



YEA NEWSLETTER

Newsletter produced by Young Engineers in Action

Open House Expands YEA's Outreach to Local Communities

Written by: Emily Ren



YEA hosted its first Open House on May 22. The student officers presented various STEM programs to local communities: Jessica Li and Rose Kong (upper left), Emily Ren (upper middle), Tracy Han and Reenie Cao (upper right), Aaron Pan (lower left), Ethan Chiang and Bryan Ruizhi Zhang (lower middle), and Shawn Wang (lower right). (Photos: Matthew Phan)

Young Engineers in Action (YEA) organized its first Open House on May 22, which attracted about 80 students and parents from local communities to tour the YEA office and know more about the different STEM programs offered by YEA.

The student officers from the YEA board set up booths at the Open House to showcase a variety of STEM programs organized by YEA, including TARC, math, science, computer science, newsletter, and fundraising.

At those booth tables, the student officers creatively presented the STEM program by informative tri-folds and fun games, and answered questions from students and parents.

"Transitioning back to in-person learning, we want to expand YEA's reach," said Matthew Phan, president of the YEA student board.

YEA was founded by then high school students Nicholas Fu and Lia Tian in May 2016, and has grown into a non-profit organization with participants actively involved in promoting STEM in local communities.

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YEA TARC Team Placed Eighth in 2022 National Finals

Written by: Emily Ren

One of the YEA TARC Teams placed eighth in the 2022 national finals of the American Rocketry Challenge (TARC), the world's largest student rocketry competition, which took place at Great Meadow in The Plains, Virginia in May.

During the national finals, the YEA TARC Team 1 (team #22-0000001500) scored 19.64 in its first flight and 10 in its second one, totaling 29.64. Besides a team trophy and individual medals, the team also won \$2,500 in prize.

The seven-member team from YEA includes: Catherine Liu (Captain), Emily Ren (Chief Operating Officer), Lee Marquez (Chief Safety Officer), Neil Marquez (TARC Manager), Rohan Nair (STEM Engagement Officer), Andrew Liu (Outreach Officer), and Jessica Li (Finance Officer).

It is the second consecutive year for the team to make it to the TARC national finals and place Top 10. As one of the Top 25 teams, the YEA team has also received the invitation for



One of the YEA TARC teams placed eighth in the 2022 TARC national finals in Virginia on May 14. From left: Neil and Lee Marquez, Emily Ren, Jessica Li, Catherine Liu, and Andrew Liu. (Photo: YEA Newsletter Reporter)



One of the YEA TARC teams placed eighth in the 2022 TARC national finals in May. The picture shows most of the team members at the TARC award ceremony in Virginia on May 14. Front row from left: Jessica Li and Emily Ren. Back row from second left: Andrew Liu, Catherine Liu, Neil and Lee Marquez. (Photo: YEA Newsletter Reporter)

the second year in a row to participate in the nine-month NASA Student Launch (SL) program to continue their exploration of rocketry with high-powered rockets and challenging mission parameters.

The team successfully completed its NASA SL Program in April for the 2021-22 competition season. The team members have been working hard to meet the multiple documentation and presentation milestones with NASA, and writing hundreds of pages of reports. The rocket designed and built by the team carries the payload of three *Mimosa pudica* plants. The team has been conducting a biological experiment on how forces and altitude affect *Mimosa pudica*.

The other TARC team of YEA (team #22-0000001148) made it to the national alternates. That team includes Aaron Pan (captain), Adora Yan, Zipeng Guo, Yiyan Qu, and Jaden Zhang.

According to TARC, teams at the national finals represented 27 states, and the prize pool of \$100,000 has been split among the Top 10 teams. A total of 724 teams from 41 states competed in the 2022 TARC.

Fun Bio Chem Series Announces Winners of the Latest Round

Written by: YEA Newsletter Reporter

Nathan Liu has won the first place in the latest round (December 2021 to May 2022) of the Fun Biology and Chemistry Virtual Workshop Series, organized by Young Engineers in Action (YEA).

The second and third places went to Elizabeth, Isabelle, and Daren. All of the winners have actively participated in the workshop series.

The workshop series, hosted by Emily Ren, a rising junior from Diamond Bar High School, has been held once every month since it kicked off on July 30, 2020. The series has covered a wide range of topics in biology and chemistry.

