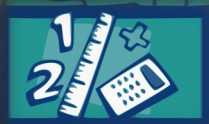# STEAM NEWSLETTER

THE OFFICIAL NEWSLETTER FOR THE ILLINOIS DEPARTMENT OF INNOVATION & TECHNOLOGY (DoIT) STEAM EDUCATION GROUP

National STEM/STEAM Day
Nov. 8, 2022

November 8th has been designated as National STEM/STEAM Day. Explore fun ways to spark curiosity and encourage exploration of STEAM careers, STEM Stats from the U.S. Census Bureau, Illinois State Board of Education STEAM website, Exploratorium, or National STEM day activities.

Plan ahead to celebrate Computer Science Education Week December 5-11, 2022 and learn about the related Technology Student Association competitions.

International Education Week 2022
Nov. 14 - 18, 2022

Absorbed in a globalized and diverse society, we are intersecting with multi-culture and inclusive educational environment. According to U.S. Department of Education, "International

Education Week (IEW) is an opportunity to celebrate the benefits of international education and exchange worldwide. This joint initiative of the U.S. Department of Education and the U.S. Department of State is part of our efforts to promote programs that prepare Americans for a global environment and to attract future leaders from abroad to study in the United States."

University of Illinois at Urbana-Champaign, University of Illinois Springfield, Illinois State University, Northern Illinois University, Illinois Wesleyan University, other institutions, organizations, and agencies will celebrate the week, and promote the preparation for a global environment. Activities and events will be hosted to encourage students and educators to share and learn different cultures together.

Let off some STEAM with these fun activities!

◊ **K - 4**
NASA | Observing the Moon

◊ **5 - 8**
IMSA | Chewing Gum Challenge – 7 years to digest?

◊ **9 - 12**
Project WET | Ocean Rising Puzzle Answers

Educator's Corner

STEAM resources for in-person, hybrid, remote learning, and professional development

- Center for Ecoliteracy | Understanding Food and Climate Change

- EEA | Illinois Environmental Education Resource Database

- ENVIROTHON | NCF-Envirothon iNaturalist Project - Activity Guides

- Next Generation Science Storylines | Tools for Storylines

- Department of Natural Resources | Illinois State Symbols

- OK GO SANDBOX | Art Together Now

- CODE | AI and Machine Learning Module

- ACS | Chemistry Education Resources

- NASA | X-59 Quite Supersonic Flight: STEM Learning Module

- US EPA | Presidential Innovation Award for Environmental Educators

- IDRA | STEM Equity - Online Technical Assistance Package

- IDRA | Strategies for Increasing Girls' Participation in STEM

NEWS & EVENTS

Star Duo Forms 'Fingerprint' in Space, NASA's Webb Finds

"The James Webb Space Telescope will find the first galaxies that formed in the early universe and peer through dusty clouds to see stars forming planetary systems...

A new image from NASA's James Webb Space Telescope reveals a remarkable cosmic sight: at least 17 concentric dust rings emanating from a pair of stars. Located just over 5,000 light-years from Earth, the duo is collectively known as Wolf-Rayet 140."

## Neanderthals, humans co-existed in Europe for over 2,000 years: Study

"Neanderthals and humans lived alongside each other in France and northern Spain for up to 2,900 years, modeling research suggested Thursday, giving them plenty of time to potentially learn from or even breed with each other…

Given the changes in culture and the evidence in our own genes, the new timeline could further bolster a leading theory for the end of the Neanderthals: mating with humans."

Ozone hole grows this year, but still shrinking in general

Sep 08, 2019
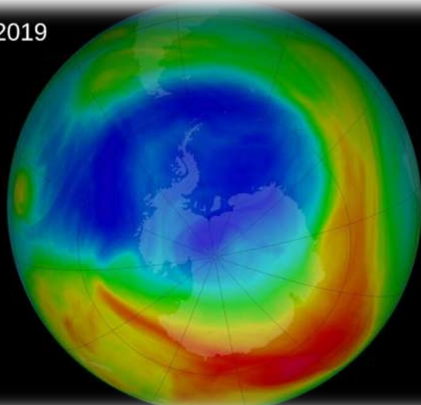
"The Antarctic ozone hole last week peaked at a moderately large size for the third straight year—bigger than the size of North America—but experts say it's still generally shrinking despite recent blips because of high altitude cold weather."

NEWS & EVENTS Cont.

