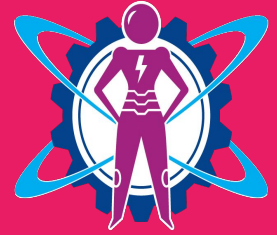
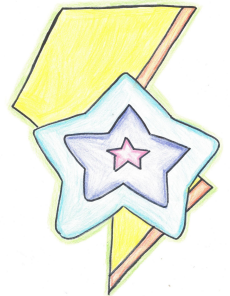




# How Girl Powered transforms us into the VEXcellent Girls



Submitted for 2020 Girl Powered Online Challenge  
VRC Team 47114A



# Introduction

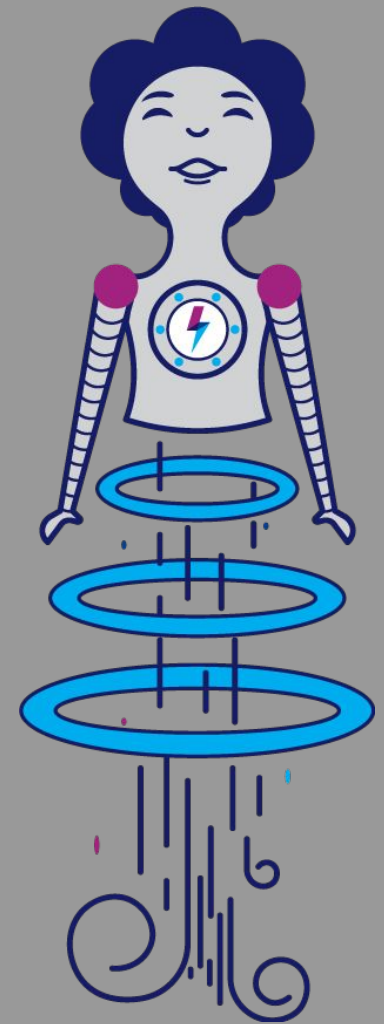


We are five 6th grade girls in Great Neck, NY that have different talents and interests. Through Girl Powered, we are united and transformed into the VEXcellent Girls, the first all-girls VEX team in our town.

We share our love for robotics and we have come a long way to compete in VEX VRC this season. Doing robotics involves a lot of hard work in designing, building, and programming, and sometimes we don't succeed. It's not easy for girls and competing as all-girl team is even harder. How do we persist and gain experience through all these years? Through Girl Powered.

Girl Powered is a belief of diversity and inclusion. It encourages us when we encounter obstacles. We see the values of Girl Powered living well throughout the human history. We see the values in our STEM role model, Marie Curie, who lived almost 100 years ago.

Our interaction with Girl Powered is two-way. We are persistently spreading the magic by hosting workshops to attract more girls with diverse background to robotics.





**Chloe Ning**

**Team captain  
and programmer**

*Some of my hobbies  
are reading, playing  
the clarinet, and  
writing.*



**Julia Xu**

**Builder and  
driver**

*In my free time, I  
like to draw, read,  
and swim.*



**Ellen Zhang**

**Engineer and  
ambassador**

*Some things I like  
to do are singing,  
drawing, and  
crafting.*



**Avery Chen**

**Engineer and  
designer**

*I enjoy doodling  
and playing the  
violin.*



**Jessica Cao**

**Building  
assistant and  
engineer**

*I like to draw and ice  
skate.*

**Our Diverse Team: The Vexcellent Girls**

# VEX Robot + 5 girls + Girl Powered = VEXcellent Girls

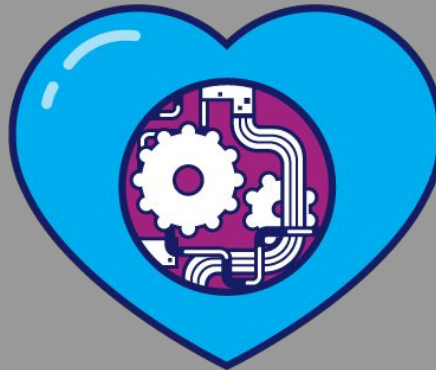


We meet weekly in our local community center. There, we share our ideas and work on our robot.

