S T E M
Savvy
GENEALOGY V. III SPRING 2020

Brought to you by:
Gearbox Girls &
FRC Team 5414
Pearadox

CREATIVE • CONFIDENT • CAPABLE

GIRLS IN STEM

Science, Technology, Engineering, Math

EDITOR'S NOTE

•VOLUME 3•

GENEALOGY ISSUE

ABOUT US

Creative - Confident - Capable

This magazine seeks to fill a role being neglected by most media. By using art to communicate the wonders of STEM, we can give girls access to a magazine that not only encourages, but sustains their interest in STEM.

Cheers,

Gearbox Girls of Pearadox

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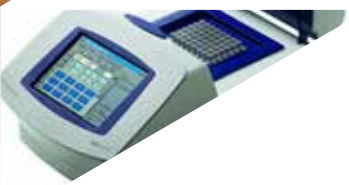


INTERVIEW

TANYA EBLE

GENETIC COUNSELOR

The Baylor College of Medicine
5 years in the field

by: Julia Rieger

Q: What is your current career and what do you enjoy about it?

A: *"The National Society of Genetic Counselors defines genetic counselors as "professionals who have specialized education in genetics and counseling to provide personalized help patients may need as they make decisions about their genetic health." Genetic counselors work in settings, from hospitals and academic medical centers to commercial laboratories. We can get involved in research, clinical care, education, or mix and match roles to suit our interests. It's a very dynamic field with many opportunities. Genetic Counseling was ranked as the #1 job in 2018 by careercast.com.*

When providing genetic counseling in a clinical setting, we help provide information and support for patients seeking information about their risk for disease or recurrence of disease, genetic testing options, and the implications of genetic test results on future health and disease management. Discussions often include understanding risks for their children and other family members. A major goal is to help individuals understand often complex medical information and make informed decisions about their health.

"If you want to a STEM field but by how much then embrace and use it to drive investigate,

Personally, I enjoy the puzzle of trying to piece together various aspects of a person's medical history, lifestyle, and family history to understand if they may be at risk for a genetic condition. I also feel the field is very fulfilling because we can help people to be empowered to understand more about their health and make informed decisions based on their own beliefs and values. I feel very blessed to have a career that allows me to talk about something of great interest to me and to work with people who constantly challenge and inspire me."

GENETIC COUNSELOR

Q: How did you get interested in STEM? Was there a specific instance where you realized you wanted to work in the field?

A: *"I was fortunate to have some really supportive and engaging science teachers. One teacher noticed my interest and started a Genetics course – for a semester, I was the only student in that course! In college, I found an undergrad research position in a lab. I am so thankful for that opportunity, in part because I learned a lot more about genes and laboratory methodology, but more so because it helped me to see that I did NOT want to work in a laboratory.*

I'd never heard of genetic counseling. I saw a flyer in the guidance office and decided to check it out. The combination of genetics, psychology, and healthcare turned out to be a perfect fit for me. One thing I learned is that it's a good idea to "try on" different career options for size – join clubs, take on internships, go to talks, apply for research positions or volunteer. Through these experiences you'll find out more about yourself, what drives you, and what excites you."

get involved in feel intimidated there is to learn, that awareness you to study, and explore."

Q: Was there another field you thought you would be in or was STEM always your top interest?

A: *"I grew up in a very rural area. There didn't seem to be many career options available, or if there were, I wasn't aware of them. I love gardening and thought I would study how genes affect crops.*

With this idea in mind, I applied to and was accepted into a summer program at Penn State University the summer before my freshman year. It was a general biology program but there was a strong emphasis on genetics. During college I spent some time working in a greenhouse and a tree genetics laboratory. But I also did volunteer work in a hospital and I volunteered as an HIV test counselor. I realized that my true passion lay in talking with people about their health and breaking down complicated information to help people make informed decisions."

Q: Some may consider STEM a "boy's thing". What is your response to this?

A: *"Women make up more than 90% of genetic counselors, so the assertion that STEM is a "boy's thing" doesn't hold up in this career. But beyond that, I have to ask, why are we still thinking about fields in terms of "boy jobs" and "girl jobs?"*

Do you want to help people? Are you fascinated by developing technology? Do you enjoy learning new things? Do you want to take complicated medical jargon and make it understandable for others? If you answered yes to some of these questions, then whether you're male or female, maybe a career in genetic counseling or another STEM field could be right for you."