The top winners for the first round (July 2020 to May 2021) were Sanjana Hegde, Farhan Alam, and Darsh Maheshwari.

The top winners for the second round (June 2021 to November 2021) were Nathan Liu and Sanjana Hegde.

Fun Bio & Chem Workshop Series	
Schedule from 7/2020 up till 9/2022	
26) Intermediate Epidemiology (2):	5:30 - 6:30 PM, Monday, September 5, 2022
25) Intermediate Epidemiology (1):	5:30 - 6:30 PM, Monday, August 8, 2022
24) Anatomy & Physiology (9) - Immune System:	5:30 - 6:30 PM, Monday, July 6, 2022
23) Anatomy & Physiology (8) - Respiratory System:	5:30 - 6:30 PM, Monday, June 6, 2022
22) Anatomy & Physiology (7) - Digestive System:	5:30 - 6:30 PM, Monday, May 30, 2022
21) Bioinformatics / Computational Biology (3):	5:30 - 6:30 PM, Monday, April 11, 2022
20) Bioinformatics / Computational Biology (2):	5:30 - 6:30 PM, Monday, March 21, 2022
19) Bioinformatics / Computational Biology (1):	5:30 - 6:30 PM, Monday, February 21, 2022
18) Cell Biology (3):	5:30 - 6:30 PM, Monday, January 3, 2022
17) Cell Biology (2):	5:30 - 6:30 PM, Wednesday, December 22, 2021
16) Cell Biology (1):	5:30 - 6:30 PM, Wednesday, November 24, 2021
15) Environmental Chemistry (2) / Green Generation:	5:30 - 6:30 PM, Monday, October 11, 2021
14) Environmental Chemistry (1):	5:30 - 6:30 PM, Monday, September 6, 2021
13) Anatomy & Physiology (6) - Endocrine System:	5:30 - 6:30 PM, Wednesday, August 11, 2021
12) Anatomy & Physiology (5) - Nervous System:	5:30 - 6:30 PM, Wednesday, June 28, 2021
11) Anatomy & Physiology (4) - Sense Organs:	5:30 - 6:30 PM, Wednesday, June 9, 2021
10) Plants (2):	5:30 - 6:30 PM, Wednesday, May 26, 2021
09) Plants (1):	5:30 - 6:30 PM, Wednesday, April 7, 2021
08) Water Quality (Marine Biology / Chemistry) (2):	5:30 - 6:30 PM, Wednesday, March 17, 2021
07) Water Quality (Marine Biology / Chemistry) (1):	5:30 - 6:30 PM, Wednesday, February 17, 2021
06) Anatomy & Physiology (3) - Integumentary System:	5:30 - 6:30 PM, Wednesday, January 6, 2021
05) Anatomy & Physiology (2) - Muscular System:	5:30 - 6:30 pm, Wednesday, December 23, 2020
04) Anatomy & Physiology (1) - Skeletal System:	5:30 - 6:30 pm, Wednesday, November 11, 2020
03) Disease Detectives (2):	5:30 - 6:30 pm, Wednesday, October 14, 2020
02) Disease Detectives (1):	5:30 - 6:30 pm, Wednesday, September 16, 2020
01) Overview:	4:00 - 5:00 PM, Thursday, July 30, 2020

⬆️ A slide screenshot of the Fun Bio Chem Workshop Series #24 on July 6, 2022 shows the topics and schedule of the first 26 workshops from July 2020 to September 2022. (Photo: YEA Newsletter Reporter)



⬆️ YEA will host its second Science Challenge on August 6, 2022. (Photo: YEA Newsletter Reporter)

YEA Science Program to Host its 2nd Science Challenge

Written by: YEA Newsletter Reporter

YEA Science Program will host its second Science Challenge on August 6, 2022 to fuel students' passion in sciences.

According to Emily Ren, vice president and science program director of the YEA student board, Science Challenge is an online competition launched by YEA for 3rd to 8th graders to challenge their knowledge and skills about the different fields of science ranging from biology, chemistry, life sciences, environmental science, physics, computer science, and more.

During the competition, students will log into the zoom meeting and have 50 minutes to work on 40 multiple-choice questions.

The winners will earn medals, trophies, certificates of achievement, and YEA merch to show their YEA pride.

