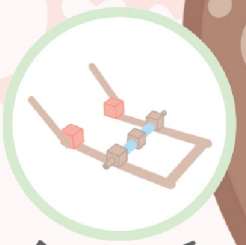
ISSUE 02

SWEET

ENGINEERING



DIY PROJECT

ORIGAMI IN SPACE!

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CONTACT US!

@sweetsciencezine

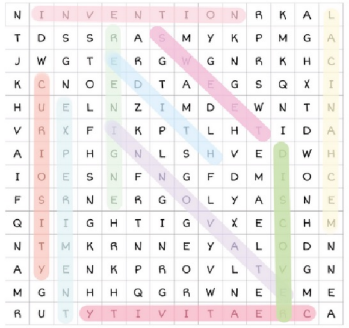
sweetsciencezine@gmail.com

sites.google.com/view/sweetsciencezine

ABOUT

SWEET (Science with Exciting Experiments & Tips) is a zine that aims to spark curiosity and empower the next generation of girls in STEM through hands-on experiments, fun lessons, and games.

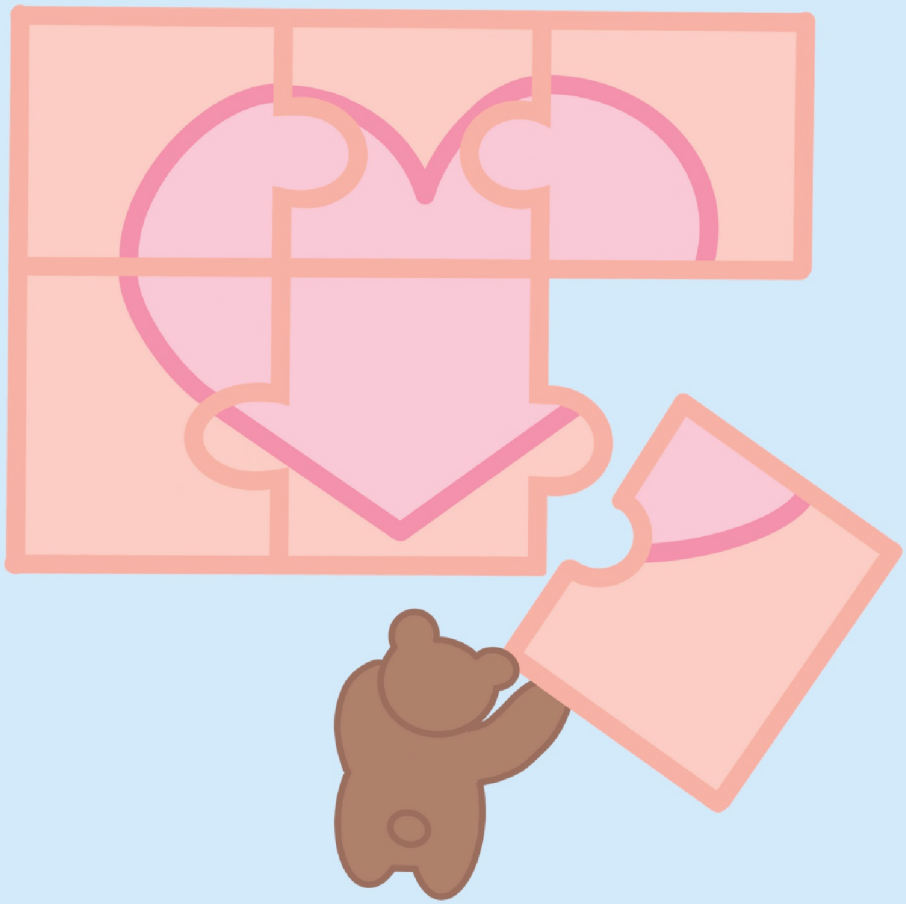
SOLUTION



OUR TEAM

Chloe Drieu
Clementine Préfot
Aleena Wong
Melody Alduy-Berman

THANK YOU!



Dear Readers,

Welcome back to another issue of SWEET Zine! I'm especially excited about this one because it dives into the expansive world of engineering. Last summer, I attended two college programs that explored engineering and its many possibilities, completely reshaping my understanding of the field.

I'm thrilled to share my insights and passion with you, along with contributions from our new writers! After the release of Issue 01, I brought together a team of passionate, brilliant young women who are committed to making STEM more accessible and exciting for everyone. Together, we've created an issue that celebrates not only the technical side of engineering, but also the creativity, problem-solving, and meaningful impact that make it so inspiring.

I hope this issue sparks your curiosity, fuels your creativity, and reminds you that STEM truly has a place for everyone.

Happy exploring,

Chloe

STEM Exploration

EXPLORING ENGINEERING

Building Tomorrow Through Engineering Today

When you think of engineering, what comes to mind first? Wrenches? Nuts and bolts? Coding? If so, I completely get it—I used to think that engineering was all about mechanics and circuits. But here's a little secret: it's so much more than that.

