Student Spaceflight Experiments Program (SSEP)
Mission 22 to the International Space Station

Last revised: February 6, 2026
All links are active in this document, allowing a deeper exploration of SSEP

At a time when it should be the birthright of all students to an education that allows them to successfully enter the job markets of the 21st century…

At a time when America must inspire its next generation of scientists and engineers if the nation is to compete in the technology markets of the 21st century…

The Student Spaceflight Experiments Program (SSEP) was launched in June 2010 by the National Center for Earth and Space Science Education (NCESSE). Designed as a model U.S. National Science, Technology, Engineering, and Mathematics (STEM) education initiative, the program gives students across a participating community the ability to design and propose real microgravity experiments to fly in low Earth orbit (experiments conducted in a "weightless" environment). SSEP was first carried out aboard the final two flights of the U.S. Space Shuttle Program. In 2012 SSEP transitioned to operations on the International Space Station (ISS)—America's newest National Laboratory.

SSEP is suitable for students in pre-college grades 5-12, 2-year community colleges, and 4-year colleges and universities. For pre-college grades 5-12, each community typically engages 300+ students (at least 100) in microgravity experiment design and proposal writing. For an undergraduate community, it is expected that at least 20 students will be engaged.

In 2012, SSEP was extended to international communities through the Arthur C. Clarke Institute for Space Education, NCESSE's international arm.

For school districts—even individual schools—SSEP provides an opportunity to implement a systemic, high caliber STEM education program tailored to a community's strategic needs in STEM education.

Program Overview: Each community participating in SSEP is provided a microgravity research mini-laboratory, and guaranteed launch services to transport the mini-lab containing a single experiment to the International Space Station (ISS), where it will be operated by the astronauts. Mirroring how professional researchers compete to obtain limited research assets, the community conducts a local **Flight Experiment Design Competition**, with their student teams submitting formal experiment proposals. Proposals go through a 2-step review process to select the single flight experiment for the community. SSEP provides your community its own *real* space program.

Your design competition – from program start, to experiment design, to submission of proposals by your student teams – runs 9 weeks. Students can design experiments in diverse fields, including: seed germination, crystal growth, physiology and life cycles of microorganisms (*e.g.* bacteria), cell biology and growth, food studies, and studies of micro-aquatic life. Content resources for teachers and students support foundational instruction on science in microgravity and experimental design. A suite of SSEP program elements – the **Community Program –** leverages the flight experiment design competition to engage the entire community, embracing a Learning Community Model for STEM education.

Note: SSEP is not designed for an individual class, or small number of students, in a pre-college community.

Heritage: The SSEP paradigm derives from the National Center for Earth and Space Science Education's Core Beliefs, its embraced Learning Community Model for STEM education, its heritage of delivering community-wide programming, and its heritage of SSEP operations to date.

Who Can Participate: The program is open to 5 categories of community, providing a great deal of flexibility in implementing SSEP at the local level:

- ***Pre-College (the core focus for SSEP) in the U.S.,*** (grades 5-12), with school districts—even individual schools—providing a stunning, real, on-orbit RESEARCH opportunity to their upper elementary, middle, and high school students
- ***2-Year Community Colleges in the U.S.,*** (grades 13-14), where the student body is typically from the local community, providing wonderful pathways for community-wide engagement
- ***4-Year Colleges and Universities in the U.S.,*** (grades 13-16), with an emphasis on Minority-Serving Institutions, where the program fosters interdisciplinary collaboration across schools and departments, and an opportunity for formal workforce development for science majors
- ***Communities in the U.S. led by Informal Education or Out-of-School Organizations,*** (*e.g.,* a museum or science center, a home school network, a scout troop), because high caliber STEM education programs must be accessible to organizations that promote effective learning beyond the traditional classroom
- ***Communities Internationally:*** in European Space Agency (ESA) member nations, European Union (EU) member nations, Canada, and Japan, with participation through NCESSE's Arthur C. Clarke Institute for Space Education. Communities in other nations should explore the potential for their participation via the Mission 22 contact provided below.

