AFRL La Luz Academy

"Creating the Possibilities"

Inspiring Future Scientists and Engineers

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In This Issue...

The Rocket Report

MELT Mission Accomplished


Photo by Anita Collins

On Friday, 4 May 2012, over 1,000 fifth grade Mars Missions Flight students from 36 schools built 59 habitats and linked them together in colonies at the Link-Up Day event. This culminating event, held at the Albuquerque Convention Center, marks the successful completion of the Mars Microprobe Evaluation of Lava and Titanium (MELT) Mission.

The MELT Misson focused on supporting an imaginary trip to Mars to investigate Martian "melts" (tiny titanium-rich globules of lava from the planet's interior, encased

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Students Wow at WOW Events

WOW! Van Buren Middle School students wrapped up their Citizen Schools STARBASE 2.0 Scalextric and Robotics afterschool programs at mini-WOW events on 24 and 26 April 2012 at our facility.

The student teams each gave PowerPoint presentations of their projects to mentors and each other. Scalextric students had their posters judged, and tested their model car designs in a racing competition. Robotics students programmed their Boe-Bot® robots to negotiate obstacle courses.

On 9 May 2012, the Scalextric and Robotics groups again presented their projects, manning display booths and through PowerPoint presentations, to all the Van Buren Citizen Schools participants at the culminating Big WOW event.

Citizen Teacher volunteers Ms. Ronda Cole and Ms. Diane MacAlpine were among those who received recognition at the event.

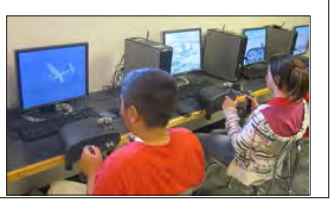
USA S&E Booth

AFRL La Luz Academy took STEM to our nation's capital on 28-29 April 2012, when we manned a booth at the USA Science and Engineering Festival in Washington, DC. Visitors to our booth measured the volume of fuel cells (strongly resembling Starburst® candies), and did some math to compare them to the volume of a space station cargo bay (resembling the box the Starburst® packs came in). Afterwards, visitors recharged by eating the fuel cells. They also constructed a model plug-andplay satellite using LEGO® bricks.

Nearby, visitors participated in an interactive cryogenics demonstration involving frozen marshmallows, popcorn, and other items, from AFRL's Mr. "Cryo" Mike Martin and Mr. Tom Fraser.

Flying "STEM Star" Expedition

When Ms. Chelsea Ketchum asked her 19 "STEM Star" MESA students from Tony Hillerman Middle School, who were flying our flight simulators on 9 May 2012 during a STEM Expedition, who was having fun, all 19 students called out, "Meeeeeeeee!"



Mars Missions Flight

for fifth grade students

Microprobe Evaluation of Lava and Titanium (MELT) Mission 2011-12

MELT Mission Accomplished

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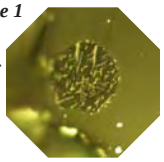


Melt

Credit: Saal Lab—Brown University

in crystal and volcanically brought to the surface) using an AFRL-developed ion microprobe, looking mainly for evidence of underground water.

Students build habitats at the Link-Up Day event that simulate what the MELT Mission scientists would live and work in on Mars during the mission.

The students worked in TEAMS for weeks in their classrooms to prepare for this mission. They designed uniforms and mission patches; planned and packed nutritious, minimal-weight and space-saving lunches; studied Mars Facts and designed Life Support Systems based on those facts; wrote and rehearsed a Saga song/dance routine about their journey to Mars; telecommunicated with other schools' TEAMS, and measured and cut their assigned plastic habitat pieces.

On Link-Up Day, students demonstrated readiness for the mission and received TEAM Mission Log points at holding stations, assisted by 33 adult volunteeers from AFRL, 377th ABW, Sandia National Laboratories, AFOTEC, and AFNWC, plus 16 Leadership Flight students. Then, the Mars Missions Flight students constructed, and ate lunch inside, the habitats.

What's Link-Up Day without a link-up? After weighing lunch waste, students cut open the habitat connecting tunnels, linking them together to form colonies.

Photo by Anita Collins

Dignitaries such as Col. David Hornyak, vice commander, 377th ABW; Dr. Marc Mehalic, Technical Director, AFNWC/EN; Col Scott Maethner, Deputy Director, AFRL/RD; Mr. Gabe Long, Senator Bingaman's Office; Ms. Heather Brewer, Representative Heinrich's Office; Dr. Eileen Ryan, NM Tech-Magdalena Ridge Observatory; Mr. Roger Newall, Veteran Affairs Liason, Albuquerque Mayor's Office; and Mr. Mike Burgess, General Manager, KOBTV4, attended and observed the students at work.

