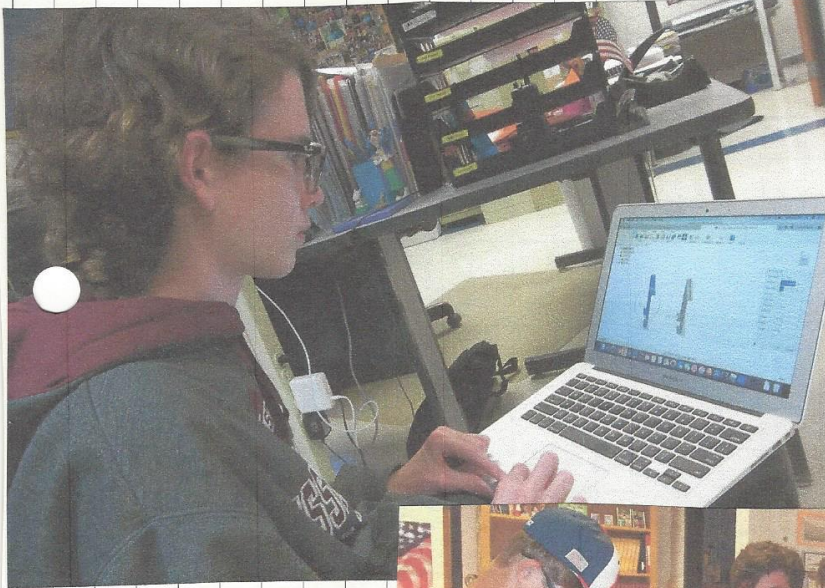
WITNESSED BY Brandon Kemp

DATE 9/25/19

BOOK NO. _____

Attendance
 Caleb Murrell
 Mac Gentry
 Will Riley
 Bryndon Kemp

- Started building
- Started Designing
- Started CAD
- We had trail and error for the chain breaker
- We needed to get the base almost built but couldn't because of missing parts
- Ordered missing parts
- Got some of the base done on CAD



SIGNATURE Caleb Murrell
 WITNESSED BY Mac Gentry

DATE 10/21/19

DATE 10/21/19

BOOK NO. _____

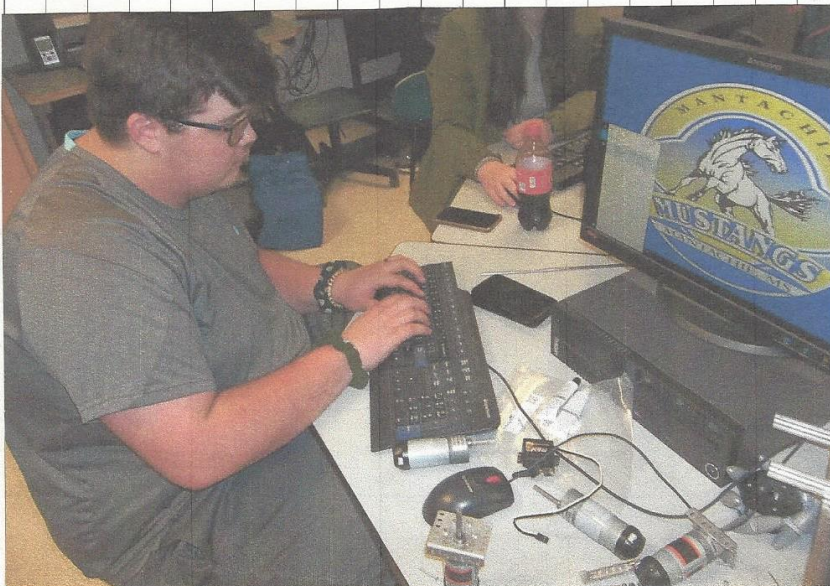
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5

Attendance

Caleb Moore
Max Gentry
Brandon Kemp
Blake Moore
Alex Moore
Will Riley

- Guiding the wheels and tracks
- Talk about shirts
- Talk about fundraising



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SIGNATURE Caleb Moore

DATE 10/7/19

WITNESSED BY Brandon Kemp

DATE 10/7/19

BOOK NO. _____

Attendance

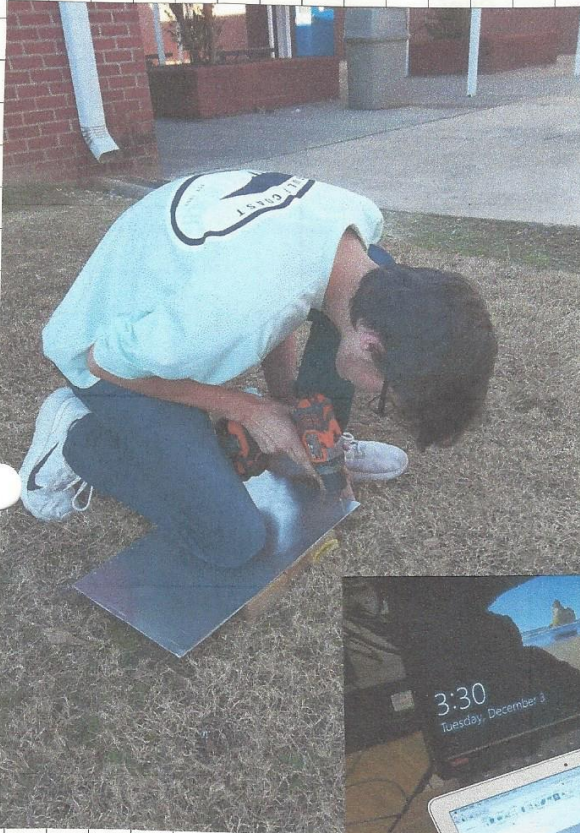
Caleb Murrell

Mac Gentry

Brandon Kemp

Will Riley

• Cutting pieces

• Alex watched videos about
programming with blocks• Will done more with the
chassis design

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SIGNATURE Caleb MurrellDATE 10/9/19WITNESSED BY Brandon KempDATE 10/9/19

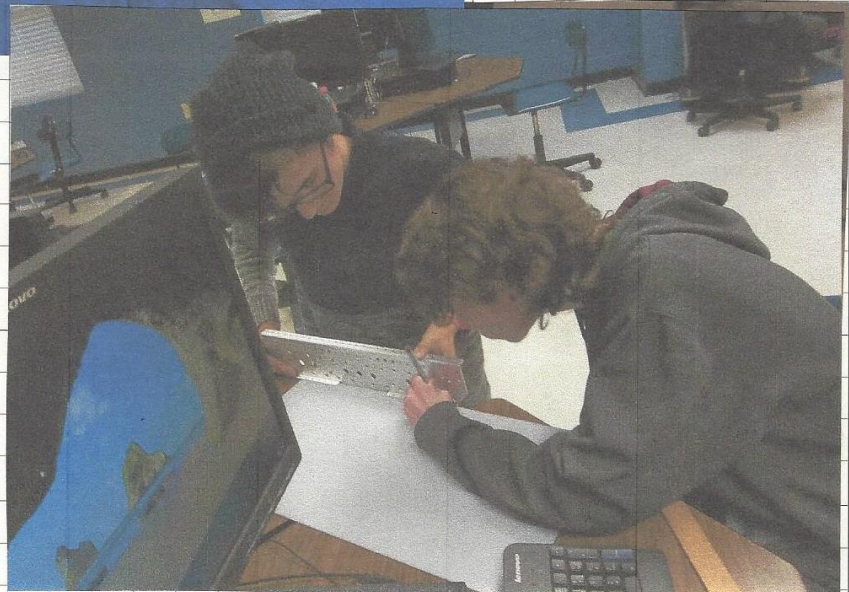
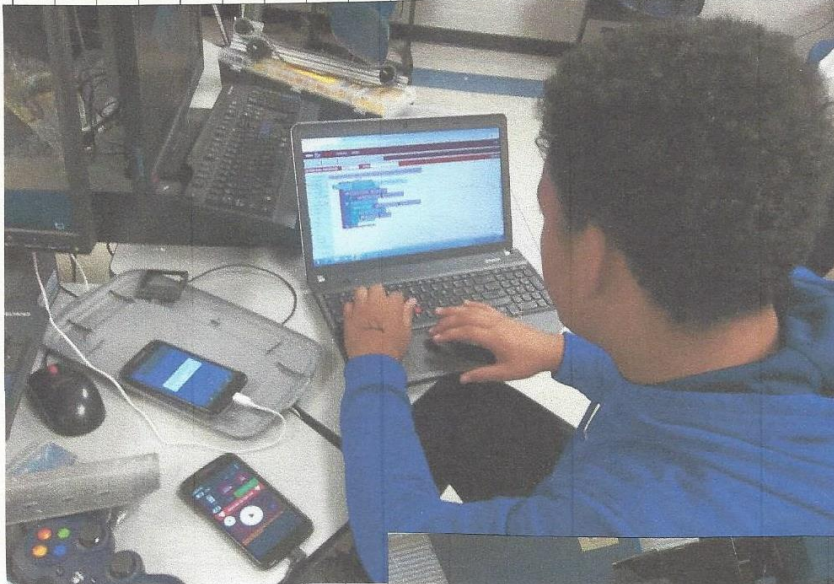
BOOK NO. _____

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7

Attendance
Caleb Murrell
Alex Moore
Will Riley

- Built one fire part
- Started programming
- Finished more on CAD
- Marked off place to cut on a panel



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SIGNATURE Caleb Murrell

DATE 10/16/19

WITNESSED BY Will Riley

DATE 10/16/19

BOOK NO. _____

Attendance

Blake Moore

Will Riker Barber

- Built + second side of ~~chassis~~ chassis
- Watched videos on how to pick up brick
- tried to break wiffle ball (fail)



