



this issue

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Upcoming Events:

- 1. [OMSC](#), February 14, 2025, Zoom
- 2. [NORTech Robotics Challenge](#), February 20, 2025, Bowling Green
- 3. [ITEEA 2025 Conference](#), April 2-5, 2025, St. Louis, MO
- 4. [National Robotics Challenge](#) April 3-5, 2025, Marion

## 2025 OTEEA School Exhibits and Restoration Innovation

This year's 2025 Spring OTEEA School Exhibit Program will be a one day event in conjunction with National Robotic Challenge event Friday April 4th. This year's School Exhibit program will be on the Marion County Fairgrounds.

We encourage your involvement in this year's school exhibits and the Restoration Innovation challenge. It will prove to be rewarding to you, your students, your program, and your school. Whether you bring one project or many, it will promote public awareness of your program and Technology and Engineering Education.

For more information contact: [Levi Brown](#) - OTEEA School Exhibits Manager



More School Exhibit information and application are coming soon.

Our second challenge is a new Restoration Innovation. Details are coming but the idea is to Create a unique project of your choice from something that is considered junk/ not pretty/useless. [The current draft of the rules is here.](#)

### National Robotics Challenge



The National Robotics Challenge is April 3, 4 & 5, 2025 in Marion, Ohio. The contest manual is [available here.](#)

OTEEA webinars [online archive](#)

OTEEA News, Resources, and Notes [online archive](#)

STEM is Elementary [Newsletter Subscription And Archived Issues](#)

[STEM competitions and more resources](#) spreadsheet

[Link to OTEEA membership form](#)

## How is the National Robotics Challenge different from other robotics competitions?

1. No specific kit to buy.
  - At the National Robotics Challenge we believe that engineering is not just about taking the same parts as someone else and changing how they are put together. Engineering is about finding the materials and equipment that is best for the problem you are given.
2. Low costs.
  - With entry fees that are low and no mandatory kit to buy, your school will have more money to spend on the materials and equipment to build robots.
3. A contest that your students can continue through college.
  - The National Robotics Challenge contests are open to students in 6th grade through graduate school. This not only allows your students to continue with robotics as they move on, but it also let's them meet students at the next level that will inspire and encourage them.

[Read more](#) also includes highlight video.

Registration must be received no later than Friday, February 21st, 2025.



## Ohio Mathematics and Science Coalition (OMSC) Meeting

Friday, February 14, 10 am to 12:30pm on Zoom

Keynote speaker: Jackie Kraemer

Topic: Thinking Differently About Math:  
Observations from Top Performing  
Systems Globally

There will also be updates from Professional Organizations, the Ohio Department of Higher Education, and the Ohio Department of Education and Workforce. For more information or to get the Zoom link contact [Paul Post](#).

## NORTech Robotics Challenge

The [NORTech Registration Link](#) is live. The 2nd annual NORTech Robotics Challenge will be held Thursday, February 20, 2025, from 9:30 am – 2:00 pm at the BGSU Student Union.

**Registration is due January 31 but T-shirt info needs to be in this Friday, January 24.**

Events will follow the rules as published in [The NRC 2025 Contest Manual](#). The cost to enter is \$5 per robot.

This year we are introducing 4 additional **NORTech EXCLUSIVE** events intended for Elementary and early Middle School students just getting started in robotics. These are:

- Triathlon (combined score)
- Shuttle Run
- Line Dancing
- Line Following Race

At the end of this newsletter is a flyer and the Robotic Triathlon rules.

If you would like to help judge, please complete the registration form with your information including the names of people from your business or organization, and choose the event(s) you are interested in judging from the pull-down menu. Thank you for all the work you do with students.

Contact if you have any questions:

[Gabe Oberlin](#), MEdAdmin

Horticulture & Technology Instructor

Patrick Henry High School

work: 419-274-5026

## ARRL Teachers Institute on Wireless Technology

The ARRL Teachers Institute on Wireless Technology is a donor-funded professional development program designed to help classroom

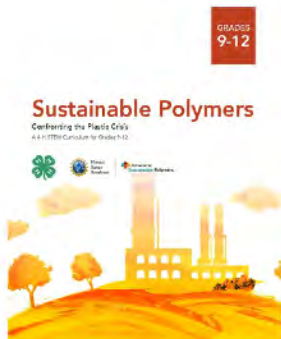
teachers elevate their STEM programs through the use of wireless technology. As a part of the ARRL **Education & Technology Program**, several sessions are conducted each year, and the program continues to grow. Teachers Institute is filled with lectures, hands-on activities, and demonstrations to inspire teachers so they can inspire their students through the use of tools and strategies to introduce basic electronics, radio science, satellite communications, Amateur Radio, radio direction finding (fox hunting), weather science, microcontrollers, and electronic sensors to their students. Teachers are provided with the equipment needed to take wireless technology to their classrooms.

[Read more](#)

Several Ohio teachers have participated in the past and speak highly of the experience.

## 4H Meet The Author Webinar on Plastics

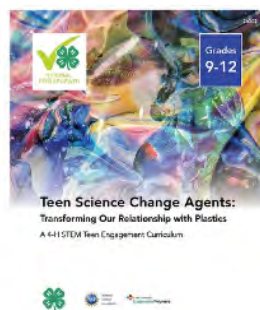
Join us for a Meet The Author session all about two different Teen Polymer Science curricula - Sustainable Polymers: Confronting the Plastic Crisis, Grades 9-12 AND the Teen Science Change Agents. Hear from the author as they explain more about the curriculum and give tips and best practices for implementing it in your program.



[Sustainable Polymers: Confronting the Plastic Crisis, Grades 9-12](#)

[Teen Science Change Agents: Transforming Our Relationship with Plastics](#)

[Register here](#)



## NEO:STEM

Newsletter discussing planning for Score With STEM with the Cavaliers on March 16, 2025 at Rocket Mortgage FieldHouse and STEM Day with the Guardians on May 14 at Progressive Field and more Northeast Ohio resources.

