



AFRL LA LUZ ACADEMY

“CREATING THE POSSIBILITIES”



INSPIRING FUTURE SCIENTISTS AND ENGINEERS

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The Rocket Report

Mentor Training, Apprenticeship Fairs Start STARBASE 2.0 Program

In partnership with the Citizen Schools program, STARBASE 2.0, the school-based afterschool program targeting middle school students, started up in January at Van Buren Middle School with a pair of Mentor Training meetings, followed by a pair of Apprenticeship Fairs.

On Tuesday, 17 January 2012, the first Mentor Training meeting was held to orient Tuesday session Citizen Teacher and Citizen



Tuesday session apprenticeships, students will design, construct, and race scale-model Scalextric racecars.

STARBASE Director Ronda Cole is the Scalextric STARBASE 2.0 Citizen Teacher. Her Citizen Volunteer mentors include Capt Tae Kim, Lt Tyler Jones, Lt Eric Bailey, Lt Nathan Haluska, and Ms. Rosemary Williams.

On Thursday, 19 January, the second Mentor Training meeting was held to orient the Thursday session Citizen

Teachers and Volunteer mentors. For the Thursday session apprenticeships, students engage in Robot Systems activities using Boe-Bot® robots.



NDEP Coordinator Diane MacAlpine is the Boe-Bot® STARBASE 2.0 Citizen Teacher. Her Citizen Volunteer mentors include LtCol Richard Rupanovic, Lt Matthew Leines, Lt Alexander Stevenson, Lt Christopher Ball, Lt Benjamin Struebing, and Ms. Catherine Pierce.

Apprenticeship Fairs for the Tuesday and Thursday sessions were *Continued on page 2*

Website Update

The AFRL La Luz Academy website has been updated, and is ready for viewing! Check it out at <http://prs.afrl.kirtland.af.mil/LaLuz/>.

There you'll find general Flight information, forms, Fact Sheets, photo galleries, important website links, and other information and resources.



Girl Scout STEM Expedition Smiles

The newest, lemony Girl Scout cookie is called "Savannah Smiles." The Girl Scouts were the ones smiling at the STEM Expedition 25 January 2012. They learned about flight surfaces and principles, tried on actual flight gear, and practiced flying on flight simulators.

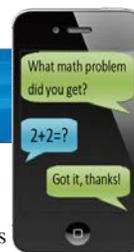




Mars Missions Flight

for fifth grade students

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



tion for TEAM Mission log points.

Let's add this up, shall we? Telecommunicating enables TEAM introductions, ensures everyone has the right habitat pieces, facilitates choosing a habitat decoration theme, helps you determine your colony's location on Mars, and gets you points on the TEAM Mission Log.

Do the math—it *pays* to telecommunicate!



ReMMinders

- The **Mid-Year Meeting** is Thursday, 23 February 2012, 12:30 to 3:00 pm. We'll give out plastic and thoroughly discuss Link-Up Day. Give us your names and last four of your Social Security numbers at least one week prior. Details were emailed; contact us if you have any questions.
- Send us your **TEAM Registration Forms**, if you haven't already.

Do the Math—It Pays to Telecommunicate

The habitat CREW is made up of three TEAMS, each of which is responsible for about one third of the habitat pieces. Each TEAM goes to a different school, and they only meet each other at the very end, at the Link-Up Day event.

So, do the math—how many other TEAMS will your TEAM have to telecommunicate with (text, email, fax, phone, videoconference, etc.) to introduce yourselves, ensure each TEAM prepares the correct habitat pieces, and establish a habitat decoration theme?

If you said "the other two TEAMS in our CREW," you are correct! See pp. **81-86** in your handbook.

Plus, CREW members need to make sure they know the colony site coordinates. What if the TEAMS get separated? Mars is smaller than Earth, but it's still plenty big enough to get lost on.

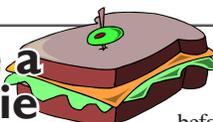
So—do the math! We send each TEAM one of three math problems (let us know if you didn't get yours). Telecommunicate your respective math problems to the other two TEAMS and do the math.

The answers provide clues to the colony's *latitude*, *longitude*, and position relative to the Martian *equator*, using the Mars map you received from us.

Oh, and whenever you receive a telecommunication from another TEAM, be sure to thank them or otherwise acknowledge receipt of transmission. True communication is a two-way street!

Fill out your Telecommunications Log (pp. **85-86**); on Link-Up Day, turn it in at the "Uniforms and Telecommunications" holding sta-

How to Be a Mars Foodie



Foodie is an informal term for someone who loves and wants to learn all about food, including the science of it. Here's how to be a Mars Foodie:

First of all, each TEAM uses teamwork, problem-solving, and

math to plan/pack a Link-Up Day lunch before they *launch* (pp. **97-98**). Flight Directors (teachers) bring the same lunch as the students—there's no burger joints on Mars (yet).