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SIGNATURE

WITNESSED BY Will Riker Barber

DATE

DATE 11/7/19

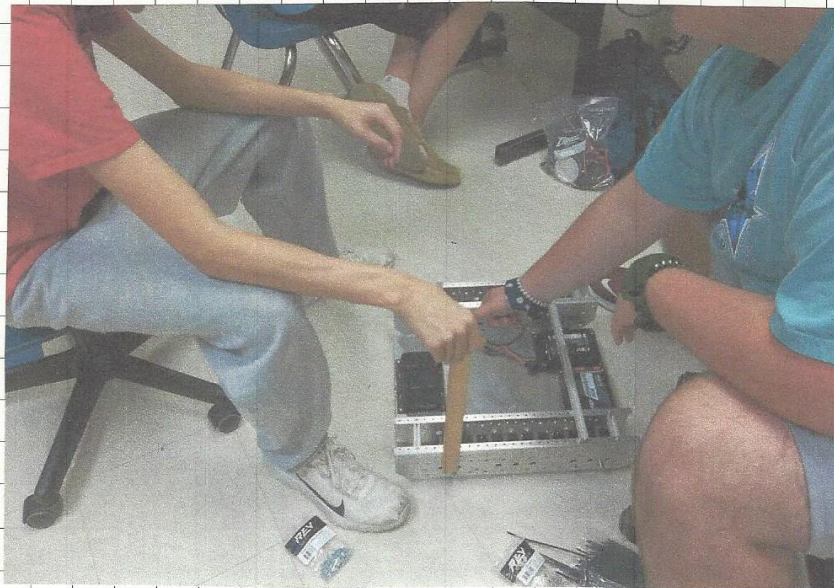
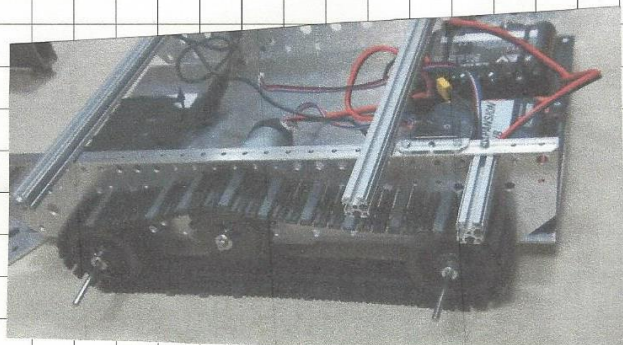
BOOK NO. _____

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9

Attendance
Caleb Murrell
Brandon Kemp

- Built tracks and frame
- Ordered more parts
- Measurements to cut



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SIGNATURE *Caleb Murrell*

DATE 11/12/19

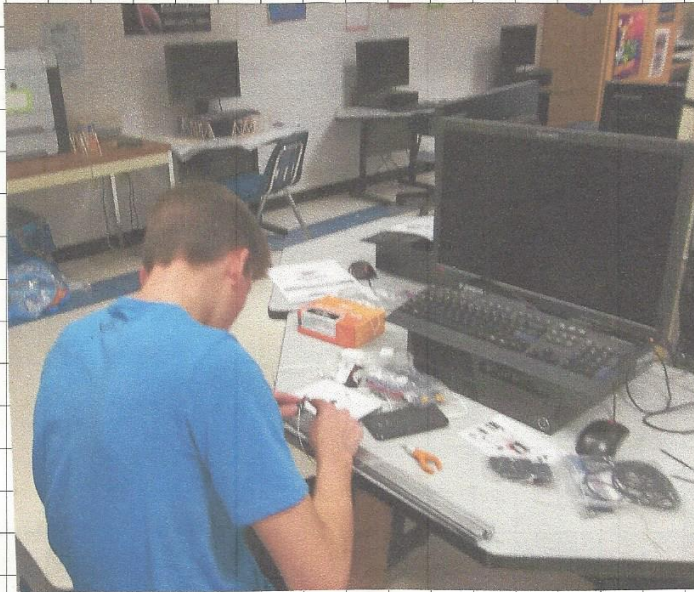
WITNESSED BY *Brandon Kemp*

DATE 11/12/19

BOOK NO. _____

Attendees
 Caleb Murrell
 Blake Moore
 Brandon Kemp

- Built the classic
- Started on a linear motion kit



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SIGNATURE Caleb MurrellDATE 11/18/19WITNESSED BY Blake MooreDATE 11/19/19

BOOK NO. _____

Attendance

Caleb Murrell
 Brandon Kemp
 Mac Gentry
 Will Riley
 Blake Moore
 Mason Rutfin

- Added Mason Rutfin to the team
- Built more on the linear motion
- Put the battery and phone and expansion hub on the robot
- Put Mason Rutfin on programmer



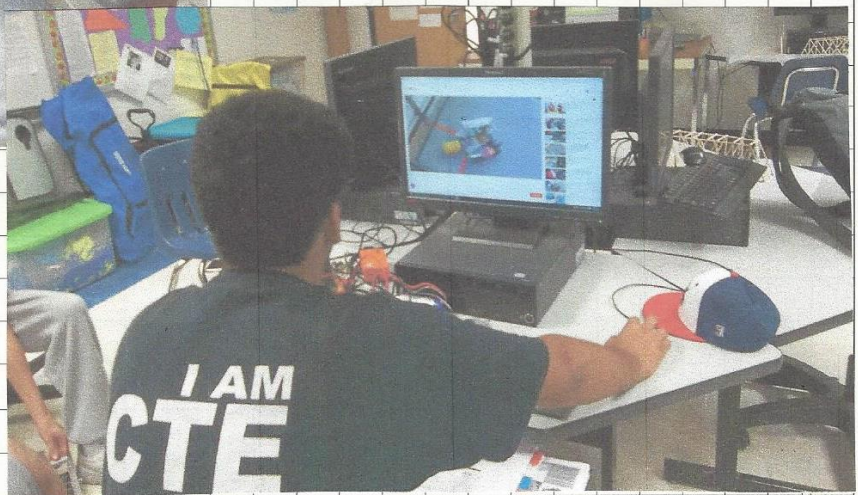
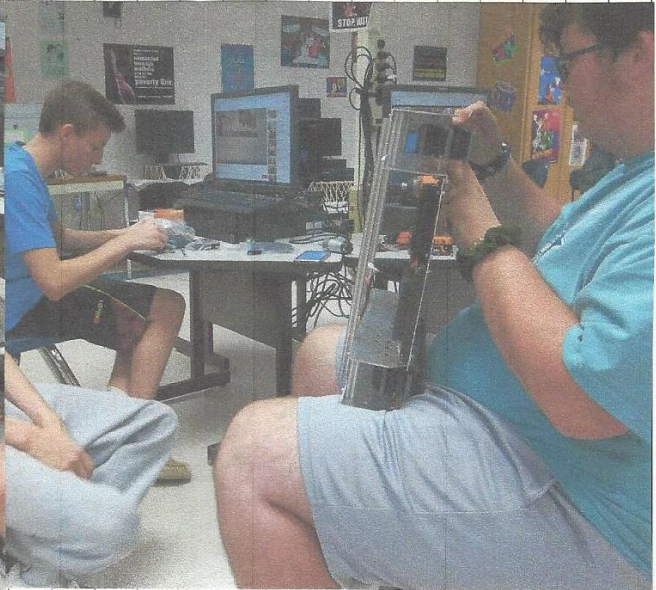
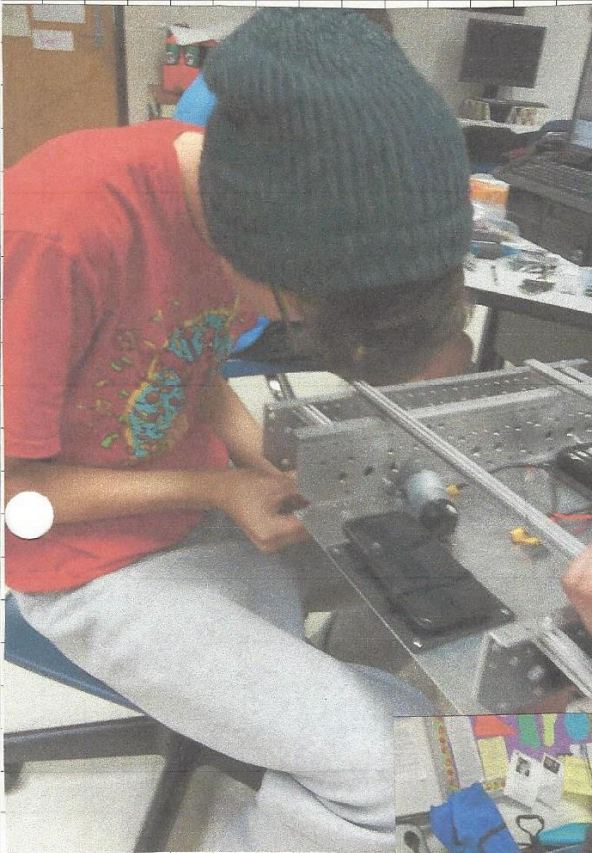
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SIGNATURE Caleb MurrellDATE 11/20/19WITNESSED BY Mason RutfinDATE 11/20/19

BOOK NO. _____

Attendance
 Coleb Murrell
 Blake Moore
 Will Riley
 Mason Ruffin

- Connected the battery to the expansion hub
- Worked on a different linear motion design
- Sorted every part we had
- Adding more ports on the CAD software
- Mason watched videos on programming with blocks



