



# NASA Aeronautics

December 2022  
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## Monthly STEM Newsletter

### INSIDE

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**Coming Soon!**  
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**Computer Science  
Education Week**  
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**NCAS Mission 1  
Applications Due!**



*A GE Aviation F414 GE-100 engine is installed in NASA's Quiet supersonic X-59 aircraft at Lockheed martin's Skunk Works facility in Palmdale, CA. The 13-foot-long engine packs 22,000 pounds of propulsion energy and will power the X-59 to speeds up to Mach 1.4. Photo credit: NASA/Carla Thomas*

## December 2022

Here at NASA Aeronautics someone shared a meme with us that compared the classroom during the three weeks between Thanksgiving and the Winter Break to the last lap in Mario Kart: "There's all this fast music, it gets really stressful, and people keep throwing things at you." While we certainly hope this is not what your days look like right now, we suspect there might be some truth to that for some of you! To help alleviate some of that, follow our NASA Aeronautics for Educators Facebook page this week where we will share our Winter Break STEM Activity Series with activities for all ages and ability levels. Also, celebrate Computer Science Education Week with us through our partners at code.org or use some of our own UAS coding activities. Finally, read more in this issue about the other exciting opportunities and materials we have coming your way in 2023.

Do you need to see more of something or have a new idea for upcoming newsletters? Let us know! Do you know someone else who needs this monthly update? [Sign up for our monthly STEM newsletter](#). Have questions or want to be removed from the list? Send an email to [April.a.lanotte@nasa.gov](mailto:April.a.lanotte@nasa.gov).

Let's Fly!

### Newly Released STEM Items:

#### Sensor Solutions

Designed for grade levels 5-8 and 9-12 shares activities for students to gain a better understanding of the types of sensors installed on drones, how sensors work, advantages and limitations, and more. Available in both English and Spanish.

#### Wingin' It

Also available in English and in Spanish, this set of activities and accompanying video encourages students to explore the impact of aircraft design, weight, and weight distribution on flight distance by testing paper airplane designs.

### Coming Soon!

Like Orville D. Squirrel preparing for winter \*, our Aeronautics STEM Team is busy preparing for the end of 2022 and a busy Spring 2023 season. Here are a few of the items you can look forward to:

### Winter Break STEAM Activities (in English and Spanish)



Craft-stick aircraft, X-59 snowflakes, personalized travel logbooks and more! Activities will be released this week via our NASA Aeronautics for Educators Facebook page and will be available on our [Aeronautics@Home](mailto:Aeronautics@Home) webpage.

### NASA Aeronautics en Español

You might have noticed that NASA has been working hard to offer many STEM materials and other NASA resources in both English and Spanish. We are so excited to announce the debut of our Spanish-language section of the nasa.gov website—coming soon in early 2023. Stay tuned!

### Career Highlight: Divya Bhadoria



This month we are featuring Divya Bhadoria, the Deputy Subproject Manager for NASA's Advanced Air Mobility (AAM) National Campaign. As the second in command for the work to bring air taxis and other emerging aviation concepts to places that are historically not served by aviation. Her work involves plenty of computer science, which makes her job applicable to this month's highlight.

Divya was not always involved in computer science for aeronautics alone; she has had the opportunity to work in a variety of fields including semi-conductors, biotechnology, and surgical robotics before she joined NASA in 2019. "Every industry has a need to develop or use some type of software for their business," Bhadoria said. "The coolest thing is that, because of this, a computer scientist can take his or her core skills and work in many different industries."

While you don't need to have a computer science degree to work in this field, Ms. Bhadoria has a BE degree in Computer Science and Engineering as well as an MS degree in Computer science. One of her research interests? Using machine learning techniques

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towards developing safe and efficient airspace.

## Smart Skies Reinvigorated

Do you teach pre-algebra? Have you used NASA's Smart Skies hands-on math program? Smart Skies teaches students about distance-rate-time through air traffic control. The program has been around for quite a while and has been undergoing some much-needed renovations (think Quicktime and Windows 7!). Stay tuned for the new-and-improved Smart Skies webpages, coming in January. Access our lessons and activities, videos, and simulator that help teach some challenging topics.

## 2023 Dream with Us Design Challenge

Launching Feb. 28, 2023, NASA Aeronautics and Aeronaut-X will present this year's "Dream with Us" design challenge for students in grades 6-12. We can't tell you the challenge topic and rules yet (stay tuned for details and the official announcement during the ImaginAviation 2023 virtual conference

## ImaginAviation 2023



Starting Wed. Dec. 7<sup>th</sup>, sign up for [ImaginAviation 2023](#). Educators, students, and anyone interested in learning more about the latest innovations in NASA Aeronautics through the eyes of our Transformative Aeronautics Concepts Program is invited to attend.

## Jr. Pilot Book: X-57 (in English and Spanish)

Our [first Jr. Pilot Book](#) focused on the X-59 and the science of sound. Coming soon—our X-57 book which will allow elementary-aged students to have fun while learning about the X-57 and electricity.