THE "E" IN STEM

What if I told you that engineering could involve flowers? Believe it or not, bioengineers study plant cell structures to design sustainable materials and improve agriculture. Engineers also work in the realm of fashion, using fabrics to develop wearable technology that can track health data or create sustainable clothing that reduces waste. There's even an entire field dedicated to food engineering, where scientists innovate new ways to improve food safety and nutrition!

Did You Know?

NASA's Starshade, a giant space sunflower designed to help find Earth-like planets, folds up like origami to fit inside a rocket.

One of the most famous examples of this technique is the James Webb Space Telescope (JWST). Its massive sunshield, which protects the telescope's instruments from intense heat, was designed to fold like an accordion within the rocket. Once in space, it unfolded perfectly. The engineers had to ensure it worked flawlessly, because there was no option to repair it once it was 1 million miles away!

FOLD, LAUNCH, HEAL!

Origami-inspired engineering isn't just used in space. It's also changing medicine! Scientists have created tiny, foldable medical devices, like stents and surgical robots, that can be compressed to fit inside the human body and then expand in the right spot.

This shows that engineering is more than just numbers, formulas, and machines. It's about creativity, problem-solving, and drawing inspiration from unexpected places—like the art of folding paper.

So, next time you see someone folding a paper crane, think about this: they might just be holding the future of science in their hands.

Lesson

ORIGAMI

BUT MAKE IT ENGINEERING

When you think of NASA, you probably picture rockets, astronauts in bulky suits, or rovers crawling across Mars. But would you ever imagine NASA scientists sitting around, folding paper? Believe it or not, some of the most advanced space technology is inspired by an ancient Japanese art form: origami.

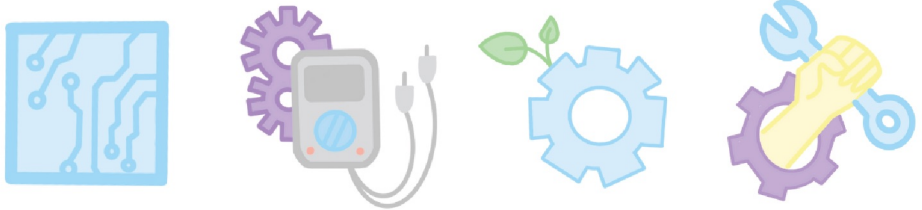
NASA's aerospace engineers have a big problem—literally. Many of the things they send to space, like solar panels, antennas, and telescopes, need to be significantly large to work properly. But rockets? They aren't so roomy. Everything has to be compact enough to fit inside a rocket during launch, then unfold smoothly once in space. That's where origami comes in.

THE SOLUTION

Rather than designing complex mechanisms to deploy solar panels and other structures, NASA engineers turned to origami artists for inspiration. By studying traditional paper-folding techniques, they developed precise folding patterns that allow large structures to collapse into small, compact shapes.

Engineering spans an incredible range of disciplines, including:

Aerospace | Biomedical | Chemical | Civil



Computer | Electrical | Environmental | Mechanical

THE ART OF INNOVATION

So... what exactly is engineering? I like to think of it as the "art of innovation." At its heart, it's about using science and creativity to solve problems, through designing life-saving medical devices, building energy-efficient cities, or creating software that connects people around the world.

Engineers do more than crunch numbers and solve equations: they think outside the box, asking "What if?" and "How can we make this better?" They look at the world, identify challenges, and create new ways to overcome them. They dream up the impossible and make it real. And maybe, one day, that engineer could be you!

Project

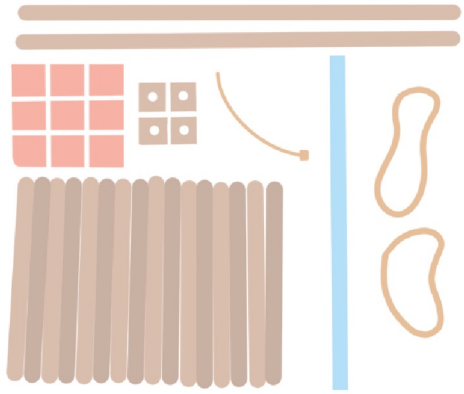
MECHANICAL HAND

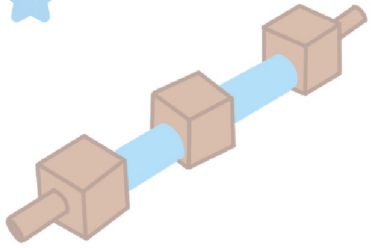
By Melody Alduy-Berman

Are you a DIY enthusiast and creative builder? Do you love the joy of transforming raw or old materials into interactive masterpieces? If so, this is the perfect project for you!

