



U.S. ARMY



STEM@Home

Approved for Public Release

Vol 4 | Issue 7

Welcome to STEM@Home!

The STEM@Home Newsletter is intended to be a resource to provide engaging and educational activities that can be done with minimal materials and a whole lot of imagination.



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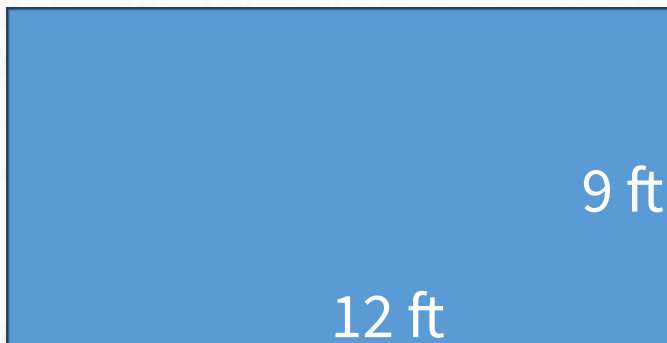
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Welcome Back!!!
Join us for another
year of amazing
STEM@HOME

Math Corner

Find the perimeter and area of each rectangular shape.

Answer & Explanation
on Page 8



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C5ISR Center Spotlight

Holly Nathaniel



Engineer (5 Years)

Education: Master of Science in Systems Engineering from Johns Hopkins
Bachelor of Science in Biomedical Engineering with a Minor in Mathematics from Texas A&M University

1. What is your job and how does it support the U.S. Soldier?

My role within the U.S. Army revolves around supporting modernization efforts through evaluating and developing software implementations. Specifically, I serve as a Team Lead, where our focus is on developing and implementing cutting-edge systems engineering strategies, oversee program management of mission programs, and coordinate with other U.S. Army customers to forge the future for the Warfighter.

These strategies are pivotal for enhancing our Soldiers' capabilities – by ensuring they have access to the most advanced and effective technology. By leading the team, I contribute to the development of systems that are interoperable, adaptable, and scalable, thereby enhancing the efficiency, effectiveness, and safety of our Soldiers in the field.

2. What drew you to the STEM field originally?

My journey into the STEM field was deeply influenced by witnessing the impact of science and technology during my high school years. I saw firsthand the impact of poorly designed medical devices on individuals' lives. The need to protect those around me from faulty medical devices ignited a passion within me to pursue biomedical engineering at Texas A&M University. I was driven by a desire to make a tangible difference in people's lives and contribute to ensuring their safety. After graduating, I worked as a complaint engineer for a medical device company and felt the call to be a part of something bigger. From there, my career pivoted to supporting the Army as a civilian; where I earned my Systems Engineering Degree from Johns Hopkins University in an effort to support the sustainment and modernization of capabilities for the Warfighter.

C5ISR Center Spotlight

Holly nathaniel, cont'd

3. What is the most important STEM related innovation you've witnessed in your career?

In my career, one of the most significant STEM related innovations I've witnessed is the rapid evolution and integration of Artificial Intelligence (AI) and autonomy technologies. These innovations have revolutionized the battlefield while keeping Soldiers out of harm's way. Specifically, the U.S. Army has challenged its workforce to keep pace or lead industry in the adoption of these technologies, pushing the limits of what is possible to achieve and maintain technological superiority to address conventional and unconventional Multi-Domain Operations.

4. Why is STEM important to our national security and our national future?

STEM plays a critical role in ensuring our national security and shaping our future as a nation. It drives innovation and technological advancements across various domains, including defense, healthcare, energy, and infrastructure. In the defense sector, STEM expertise is essential for developing and maintaining cutting-edge military capabilities, safeguarding against emerging threats, and maintaining our strategic advantage on the global stage. Additionally, STEM education and research are fundamental for fostering a skilled workforce, driving economic growth, and maintaining competitiveness in an increasingly interconnected and technologically driven world.