Q: Is there anything you want girls who may be intimidated by STEM to know? If you ever felt this, how did you push through it?

A: *"In STEM fields, there are always new developments. If you want to get involved in a STEM field but feel intimidated by how much there is to learn, then embrace that awareness and use it to drive you to study, investigate and explore. STEM is great for people who are curious and open minded. Seek out people who support and motivate you and remember to lend a helping hand and kind word to your fellow women in STEM."*

BIOLOGY is known as the study of life, and contains an incredibly diverse selection of careers. If genealogy is a possible interest to you, there are many other similar (and not) options you could look at too!

by: Julia Rieger

Pharmacist

Doctoral or Professional degree

Pharmacists work to make, dispense, and council people about safe and effective medication. Interest in medicine, chemistry, and communication.

Wildlife Biologist

Bachelor's degree

Wildlife Biologists study and observe animals to determine their traits, behaviors, and impact on humans/vise versa. Interest in animals, ecosystems, and data collecting.

Registered Nurse

Bachelor's degree

Nurses do various thing to assist the doctor, such as dressing wounds, helping during exams, or assessing and collecting data on patients. Interest in communication, data collecting, and medicine.

Physician

Doctoral or Professional degree

Physicians can be many things—doctors, surgeons, medical practitioners. What they all have in common is a practice in medicine and maintaining people's health. Interest in medicine, health, and research.

Educator

Bachelor's- Doctoral degree

Educators work to teach others about a subject, in this sense, biology. It could be a school teacher, professor, researcher—anyone who "educates". Interest in communication, teaching, research.

This issue's interviewee and genetic counselor, Ms. Tanya Eble, noted that ""Having to deal with it all" has long been a catch phrase for women [in STEM] who juggle careers and family life, but having so many balls in the air can come at a price."

Self care is necessary for a healthy mental space. Though it is becoming more normalized in society, many of us are still far from true peace and happiness with ourselves. Practicing self care regularly will not only give you peace of mind, but more compassion to give the world.

Self Care Challenge #2

Exercise

by: Anna Guo

For those who aren't involved in a some sort of sport or activity, it can be hard to find the motivation to get up and move, especially as one grows older and becomes more bogged down with work and extracurriculars in school. Exercising is very important though, for physical and mental health. Action can both stimulate and allow the mind time for itself, giving you more energy to work and making you more efficient.

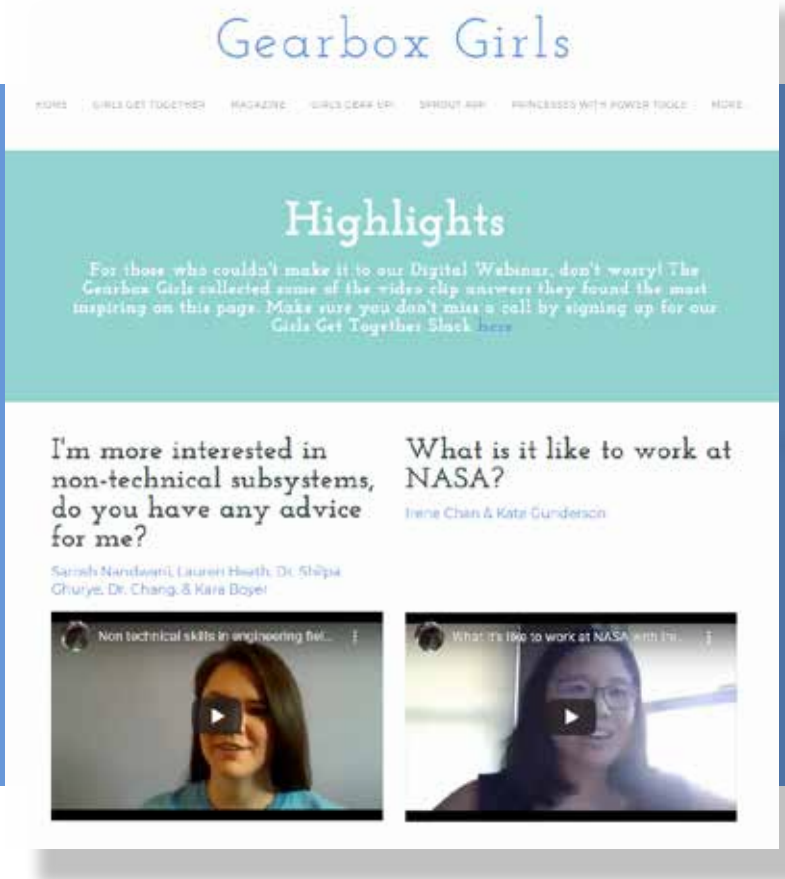
There are many different ways to exercise, so hitting the gym is not the only way to be healthy. Find something that works for you, like jumping up and down with your backpack at the bus stop while you wait for the school bus, or dancing to a play-list of your favorite songs. If you do your homework on the floor, you could try to do the V-sit and reach stretch while you complete your homework. The options are limitless!