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SIGNATURE Coleb MurrellDATE 11/21/14WITNESSED BY Blake MooreDATE 11/21/14

BOOK NO. _____

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13

Attendance
Caleb Murrell
Branden Kemp
Mason Rutten
Mac Gentry

- Build on arm
- Build on base and tracks
- Wired motors



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SIGNATURE Caleb Murrell

DATE 11/25/14

WITNESSED BY Mac Gentry

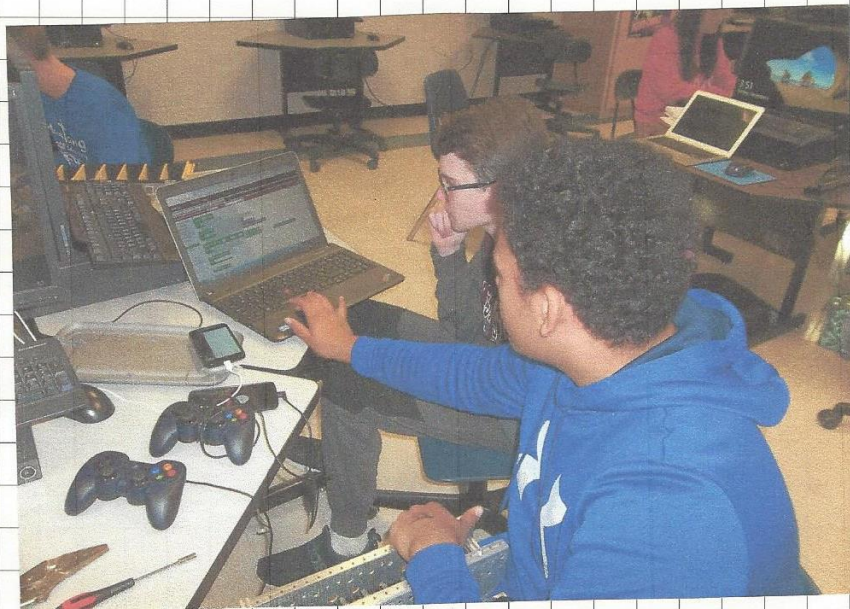
DATE 11/25/14

BOOK NO. _____

Attendance

Mason Ruffin
Branden Kemp

- Mason wrote more
OP Modes
- Branden worked on
Building the arm.
- Broke the treads



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SIGNATURE Mason RuffinDATE 11-27-19WITNESSED BY Branden KempDATE 11-27-19

BOOK NO. _____

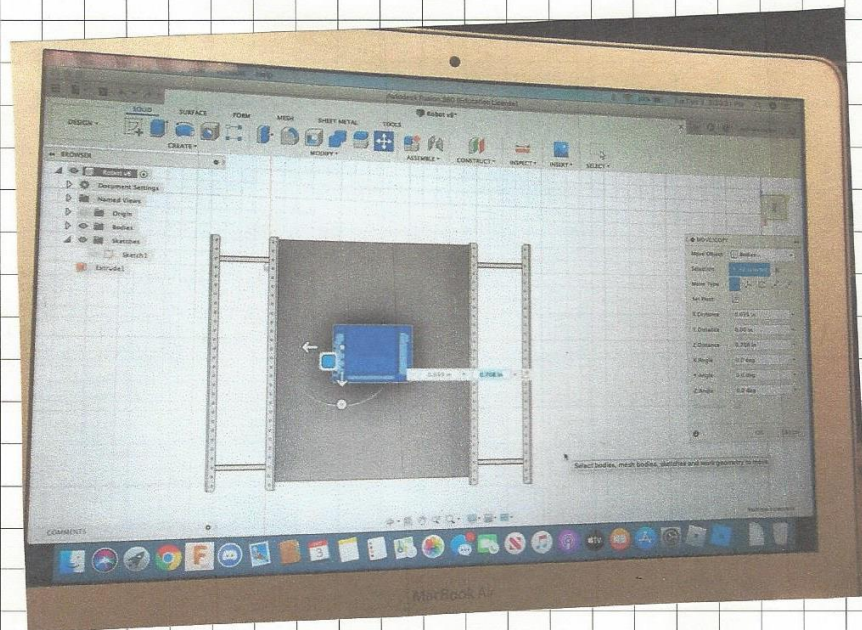
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15

Attendance

Calvin Murrell
Brandon Kemp
Max Gentry
Mason Ruffin
Will Riley
Blake Moore

- Had to rebuild the tracks to do wheels
- Mason was debugging
- Figured out how to draw sheet metal in CAD
- Put motors just expansion hub, and wheels in CAD



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SIGNATURE Calvin Murrell

DATE 12/13/19

WITNESSED BY Will Riley Barber

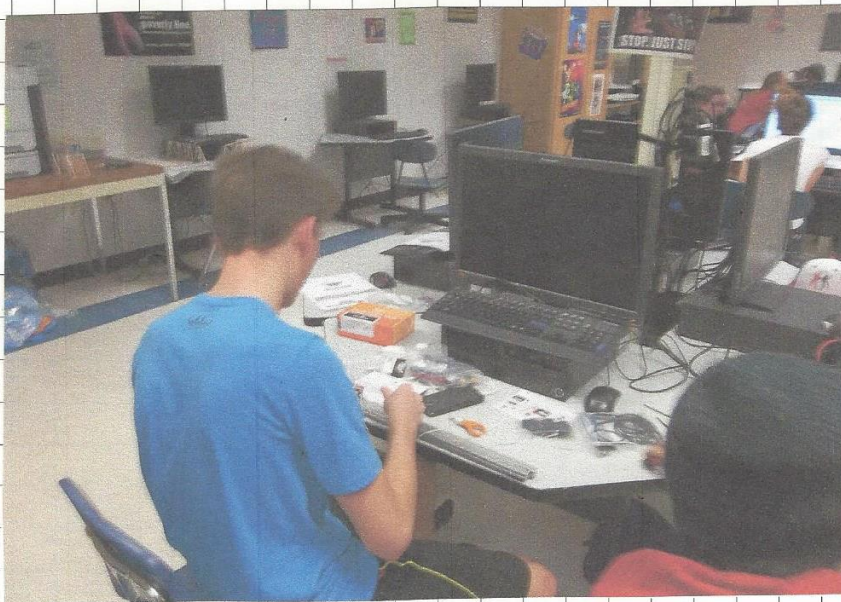
DATE 12/3/19

BOOK NO. _____

- Worked on ~~linear~~ linear motion mechanism
- had to sand down plastic to fit in a space to keep the shafts tight
- Assembled linear motion mechanism
- Tested it & failed

Attendance

Blake Moore



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SIGNATURE

Blake Moore

DATE

12/5/19

WITNESSED BY

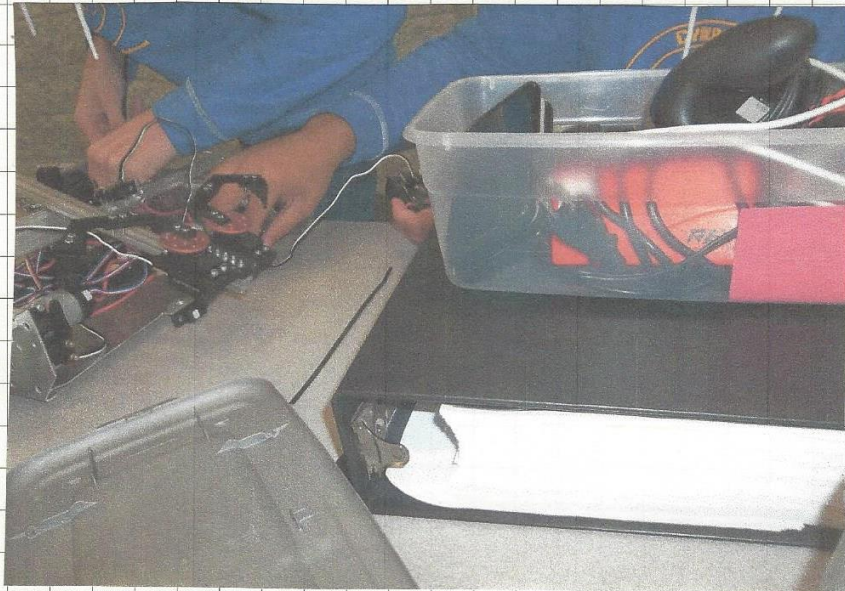
Brandon Kent

DATE

BOOK NO.

