NASA Glenn Research Center – Office of STEM Engagement
Innovative Student Programming

Spring 2021 Solicitation

Solicitation posted:	November 23, 2020
Solicitation URL:	https://paragon-tec.com/funding-opportunities/
Proposal form URL:	**https://forms.gle/fGKw6SPBYsQeH5aT8**
Proposal receipt deadline:	**January 20, 2021, 8:00 PM Eastern Time**
Notification of awards:	February 18, 2021
Virtual workshop dates:	March 4-5, 2021
Implementation dates:	March 8, 2021 - July 31, 2021
Final report deadline:	August 16, 2021

PROJECT OVERVIEW

OPPORTUNITY DESCRIPTION

As a leader in innovation, NASA is marking a new era of exploration, discovery and a quest for human knowledge. NASA is revolutionizing human exploration as we push forward to the Moon and on to Mars, landing the first women and next man on the Moon, by 2024. Working to create a permanent human presence on the Moon, the opportunities for scientific discoveries are limitless.

In aeronautic exploration, NASA is working to create faster, quieter and cleaner aircraft here on Earth. The possibilities of aircrafts flying faster than the speed of sound with no sonic boom, or all electric aircraft, or even aircraft flying on other planets is becoming a reality. In the continued quest to further understand our planet, NASA continues to study the Earth and all it entails. This includes rising sea levels, our atmosphere, the weather, and assisting first responders during natural disasters.

Figure 1: Artist Rendition of the X-59 in flight
Credit: Lockheed Martin

As NASA continues to push the boundaries of exploration, education continues to push the boundaries of innovative virtual learning. Virtual learning has become an integral part of K-12 education. With an unprecedented number of students learning virtually, the digital divide in education is apparent. To effectively reach students, education settings require more equipment and innovative digital resources than ever before.

NASA Glenn's Office of STEM Engagement has an interest in engaging local Ohio audiences to achieve the Agency's science, technology, engineering and mathematics (STEM) education goals. Goals include advancing the STEM education and workforce pipeline by increasing and enhancing STEM knowledge for students, particularly those currently underrepresented and underserved in STEM fields. To that end, Paragon TEC, Inc., the Education Support Services contractor for the NASA Glenn Office of STEM Engagement is soliciting proposals from youth-

serving organizations, formal and informal education institutions in Ohio to receive virtual professional development and implement NASA STEM content.

This solicitation is requesting proposals to:

- Implement STEM content in virtual, formal or informal settings
- Support students in grades K-12
- Implement chosen NASA activities between March 8, 2021 and July 31, 2021 with a proposed group of students
- Address the digital divide while utilizing NASA resources and content

The funding received via this opportunity will address the digital divide and ensure sustained virtual models of STEM engagement in K-12 education settings. Students have the opportunity to work on real-world problems in collaborative, team-based, virtual environments. Students apply lessons learned to solve problems that STEM professionals may face while gaining a deeper knowledge of how NASA is a part of their everyday lives.

Funding will be awarded through a competitive application process in which up to 18 awards may each receive up to $10,000.00. Based on available funding, Paragon TEC, Inc., will issue full or partial awards on behalf of the Office of STEM Engagement.

This opportunity is designed to provide organizations with:

- Funding for materials and supplies needed to support sustained virtual models of STEM engagement
    - Organizations will propose a number of students to participate fully in the NASA content at their location.
    - Organizations will propose a total amount of funding not to exceed $10,000 for materials and equipment to implement the NASA content virtually.
- NASA activity content documents and related resources
- Help-desk support to assist educators as needed in facilitating the content
- Opportunities for live web-based connections with NASA scientists and engineers

BACKGROUND

NASA GLENN'S OFFICE OF STEM ENGAGEMENT

NASA Glenn's Office of STEM Engagement delivers tools for young Americans and educators to learn and succeed. The office seeks to create unique opportunities for students and the public to contribute to NASA's work in exploration and discovery; build a diverse future STEM workforce by engaging students in authentic learning experiences with NASA people, content, and facilities; and strengthen public understanding by enabling powerful connections to NASA's mission and work. To achieve these goals, NASA's Office of STEM Engagement strives to increase K-12 involvement in NASA projects, enhance higher education, support underrepresented communities, strengthen online education, and boost NASA's contribution to informal education. The intended outcome is a generation prepared to code, calculate, design, and discover its way to a new era of American innovation. For more information about STEM engagement at NASA Glenn Research Center, visit https://www.nasa.gov/centers/glenn/stem.

