


 The logo for SWENEXT features the letters 'SWE' in a dark blue, sans-serif font, followed by 'NEXT' in a larger, light blue, sans-serif font. The letter 'X' is highlighted in a bright yellow-green color.


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What is Chemical Engineering?

Who doesn't like gummy bears? It's a nice surprise to get gummy bears when you go trick-or-treating! Have you ever wondered how gummy bears are made?

Gummy bears are made from mixed sugars to make them sweet; and pectin to make them chewy. Machines are used to mix all the ingredients together and pour them into a mold. There is a special way that they are mixed and poured. Bet you didn't know that Chemical Engineers design these kinds of processes!

Chemical Engineers work together with other engineers and chemists to design gummy bears with different colors, tastes and textures. How neat is that?

That's not all Chemical Engineers do. Think about the gas that your parents put into your family car. Oil is used in the fuel that cars need to make them work. What about the clothing that you wear? Maybe the medicine that you might take? Does your family use fertilizers in your garden? Chances are that a Chemical Engineer used their knowledge in math and science to help design processes that make all of these things. Chemical Engineers process chemicals. These chemicals are used to make your life easier!

Meet Chemical Engineers

Meet Kristine, a Chemical Engineering Student in Pennsylvania

Kristine is a student at Drexel University in Philadelphia, Pennsylvania. She is studying for her Bachelor's Degree in Chemical Engineering. She is also studying for her Master's Degree in Materials Science and Engineering. Kristine is in her fourth year of school. She hopes to graduate in one year with both her Master's and Bachelor's degrees.



What do Chemical Engineers do?

Chemical Engineering is finding the best way to make a lot of material in the safest, cheapest and fastest way possible. Almost everything that we use is mass produced. Mass produced means that a lot of it is made at once. Chemical Engineers design ways to do this.

What made you decide to go into Chemical Engineering? How did you first become interested in a STEM Field?

In high school, I got to take engineering classes through the "Project Lead the Way" program. I learned a lot about Mechanical and Electrical Engineering, but I didn't love what I was learning. It wasn't until we learned about manufacturing that I could see myself as an engineer. I learned that many engineers in manufacturing are Chemical Engineers. I was also taking chemistry at the time and loved it. It clicked for me. I loved both engineering and chemistry, so I decided Chemical Engineering was the best fit for me.

Do you have one piece of advice for young girls considering going to school for Chemical Engineering?

It's a good thing to fail, and it's OK to put yourself first sometimes. Engineering is hard, and it's not just you! Taking the time to understand and learn from your failures is just as important as being proud of your successes.

Meet Yoselin, a Chemical Engineering Student in Florida

Yoselin is a student at the University of South Florida in Tampa, Florida. She is a Junior studying Chemical Engineering and hopes to graduate in two years. Yoselin volunteered with Engineers Without Borders in South America and hopes to use her knowledge to improve life for others.



What did you know about Chemical Engineering when you were a child?

Growing up, I did not know much about Chemical Engineering. I knew that I wanted to make a positive difference in someone's life. I was raised by a single father. He taught me to work hard and made sure I went to school. I like helping others. I figured Chemical Engineering can help me do that. Maybe I will be able to invent something that changes someone's life.

What are some really cool things that people in your profession work on?

There are lots of cool things Chemical Engineers do! As a student, I recently traveled to Bolivia, which is in South America. I volunteered in a community called Kumucala. I worked with a team of engineers volunteering through Engineers Without Borders. We built latrines, which are basically toilet systems. These are important to keep people safe and clean. I really liked the work I did because I knew that I was making a difference. When you are in college, if you have the chance to volunteer with Engineers Without Borders, take that chance. I had an amazing time, I helped people and I learned a lot.

Can you describe a "day in your life" studying Chemical Engineering? Are there any exciting projects you have been a part of?

I spend a lot of time studying with my classmates. I am also a member in lots of clubs. I volunteer with Engineers Without Borders, and I am in Society of Women Engineers. I think getting involved in clubs is very important because it helps you make friends and learn too! You also get to learn how to be a good leader. Having extra-curricular activities can also help you learn how to balance fun with work.

What Do Engineers Really Do?

What would we do without things like dishwashers, stoves, washing machines, cars or cell phones? Humans did it once – do you think it would be easy for us to do that now? Probably not. Now, these things are very important in our everyday lives and some of us cannot live without them!

Without dishwashers, you would be scrubbing your dishes. Without cars, perhaps you would have to walk everywhere. Without cell phones or computers, you would probably have to handwrite letters. Engineers design these sorts of things to make everyone's lives easier, in every way imaginable!