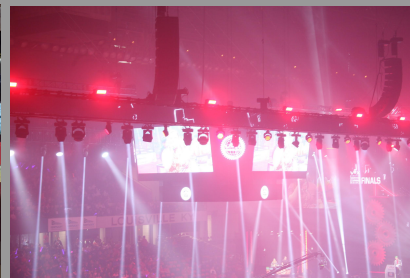
In October 2019, our team attended the first-ever Google hosted Girl Powered NYC workshop. We gained more experience, made friends and met other empowered girls.

# Tower Takeover Season

Tower Takeover is our first season in VRC. Though most of our teammates have been in VEX IQ for the past two seasons, we still face many new challenges. We learned how to cut shafts, trim aluminum C-channels and successfully build our first competition robot using the double reverse 4-bar design.







# 47114A's Journey in Robotics

**April 2014**

Our mostly girls' team was invited to JR FLL World Festival.

**April 2019**

Competed in VEX IQ World Championship.

**October 2019**

Hosted our 2nd annual Girl Powered robotics workshop at our community center.

**Future**

We will host more workshops to help girls, minorities and underrepresented kids to introduce them to robotics.

2014

2017

2018

2019

2020 - Beyond

**March 2017**

Competed in the VEX IQ state championship of Southern New York.

**October 2018**

Hosted our first Girl Powered robotics workshop.

**June 2019**

Hosted Girl Powered inspired event at the town library STEM lab.

**September 2019**

Built our first VEX V5 robot and competed in a qualifying event.

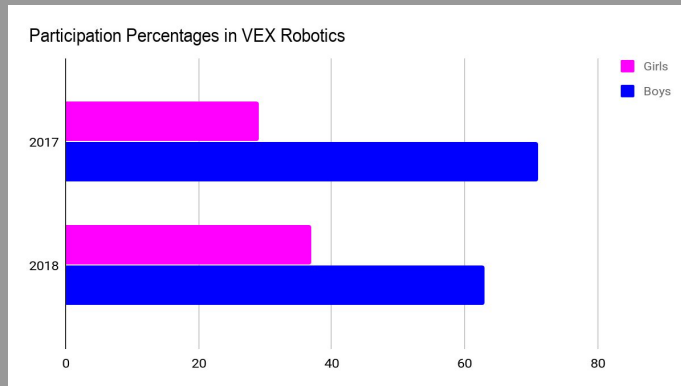
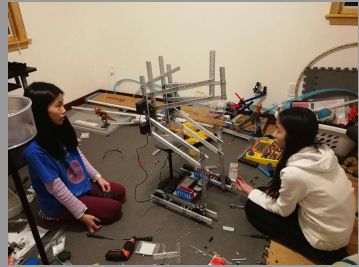
**October 2019**

Attended Girl Powered workshop at Google NYC office.

# Girls are under-represented in robotics

It's no secret.

Girls are more likely given supporting roles in a robotics team. The boys get the building and programming, and girls get the notebook. Girls are usually known for good writing and drawing skills, organization and neatness. But that's not the whole truth. We strongly believe that every girl is unique. Girls can do more if they are given the opportunities. In our team, girls fill ALL the roles: driving, building, designing, programming, and writing the notebook.



In 2018, the percentage of girls in VEX robotics was only 37%. It is improved from 2017's 29%. In our team? The percentage is 100%.



# What is Girl Powered?

Girl Powered is a cause dedicated to accepting our differences and encouraging others to believe, despite our differences, we are all important. Our team represents this diversity through our different skill sets, hobbies, and approach to obstacles. These differences are what define our team, and we think of that every time we declare that our team is Girl Powered.

