STEM

Savvy

VOLUME I 5414 JANUARY 2019

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

CONFIDENT • CREATIVE • CAPABLE

GIRLS IN STEM

Science Technology Engineering and Math

• VOLUME 1 •

MECHANICAL ENGINEERING ISSUE

ABOUT US

This magazine seeks to fill a niche role being neglected by most magazines. We want to give adolescent girls access to a magazine that helps their interest in STEM.

Cheers,

Gearbox Girls & Pearadox

INTERVIEW
KARA BOYER
Mechanical Engineer

by: Anyssa Castorina

Age: 31
Job Title: Mechanical Integrity Engineer
Company: PinnacleART

Q: Do you have any specific experiences from your childhood that cemented your interest in STEM?

A: *It is hard to pinpoint the very first time I knew I wanted to pursue STEM. I was fortunate to have a dad who was an engineer, and he would do small things like point out how things work and invite me to the annual "take your daughter to work day". At these events, I remember being so intrigued with how things work and the people that make them work. I met so many nice engineers who were excited to tell me about what they do. I remember loving the feeling of being around people who were so happy with what they do and who enjoyed learning new things in the pursuit of making things work. I felt happy, excited and driven every time I visited. Soon all the library books I wanted to read were science-based, and then I joined an after school robotics program where it became clear that I was not interested in pursuing anything other than mechanical engineering.*

Q: What factors influenced your choice of major?

A: *It's actually completely random how I stumbled on the program that has had the greatest impact in my career. My sophomore year of high school I was attending a College Expo intending to only talk to college reps when I saw a person I knew from school. I went to say "hi" and found out he was there promoting our high school's FIRST Robotics team. When he asked if I wanted to join, I said that I really didn't know anything about robots. When he said that he works with engineers after school who will teach me everything I need to know, I figured there was no harm in showing up. As a member of this team, I was able to create designs, model them on the computer, bring them to life through machining and assembly, and then test my ideas all under one roof side-by-side with real engineers. Not only that, but volunteering, community service, and public speaking were core values on this team. I loved being a part of a team that could bring a 120lb machine to life, then take it out into the world to inspire young kids. It felt like I was the back at the "take your daughter*

INTERVIEW
KARA BOYER

to work day" events, only I was inspiring kids with my work. I knew designing machines and making them more reliable was a core part of what I wanted in a career.

Q: Did you have any internships that influenced your career path?

A: *I really value the experiences I have had at all of the companies I have worked for but I put a lot of value on the experience I gained before I graduated college such as: joining a high school robotics team to work with engineers in industry, interning at NASA and interning with an engineering firm in the petrochemical industry. This experience helped me apply what I WAS learning in school as well as affirming my abilities to keep working toward my engineering degree. This experience also helped me pay for college and get a job after graduating with my engineering degree. For a while, I planned to work at NASA, specifically the robotics division at the Johnson Space Center. I interned in that division for two summers and absolutely loved it! Projects were really taking off and the team was growing. I was able to be a part of an exciting lunar rover prototype project now known as Chariot. It was so fun being a part of the design, fabrication, assembly, testing and integration processes. NASA is such an inspiring institution full of people who are passionate about space exploration and inspiring the next generation. This experience definitely fueled my passion for pursuing mechanical engineering.*

Q: What is your current career, and what problems does it focus on solving?

A: *I am a Mechanical Integrity Engineer who works for an engineering firm which primarily serves the petrochemical industry. Day to day, I evaluate or create processes, programs or assets to determine the best practice for maximizing reliability. Basically, I use math to determine how long companies can use machines before they need to be fixed or replaced. This is important because not knowing when a piece of equipment might have a major problem can result in people getting hurt and also cost a lot of money. Originally I started down this career path so that I could interact with large machines and troubleshoot issues. I love problem-solving, and I love optimizing processes. I took this specific role because I can help many companies operate safely and perform reliably. Now I channel my love of problem-solving into creating safer work environments and increasing efficiency for companies in the petrochemical industry. I also love the opportunities I have to educate my peers and others in the industry on various engineering topics. When information is shared, everyone can improve.*

Q: Some people regard the STEM subjects as 'geeky'. What would you say to them?

