



# AFRL LA LUZ ACADEMY

“CREATING THE POSSIBILITIES”



INSPIRING FUTURE SCIENTISTS AND ENGINEERS

STAR DATE: MAY 2011  
VOLUME VIII, ISSUE 9

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# Fifth Graders Successfully Complete Mars CSI Mission

Over 1,400 fifth grade Mars Missions Flight students worked together to build 78 habitats and link them together in colonies at one of three Link-Up Day events around New Mexico to successfully complete the Mars Cave Skylight Investigation (CSI) Mission!

Twenty-two students from four area schools built a colony of two habitats during the Link-Up Day event at Roswell, New Mexico's Yucca Recreation Center on 26 April 2011. Students at this Link-Up Day event also put their

knowledge of the Red Planet to the test by participating in a round of Mars Facts Bingo.

Over 1,200 students from 40 schools participated in the Link-Up Day on Space Day, 6 May 2011, at the Albuquerque Convention Center, building 62 habitats.



Dignitaries such as Mr. Gabe Long, representing Senator Jeff Bingaman's office; Mr. Matt Zidovsky, representing Representative Martin Heinrich's office; Dr. Peter Gerity, NM Tech's Vice

President for Academic Affairs; Mr. Lonnie Marquez, NM Tech's Vice President of Administration and Finance; and Ms. Melissa Jaramillo-Fleming, Interim Vice

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## Students Challenge STEM at STEM Challenge Symposium

Nine teams of high school students from seven schools successfully challenged their knowledge of science, technology, engineering, and math (STEM) at this year's STEM Challenge Symposium.

Projects/teams were as follows:

- Media Arts Collaborative Charter School — “RoboRAVE — Ping Pong Team” and “RoboRAVE — FireFighting Team”
- St. Pius X High School — “Team America Rocketry Challenge”
- Quemado High School — “Electric Racing Car”
- Albuquerque Academy — “Team America Rocketry Challenge” and “Rocket Recovery Vehicle”



- La Academia de Esperanza— “V-2 Rocket”
- Hot Springs High School— “Spaceport America Student Launch Program”
- Sandia Preperatory School— “Team America Rocketry Challenge”

The student teams each presented their project results in a Power-Point presentation and a display

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## Dignitaries Visit AFRL La Luz Academy Booth for State Day

As part of a tour of Air Force Research Laboratory (AFRL) facilities, dignitaries visiting AFRL Space Vehicles Directorate building 472 stopped at our booth at the AFRL State Day event on 5 April 2011.

There, Director Ronda Cole and Deputy Director Diane MacAlpine demonstrated some of the STEM education outreach activities we offer that are related to AFRL's Directed Energy and Space Vehicles Directorates research.



## Fifth Graders Successfully Complete Mars CSI Mission

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President for Student and University Relations, attended and observed the students at work.

Mr. Long read a Link-Up Day proclamation from Senator Bingaman at the event. Mr. Zidovsky shared words of encouragement with students on behalf of Congressman Heinrich. Then they both observed students constructing habitats, and got a first-hand look inside a habitat.

Over 200 students from four schools participated in the Las Cruces Link-Up Day event on 13 May 2010 in New Mexico State University's Corbett Center, building 14 more habitats there.

These habitats simulate what scientists and engineers engaged in the Mars CSI mission would live and work in on Mars to carry out their mission of locating and investigating caves with a natural hole, or "skylight," in the roof.

The students worked in TEAMS for weeks in their classrooms, designing uniforms and mission patches; planning nutritious and weight/space-saving lunches; studying Mars Facts and design-

ing Life Support Systems; writing a Saga about their journey to Mars; telecommunicating with other schools' TEAMS, and measuring/cutting their assigned pre-cut plastic habitat pieces.

On Link-Up Day, students demonstrated they were ready for the mission at a series of holding stations, where they received points on TEAM Mission Logs for their efforts, before constructing their habitats.

Leadership Flight middle school students and adult volunteers assisted the students at the larger Link-Up Day events, manning holding stations and guiding students to the next activity.



