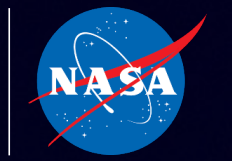
National Aeronautics and Space Administration



NASA's Continued Partnerships with High School Students during a Global Pandemic

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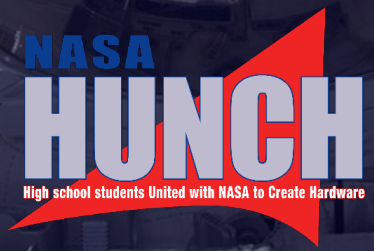


The HUNCH Program

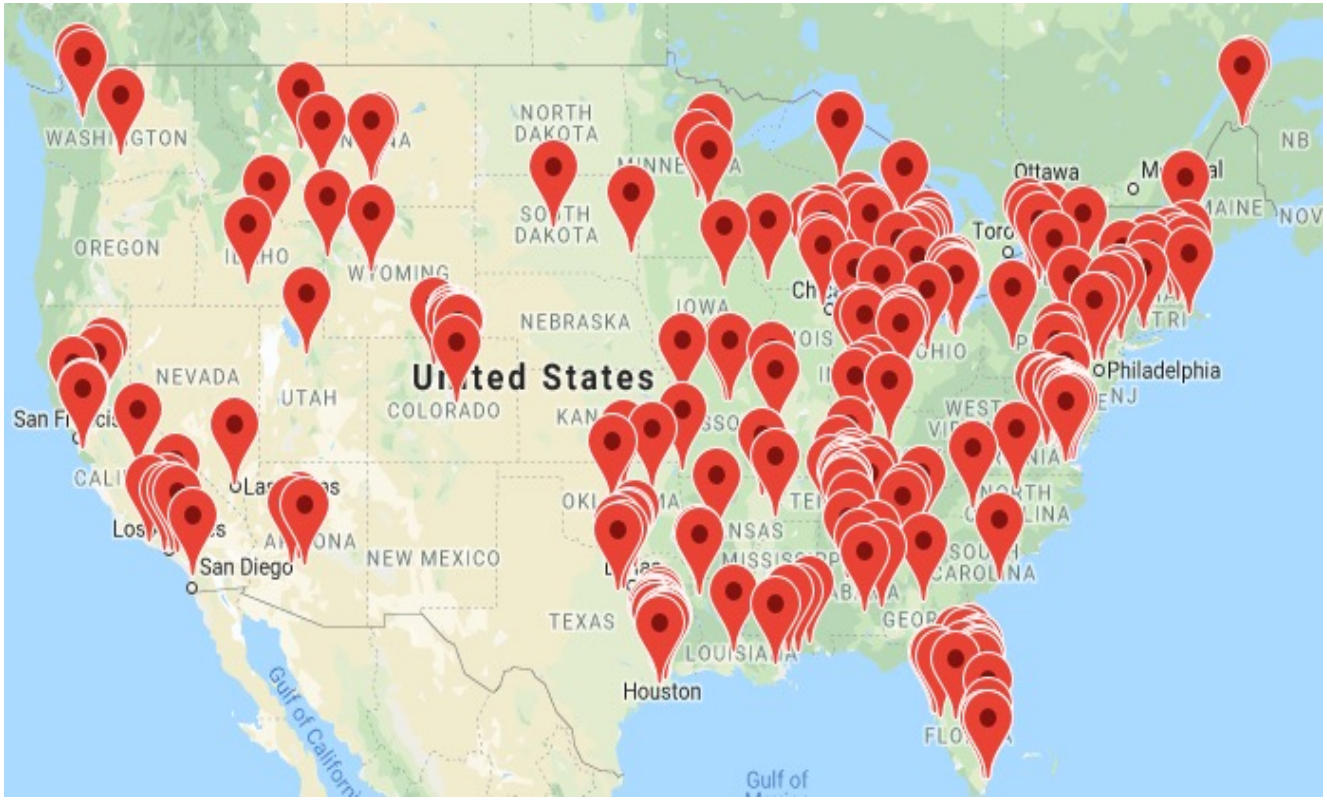
Welcome to the NASA HUNCH Program designed to give students a hands-on project-based experience while producing critical products for NASA.