QUARAN-TEAM

Digital GGT

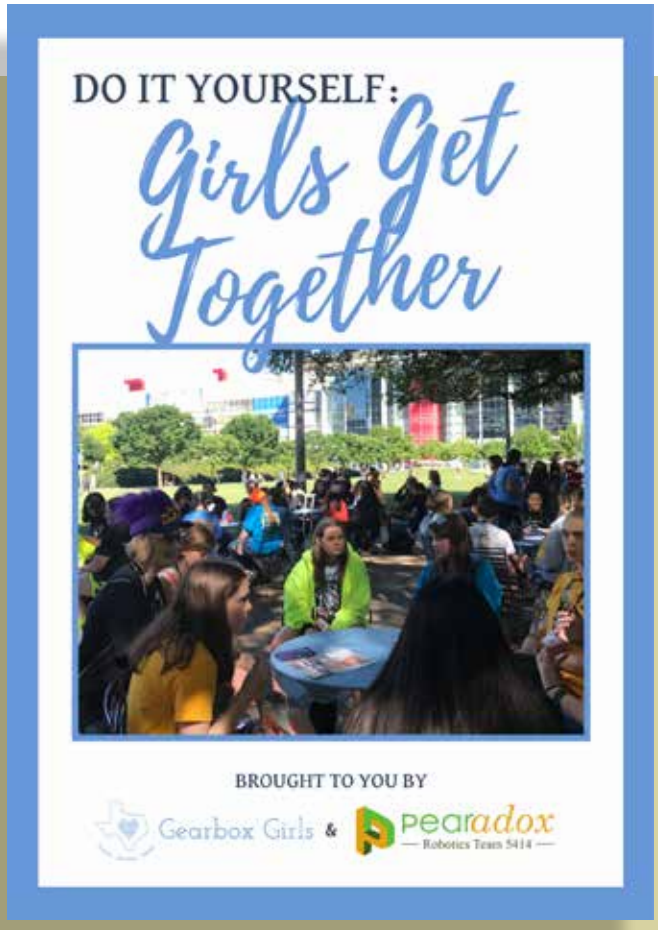
We didn't want the fun to stop during quarantine! The Gearbox Girls held a Digital Girls Get Together Panel to get excited while at home. We worked hard to transfer our normally in-person event at our FRC robotics competitions onto a fun interactive online section!

SCAN THE QR CODE TO CHECK OUT OUR DIGITAL GGT HIGHLIGHTS!



QUARAN-TEAM
DIY GGT

by: Julia Rieger



Our D.I.Y. Girls Get Together has everything you need to know on how FIRST Robotics Teams or similar programs can start their own Girls Get Together events!

SCAN THE QR CODE TO CHECK OUT OUR D.I.Y. GGT!

Why is this effort important?

There is and has always been a noticeable gender gap in STEM fields—and it is *not* due to lack of interest.

by: Julia Rieger

The Gearbox Girls run many initiatives about introducing and sustaining girl's interest in STEM (science, technology, engineering, and math), but it is important to slow down and look at the reason why this effort is important. Though the number of women entering the STEM field has grown significantly in the last 5 years, fields such as engineering, physics, and computer science have a female employment rate of less than 20% (according to the Bureau of Labor Statistics). We believe the reason for this is not a lack of interest or talent in the subjects, but a lack of support, motivation, and normalization from society.

