

swe **NEXT**



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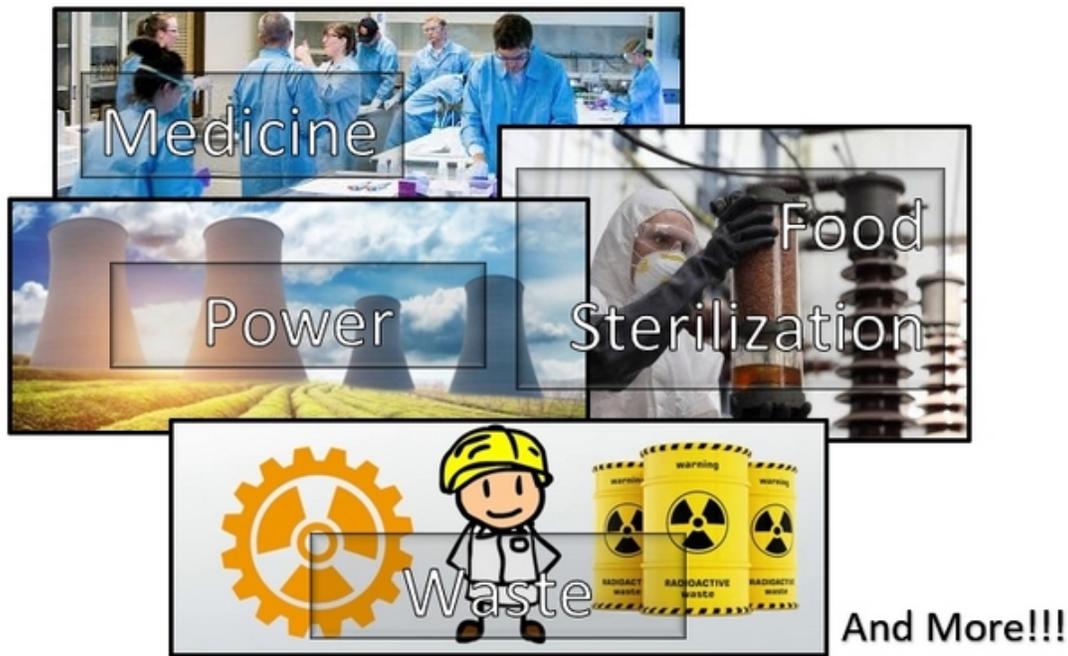
Nuclear Engineering

Nuclear Engineers get to work with one of the most powerful energy sources known to mankind. They work to safely harness this energy for different uses. They design power plants. They design reactors that can power submarines or spaceships. They manage the safe disposal of nuclear waste. And they create industrial or medical uses for radioactive materials.

Did you know that X-ray, CT, and PET scanning machines in hospitals all use radiation? X-rays are the most common and provide valuable information to doctors and other medical professionals on patients' injuries so they can help them get better faster.

Radiation is also used in food irradiation which sterilizes food by killing bacteria and viruses without making the food radioactive. There are a lot of helpful ways to improve society by being a Nuclear Engineer!

What industries can a Nuclear Engineer work in and make a difference?



Meet Jocelyn, Nuclear Engineering Student

Jocelyn is a junior at the Pennsylvania State University studying Nuclear and Mechanical Engineering. On campus, she is the Vice President for the Penn State chapter of Women in Nuclear (WIN). She is also a director for the Society of Women Engineers (SWE) Penn State section, and an officer for the student chapter of the American Nuclear Society.



Why did you pick Nuclear Engineering?

My first interaction with nuclear technology occurred during my sophomore year of high school. I was a softball player and had extensive shoulder pain. The doctor did an arthrogram to examine my shoulder cartilage. During this procedure, a contrast solution was injected into my shoulder cartilage and then an MRI was done so the doctor could see if there were any tears.

After this procedure, nuclear technology captured my attention and I began to look into it further. Although I knew that Radiology would not be my career path, other areas of the nuclear industry, like energy production, were interesting to me. I looked for colleges that offered a degree in Nuclear Engineering.

What do you plan to do with your degree?

My interests lie mainly in the nuclear industry. I have completed two internships where I gained experience with energy production. This upcoming summer I will be working with designing the nuclear reactors that power naval submarines. I am excited to learn more



about a career in this industry because it would provide an opportunity for me to contribute to my country.

I am also interested in exploring career opportunities involving the use of nuclear propulsion in space. As space exploration interests continue to grow, new technology will be needed to achieve more complex and challenging goals. I feel that nuclear propulsion, when harnessed, could offer a unique and powerful way to fuel these explorations in space. Being a part of the research and development for this technology would be an intriguing and exciting career. Overall, my goal is to enjoy a career where I am continually challenged and am also able to make a positive impact on the lives of others.

Do you have any advice for young girls who want to be an engineer?