[Read more](#)

5 Ways to be a STEM Champion for Girls in 2025

'Tis the season once again for countdowns, reflections, and resolutions. Here at NGCP, we are incredibly inspired by all of the ways you have supported and uplifted girls in science, technology, engineering, and mathematics (STEM) throughout 2024. Looking ahead to the possibilities and excitement of another year, we are counting down five ways that you can continue working alongside us to support gender equity in STEM in 2025.

1. Be a Vocal Champion
2. Support Girl-Serving Programs
3. Counter STEM Stereotypes
4. Learn to Be an Ally
5. Stay Educated on Gender Equity Issues

[Read more](#)

## The 100 Year Project: a Guide to Imagining Education in 2074



[STEM ecosystems January newsletter](#)

This [comprehensive guide](#) explores potential futures for education technology over the next 50 years. It presents scenarios, trends, and challenges that could shape learning environments by 2074. The guide aims to inspire educators, policymakers, and technologists to think critically about long-term impacts of educational technology decisions made today. [Learn more about the project](#) and how you can get involved!!!



# Technology and Engineering Education News and Resources

Activities, Contests, Student Opportunities, and New Technologies

## ITEEA REACH Challenge Winning Teams Announced

Students from across the United States discovered today that their REACH Challenge projects, which changed the lives of people with different abilities in their communities, have earned awards through the International Technology and Engineering Educators Association (ITEEA). This year's award winners hail from eight states: Virginia, California, New Jersey, Illinois, New York, Hawaii, Delaware and Missouri.

**REACH Challenge** is an impactful Adaptive & Assistive Technology (AT) design-thinking project for middle school, high school, and college level STEM programs. Teachers are provided with lesson plans and activities on Empathy, User-Centered Design, Prototyping and more, to lead their students in using their STEM skills to REACH a member of their community who has a challenge to overcome. This innovative project shows students that they can use their STEM skills for social good, making a real-world difference in the lives of those around them.

[Read more and watch videos](#)

## ITEEA STEM Center for Teaching and Learning



[January Newsletter available here](#)

## Register Now for ITEEA's 2025 Conference in St. Louis



In April 2025, we converge to explore the transformative power of technology and engineering education. Together, we'll delve into how educators can amplify the benefits of innovation and forge connections that enable you and your students to thrive. View the preliminary [Agenda At-a-Glance](#).

[Registration](#)

Nestled against the iconic backdrop of the Gateway Arch, St. Louis sets

the stage for ITEEA's 2025 conference on April 2-5, where we'll converge to explore the transformative power of technology and engineering education. [View the full program of professional learning sessions, special events, networking opportunities, hands-on labs, and more!](#) Including Wednesday workshops onsite and an offsite workshop at Energizer Park, St. Louis CITY Soccer Club's stadium.

## January Issue of *STEM Sparks*

From ITEEA - Free to All!

Don't miss the just-released January issue of ITEEA's [STEM Sparks](#), with a focus on "Lit-Based Learning with Self-Determination Theory (SDT)." Bursting with knowledge and rich resources, *STEM Sparks* articles help guide educators through the dynamic landscape of their field. Each article is designed to excite and inform in equal measure, distilling complex concepts into digestible insights, and sparking a new idea, activity, or practice that can be immediately implemented in your classroom or workplace.

## Subscribe to the New AI in Education Newsletter

Discover new ways to harness the power of AI by subscribing to the new [AI in K-12 Education](#) newsletter from eSchool News. Get weekly AI news, insights, and resources delivered straight to your inbox – keeping you on the leading edge of the innovations powering education today.

[Subscribe for FREE today!](#)

## Ohio Companies Are Investing in Hydrogen Cars Despite Infrastructure Issues

Three Ohio companies are investing in hydrogen fuel cell passenger vehicles even as the U.S. market for electric vehicles continues to grow. Each has an innovative approach to the chicken-and-egg problem of having fuel available when and where drivers need it.

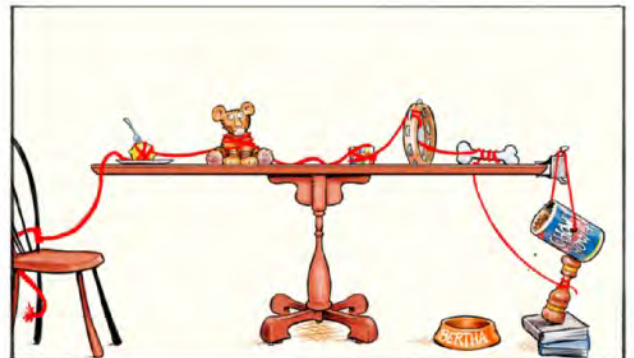
The Ohio companies' focus on fuel cell passenger vehicles is unique nationwide, especially for a state that doesn't yet have any public hydrogen fueling stations. California, where almost all of the country's hydrogen fuel cell cars are registered, still has [fewer than 60 public stations](#).

[Read more](#)

## 2025 Rube Goldberg Machine Contest



Team Registration deadline extended to February 1.



Picture Credit: Ed Steckley

This year's task is **Feed a Pet!**

There's still time to join us in person at the 2025 Rube Goldberg Machine Contest.

Compete at a live regional for the chance to attend World Championships

March 29, 2025 at Purdue University

Team registration open until: February 1, 2025

[Register Here](#)

For more information

[Click Here](#)

## Floating Solar Panels Could Support US Energy Goals

[NREL](#)

New Study Shows Federally Controlled Reservoirs Could Host Enough Energy To Power Approximately 100 Million US Homes a Year



For the first time, researchers have used more detailed criteria—like water depth and temperature—to get a more accurate idea of how many floating solar panels some U.S. reservoirs could hold. Even in their most conservative estimates, the country's reservoirs offer huge potential for future development and could host projects with capacities of up to 77,000 megawatts. *Photo from Getty Images*

[Read more](#)

## Why Aren't There More Women in STEM?

[STEM Education Works®](#)

According to the [Global Gender Gap Report](#) (2023), women comprise only 29.2% of the STEM workforce. Women in STEM are essential for fostering innovation, diversity, and equality. When they participate in STEM, they bring unique perspectives that drive creativity and better problem-solving.