This leads to our attempts at closing this gap, first within our community, and later throughout our nation and world. STEM Savvy was not our first project relating to this mission—in fact, it was not our second or third either. Before we even dreamed of publishing our own magazine, we hosted events connecting girls and engineers, called our Girls Get Togethers. We donated food to women's shelters and invited Girl Scouts to drive our 120 pound robots; we even worked to teach girls how to build their own Lego robot at a summer camp! Then, our team's co-captain, Anyssa Castorina, and mentor, Kara Boyer, had the idea to branch out from face to face interactions and reach even more people.

We wanted to reach girls through a fun medium, and the magazine was perfect. We created STEM Savvy not to just to show a girl that women can succeed in STEM, but to relate to her, to tell her it could be her. We wanted to push

the Gearbox Girls mission statement of proving every girl can be creative, confident, and capable enough to pursue her interests—whether it be engineering or nursing or even genealogy. We love that through these interviews and tool introductions and activities, we can give them a glimpse of what their future could be.

But why did we choose a magazine? The reason means a lot to all of us. We wanted a method of spreading our message to everyone, to prove that your future doesn't have to be determined on the education, materials, or means you have right now. We also wanted a cheap medium that would allow us to be able to give them away for free, and something that could engage our own girls in the creating process. We care so much about inclusivity that we had team members translate the issues into Spanish and Chinese, allowing us to ship them out internationally.

But most of all, the reason why we do this is because we have seen the effect it can have on girls. When their eyes light up after seeing one of our Gearbox Girls on the cover, or when they shout "I want to build robots now!", we realize the incredible impact we get to have in these girls' lives.

THE BREAKDOWN:

WOMEN ARE...

STEM

- **13% OF ENGINEERS**
- **43% OF SCIENTISTS**
- **26% OF PROGRAMMERS**
- **50% OF PHYSICIANS**
- **22% OF PHYSICS MAJORS**
- **28% LESS PAY THAN MALE COUNTERPARTS**

STEM

Studies taken from the National Science Foundation, the Society of Women Engineers, the University of Cornell, and the American Association of University Women

Genetic Counseling Tools n' Terms

by: Sara Estrada

Polymerase Chain Reaction

Polymerase Chain Reaction is a commonly used method to quickly make millions of copies of a DNA sample to amplify it enough for study. This process is essential in a thermal cycler and is commonly used in medical or biological research labs.

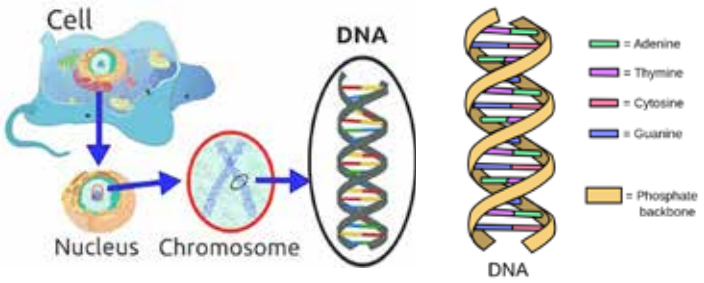
What is a Thermal Cycler?

A thermal cycler is a device used to amplify DNA. For a DNA sequence to be tested it must be amplified, which means multiple copies of it are made so they can be better observed. Thermal cyclers conduct DNA amplification by raising and lowering temperatures in a pre-programmed manner to re-shape the DNA.

Why is this important?

Interpreting your DNA can reveal many hidden traits about yourself. You can discover lost relatives, learn your ethnic origins, and even tell how well you are aging! Your telomers are little caps at the end of each strand of DNA. Telomers shorten as we age, but unhealthy life choices can cause them to pre-maturely degenerate. So, DNA testing can even be a general gauge of how healthy you are.

DNA



DNA (deoxyribonucleic acid) carries genetic code that determines everything about us, from our eye color to our personalities. DNA is commonly tested through saliva, hair, skin, and blood.

EVER WONDERED?

Can you have blue eyes if both your parents have brown eyes?

To find out, let's use a punnet square. If both parents have the genotype Bb, their child has 3 genotype possibilities: BB, Bb, and bb.

	B	b
B	BB	Bb
b	Bb	bb

Since b (blue) eyes are recessive, the trait will only pass if there are two of them. So the baby has a 25% chance of having blue eyes. (Remeber, capital letters are dominant, so they always win)

In short, yes, you can have blue eyes if both your parents have brown eyes!

