

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off - Secondary Space Education (2)

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STUDENTS TEACHING STUDENTS: DESIGNING AND LAUNCHING A SUBORBITAL
EXPERIMENT AT A U.S. MONTESSORI SCHOOL**Abstract**

During 2017, a group of middle school students at DCS Montessori School in Castle Pines, Colorado, working in partnership with DreamUp, the provider of space-based educational opportunities, designed a suborbital payload that was successfully launched to space on a Blue Origin New Shepard launch vehicle in December 2017.

While the act of students launching a suborbital experiment to space was not new, the approach taken by the students, teachers, and mentors to involve more than 500 students in the process was unique. DCS Montessori School is a public charter school that includes student from preschool through 8th grade and follows the Montessori philosophy of grouping and teaching students. This philosophy was critical to the success of the curriculum developed for creating a payload and involving all the students.

DCS Montessori School contracted with DreamUp, NanoRacks, and Blue Origin to provide payload integration services for the future launch of the suborbital reusable launch vehicle known as New Shepard, which operates from the West Texas Launch Site. Once a contract was established, the middle school students were split into four groups. Group 1 was responsible for designing and building the payload enclosure. Group 2 was responsible for developing and testing an experiment. Group 3 was responsible for generating and organizing a school-wide art project to enable all students at the school to create something that would be sent into space. Group 4 was responsible for conducting educational outreach and developing an age-appropriate lesson to share with the preschool, lower elementary, and upper elementary students. By engaging the entire school in various aspects of the suborbital experiment, the project exposed students to a real-world challenge that incorporated Science Technology Engineering Art and Math (STEAM) in a powerful and effective way.

The student payload consisted of two parts. The first was an Arduino Nano with a sensor package that was designed and programmed by the students. The second part was the school-wide art project that all student participated in. Upon landing, the data from the experiment was analyzed and the art has been returned to the students. Through the active engagement of leaders at DCS Montessori and the support of DreamUp, NanoRacks, and Blue Origin, the students had a once in a lifetime opportunity to send, recover, and analyze science conducted in microgravity.