"But how realistic is this event?" one observer asked. Well, given that everything is scaled down to a fifth-grade level, it's actually pretty realistic:

- The Mars Missions Flight is a good fifth-grade introduction to systems engineering concepts.
- The students engage in preparations similar to what a real astronaut crew would undertake.
- The European Space Agency has already held a similar real-life "Mars 500" simulation for its astronauts, and NASA is considering conducting one on the International Space Station.
- NASA is testing inflatable Mars habitats very similar to the ones students inflate at Link-Up Day.

Photo by Anita Collins

To all the teachers, parents, volunteers, Leadership Flight students, dignitarites, media, Albuquerque Convention Center staff, and everyone who made the Mars MELT Mission Link-Up Day 2012 such a success:

THANK YOU.

To all the fifth grade students participating in the Mars Missions Flight this year:

GREAT JOB!

DoD STARBASE Flight

for elementary fifth and sixth grade students

Passing With Flying Colors

Day 5 wraps up the second semester of the DoD STARBASE Flight for the year, and the students are passing it with flying colors!

Red, yellow, green, blue...those are among the colors flying through the air when the students try out their brightly-colored Bernoulli Bags. The students find they have difficulty inflating the bags, which are several feet long, with just one lungful of air...until they invoke Bernoulli's Principle: Faster-moving air creates lower pressure.

By simply holding the bag a foot or so away from their face as they blow into the bag, the faster-moving air they're blowing creates an area of lower pressure near the bag's opening. More air is "recruited" to join the air the students are exhaling, and voila! The bag fills completely. Students explore Bernoulli's Principle further by blowing across the top of a strip of Bernoulli Paper, making it rise.

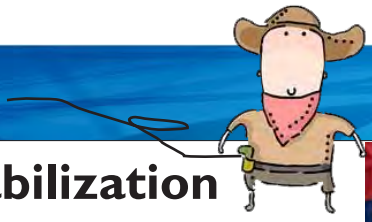
Next, more flying colors: The yellow shirts the students wear while flying flight simulators. Pilots from the Air Force, Civil Air Patrol, and elsewhere come to assist, and often bring along flight videos, helmets, and gear, and share their flying experiences with the students.

Students also take a post-test to recap all the STEM they've learned during the DoD STARBASE Flight. Of course, they pass that with flying colors, too!

TECH Flight

for sixth and seventh grade students

Technology and Engineering Challenges Flight



Soldering and Satellite Stabilization

One of the "Deep Thoughts" Jack Handey is said to have had was if he had lived in the Old West, he'd carry a soldering iron in his holster instead of a six-shooter. If any cowboys tried to make fun of him for it, he'd say, "That's right, it's a soldering iron...*The Soldering Iron of Justice.*"

(Cue theme from *Rawhide*.)

Well, the students in this semester's TECH Flight Day 3 are wielding their own "Soldering Irons of Justice," and no one is making fun of them. Actually, they're more like the "Soldering Irons of STEM." The students are using them to solder electronic components together to make a flashing LED badge that reads, "I have the power!"

"Soldering" means "to metallically fuse" and is pronounced "soddering" in the US. (I know, it's weird, you don't pronounce the "l." It comes from the Old French word "soulder," meaning "to make solid." French often has silent letters like that.)

The students learn about electronic components such as capacitors, timers, light-emitting diodes (LEDs), and resistors. They place these components in the proper locations on a printed circuit board. They thread the leads (the metal wires protruding from the components) through the appropriate vias (holes in the circuit board with small metal rings around them), orienting for positive and negative when necessary. Then they solder these components to the circuit board with their "Soldering Irons of Justice...and STEM."

Students in TECH Flight Day 3 also discover the power of angular momentum by exploring with gyroscopes that simulate the way motion is controlled on satellites. They even make themselves into human gyroscopes by spinning a bicycle tire while sitting on a stool.

Watching the students work in TECH Flight Day 3, you can almost see Clint Eastwood, standing on a dusty dirt road, wearing a poncho, with a gritty, determined look on his face, saying, "Go ahead... *make my LED badge*."

STEM Challenge Flight

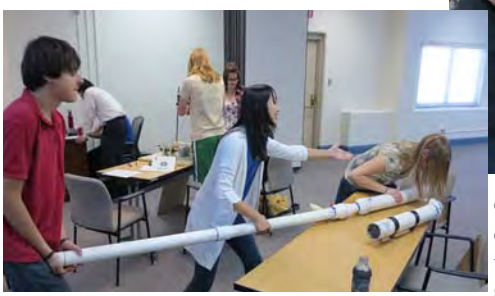
for high school students

STEM Challenged, Lessons Learned

OK, fellow egg-lomaniacs, we have reached the end of our STEM Challenge Flight for the year. The bad news? None of the teams got quite enough points to qualify for the STEM Challenge Symposium competition. The good news? We learned a lot from the experience.