Pedagogy: When designing SSEP, we had our pedagogical approach to STEM education in mind. SSEP empowers the student ***as scientist***, and within the real-world context of science that is far more than exploration through inquiry. SSEP allows student teams to—

- design an experiment like professional scientists, with real constraints imposed by the experimental apparatus, current knowledge, and the environment in which the experiment will be conducted
- write a formal research proposal like professional scientists, requiring critical written communications skills
- experience a real 2-step science proposal review process
- have their own science conference, a venue where they are immersed in ***their*** community of researchers, and in which they can communicate their thoughts, ideas, and experimental results to their peers.

TO THE TEACHER: The Essential Question for the Design of an Experiment–

What physical, chemical, or biological system would I like to explore with gravity seemingly turned off for a period of time, as a means of assessing the role of gravity in that system?

You are invited to explore the SSEP experiments that have already flown.

A New Approach to STEM Education*:* SSEP is the first pre-college STEM education program that is both a U.S. national initiative and implemented as an on-orbit ***commercial space venture***. It is made possible by the new private sector of companies providing transport services to and from low Earth orbit. SSEP is not a NASA program.

Our Motivation and Commitment: Science is more than a book of knowledge. Science is a way of thinking and interacting with the natural world. And science is also a complex social landscape filled with challenges, and the need for multi-faceted and successful communication with ones peers. SSEP is about introducing ***real*** science to our next generation of scientists and engineers.

We invite students across your community to truly slip on the shoes of researchers and design and propose experiments just like professional scientists and engineers. One cannot imagine an education program with greater potential to engage students in the process of scientific inquiry, and get them thinking about a career across all STEM disciplines.

For complete program details and to explore this opportunity, carefully read the SSEP Home Page, which is an Executive Summary of the Program: http://ssep.ncesse.org

(6/2/26) NEW Flight Opportunity

Announcing SSEP Mission 22 to the International Space Station (ISS)

The National Center for Earth and Space Science Education (NCESSE) announces the 24th SSEP flight opportunity – **SSEP Mission 22 to the International Space Station (ISS).** Each participating community will be provided all launch services to fly a real microgravity research mini-laboratory to ISS, which contains a single student team designed experiment selected through a formal research competition. SSEP typically engages 300+ students (at least 100) across a pre-college community; or at least 20 students in an undergraduate community.

Mission 22 to ISS provides for an experiment design competition in Fall 2026, and an expected ferry flight of the community's selected flight experiment to ISS in Late Spring 2027. SSEP Mission 22 to ISS is currently the only SSEP flight opportunity available.

Time Available for Experiment Design:
Your Student Teams, led by your designated SSEP Local Team of Teacher Facilitators, will have 9 weeks from program start to proposal submission: September 1 to November 3, 2026. During this time, core activities include:

- introducing SSEP curricular content for foundational instruction on: the nature of microgravity, science conducted in microgravity, mini-laboratory operation, and experimental design
- defining student teaming; facilitation of microgravity experiment design across all student teams
- each team writing a formal 5-page grade level appropriate flight experiment proposal

Key Milestones:

- Experiment Design and Proposal Writing (9 weeks): September 1 to November 3, 2026
- Flight Experiment Proposals due to your lead institution: November 3, 2026
- Local Step 1 Review Board selects 3 finalist proposals, submits to NCESSE: November 12, 2026
- Formal selection of your community's flight experiment: December 18, 2026
- Ferry Flight of SSEP Payload to ISS on SpaceX Dragon, estimated launch date: Late Spring 2027
- Ferry Flight of SSEP Payload back to Earth: typically Launch Plus 4 to 6 weeks
- SSEP National Conference for students: late June 2027, at NASA's Kennedy Space Center in Florida.

TIME CRITICAL:
***Letters of Commitment of Funding from Participating Communities*:** due August 24, 2026
Mission 22 to ISS Starts in Participating Communities: September 1, 2026

ASAP:
Interested communities are directed to contact NCESSE no later than March 15, 2026, to explore participation. It typically takes 2 months in advance of program start to plan the program in a community.

Contact: Dr. Jeff Goldstein, NCESSE Center Director, jeffgoldstein@ncesse.org

SSEP is a program of the National Center for Earth and Space Science Education (NCESSE) in the U.S., and the Arthur C. Clarke Institute for Space Education internationally. It is enabled through a strategic collaboration with Rhodium Scientific, America's first commercial space biotech company, working with NASA through a CASIS Agreement to utilize its facilities aboard the International Space Station. The International Space Station (ISS) National Laboratory is a National Partner on SSEP.