AFRL La Luz Academy

"Creating the Possibilities"

Inspiring Future Scientists and Engineers

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In This Issue...

The Rocket Report

Everything is "STEM Possible" at Summer STEM Camp

Students achieved the "STEM Possible" at this year's Summer Science, Technology, Engineering, and Math (STEM) Camp.

The week-long Summer STEM Camp was held 14-18 June 2010 at AFRL La Luz Academy. The theme for this year's event was "Mission: STEM Possible."

Rising fifth, sixth, and seventh grade children of military personnel on Kirtland Air Force Base spent the week engaged in a variety of hands-on/minds-on activities.

Among other things, they made and tested concrete using different ingredient ratios; engaged in flight simulation and related activities,such as working with Bernoulli Bags and listening to a discussion on flying from Civil Air Patrol Major Ted Spitzmiller; and used teamwork to operate a set of intergalactic skis.

They also made and programmed Boe-Bot® robots, played interactive Tabula Digita™ video games that require solving math problems, worked with force plates and sensors, and much more.

STEM Dreams Caught at Dreamcatchers Booth

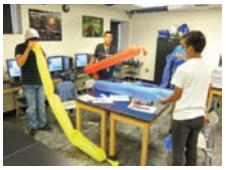
AFRL La Luz Academy manned a booth at the Native American Dreamcatchers STEM event on 26 July 2010.

Native American students who visited the booth explored STEM activities such as making binary numbers like a computer does, and working with properties of air in Tornado Tubes. They also received information on the Flights available at AFRL La Luz Academy.

Several STEM Expeditions Over the Summer

Several STEM Expeditions were held at AFRL La Luz Academy over the summer.

On 11 July 2010, Summer Transportation Institute students explored Flight Simulation and related activities.



On 25 June 2010, Robertson High School MESA students explored Flight Simulation and soldered LED badges, as did Belen Summer of Innovation Camp students on 5 August 2010.

Mars Missions Flight

Mars Missions Teacher Training in September/October

New Teachers

Teachers who have never participated in a Mars Missions Flight before, *welcome aboard!* You and your students are embarking on an exciting journey to Mars, full of STEM

activities none of you will soon forget!

The activities are all tied to New Mexico State Content Standards and Benchmarks, so don't worry, it will fit right in with your existing curriculum.

Wondering how to proceed? No problem. We provide a full-day (8:00 am to 3:00 pm) training session for you on Thursday, 21 October 2010.

We'll give you instructions and tips on how to do the Mars Missions Flight with your students, and on how to prepare for the big Link-Up Day event at the end of the school year.

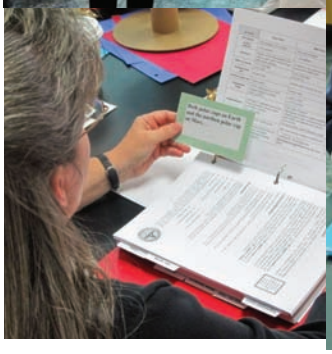
You'll get hands-on experience designing a mission patch, making a life support system, and building a habitat. This should make it easier for you to explain these processes to your students. You will also receive a copy of the updated Mars Missions Flight manual.

Returning Teachers

Returning teachers, *welcome back!* There's a shorter (1:00 pm to 3:00 pm) "refresher course" training session on Wednesday, 29 September 2010 just for you. We'll give you a copy of the updated Mars Missions Flight manual, too.

Regional Training

Can't make the new or returning teacher training because Albuquerque is too far? Regional training sessions may be scheduled as needed. We'll keep you posted as to when and where.



Middle School Flights Orientation

Participating Middle School Flight Teachers Attend Orientation Sessions

Teachers interested in participating in this year's Middle School Flights (the DoD STARBASE Flight for sixth graders, the PETES PRS Flight for seventh graders, and the Intro to Systems Engineering Flight for eighth graders), attended orientation sessions in August.

Deputy Director Diane MacAlpine gave an overview of AFRL La Luz Academy and the Middle School Flights.

She explained that our Flights provide their students with opportunities to perform activities that may not be available in their classrooms, such as building and launching six-foot high-powered rockets or programming robots.

Ms. MacAlpine also pointed out that the Middle School Flights offer wonderful opportunities for students to interact with scientists and engineers, such as when the Air Force Research Laboratory (AFRL)'s Mr. Tom Fraser leads interactive demonstrations of the electromagnetic spectrum.

The teachers were made aware of the expectations for participation and given the paperwork they would need to complete.

Then Ms. MacAlpine and the teachers discussed scheduling issues and arrangements.

DoD STARBASE Flight

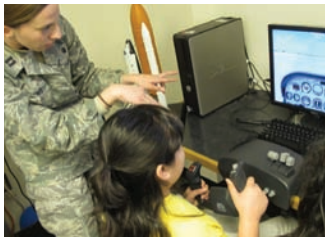
What To Expect

The DoD STARBASE Flight, for sixth graders, helps students develop some basic skills and a realization that they can aspire to careers in STEM.

Students come to our classroom facility on base for five non-consecutive days of instruction, during the Fall or Spring semester, and participate in various STEM activities.