- It is exciting to have students while still in high school design and fabricate valued products for the International Space Station (ISS) and beyond.
- Since 2003 the NASA High School Students United with NASA to Create Hardware (HUNCH) Program has partnered with students by challenging them to make *critically-valued* products for NASA.
- Each year the quality, quantity and diversity of these products has improved and expanded as well as the number and diversity of the students. Today over 2,500 students in middle school, high school and some post secondary schools participate in HUNCH projects.
- During the COVID global pandemic, we still were able to work with students to make products for NASA, while keeping students and teachers safe.

Visit this site at https://www.nasa.gov/mission_pages/station/research/news/engage_with_hunch to learn more about the NASA HUNCH program.

The Numbers

The 5 NASA HUNCH centers comprises 277 schools in 44 states and have designed, developed and delivered over 700 products to NASA



Benefits of HUNCH

The HUNCH Program is a win-win situation for both NASA, the students, teachers, schools, businesses and the nation.

- Students benefit by practicing skills that are vital for the 21st Century workforce such as resiliency, teamwork, and innovative thinking.
- Schools benefit by implementing a culture that demonstrates that students are capable of the highest expectations.
- Businesses benefit by having a source of workers that are ready to meet the challenges that their company needs to succeed.
- The Nation benefits by leading the world in technology.
- Visit this site at https://www.youtube.com/watch?v=nbdrZ2JUOw0 to watch a video about the benefits of the HUNCH program.

NASA HUNCH Projects

The HUNCH program has 7 different tracks that are as follows:

- Precision Machining Hardware
- Sewn Flight Articles
- Design and Prototyping
- Flight Configuration
- Culinary Challenge
- Video Challenge
- Health and Biomedical Science (new track)

Visit this site to watch a video of an overview of NASA HUNCH
https://www.youtube.com/channel/UCFwf6s0Ya1uTRjJnZqeA7gA

Precision Machining Hardware

- **Students in manufacturing classes have produced 138 Flight Ready Single Stowage Lockers (SSL) for the ISS as of March 2022.**
  - This equates to over 30,000 individual precision machined components being produced and delivered to the ISS program office.
- These lockers have parts that must be fabricated on Computer Numeric Controlled (CNC) machines. However, since hardware is going to the ISS the parts not only have to be precision machined and finished but also documented according to NASA's stringent requirements for Quality Assurance.
  - Parts must have special surface finishes applied such as Anodizing, Alodine, Passivation and dry film lubricants.
  - They must be meticulously assembled in conformance with the engineering drawings and critical Space Flight Hardware assembly processes and military standards.
  - This includes aircraft riveting, torquing of threaded fasteners and sealing of faying surfaces.
- Over the past 17 years, HUNCH students have made thousands of parts for space including 4 SSLs that arrived at the ISS on May 31, 2020, aboard the initial flight of SpaceX Crew Dragon.
- To accommodate pandemic restrictions, students worked at every other machines at their school to ensure the 6-foot distance. In addition, the HUNCH mentors had to be flexible as to when the school allowed mentors to visit.

- Visit this site to watch a video about NASA HUNCH manufacturing projects. https://www.youtube.com/watch?v=CNcuKoeM1N0#action=share

Sewn Flight Articles

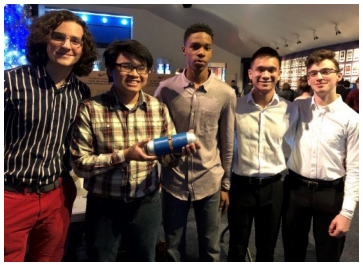
- This track is for students in Family and Consumer classes or Fashion Design classes to produce both training and flight sewn products for ISS.
- These products require both attention to detail and engineering acuity. Some of the items that HUNCH students have produced are hygiene kits, Zero-Gravity Stowage Rack (ZSR) Panels, & Foot Pads.
- In the 2021-2022 school year, 4 hygiene kits were delivered in October 2021 and December 2021, 8 ZSR panels are on schedule to be delivered in August 2022 and 5-foot pads of each size are on schedule to be delivered by the end of the school year.
- To accommodate pandemic restrictions, the HUNCH mentors had to be flexible as to when the school allowed mentors to visit.