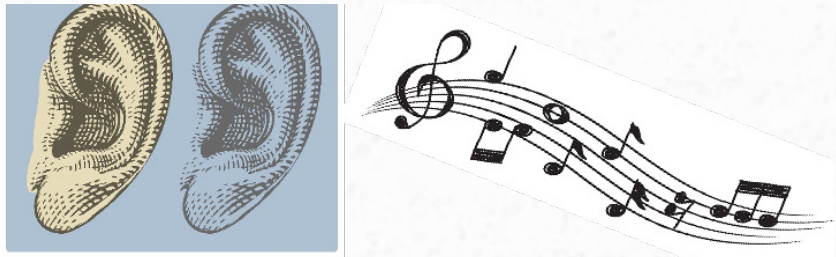
5. What should students be engaging in to further their interests in a STEM field?

To further their interests in STEM fields, students should actively engage in hands-on learning experiences, such as internships, research projects, and extracurricular activities. These opportunities enable students to apply theoretical knowledge to real-world problems, develop practical skills, and gain valuable insights into their chosen fields. Additionally, seeking mentorship from professionals in STEM fields can provide guidance, support, and valuable networking opportunities. Furthermore, staying curious, being open to learning new concepts, and embracing challenges are essential attitudes for transformational success in STEM fields.



STEM In The News

Music for all to Hear



Have you ever heard of the phrase music can touch the soul? Music provides a deep connection to a person's limbic system "a complex system of nerves and networks in the brain, controlling one's basic emotions." People often find connections in music through memories. "Certain songs have a way of taking you to a certain time or a specific place in your life. Because of this, we feel a reminiscent connection to music to go along with the emotions." Live concerts provide this opportunity for many people, including individuals in the deaf community. If you attend a live concert, you will almost always see interpreters signing their hearts out for their clients. While having access to an interpreter is wonderful, the sensory experience of live concerts is limited for individuals in the deaf and hard-of-hearing community.

Theater artist and musician Daniel Belquer, along with a team at Not Impossible Labs (NIL), have set out to create an immersive experience for the deaf community by creating an innovative haptic suit that will allow deaf individuals to "feel" music in a whole new way. Belquer and NIL, teamed up with engineers from an electronic components company called Avnet to create a haptic suit – a vest like contraption, like the ones used for virtual reality or video games. This software programmed vest "allows musicians and DJs to easily integrate the haptic suits into their program. While the vibrations are not synched to the songs, they complement the music, allowing for a full concert immersing experience" (Vanasco).

To read the article in its entirety please visit:

<https://www.npr.org/2023/07/17/1186173942/vibrating-haptic-suits-give-deaf-people-a-new-way-to-feel-live-music>

For a more condensed version, please visit:

<https://www.dogonews.com/2023/9/29/vibrating-haptic-suit-allows-deaf-people-to-experience-live-music-in-a-new-way>

Resources:

Vanasco, Jennifer. "Vibrating Haptic Suits Give Deaf People a New Way to Feel Live Music."

NPR, NPR, 17 July 2023,

www.npr.org/2023/07/17/1186173942/vibrating-haptic-suits-give-deaf-people-a-new-way-to-feel-live-music.

STEM Challenge

Egg Drop Challenge

What happens when you drop an egg? Simple answer, it cracks. But what if there was a way to prevent the egg from cracking when dropped?

Mission:

The goal of the egg drop challenge is to drop an egg without breaking it when it hits the ground. Record how many times it takes before the egg breaks on the ground. Record how high the egg had to drop before it cracked.

Requirements:

- Use any material around the house that you think will protect your egg.
- The egg must be dropped from a height no less than two feet.

Materials:

- Any soft fabric one can find around the house:
 - Bubble wrap
 - Tissue paper
 - Paper towel
 - Dish cloth
 - Etc..
- Tape
- Safety pins
- Clothes pins
- Paper and pencil to record your results
- One dozen eggs



STEM Challenge

Egg Drop Challenge, cont'd

Design Process:**Ask:**

What needs to be accomplished? Create a form of protection around an egg to prevent it from breaking.

Plan:

Brainstorm what materials you will need to protect your egg. Ask yourself, how will I construct a barrier around the egg?

Create:

Begin your build. Will you make a pattern with the material to wrap the egg?