For registration and more information about Science Challenge, please visit <https://www.youngengineersinaction.org/contests.html>.

A Concerning Past and Uncertain Future?

Written by: Ethan Chiang

Gretchen Whitney High School, the top ranked public high school in California, is undergoing major changes for the next school year.

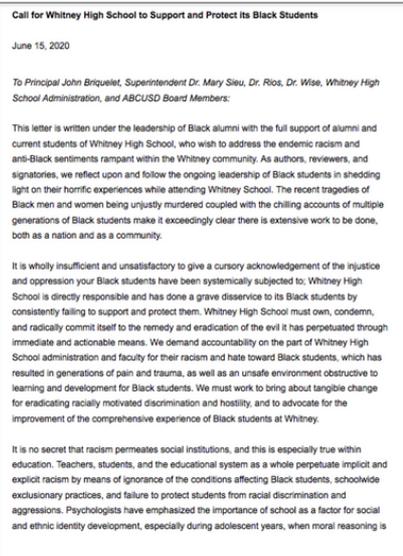
Principal John Briquetet and Assistant Principal Larry Natividad will both be resigning, leaving the school with no administrators except for the Dean of Students.

Natividad has been part of the ABC Unified School District for the past 19 years, as an AP Civics teacher, CP Economics teacher, Dean of Students, and Assistant Principal. Briquetet has served as the principal for the past six years, three of which Whitney HS has been awarded #1 High School in California by the US News and World Report.

According to some students, although this is an incredible accomplishment, there are several aspects of Whitney that are far from perfect. It has a history of failing to demonstrate a welcoming, inclusive, and equitable learning environment, they say.

In 2017, an investigation was begun by the Cerritos Mayor pro tem, Mark Pulido, and ABC USD board member Chris Apodaca. It was in response to a controversial activity involving three eighth-grade history teachers at Whitney HS.

This learning exercise was designed to expose students to horrors of slavery, in which teachers would act as “slave ship captains” and use masking tape to tie the students’ wrists together. Afterwards, the students would lay the ground inside a dark classroom and watch a clip from *Roots*,



📸 In June 2020, Whitney HS received a letter from its Black Alumni Association, demanding that the school “protect its black students.” (Photo: Screenshot from Los Cerritos News)

a television show about an African villager sold into the Atlantic slave trade.

ABCUSD Superintendent Dr. Mary Sieu claimed that the slavery simulation was created several years ago and gave students the opportunity to opt out if they were uncomfortable, but Cerritos Mayor pro tem Mark Pulido insisted on holding a city council meeting with Principal Briquetet.

Whitney HS’s concerning past has much more to show. In 2020, the Los Cerritos News released an article regarding racism being used in cyberbullying from Whitney HS students. The screenshots included the use of the n-word, ridicule of the BLM movement, and accusations and stereotypes of African American students’ academic performance at Whitney. As a result, Principal Briquetet set up mandatory CCEJ (California Conference for Equality and Justice) sessions for all students during the 2020–2021 school year.

With both a principal and assistant principal resigning in one school year, it will be difficult for Whitney HS to hire two new administrators on such short notice. With two new people to run the school, the next academic year could be the beginning of Whitney’s redemption arc, or a continuation of its current reputation, as students say.

22 Fatalities for the Worst of 2022

Written by: Ethan Chiang

On the morning of May 24, Salvador Ramos murdered his grandmother using an AR-15 style rifle, a few streets away from Robb Elementary School in Uvalde, Texas. Shortly afterwards, Ramos began firing at the school and eventually entered the building, where he killed 19 students and two teachers in a pair of connected fourth-grade classrooms.

The situation was handled very poorly, and officers failed to respond in a reasonable amount of time. It was not until an hour after Ramos entered the building when the Border Patrol officers rushed through the classrooms and shot him to death.

On June 21, Steven McCraw, the director of the Texas Department of Public Safety,



🔗 A UPenn study shows that new gun-control laws led to a dramatic decrease in firearm mortalities in Australia between 1979 and 2013. (Photo: Wharton School of the University of Pennsylvania)

declared that the police response contradicted their training in which they were instructed to confront an active shooter without hesitation.

Pete Arrendondo, the chief of the Uvalde school district's police department, was one of the first officers to arrive at the scene. Because of his poor decision-making, he was placed on administrative leave the day after McCraw's testimony.