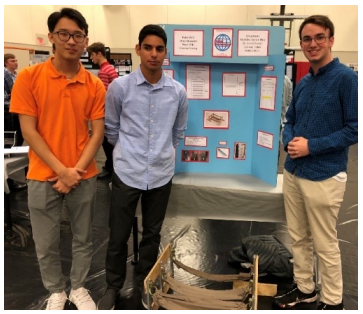
Design and Prototyping

Students in engineering, science and a variety of other high school classes work on design and prototyping projects for the ISS, the moon and beyond.

- NASA engineers and astronauts tasked with facing difficulties while working or living in space are the main sources of ideas for these projects. They either want something redesigned, replaced or created which would improve living and working on the ISS.
- However, in keeping with the Artemis mission this year's students' projects include projects for the return to the moon.
- Examples of these projects are a lunar flagpole, lunar dust brush, lunar tongs and lunar wagon wheels.
- Projects for the ISS were a washing machine, mouse feeder and crew airflow diverter.
- To accommodate pandemic restrictions, students participated in hybrid teams where some students were at home and others were at schools. The final design review in 2021 was held via Microsoft Teams where students presented to NASA and industry professionals. In addition, the HUNCH mentors had to be flexible as to when the school allowed mentors to visit.

- Visit this website to find out more http://www.nasahunch.com





Flight Configuration

This year students in Career and Technical Education courses, such as Manufacturing and Engineering Design worked on projects that were selected in Design and Prototyping as projects that NASA astronauts have indicated they would like to be sent to the ISS.

- The students, using machining techniques, additive manufacturing, and parametric modeling software, mature the selected designs working toward a completed, ready to deliver project.
- Two projects almost ready to be sent to the ISS are a one-handed 2 roll tape dispenser with a newly designed seat track attachment and a ball clamp monopod that will help astronauts movability when performing experiments.

Culinary Challenge

- Students in culinary and food science classes have participated in a Culinary Challenge in which astronauts select various types of entrées that they would like to be included on their menu while on the ISS.
- The teams of students had to meet the strict nutritional requirements as well as understand specific packaging processes needed to preserve food in space without refrigeration.
- The students spend ample amount of time in the research process to understand food science and space physiology and why there are certain nutritional needs for the crew while in a microgravity environment.
- To accommodate pandemic restrictions, for the 2020-2021 Final Culinary Review, NASA and Sullivan University prepared and test the entrées of the top 10 teams using Facebook live. For the 2021-2022 school year, the top 10 teams were back at Space Center Houston to prepare their meals for the panel of judges that included astronauts, Johnson Space Center food lab, ISS program, and guest chefs.
- The American Culinary Federation and Sullivan University now provide funding and scholarships to the winning teams.
- To find out more about the culinary challenge visit their website at http://hunchculinary.com

Video Challenge

In order to provide videos to inspire students in K-12 education, HUNCH partners with the Association for Career and Technical Education (ACTE) to manage and fund a video challenge.

- Students in video classes and other courses are tasked with making 2-minute videos to inspire the next generation of scientists and explorers.
- The theme for the 2019-202 school year was *"Living and Working on the Moon and Beyond".* A record 71 videos were submitted including from schools in Belgium and Puerto Rico.
- The video theme for 2020-2021 school year was "*Advancing Space Exploration through Manufacturing" and for the 2021-2022 school year it will be "What is the Purpose of NASA".*
- *To view past video challenge videos go to* https://www.youtube.com/channel/UCFwf6s0Ya1uTRjJnZqeA7gA/playlists

How to Join NASA HUNCH

To join, partner, or volunteer please go to www.nasahunch.com and click on *Get Involved*.

- **Interested Teachers please fill out the Statement of Work and send it to JSC-HUNCH@mail.nasa.gov**
- **Interested volunteers or mentors please fill out the *Volunteer Application* found at** https://docs.google.com/forms/d/e/1FAIpQLSdKJzMNrl2eoJjKaGCcSO6c7LLasIu_a7ulICwx287PrXccyQ/viewform
- **Interested partners please contact Loy Trevino at eloy.w.Trevino@nasa.gov**

NASA HUNCH Partners

Questions?

Thank you for attending our presentation.