During the Fall semester, the first two days focus on building high-powered six-foot rockets as a team, simulating their flight path, and then launching them. Spring semester students will engage in similar activities using water bottle rockets.

Day 3 involves chemistry and design. Activities include learning about properties and states of matter with an interactive cryogenics demonstration.



On Day 4, students explore Newton's Laws of Motion with activities that include working with force plates and sensors, and reducing the impact of a Mars Lander. Students also construct a space station using 3-D modeling software.

The theme for Day 5 of this Flight is flight. Students study the properties of air and aircraft control surfaces, and earn their future-pilot wings on flight simulation software. Guest pilots and enthusiasts discuss their flying experiences and give the students flying tips.

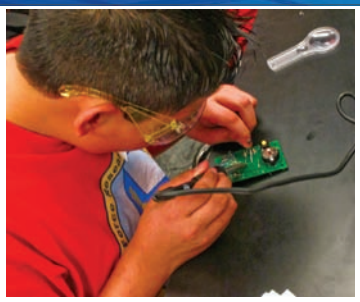
PETES PRS Flight

Providing Engineering and Technology Experiences for Students Phillips Research Site Flight

What To Expect

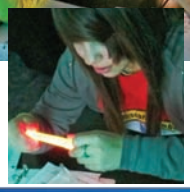
The Providing Engineering and Technology Experiences for Students (PETES) Phillips Research Site (PRS) Flight, for seventh graders, consists of three non-consecutive days of instruction.

The first day is devoted to Directed Energy concepts. Students engage in activities involving the electromagnetic spectrum, optics, and lasers.



Day 2 revolves around space weather and its impact to the Air Force and society. Students work with Van de Graaff generators, sunspotters, and electronic circuits.

Day 3 focuses on Space Vehicles concepts. Students work on activities related to satellite subsystems, electronics, and power, such as soldering their own working, blinking light-emitting diode badges, and exploring gyroscopes.



Intro to Systems Engineering Flight

What To Expect

The Intro to Systems Engineering Flight, for eighth graders, consists of three non-consecutive days of instruction.

The first day provides the foundations of programming and robotics. Students learn about systems engineering and computer science, practice some binary math, and make a flowchart. Plus, they get an introduction to BASIC programming.

The second day, students build robots and use their new programming skills to control the robots.

The third day is the Robotics Expo, the Operational Test and Evaluation phase of their robotics activity, in Systems Engineering-speak. Students program their little wheeled robots, called Boe-Bots®, to manuever through an obstacle course.

Phillips Challenge Flight (formerly the SPACE Flight)

A Systems Engineering Approach to STEM Projects

What to Expect

The Phillips Challenge Flight (formerly the SPACE Flight) Teacher Orientation will be on 23 September 2010. Participating teachers will receive an overview of AFRL La Luz Academy and the Phillips Challenge Flight, and discuss requirements and expectations.

The Kickoff Briefing, on 28 October 2010, is the formal beginning of the Phillips Challenge Flight for the school year. Student teams, teachers, and technical advisors meet and develop a strategy for working on their STEM project, using a systems engineering approach.

The STEM project can focus on an original topic, or it can be a structured project or competition such as Team America Rocketry Challenge, New Mexico Supercomputing Challenge, or New Mexico RoboRAVE International.

We will conduct two reviews at each participating school during the school year to check on that team's progress.

At the Phillips Challenge Symposium, on 19 April 2011, Phillips Challenge Flight teams present a briefing and poster display of their project.

AFRL La Luz Academy

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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)

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

T²: Technology Transfer

TTE: Technology Transfer for Education

USAF: United States Air Force

Teacher Institute

Teacher Institute Fellows Off to a Good Start

This year's successful summer session Teacher Institute was held 19-23 July 2010, with Robotics as the theme.

Participating teachers listened to presentations from keynote speaker Mr. Rick Dove amd guest speaker Ms. Cheri Burch, with special visits by NM Tech Dean of Graduate Programs Dr. David Westpfahl and AFRL Executive Director Joe Sciabica.

The teachers also toured the AFRL's Aerospace Engineering and Shiva Star facilities and used a Systems Engineering approach to assemble and program Boe-Bot® robots.

STEM Bytes

Educator News

Our new Educator on Loan is Ms. Kathy Melendez, a teacher from Grant Middle School who is very knowledgeable about bringing technology into the classroom. Welcome!

Meanwhile, last year's Educator on Loan, Ms. Esti ("Esh-tee") Gutierrez, is staying on as our Lead Educator. Yay, Esti!

Writing Secret Codes With Math

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C

Did you know that you can use math to write secret codes?

The grid above is called a "Caesar Cipher" (no relation to Caesar salad). Julius Caesar used to send secret messages to his military commanders using ciphers like this. It's based on a simple math formula: add 3 to every letter to get a new letter. So, A becomes D, D becomes G, and so on.

Using the top row letters and matching them to the ones directly below them, how would you decode XCOI IX IRW XZXABJV?

For more information about this and other math-related activities, visit www.mathcounts.org.

Coming Next Issue...

- A new Mars Mission
- Sixth graders build six-foot rockets
- Phillips Challenge teachers get oriented

Watch for it!