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Welcome back to another exciting year of SWENext! My name is Elise Hough, and I am the SWENext K-8 Newsletter reporter for this school year. I am eager to share with all of you the current interesting STEM topics, the different types of engineers, and all the great opportunities that you can take advantage of throughout the year.

I grew up in Huntington Beach, California and now live in Palmdale, California. I got my Bachelor's Degree in Mechanical Engineering from California State Polytechnic University, Pomona and I am working on a Master's Degree in Aerospace Engineering right now.



I am a Structural Analyst for the Aerospace Sector at the Northrop Grumman Corporation in Palmdale. I get to work on some of the cutting-edge aircraft that protect American freedom through our armed forces and military. Northrop Grumman is an amazing company and has given me a lot of opportunities. They are a leading global security company providing autonomous systems (like drones), cyber security, surveillance, telescopes, satellites, military aircraft, and logistics (strategic planning). If any of those fields sound interesting to you when you grow up and become an

engineer, Northrop Grumman would be more than happy to have you help us solve some of the world's most challenging engineering problems!

Ocean and Marine Engineering

Every month, we feature a different type of engineer so that you can see all the ways that engineers improve our world. This month, we focus on Ocean and Marine Engineering.



Did you go to the beach and swim in the ocean during summer vacation? Did you know that there are engineers that design and build things that go in or on the ocean?

Ocean and Marine Engineers solve problems just like all engineers, but all the problems will be related to the oceans. Some of the problems Ocean Engineers help solve are beach erosion, water pollution, and water desalination (turning saltwater into fresh water). Some Marine Engineers work on large ocean-going ships, oil rigs, and underwater tunnels.

Oceans cover over 70 percent of the earth and we have not yet discovered everything there is to know about them. There are a lot of interesting things that a Marine or Ocean Engineer might work on. It is a very wide field of study and it is always growing as we learn more about the oceans.

Register for Invent it. Build it.



Middle school SWENexters! Now's the time to **register for Invent it. Build it.** our largest hands-on engineering event. Everyone will learn about engineering clubs, camps, after-school programs, colleges, and competitions at the Outreach EXPO. **See our 2018 exhibitors here.** Middle school girls will build a wind power station with women engineers lead by Design Squad Global star Deysi Melgar.

Meet Juliana, Marine Engineer

Juliana is a chief engineer on an oil tanker. She's 28 years old and lives with her family in Vitoria, Brazil. She wants to motivate girls around the world to explore the numerous opportunities that the Marine Industry provides.



Juliana's ship supplies fuel to other ships coming to the port and her job requires her to be on her toes all the time. Working on the oil tanker, Juliana has been able to work and travel the world at the same time. She loves the satisfaction she gets from doing something adventurous and unique.

[Learn more about Juliana's adventure as a Marine Engineer here.](#)

National Hispanic Heritage Month

Did you know that September 15 – October 15 is National Hispanic Heritage month? There are so many amazing Hispanic Engineers! We're excited to be able to introduce you to a few.

Adriana Ocampo went to school to be an Industrial Engineer at the University of Missouri – Columbia. She works at Boeing which is an aerospace company. She is currently the vice chair of the Society of Hispanic Professional Engineers (SHPE). Adriana has been recognized by SHPE and her employer Boeing multiple times for her community involvement outside of work and her promotion of STEM and diversity throughout her career.



Ellen Ochoa was the first Mexican-American astronaut and the first Latina in space. She worked as an engineer on four different NASA Missions. Ellen is a co-inventor for three different patents regarding optics, object recognition, and image processing. She was also the second woman, and first Latina, to become Director of NASA's Lyndon B Johnson Space Center.

Sylvia Acevedo is the CEO of Girl Scouts, but she has also worked for NASA Jet Propulsion Laboratory, IBM, and Apple as an engineer. Sylvia has a bachelor's degree in Industrial Engineering from New Mexico State University, and a master's degree in Systems Engineering from Stanford University. She was one of the first Hispanic students to earn a master's degree from Stanford. When she worked at NASA, she was a rocket scientist developing programs for Voyager 2's flyby of Jupiter. Sylvia was also a brownie and a girl scout when she was a young girl.



[Learn more about Hispanic Heritage Month here.](#)

Want to Know How to Start a SWENext Club?

SWENext Clubs are a way to connect with SWE members and other SWENexters in your area. Your SWENext Club can be any size with students in K-12 grades. You can work on projects that use engineering to help people in your community, or compete in a competition like Future City Competition or FIRST Robotics Competition. The direction of your club is up to you!

To learn more about how to start a SWENext Club, [check out this helpful guide.](#)

Questions about SWENext Clubs? Contact us at swenextclubs@gmail.com.

SWENext Engineering Challenge with a Chance to Win a Freebie – Deadline is September 28



Marine and Ocean Engineers design and operate marine vessels and power generating plants, develop solutions for coastal land preservation and waste management, and investigate the layout of the ocean floor.

This month, we're challenging you to design a boat like a Marine Engineer.

Your boat will be built out of straws, plastic wrap, and paper cups. Your goal will be to engineer the boat so it holds 25 pennies for at least 10 seconds before it sinks. You will need the following materials:

- A container filled with water (bucket, sink, plastic tub) to simulate the ocean
- Duct tape
- Paper cups (8 oz. size or larger)
- Plastic wrap
- Straws
- Scissors
- Towels
- 25 pennies

Follow the instructions listed below to design, build, and test your boat.

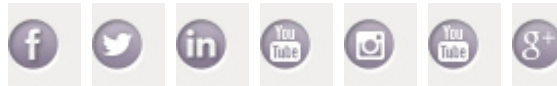
1. Sketch out a design plan for your boat, keeping the following in mind:
 - a. What shape should the boat be?
 - b. How will you make sure the boat stays waterproof?
 - c. What combination of materials should you use?
 - d. How big should be boat be to hold the load of 25 pennies?

2. Use the plastic wrap, straws, and paper cups to build your boat. The scissors can be used to cut the materials to size, and the duct tape can be used to hold everything together. Be careful using scissors!
3. Test your boat in the "ocean." Add one to two pennies at a time to test how well your boat holds up.
4. If your boat was able to stay floating with all the pennies, try adding more pennies. Record how many pennies your boat could hold before sinking!
5. If your boat sank, take note of which part let water in or tipped over. Try rebuilding and re-test it with the 25 pennies.

If you're looking for another challenge, try rebuilding your boat that is just as strong using fewer materials than your original boat!

[Check out the video and instructions on this web page for more details on the activity.](#)

When you are all done, take a picture of your boat in the water and share it with SWENext! Each month, a lucky winner will be selected from the submissions to win a SWENext freebie. Don't miss the chance! All it takes is a few minutes and a great picture. **Please email your entry to swenext@swe.org by September 28.**



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