## Roswell Daily Record Runs Another Alien Article

Almost 64 years after their famous "crashed flying disk" article, Roswell Daily Record's staff writer Mr. Matthew Arco has run another alien article. This time, Roswell fifth grade aliens visited Mars at Link-Up Day, 26 April 2011!



## Hey, Thanks!

Thanks to all who made our Link-Up Days so successful this year:

Parents; teachers; students; volunteers; Leadership Flight students; dignitaries; guests; and venues Yucca Recreation Center in Roswell, the Albuquerque Convention Center, and NMSU's Corbett Center in Las Cruces.

## Link-Up Day Dates and Sites

Date	Site	# of Habitats
✓ 26 April 2011	Roswell	2
✓ 6 May 2011	Albuq.	62
✓ 13 May 2011	Las Cruces	14

# DoD STARBASE Flight

## Can't Keep Enthusiasm for STEM Bottled Up

Sixth graders participating in the spring semester DoD STARBASE Flight Day 5 are discovering that they just can't keep their enthusiasm for STEM bottled up. They have to let it fly!

So, students in Day 5 build *bottle rockets*. Using 1-liter plastic bottles for the body, paper for the fins, and a combination of water and compressed air for fuel, students construct small bottle rockets.

With a computer simulation program called Water Rocket Fun, stu-

dents enter variables such as bottle size, air pressure, and percentage of water used, and calculate how their rocket should perform.

The students are assigned various rocket launch duties including *Spotter*, who tracks the launch and reports the altitude to the Data Manager; *Data Manager*, who records and organizes the launch data and reports it to the teacher; *Pad Manager*, who puts the rocket on the launch pad and recovers the rocket after launch; and *Launch Control Officer*, who

gives the countdown and then launches the rocket.

After launch comes lunch, followed by analyzing the launch data, a STEM Challenge Review game, and a Post-Test.





## Seventh-Grade Students Study STEM, Successfully Solder

Seventh grade students participating in Day 3 of the PETES Flight study satellite subsystems such as *power*, *attitude control* and *electronics*. They learn about electronic components such as *capacitors*, *timers*, *light-emitting diodes* (LEDs), and *resistors*.

The students place these components in the proper locations on a *printed circuit board*. They thread the *leads* (metal wires protruding from the components, pronounced "leeds") through the appropriate *vias* (holes in the circuit board

with small metal rings around them), being careful, when necessary, to orient the components so that the *anodes* (positive leads) go through positive vias, and *cathodes* (negative leads) go through negative vias.

Next, they *solder* (metallically fuse, pronounced "sodder") these components to the circuit board using a *soldering iron*.

When this has been completed, the students discover they have made their own flashing LED

badges that, quite accurately, read, "I have the power!"

Students also discover the power of *angular momentum* by exploring with *gyroscopes* that simulate the way motion is controlled on satellites.



## Intro to Systems Engineering Flight

### Hey, Ho, Let's All Go to the Robotics Expo!



All the hard work the eighth grade Intro to Systems Engineering Flight students did, building their small, wheeled Boe-Bot® robot and learning how to program it, pays off at the Robotics Expo.

After a quick review, students get to work programming a Boe-Bot® to run a green (easy), blue (intermediate), and black (advanced) obstacle course.

When they're ready, they report to

one of our volunteer judges, who times and grades their robot's performance for the three courses on an official scorecard.

Scoring works like this: Each team starts out with 50 points.

Time to complete the course is added to that. Points are subtracted if the Boe-Bot® followed its intended course, found the exit, played sounds, or flashed any lights.

Up to 10 "style" points can be subtracted if the Boe-Bot® runs the course with a little flair. Points are added if any lines are crossed, or if any "land mines" are hit.

The less points, the better the score!



## STEM Challenge Flight

(formerly the SPACE Flight)

A Systems Engineering Approach to STEM Projects

### Students Challenge STEM at STEM Challenge Symposium

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booth for the STEM Challenge Review Panel and other STEM Challenge Flight teams. Four scientists and engineers (S&Es) served as reviewers: Lt Richard Shepherd (AFRL/RVES), Mr. Doc Aguilar (AFRL/RVOT), Lt Col Chuck Finley (ORS), and Ms. Catherine Tsairides.

