

The logo for SWENEXT, with 'SWE' in blue and 'NEXT' in light blue and green.

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What is Mechanical Engineering?

Have you ever ridden an elevator and wondered how it works? You can't see all the moving parts, but they are there! Elevators are a classic example of a machine that is designed by Mechanical Engineers.

Elevators have a counter-balance and pulley system. Elevators also have an electric motor that moves them up and down. They would not be safe without a braking system! Brakes are used to slow the elevator down when it goes down a level.

Elevators have a lot of moving parts. Designing systems and machines like that is a Mechanical Engineer's specialty. They don't just design elevators. They also design car engines, airplane turbines, lawn mowers and even bicycles. If you use anything that has moving parts and gears, you can bet that a Mechanical Engineer designed it!

Mechanical Engineering Spotlight

Meet Taryn, a Mechanical Engineering Student in Colorado

Taryn is a junior in Mechanical Engineering at the Colorado School of Mines. She is also minoring in Space and Planetary Science and Engineering.



She hopes to graduate in about one to two years.

“There are so many cool things that Mechanical Engineers can do! I have worked on space vehicles, but a Mechanical Engineer can do almost anything. There are Mechanical Engineers who design roller coasters, cars and robots. Some also design machines that can save lives, like pacemakers or X-Ray machines. Others might work at Disney on animated movies. Some Mechanical Engineers might design machines in food packaging factories, like those that fill jugs with milk. Many Mechanical Engineers work with Civil Engineers on building bridges, schools, roads and so much more!

“If you are a Mechanical Engineer, **you can work wherever you want!**”



Meet Melony, a Mechanical Engineering Student in Pennsylvania

Melony is a senior in Mechanical Engineering at Temple University in Philadelphia, Pennsylvania. She graduates in less than a year with her Bachelor’s Degree.

“One of the coolest classes we take as Mechanical Engineering students is Senior Design. It is the last and biggest class that engineers will take. We use all of the cool things we learned from our classes to complete a project. Most engineering colleges make you take it, and it is super fun.

My team gets to work on a project with NASA called RockSat. We will be designing a payload that will be sent to the upper atmosphere in a rocket. A payload is a probe or satellite. This will collect information about Earth’s upper atmosphere. Scientists at NASA can use the data to understand more about Earth’s atmosphere and outer space.

“It’s a really neat project. **My family thinks it’s pretty cool, too!**”

Meet Jessica, a Mechanical Engineering Graduate Student in South Carolina

Jessica is a graduate student in Mechanical Engineering at Clemson University in Charleston, South Carolina. She hopes to graduate with her Master's Degree in about two years. She works as a Test Engineer at the Clemson University Wind Turbine Drivetrain Testing Facility.



“People in wind energy get to climb wind turbines to fix them. Imagine yourself climbing a 300-foot ladder up a tube to get to the top of a wind turbine. Once you're up there, you can see huge turbines and miles and miles of flat lands with wind turbines spinning in the wind all around you. **It is such a beautiful thing.** Right now, I don't climb ladders. I test the drivetrains and turbines with a machine that simulates the wind!”

Engineering with Girl Scouts

Did you know that Girl Scouts offer nine Mechanical Engineering badges? Each badge has a design challenge where you can design and test a project. When you earn any of these badges, you will learn how to brainstorm, make a prototype and test your invention. A prototype is a way to show your idea to others so they can try it out. You can use objects around your house, with your parents' permission, to design your very own crane, roller coaster or robot!

Are you curious about other ways you can learn about engineering through Girl Scouts? You can also earn a “Think Like an Engineer” journey badge. [Click here to learn about these Journey Badges!](#) Girls Scouts of Northern California have some really cool ideas, which you can [check out here](#).

NASA also has a Girl Scout Camp-In program where you can learn about real-world problems that NASA scientists solve every day! Girls who go to Camp-Ins make a rocket, program a Mars rover and get a private tour of NASA facilities. [Check this out if you want to learn more about NASA!](#)

Check out what these Girl Scouts did to earn their “Think Like an Engineer” Journeys!

Girl Scouts of Northeast Texas

This group of Daisies, Brownies, Juniors and Cadets all earned their “Think Like an Engineer” Journeys this summer! They met a Civil Engineer

to learn about engineering and the environment. They also learned about city planning and safety.



Brownies and Daisies made cars powered by air. Juniors and Cadets built Popfly devices to shoot ping pongs into cups. All of the girls researched different Hidden Figures or women who pioneered in STEM.

They presented their hard work once they finished their projects and impressed a lot of people!



USA Girl Scouts Overseas

These Juniors earned their “Think Like an Engineer” Journeys. They built paper structures that could hold up to seven binders. They also built models of emergency shelters using a tarp, a poncho, tent stakes, hiking sticks, parachute cord, and bungee cords. They also built earthquake tower models out of straws, toothpicks and clays.

Their final project was an egg drop competition. Each girl built their own vehicle to hold an egg and keep it safe when dropped from a tall height. They made a poster about how important it is to work together as a team, plan out designs and how the engineering process works. How neat!