PEARADOX 5414 SPOTLIGHT

by: Kayleigh Weldon

Pearadox 5414 is a high school FRC robotics team that builds industrial- sized robots, participates in global competitions, and teaches teenagers invaluable skills. Students on Pearadox are immersed in an environment that allows them to be mentored by profession engineers while we work together to overcome unique challenges. Pearadox is not only about building robots- chairmans, marketing, and business are extremely important subsystems on our team. These subsystems handle sponsor relations, branding Pearadox, and making sure our team is reaching out to our community and the world. Pearadox has many initiatives to introduce girls into STEAM (Science, Technology, Engineering, Art, and Math), like the Girls Get Together, an event we created to network girls and engineers, and this magazine,which we made an improvement the lack of career- focused girl magazines.

REACHING OUT TO OUR COMMUNITY

Pearadox knows that our goal may be to build a robot, but our mission is so much more than that. We strive to reach out and make a lasting impact on the students, parents, and teachers in our community. We do this to educate and enable not only the hundreds of students that pass through our program, but also for the thousands of people who may not feel motivated, confident, or capable enough to follow their dreams. Pearadox has reached a total of 30,000 people and counting through this initiative, and students have spent more than 5,000 hours out in our community, making a difference.

JOIN PEARADOX ON OUR ADVENTURES AT OUR

UPCOMING EVENTS

by: Julia Rieger

Texas Robotics Invitational (T.R.I.)

JUNE

T.R.I. is a small scale robotics competition hosted by the FRC team Spectrum #3847. It is more fun and quirky than our other, more serious competitions, and because of that, has a series of fun "mini" competitions. One of them is the all-girls drive team round, which poses a fun challenge for teams to make all drive team roles (the most important) filled by girls. Join us, it's free!

Introduce a Girl to Engineering Day

FEBRUARY 21

February 21st, Introduce a Girl to Engineering Day, is something us at Pearadox celebrate and take full advantage of. We post videos annually covering the intimidation many girls feel in STEM, and how to push through it. We also publish tool introductions, personal stories, interviews, and room tours to our YouTube channel— Pearland FRC 5414

Digital Girls Get Together

The Girls Get Together is an event ran by Pearadox and the Gearbox Girls designed to help girls network with real women engineers. In light of social distancing during Covid-19, the Gearbox Girls started a Digital GGT Webinar Panels. Check out highlights from the webinars and future event dates at our website: gearboxgirls.weebly.com.

Girls Gear Up!

If your girl scout troop is interested in earning their robotics badges , you can sign up for a class on the "Girls Gear Up! " page on our website for FREE! (depending on skill level required, cost for materials may vary).

For more information on F.I.R.S.T. and robotics, visit www.pearadox5414.org or www.firstinspires.org

ACTIVITIES

Try to answer these biology trivia questions! Check to see if your answer is correct at the bottom of page 15.

A. What is the hardest bone in the human body?

B. How many bones are human babies born with?

C. How many different types of cells are in our bodies?

D. Which branch of science helps us take a closer look at cells?

Make your own candy DNA model with this at-home science activity!

Scan the QR Code for the full tutorial from Little Bins Little Hands!

All you need are:

-Twizzlers/long candy

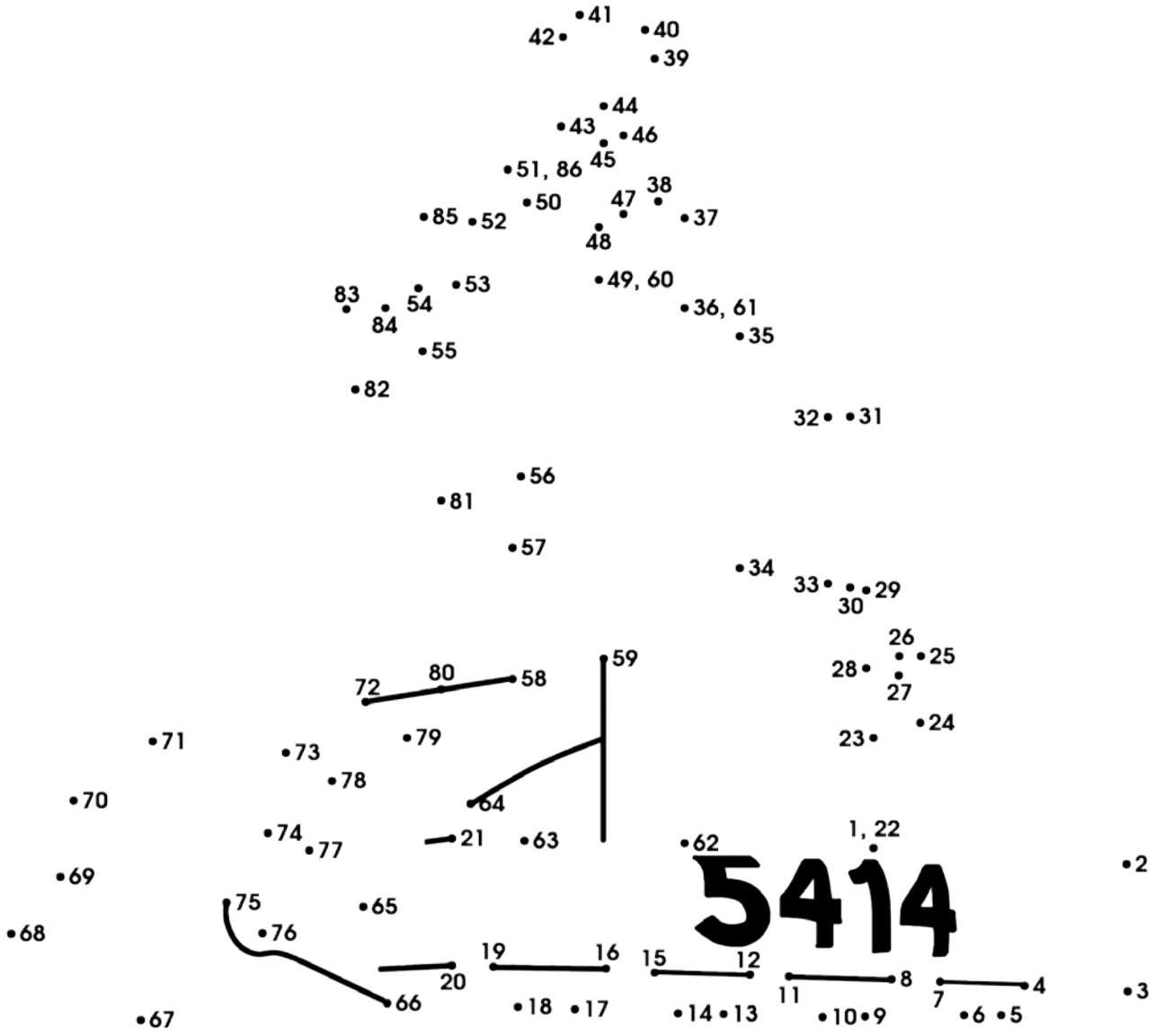
-Soft candy in 4 different colors

-Toothpicks

-A sweet tooth!

AND GAMES

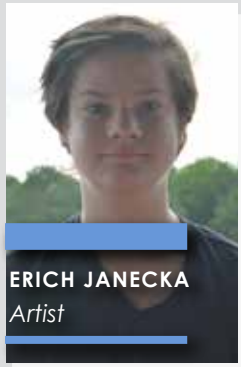
Connect the dots to make Pearadox robotics team's 2019 robot: Waste Management!

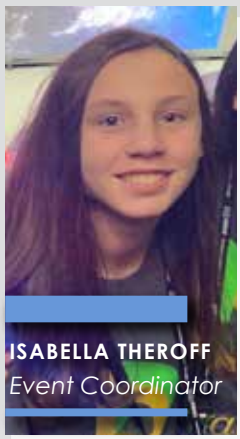


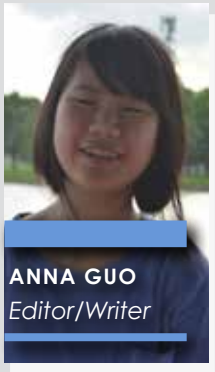
A. The Jawbone B. 300 C. 200 D. Microscopy (like microscope!)

MEET THE GEARBOX GIRLS

RESPONSIBLE FOR CREATING THIS ISSUE







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