FUNDING OPPORTUNITY DESCRIPTION
NASA Glenn’s Office of Education has an interest in engaging local, regional, and national audiences to achieve the Agency’s science, technology, engineering and mathematics (STEM) education goals. Goals include advancement of the Nation’s STEM education and workforce pipeline and increasing and enhancing STEM knowledge for students, particularly those currently underrepresented and underserved in STEM education and/or fields. To that end, NASA Glenn seeks to collaborate with out-of-school time (OST) organizations to support OST facilitators in providing the excitement of STEM learning as only NASA can.

The Office of Education is soliciting applications from youth-serving organizations (YSOs) and formal/informal education institutions in NASA Glenn’s six-state service region (IL, IN, MI, MN, OH, WI). This solicitation is requesting proposals to:

- Implement STEM content in out-of-school time (OST) settings
- Support students in grades 5-9
- Conduct NASA activities between June 1, 2019 and August 31, 2019
- Utilize either of the following NASA Glenn activities:
  - NASA Glenn Engineering Design Challenge (EDC): Spacecraft Safety
  - Make it NASA: How Would You Measure the Moon?

The content received via this opportunity will allow students to work on real-world problems in a collaborative, team-based environment. 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 NASA Glenn seeks to fund up to 50 awards each between $200.00 and $2,000.00. Based on available funding, Paragon TEC, the Education Support Services contractor for the NASA Glenn Office of Education, will issue awards on behalf of the Office of Education based on proposed numbers of student participants and facilitators attending training workshops. The Office of Education may elect to make full or partial awards based on proposals received.

This opportunity is designed to provide organizations with:

- Funding to supplement travel for attending a required one-day facilitator training workshop
  - Organizations will propose one or more facilitators, based on proposed number of student participants, to attend a workshop hosted at the NASA Glenn Research Center in Cleveland, OH. Proposing organizations should consider reasonable OST facilitator-to-student ratios when proposing number of facilitators to be trained.
  - Organizations will also propose a total amount of funding requested to supplement travel for these facilitators.
- Funding for materials and supplies needed to support the EDC or Make it NASA student experience.
  - Organizations will propose a number of students, minimum of 20, to fully participate in the NASA content at their location.
  - Organizations will also propose a total amount of funding to support the students’ experience with materials and supplies to implement the content.

The total funds requested including both the travel supplement and materials support above are not to exceed $2,000.00.

- EDC or Make it NASA activity content documents
- Help-desk support to assist educators as needed in facilitating the content
- Opportunities for live web-based connections with NASA scientists and engineers
BACKGROUND

ELEMENTS OF A QUALITY OUT-OF-SCHOOL TIME STEM PROGRAM
These opportunities will be offered to organizations and programs that indicate the greatest potential to offer high-quality OST STEM programs utilizing evidence-based best practices. Organizations who have not previously offered STEM learning experiences but would benefit from the support that NASA content and professional development could provide are also encouraged to apply.

Leading research indicates that quality OST STEM programs should include learner-centered, participatory activities that provide opportunities for participants to engage in STEM practices, explore their interests, and identify with STEM professionals. Activities should reflect the nature of OST STEM program learning environments by providing opportunities for choice, autonomy, ownership, active involvement, wonder, and discovery. Activities should be age appropriate, varied, interesting, enjoyable, challenging, connected to real work, and be flexible (Fredricks, 2011; Graves, 2016; Kesidou & Koppal, 2004; PEAR, 2016; Stocklmayer, Rennie, & Gilbert, 2010). The NASA content for this opportunity was developed to align to these best practices and support organizations that are equipped to provide high-quality OST STEM programming. Additional information on current research related to quality OST STEM learning can be found at the National Research Council’s, *Identifying Supporting Productive STEM Programs in Out-of-School Settings*.

NASA GLENN ENGINEERING DESIGN CHALLENGE: SPACECRAFT SAFETY
Using the Engineering Design Process, students will design and build a model of a spacecraft that can safely transport two astronauts on a mission to the Moon, Mars, or other destinations in space. A drop test will determine how well the spacecraft will protect the astronauts during landing. During the drop test, the model spacecraft will be deployed, or dropped, from a height of at least 2 meters to simulate landing. Students will submit their final solutions through a short video or capstone presentation document.

Information about NASA Glenn Engineering Design Challenges can be viewed at https://www.nasa.gov/glenn-engineering-design-challenges.

MAKE IT NASA ACTIVITY: HOW WOULD YOU MEASURE THE MOON?
Using the Design Thinking Process, students plan and conduct a scientific mission to take measurements on the lunar surface. They design a scientific payload consisting of sensor-microcontroller-transmitter, and mount it on a model lunar rover. Students then program the payload to take data and transmit it back to the team. They execute the program, and conduct the mission on a 3-foot-by-3-foot area of a simulated lunar surface, transmitting at least nine data points back to the team.