*\*If you want to know how Orville and his other flying squirrel friends prepare for winter, take a look at the "Did You Know?" section...*

## Professional Development:

### [Educator Professional Development Collaborative](#)

**(EPDC):** We know you're back in the classroom, but that doesn't mean you can't learn, too! Join NASA's EPDC team for free, virtual professional development to give you some great ideas for new lessons and activities tied to aeronautics. December virtual professional development includes: [Propeller Design Challenge](#) on Dec. 6<sup>th</sup> from 7-8pm EST, [Explore Aeronaut-X: 3,2,1...Lunch!](#) on Dec. 13<sup>th</sup> from 5-6pm EST, [Aeronaut-X: Robotic Search and Rescue](#) on Dec. 19<sup>th</sup> at 5pm EST and others. Sessions are free, but registration is required.

## Did you know??

Flying squirrels don't actually fly, they glide (unless they hop on aircraft like Orville D. Squirrel does!). They use membranes of fur between their arms and legs, called patagia, to act as parachutes to slow them down to help them leap between trees. Flights--or glides--of nearly 300 feet have been recorded.

Flying squirrels can turn nearly 180 degrees in mid-air. Their limbs and their flat, rudder-like tail help them steer and control their leaps.

The Northern and Southern Flying Squirrel species in the US don't hibernate. They enter a slow metabolic state known as torpor, and as the social creatures they are, they curl up in nests of up to 20 others to keep warm.

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## Computer Science Education Week and Hour of Code

NASA is working with [code.org](https://code.org) to share great computer science content including videos featuring some of our NASA experts as they talk about the importance of computer science in what they do as well as fun Hour of Code activities. You can also find some of NASA Aeronautics' UAS coding activities there. Don't want to leave us? Don't worry, you can also find our "[Attack of the Drones](#)" and "[Package Delivery Drone Simulation](#)" coding activities in our [AAM STEM Learning Module](#). Our "Make a Parachute Code Message and other binary code fun, along with other computer science resources are also compiled in [one spot](#) to make your work a bit easier.



## Funding and Internship Opportunities:



[NASA Community College Aerospace Scholars \(NCAS\)](#) is a program focused on opportunities for students in community college and trade and technical schools. NCAS offers three missions designed to challenge and build student knowledge and skills by focusing on NASA's mission goals, collaboration, and career pathways.

Mission 1: Discover is a self-paced online course open to US citizens 18+ who currently attend a community college or trade and technical school. **The FY23 cohort application deadline is [December 9, 2022](#). An information session is also available on [December 7 from 5-6pm EST on NASA's STEM Gateway](#).**

### Links to our Aeronautics STEM Resources:

[Aeronautics Research Resources](#): (all ages) This link takes you to a wide variety of educator resources, Aeronautics@Home, ebooks, National Academies Reports, webinars, lithographs and mini posters, the NASA Aeronautics Research Institute, and more.

[Aeronautics@Home](#): (K-12) This web page contains aeronautics-based activities, videos, games, and more that can be completed at home, in the classroom, or in any number of settings. Topic areas include: "Build It!" "Explore It!" "Watch It!" "Solve It!" "Color It!" and "Aero Educator Resources". Coming soon: "Read It!" and "Do It!"

[Aeronautics Innovations Challenges](#): Keeping up with our many design challenges and opportunities for both post-secondary and K-12 can be tough. In response, we created a "one-stop shop" to pull them all together in one location.

[Flight Log Experience](#): (K-12, post-secondary, general public) Sign up to send your name with NASA Aeronautics on X-planes, UAS flights, and more as you build your virtual NASA flight log. Earn virtual endorsement stamps and mission patches and access aeronautics STEM activities and resources. Educators can sign up their entire class.

[NASA Express Sign-Up](#): (K-12, post-secondary) Have you signed up for NASA's NASA EXPRESS weekly newsletter? This newsletter contains the latest information for educators (K-12 and post-secondary) about new resources, design challenges, internships, and workshops. It is THE go-to for the latest STEM news.

[NASA Educator Professional Development Collaborative](#): (K-12 educators) Where do you go for ongoing, free NASA educator professional development opportunities? To EPDC! Take a look at webinars, digital badging and CEU opportunities, STEM teaching tips, videos, and so much more.

[Aeronaut-X](#): (K-12) Our Next Gen STEM: Aeronaut-X team provides new and exciting STEM activities that focus on cutting-edge aeronautics education and the future of flight.

[Museum and Informal Education Alliance](#): (Informal Educators and Museums) Not in a classroom? Looking for informal education materials? Join NASA's Museum and Informal Education Alliance, where you have access to NASA resources—including aeronautics—for your program, organization, museum, science center, or library. Find out about events happening near you and in the virtual world, and let the MIE Alliance help you build your programs! Access to guest speakers, the latest announcements about grant programs, and an active community network allow you to connect with other like-minded people in a supportive, engaging, and aerospace-focused neighborhood.

[NASA Aeronautics for Educators Facebook Page](#): (K-12, post-secondary) Join our NASA Aeronautics for Educators Facebook page, where the latest aeronautics updates, professional development opportunities, lessons and ideas are freely shared.

[NASA Connects](#): (K-12, post-secondary) NASA Connects is a network of educators who come together to collaborate, share NASA resources, and create personal collections of materials that can then be shared with others. Members can join groups tailored to their specific interests.