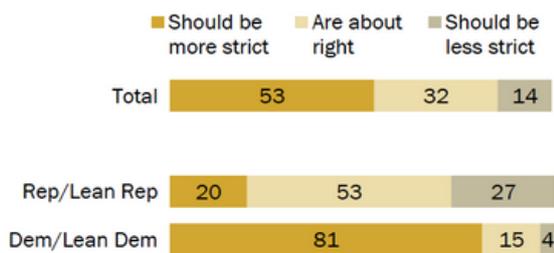
The fact that it took authorities a ridiculous amount of time to respond to the situation is concerning, but another worrisome sign is the exceptionally high number of fatalities.

The Uvalde shooting is the deadliest school shooting since the Sandy Hook Elementary School shooting in 2012. It has been more than a decade, yet it appears the United States is making minimal progress in terms of proper gun control and safety protocols.

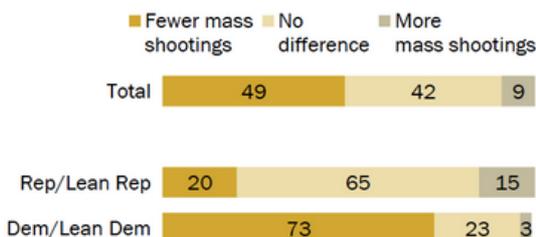
About a month after the shooting, Congress granted final approval to a bipartisan compromise designed to prevent dangerous citizens from accessing firearms. President Biden signed this measure on June 25.

If we want to create a safer future for the public education system, firearms should be more difficult to access, and more elaborate procedures should be formed to ensure that firearms will be used for beneficial purposes.

% who say gun laws ...



% who say if it was harder for people to legally obtain guns in the U.S. there would be ...



🔗 The Pew Research Center released a study in April 2021 that gun policy remains deeply divisive among Americans. (Photos: Pew Research Center)

Growing Plants in the Dark

Written by: Ruizhi Zhang

A team at UC Riverside has discovered how to initiate photosynthesis without sunlight. This breakthrough, published by the team in *Nature Food*, uses an electrocatalytic process to convert carbon dioxide, electricity, and water into acetate, a compound used by plants for energy. Using solar energy to power this process, artificial photosynthesis is up to 18 times more efficient in converting sunlight to energy for some plants.

Traditionally, plants photosynthesis by drawing energy from sunlight. This energy is then used to convert carbon dioxide and water into useful sugars. These sugars then power many processes around the plant. This new discovery completely bypasses the sun and instead uses electrolyzers to convert carbon dioxide and water directly into sugars. Electrolyzers are devices that take reactants, such as carbon dioxide, and convert them into useful products, such as acetate. To integrate all components of the system, the output of the electrolyzer was optimized to support the growth of food-producing organisms. The amount of acetate produced was increased while the amount of salt used was decreased, resulting in the highest levels of acetate produced in an electrolyzer to date.

Experiments showed that a wide variety of food crops can be grown in the dark using this method, and the potential of growing cash crops like tobacco and rice have also been explored. "We found that a wide range of crops could take the acetate we provided and build it into the major molecular building blocks an organism needs to grow and thrive. With some breeding and engineering that



👉 A team at UC Riverside has discovered how to initiate photosynthesis without sunlight. (Photo: University of Delaware)

we are working on, we might be able to grow crops with acetate as an extra energy source to boost crop yields," said Marcus Harland-Dunaway, a co-lead author of the study. By eliminating sunlight from the equation, artificial photosynthesis opens the door to countless possibilities for growing food under the increasingly difficult conditions caused by climate change.

Drought, floods, and reduced land availability are no longer concerns when crops can be grown in controlled environments that require few resources. Artificial photosynthesis also opens the door to growing crops in cities and other areas currently unsuitable for agriculture, and perhaps even provide food for space missions in the future.

"Using artificial photosynthesis approaches to produce food could be a paradigm shift for how we feed people. By increasing the efficiency of food production, less land is needed, lessening the impact agriculture has on the environment. And for agriculture in non-traditional environments, like outer space, the increased energy efficiency could help feed more crew members with less inputs," said Robert Jinkerson, a professor at UC Riverside and co-author of this study. With this discovery, perhaps in the future, your food will be grown in the dark.