Getting more women in STEM challenge stereotypes, closes gender gaps, and builds a workforce that reflects the diverse world we live in. How do we get more girls interested in STEM so

we can increase their representation? Start with some resources below!



Getting more women in STEM challenge stereotypes, closes gender gaps, and builds a workforce that reflects the diverse world we live in. How do we get more girls interested in STEM so we can increase their representation? Start with some resources below!

Girls in STEM Resources

### 1. [Fostering STEM Interest in Women and Girls](#)

This article emphasizes the importance of addressing the gender gap in STEM by creating inclusive classroom projects, showcasing successful women in STEM as role models, and promoting extracurricular STEM activities tailored for girls.

### 2. [Women In Engineering: An Interview with Bunmi Babajide](#)

The article highlights the underrepresentation of women, particularly Black women, in STEM fields and features the inspiring journey of Dr. Bunmi Babajide, an accomplished engineer.

### [3. Monthly Newsletter – Women’s History Month, March 2023](#)

The newsletter spotlights women in STEM, offering resources to inspire girls to pursue STEM careers and celebrate Women’s History Month. It also includes blog posts, free educational materials, STEM books about women, and introduces new account executives passionate about expanding STEM opportunities.

[Explore more resources](#)

## The Dawn of Electric Trucking Calls for High-Power Charging

NREL

NREL's Globally Unique ARIES Platform, Plus Decades of Electrification Research, Will Drive Medium- and Heavy-Duty Electric Vehicle Charging



Just a few years ago, electric trucks seemed like a distant dream. Yet in 2024, American companies deployed more than 15,000 medium- and heavy-duty electric vehicles (EVs)—including battery-electric semitrucks, passenger buses, and delivery vans.

Battery-electric trucks are not the only promising solution to reducing energy use in the transportation sector: Hydrogen fuel cell, biodiesel, and renewable diesel technologies will likely also play a role in helping slash the [20% of harmful transportation emissions](#) produced by trucks. These vehicles are strong contenders to complete

long-haul routes, which can often stretch for 1,000 miles or more.

But unlike other alternative fuel vehicles, electric trucks have hit American roads in force. As the e-commerce and freight industries boom, fleet orders for 2024 and beyond are [picking up speed](#), spurred by [increasing battery ranges](#) and [falling battery prices](#), [lower operating and maintenance costs](#), and [competitively low cost of ownership](#)—in addition to [duty cycle analysis](#) showing many regional and local routes can easily be completed by today's EVs.

[Read more](#)

## STEM Is Elementary



The January issue of STEM is Elementary is [available here](#).

## Teach Like A Hummingbird (Not a Helicopter)

[Edutopia](#)

Giving preschoolers freedom to choose what they learn, and how they learn it, fosters curiosity and independence in the classroom.

[Read More](#)

## From Discover Engineering Get Ready for Engineers Week!



### Plan an Event

With our volunteer & educator guides, we compiled tools, activities, talking points, and resources you need to make this year's event an easy lift!

Engineers Week Guide:  
[Educator Version](#)  
[Volunteer Version](#)

Girl Day Guide:  
[Educator Version](#)  
[Volunteer Version](#)

[More on the theme and resources here.](#)

### Sign up for our January webinars!

[Engaging Kids in Engineering Webinar:](#)  
[Wed, Jan 22](#)

[Celebrating Engineers & Promotion Tips:](#)  
[Wed, Jan 29](#)

-

## Chats With Change Makers

Thursday January 23 • 1PM ET

**DISCOVER** CHATS WITH CHANGE MAKERS

MEET JAMES DOUGHERTY  
ELECTRONIC TEST TECHNICIAN

James operates robotics to help create lasers, antennas and high-power microwave circuits.

Official Partner: RTX

Thurs Jan 23  
1PM US ET

> REGISTER NOW

A promotional graphic for a 'Chats With Change Makers' event. It features a blue and green color scheme. At the top left is the Discover Engineering logo. To its right is a circular portrait of James Dougherty, an electronic test technician. Below the portrait is a green button with a white hand cursor icon and the text '> REGISTER NOW'. To the right of the portrait, the text reads 'MEET JAMES DOUGHERTY ELECTRONIC TEST TECHNICIAN' followed by a short bio: 'James operates robotics to help create lasers, antennas and high-power microwave circuits.' Below this is the RTX logo with the text 'Official Partner:'. At the bottom right, a green banner contains the event details: 'Thurs Jan 23 1PM US ET'.

Meet James Dougherty, an electronic test technician at RTX who operates robotics to help create lasers, antennas and high-power microwave circuits for radars. Register NOW to join us on January 23 at 1pm ET to hear James' stories and ask questions!

Did you know you can send your questions in advance? Email [social@discovere.org](mailto:social@discovere.org)! Don't forget to share what grade-level & city you represent!

[RSVP: Jan 23 @ 1pm et](#)

## Organic Solar Cells Could Be Best for Space Missions

[Futurity](#)

Radiation testing suggests that solar cells made from carbon-based, or organic, materials could outperform conventional silicon and gallium arsenide for generating electricity in space, researchers report.

[Read more](#)



# The Role of Power Transformers in Electrical Grids

[Machine Design](#)



Design engineers should know how transformers work so they can design machinery that operates optimally within the proper voltage ranges. Because the equipment that these engineers design will interface with electrical systems, they need to know the correct voltage and current levels to prevent malfunctions or damage and ensure safety.

[Read more](#)

## Spotlight on... Free Coding Websites for Kids! [Get Caught Engineering](#)



Here are just a few of the tried-and-true free coding websites available. They are perfect for indoor recess or a weekly hour of code.

Best of all, students can access these at home!

