

Student experiments take flight on Cygnus cargo craft

September 30 2013



San Marino High School's Jasmine Kuo and Kara Lukas take notes from their Fibroblast Division in Microgravity experiment. Credit: NCESSSE

Dreaming big may not literally make the world go round, but it can power student curiosities to circle the globe as orbiting science investigations aboard the International Space Station. On Wednesday, Sept. 18, the private commercial space company, Orbital Sciences Corp. of Dulles, Va., launched its test flight Cygnus cargo spacecraft to the space station on a demonstration mission, taking the students' cargo with it.

The goal of the flight may be to show the vehicle's capabilities to send research and supplies to the world's only orbiting laboratory, but when

the flight docked on Sunday, Sept. 29, the young scientists had research on their minds.

Seven of those educational payloads were courtesy of the Student Spaceflight Experiments Program (SSEP), which is an initiative that enables students across participating communities the ability to design and propose real experiments for investigation aboard the space station. The Center for the Advancement of Science in Space (CASIS) is a strong supporter of SSEP and is funding three of the student investigations directly, making them the first CASIS-sponsored payloads to ever be sent to the space station.

In 2011, CASIS was tasked by Congress to manage, promote and broker research on the U.S. National Laboratory section of the station. Its mission is to bring previous and new, non-traditional research opportunities to the space station, using this unique technical platform for benefits on Earth. The facilitation of advanced research on the space station will yield tremendous benefits to all humankind through the development of new treatments for disease, better materials, and cutting edge consumer products.

"CASIS is honored that our first funded science payloads arriving aboard the International Space Station came by way of student research experiments from the SSEP," said CASIS Director of Operation Ken Shields. "It is through inciting the minds of our youth that space exploration will continue to flourish and put into motion the next wave of investigators who will look beyond Earth for innovative and groundbreaking developments."



Students at Howard Phifer Middle School from Pennasauken, N.J., complete their proposal for the Effects of Microgravity on Eggshells and Vinegar. Credit: NCSSE

The students presented the plans for the selected investigations this past July at the annual SSEP National Conference in Washington, D.C. Presentations included studies that had already been to the space station and back, as part of previous flights. Students reported on what they hope to uncover when their inquiries reach the station during Expedition 37/38. The three CASIS-sponsored investigations, along with the other studies included on the Orbital flight, were also shared with the crowd of inquiring minds. Here is a snapshot of the three experiment concepts currently in orbit:

Fibroblast Division in Microgravity

This study, from San Marino High School in San Marino, Calif, is the brain child of a group of 11th graders. Past experiments that have been

conducted on Earth in simulated microgravity have shown that the lack of gravity causes cells to divide at a slower rate. The purpose of this study is to observe the effect of microgravity on cell division and to compare the rates of cell division in the absence and presence of gravity, which is dependent on the number of cells produced. The chosen cells are fibroblasts, which play a critical role in the healing of wounds. With the data from their study, the students hope to further our current scientific knowledge of cell growth and cell behavior.

The Effects of Microgravity on Eggshells and Vinegar

This study from Howard Phifer Middle School in Pennsauken, NJ, is the concept of a collection of 8th graders. These students want to determine if the eggshell disintegration rate in vinegar differs in the presence of gravity and microgravity. The idea is to use chicken eggs to infer the damage acids will have against human teeth in space. The results of this experiment can aid in the development of dental products in order to protect teeth from acidic foods, both for use while in space and on Earth.

Germination of Cabbage Seed

This study, from A.R. Turner, C.C. Hardy, and Parmley elementary schools in Willis, Texas, is inspired by the curiosity of the schools' 5th grade students. These young minds want to test Savoy cabbage (*Brassica oleracea*) in space and see if the seeds will germinate more fervently. In other words, will the plants grow at a greater rate in space than here on Earth. The students believe findings from their study could be good for astronauts, because such plants grown in orbit could give astronauts more nutrients and a fresh source of produce while in space.

Jeff Goldstein, the Executive Director for the National Center for Earth

and Space Science (NCESSSE), which oversees SSEP, had this to say on providing young students the opportunity to access the [space station](#) for research investigation: "The Student Spaceflight Experiments Program helps the International Space Station fulfill a strategic commitment to workforce development at the pre-college level for tens of thousands of students, providing absolutely unique, immersive experiences in real microgravity research."

Through this partnership with SSEP, CASIS sees an incredible opportunity for students to develop and pitch their ideas for station-based research. Now, more than ever, student research programs are allowing young scientists the opportunity to engage in real investigations with real results. With access to humankind's greatest technical platform for educational endeavors, these creative minds begin a lifetime of inquiry with a chance to add to the global knowledge of various scientific disciplines. With CASIS agreeing to continue to partner with NCESSSE SSEP, development of today's innovative minds will not have to wait to pursue their questions tomorrow.

Provided by NASA/Johnson Space Center

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