Engineering provides a fantastic way for a girl to contribute to society. Whether you are passionate about energy, medicine, cars, space, the environment, or any other topic, you will be able to work hands-on in these areas as an engineer.

I think that when it comes to deciding what you want to be when you grow up, it is important to identify what you find fascinating. Pursuing a degree and career that you are truly interested in will help make school, work, and life more exciting. One thing that really helped me decide was talking with high school teachers that I was close with. It can be helpful to discuss career ideas with people who get to be with you on a daily basis and can view your strengths and weaknesses from a different perspective.

What Makes a Girl a Great Engineer?



Her Desire to Figure Things Out

This is the girl (maybe you!) who takes apart whatever they can get their hands on to see how it works, or the teenager who fixes things around the house.

Her Creativity

Engineers turn ideas into real-world applications. This process requires creativity.

Her Math Skills

A girl doesn't need to be a genius in math to be an engineer, because not all engineering jobs involve performing complex equations as a part of the everyday routine. As many women engineers have said, "You don't need to love math, you just need to be able to do it!" Take as many math courses as you can in school to build up those skills.

Her Listening and Problem-Solving Skills

Really listening and fully comprehending what a speaker is saying is a valuable skill. When you listen, you learn. And the more you learn about a problem, the more likely you are to be able to solve the problem.

Her Interpersonal and Leadership Skills

Engineering is a team sport! All engineers work on teams. They need to be able to get along with colleagues, work together, and participate in meetings.

If you practice these skills you will be an amazing engineer!

Middle School Girls – Apply for a SWENext Community Award!

If you are a 6th, 7th, or 8th grader who lives near Baltimore, St. Louis, Denver, or Bellevue, Washington, you can apply for the SWENext Community Awards!

We will be honoring girls who are actively interested in STEM and are out doing something in their community about it, for example participating in STEM competitions like Future City, FIRST, or science fairs, participating in a SWENext club, raising awareness about STEM, doing community service, or mentoring students.

If selected, you will participate in a special program with other SWENexters to learn how to be a leader in STEM, and how to prepare for a STEM career. You will also meet and network with women engineers and engineering students.

Learn more here >>

Application deadlines:

Baltimore: Application due January 19, 2019

St. Louis: Application due: February 9, 2019

Denver: Application due: February 23, 2019

Bellevue: Application due March 9, 2019

Still have questions? Send an email to swenext@swe.org.

2019 EngineerGirl Writing Contest

Do you like writing creative stories? If so, you'd be perfect for this contest!

For the first time ever, EngineerGirl is running a writing contest for creative fiction.

To enter the contest, write an original, fictional story in which the main character is a female who uses engineering skills to solve a problem.

There are three basic rules:

1. Your main character must be female.
2. Your main character must use engineering design principles to solve a problem.
(She cannot use or rely on magic or supernatural powers.)
3. Your story must be under the word limit for your grade level.

Elementary (grades 3-5): 800 words.

Middle School (grades 6-8): 1100 words.

High School (grades 9-12): 1500 words.

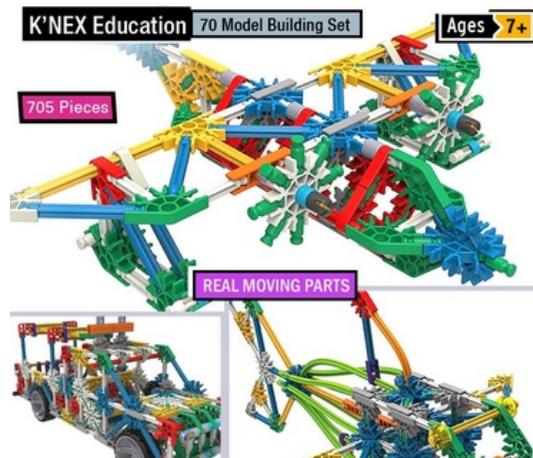
We would love it if a SWENexter like you won!

[Learn more here >>](#)

Cool Engineering Toys – Check Them Out!



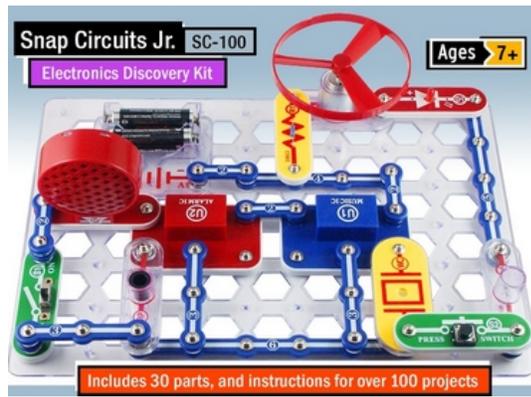
K'Nex Education: Force, Energy, and Motion Set