- Connected extrusions to servo motors.
- then put a hex motor on the chassis
- Put the arms on the robot

Attendance
Blake Moore



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SIGNATURE Blake MooreDATE 12/6/19WITNESSED BY BramptonDATE 12/6/19

BOOK NO. _____

CONTINUED from page

18

Attendance

Caleb Murrell
Blake Moore
Mason Buffin
Will Rilee
Brandon Kemp
Mac Gentry

• ~~Mac~~ started typing engineering notebook

• ~~Blake~~ found problems in linear motion arm

• Tracks failed to work

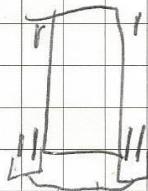
• got motors for linear motion arm going

• Discussed setup for tires

• Programmed servo to perform during autonomous mode

• rebuilt robot chassis

• decided on dual wheel design



2 wheels
on each
side of
rear

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SIGNATURE Mal Gentry

DATE 12-5-19

WITNESSED BY

Brandon Kemp

DATE

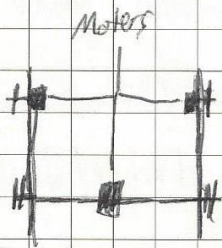
BOOK NO. _____

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19

Attendance
Caleb Murrell
Brandon Kemp
Mason Ruffin

- replaced 2 motors with a drive shaft and 1 motor
- Finished programming the TeleOP
- Attached alligator monitors
- Put sponsor markers on



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SIGNATURE Caleb Murrell

DATE 12-6-19

WITNESSED BY Brandon Kemp

DATE 12-6-19

BOOK NO. _____

Attendance

Caleb Murrell

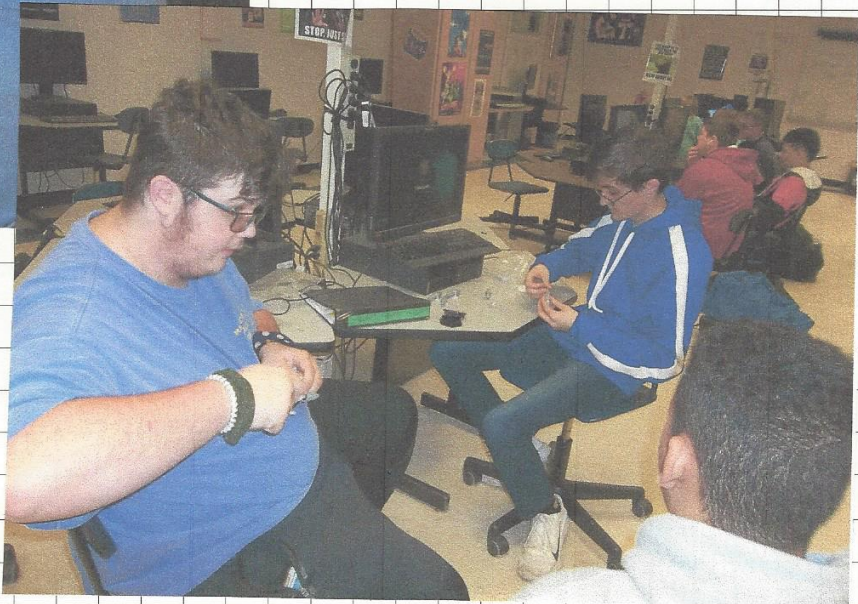
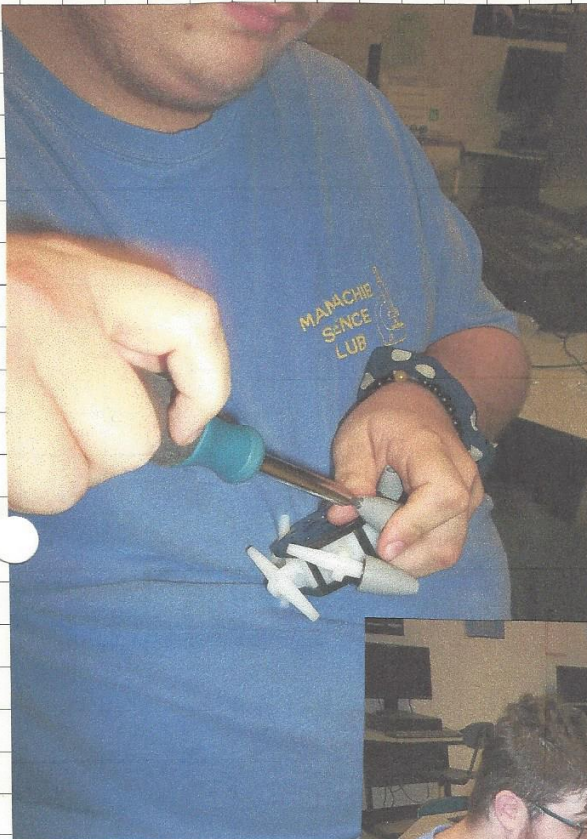
Mason Ruffin

Brandon Kemp

• Started brainstorming on how to mount medium wheels

• Brainstormed how to mount the new rotors

• ordered new parts and longer drive shafts



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SIGNATURE Caleb MurrellDATE 1-7-20

WITNESSED BY _____

DATE 1-7-20

BOOK NO. _____

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21

Attendance

Mason Ruffin

- Involvement in a dive of code over Christmas break
- Brainstormed Autonomers



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SIGNATURE _____

DATE 1-9-20

WITNESSED BY _____

DATE 1-9-20

BOOK NO. _____

Attendance
Caleb Morrell
Brandon Kemp

- Started taking off old motors
- Figured out how to use the new parts to mount the wheels/motors
- Started on the arm 2.0



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SIGNATURE ~~Brandon Kemp~~ Caleb Morrell

DATE 1-14-20

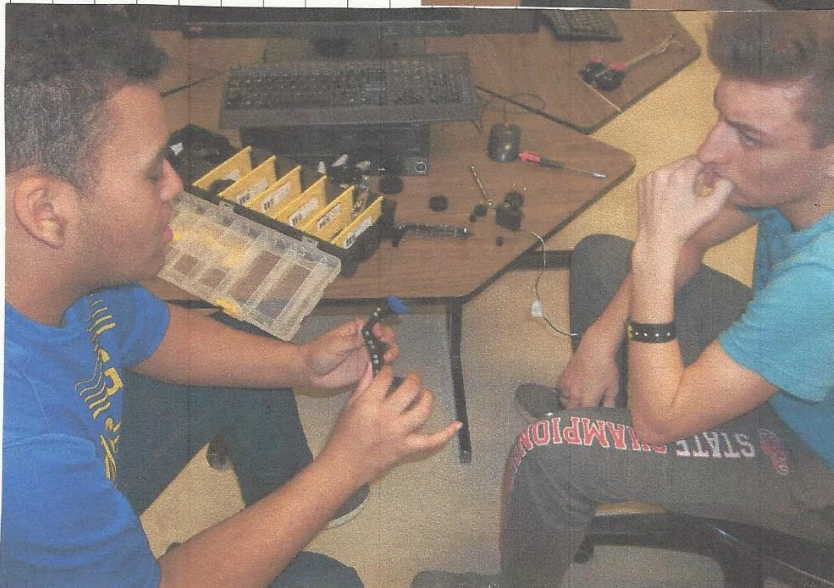
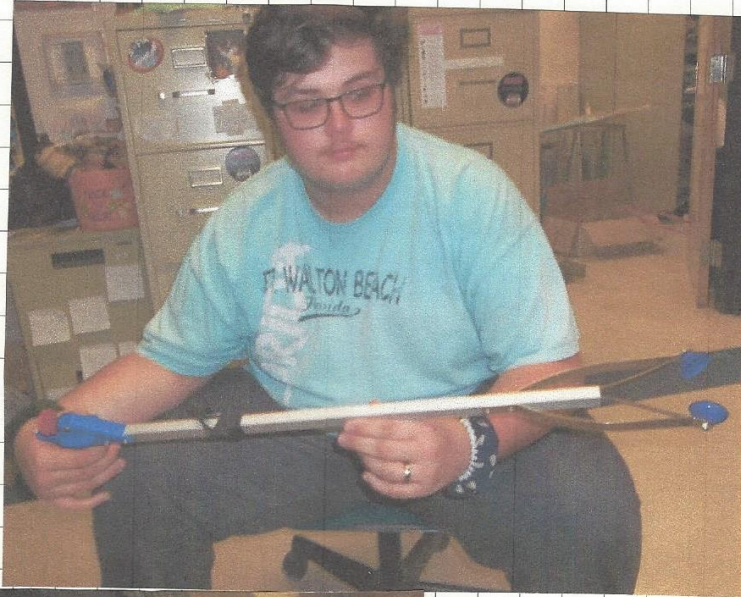
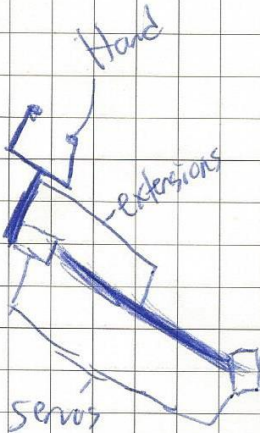
WITNESSED BY

DATE 1-14-20

BOOK NO. _____

Attendance
 Carter Murrell
 Mason Buttin

- Brainstorm on wiring
- Brainstorm on how to use servos instead of motors for the arm
- Brainstormed on how to make a "wrist" on the arm



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SIGNATURE CMDATE 1-16-20

WITNESSED BY _____

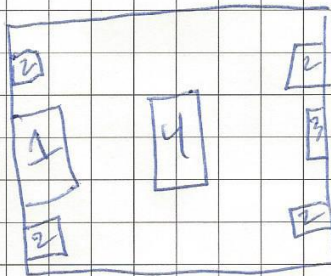
DATE 1-16-20

BOOK NO. _____

Attendance
Caleb Marshall
Brandon Kemp

- Started Attaching wheels/motors
- Attached side panels
- Attached battery
- Attached expansion hub and ~~lost~~ phone holder
- Started to build arm

