



## Micro-g NExT FAQs

*Micro-g Neutral Buoyancy Experiment Design Teams Frequently Asked Questions*

### Contents

<a href="#">Lessons learned from former Micro-g NExT Participants</a> .....	Page 1
<a href="#">FAQs: General</a> .....	Page 2
<a href="#">FAQs: Technical</a> .....	Page 5

### Lessons Learned from former Micro-g NExT Participants

Want to know what advice past participants would give to students thinking about taking the Micro-g NExT journey? Click the links below to view video of past participants sharing their advice from a student's perspective. The topics include how to collaborate with teams, the importance of a timeline, how to build a successful team, and the impact Micro-g NExT can have on your future. These lessons learned from previous participants will help make your upcoming journey with Micro-g NExT more successful.

- [How are teams structured?](#) (Video)
- [How do teams successfully manage deadlines?](#) (Video)
- [What is the makeup of a successful team?](#) (Video)
- [What can one expect to learn during Micro-g NExT?](#)(Video)
- [How can Micro-g NExT help in future career success?](#) (Video)

## FAQs: General

**1. *What is the Artemis program?***

The Artemis program is NASA's lunar exploration program which will use innovative new technologies and systems to explore more of the Moon than ever before. To learn more, please visit <https://www.nasa.gov/what-is-artemis>.

**2. *What is Orion?***

Orion will serve as the exploration vehicle for the Artemis program. It will carry the crew to space, provide emergency abort capability, sustain astronauts during their mission, and provide a safe re-entry from deep space return velocities. To learn more, please visit <https://www.nasa.gov/exploration/systems/orion/index.html>.

**3. *How does my team's design potentially benefit space exploration?***

NASA is currently working on systems to take humans beyond Low Earth Orbit to explore the solar system. Some of the destinations of interest are the Moon and Mars. As part of NASA's exploration objectives, new tools and procedures are necessary to carry out the upcoming missions.

**4. *What expenses does NASA cover?***

The selection of a team for this opportunity does not include a monetary award to your institution. NASA assumes responsibility for costs involved with prototype testing in the NBL. Each team is responsible for all other costs including travel to Houston and cost of building the prototype.

**5. *With whom will my team interface with at NASA?***

Your team will have multiple interfaces at NASA, each of which serve a different function. Your primary interface will be the Micro-g NExT Coordinators.

**6. *How much time should I anticipate spending on this project?***

Time requirements will vary from team to team. Expect to spend a large portion of your time on design, creation, and outreach. If your team is struggling with time management, please work with your faculty advisor to set a feasible timeline. The workload of this project is comparable to that of a 3-credit hour course.

**7. *How many teams will NASA select to test their prototypes in the NBL?***

The number of teams is not predetermined but rather based on the quality of submitted proposals.

**8. *Can I submit a design for more than one tool?***

Each team may submit a proposal for only **one** of the Micro-g NExT challenges.

**9. *Can more than one proposal be submitted from the same school?***

Yes, more than one proposal can be submitted from the same school. However, students may only belong to a single team.

**10. *If a school submits multiple proposals, does each proposal need a different outreach section?***

Yes, each proposal will need its own outreach section.

**11. *Do we need a signature from the Department Head or any other management individual from our school before submitting the Letter of Intent and/or the Project Proposal?***

You do not need a letter of endorsement for the Letter of Intent, but it is a requirement for your team's proposal.

**12. *Does a prototype need to be submitted with the proposal?***

A prototype is not required to be submitted with the proposal. However, any prototyping you do will add to the quality of your proposal.

**13. *If selected, what is the first step?***

Your team will be invited to attend a 1-hour orientation session with the Micro-g NExT staff. Attendance of this session is required of the faculty advisor and student team. The session is conducted online.

**14. *Can teams be comprised of students from multiple schools?***

Absolutely! We encourage collaboration and interdisciplinary teams.

**15. *Can returning teams participate?***

Returning teams may participate; however, teams may only have 2 returning members.

**16. *Do members who have submitted a proposal, but have not been selected constitute a returning member?***

No, the requirement only refers to teams that have previously participated on a team that advanced to Phase II of Micro-g NExT.

**17. *Are BS/MS students who have yet to be immersed in graduate courses allowed to compete in this project?***

If your academic status is listed as an undergraduate student when we verify with your college/university, you are eligible to participate as a student.

**18. *Can I participate in Micro-g NExT if I have a green card/am a Legal Permanent Resident or DACA student?***

Micro-g NExT is currently available to U.S citizens enrolled in U.S institutions of higher learning.

**19. My choice for faculty advisor is not a U.S. citizen. Is he still able to work with my team?**

Yes, he can still act as your advisor. However, he will be unable to travel to Houston for the test week. **Any person participating in the Test Week in Houston must be a US citizen.**

**20. Where can I find information about the Neutral Buoyancy Laboratory (NBL)?**

Information about the NBL can be found at the following

link: [https://www.nasa.gov/centers/johnson/pdf/167748main\\_FS\\_NBL508c.pdf](https://www.nasa.gov/centers/johnson/pdf/167748main_FS_NBL508c.pdf)

**21. Are there hardware requirements and/or standards my team should be aware of before testing in the NBL?**

Requirements for hardware that will be tested in the Neutral Buoyancy Laboratory (NBL) can be accessed in the NBL Engineering and Safety Requirements document.

**22. Do I get to dive with my team's prototype during testing in the NBL?**

Professional NBL divers will test the tools and students will direct the divers from the Test Conductor Room of the NBL facility.

**23. Who is responsible for writing the procedures that will be used to conduct test in the NBL?**

Your team is responsible for drafting the diver procedures and coordinating with the assigned Ops Lead to finalize the procedures.

