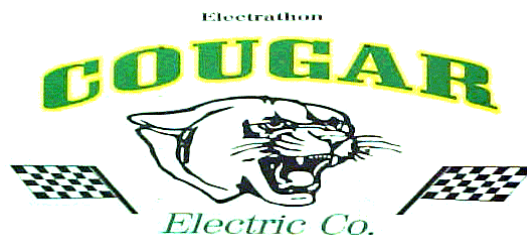


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# Section I

## Team Information/Cover Page



# Kennedy High School

Cougar Electric Car Company

# 983



# 2020

# 2021

Advisor: Barry Wilson

Crew Chief: Colin Flannagan

Driver: Keira Zortman

Battery Lead: Noah Wilson

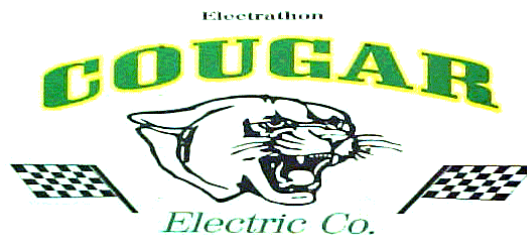
Documentation: Kaleigh Martin

And Elizabeth Severson

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# Section II

## Background Information



# **Kennedy Electric Car (Cougar Electric Car Company)**

## **Car 983, Class 1**

Advisor: Barry Wilson

### Contact Information:

#### School Address

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Kennedy High School  
c/o Barry Wilson (Advisor)  
4545 Wenig Rd. NE  
Cedar Rapids, IA 52402

#### Phone

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Barry Wilson (Advisor)  
(319) 558-1595 (school number)

#### E-mail

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Advisor Email:

[bwilson@crschools.us](mailto:bwilson@crschools.us)

Alternative Student E-mail:

[cougarelectriccar@gmail.com](mailto:cougarelectriccar@gmail.com)

### Website

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[www.cougarelectriccar.com](http://www.cougarelectriccar.com)

### Social Media

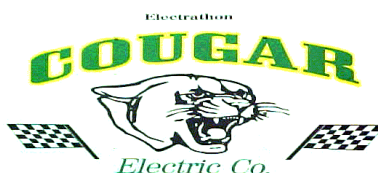
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Facebook:

Kennedy Electric Car Company

Instagram:

@cougarelectriccar



## Electric Car at Kennedy

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John F. Kennedy High School's electric car program is called Cougar Electric Car Company. Our school and program are located in Cedar Rapids, which is in east-central Iowa. Cougar Electric built its first car in 1998 to take part in the 1998-1999 race season. The program was originally held as an after-school class, but starting in 2016, it was added to the normal school day. All of the planning, designing, and assembly is done in the shop by students.

In 2001, Iowa governor, Tom Vilsack, awarded the FINE (First In Nation in Education) award. We were one of five K-12 programs in Iowa to receive this award, as well as the first electric car program in the nation to win a prestigious award in education.



## Skills

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Cougar Electric Company provides an opportunity to learn a variety of soft and Iowa Core skills. Soft skills include problem-solving, communication, and time management. These soft skills as well as the Iowa Core skills below are learned within the program to help students in their everyday lives and futures.

### Iowa Core Skills

- Manage money efficiently by developing spending plans and selecting the appropriate financial instruments to maintain positive cash flow
- Demonstrate critical thinking skills using the appropriate tools and resources to plan and conduct research, manage projects, solve problems, and make informed decisions
- Communicate and work productively with others to increase innovation and work quality
- Adapt to various roles and responsibilities
- Change priorities
- Demonstrate leadership skills, integrity, ethical behavior, and social responsibility while collaborating to achieve common goals
- Demonstrate initiative and self-direction while exploring the ways individual talents and skills can be used for productive outcome in personal and professional life
- Demonstrate productivity and accountability by meeting high expectations
- Listen to establish, maintain, and enhance relationships
- Gain knowledge through problem solving
- Apply and adapt a variety of appropriate strategies to solve problems
- Understand, analyze, represent, and apply problem (problem solving skills)
- Understand and interpret descriptive statistics



## Car History

This car is being newly built for this season, so this specific iteration doesn't have a history, but a version the number 983 has belonged to a car since the start of Kennedy's Electric Car program when it started over twenty years ago. The 983 was transferred from the now-graduated John Tedesco to junior Colin Flannagan as a partially completed frame. This car is both John's and Colin's first time building and designing a car.