1 - Expansion hub
2 - Motors
3 - Battery
4 - phone holder



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SIGNATURE CalebDATE 1-24-20

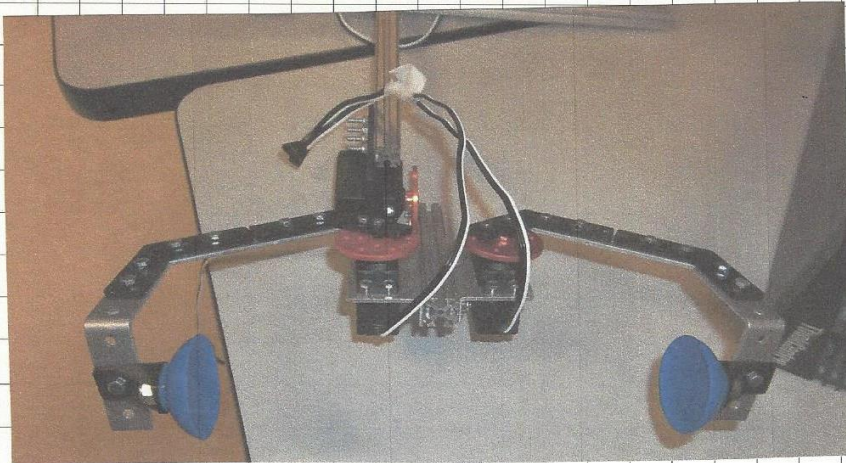
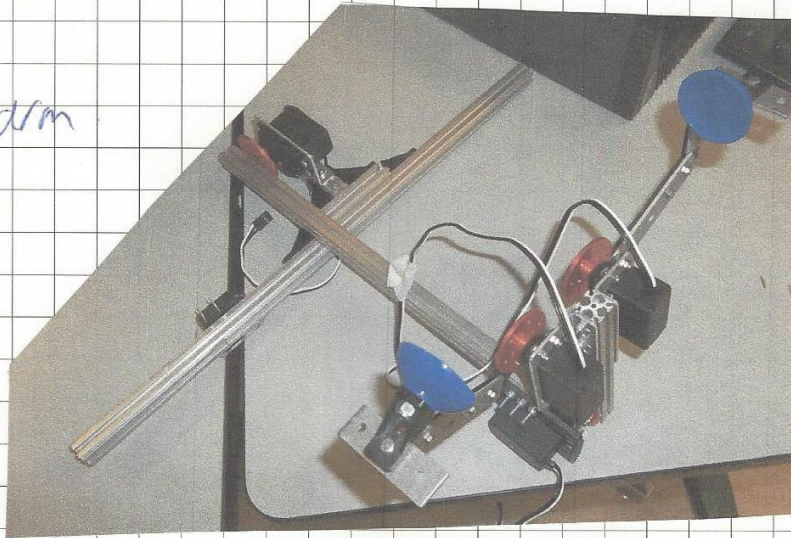
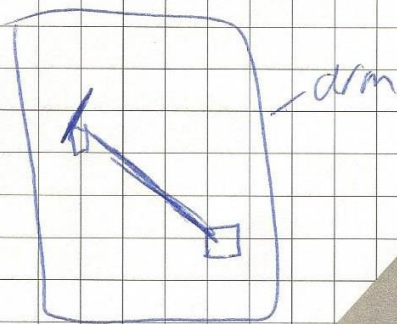
WITNESSED BY _____

DATE 1-24-20

BOOK NO. _____

Attendance
Caleb Murrell
Will Riley
Mason Ruffin

- Wired all motors up
- Will started over on the motors in Fusion 360
- Mason finished programming motor for medium wheels
- Built most of the arm have the grippers left