Did you know that National Cyber Security Day is November 30th?

Today, we all use computers. In fact, you are probably reading this on a computer! Many of us use computers to do good things but sometimes people use computers to do bad things. They might trick people into downloading a virus. Once a virus gets on a computer, these bad guys can hack into an email account. Worse, they can try to get to bank accounts to steal money. Some might even try to steal secrets from the government. That’s where Cyber Security comes in. People who work in Cyber Security protect computers, internet servers and mobile devices from these bad guys. They keep people like you and me safe because they make our computers safe.

Have you ever been curious about Cyber Security?

Ask a Professional! Meet Victoria, a Computer Scientist from the National Institute of Standards and Technology



Victoria leads a team that write rules to help the government, schools and private companies protect people from Cyber Security risks. Victoria loves what she does because she gets to work with some of the smartest people in the country to protect the country from cyberattacks. Victoria has a Bachelor's Degree in Electrical Engineering, which she earned at the University of Maryland. She also has a Master's Degree in Computer Science, which she earned at the George Washington University.



Ask a Peer! Meet Michaela, who LOVES Cyber Security and STEM!

Michaela is an 8th grade student from Washington D.C. She is taking college classes to earn an Associate's Degree in Cyber Security! Michaela has always loved STEM and programming. She was inspired to study Cyber Security when she visited the National Security Agency with "Black Girls Code". She is now working as a web designer! While Michaela has a passion for science, she is also a talented

violinist! She enjoys travelling, sailing and even did competitive swimming. She also volunteers and mentors other girls in STEM as well! Michaela's hard work shows that if you are passionate, you can do almost anything you set your mind to! Way to go Michaela! Thank you for inspiring us!

2020 SWENext Awards Season – Apply Now

Do you live within a couple of hours of **San Diego, Buffalo or Des Moines**? Are you willing to travel to one of these cities early next year with your friends? If so, read on!

We are excited to announce the 2020 SWENext Awards and the DesignLab Community Engagement Challenge.

The **SWENext STEM in Action Award** recognizes girls in **grades 6-12** who are actively interested in STEM and doing something in their community about it (for example, raising awareness, mentoring students, participating in SWENext, etc.).

STEM in Action Award recipients will attend the DesignLab event where they will meet women engineers, learn about careers in engineering, learn how to be a role model and watch the DesignLab presentations. They will also receive a certificate during the awards ceremony.

You must attend the DesignLab event in order to receive the award. See the dates of the event below.

We are using a rolling application process which means we will review your application and determine the award within two weeks of your application. Apply early so you can save your seat at the DesignLab event! Learn more and apply today!

The DesignLab Event in San Diego will be held on February 1, 2020.

STEM in Action Award Application Deadline: January 5, 2020 - [STEM in Action Application](#)

The DesignLab Event in Buffalo will be held on March 28, 2020.

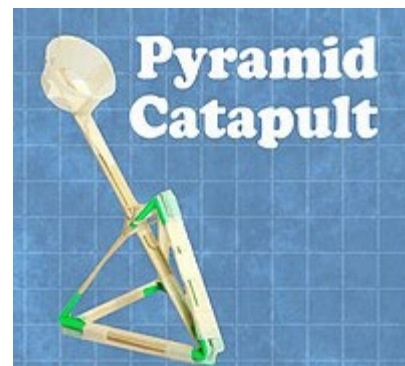
STEM in Action Award Application Deadline: March 1, 2020 - [STEM in Action Application](#)

The DesignLab Event in Des Moines will be held on April 18, 2020.

STEM in Action Award Application Deadline: March 22, 2020 - [STEM in Action Application](#)

SWENext Engineering Challenge with a Chance to Win a Freebie!

Mechanical Engineering is one of the oldest and broadest engineering disciplines. It applies the principles of Mechanics and Materials Science for analysis, design, manufacturing and maintenance of mechanical systems. Mechanical systems can vary from building a rocket ship all the way down to the bicycle you rode to school. If you like roller coasters, cars, rockets and robots, you may also like Mechanical Engineering.



This month we're going to build a catapult! Catapults work by **storing tension** either in twisted ropes, in a flexed piece of wood (in the same way an archery bow does, but on a larger scale), or in this case, in a rubber band.

What You Will Need

- 10 craft sticks
- 5 skewers

3 milkshake straws (2.5 cut into quarters)

- 1 cup
- 1 rubber band
- Masking tape
- Cork, ping pong ball or any moderate weight projectile

These [procedures](#) can be useful to help you build your catapult!

This project can be a little dangerous! If you are confined indoors, be sure to designate a firing range and keep family, friends and pets out of the line of fire!

Think like an engineer: How far could you shoot things? Did the distance change if you pulled the catapult back farther? How did the distance change if the projectile was heavier or lighter? What happens if you add a second rubber band or use a tighter one?

After your challenge is complete, we encourage you to share a picture of your catapult. Let us know how far things flew! Each month, a lucky winner will be selected from the submissions to win an Amazon gift card. Don't miss the chance! All it takes is a few minutes and a great picture. Email your picture to swenext@swe.org by December 10th.



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