- Code.org® at [Learn today, build a brighter tomorrow. | Code.org.](#)
  - [Code.org](#) believes that every student should have the opportunity to learn computer science as part of the core education.
  - Free learn to code activities for grades K-12.
- Scratch at [Scratch - Imagine, Program, Share](#)
  - Scratch is the world's largest free coding community for children and is available in 70 languages.
  - It has a simple visual interface allowing kids to create digital stories, games and animations.
- Blockly games at [Blockly Games](#)
  - Blockly teaches kids to code using drag and drop blocks to solve challenges.
  - Although no prior experience is necessary, children need to be able to read independently.
- Gamestar Mechanic at [Gamestar Mechanic](#)
  - Gamestar Mechanic uses fun, game based quests to help coders learn game design, with the goal to code and share their own video games.
- Code Monster at [Code Monster from Crunchzilla](#)
  - Code Monster teaches kids Javascript programming through fun, interactive lessons with a blue monster.
  - Children must be able to read independently.

## Inside Look: a Design Engineer's Guided Tour of Zebra Technologies' R&D Facility

[Machine Design](#)

Tim Kyowski, site leader of Zebra Technologies' Canadian R&D facility, led Machine Design on a tour of the R&D facility. The mechanical design engineer talked about his role at the front end of designing wearables mobile technology.

[Watch tour and read more](#)

## PAST Summer Experiences 2025

Registration Opens ONLINE on Saturday, January 25th at 10 AM | In-person registration is not necessary

In-person registration is not necessary. PAST Innovation Lab will be open from 10 AM - 1 PM, with computers and registration support.

[2025 Summer Catalog](#)

[More Information](#)

## The Master Guide to Creating Model Trees!



There are many ways to make realistic trees as well as various styles you can create for your layout. In the Master Guide to Creating Model Trees, we've compiled our top videos to teach you how to create the best model trees! Download the free guide to get started.

[UNLOCK NOW](#)

## 2025 National Stem Festival

March 19 - 25, 2025  
Washington, DC

The National STEM Festival celebrates the exceptional talents of our nation's youth and the innovative businesses driving progress, all year round.

Sign up to receive announcements, explore digital learning opportunities, and engage in networking [here](#).

## OETC25 Session Schedule Is Here!



The [presentation schedule](#) for OETC25 is available. Check out the sessions, presenters, and many exciting topics that explore the conference theme of "Innovation. Access. Collaboration." Sessions are centered around the conference tracks that include instruction, information technology, leadership, and library and media specialists.

[OETC](#) will be at the Greater Columbus Convention Center on Feb. 11-13, 2025. You can book your hotel stay through the [Experience Columbus Passkey](#).

Keep an eye on [@OhioEdTech](#) on X (Twitter), [Facebook](#) and the conference website <https://oetc.ohio.gov/> as we release more information about keynotes, sandbox presentations, student demonstrations, exhibitions, and vendors. There is lots of exciting news on the way!

Please reach out to [info@oetc.ohio.gov](mailto:info@oetc.ohio.gov) with any questions.

## How Sponge Cities Offer a Sustainable Solution to Rising Sea Levels

[wbur](#)



Hugo Urbina, of SumCo Eco-Contracting, lifts a panel into the new living seawall at the Condor Street Urban Wild in East Boston. (Robin Lubbock/WBUR)

Kongjian Yu, the son of a rice farmer who tended terraced water-filled rice fields in China, is now a world-renowned leading voice on what he calls 'sponge planet.' Sponge cities, sponge waterfronts, places where water from rising seas is allowed space to flow in and out of areas instead of crashing over sea walls. And falling rain — stormwater — is captured and soaked up like a sponge. It's used again during drought, to irrigate or to fill beautiful urban water parks.

"We don't box with water. We don't fight it," Yu says. "We make it our friend."

He created Peking University's College of Landscape Architecture and founded the company

Turenscape, which builds huge sponge projects around the world. His work has won the industry's highest awards, including the Oberlander Prize.

[Read more](#)

Information on other sponge cities can be found on the internet.

## The Engines of Ingenuity

University of Houston, Cullen College of Engineering

The Engines of our Ingenuity was founded by John Lienhard and is hosted by [Houston Public Media](#). He and many others use the series to tell the story of how our culture is formed by human creativity. The program uses the record of history to reveal the way art, technology, and ideas have shaped us. Episode topics range from cable cars to Civil War submarines, from the connection between Romantic poets and Victorian science to the invention of the bar code.

The series is broadcast five days a week by over thirty National Public Radio affiliates nation-wide. Episodes are under four minutes long. They have transcripts that often include pictures. The over 3,300 episodes are [available here](#). One on windmills [is here](#).

## How Much Energy Does It Take To Get Meat on Your Table?

[Futurity](#)

Researchers have calculated just how much energy it takes to put animal products like meat, cheese, and eggs, along with other foods on our tables.

It turns out that animal products were responsible for almost 60% of the energy footprint of agriculture worldwide in the period from 2015-2019, according to the new research.

That energy is predominately from fossil fuels, says Edgar Hertwich, a professor at the Norwegian University of Science and Technology's

(NTNU) Industrial Ecology Programme and senior author of the new paper.

As societies are working to moving towards renewable energy, they are often choosing electricity as a green alternative, Hertwich says.

“But what’s the solution for agriculture?,” he says. “Animal husbandry is hugely inefficient. We first produce edible products and then we feed these edible products to animals to get a much smaller fraction of the calories back.”

As a result, animal-based products, with their giant energy footprint, provided just 18% of the calories consumed worldwide in 2015-2019, the latest period for which the researchers had data.

[Read more](#)

## World’s First Inflatable Farm Uses 99% Less Water To Grow Vegetables in Deserts

[Interesting Engineering](#)

The lightweight and portable modules are not only 75% lighter than conventional container farms but also designed for quick installation, requiring just half a day.