We will be sending out STEM Challenge Symposium Proceedings booklets soon that contain team photos and copies of the stu-

dent PowerPoint presentations.

We handed out Student Information forms at the STEM Challenge Symposium. Please ensure students submitted completed forms, including their summer mailing address, so we can get the Symposium Proceedings out to all participants.



### The Next Step...



Visit [www.summerscience.org](http://www.summerscience.org) to learn about a summer program for high school students to determine the orbit of a near-earth asteroid.

Seniors, consider pursuing a STEM degree from an accredited institution like New Mexico State University, New Mexico Tech, or University of New Mexico. Everyone else, consider continuing your STEM Challenge Flight project, or start a new one, next year!



## Fellows Present STEM Lessons at TI Symposium

My "Fellow" Americans! The Teacher Institute (TI) Fellows have successfully presented STEM lessons at the TI Symposium.

Fifteen TI Fellows presented 12 STEM lessons, which they developed and implemented in their classrooms during the 2010-2011 school year, at TI Symposium events held 26 and 30 April 2011.

The TI Fellows discussed goals, accomplishments, and lessons learned, and shared resources such as helpful websites they found, with their fellow teacher Fellows.



## Another Teacher Institute Coming

The 2011 Teacher Institute is coming this summer, 18-22 July 2011. It will focus on completing a satellite mission.

Using a systems engineering approach, teams of teachers will develop/complete a STEM project to be applied during the school year in their respective classrooms.



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### Important Terms and Acronyms

- AF:** Air Force
- AFB:** Air Force Base
- AFRL:** Air Force Research Laboratory
- AFRL/RD:** The Directed Energy Directorate of the AFRL (formerly AFRL/DE)
- AFRL/RV:** The Space Vehicles Directorate of the AFRL (formerly AFRL/VS)
- CSI:** The Mars Cave Skylight Investigation mission
- DoD:** Department of Defense
- KAFB:** Kirtland Air Force Base, Albuquerque, N.M.
- LF:** Leadership Flight
- PETES:** Providing Engineering and Technology Experiences for Students
- PRS:** Phillips Research Site
- R&D:** Research and Development
- STEM:** Science, Technology, Engineering, and Math
- TI:** Teacher Institute
- T<sup>2</sup>:** Technology Transfer
- TTE:** Technology Transfer for Education
- USAF:** United States Air Force

## STEM Bytes

### AfterMath™ Camp Helps Ease Math Anxiety

The AfterMath™ Summer Camp, 1-4 August 2011, for 7th to 9th grade students, aims to improve student interest and performance in math, and highlights key elements of pre-algebra, algebra, and geometry.

There will be lecture; testing practice to help break test anxiety; hands-on exercises; math-based science experiments and physical education; and career speakers illuminating how math is in every job and career.

Doors open at 7:30 am. Formal Camp is from 8:30 to 3:30 with tutoring available from 3:30 to 5:30. There will be a parent work-



shop to help parents get resources for helping their kids with homework. Breakfast, lunch and supplies are included.

There are 25 slots, and there is no cost for the camp. For more information, visit [www.aftermathcamp.com](http://www.aftermathcamp.com).

### Summer STEM Camp Soon

We are accepting applications through 1 June 2011 for our Summer STEM Camp. Students from military families on Kirtland Air Force Base who will be in the fifth, sixth, or seventh grades for the 2011-12 school year are eligible to participate.

The camp will be held from 13-17 June 2011 from 9:00 am to 3:00 pm each day. Students participate in various hands-on, inquiry-based STEM activities related to a satellite mission.

Contact us for more information.



### Studying Mars Facts is Rewarding

Students in Ms. Elyse Sedillo's Adobe Acres class have discovered how rewarding studying Mars Facts can be.



In addition to helping them construct a Transportation Life Sup-

port System model, the students used their knowledge of the Red Planet to write a well-organized piece of creative writing for a Pets in Space contest.

They won second place and a trip to the Challenger Learning Center of New Mexico. Congratulations!

### Coming Next Issue...

Another great year of students participating in hands-on STEM activities with us!

**Watch for it!**