A: *I would say, don't believe everything you hear. I would also say, stop saying it!! There are people out there saving the world, and they are doing it with code or maybe just by having the courage to ask the right questions. Why is that perceived negatively as "geeky" where sports players and movie stars are admired and paid well for their physical abilities and attributes? How we spend our money and our time says a lot about what we value. Society is really limiting our next generation when they label STEM careers as "geeky". I fight this stereotype every day. I mentor youth through robotics programs specifically to allow them to fall in love with STEM before they hear that it is "geeky". I even work to educate parents who don't envision their princess growing up to hold a robot instead of a Barbie doll. These messages are so destructive and are limiting the people we care about the most. There are plenty of times where I have not been taken seriously as an engineer because I am a woman or because I "don't look like an engineer". I look forward to the day where the students I mentor are not affected by way of thinking.*

TOOLS

WRENCHES

by: Anyssa Castorina

What is an Allen Wrench?

An Allen wrench (also called a hex key or an Allen key) is a tool usually used to turn hex socket bolts while a crescent wrench holds the nut on the bolt so the bolt-nut system can be tightened or loosened.

Allen Wrench

What is the Difference?

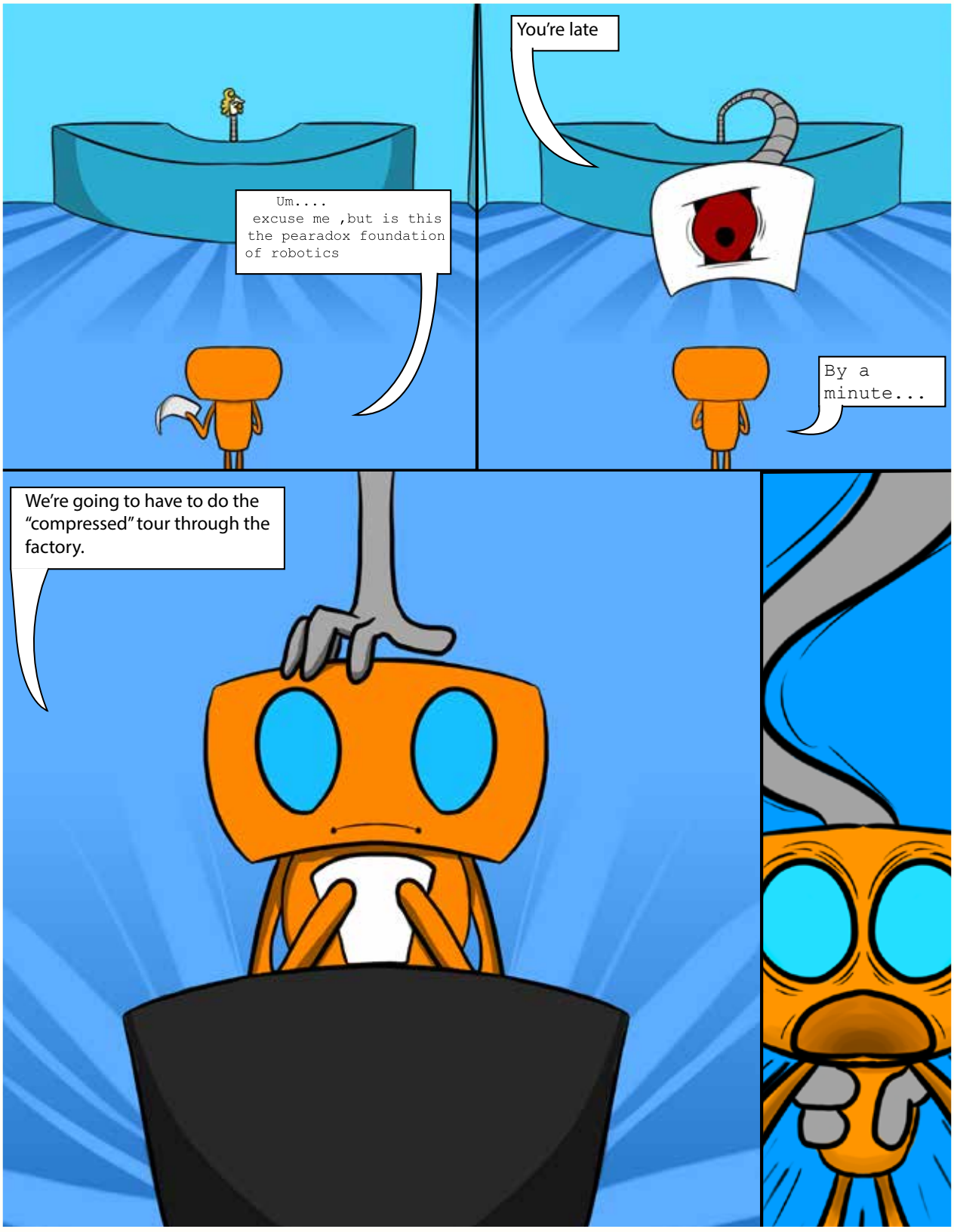
Metric vs Standard Allen Wrenches

- *Metric Allen wrench heads sizes are measured in millimeters.*
- *Standard Allen wrench heads sizes are measured in inches or fractions of an inch.*