Wed. November 9 | 6 pm | Online

Explore Moon to Mars: Engineering Our Way to the Moon

"Join us for this free 1 hr. webinar where we will explore **engineering design activities** for students based on NASA's real-world engineering design considerations involved in lunar exploration with the Artemis Missions. The webinar will also explore **pedagogical and practical aspects** of implementing hands-on activities in formal and informal education settings and engaging students of diverse backgrounds."

Thu. November 10 | 5:30 pm | Online

CSEdWeek 2022 Preview

"Join us to hear an overview of all of the resources that have been created for this year's CSEdWeek. You'll be able to spend time in breakouts with fellow teachers planning how you can use the CSEdWeek resources in your classroom!

Please join us for our CSTA Engage Meetup on Thursday, November 10, 2022, from 5:30 - 7:00 p.m. CT to connect with and learn alongside other K-12 CS teachers."

Mon. November 14 - 30 | Online

November Playground | Computer Science

"In this playground we will focus on the following areas:
- Unplug, unpack and repack
- Working together to integrate
- Reading and exploring code
- Modeling best practices
- Challenging misconceptions
- Creating projects

This playground will help support learners' conceptual understanding of **computer science**."

NEWS & EVENTS Cont.

Tue. November 15 | 5:45 - 7 pm | Online Smithsonian

Back to the Moon: The Next Giant Leap for Humankind

"Just over half a century since Neil Armstrong first stepped foot on the lunar surface, a new space race to the Moon is well underway and rapidly gaining momentum. Astrophysicist Joseph Silk addresses both the challenges and the promise of lunar exploration and exploitation, emphasizing how prioritizing science, in particular lunar astronomy, will enable us to address the deepest cosmic mysteries and discover unimagined opportunities."

Wed. November 16 | 5 pm to 6pm | Online
Methods to Incorporate Deeper Thinking in All Levels of Chemistry

AACT
American Association
of Chemistry Teachers

"Attend this webinar for a general overview of various ways to provide opportunities to students to think deeply about **chemistry** in both first-year and AP Chemistry, including POGIL-like activities, whiteboard problem-solving, and inquiry lab activities designed to lead to post-lab discussions."

Wed. Novermber 16 | 11 pm - 12:15 pm | Online

The Search for Life Beyond Earth   Smithsonian

"The race to remotely detect the first sign of alien life is gaining speed as technology starts to catch up to humanity's imagination. Yet what evidence of 'life' are we looking for? Louisa Preston of the Mullard Space Science Laboratory at University College London explores the question through the study of terrestrial **biology and geology** and considers predictions as to what extraterrestrial life might be like and how it might be found."

NEWS & EVENTS Cont.

Wed. November 16 | 3:30 pm - 4:30 pm | Online

Join the Movement: Run an Hour of Code with CodeHS

"In this webinar you will learn how to set up and prepare for the **Hour of Code** with your students. Hour of Code is a nationwide initiative to introduce millions of students to one hour of computer science during **Computer Science Education Week (December 5 - 11)."**

Thu. November 17 | 3:30 pm - 5:30 pm | Online

Computer Literacy and Computer Science in the Classroom Series: Diving into CS

"Join us as we break down standards into easy-to-understand chunks, including the **computational skills and competencies** addressed in the **K-2, 3-5, and 6-8** standard sets. We'll also highlight several best practices your district can use today to start incorporating **CS concepts** into any classroom or content area."

Tue. November 29 | 4 pm | Online

NASA STEAM: Snow and Ice-The Water Cycle

"Explore experiential **learning and interactive technology lessons around snow and ice.** The lesson plans will engage students in problem-solving of real-life events concerning winter storms and snow and the water cycle. The water phase changes problem-based learning lessons and acting out science lessons will be introduced. The lesson plans will include digging snow pits and ice core samples."

NEWS & EVENTS Cont.

Wed. November 30 | 11 am - 12:30 pm | ROE 11
Press "Start" on your District's Esports Program

"Join the LTC's Holly Kelly for a primer on kickstarting an **esports program** in your district. This multi-hour session will focus in on the background knowledge needed to initiate a successful esports program … This session will cover information relevant to elementary, middle, and high school program, too, so all teachers and administrators curious about esports in education are encouraged to attend."

NOBEL PRIZES 2022

The Nobel Prizes 2022 were announced on Oct. 3 - 10. Through the lens of STEAM, this volume will provide useful resources and stories on their remarkable achievements. The following information is provided by Nobelprize.org.