K'Nex Education: 70 Model Building Set



LEGO/Klutz LEGO Chain Reactions
Craft Kit



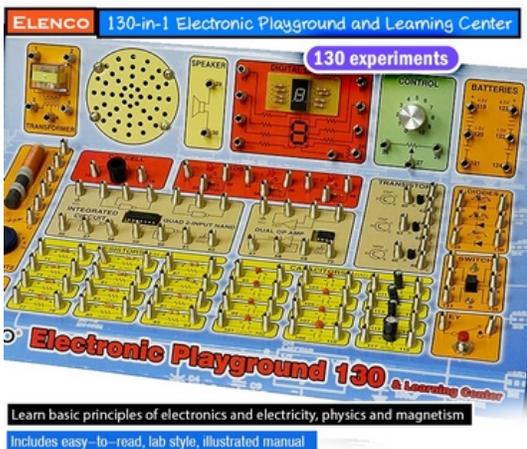
Snap Circuits Jr. – SC-100 Electronics
Discovery Kit



SmartLab Toys – Smart Circuits Games
& Gadgets Electronics Lab



Circuit Maze Board Game



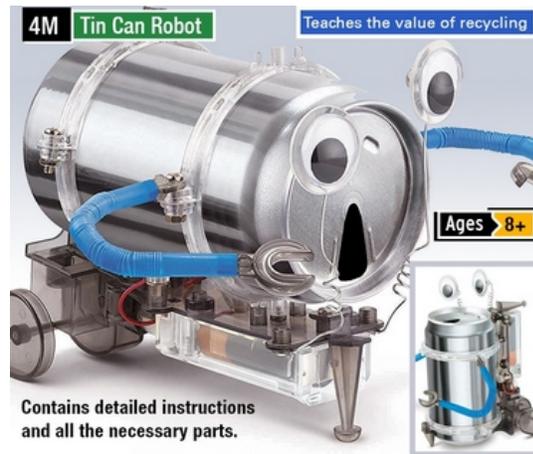
130-in-1 Electronics Playground &
Learning Center



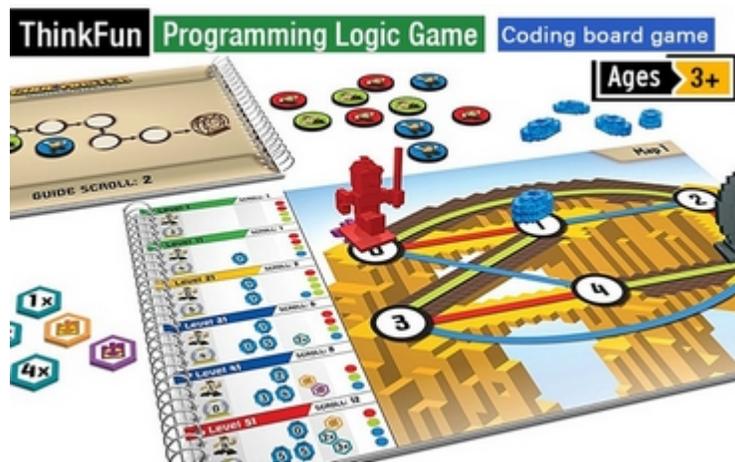
Wonder Workshop – Cue Robot/Dash
Robot



QWI – Hydraulics Arm Edge Kit



4M Tin Can Robot



Code Master – Programming Logic Game

SWENext Engineering Challenge with a Chance to Win a Freebie!

Nuclear Engineers run power plants that generate energy from splitting large atoms into smaller ones. While at work, a Nuclear Engineer performs tasks such as factory equipment design, procedure writing, and process monitoring. In addition to writing procedures about how to run the equipment that makes electricity, engineers also need to write procedures about how to be safe in the plant. Nuclear reactions let off radiation, which can harm people and the environment, so it's important that the equipment is run safely, and any waste is disposed of properly.

We're challenging you to think like a Nuclear Engineer by writing a safety procedure. Instead of writing a safety procedure to be used in a energy plant, you're going to write one for a task you or a family member might do at home. Write a procedure for an activity that involves wearing protective gear like safety glasses or gloves, disposing waste, or anything you can think of!

Here are some examples:

- Pulling weeds in the garden
- Operating a power tool like a drill to hang something on the wall
- Cooking using a stove, oven, or grill
- Cleaning with products containing chemicals

In your procedure, make sure you summarize specific dangers of the activity at the top of the page before writing out the steps it takes to do the task.

Once you're done, model some of the safety equipment or safe behaviors you wrote about and send us your procedure and a picture! **Please email your entry to swenext@swe.org by January 5th. 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.

Shout Out to Last Month's SWENext Engineering Challenge Winner

The lucky winner for November's Industrial Engineering challenge is Angel, age 11. She tried two different procedures to make up snack bags. The first procedure averaged 43.5 seconds, and the second procedure averaged 26.5 seconds.

Congratulations! Way to #BeThatEngineer and find a more efficient way of doing the task! Your awesome freebies are on the way.



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