Wrench

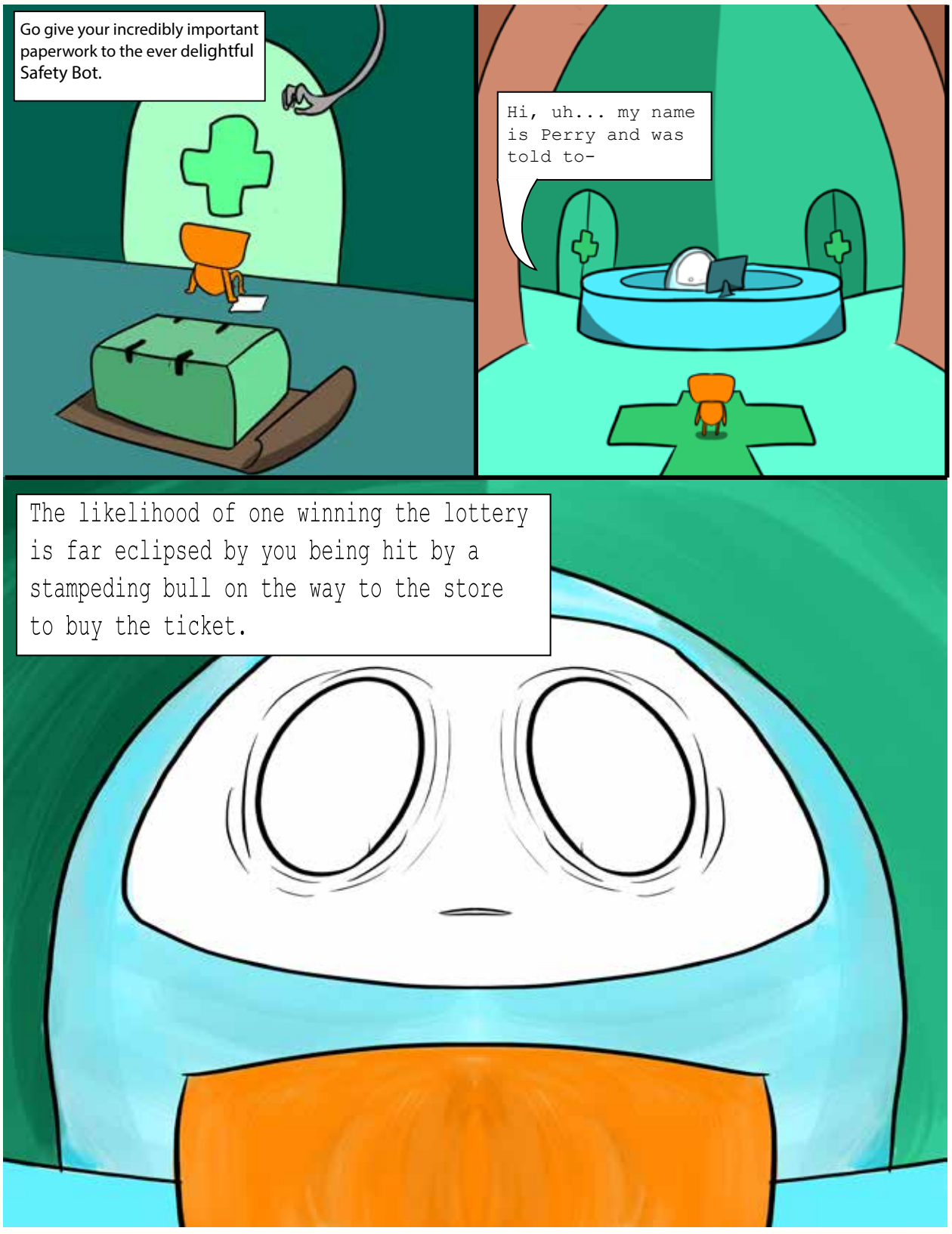
Bolt & Nut

ADVENTURE OF PERRY:
THE INITIATION



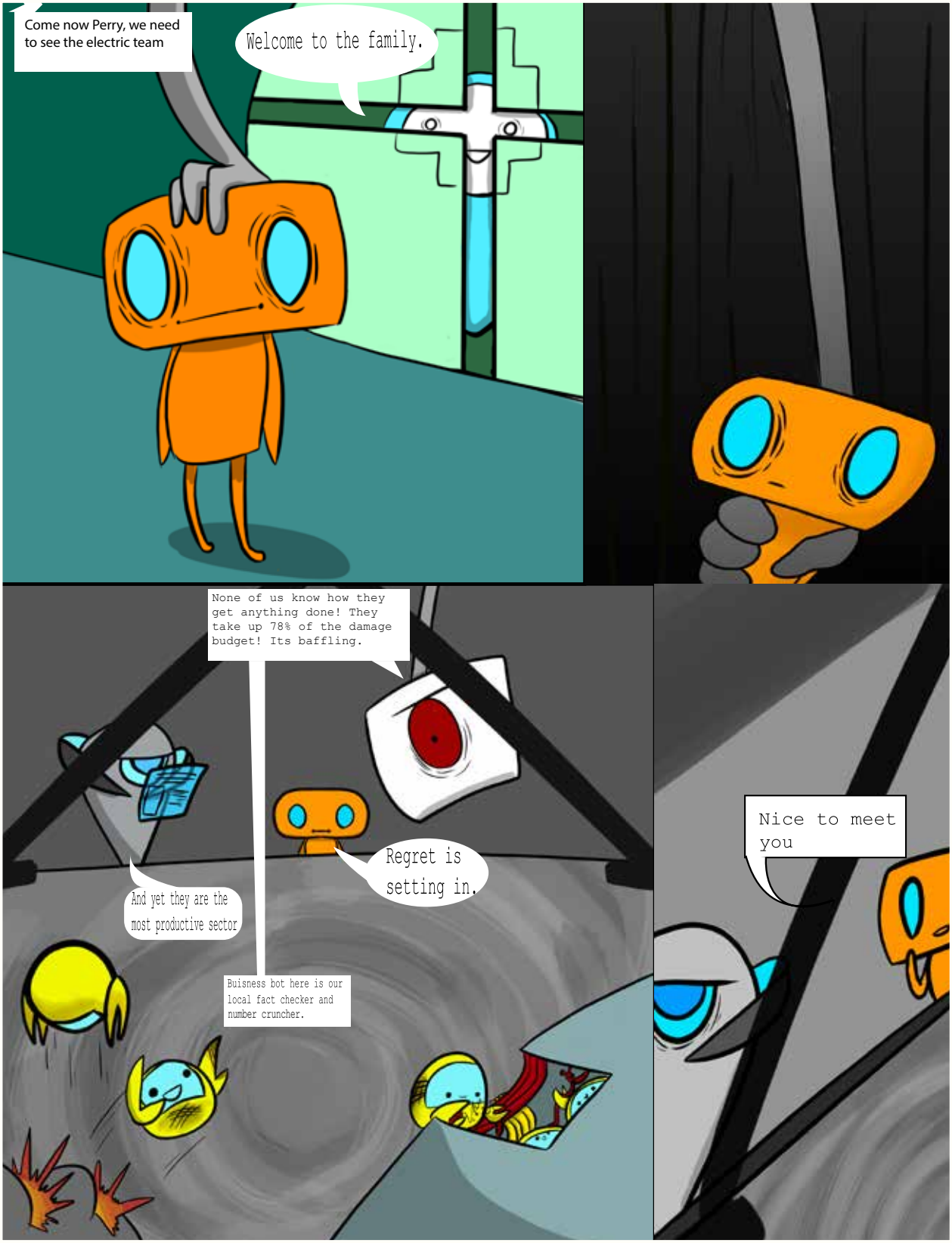
ERICH JANEKA

ADVENTURE OF PERRY:
THE INITIATION



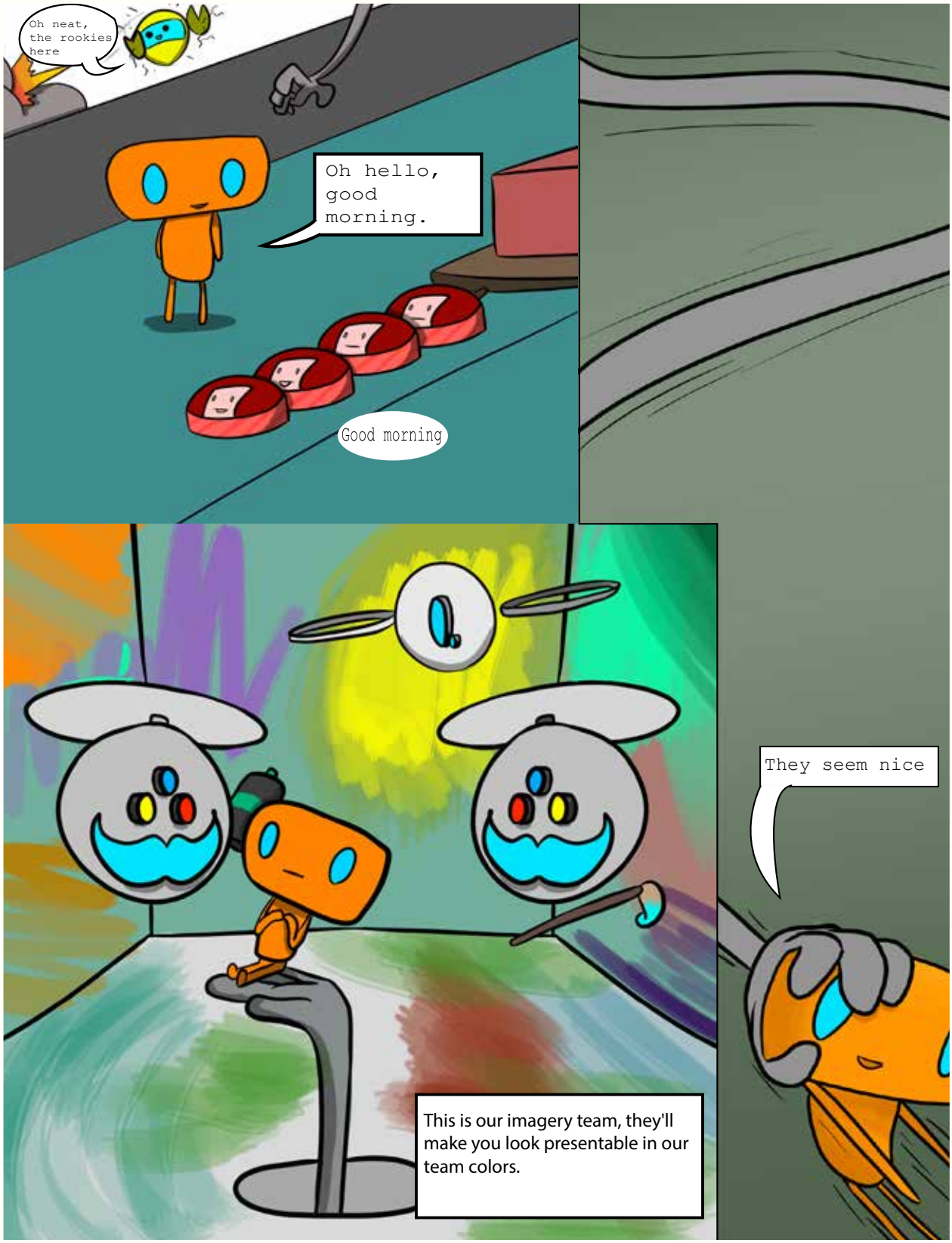
ERICH JANEKA

ADVENTURE OF PERRY:
THE INITIATION



ERICH JANEKA

ADVENTURE OF PERRY:
THE INITIATION



ERICH JANEKA

SCIENCE ACTIVITY

STICK BOMB

by: Anyssa Castorina

VIDEOS FOR POPSICLE HELP & RELATED PROJECTS

Stick Bomb Help

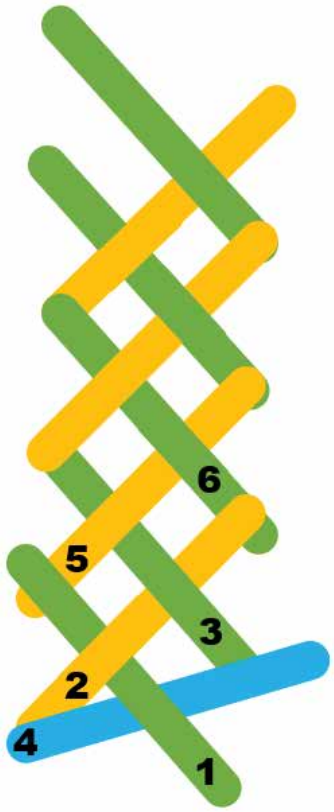
https://www.youtube.com/watch?v=vyFDGczUdQQ

Paper Airplanes

https://www.youtube.com/watch?v=3BNg4fDJC8A

Stacking Dominoes

https://www.youtube.com/watch?v=3omJb8ue25U



Challenge: Create a formation of craft sticks that holds potential energy that, when released, causes the sticks to fly in various directions.