MATERIALS

- Hot or liquid glue
- 15 popsicle sticks
- 8 wooden blocks
- 4 wooden blocks
- 1 sturdy straw
- 2 wooden dowels
- 2 rubber bands
- 1 cable tie
- Masking tape





1 The Hinge

Cut two ½-inch straw pieces. Then, tape one end of a 2/8 inch dowel and the other end and trim excess tape

Word Search

Find the following words: invention - engineer - Edith - curiosity - experiment - innovate, discover - creativity - mechanical - SWEET

N	I	N	V	E	N	T	I	O	N	R	K	A	L
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V	R	X	F	I	K	P	T	L	H	T	I	D	A
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R	U	T	Y	T	I	V	I	T	A	E	R	C	A

solution p. 13

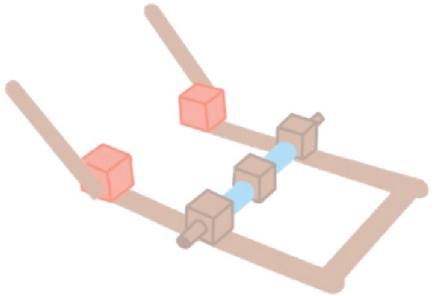
Additionally, she became the first female professor of electrical engineering at the University of Texas at Austin in 1947 and was the first woman to present a paper at the American Institute of Electrical Engineers in 1926.

"There is no demand for women engineers, as such, as there are for women doctors; but there's always a demand for anyone who can do a good piece of work."

LEGACY

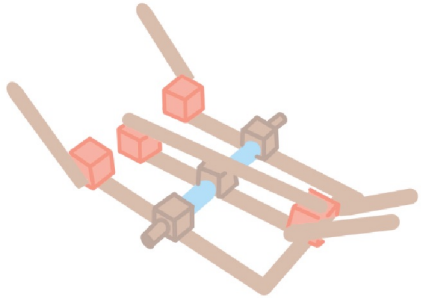
Edith Clarke was a trailblazer in electrical engineering and has undoubtedly shaped the field. Her legacy is marked with the publication of 18 technical papers that laid the groundwork for the "smart grid", her influential textbook Circuit Analysis of A-C Power Systems (which addressed critical issues in electrical equipment), and her receipt of prestigious awards such as the Society of Women Engineers (SWE) Achievement Award in 1954 and the Best National Paper Prize in 1941.

2 The Fingers



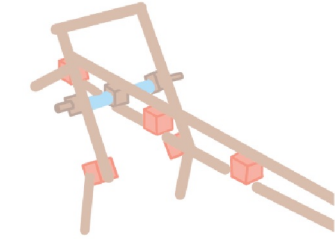
- Glue wooden blocks to the center of two popsicle sticks
- Cut another stick and glue it to one side to form a U-shape
- Glue a regular block to the end of each craft stick
- Glue half sticks to the sides at a 45° angle

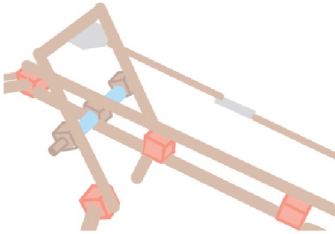
For the center finger, glue two half sticks and two blocks to the center hinge block. Then, glue two more half sticks at a 45° angle, away from the hinge and the first two fingers.



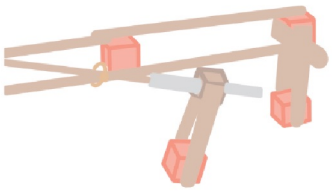
3 The Arm

- Glue popsicle sticks and blocks together to form a beam (overlap by 1 inches)
- Add 3 more sticks to extend the grabber (5-6 is recommended)
- Glue two half sticks and a bead at a 90° angle at the end to form the handle
- Glue another half stick to the end to rest your thumb

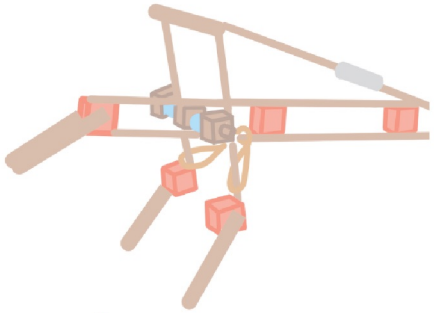




4 The Trigger



- Tape a dowel to the popsicle stick that connects the two fingers
- Thread two half sticks, a block with a hole, and a regular block onto the skewer near the handle



- Once adjusted, glue it onto the dowel.
- Finally, loop the rubber band around the outside fingers to the arm.

CHALLENGE YOURSELF!

Looking for a challenge? Get some marshmallows, set a timer for five minutes, and try to transfer as many of them as possible from one container to another. Be careful: you can't drop or squish them. You can only take one marshmallow at a time!

Keep track of the number of marshmallows successfully transferred. This challenge will require you to think like a true engineer by investigating the properties of the marshmallows, like softness, and their effect on the grip and handling of the hand (this will also require a lot of patience).

Women in STEM

Edith Clarke

1883 - 1959

By Aleena Wong

Edith Clarke was not only the first female electrical engineer in the US, but she was also the first female to hold a professional position as one. She is most famous for her work in inventing the graphical calculator, or the Clarke Calculator, as it greatly simplified complex calculations for electrical power transmission. Her invention was the basis for modern day graphical calculators and helped expand electrical infrastructure, bringing telephones and light across the country.

HER STORY

Edith Clarke was born in a small farming town in Maryland alongside her 9 siblings. At the age of 12, after losing both of her parents, she attended Vassar College.There, she studied math and astronomy, graduating with honors. After graduating, she taught math in various schools and attended Massachusetts Institute of Technology (MIT), where she pursued civil engineering.