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SIGNATURE gm

DATE 1-29-20

WITNESSED BY _____

DATE 1-29-20

BOOK NO. _____

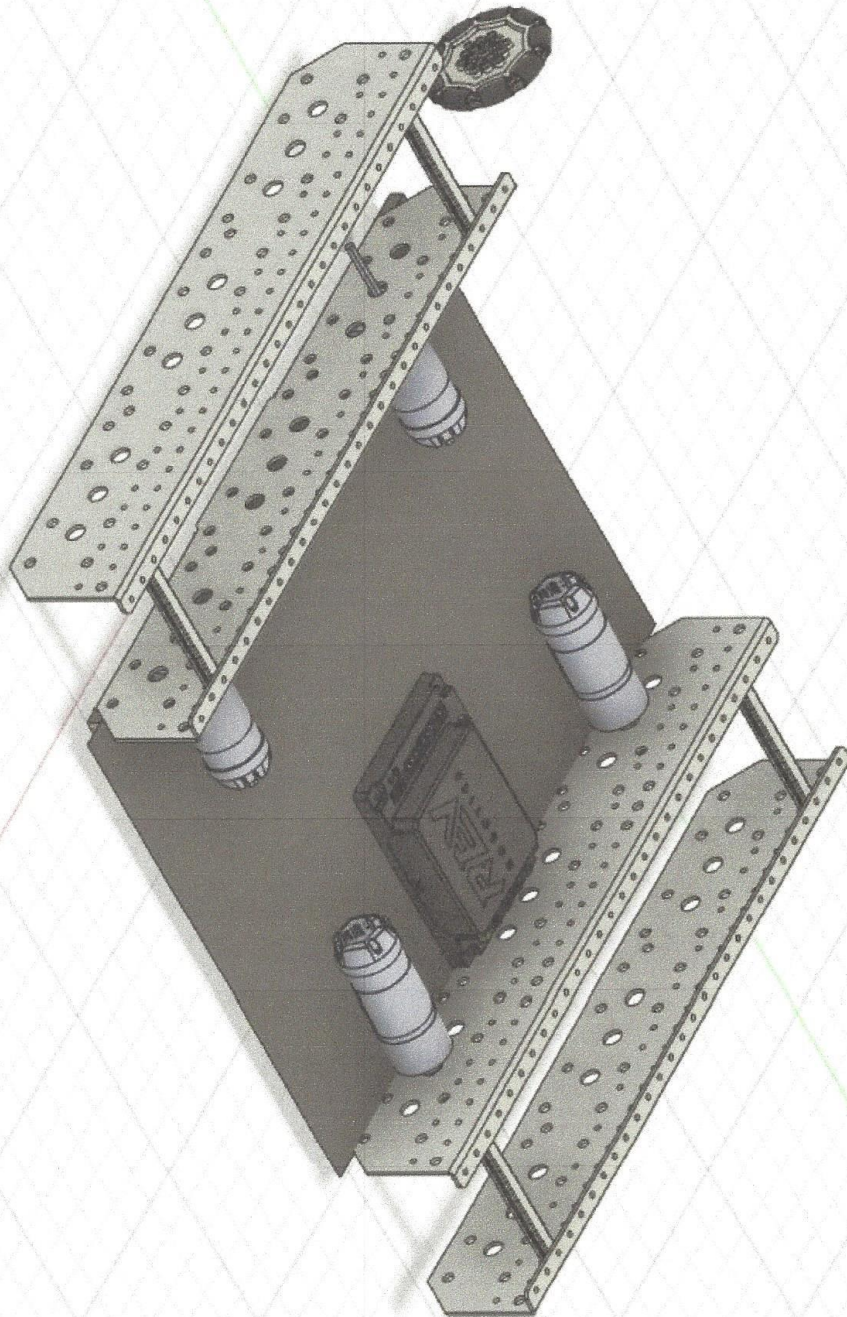
#14800 - TEAM CYBERDINE

FUSION 360

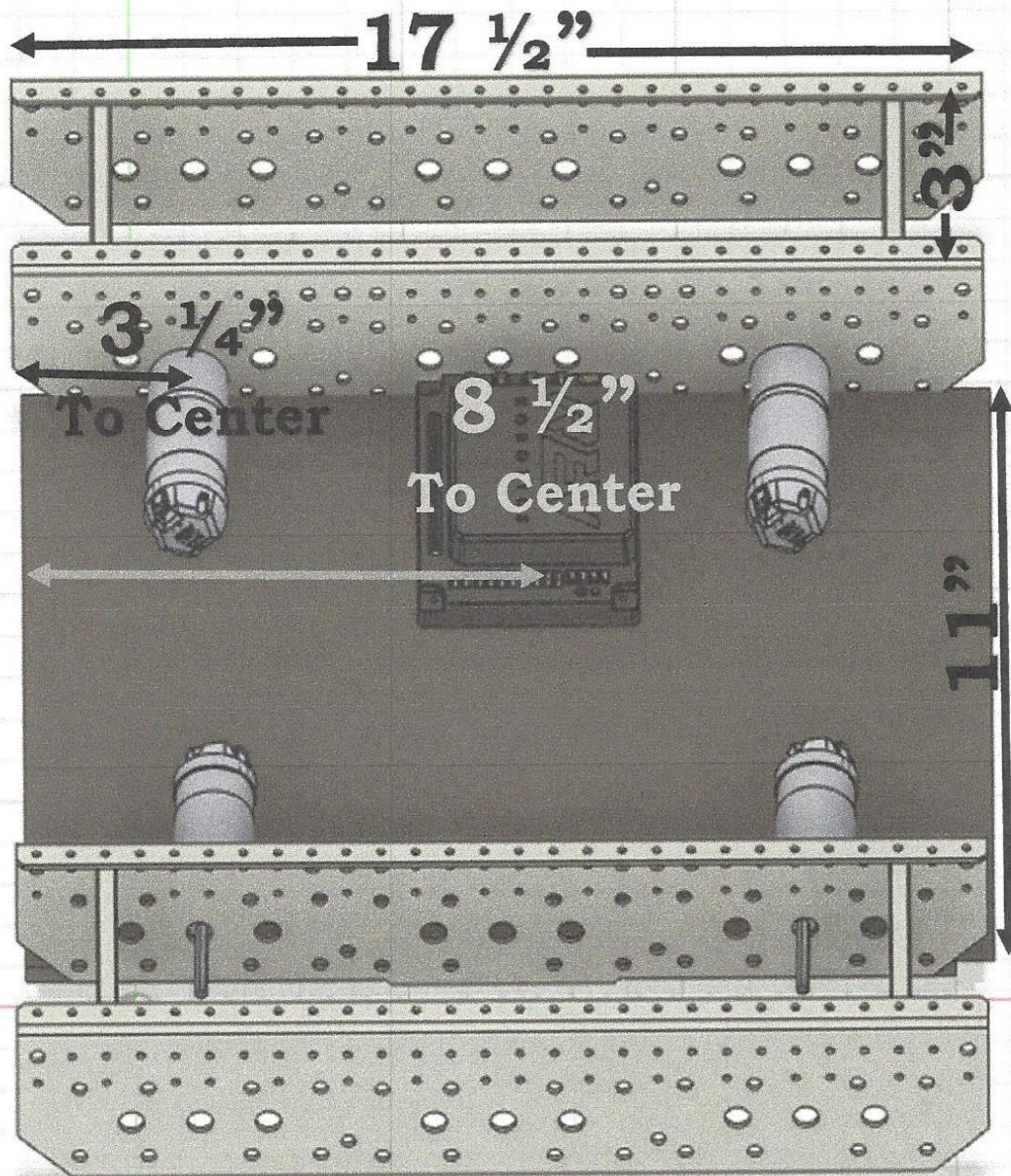


CAD DESIGN

Fusion 360 CAD Drawings



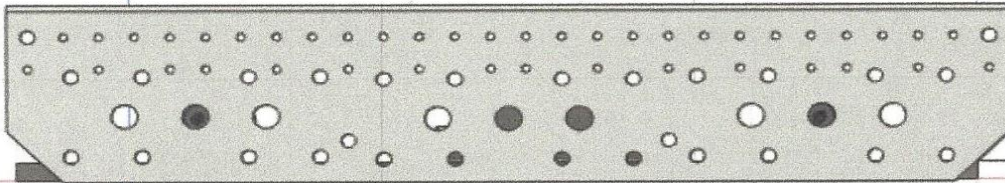
Measuring Placement Guide



Fusion 360 CAD Drawings

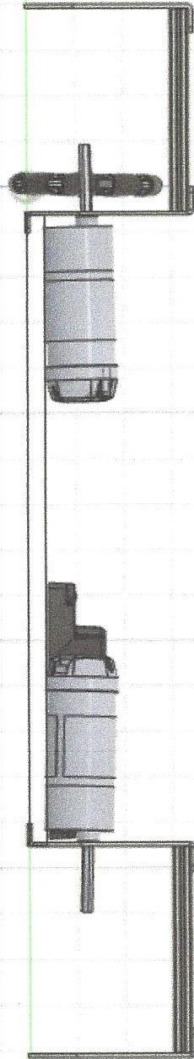


Team Number & Sponsor Placement



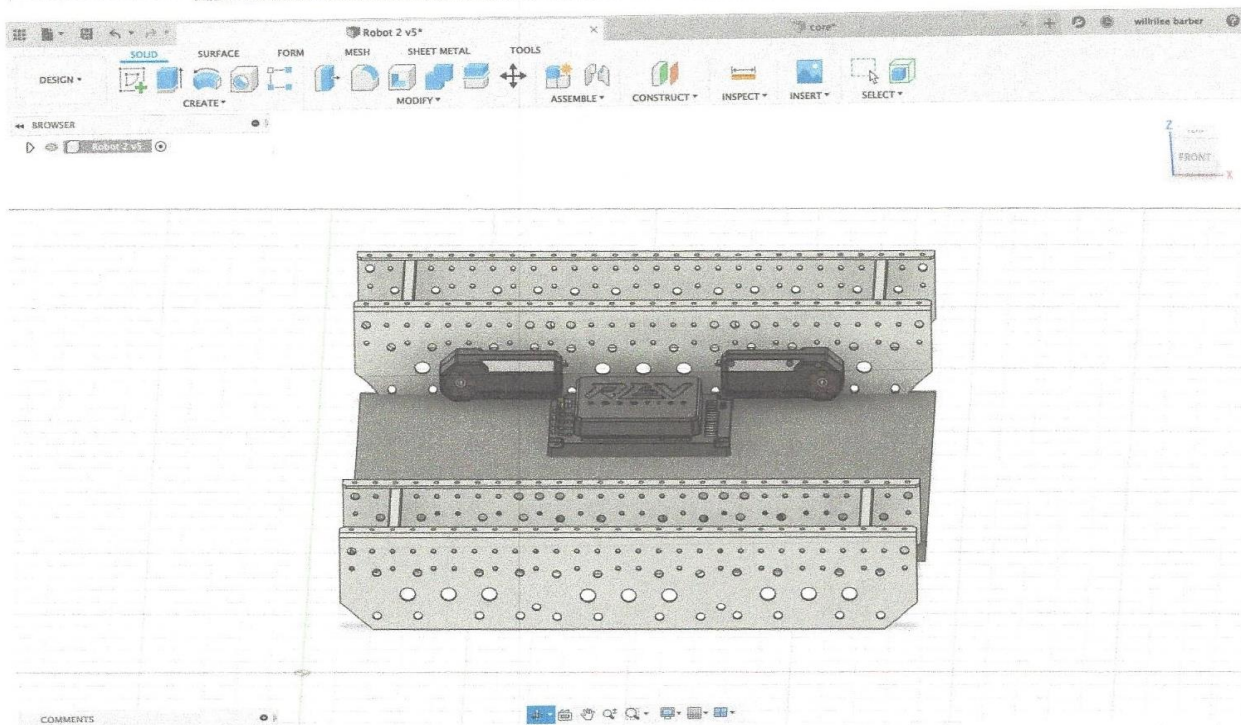
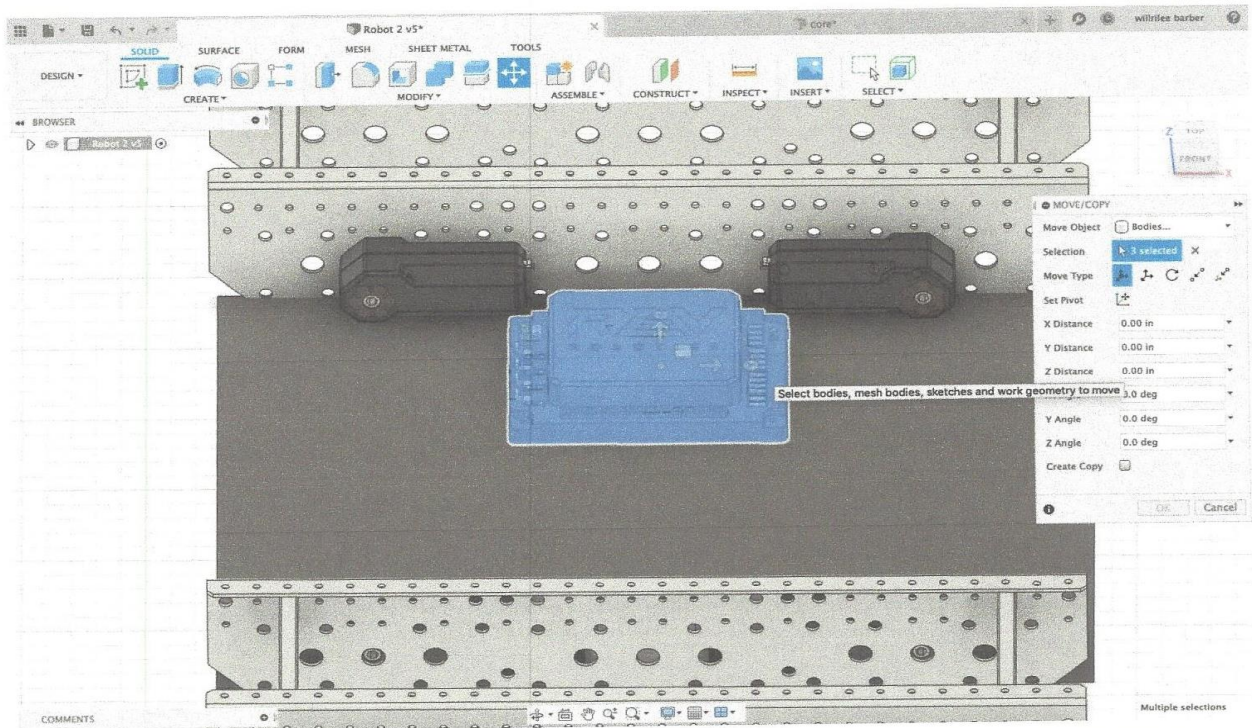
Chassis Side View