Now, imagine people who are living with a disability. Engineers make things so that their disability won't stop them from achieving their dreams. Maybe they can't hear as well as you can. Hearing aids help them to hear things better. Or maybe they can't walk easily. Wheelchairs are designed to be comfortable and easily rolled. Engineers determine how big the wheels need to be. They also think about how to make it easier for someone to push themselves if they have to. Without a wheelchair, some people would not be able to get around very easily.

Engineers also design things that are really fun! Have you ever ridden a roller coaster? Imagine the excitement as you roll from the top! A whole team of engineers works really hard to design a roller coaster that would be fun and safe for the whole family!

Engineers change technology to make it better too! [Read this article to see how phones have changed over time!](#)

Happy Halloween – Spooky Engineering!

We talk about how engineers design cool things like airplanes, cars, and cell phones. Bet you didn't know that engineers design things to make Halloween fun!

Have you gone trick-or-treating? Those houses that have all of the cool tricks on their porches are pretty neat, huh? Do you ever wonder how to make the treat bowl that has a mechanical hand that snaps down just as you are about to grab a piece of candy? What about the creepy flashing lights or the mechanical dropping spider? Engineers designed all of these things!

Think about your favorite candy. The wrapper was designed by an engineer. The candy was made in a factory using a bunch of machines and conveyer belts. It is possible that teams of Chemical Engineers, Mechanical Engineers or Manufacturing Engineers had a hand in making that Reese's Peanut Butter Cup you enjoy. Who'd have thought?

Have you gone to a haunted house before? A lot of the scary props are made in a factory just like the candy is. The gravestones you might see are likely made from Styrofoam. Styrofoam is a type of plastic. The plastic is heated and poured in a mold with very little air pressure. Air is quickly blown into the plastic, making the foam.

Do you know what you want to be for Halloween? Have you ever thought of what your costume is made of? If you plan to wear a tiara, or carry a fake sword, you might wonder how those were made! Even the face paint that you buy was mixed and

packaged in a factory using machinery designed by engineers!

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 and parents? If so, read on!

We are excited to announce the 2020 SWENext STEM-in-Action Award.

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!

A Chemical Engineer often works in a laboratory and applies the principles of chemistry and other sciences to solve problems that improve our lives. In this way, a chemical engineer has the power to change the world. Chemical Engineers can work in a variety of different areas of chemistry, including creating new processes for

manufacturing food or creating the fuel that gets us to Mars or reduces our use of fossil fuels. Someday you could even invent a bubble gum that blows huge bubbles! How could you do these things? Simple -- by becoming a Chemical Engineer.

This month's activity has us thinking like Chemical Engineers as we make sun catchers out of salt crystals.



The process of building crystals is called **nucleation**. When the molecules of the to-be crystals (called a **solute**) are bumping around each other in a liquid (called a **solvent**) they like to stick together. There are other forces in the solution that cause them to pull back apart but once in a while you get two molecules that hang on just long enough to attract another molecule and then another and another until a crystal structure starts to form.

What You Will Need

- Epsom Salt
- Clear Recycled Plastic Lids- use the clearest you can find. The best type is the completely clear plastic found in food packaging, some to-go cup lids (like those used for iced coffee) or mini sauce and salsa lids at restaurants.
- Water
- Empty Jar
- Bowl or glass measuring cup
- Fork
- Microwave
- Tray
- String
- Pin

Add 1 cup of Epsom salt to an empty glass jar. Add 1 cup of water to a microwave-safe bowl.

Get help from an adult for this next step. Heat the water in the microwave for 45 seconds. If you do not have a microwave, use tap water as hot as you can get it. Quickly pour the water into the jar with the salt. Stir the salt and water for 2 minutes to dissolve the salt.

Place several plastic lids on a flat-bottomed tray or cookie sheet in a sunny location where they can remain undisturbed. Pour just enough of the solution into each plastic lid to cover the surface. Then you wait.

When the liquid has completely evaporated your crystal suncatcher is ready! You will be able to see salt crystal structures from both sides of the lid. VERY carefully poke a small hole in the edge of the lid and thread a piece of string through the hole. Tie in a knot and hang your sun catcher up!

You can also leave the solution in the jar and put it in the fridge overnight. You'll have crystals left in the jar the next day when you pour the solution into the lids.

What do you think would happen if you used a different solute? Have you ever seen rock candy made of sugar crystals? How are they different than our salt crystals? If you want to try other crystal growing solutions you can [find some recipes here](#).

After your challenge is complete, we encourage you to share a picture of your sun catcher!

Email your picture to swenext@swe.org by November 4th. 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.

Would You Like to Be Featured in the Newsletter?

Would you like to be featured in the SWENext Newsletter? We want to hear why you love STEM and share that with your SWENext Sisters!

Email us at swenext@swe.org and tell us about yourself and why you like STEM! Make sure to ask your parents first!



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