Information about Make it NASA activities can be viewed at https://www.nasa.gov/make-it-nasa
### NASA OST CONTENT SUMMARY

<table>
<thead>
<tr>
<th>Module</th>
<th>Standards-Based Content Focus</th>
<th>Synopsis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Design Challenge: <em>Spacecraft Safety</em></td>
<td>NGSS: Engineering and Physical Science</td>
<td>Using the Engineering Design Process, students will design, build, and improve a model of a spacecraft to safely transport two astronauts on a mission in space. A drop test will determine how well the spacecraft will protect the astronauts during landing.</td>
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<tr>
<td>Make it NASA: <em>How Would You Measure the Moon?</em></td>
<td>ISTE: Computational Thinking</td>
<td>Using the Design Thinking Process, student teams plan and conduct a simulated scientific mission to take measurements on the lunar surface. They will design a scientific payload, mount it on a model lunar rover, and conduct the mission, transmitting at least 9 data points back to the team.</td>
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### NASA GLENN’S OFFICE OF EDUCATION

NASA Glenn’s Office of Education 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 Education 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.
BENEFITS FOR PARTICIPATING ORGANIZATIONS

FUNDING
Awarded organizations will receive funding to supplement travel materials costs to implement EDC or Make it 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 travel costs will not exceed $2,000.00. Upon successful completion of the appropriate facilitator workshop, initial funding will be provided including full travel supplement and 75% of materials support. The remaining 25% of materials support will be provided upon successful submission of final reporting requirements and submissions of final student team solution presentations (video or slide presentations) by August 31, 2019.

TRAINING
Facilitators or staff trainers will be provided a required one-day training session at NASA Glenn Research Center in Cleveland, OH. Funding will be provided to supplement travel costs for one or more facilitators to attend NASA OST facilitator training.

- Organizations will propose one or more facilitators, based on proposed number of student participants, to attend a workshop hosted at the NASA Glenn Research Center. Proposing organizations should consider reasonable OST facilitator-to-student ratios when proposing number of facilitators to be trained.
- Organizations will also propose a total amount of funding requested to supplement travel costs.

Workshops will consist of one full day, occurring on the following dates:

- Engineering Design Challenge: May 23, 2019
- Make it NASA: May 29, 2019

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 or instructional videos, outlining characteristics of quality OST STEM programing or demonstrating specific technology platforms to be used during the workshop.
- Sessions during the in-person workshop will focus on the activity content based on the pre-workshop content. Participants will have the opportunity to work through the content to gain knowledge on execution of activities, STEM learning background information, and delivery techniques.

Awardees will also have access to web-based training sessions during implementation.

IMPLEMENTATION SUPPORT FROM NASA EXPERTS
Awardees will receive support throughout implementation via email and phone conferences from NASA education specialists. Sites can request specific web-based facilitator training sessions as needed. As a collaborating organization with NASA Glenn, NASA scientists and engineers can talk directly with students via web-based platform to discuss the scientific and engineering concepts related to the NASA content and their STEM careers.
ELIGIBILITY REQUIREMENTS

NASA Glenn is seeking:

- Organizations located in NASA Glenn’s six-state service region (IL, IN, MI, MN, OH, WI).
- Organizations that will reach students in 5th to 9th 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 at least 10 hours to conduct the entire EDC or Make it NASA content during the timeframe of June 1, 2019 through August 31, 2019.
- Organizations that will provide the NASA content to 20 or more students. Organizations with greater student reach are highly desirable.
- Organizations who are committed to providing their staff with professional development opportunities, including the in-person training session.

The proposed program must:

- Serve students in grades 5-9.
- Provide all proposed students with the EDC or Make it NASA content including creating and submitting student solution presentations.
- Be conducted during the implementation period of June 1, 2019 through August 31, 2019.

Selected organizations must agree to the following:

- One or more designated facilitators must participate in the in-person training session at NASA Glenn Research Center in Cleveland, OH.
- Organizations must complete the content with the number of students proposed in the application. Groups of up to four students work through an iterative design process to build a solution to the given problem. Each group must present their work accomplished through the design process and their final solution in the form of a 5-minute video or a slide presentation submitted to NASA.
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?
  - 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 OST 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 APPLICATION

All applications are to be submitted through the online application form, which is located at http://tinyurl.com/NASA-Glenn-OST-Application. Applications must be submitted by 11:59 PM Eastern on April 14, 2019. Applications must be submitted completely at the time of submission, so it is encouraged to prepare responses prior to beginning online application. A list of the application questions for reference is available here. Only applications submitted online will be accepted.
APPLICATION REVIEW PROCESS

Applications are reviewed by a panel of experts. Full or partial awards may be granted. Award funds are distributed after participation in the in-person training session.

Applications will be evaluated to determine they meet solicitation requirements for the following criteria:
- Number of student participants
- Number of content hours
- Percent of underrepresented students as defined in the application
- Ability to recruit and sustain student participation in the program
- Status as previous NASA partner: if so, previous NASA participation and plans to engage different participants; if not, previous experience with similar programming
- Ability to demonstrate likelihood for quality STEM programming

AWARD ADMINISTRATION INFORMATION

Date application posted: March 11, 2019
Solicitation URL: https://www.nasa.gov/Glenn-OST-Summer2019Solicitation
Application URL: http://tinyurl.com/NASA-Glenn-OST-Application
Application Receipt Deadline: April 14, 2019, 11:59 p.m. Eastern Time
Notification of awards: April 22, 2019

EDC in-person training: May 23, 2019 9:00 AM - 5:00 PM
Make it NASA in-person training: May 29, 2019 9:00 AM - 5:00 PM

OST implementation dates: June 1, 2019 - August 31, 2019
Student presentation deadline: August 31, 2019
Final report deadline: September 15, 2019

POINT OF CONTACT

If you have questions about the project or the application, contact:
NASA Glenn Research Center Office of Education
GRC-Ed-Opportunities@mail.nasa.gov
Chris Hartenstine at: 216-433-2755
REFERENCES