Fusion 360 CAD Drawings

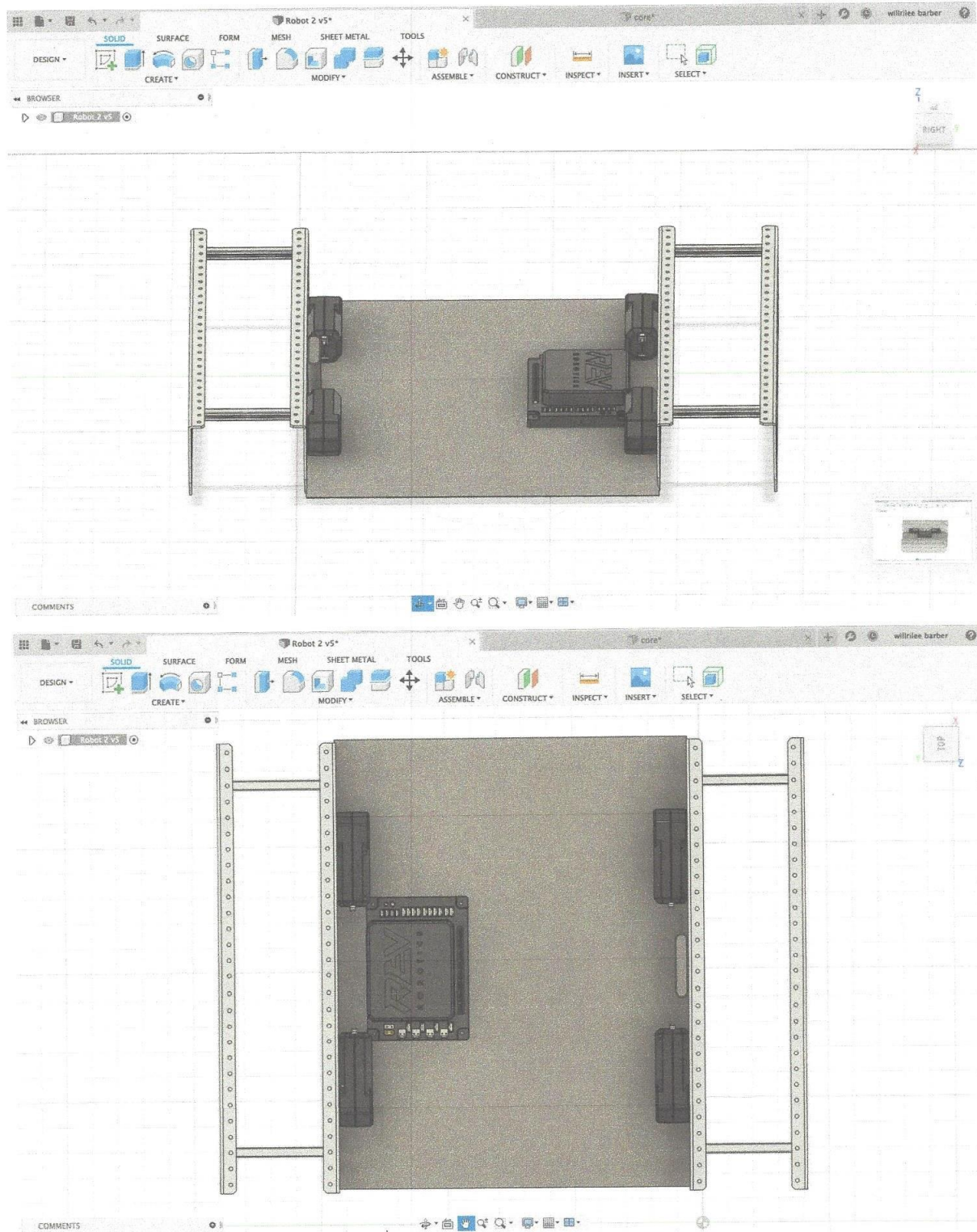


Head On View of Motor & Wheel Placement

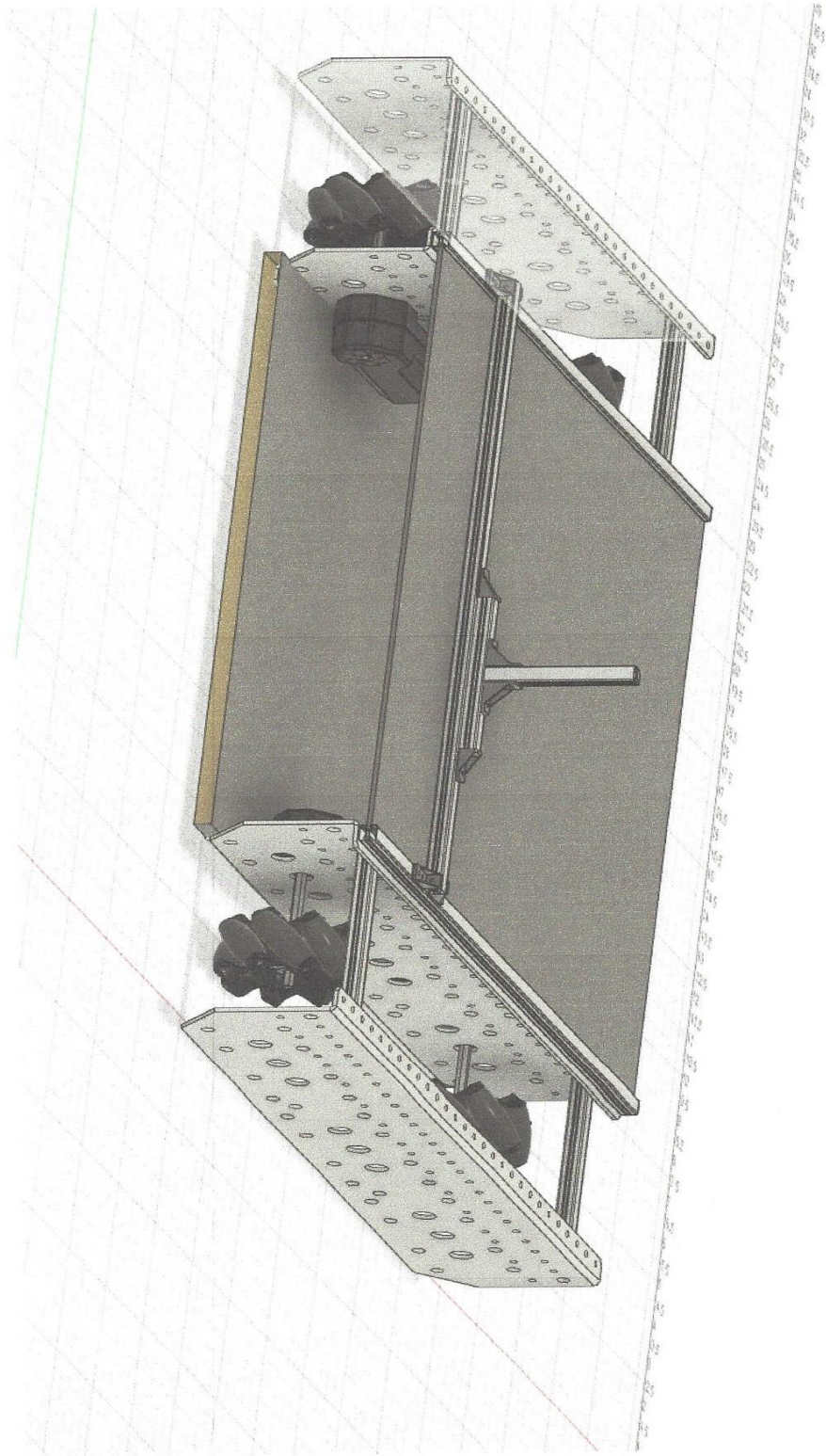
Robot Motor Redesign



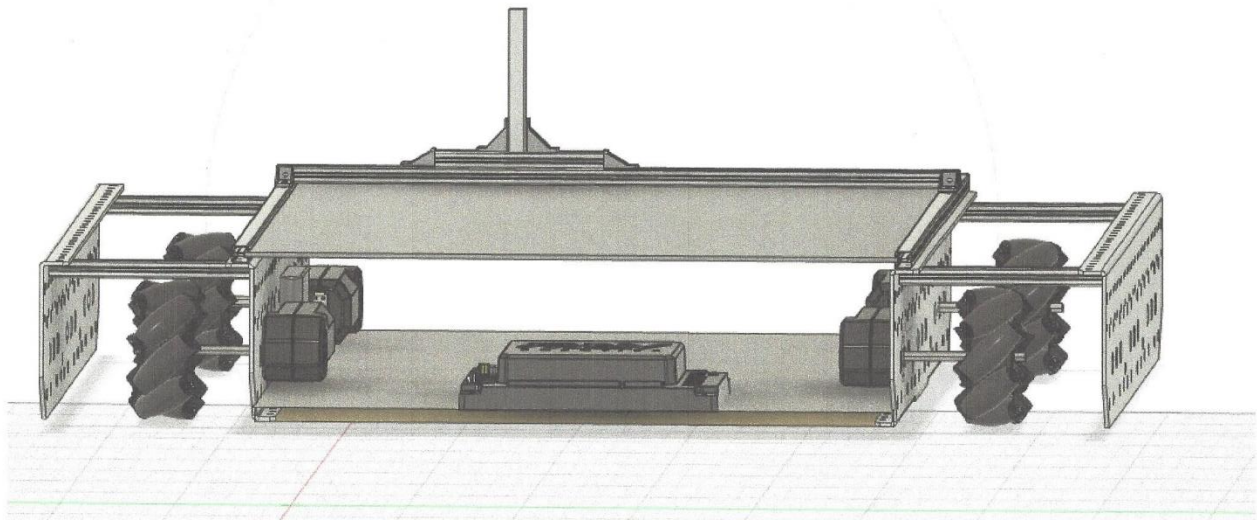
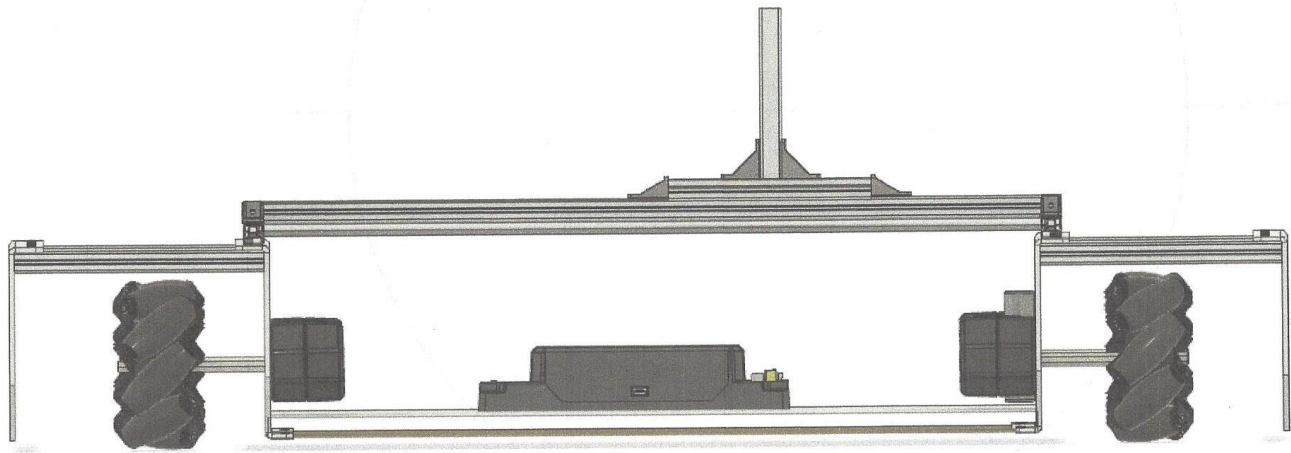
Robot Motor Redesign



Final Robot Redesign



Final Robot Redesign



#14800 - TEAM CYBERDINE

SPREADING THE WORD...