As is now tradition, the 983 will be the color grape ape- a bright purple. Four years ago was the first time our crew chiefs were allowed to pick what color their cars were. In years past as an effort to have our cars stand out our advisor had all three cars painted a bright yellow. After years of nagging, crew chiefs were able to pick their own colors and a bright purple was chosen for the 983. This will be the fourth year the 983 will be that color.



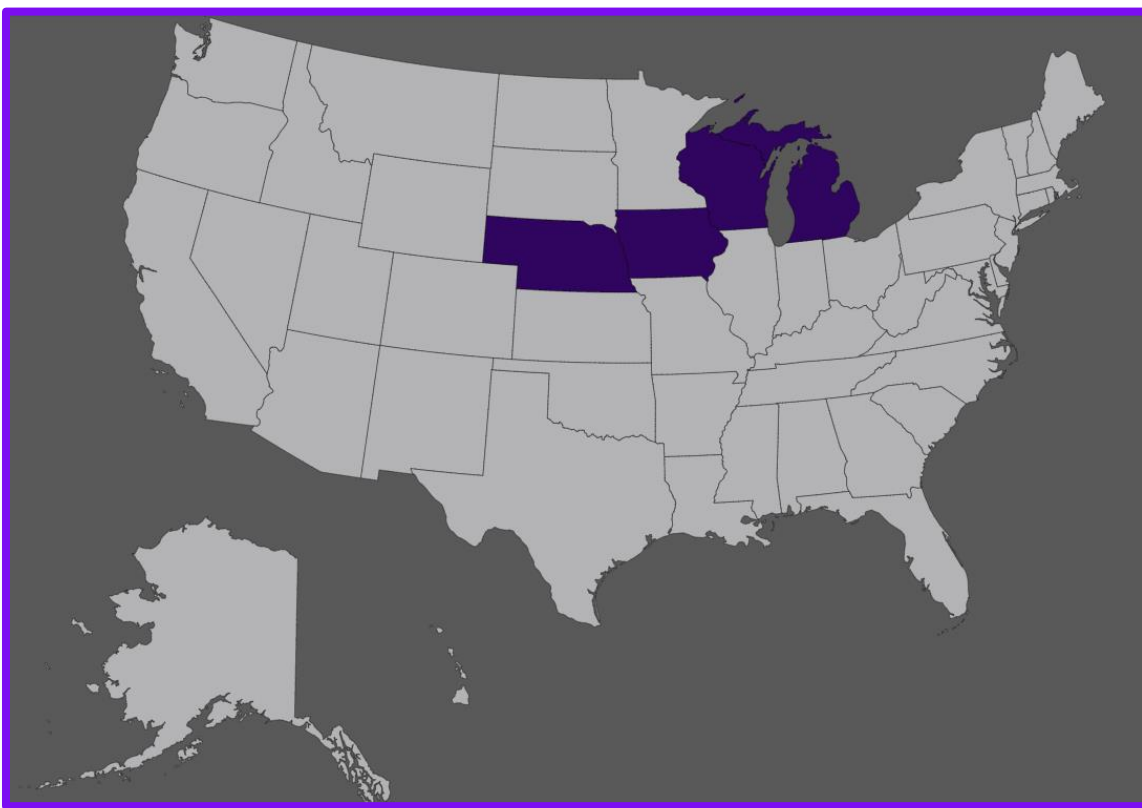
Last year's 983 crew with the partially completed frame.

## 2021 Racing Schedule

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Our team is making an effort to attend every race we possibly can this year. As of now, we are planning on racing in four states: Iowa, Nebraska, Wisconsin, and Michigan.

Race	Location	Date
West Point	West Point, NE	April 17 <sup>th</sup>
Berlin	Grand Rapids, MI	April 30 <sup>th</sup>
Wayne	Wayne, NE	May 1 <sup>st</sup>
Road America	Elkhart Lake, WI	May 10 <sup>th</sup> & May 11 <sup>th</sup>
Hawkeye Downs	Cedar Rapids, IA	May 29 <sup>th</sup>
Prairie	Cedar Rapids, IA	May 30 <sup>th</sup>





## Teams

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Our full program includes ten individual teams a student can be a part of.