The 2022 Nobel Prizes Laureates:

The Nobel Prize in Physics:
> *Alain Aspect; John F. Clauser; Anton Zeilinger*

The Nobel Prize in Chemistry:
> *Carolyn R. Bertozzi; Morten Meldal; K. Barry Sharpless*

The Nobel Prize in Physiology or Medicine:
> *Svante Pääbo*

The Nobel Prize in Literature:
> *Annie Ernaux*

The Nobel Peace Prize:
> *Ales Bialiatski; Memorial; Center for Civil Liberties*

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel:
> *Ben S. Bernanke; Douglas W. Diamond; Philip H. Dybvig*

Nobel Prizes Press Releases:
- Physics
- Chemistry
- Physiology or Medicine
- Economic Science
- Literature
- Peace

Easy to use lessons on the 2022 Nobel Prizes:
Physics
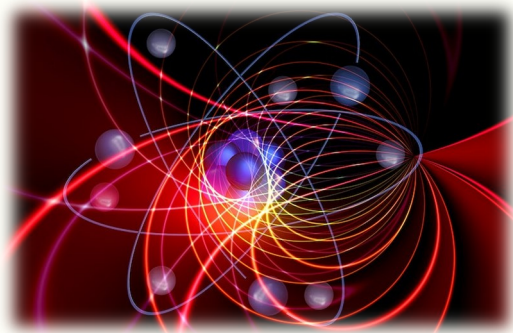Chemistry
Physiology or Medicine
Literature
Peace
Economic Science

** Curriculum activities, slides, assignments and resources are included

THE NOBEL PRIZE 2022

The Nobel Prize in Physics 2022

Entangled states – from theory to technology

"Alain Aspect, John Clauser and Anton Zeilinger have each conducted groundbreaking experiments using entangled quantum states, where two particles behave like a single unit even when they are separated. Their results have cleared the way for new technology based upon quantum information."

Some ideas to spark curiosity in physics:

1. Einstein was WRONG?

2. Does color exist when no one is watching?

3. Is quantum travel possible?

4. Quantum teleportation is REAL.

HIDDEN VARIABLES

ENTANGLER

ENTANGLED PAIR 1   ENTANGLED PAIR 2

QUANTUM MECHANICS
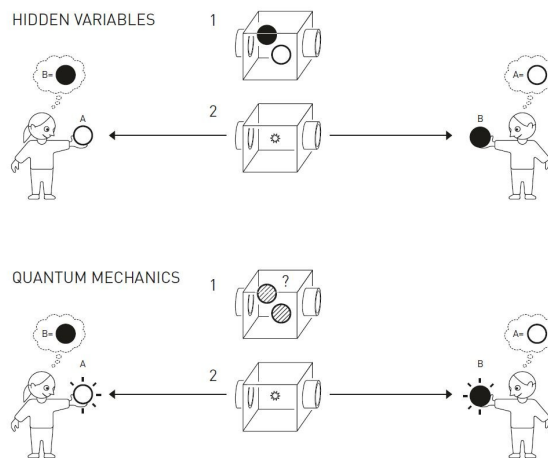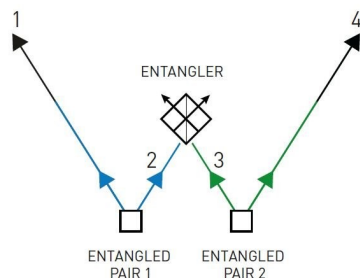
Some useful links:

- Popular Information: How entanglement has become a powerful tool
- Advanced information: Scientific background
- A Brief History of Quantum.
- Video: Transporters or Quantum Teleportation
- DoIT Quantum Resources Website
- DoIT World Quantum Day Webinar Recording and Slides

Interview with Alain Aspect   Interview with John Clauser   Interview with Anton Zeilinger
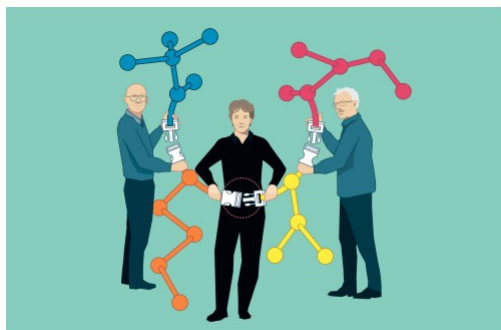
The Nobel Prize in Chemistry 2022

Their functional chemistry works wonders

Lesson (Ready to Use)

© Johan Jarnestad/The Royal Swedish Academy of Sciences

"Sometimes simple answers are the best. Barry Sharpless and Morten Meldal are awarded the Nobel Prize in Chemistry 2022 because they brought chemistry into the era of functionalism and laid the foundations of click chemistry. They share the prize with Carolyn Bertozzi, who took click chemistry to a new dimension and began using it to map cells. Her bioorthogonal reactions are now contributing to more targeted cancer treatments, among many other applications."