Materials: Popsicle sticks

Step 1: Place STICK 1 down.

Step 2: Place STICK 2 as shown, overlapping STICK 1.

Step 3: Place STICK 3 as shown, overlapping STICK 2.

Step 4: Place STICK 4 as shown, under STICK 1 and over STICK 2 to bind the tension.

Step 5: Hold down the sticks and weave STICK 5 into place, as shown.

Step 6: Hold down the sticks and weave STICK 6 into place, as shown.

Step 7: Continue adding to the pattern by repeating Steps 5 and 6 with additional sticks.

Step 8: Finish the stick bomb by repeating Step 4 at the end.

UPCOMING EVENTS

Channelview District Robotics Competition

March 15th & 16th 9am-4pm
Channelview High School
1100 Sheldon Rd., Channelview, TX 77530
No Admission Fee!

-District Girls Get Together

Please join us for candy and conversation!
Girls Get Together is an event geared towards introducing women in engineering to high school girls currently involved in FIRST robotics.

FIRST World Championship: April 17-20, 2019 George R. Brown in Houston, TX

Prepare to be inspired as you watch tens of thousands of students compete on the world stage at the FIRST Championship. . . With all the heart-pounding thrills and team spirit of a professional sporting event, FIRST uses robotics as the backbone for the "only sport where every kid can go pro.

FIRST
FIRST Lego League: 4th-8th Grade
FIRST Tech Challenge: 7th - 12th Grade
FIRST Robotics Competition: 9th- 12th Grade

DESTINATION: DEEP SPACE
Presented By BOEING

Girls Gear Up!

GIRL SCOUTS

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.

Introduce a Girl to Engineering Day: Feb. 21st

"Introduce a Girl to Engineering Day (Girl Day) helps focus a growing movement to inspire girls' futures so they learn they have a place in engineering a better world. In just one day you can make a difference by sharing your knowledge, experience, and some fun! Give girls the chance to think like an engineer and you'll be amazed at what you learn!"
- National Society of Professional Engineers

CONTACT US

FIND ALL MAGAZINE ISSUES:

https://gearboxgirls.weebly.com/

REACH US AT:

gearboxgirls@gmail.com

FOLLOW US!

Instagram: @gearboxgirls5414

THANK YOU TO OUR SPONSORS!

Best Buy:
2632 Smith Ranch Rd
Pearland, TX 77584

Code Ninjas:
8325 Broadway St Ste 224
Pearland, TX 77581