NASA OFFICE OF STEM ENGAGEMENT RESOURCES

NASA Glenn's Office of STEM Engagement recognizes the need for innovative, sustained, virtual models of STEM engagement, particularly with respect to the digital divide within K-12 education. Solicitation proposals must include a minimum of one chosen NASA activity and any intended or requested NASA resources for implementation. Below are example activities from each of NASA's explore campaigns and mission focused activities. The activities outlined below are a small sampling of the many options available for implementation. For more available activities and resources, please visit https://www.nasa.gov/education/materials/.

NASA CONTENT SUMMARY

Module	Standards-Based Content Focus	Synopsis
Make it NASA: *What Will it Take to Live on Mars?* Grades 5-*8* *https://www.nasa.gov/centers/glenn/stem/make-it-nasa/content-modules/*	NGSS: Engineering Design	Using the Design Thinking Process, students design and build an element critical for astronauts to live and work on Mars. Products could pertain to how astronauts would get to Mars, live and work on the planet's surface, or return to Earth. Student teams will research one aspect of a mission to Mars, decide on a product that needs to be created to support that aspect, and build a prototype model. The teams will evaluate and improve the prototype, and present their final model, key design features, and how it supports the astronauts on their mission.
Explore Earth: *Weather and Climate iQuest* Grades 5-8 https://www.nasa.gov/stem-ed-resources/weather-and-climate-iquest.html	NGSS: ESS2.C, ESS2.D	Students will explore the wild and changing world of weather and climate as they follow the links to answer questions about oceanic and atmospheric flow patterns, global climate change, Earth's vital signs and weather.
Explore Flight *The Ring Wing Glider* Grades K-8 https://www.nasa.gov/stem-ed-resources/ring-wing-glider.html	NGSS: MS-ETS1-2, MS-ETS1-4, MS-ETS1-3, 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3	Students will use engineering design principles to turn a piece of paper into an experimental wing for a new type of aircraft designed to be more economical and efficient than today's airliners. Airplanes of the future may look very different from those of today. NASA is developing high-payoff technologies for a new generation of safe, environmentally compatible and highly productive aircraft. Students will construct a ring-winged aircraft, and test and improve on their design.
Explore Humans in Space *Touchdown* Grades 3-8	NGSS: 3-5-ETS1-2, MS-ETS1-1	Students will design and build a shock-absorbing system that will protect two "astronauts" when they land. In this challenge, students follow the engineering design process to: (1) design and build a shock-