Leafy greens growing in an AirFarm in Jordan. [Midbar](#)

At [CES 2025](#), Jordanian company AirFarm introduced a new, innovative approach to indoor farming with its innovative inflatable modules that utilize aeroponics to grow crops faster and with never-seen-before efficiency.

By employing a micro mist aeroponic system, AirFarm achieves water usage reductions of up to 99% compared to traditional agriculture, making it a game-changer for water-scarce regions and urban farming.

The lightweight and portable modules are not only 75% lighter than conventional container farms but also designed for quick installation, requiring just half a day. This efficient design also enhances shipping logistics, allowing 10 units to fit into a single container, eliminating the need for a trailer.

[Read more](#)

## National Apprenticeship Week: NEW Apprenticeship Arcade Games!

[All About STEM](#) - This is a British resource so the Apprenticeship Week is over there. But the games work here!

[National Apprenticeship Week](#) starts on the 10th of February and Amazing Apprenticeships have you covered with [an amazing resource bundle](#) and new Apprenticeship Arcade games!

The [Apprenticeship Arcade](#) is packed with interactive games and quizzes to help young people explore and learn about apprenticeships. Match jobs to roles, guess the apprenticeship emojis, identify real apprenticeships, name the logos and more.

Click the links below to have a go. Different games can be played in groups or independently.

[NEW: Meet the Employer – Logo Reveal](#)

[NEW: Whackamole Apprenticeship Application Process – Wordwall](#)

[NEW: Linking Apprenticeships & Subjects](#)

[NEW: Apprenticeship Wordsearch – Wordwall](#)

[NEW: Apprenticeships FAQs – Blooket](#)

[Balloon Pop Game](#)

[Whack-a-mole Game – Wordwall \(Edition 2\)](#)

[Life as an Apprentice Game \(Blooket\)](#)

[Apprenticeships Missing Words Quiz \(Kahoot\)](#)

## [Key Apprenticeship Terms – Wordwall](#)

[True or False Game](#)

[Apprenticeship Logo Game](#)

[Apprenticeship Facts Game](#)

[Apprenticeship Halves](#)

[Apprenticeships Emoji Quiz](#)

[Celebrity Apprentices Game](#)

[Apprenticeship Basics Game](#)

[Guess The Apprenticeship Quiz](#)

[Short Guide to Blooket](#)

[Shot Guide to Kahoot](#)

[Click to find out more & view the resources!](#)

## [ASK – School & College Apprenticeships Support](#)

Browse the [ASK Brochure](#) to find out about the wide range of free apprenticeships support available.

[Amazing Apprenticeships](#) is a key partner supporting the ASK Programme with content, communications, webinars, workshops and more.

## What Did People Do Before Eyeglasses?

### [History Facts](#)

Somewhere in the vicinity of Pisa, Italy, around 1286, an unknown craftsman fastened two glass lenses to a frame likely made of wood or bone to create the first eyeglasses.

With approximately two out of three adults in the United States today requiring some form of visual aid, it's safe to say that invention has been well received. But even though 1286 is well before any of us first discovered the splendor of improved eyesight, it's relatively recent in the larger picture of human existence. So how did people with subpar vision get by before there was a convenient LensCrafters to pop into?

[Read more](#)

## Eyes in Space: Wildfires 101 and How NASA Fights Them

[The Kid Should See This](#)

Watch to discover how both polar-orbiting and geostationary satellites work together to monitor fires day and night, measure burn scars, and track the recovery of affected landscapes over time. Plus, learn about the three key ingredients that make wildfires possible in the first place: “fuel to burn, the right conditions, and a source of ignition.”

[Watch and read more](#)

## AI Could Help Stop Train Wrecks

[Futurity](#)



Credit: [Getty Images](#)

Researchers have found a way to use artificial intelligence and guided ultrasonic waves for detecting faults inside switch rails.

Their model is a significant advancement from the existing ones. It has the potential to be used for practical purposes, including preventing train accidents.

With an increased demand for faster trains, switch rails (regions of tracks where trains switch from one direction to another) tend to get more easily damaged—especially in high-speed rail tracks—due to their special structures and heavy workload, increasing the risk of train accidents.

To help solve this problem, AI researchers at Stony Brook University have found a way to use AI and guided ultrasonic waves for detecting faults inside switch rails.

[Read more](#)

## How Were the Egyptian Pyramids Built?

[History Facts](#)

The Egyptian pyramids stand as one of humanity's most remarkable architectural achievements, and their incredible precision and massive scale have confounded researchers for centuries. Despite numerous theories and extensive archaeological research, the exact methods of their construction remain a subject of scholarly debate. How did ancient Egyptians erect pyramids using millions of massive blocks weighing as much as 2.5 tons each? And how, more specifically, did they move those blocks up the superstructure?

[Read more](#)

## Extreme Wildfire: Deadly, but Not for the Climate?

[PBS Weathered: Earth's Extremes](#)

A fire tornado, or "firenado," is exactly what it sounds like: a tornado made out of fire... and it is truly the stuff of nightmares. The most famous example occurred when the 2018 Carr Fire spawned an EF3 fire tornado with estimated wind speeds of 143 mph! And as climate change drives increasing wildfires around the planet, it only makes sense that we see more fire tornadoes as well

[Watch](#)

## America's Secret History in Greenland

[Interesting Engineering](#)

During an April 2024 flyover of Greenland, NASA scientists made an incredible discovery, uncovering the remnants of a hidden city buried deep beneath the ice. This turned out to be Camp Century. A US military research base, setup during the Cold War as a strategic location for fighting the USSR

[Read more and watch](#)

## US Creates Strongest-Ever Armor Material With 100 Trillion Bonds per Cm<sup>2</sup>

[Interesting Engineering](#)

Unlike conventional methods, the manufacturing process of the 2D polymer is highly scalable.