Nutrition, weight, and space are important to astronauts. Meals must be nutritionally complete,

including 8 oz. of fluid per TEAM member. Total weight of food and liquid must not exceed 20 oz./TEAM member. Carry all food, liquid, and packaging in no more than five one-gallon ziplock bags.

Hey, if master Foodie chef Emeril Lagasse was an astronaut, he'd be following this recipe, too. BAM!



Your **commitment** to this mission is crucial to its success



DoD STARBASE Flight

for elementary fifth and sixth grade students

and the STARBASE 2.0 afterschool program

Designs on Engineering

It's a new semester for the DoD STARBASE Flight, and the students participating in Day 1 have designs on engineering. Student teams begin by discussing how best to protect Eggbert the Astronaut as he crash-lands his spacecraft.

Once the team agrees on a design,



they sketch out their plan, and build and test a prototype. If successful, Eggbert remains inside his pressurized suit (shell).

Next, the students take design to a new dimension, making a space station module using PTC Pro/ENGINEER® 3D design software. They factor in concepts such as *horizontal*, *vertical*, *perpendicular*, and *aligned planes*.

Feet, don't fail me now—just convert to meters, please. Students take on a Metric Mission using tools such as *graduated cylinders*, *protractors*, *scales*, and *rulers*.

At least one week in advance, please give us the name of each adult per driver's license, the last four digits of their Social Security Number, and the estimated number of students you're bringing. Don't forget to turn in your Media Release forms, too!

Mentor Training, Apprenticeship Fairs Start STARBASE 2.0 Program

Continued from page 1

held the following week. Students attended presentations by STARBASE 2.0 and other Citizen Teachers and mentors, and listened to pitches describing what the students would be doing if they chose that activity.



Five groups of students attended the Scalextric Apprentice Fair, and four attended the Boe-Bots® Fair. Students seemed quite interested in our pitches, and eagerly explored the Scalextric/Boe-Bot® activities/components hands-on.

The following week, Citizen School students who chose a STARBASE 2.0 activity began attending the Scalextric and Boe-Bot® sessions.





There's Always Room for Lasers

Day 1 of the Spring semester of the TECH Flight has the students in orbit.



The sixth and seventh grade students learn about the various components and systems, like the *antenna*, the *solar array* or other *power source*, and the *payload*, that comprise man-made satellites such as the Air Force Research Laboratory (AFRL)'s *TacSat-3*, *CNOFs*, and *XSS-11*.

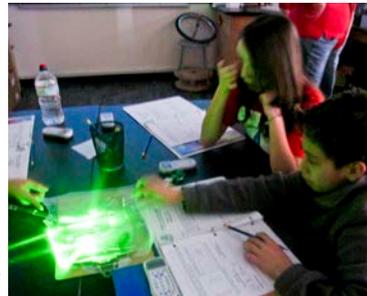
They also learn about the *Plug*



and *Play technology* AFRL uses to build multi-purpose satellites less expensively, and explore building their own plug-and-play model LEGO®-Sats.

Students investigate *ultraviolet radiation* by comparing what effect different sunblocks with various levels of *sun protection factor* (SPF) have on an ultraviolet frisbee that's exposed to sunlight.

After that, they still have room



in their Day 1 class to explore lenses and light in a Laser JELL-O activity. Students cut various lenses out of red and green JELL-O, and experiment

with shining red and green laser beams through the lenses. The hardest part of this, naturally, is trying to avoid eating the lenses first.

Students also use *lightboxes* to explore combining different frequencies (colors) of light.

At least one week in advance, please give us the name of each adult per driver's license, the last four digits of their Social Security Number, and the estimated number of students you're bringing. Don't forget to turn in your Media Release forms, too!

STEM Challenge Flight for high school students

STEM Challenge Flight Kicks Off

Nineteen high school teams, from Amy Biehl, Cottonwood Classical, and Media Arts Collaborative Charter Schools, Hot Springs High School, and West Mesa High School, are participating in the STEM Challenge Flight this year. Teams attending the Kickoff Briefing on 12 January 2012 received an overview of this year's STEM Challenge Flight.

This year's 12-week challenge has students use an engineering design process to build a remote-con-



trolled device to launch a raw egg through a hula hoop, landing on target intact, within a \$100 budget.

Students were introduced to AFRL scientist and engineer mentors, including Mr. Doc Aguilar, Lt Kelly Alexander, Capt James Crane, Mr. Tony Hostutler, Mr. Wade Klennert, Lt Matthew Leines, Mr. Greg Pitz, and Lt Kaz Teope.