Module	Standards-Based Content Focus	Synopsis
https://www.nasa.gov/stem-ed-resources/otm-touchdown.html		absorbing system out of paper, straws, and mini-marshmallows; (2) attach their shock absorber to a cardboard platform; and (3) improve their design based on testing results.
Explore Moon to Mars *Impact Craters* Grades 5-12 https://www.nasa.gov/stem-ed-resources/impact-craters.html	N/A	Students will create their own impact craters to learn about how projectiles have affected the surface of the Moon. When astronauts visit the Moon for the Artemis III missions, they will be able to study the craters that may contain water and ice. Testing and studying these craters may help NASA identify areas on the Moon that are rich in water and other resources to determine how to best use those materials while on the lunar surface.
Explore Solar System and Beyond *Planetary (Egg) Wobble and Newton's First Law* Grades 3-8 https://www.nasa.gov/stem-ed-resources/planetary-egg-wobble-and-newtons-first-law.html	NGSS: 3-PS2-1, MS-PS2-2	Students will observe the motions of spinning eggs to determine which are raw or hard-boiled. They will apply what they learn to understanding how scientists determine whether the center of a planet is liquid or solid while they gain an understanding of Newton's first law of motion and the center of mass. This activity will help students understand NASA's Mars InSight spacecraft, which is gathering data that will help scientists determine the composition of the Martian core.
Explore Space Tech *Build Your Own Spacecraft* Grades K-8 https://www.nasa.gov/stem-ed-resources/build-your-own-spacecraft.html	N/A	In this activity, students will become the chief engineer for an important mission as they design a new satellite for NASA. Students will choose the instrumentation necessary to accomplish a chosen mission. Students will investigate the different uses of satellites including helping to study things happening on Earth, taking pictures of planets in our solar system, keeping an eye on our Sun or even finding planets elsewhere in the universe!
Aeronaut-X *Lower the Boom Citizen Science* Grades 5-8 https://www.nasa.gov/stem-ed-resources/nasas-lower-the-boom-citizen-science-activity.html	NGSS: MS-PS4-1, MS-PS4-2, MS-ESS3-3	Acting as citizen scientists, students will use a free mobile app to collect and submit levels of ambient noise. Students will investigate different noise levels throughout their day and environments. NASA's goal is to lower noise pollution from airplanes. Students' submitted data may be of value to NASA scientists or researchers trying to answer the question "How quiet is quiet enough?" for a sonic boom.

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Moon to Mars *Design and Build a Space Habitat* Grades 5-8 https://www.nasa.gov/stem-ed-resources/gateway.html	NGSS: MS-PS2-1, MS-ETS1-1, MS-ETS1-3	Students will work as a team to design and build a model of a space habitat using the engineering 90 to 120 minutes design process.
Commercial Crew Program *Eggstronaut Parachute Challenge* Grades K-12 https://www.nasa.gov/stem-ed-resources/eggstronaut-parachute-challenge-educator-guide.html	NGSS: 3-5-ETS1-3, MS-PS2-2, MS-PS3-5, HS-PS2-3, HS-PS3-5	Students will use the engineering design process to construct, test and analyze a prototype parachute designed to slow the descent of an egg and minimize the force of impact when landing, allowing the "eggstronaut" to land safely.

BENEFITS FOR PARTICIPATING ORGANIZATIONS

VIRTUAL FACILITATOR WORKSHOP

Facilitators or staff trainers will be provided a required multi-day virtual facilitator workshop hosted by NASA Glenn Research Center Education Specialists. The workshop will consist of multiple content specific virtual webinar segments, occurring March 4-5, 2021.

- Organizations will propose one or more facilitators to attend the virtual workshop. Proposing organizations should consider reasonable facilitator-to-student ratios when proposing the number of facilitators to be trained.
- Workshop content will be tailored to meet the needs and requests outlined in solicitation proposals.

Awarded organizations will confirm their workshop attendance upon notification of award.

- Some content may be provided for facilitators to review in advance of workshop attendance, in the form of webinar sessions, instructional videos, or document reviews outlining characteristics of programing or demonstrating specific technology platforms to be used during the workshop.
- Sessions during the virtual workshop will focus on the requested content based on solicitation proposal awardee requests. Participants will have the opportunity to work through the content and equipment to gain knowledge on execution of activities, STEM learning background information, and delivery techniques.

FUNDING

Awarded organizations will receive funding for requested materials to address the digital divide and implement NASA content. Organizations can have an unlimited number of students and facilitators participate in NASA programming; however, total funding provided through this opportunity for student materials and equipment will not exceed $10,000.00. Upon successful completion of the facilitator workshop, the initial 75% of funding will be provided. The remaining 25% of materials support will be provided upon successful submission of final reporting requirements by August 16, 2021.

IMPLEMENTATION SUPPORT FROM NASA EXPERTS

Awardees will receive support throughout implementation via email and phone conversations with NASA education specialists. Sites may request specific web-based facilitator training sessions as needed. As a collaborating organization with NASA Glenn, sites may request virtual connections between their students and NASA scientists and engineers to discuss the scientific and engineering concepts related to the NASA content and STEM careers.