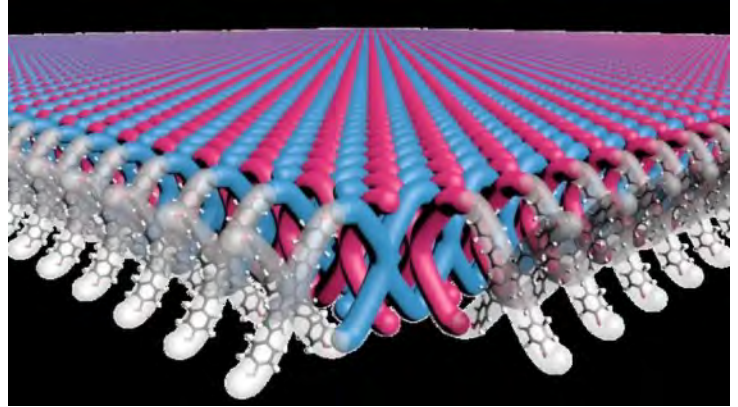


Illustration shows X-shaped monomers are interlinked to create the first 2D mechanically interlocked polymer. [Mark Seniw, Center for Regenerative Nanomedicine, Northwestern University](#)

A research team led by scientists at Northwestern University has developed the first-ever two-dimensional mechanically interlocked material with high flexibility and strength. In the future, this could be used to develop lightweight yet high-performance body armor and other such tough materials, a press release said.

[Read more](#)

## NC State Design Lab

The Design Lab is dedicated to teaching design as a way of thinking and to delivering design education experiences to benefit the K-12 community and beyond. Through active partnerships with College of Design faculty, students, alumni, and community, the Design Lab integrates collaborative, immersive, and interdisciplinary programming and resources for students and educators. We assert that design is a skill of everyday life, and seek to promote development of these skills for the betterment of the future.

[Website](#)

## 5 Inventions That Came Out of the Great Depression

### [History Facts](#)



Photo credit: [Popovic Dragan](#) via Getty Images

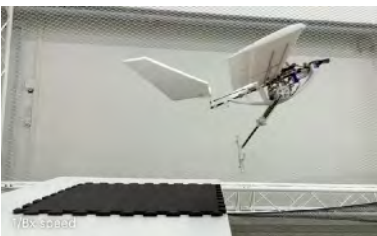
The Great Depression began in 1929 and lasted for an entire decade, affecting nearly every aspect of daily life for people all over the world — and hitting the United States especially hard. U.S. unemployment soared to nearly 25%, businesses shuttered, and families lost their life savings. Food became scarce in many communities, especially as a severe drought hit the Great Plains, leading to the agricultural disaster known as the Dust Bowl.

This difficult era also impacted innovation. Independent inventors found themselves with less funding, and many businesses shied away from risky initiatives, but big inventions also helped keep companies and innovators afloat during the hard times. Some inventions were successful specifically because of the economic downturn, such as the groundbreaking new adhesive that could repair just about anything. For others, success came in spite of the crisis. Here are five inventions that came out of the Great Depression that are still shaping our lives today.

[Read more](#)

## RAVEN, a Flying Robot That Takes Off Like a Bird

### [The Kid Should See This](#)



Meet **RAVEN**—the **Robotic Avian-inspired Vehicle for multiple ENvironments**—a flying robot that's bringing scientists closer to understanding one of nature's most impressive moves: how birds leap from earth to sky.

With avian-inspired multifunctional legs, this 600-gram (21-ounce) marvel—about the weight of a crow—can walk, hop, and impressively jump straight into powered flight, reaching speeds of 2.4 meters per second (about 5.4 miles per hour) from a standing start.

[Read more and watch](#)

## Organic Solar Cells Could Be Best for Space Missions

### [Futurity](#)

Radiation testing suggests that solar cells made from carbon-based, or organic, materials could outperform conventional silicon and gallium arsenide for generating electricity in space, researchers report.

[Read more](#)

## KidWind



Dream big, but start small! Join KidWind as we help teachers and students creatively explore the science, technology and implications of a world powered by clean energy.

[What We're About](#)

They have a variety of challenges for students in grades 4-12. [Check out their website](#). They also have curriculum and teacher trains.

[Episode of This American Land featuring KidWind](#)



1. The Outreach group is looking for more members!
2. Have a story or pictures to share that tell about your program or

- students? Let us know!
3. The webinar has been discontinued. Archived webinars can be [viewed at online](#).

4. What OTEEA programming would you like to see? Contact [Paul Post](#)

"Technology is anything that wasn't around when you were born."  
Alan Kay  
(Computer Scientist)

## This Week's Technology Tip

### Electrolysis Rust Removal: Restore Old Tools with Ease

[Woodworkers Guild of America](#)

Ever get to an auction or flea market and stare lovingly, but in despair, at a hand plane that you'd love to own, but are going to pass on because it's too rusty? There's a solution to this problem.

Electrolysis. It's crazy cool and easy to do.

Here's the overview: Submerge the tool in a solution of baking soda and water, connect a battery

charger, and let it sit overnight. By the next day, the rust will have sloughed off.

The beauty of using electrolysis for rust removal is that you're not abrading the tool and removing metal. It's better for the tool, especially if you're concerned about its value if you don't hit it with sandpaper or a wire wheel. This, and the ease of doing it, makes electrolysis the perfect answer for restoring old tools. Electrolysis provides a very easy way to get rust out of a tool's nooks and crannies. [Read more](#)







Northwest Ohio  
Regional Technology  
Robotics Challenge



# NORTech ROBOTICS CHALLENGE



## Events

- ✓ Box Bot
- ✓ Mini-Sumo Robot
- ✓ Rescue Robot
- ✓ Robot Maze Contest
- ✓ Combat Robot
- ✓ Manufacturing Workcell
- ✓ Robo Hockey
- ✓ Sumo Robot

## New for 2025

- ✓ Shuttle Run
- ✓ Line Following Race
- ✓ Line Dancing
- ✓ Triathlon

**Date:**  
February 20, 2025

**Venue:**  
Bowling Green  
State University®



Gabe Oberlin



goberlin@phpatriots.org



419-274-5026

# Robotics Triathlon Rules

Intended for elementary and middle school students using commonly available educational robots like LEGO Mindstorms, VEX IQ, or similar kits. This activity combines competition with skill-building in robotics and engineering.