We also refer to these teams as jobs, for example, a member of the batteries team can also be said to have batteries as a job. These ten teams fall under three categories: Mechanical Engineering, Electrical Engineering, and Promotions. Within these ten there also traveling and non-traveling teams. Electric Car is a class that is offered during the school day along with being an extracurricular activity. Not every student who is a member of the class travels with the team to races. The travel team consists of the students that regularly attend races. The bare minimum for the travel team has six students: three crew chiefs and three drivers. We usually have at least one parent accompanying us to races so we can bring along assistant crew chiefs, the batteries lead, and the telemetry lead. The latter two may also bring assistants, but the assistant crew chiefs and the batteries lead receive priority. Other students who do not travel also get to experience racing as it is required for students in the class to participate in the race we host every year at Hawkeye Downs. Non-traveling teams are integral to the overall program but do not have a job to do during races.



## Mechanical Engineering

### Crew Chief

Crew chiefs are the leaders of the class, each assigned one car and typically one assistant crew chief. They are in charge of putting all the individual parts together into a working car. They oversee and participate in the designing, building, wiring, and fixing of the cars. This year we are exploring more cooperation and teamwork across the three car teams in our program. In years past crew chiefs have exclusively worked on their cars. This year, while a single crew chief is still responsible for their car and has ultimate authority over their car, however, all three crew chiefs are to help with the design and construction of all three cars. Before, our program only had crew chiefs helping each other with repairs at races, but now they are helping each other in the classroom. At races, crew chiefs are responsible for making sure the car passes inspections, performs to the best of its ability during heats, and handling any repairs that need to be made mid-race or in between heats. Through communication with the driver during the endurance heats, crew chiefs use battery information given to them by the batteries team to pace the car. Crew chiefs are all-in-all responsible for the success of their assigned car for the season. This is the 983's crew chief Colin's second year in the role.



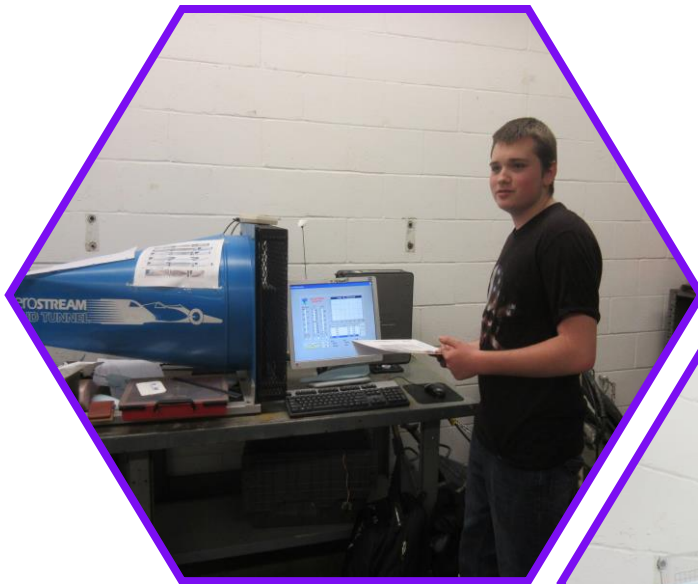
## Machinist

Our machinists work with the lathe and mill to make custom parts for our cars like our back axles and spacers. Both machinists this year are relatively new to the job, but not the program. We typically have older students train the incoming team members, but this wasn't possible for machining this year, so our advisor Barry has been given that responsibility. Given that both team members have limited experience, neither has been labeled 'lead' and the team instead works under Barry's leadership. This is a non-traveling team.



## Aerodynamics and Design

The aerodynamics and design team use a wind tunnel and 1/10 scale models they make of our cars to advise the crew chiefs of the design of their car. They are either telling the crew chiefs where to make their car more aerodynamic, or if the crew chief is making a new car, which parts of other cars to copy, and what parts to do differently. Members are not apart of the traveling team and do their work exclusively in class. The team lead and sole member is Jesse Hempstead.