ELIGIBILITY REQUIREMENTS

This solicitation seeks:

- Organizations located in Ohio.
- Organizations that will reach students in Kindergarten to 12th grade. Greater consideration is given to organizations who are able to reach underrepresented and underserved students. For purposes of this solicitation, groups underrepresented in STEM fields include Hispanics and Latinos, African Americans, American Indians, Alaska Natives, Native Hawaiians and Pacific Islanders, the economically disadvantaged, people with disabilities, and women and girls.
- Organizations that will facilitate the entire chosen NASA content during the timeframe of April 1, 2021 through July 31, 2021.
- Organizations that can recruit and retain the proposed number of students through the full NASA activity implementation. Organizations with greater student reach are highly desirable.
- Organizations who are committed to providing their staff with professional development opportunities, including the virtual facilitator workshop.

The proposed program must:

- Serve students in grades K-12.
- Provide all proposed students with the chosen NASA content and needed equipment to implement across the digital divide.
- Be conducted during the implementation period of March 8, 2021 through July 31, 2021.

Selected organizations must agree to the following:

- One or more designated facilitators must participate in the virtual training session hosted by NASA Glenn's Office of STEM Engagement's Education Specialists on March 4-5, 2021.
- Organizations must complete their chosen NASA content with the number of students written in their proposal.
- Organizations must provide a final report including any potential NASA content adaptations created as a result of the solicitation.

Evaluation Requirements:

All awarded organizations must provide a final data report. Details and reporting template will be provided to awarded organizations. The final data report must include the following:

- A brief narrative of the implementation of the activities with the students
- Student and facilitator participation data (anonymized)
    - Number of students (by each grade level)
    - Number of educators/facilitators (certified teachers, pre-service teachers, informal educators)
    - Demographic data (gender, ethnicity, and race)
- Model of implementation
    - When did the program take place (after school every day, half-days on Saturday, etc.)?
    - How were NASA content activities used?
        - Any NASA content adaptations created for implementation
    - When did virtual connections with NASA scientists and engineers occur?
- Signed budget summary
- Stories, images and media release forms of all participants whose likenesses are featured
- Any partnerships and/or collaboration data pertaining to the NASA content implementation

Selected sites may be asked to participate in one or more of the following evaluation activities to help improve NASA's STEM programming opportunities. By applying, your organization agrees to participate in the following:

- Complete facilitator surveys
- Participate in focus groups between NASA evaluators and site facilitators
- Have students complete participation surveys

SUBMITTING YOUR PROPOSAL

All proposals are to be submitted through the online proposal form, located here. Proposals must be submitted by 8:00 PM Eastern on January 20, 2021. Only proposals submitted online will be accepted.

Proposals must be completed in full at the time of submission, so it is encouraged to prepare responses prior to beginning the online proposal form. A list of the proposal form questions for reference is available here.

A budget document must be submitted as part of your proposal, indicating both funds requested from NASA and a description of any funds or supplies to be leveraged from other sources. An editable budget template is available here. The Facilitator Travel category does not apply to this opportunity and should be left blank.

PROPOSAL REVIEW PROCESS

Proposals are reviewed by a panel of experts. Full or partial awards may be granted. Award funds are distributed after participation in the virtual facilitator workshop.

Proposals will be evaluated to determine likelihood of project success using the following criteria:

- Number of proposed student participants
- Percentage of students from underrepresented populations as defined in the solicitation
- Plans to recruit and retain student participation in the program
- Alignment of the program's goals and objectives to those of this opportunity
- Reasonability of funding requested based on expected numbers of participants and leveraging of additional resources beyond this solicitation
- Ability to address the digital divide
- Likelihood for delivery of quality STEM programming demonstrated through relevant STEM experience

Proposing organizations will be notified of their award status by February 18, 2021.

AWARD ADMINISTRATION INFORMATION

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POINT OF CONTACT

If you have questions about the project or the online proposal form, contact:
NASA Glenn Research Center Office of STEM Engagement
GRC-Ed-Opportunities@mail.nasa.gov