We eggs-changed the focus of our STEM Challenge Symposium event on 24 April 2012 from a competition to a Lessons Learned meeting instead. We shared the presentations, photos, and egg-launching devices the STEM Challenge teams built in their quest to launch an egg safely through a hoop and onto a target without breaking.

We discussed what went right and wrong with the STEM Challenge Flight this year, and why the teams didn't score as many points as we thought they would. We looked at the number of points the teams did score, and saw that while no one team made the baseline 3,000-point total we were looking for, some teams came pretty close:



- The *New Paradigm* team, from Cottonwood Classical Preparatory School, finished third with 2,224 points.
- Team *Bazinga*! from Hot Springs High School, finished second with 2,776 points.
- And nosing them out by merely six points to take first place, at 2,782 points, was Media Arts Collaborative Charter School's *Slack Mesa*.

Among the issues raised that caused students difficulty included varying spring break schedules which interfered, sometimes quite a bit, with STEM Challenge Flight deadlines near the end of the project, and technical issues such as the v-e-r-y s-l-o-w video uploading times to the School Town website.

The students also discussed what did work well; items ranging from good organization and feedback, to technical successes such as *Slack Mesa's* successful two-day time-lapse film of the construction of their egg-launcher...with a little help from a box of Cheez-Its!

Afterwards, even though it wasn't a formal competition, the teams took their egg-launchers outside and tried them out. Following that, the teams practiced launching slices of pizza into their mouths...and hit the bulls-eye every time!

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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

MELT: Microprobe Evaluation of Lava and Titanium

PRS: Phillips Research Site

PWN: Pinpoint WeatherNet

STEM: Science, Technology, Engineering, and Math

TECH: Technology and Engineering Challenges

T²: Technology Transfer

TTE: Technology Transfer for Education

USAF: United States Air Force

Brace For the AfterMath

Brace yourself for the impact because AfterMath Camp is in Albuquerque this summer!

This program is a hands-on, interactive, super fun, four day camp. Enjoy a diverse curriculum that includes Math and the integration of Math into Science and Athletics. Testing and testing techniques are included. The combination of fun and entertainment in education has proven to raise practice SBA/ ACT scores an average of 30%!

This camp builds confidence and competency in every student. Best of all, students can attend on a scholarship.

Students are not turned away for lack of funds; the program provides scholarships for many students.

There are 100 slots for Middle School and 100 slots for High School students this summer. Students are selected on a first come first serve basis.

Do not lose out on this incredible opportunity; register on-line today: www.aftermathcamp.com.

For more information, call (505) 449-8810 or send an email to info@aftermath.com.

We're Looking For a Few Good...

STI Teachers

We're looking for about 30 teachers to attend our week-long Summer Teacher Institute (STI) professional development workshop for teachers. It's scheduled for the week of 16-20 July 2012.

The workshop will be divided into two curriculum groups: one for the high school STEM Challenge Flight and one for the middle school Robot Systems Flight.

To participate in the Robot Systems Flight at their school for the 2012-13 school year, teachers must have participated in last summer's Robot Systems Teacher Training, or this year's Summer Teacher Institute—or both.

Interested? Call Ms. Diane MacAlpine at 853-8110, or email AFRLLaLuzAcademy@kirtland.af.mil.

This Newsletter Looks *Awesome* on the New iPad

Seen the "retina display" on the new Apple iPad? Pretty cool, huh? And this newsletter looks *awesome* on it.

When you get your emailed copy, just press on the .pdf file in the email and select, "Open in iBooks." It turns out iBooks is an excellent .pdf reader, letting you swipe to turn pages and tap to zoom in on photos and articles.

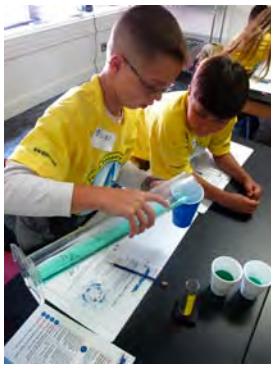
This trick works for the iPhone/iPod Touch, too, and also on non-Apple smartphones/tablets using the appropriate apps.

Don't already get a .pdf of this newsletter? Contact us at AFRL-LaLuzAcademy@kirtland.af.mil and we'll add you to our email list.

Spotlight Successful STEM Students

Teachers, have any of your students gone on to win a STEM competition, pursue a STEM degree, or work in a STEM field? Tell us about them and we may spotlight them in a future issue of the newsletter!

Email AFRLLaLuzAcademy@kirtland.af.mil.



Coming Next Issue...

A whole new year of STEM!

WATCH FOR IT!