Some ideas to spark curiosity in chemistry:

1. *Assemble chemistry like Lego!*
2. *Click chemistry and the click reaction.*
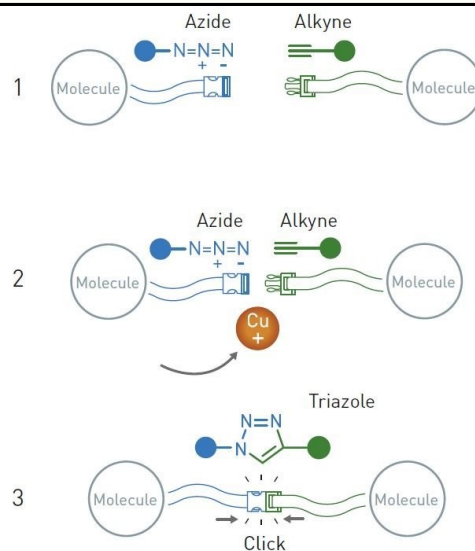3. *Connection between chemistry and biology—Bioorthogonal chemistry*
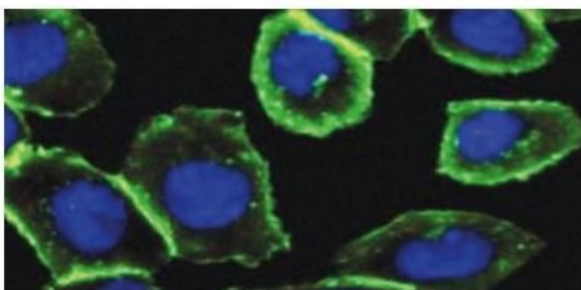
Image from *Proc Natl Acad Sci USA* (2007) 104:16793–16797

Some useful links:

- Popular information: Their functional chemistry works wonders
- Advanced information: Scientific background

Interview with Carolyn Bertozzi   Interview with Morten Meldal   Interview with K. Barry Sharpless

The Nobel Prize in Physiology or Medicine 2022

"for his discoveries concerning the genomes of extinct hominins and human evolution"

Lesson (Ready to Use)

© The Nobel Committe for Physiology or Medicine. Ill. Mattias Karlén

"Through his pioneering research, Svante Pääbo accomplished something seemingly impossible: sequencing the genome of the Neanderthal, an extinct relative of present-day humans. He also made the sensational discovery of a previously un-known hominin, Denisova. Importantly, Pääbo also found that gene transfer had occurred from these now extinct hominins to Homo sapiens following the migration out of Africa around 70,000 years ago. This ancient flow of genes to present-day humans has physiological relevance today, for example affect-ing how our immune system reacts to infections."

Some ideas to spark curiosity in physiology:

1. *Where do we come from?*
2. *How strong were Neanderthals? Extremely Strong!*
3. *What is your specific ID? Not SSN, but DNA!*
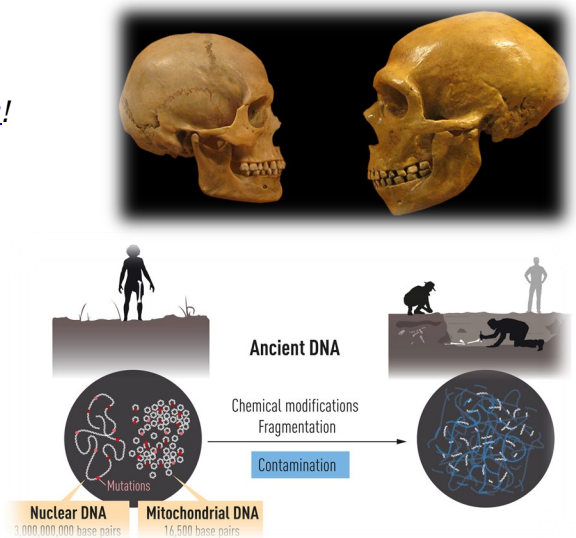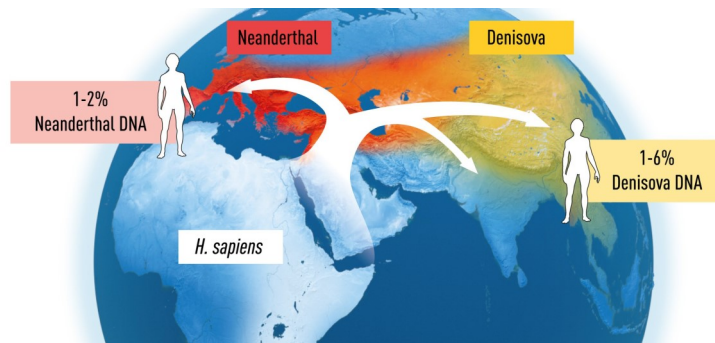
Some useful links:

- Press release: The Nobel Prize in Physiology or Medicine 2022

- Advanced information: Scientific background

- TEDx Talks: DNA clues to our inner neanderthal | Svante Pääbo

- Video: Who Would Win: You vs. Neanderthal

- Neanderthals were sprinters rather than distance runners
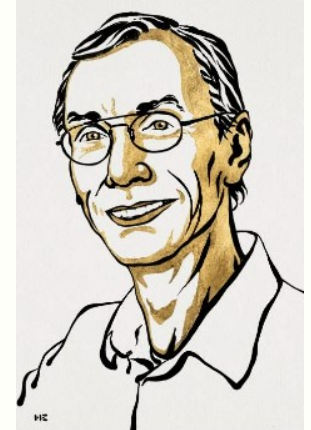
Ill. Niklas Elmehed © Nobel Prize Outreach

STEAM Resource Spotlight

James Webb Space Telescope STEM Toolkit

"Bring the excitement of the James Webb Space Telescope into your classroom with this STEM toolkit. Find resources, activities, videos and more for your students to learn about NASA's newest space observatory! Webb's infrared sensitivity will be able to detect light emitted from the universe's first galaxies formed over 13.5 billion years."

Smithsonian Learning Lab

"Smithsonian Open Access expands the ways educators and students may use our digital resources… You may continue to use the Smithsonian Learning Lab as a trusted platform to search for resources, create personalized collections of those resources, and share them with others. With the addition of **CC0 licenses** to some resources, you may freely download, build upon, transform, and reuse them for any purpose, *outside of the Learning Lab* (e.g., on your own website)."

Hour of Code Activities from Code.org

"The Hour of Code is a global movement reaching tens of millions of students in 180+ countries. **Anyone, anywhere can organize an Hour of Code event or try any of the over 500+ one-hour tutorials,** available in over 45 languages." Get ready to celebrate Computer Science Education Week December 5-11, 2022.

The 'A' in STEAM

"Arts foster scientific success" -Dr. Temple Grandin

This series is dedicated to showing how art and creativity play a crucial role in our society on its own and even within the STEM fields. There's a great deal of artistry that goes into our favorite products and media we consume that make our lives easier, or at least a bit more enjoyable, and teach us valuable lessons about history.

Hola Utopia! 2022 Festival in Hannover, Germany

"Hola Utopia! is an international street art festival in Hannover that transforms the city into a space of debate and promotion of progressive values. The socio-cultural festival encourages all Hannoverians to share their ideas for the future of their city during workshops.

The beautiful murals by leading German and international artists Lily Brick, Nasca One, Bier En Brood, Galletamaria, Rookie The Weird, Feros One and Dilk One will remain as a permanent contribution to the visual arts scene in Hannover."

Mural Registry

"The Mural Registry catalogs Chicago's long and rich tradition of murals and other street art and includes a growing list of completed murals created on private and public property. The Mural Registry was established to protect, preserve, and celebrate murals as significant public assets. The Mural Registry is managed and maintained by the Department of Cultural Affairs and Special Events (DCASE)."
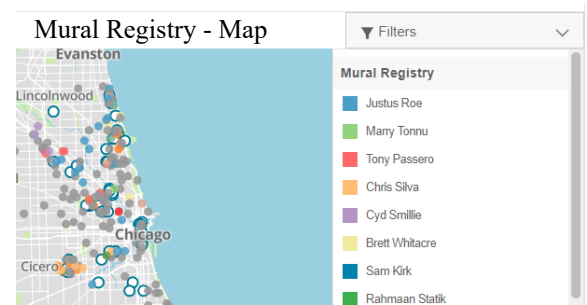
Artist Credit: Chicago Math and Science Academy Art Students

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✉	Please submit STEAM ideas, comments, or questions using our contact us form.