## Electrical Engineering

### Batteries

The batteries team is responsible for maintaining and caring for our batteries and deciding how to pair them for racing sets. They run a series of tests using our dyno, a device we use to simulating driving, to see how the batteries run down. They use this data to designate 'A', 'B', and 'set-up' sets and create battery curves that tell crew chiefs where voltage should be at different times during races to make sure the car can run for the entire heat. While batteries are in protective storage to extend their life the batteries team is in charge of trailer maintenance. They clean, organize, and make any necessary repairs to the team trailer we bring to races. Noah Wilson is the batteries team's lead and is typically the only batteries team member that travels. If there is space available an assistant may accompany the travel team as well. At races battery team members make sure batteries are on chargers or maintainers, decide which car gets which set of batteries, and are general helpers that can provide another set of hands to help with any repairs.





## Telemetry

Telemetry is in charge of the communication pathways between the drivers, the crew chiefs, and the batteries. They work on the system that relays the batteries volts and amperage during races to both a display in the cockpit of the car and to the crew chiefs in the pits. The main goal of the team this year is finding a way to allow both the driver and the crew chiefs in the pits to see battery and amperage information instead of relying on verbal relaying. This team sometimes travels; at races, the telemetry team makes sure their system is working and tries to fix any issues with the hardware or software that may arise. The current lead is Brian Stubblefield.



## Promotions

### Promotions

Like mechanical engineering, promotions is both an overhead and its own team. Promotions is an outreach team that communicates with both the public and sponsors. Members run our social medias (Facebook and Instagram) and maintain our website. These are used as ways to get the word out about our program, keep in touch with parents and former students, and give sponsors an idea of what the program does. The team communicates with sponsors to secure donations to keep our program running. They also make or organize all sponsor thank-yous. This is not a traveling team, but the team does post-race results on our social medias and website using pictures and information from travel team members.

This year there are no students whose sole job is promotions; the responsibilities of the promotions team are split between members of different teams. Our social medias are managed by our advisor Barry and telemetry lead Brian Stubblefield, the website and sponsor thank-yous are run by the documentation team, and sponsor communications are handled by Barry, the documentation team, and batteries lead Noah Wilson. With there not being any full-time members, this team does not have a lead.



## Documentation

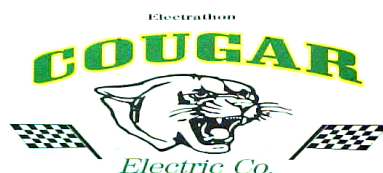
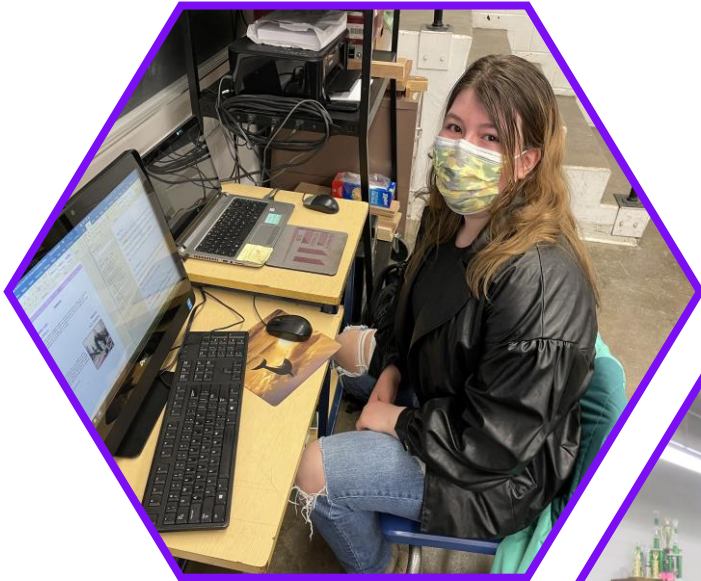
The documentation team is responsible for making the documentation books and monthly log books that are submitted for scores that add to each car's overall season points. Due to the lack of a dedicated promotions team, the documentation team also handling sponsor communications and running the program's website this year. In years past the documentation has an assigned a car to each member to write about with a lead approving final copies. This year the team is working collaboratively on all three car's books. The documentation team does not travel.