**24. What is considered STEM engagement?**

STEM engagement may consist of a presentation to a school group, a symposium, or other similar event. You may also incorporate a social media plan in your outreach.

**25. When will we hold the STEM engagement component?**

Your STEM engagement component can occur prior to test week, but as some outreach components will include testing results, some outreach could occur after your team's test week.

**26. The STEM engagement portion of my project involves development of K-12 curriculum for classroom use. Are there any suggested components I need to incorporate?**

The following websites might be useful when looking to incorporate NASA missions into the curriculum:

<https://www.nasa.gov/stem/nextgenstem/index.html>

<https://www.nasa.gov/stem/nextgenstem/webb-toolkit.html>

You may consult with a current K-12 educator on this topic. It is suggested that you consider the following:

- All curricula are aligned to national standards.
- Each curriculum piece provides the user with a connection between the curricula topic and microgravity, the NBL, or your prototype’s potential use in space exploration via an introductory paragraph. This adds relevance to the material.
- A curriculum incorporates the 5E model to the extent possible.
- The curricula are written in grade level appropriate language.

**27. *How should STEM engagement be documented in the proposal?***

Include a description of activities you plan to carry out. The description should include the purpose of the activity, the intended audience, the expected number of participants, and the perceived impact of the activity. It helps to have a letter of support from organizations you plan to work with in your outreach efforts. It is advised that you begin making connections now.

**28. *Can we coordinate social media outputs about the project with Micro-g NExT?***

Absolutely. This can be coordinated with the Micro-g NExT coordinator.

We may retweet a team’s posts. We encourage you to use our hashtag #MicrogNExT.

## FAQs: Technical: General

Please visit the [EVA Reference Website](#). It provides a reference you can use when considering your design. You will only be judged on your ability to meet the requirements outlined in the challenges. You are not required to meet the requirements outlined in the website.

**1. *Who would own the intellectual property rights?***

NASA hopes to potentially utilize some of the ideas that your team puts forward in a future space mission. Therefore, we ask that teams complete a “Statement of Rights” document. See the Proposal Guidelines for specifics regarding this topic.

**2. *Do I have to meet all the requirements?***

You will be scored based on how many requirements you meet.

**3. *Some requirements are vague. What should I do in this case?***

Some requirements are purposely vague. We want you to do the research and provide the rationale for why you designed your device the way you did.

**4. *Can you combine the functions of multiple tools together to save cargo space?***

That’s a great thought and an important consideration for space tool development. For the purpose of this activity, we ask you select only one (1) challenge.

**5. Can we have detachable parts on the prototypes?**

Yes. You can have multiple pieces of hardware to accomplish the challenge. All pieces together should fit within the given dimensions.

**6. May we 3D print parts of the tool?**

Yes. Though you'll want to consider the loads that your tool will encounter and ensure that the plastics used in the 3D printer can handle those loads.

**7. Will we have to make a waterproof version of our tool?**

You will have to make a version of your tool that operates in the NBL. We will work with you to ensure you are using approved materials.

**8. Does the prototype have to be built on a 1:1 scale, or can it be smaller?**

The simulation in the NBL will be full-scale, 1:1. However, doing scale prototypes during the proposal phase is recommended to show the validity of your design.

**9. Is there somewhere to get more in detailed specs regarding the NBL (such as density)?**

The NBL is filled with chlorinated water with a density of approximately 1 g/cm<sup>3</sup>.

**10. What will be the depth of operation in the NBL?**

Assume a depth of 40ft. That is the maximum depth of the NBL.

**11. Do the prototype materials need to be NBL and Space approved?**

For the purpose of the proposal, the minimum requirement is to describe the materials you would use in the NBL. Any additional information you want to provide about what you would do in a legitimate space application would be very valuable as well.

**12. What are the temperatures our materials need to be able to withstand?**

The actual testing will occur in the NBL which is about 85°F. So, for this effort of developing a prototype, temperature will not be a major factor. For space application, there is information online that details different temperature ranges in space.

**13. What is the size of an EVA glove?**

See the [EVA Reference Website](#) for glove dimensions. You can also use a ski glove as a reference. It is approximately the same thickness as an EVA glove. Remember that when a space suit glove is pressurized its nominal position will be "hand open" and the astronaut needs to expend energy to close their hand.

**14. Will tools need to be able to be used with either hand?**

This is not a requirement, but NASA does like tools that can be used by both left and right-handed astronauts.

**15. Are we able to use magnets for any part of the challenges, just as a small component, not as a whole?**

Yes, magnets are okay in that capacity.

**16. How often can the teams ask for technical clarifications? Will all technical clarifications be posted for all teams to see?**

All questions and their answers will be continuously posted in this FAQ document. Check this document regularly. Ask as many questions as you'd like, we'll get to them as soon as we can.

**17. What kind of CAD program is best for all of these? SolidWorks or AutoCAD?**

You can use any CAD program you'd like, or none. A 3D model is not required, though it is recommended as it is easier to understand a design that way.

**18. Can aerogel be used?**

As Aerogel can have different formulas, it will be up to the team to prove that it is safe to use in the water. You'll need to provide the Safety Data Sheet and do testing of your own to show it is safe.

**19. Can we have more than two parts as detachments?**

Yes.

**20. If we have something on our design that fits the requirements, but upon using it, that part may stretch outside of the dimensions given, is that allowed? Or does everything have to stick within the dimensions you gave us?**

The dimensional requirement is a stowage requirement. If your tool doesn't fit into that box when stowed, consider making your device in multiple pieces. Also, not meeting one of the requirements does not disqualify you. You just won't get full credit for meeting that requirement.

**21. Can our design deviate slightly from proposal drawings to actual day of testing?**

Yes. As with all proposals, there may be slight modifications. However, all changes will need to be approved.

**22. Can we adapt technology used in other industries for our design?**

Absolutely!