Objective: Each robot will compete in three events—Shuttle Run, Line Dancing, and Line Following—scoring points in each challenge. The robot with the highest combined score across all three events will be the Robotics Triathlon champion.

1. Robot Specifications
  - a. Type: Robots must be assembled from educational robotics kits (e.g., LEGO Mindstorms, VEX IQ, Makeblock), with programming completed in advance.
  - b. Size and Weight Limits: Robots should not exceed 8 inches in width, 8 inches in length, and 12 inches in height, with a weight limit of 2 pounds.
  - c. Sensor and Component Restrictions: Robots can use line-tracking sensors, distance sensors, and light sensors but may not use GPS or external guidance.
2. Event Breakdown
  - a. Event 1: Shuttle Run (Agility Test)
    - i. Weighting: This event is weighted at  $\frac{1}{3}$  of the final score.
  - b. Event 2: Line Dancing (Rhythm and Synchronization)
    - i. Weighting: This event is weighted at  $\frac{1}{3}$  of the final score.
  - c. Event 3: Line Following (Precision and Navigation)
    - i. Weighting: This event is weighted at  $\frac{1}{3}$  of the final score.
3. Scoring and Ranking
  - a. Overall Scoring: Each event is scored individually, and points are converted into a ranking for that event. For example, the first-place robot in an event receives one point, second-place receives 2, and so on.
  - b. Aggregate Scoring: Total scores from all three events are combined to determine the overall ranking. A score of three would be awarded to a robot who placed 1st in all three events.
  - c. The robot that completes all three events with the lowest aggregate score will be declared the winner.
4. Safety and Conduct
  - a. Robot Safety: Robots must be constructed safely, with no loose or hazardous components.
  - b. Fair Play: Robots may not interfere with other robots or obstruct the track. Unsportsmanlike behavior may result in penalties or disqualification.
  - c. Testing Period: Each team will have a set time before the triathlon starts to calibrate their robots for each event.
5. Awards and Recognition
  - a. Triathlon Champion: Awarded to the team with the highest combined score across all events.
  - b. Event-Specific Awards: Additional recognition for teams achieving the highest score in each event.
  - c. Creativity Award: Given for the most innovative or visually creative robot design.

This Robotics Triathlon challenges students to design, program, and adapt their robots for varied tasks, emphasizing versatility and broad robotics skills. The competition format not only hones their technical abilities but also encourages creativity, teamwork, and sportsmanship.

## Shuttle Run Robotics Challenge

Intended for elementary and middle school students using commonly available educational robots like LEGO Mindstorms, VEX IQ, or similar kits. This activity combines competition with skill-building in robotics and engineering.

**Objective:** The goal is for each team to program and control a robot to complete a shuttle run, navigating a straight path to the far end of the field, returning to the start line, and repeating the process for two complete laps as quickly as possible. The robot with the fastest completion time wins.

1. Robot Specifications:
  - a. Type: Robots must be created from widely accessible educational kits like LEGO Mindstorms, VEX IQ, Makeblock, Sphero, etc.
  - b. Size Limit: Robots should not exceed 8 inches in width, 8 inches in length, and 12 inches in height.
  - c. Weight: Total weight should not exceed 2 pounds.
  - d. The robot must have a front and back marked with an arrow towards the forward face.
  - e. Autonomous or Remote-Controlled: Teams may choose either autonomous operation or remote-controlled navigation. Remote-controlled robots will receive a -15 second time penalty.
2. Course Specifications
  - a. Length of Course: The shuttle run path will be a straight 8-foot track with a marked starting line 12 inches from the starting wall and a turnaround line 12 inches from the other end.
  - b. The walls at both ends of the track will be 3.5 inches tall.
  - c. The lane width will be 12 inches, and marked with lines.
  - d. There will be a black center line running the length of the course.
  - e. Surface: The track surface will be a smooth, non-slip mat or similar surface to ensure stable movement.
3. Rules for the Shuttle Run:
  - a. Task Completion: Robots must complete 2 laps down & back while staying in their lane.
  - b. Turnaround: The robots must turn around when changing direction. i.e. they may not go forward for one length and then backward for the next.
  - c. Penalties: There will be a -5 second time penalty if the robot crosses outside designated path lines.
  - d. If a robot comes into contact with another robot, the robot outside of its designated lane will be disqualified for that run.
4. Scoring and Judging Criteria
  - a. The robot with the fastest single time to traverse the course will be the Speed Champion.
  - b. Autonomous advantage: In the event that a robot operating autonomously ties the time with a remotely controlled robot the autonomous robot will be declared the champion.
  - c. Reliability: the robot with the fastest average time to traverse the course will be declared the Reliability Champion.
  - d. Creativity and Innovation: Judges may recognize unique designs, innovative mechanisms, or sensors used to improve shuttle efficiency with the Creativity Champion award.
5. Safety and Fair Play
  - a. All teams must adhere to safety protocols, including secure attachment of parts, stable handling, and no intentional obstruction of other robots. Fair play is essential; teams found interfering with others may be disqualified.

## Robot Line Dance Challenge Rules

Intended for elementary and middle school students using commonly available educational robots like LEGO Mindstorms, VEX IQ, or similar kits. This activity combines competition with skill-building in robotics and engineering.

**Objective:** The goal is for students to program a robot to perform dance moves inspired by the Cotton-Eyed Joe line dance. Each robot must navigate a dance floor, synchronizing to the beat and repeating a series of programmed moves. Points are awarded based on timing, creativity, and accuracy.