## Graphics

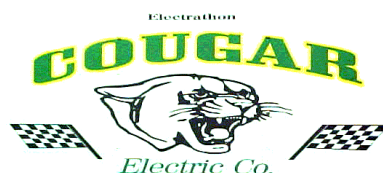
The graphics teams work with a Roland vinyl sheet cutter and by hand to create the graphics for the cars, the travel team trailer, team t-shirts sweatshirts, and promotional materials. The team also designs any graphics that are not sponsor logos. Along with making t-shirts and sweatshirts the team manages all parts of the ordering process and is in direct contact with customers. The graphics team lead is Kaylee Osborn.



## Drivers

As previously mentioned, students cannot be just a driver. Driving doesn't have any class duties, just racing duties. Because of this, the driver's other job is not typically one that is a part of the travel team. Drivers also fill this role outside of races themselves by participating in practice laps, maneuverability runs, and braking practice on weekends when we can use the empty school parking lot. They also attend events to either tell people about driving and the program or to drive in parades or demonstrations.

This year we only have one driver per car for a total of the three drivers. The 983's driver is Keira Zortman, who is only joining the team as a driver this year.



## 983 Traveling Team

### 983 Crew Chief

#### Colin Flannagan



Colin Flannagan is an extremely involved junior at Kennedy High School. He plays football, participates in wrestling and track, and is in show choir on top of being a crew chief in the electric car program. It is Colin's second year as crew chief. Last year he was crew chief for the 985 car, but this year he got transferred to the 983 car. Outside of school and sports, he enjoys fishing and working out. In the future, he would like to play college football at an east coast school while studying for an engineering degree.

**Quote:** "If you break it and blame it on Brian, no one will question you"

### 983 Driver

#### Keira Zortman

Keira Zortman is a freshman this year. Originally hailing from Mississippi, Keira is a bright character who enjoys welding, dirt bike racing, and basketball. She is joining the team as a driver only but plans on officially joining the class next year.

**Quote:** "Jah!"



## Documentation and 985 Driver

### Elizabeth Severson

This is senior Elizabeth Severson's second year on the documentation team, but her third year in the program. In addition to being on the documentation team, Elizabeth is also a driver for the 985 car. However, as the youngest sibling in an electric car family, she has been involved in the program in some way since middle school. Outside of the program, Elizabeth enjoys swimming and piano. She hopes to study agronomy or international food systems after high school.

**Quote:** "We *could* steal Barry's umbrella."



## Documentation and 984 Driver

### Kaleigh Martin



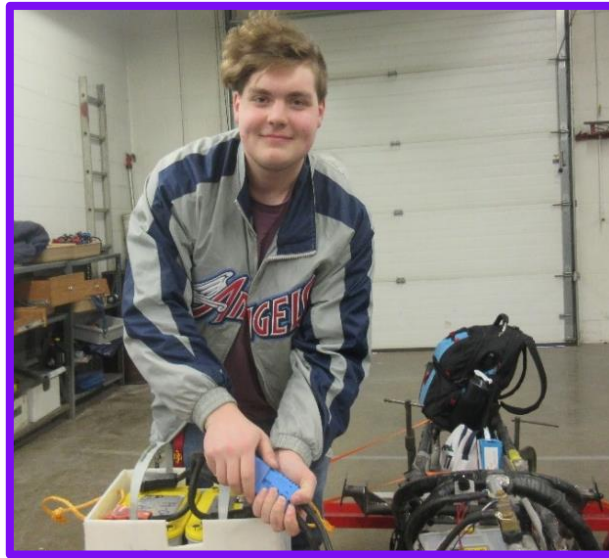
Senior Kaleigh is in her third year in the program and has been the Documentation Lead and driver of the 984 car all three years. She was encouraged by our advisor Barry to join the program so the team could have some fun building our smallest car yet around her short stature. Kaleigh is also involved in our school's Speech team and Green Bandana. She plans on becoming a high school history teacher after her time at Kennedy.

