

## IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)

Ignition - Primary Space Education (1)

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AN ELEMENTARY SCHOOL PROGRAM TO PROMOTE STEM EDUCATION LEADING TO A  
STUDENT-DESIGNED SUBORBITAL SPACEFLIGHT EXPERIMENT**Abstract**

Background: Education in Science, Technology, Engineering, and Math (STEM) remains a high priority for educators as there is a growing need to cultivate youthful minds and encourage students to consider careers in STEM-related fields. Programs that can excite and inspire students at an early age may have a long-lasting positive impact and should be encouraged and supported. Space has always been a source of inspiration, imagination, and motivation for children, and as such, is ideally suited to promote STEM in elementary school students. Methods: With the goal of promoting interest in STEM in elementary school students, we developed and executed a 3-month afterschool program open to 3rd to 5th grade students at an elementary school in Ohio, USA that ultimately resulted in designing a spaceflight experiment and preparing it for flight. The weekly sessions included lessons, workshops, presentations, and other activities to learn about the space environment, physics, effects of space on humans, the scientific method, and engineering principles. Students learned to work in teams and ultimately selected and designed a suborbital spaceflight experiment to fly aboard Blue Origin's New Shepard launch vehicle. The launch opportunity was procured commercially through a program made possible by Blue Origin, NanoRacks, and DreamUp. Results: A total of 80 3rd to 5th grade students participated in the 12-week program and the students selected an experiment that would fly jellyfish into space. The goal of JELLIES (Jellyfish Experiment to Learn about Life In the Environment of Space) was to investigate the effects of microgravity on jellyfish behavior and motility to better understand how the microgravity environment affects their graviceptors as well as their ability to respond to a light stimulus. The 12-week program concluded with a special graduation ceremony that included presentations by some of the students and a presentation by an astronaut guest speaker. Students also presented their project to the public at the local science museum (COSI, Columbus, OH). Post-program feedback was universally positive with multiple requests to continue or expand the program in the future. Conclusion: The participating students had a once-in-a-lifetime opportunity to be an active part of a scientific experiment that would fly in space. The response was overwhelmingly positive and the opportunity to be part of a spaceflight experiment stimulated interest in STEM topics. The program was affordable and manageable and may serve as a model for similar projects elsewhere.