OUTREACH & SUSTAINABILITY

PILOT CODING PROGRAM

This year, Team Cyberdine set goals to raise adequate funds, promote robotics and to increase membership. One of the ways we wanted to do this is to host a mini-robotics camp this summer for elementary students. One of the elementary teachers wrote a grant last year and received 6 Cue robots with markers and mats. We reached out to her to see if she would be willing to share some of them with us to use with the 8th grade classes as a pilot. We were given 3 of the robots to use and it was a resounding success! We are looking forward to hosting our first mini-camp this summer. Below are some pictures from the still on-going pilot project.

Meet “Fist Bumps” AKA...Cue



Figuring out the coding on the phone.



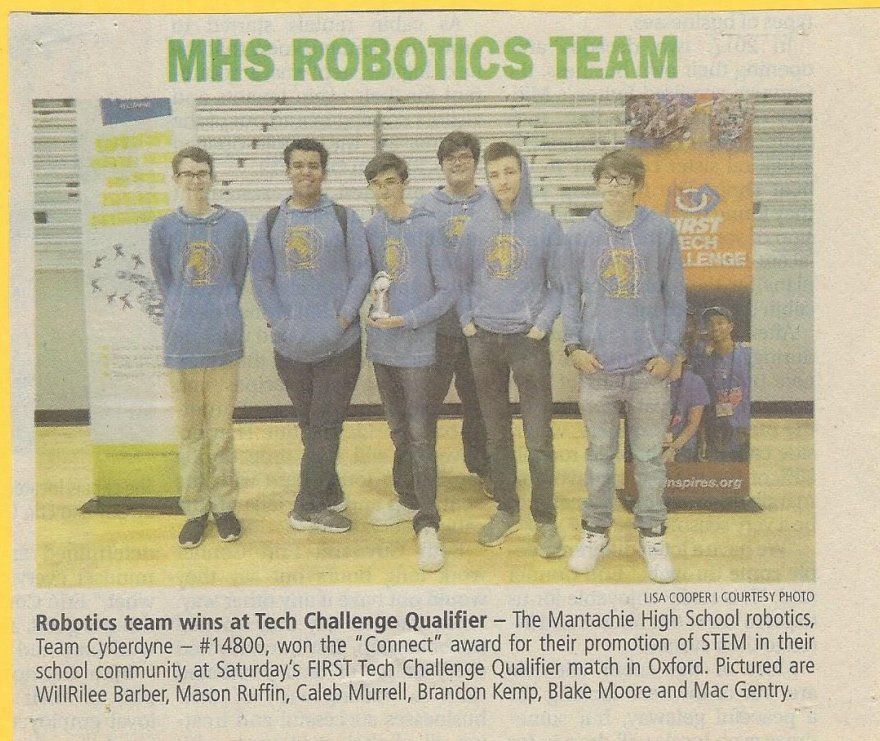
We Got This!

Shapes at last! Getting the coding all figured out.



Sharing the controller.

Itawamba Times
12 / 12 / '19



Publicity Through Local Newspaper

Twitter



#14800 - TEAM CYBERDINE

**IT'S ALL ABOUT THE
BENJAMINS...**



BUDGETING

FIRST Tech Challenge Team 14800 - Cyberdine

2nd Year--Team Season Budget



| Registration, Robot, and Event Expenses | Budget Amt. | Category | Rationale/Explanation |
|--|--------------------|--------------------|---|
| Expenses | | | |
| Program Registration Fee – North America | \$ 306.00 | Registration | Season registration fee. (Required for North America teams). |
| Kit of Parts: Control & Communication Set 2 | \$ - | Robot Supplies | Using the control & communications set from last year |
| Kit of Parts: Electronics Modules & Sensors Set | \$ - | Robot Supplies | Using the control & communications set from last year |
| Additional Parts (not included in last year's kit) | \$ 726.66 | Robot Supplies | Tile runner chassis body, polycarbonate sheet, linear motion parts , mecanum wheel kits and replacement parts. Wanting to try a different wheel type/system from last year as well as different lift mechanism. |
| Tools | \$ 20.00 | Robot Supplies | Needed tool set. |
| Misc. Parts & Supplies | \$ 100.00 | Robot Supplies | Needed storage for parts/pieces |
| Tournament Registration | \$ 150.00 | Event Registration | Fee for two qualifying tournaments - Oxford & Senatobia |
| State Championship Fee | \$ 125.00 | Event Registration | State Championship fees |
| Gas | \$ 375.00 | Travel | Bus charged @ .75 a mile 476 miles |
| Food | \$ 230.00 | Travel | Meals at events/competitions |
| Scoring Elements | \$ 63.00 | Game Supplies | Purchase of partial field with season's scoring elements to practice with. |
| Subtotal | \$ 2,095.66 | | Projected total expenses for the season. Actual Costs may be lower/higher. |

| Startup Funding, Grants, and Fundraising | Budget Amt. | Category | Rationale/Explanation |
|--|--------------------|------------|--|
| Income | | | |
| Grants (Local) | \$ 306.00 | Grants | TVA Grant |
| School or Organization Allocated funds | \$ 391.00 | Income | Asked but No monetary funds available |
| Fundraiser 1 (Business Donations) | \$ 300.00 | Fundraiser | Letter to businesses asking for \$75 donation |
| Fundraiser 2 (Hat's Off Day) | \$ 250.00 | Fundraiser | Student's pay \$1.00 to wear a hat all day |
| Student Fees | \$ 150.00 | Income | Student's pay for their team shirts. |
| EEF Cards (Advisor's cards) | \$ 530.00 | Income | EEF \$ can be spend on any equipment or supplies that are used with the instructional setting. |
| Balance on Hand | \$ 388.00 | Income | Balance from prior year fundraising |
| Subtotal* | \$ 2,315.00 | | Anticipated amount of money coming in throughout the season. Actual amount may be lower/higher. |

**Please note that the above are examples only. Actual amounts will vary and are not guaranteed.*

| Optional Expenses | Budget Amt. | Category | Rationale/Explanation |
|-------------------|-------------|---------------|-----------------------|
| Expenses | | | |
| Game Set | \$ - | Game Supplies | Partial field set up |

| | | | |
|---|------------------|---------------|--|
| Team T-Shirts | \$ 150.00 | Team Supplies | To promote the team and show spirit. |
| Promotional Items | \$ - | Team Supplies | To promote the team and raise funds. |
| Pit Display | \$ - | Team Supplies | Poster boards & supplies to showcase team members, robot build designs, and outreach efforts. |
| Subtotal | \$ 150.00 | | Projected total optional expenses for the season. Actual Costs may be lower/higher, but it's best to plan high. |
| Bottom Line | | | |
| Registration, Robot, and Event Expenses | \$ 2,095.66 | | |
| Fundraising | \$ 2,315.00 | | |
| Potential Optional Expenses | \$ 150.00 | | |
| Credit/Deficit | \$ 69.34 | | Current money still left/Money owed that still needs to be raised (marked in red) |



We posted these at
the Elementary, Jr.
High & High School.

We raised \$250.00
with this fundraiser.

FIRST
RISE
THE FORCE IS BUILDING

Help
Team Cyberdine
Raise \$ for
Competition
By donating
\$1.00
To Wear Your
Hat All Day
THIS Friday,
Feb. 21st

POWERED BY
**STAR
WARS**
FORCE FOR CHANGE

Mantachie High School

310 Mustang Drive
Mantachie, Ms. 38855
(662) 282-4276

Millie Wood
Principal

John Tigner
Assistant Principal

Oct. 7, 2019

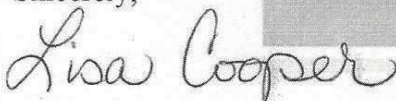
In an effort to better prepare our students for the 21st century workforce, Mantachie High School has started a robotics team where students will not only build a robot from scratch but will also program that robot using different coding languages. We are asking for your support by purchasing an ad spot that will be displayed on a poster at competition as well as on the robot itself. Each ad spot is \$75.00

The money raised from these ad sales will be used for our robotics building supplies and competition entry fees.

We appreciate your support of our school academic programs!

Thank you!

Sincerely,



Lisa Cooper & Team Cyberdine
Mantachie High School ICT 2 Instructor