**Quote:** "Tomorrow is a new day."



## Batteries Lead

### Noah Wilson



Noah is a junior who has been with the Electric car program for three years. During his time on the team, Noah has served as the Head of the Battery department and had many trainees come through his program. Whenever he can, Noah tries to have fun and help new members find as much joy in Electric car as they can. You will often find that if Noah has his recruits doing a project or if he isn't directly needed to help in Batteries he will find a way to help another team as he is knowledgeable in many subjects of the shop. Noah proudly calls himself a Thespian as he has been in almost every theatrical performance he could while at Kennedy. Along with Theatre, Noah finds great joy being in the Varsity Show Choir and on the Varsity Bowling Team. An interesting thing about Noah is that his dad is GM at the Cedar Rapids Kernels and Noah has worked as the Batboy for a couple of years, through this Noah has met famous players such as Mike Trout, Byron Buxton, Hofer Trevor Hoffman, and many more. After high school Noah wishes to study Forensic sciences or explore CTE certified teaching as a career.

Quote: "We had a Navy when Barry fought in the War of 1812?"



## 983 Non-Traveling Team

### Machinists

#### Machinist

#### Dylan Davis



Junior Dylan Davis is a great addition to the machinists. Dylan has been apart of almost every team in the program, as he was briefly on the documentation team, an assistant crew chief, a graphics team member, and a machinist. Dylan enjoys playing football and basketball and aspires to work in the trades.

**Quote:** "get 'er done"

#### Machinist

#### Tyler Barz

Junior Tyler Barz is a talented software developer who is fluent in python3 and c# and has been developing for almost four years. Outside of school he enjoys hitting the rink to play hockey. This year he plans on continuing to hone his skills on the lathe as a machinist. He hopes to study computer science and software development after high school.

**Quote:** "Are we in Mormon city? No, we're in Fond de Lac, Wisconsin"



## Aerodynamics

### Aerodynamics Lead

#### Jesse Hempstead



Jesse works as our team's aerodynamics leader, working directly with the crew chiefs and our advisor to design each new car. His prior experience as the 984's assistant crew chief has given him many insights into the program that he plans to bring into his car designs. He plans to join the military after high school.

**Quote:** "I've given up with everything by now"

## Batteries

### Batteries Lead

#### Noah Wilson

Noah's team profile can found on page 18 in the 983's travel team section, as the battery lead is integral to the success of the cars and always travels with the team to races.

### Batteries

#### Colton Staudacher

This is junior Colton Staudacher's first year in electric car, where he works on the battery team. He is heavily involved in band; performing in the marching band, concert band, jazz band, and show choir combo band. In addition to band, Colton also participates in the Kennedy Trap Club.

**Quote:** "I'm not here for a long time, just a good time."





## Telemetry

### Telemetry Lead

#### Brian Stubblefield



Brian Stubblefield, often affectionately called Stubbs, is in his third year as head of the telemetry department. As a freshman, in addition to telemetry, he dabbled in documentation. Ultimately deciding that writing was not his forte, he returned to telemetry in his sophomore year and has now tried his hand at electric engineering as a junior. He plans on attending the paramedic program at Kirkwood Community College after high school, with the goal of joining the Cedar Rapids Fire Department. In his free time, you can find him training for cross country and track, as well as working at Hyvee.

**Quote:** "Barry, I'm gonna go run."

## Documentation

### Documentation Lead and 984 Driver

#### Kaleigh Martin

### Documentation and 985 Driver

#### Elizabeth Severson

Both team profiles for our documentation team members can found on page 17 in the 983's travel team section, as both of our documentation writers are also drivers.



## Graphics

### Graphics Lead

#### Kaylee Osborn



Freshman Kaylee Osborn is a new addition to the electric car team this semester. She was originally interested in the program as a middle schooler, as her older brother participated as a crew chief. As a talented artist and writer, she will be trying her hand at leading graphics as well as simultaneously being an understudy for the documentation team. She is also involved in volleyball and dance at Kennedy.

**Quote:** "Just be yourself; everybody else is taken."

### Graphics Lead

#### Trevor Montgomery-Provencher

Trevor is now a sophomore in his second year as a part of the graphic design team. Trevor enjoys the methodical and careful work of peeling and placing the vinyl graphics and prides himself in making very few mistakes in his work.

**Quote:** "Work slow and smart, nor fast and dumb"