Improve:

Test your builds several times by dropping your egg from different heights. Start lower to the ground then work your way up. Add to or adjust your structure as needed and make note of how much fabric you need to add as you drop the egg from different heights. Ask yourself, what do I need to do differently? What other strategies will I try if my first design does not work as planned?

Questions to Ask:

What kind of structure would I have to make to achieve my goal? How can I wrap my egg in a way that will not easily break?

Fun Fact:

If you drop an egg on the floor, sprinkle it heavily with salt for an easy cleanup.



STEM Activity

Earth Balancers



Are you and your family planning to celebrate Earth Day? Earth Day, recognized on April 22nd, is a celebration of our Earth and a time to identify different ways to protect our planet. Whether it's cleaning up trash or planting a tree, we must protect our Earth because, it is the only planet we have. One big way we can help our planet is by problem solving. This activity does exactly that!

In this activity you will engineer an Earth balancer.

Materials:

- Coloring page of the Earth
- Coloring page of a small rocket and satellite
- Cardboard
- Bamboo skewers
- Clay
- Cardstock
- Scissors
- Tape
- Markers
- Glue stick
- Pencil
- X-Acto knife (Adult supervision is required)

Directions: **PARENT SUPERVISION REQUIRED**

1. Color your Earth as desired.
2. Cut out the Earth, rocket, and satellites.
3. Glue the Earth to a piece of cardboard.
4. Cut out cardboard Earth.
5. Adults only: Use the X-Acto knife to cut a $\frac{1}{2}$ inch long slot in the top middle layer of the cardboard Earth. Carefully feed one of the skewers through the slot and out the edge of the cardboard. Cut another $\frac{1}{2}$ inch long slot in the bottom middle layer of the cardboard earth. Carefully feed that same of the skewer through the slot and out the edge of the cardboard.
6. Adults only: Repeat step 5 with a second skewer on the opposite side of the Earth. Cutoff sharp ends of skewers. If the skewer pokes through the back, tape it to the cardboard to secure in place.

STEM Activity

Earth Balancers cont'd

PARENT SUPERVISION REQUIRED

- 7.. Glue the rocket to the top end of one skewer. Press to secure it in place.
8. Glue the satellite to the end of the second skewer.
9. Add a ball of clay to the bottom of each skewer.
10. Balance the Earth on your fingertip!

Science Explained:

This activity teaches the students how to problem solve by constructing a device to balance on their fingertips. While it may not work on the first try, students will be able to construct their own balancer and adjust the structure to balance. While this activity has a creative sense to it, it also teaches about the Earth's balance and center of gravity. The Earth balancer is a hands-on way to explore how to find the center of gravity.

Objects with a lower center of gravity are more stable than those with a higher center of gravity. If constructed correctly, the Earth balancers will work because the mass of the clay spheres below the cardboard Earth weigh it down, allowing it to balance on a pivot point. This is the science behind balance. By adding mass away from an object's pivot point, you will in turn help distribute and balance weight more evenly.

References:

Dziengel, Ana. "Awesome Earth Day Activity: Make an Earth Balancer." Babble Dabble Do, 14 Apr. 2021, babbledabledo.com/awesome-earth-day-activity-make-an-earth-balancer/.

Fun Fact:

Fun Fact: Earth Day is also called International Mother Earth Day.



Answer: Perimeter = 42 ft / Area = 108 ft

Ready – Set – STEM



Now is a great time to get involved in STEM.....

The C5ISR Center Educational Outreach Program is a collection of kindergarten through college-level programs designed to give students in the northeastern region of Maryland and Northern Virginia access to educational and extracurricular opportunities in the areas of science, technology, engineering and math (STEM).

For more information about our STEM Outreach Programs, visit us at:

<https://c5isrcenter.devcom.army.mil/studentprograms/>

To reach our office, you can email us at:

usarmy.apg.devcom-c5isr.mbx.outreach@army.mil

The Army Education Outreach Program (AEOP) CYBERMISSION registration is open for students, team advisors and volunteers! eCYBERMISSION is a web-based STEM competition that helps students in grades six to nine learn about real-life applications of STEM. Teams of three or four students are instructed to ask questions or define problems and then construct explanations or design solutions based on identified problems in their community.

Learn more at: <https://www.usaeop.com/program/ecybermission/>