Small Stars, Big Bang

Written by: Ruizhi Zhang

Supernovae are the violent deaths of massive stars. When a star with ten, twenty, thirty times the mass of the sun runs out of hydrogen to fuse, its gravity begins to push inwards, compressing the star. Eventually, the gravity becomes so strong that it creates a runaway effect.

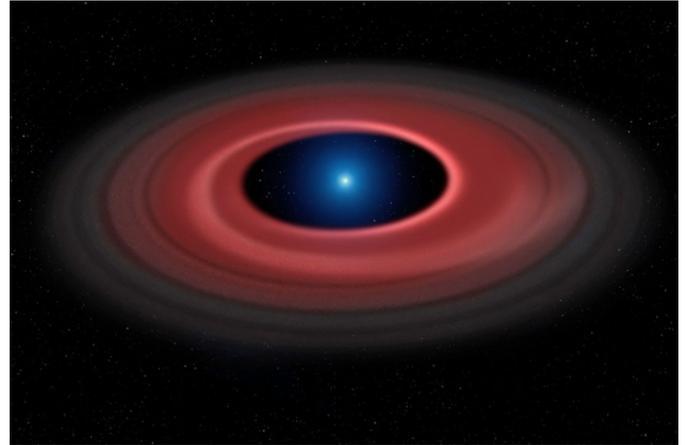
In a matter of seconds, the star collapses inwards, creating a massive explosion that, when the star is close enough, can be visible, ironically, as a bright star in the night sky.

This type of supernova is called a Type 1b supernova. Type 1b are the most common type of supernovae in the galaxy. However, some supernovae come from stranger culprits: white dwarves.

A Type 1a supernova is the violent destruction of a white dwarf star, itself a remnant of a star around the mass of our Sun. Type 1a supernovae are bright and powerful and are some of the most important tools for astronomers to measure distances in the cosmos.



⬆️ A photo of the Crab Nebula, a supernova remnant. (Photo: NASA / European Space Agency / ASU)



⬆️ Artist impression of a debris ring orbiting a white dwarf. (Photo: European Southern Observatory / University of Warwick)

Beginning in 1998, observations of these explosions revealed that the universe has been expanding at an ever-accelerating rate. This is thought to be due to dark energy, the discovery of which won the Nobel Prize in Physics in 2011.

While they are very important to astronomy, the origins of these supernovae are not well-understood. Astronomers agree that they are the destruction of white dwarf stars, but the causes of these explosions are unknown.

One theory posits that the white dwarf steals matter from a companion star. When the white dwarf gets too heavy, reactions ignite in the core and lead to a runaway explosion that destroys the star.

For decades scientists thought that Type Ia supernovae explode when a white dwarf star reaches a certain limit in size, called the Chandrasekhar limit, which is about 1.4 times the mass of the sun.

That model has been disproven recently, as many supernovae have been found to be less massive than this limit, and new theories indicate there are other reasons causing these supernovae. Of the mysteries of the universe, Type 1a supernovae are just one of the many oddities of the cosmos.

Are Calculators Really Helping Us?

Written by: Rose Kong

Calculators were introduced into school curriculums in the 1970s. In the 1990s, SAT tests and AP exams also began allowing students to use calculators during their tests. Nowadays, the number of elementary school students who use calculators in math and science classes continues to increase. However, are they really helping kids learn math?

Doing math by hand is beneficial to students. It is necessary to do basic arithmetic by hand because students can feel the numbers and patterns during the process. It also trains their brains to think so that they will be more active when solving more complex arithmetic problems. This process helps students save more time on math tests.

Consider this story. Two students arrive at a question asking for the answer to the expression 3 times 8. While one is still punching numbers into their calculator, the other student, with their background in solving by hand, arrives at the correct answer almost instantaneously. This student will save a few seconds on every subsequent math problem, and these few seconds will add up in the long run. This may sound insignificant, but on stressful timed tests such as AP exams, the SAT, and the ACT, having a few more minutes can make a big difference.

Students are relying too much on calculators. According to a research study, a math worksheet was given to forty eighth grade students with no calculators allowed, and all



⤴ Calculators are widely used in standardized tests. (Photo: University of Arkansas)

problems on the worksheet could be solved by hand.