1. Robot Specifications
  - a. Type of Robots: Teams may use robots from common educational kits (LEGO Mindstorms, VEX IQ, etc.), with all programming done in advance.
  - b. Size Limit: Each robot may be up to 8 inches in width, 8 inches in length, and 12 inches in height.
  - c. Weight: Total weight should not exceed 2 pounds.
  - d. Number of Robots: Individual robots will be judged on timing, accuracy, choreography, and style. Each school may compete with multiple robots performing a coordinated group of robots for more complex choreography.
2. Dance Floor Setup
  - a. Floor Size: The designated "dance floor" will be a 6x6 foot square marked with a grid for reference, helping robots align their movements.
  - b. Dance Zones: The floor may include up to four designated "dance zones" (marked areas where specific moves need to be executed).
  - c. Lighting and Music: The Cotton-Eyed Joe song will play, with a set beat for timing. Optional lighting cues may be used to help indicate when certain moves should be executed.
3. Dance Move Requirements
  - a. Teams must program their robots to perform a series of moves inspired by line dancing. Required moves may include:
    - i. Forward Step and Back Step: Moving forward and backward in sync with the beat.
    - ii. Side Step (or Shimmy): Moving to the left or right across the grid.
    - iii. 360° Spin: Completing a full spin at specific points in the routine.
    - iv. "Do-Si-Do": If using multiple robots, they must navigate around each other in a circle or square pattern.
    - v. Freestyle: An opportunity for teams to incorporate a creative move inspired by their unique robot design.
4. Rules and Scoring Criteria: Robots will receive a score from 1-10 based on the following criteria. The team score will also include a score for uniformity of moves.
  - a. Timing and Rhythm (25%): Robots must keep in sync with the beat, demonstrating timing accuracy and consistency throughout the dance.
  - b. Accuracy of Moves (25%): Each required move must be executed accurately within the designated dance zones. Points are deducted if the robot misses a move or strays from the zone.
  - c. Choreography and Creativity (25%): Teams are encouraged to create innovative moves or combine moves for a unique routine. Creativity in movement, design, and synchronization will earn additional points.
  - d. Performance and Style (25%): Robots are encouraged to "dress up" (e.g., hats, cowboy-themed decorations) and show flair through movement to embody the spirit of Cotton-Eyed Joe.
5. Safety and Conduct
  - a. Robot Safety: All robots must be stable and secure; no loose parts or hazardous attachments are allowed.
  - b. Fair Play: Teams may not interfere with other robots on the dance floor. Teams are encouraged to collaborate respectfully and celebrate each other's performances.
6. Competition Format
  - a. Each team will have a 2-minute routine to perform on the dance floor. Judges will score based on the criteria above, with prizes for the best timing, creativity, and overall performance.

This competition makes programming fun and also challenges students to think creatively about how robots can mimic human actions and rhythms in a lighthearted, music-filled challenge.

# Line Following Race Rules

Intended for elementary and middle school students using commonly available educational robots like LEGO Mindstorms, VEX IQ, or similar kits. This activity combines competition with skill-building in robotics and engineering.

**Objective:** The goal is for each robot to follow a black line on a white surface, navigating curves, sharp turns, and straightaways as quickly as possible. The robot that completes the course in the shortest time wins.

1. **Robot Specifications**
  - a. **Type of Robots:** Robots must be built from educational robotics kits (e.g., LEGO Mindstorms, VEX IQ, Arduino-based kits).
  - b. **Size Limit:** Robots cannot exceed 8 inches in width, 8 inches in length, and 12 inches in height.
  - c. **Weight:** Total weight should not exceed 2 pounds.
  - d. **Sensors:** Each robot can be equipped with light, color, or line-tracking sensors to detect the line, but no external guidance or assistance is allowed.
2. **Course Specifications**
  - a. **Track Width:** The black line will be 1 inch wide, set against a white surface to provide contrast.
  - b. **Course Length:** The track will be approximately 10–15 feet long, containing a mix of straight paths, curves, and at least one 90° turn.
  - c. **Boundaries:** Robots must remain within a 3-inch buffer zone around the track. Leaving this buffer zone counts as a "track exit."
3. **Race Rules**
  - a. **Starting and Ending:** Robots will start behind a designated line and end when the robot crosses the finish line. Time begins once the robot starts moving and stops when the finish line is crossed.
  - b. **Track Exits:** If a robot exits the track, the timer pauses, and the robot must be placed back on the track at the last exit point. Each track exit incurs a 5-second penalty.
  - c. **Sensor Use:** Robots must navigate using only their sensors—no remote control is allowed during the race.
  - d. **Autonomous Operation:** Robots must operate autonomously throughout the course. Any manual intervention disqualifies the robot from that race attempt.
4. **Scoring and Timing**
  - a. **Race Timing:** Each team gets two timed attempts, and the faster time is recorded. The shortest completion time, after penalties, determines the winner.
  - b. **Penalties:** A 5-second penalty applies for each track exit or if a robot touches a boundary marker.
  - c. **Tiebreaker:** In case of a tie, the robot with fewer penalties is declared the winner. If there is still a tie, a third run will be held as a tiebreaker.
5. **Safety and Conduct**
  - a. **Robot Safety:** All robots must be securely constructed to avoid breakdowns during the race. Teams must ensure their robots are safe for both participants and the course.
  - b. **Fair Play:** Teams should not interfere with other robots or obstruct the track. Unsportsmanlike behavior may lead to disqualification.
6. **Judging Criteria**
  - a. **Speed and Accuracy (50%):** The primary score is based on completion time after penalties.
  - b. **Reliability (30%):** Consistent tracking, minimal exits, and smooth handling of curves are key for a high score.
  - c. **Innovation (20%):** Points are awarded for innovative design elements that enhance line-following capability, such as unique sensor placement or advanced algorithms.
7. **Competition Format**
  - a. **Trial Runs:** Teams will have two trial runs to practice on the track before their official attempts.
  - b. **Timed Runs:** Each team completes two timed runs, with the fastest counted toward final scoring.

This competition provides a balance of speed, precision, and problem-solving, making it ideal for students developing practical robotics skills.