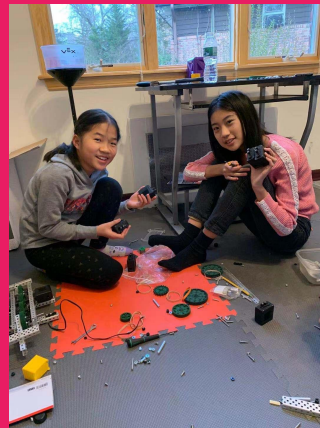






## What being “Girl Powered” means to us

To us, being “Girl Powered” means accepting diversity, acknowledging the fact that we are all different, we have different skill sets, and that we have different talents. But more importantly, to us, being “Girl Powered” means believing that if we combine our forces, what differentiates one person from another is what will make us more successful together than apart. Our different hobbies and personalities will help us be more productive, as splitting the work is always faster than doing it all yourself.

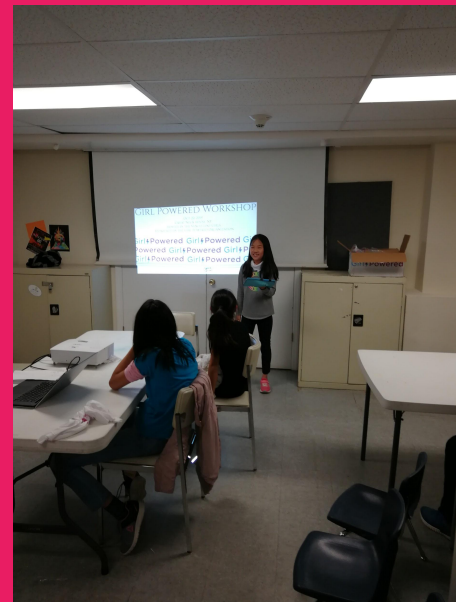




## How Girl Powered changed our perspective

Girl Powered has a direct impact on our design process. As we feel empowered, we are more willing to keep open mind to “implausible” ideas and be ready to learn from failures.

One example: we were brainstorming ideas to improve drivetrain design at one point. One teammate thought of adding chains on our drivetrain, but the chains were known to be not sturdy. Instead of dropping the idea, we were thinking harder to tackle the problem. Our final design was a refined design including 2 chains, one for backup, hence having the sturdiness problem solved.





## How we empower other girls, one robot at a time

It's as easy as 1-2-3!

**1** We have inspired 1 team to participate in VEX IQ.

**2** We have been hosting Girl Powered events in our community for 2 years in a row.

**3** We have hosted 3 STEM workshops altogether at our local community center and library STEM lab.



# Marie Curie: our STEM role model



The evolution of STEM over a century

## Early 1900s

“The golden age of physics”

*Physics was the center of STEM research to advance human knowledge to understand the world and the universe.*

## 1990s - Early 2000s

“The Internet age”

*The Internet was built and became a center stage for STEM. A connected world is a better world.*

## Now

“The age of AI and robotics”

*We are all researching new technology to design and build robots to help human beings. Moving forward is the new hello world.*

Our STEM role model is Marie Curie, the first woman who ever took the position of Professor of General Physics in the Faculty of Sciences and the first person to receive 2 Nobel Prizes. She always kept going and accomplished many firsts, but it was her determination that made her our role model.

In the past 100 years, the focus of STEM changes a lot. She inspires and encourages us greatly by those values that do not change over time, such as persistence and determination.





# Conclusion

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We love robotics. We love the the design process, competitions, programming, and building. We strongly believe there are many, many girls out there who share that love. There are far fewer girls than boys actually involved in VEX at all levels. Increasing the inclusiveness is the key to narrow the gap. We are one of many teams that are inspired by Girl Powered and we demonstrate that we can contribute back. If we can, you can, too.

This season is our first year in VEX EDR. We learn all that we can, try as hard as we can, and go as far as we can. Robotics means more than winning a trophy to us. VEX gives us once-in-a-lifetime experience as we have fun and feel empowered. We appreciate all the help from our parents, coach, and community. Last but not least, we thank Girl Powered for inspiring us and accompanying us on our journey in VEX.



# Credits

Title: How Girl Powered transforms us into the VEXcellent Girls

Team number: 47114A

Level: VRC, middle school

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