One of the problems was the following: “You bought 3 pairs of jeans for \$100. How much is each pair of jeans?” Only nine students got the right answer. Students were not told the correct answer to the worksheet. One week later, students were asked the same question again with calculators allowed. This time, only eight students missed the question. This dramatic change showed that most students were dependent on calculators when performing simple calculations. Besides, many students were disappointed or sad when they were told that calculators were not allowed. Interest is one of the keys to improvement. Dependence on calculators hinders motivation.

While calculators are beneficial in harder math classes such as calculus, they have some other issues. Calculators are sometimes very expensive. Some scientific calculators cost about twenty bucks, but other calculators with more functions can cost more than \$1,000. Also, some students may attempt to use calculators for cheating. Many graphing calculators can store answers.

GMOs: Love or Hate?

Written by: Nathan Liu

Throughout history, humans have been experimenting with genes, using selective breeding for ideal results. The first genetically modified organism (GMO), a bacterium, was made in 1973 by biochemists Herbert Boyer and Stanley Cohen. A year later, genetically modified mice became a standard for testing, saving thousands, if not millions, of lives. In 1994, the first genetically modified food, the Flavr Savr Tomato, was introduced to the market. GMOs may have their perks, but they could also carry unintended consequences.

Despite controversy over the technology, GMOs hold promising advantages for society. For instance, GMOs can help boost the money-making process for our hardworking farmers, as well as help us attain a healthy body more easily. Genes in crops could increase harvest size profits, leading to an increased quality of life for farmers and better food, as they can purchase more advanced equipment. Moreover, farmers can spend less on spray pesticides, since plants can be “vaccinated” against diseases and produce their pest deterrents. Through changing genes in plants, we can produce fruit that bears extra antioxidants or grains with additional vitamins.

One instance of helpful GMOs was in Bangladesh, where pests often destroyed eggplant crops, which led to the widespread use of pesticides. BT proteins, which were harmful to bugs but harmless to humans, were placed into the eggplants’ gene code with the hope of stopping the pests. Pesticide usage



👉 *GMO health risks remain unknown to scientists.*
(Photo: University of Texas Anderson Cancer Center)

dropped by 80% and as a result, consumers enjoyed greater crop yields and more farmers spared themselves a trip to the hospital.

However, GMOs may have unforeseen health risks. For example, nutrients from nuts placed into other foods via gene editing were shown to have set off allergies in those who are sensitive to them. GMOs can also create resistant bacteria and insects. They have already shown resistance to genes that plants naturally use as a defense against miniature pests. There is also a high chance that they will start to evolve to overcome GMOs, and mankind will be forced to put in more effort to create a new resistant plant.

Bugs can also grow resistance to GMO chemicals. Over time, this conclusion has been supported. For example, the digestive system of pests has been altered to release proteins that neutralize poisons coming into the “stomach” of the bug.

Genetic modification technology can be both harmful and beneficial. In the end, it is an almost unknown science that we have not used to its fullest extent. In the future, we could possibly create plants that can solve world hunger, but we could also create those that can release dangerous diseases across the world. The choice to support them is yours.

YEA Student Board 2022

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YEA Volunteering Program

Are you Interested in volunteering? Do you love STEM? Then you should become a volunteer for Young Engineers In Action!

Reasons why you should volunteer:

- To give back to the community.
- To hone your leadership skills.
- To make everlasting bonds with other volunteers, the Student Board, as well as young students engaged at YEA!
- To fuel your passion for STEM.
- To gain volunteering hours since YEA is a certified organization to authorize and recognize dedicated volunteers with the President's Service Award.

About US

YEA was founded by then high school students Nicholas Fu and Lia Tian in May 2016, and has grown into a non-profit organization with hundreds of participants actively involved in promoting STEM and bringing positive impact to local communities.

Contact US

For more information, please contact us at one of the following:

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YEA Programs:

<https://www.youngengineersinaction.org/programs.html>

YEA Events:

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<https://www.youngengineersinaction.org/volunteering.html>

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PURCHASE YOUR YEA SHIRT TODAY!

YEA is a nonprofit organization that organizes events throughout the year to enhance students' knowledge in STEM

SCAN THE QR CODE TO ORDER YOUR YEA SHIRT OR GO TO [TINYURL.COM/YEASHIRT](https://www.tinyurl.com/yeashirt)

Help YEA Student Board organize higher quality STEM events for elementary students!