

Science Students at Sussex County Charter Send Experiments to Space

by Mary Lou DeCaprio

This past June 23rd, Mary Lou DeCaprio, Science and STEM* teacher at Sussex County Charter School for Technology, attended a once-in-a-lifetime event that any teacher would be proud to attend. At Wallops Space Facility, she watched her students' carefully designed experiment launch into space- literally! (here's the link:

<http://www.ustream.tv/recorded/105037008>)

Mrs. DeCaprio and a dedicated group of 6th graders at Sussex County Charter School for Technology (SCCST) in Sparta, New Jersey, were among a select group of students in the U.S. and abroad who were selected by idooddu's Cubes in Space™ program to have their designed science experiments go up to space this summer. Cubes in Space™ (CiS), a global STEAM*-based education program for students (ages 11-18), provides a free opportunity to design and compete to launch an experiment into space on a NASA rocket or high altitude scientific balloon. Cubes in Space™, a program by idoodledu inc., in collaboration with NASA's Langley Research Center, NASA's Wallops Flight Facility and Colorado Space Grant Consortium, offers global design competitions for students 11-18 years of age to develop STEAM-based experiments for launch into space.

Used in formal or informal learning environments, students and educators are exposed to engaging online content and activities in preparation for the design and development of an experiment to be integrated into a small cube. Throughout the experience, students develop key 21st century skills; communication, collaboration, critical thinking and creativity.

Since 2014, Cubes in Space has flown nearly 400 experiments representing 1500 educators and over 20,000 students from 57 different countries. This year nearly 600 educators and thousands of students from 39 countries participated and proposed experiments for a space on a NASA sounding rocket or high-altitude scientific balloon mission. A total of 160 experiments were selected and were designed by students from Australia, Austria, Canada, Colombia, Ecuador, India, Mexico, Serbia, the United Arab Emirates, Uruguay, the and the United States of America.

This is the first time SCCST entered and participated. After learning about this program while attending Educator Space Academy last summer, Mrs. DeCaprio was convinced she had to implement the program into her lessons. Her administrators were very supportive of the idea and gave her the go-ahead. Mrs. DeCaprio split the students into groups of 4 or 5. They had a deadline to meet that was set by idoodledu,inc. and adjusted their countdown daily. Experiment variables and/or engineering design steps,

hypotheses, description, and analysis had to be accounted for in the proposal. An additional expectation was to plan, if the experiment was selected, how results would be reported and how those results could make a difference or solve a problem in the community or even world. Initial student proposals were sent in and reviewed by a panel of judges made up of aeronautical engineers, astronauts, and teachers. Of the 18 groups that were working on designs, 8 groups met the deadline and submitted a proposal. Of those, 3 groups made it to the second round.

From start to finish, students spent approximately 3-and-a-half-months applying the curriculum and developing their experiment proposals. Many lunch hours, in addition to time spent in class, were devoted to revising and completing proposals in the hopes that the second round would prove to be a successful one. The hard work paid off and all three of those proposals were selected. The principal visited the class to hear the students' proposals and congratulate the students on their hard work.

The payload kits arrived mid-May, and the winning members busily prepared the official experiments. The biggest constraint students have to follow in this program is cube size. The cube measures 4 cm x 4 cm x 4 cm and the payload mass for each cube's contents must be 53 grams +/- 2 in order to meet the payload limitations of the entire rocket or balloon. The objective of the Sounding Rocket (SR) experiment, called "Crushing Popcorn" was to send up pre-popped popcorn to determine whether or not the 20-G force of the rocket will affect the integrity of the popcorn allowing it to be edible and enjoyable in the Space Station. "Sending a Kiss to Space" will calculate the possible effects of cosmic radiation on chocolate, using a radiation app to measure the before and after data. Lastly, "Magnets in Space" will examine the possible change in Gaussian magnetic field strength as magnets travel through cryogenic temperatures in the stratosphere.

Students have not only reflected deeply on the scientific method while tapping their creativity, but have learned the importance of effective communication, "pitching" a proposal, meeting deadlines, and, best of all, trying to make a positive difference. Mrs. DeCaprio notes that "listening to the students discuss the payload of the nose cone, the G-force during launch, and arguing about possible interfering variables, has been an 'out-of-this-world' experience" for her and the kind of authentic, student-centered engagement that educators dream of. DeCaprio added that Amber Agee-Hart, Cubes in Space™ Founder and Debbie Ross, Operations Manager, were incredibly supportive and accessible to aid teachers every step of the way.

The SR experiment, "Crushing Popcorn" did its parabolic sounding rocket launch on June 23, 2017 from NASA Wallops Flight Facility outside of Norfolk, Virginia. Mrs.

DeCaprio and her husband attended the 5:30 a.m. momentous occasion, which launched promptly from Chincoteague Island... what a thrill to see the Terrier-Orion rocket launch 73 miles into the atmosphere! It went up in a blink of an eye, using 85,000 Newtons of thrust during the first four seconds of motor burn to send up the payload.** Its two stages after launch were brightly visible, as can be seen in the video. Teachers who participated waited until the payload was carefully re-integrated before being able to retrieve the experiment to take home for analysis.

Next up, the high-altitude scientific balloon will take up our other two accepted experiments, "Sending a Kiss to Space" and "Magnets in Space", in late August 2017 from NASA's Columbia Scientific Balloon Facility in Ft. Sumner, New Mexico. Please stay tuned for the Ustream event! .

For more information about Cubes in Space, please visit www.cubesinspace.com or www.idoodldeu.org
For more information about Sussex County Charter School for Technology, please visit www.sussexcharter.org

References:

* STEM: Science, Technology, Engineering and Math; STEAM: Science, Technology, Engineering, Art and Math

**https://en.wikipedia.org/wiki/Terrier_Orion





https://en.wikipedia.org/wiki/Terrier_Orion#/media/File:Terrier-Improved_Orion_sounding_rocket_launches_RockOn_2011_experiments_2.jpg