Students learned about the details and deadlines involved in the Flight. They also participated in a team-building exercise involving lifting a hula hoop balanced on the

pads of their fingers, as a team. Mr. Sean Noonan introduced used laptops, iPads, and smart- students to the School Town website they will be using to communicate with their mentors and post their work.

Next, students began their first assignment: working on coming up with a team name and logo.



Following that, student teams used laptops, iPads, and smart- phones to simulate the approximate flight mechanics of their egg with a popular video game app called "Angry Birds."

Engaging high school students in hands-on STEM and engineering design? There's a Flight for that!

It's Just a Phase

The first assignment of the STEM Challenge Flight, due 25 January 2012, was to create a team name and logo, and post them to the School Town website.

A number of student teams have met this challenge, including the logos pictured here.

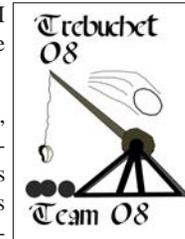
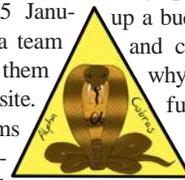
During February, students work on Phases I and II of the STEM Challenge Flight.

Phase I, R&D and Pitch, lasts three weeks, 25 January to 15 February, and is worth 600 points. Students research payload (egg) protection and launch device options, create a written

project plan, build a prototype, make a video demonstration, chart or graph supporting data, write up a budget (no more than \$100), and create a video explaining why this approach should be funded.

Most points are awarded for being able to describe the prototype and explain design and purchase choices.

Phase II, Buy and Build, also lasts three weeks, 15 February to 7 March, and is worth 900 points. In this phase, student teams obtain the materials and build their launcher, the payload protection, and the remote "trigger" mechanism.





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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

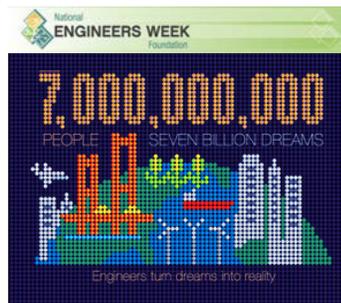
USAF: United States Air Force

STEM Bytes

National Engineers Week Coming

There are many challenges facing our world requiring immediate engineering solutions. **National Engineers Week** (19-25 February 2012; www.eweek.org) celebrates the positive contributions engineers make to society; it is a catalyst for engineering outreach across the country.

The theme for 2012, *Seven Billion People, Seven Billion Dreams*, is based on helping the next generation of engineering talent meet and overcome challenges associated with the current world population being over seven billion (7,000,000,000) people.



Events to commemorate National Engineers Week 2012 include:

Discover Engineering Family Day (18 February 2012). Held each year at the National Building Museum in Washington, D.C., this action-packed event consistently draws 6,500+ attendees. Over 29 exhibitors and 300+ volunteers,

kids and their families build ziplines to safely deliver marbles, explore buoyancy via tinfoil boats, and learn about waves via a giant wave tank, and more.

Introduce a Girl to Engineering Day® (23 February 2012). Each year, "Girl Day" gives thousands of women engineers, with support from their male counterparts, the chance to directly mentor more than one million girls and young women in grades K through 12. Girl Day celebrated its 10th anniversary in 2011. This section of the www.eweek.org website has been translated into Spanish.

As of this writing, we have six **DoD STARBASE Flight Day 3** and two **TECH Flight Day 1** classes scheduled that week.

NASA's Real-Life Inflatable Mars Habitat

In previous editions of this newsletter (March and December 2011), we told you about the European Space Agency's real-life "Mars 500" Mars Mission, a successful 520-day simulated journey of seven astronauts to Mars and back.

What's that? *Still* not convinced our Mars Missions Flight is a realistic, albeit fifth-grade-level, Mars Mission simulation?



Well, this ought to do it. NASA, *right now*, is testing an inflatable "loft" for a Martian habitat, *much like our own inflatable habitats*, out in the Arizona desert.

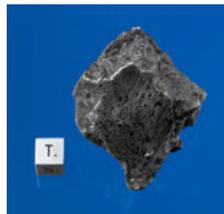
Why? It's a way to create more

social, recreational, and living space for the astronauts, using lighter materials. To learn more, see www.marsdaily.com/reports/The_Challenges_of_Building_A_House_on_Mars_999.html.

Now Mars is Visiting Us

And now it seems that Mars is visiting *us*. Meteorites that landed in Africa last July came from Mars, scientists recently confirmed.

Astronomers believe millions of years ago something big collided with Mars and sent rocks hurtling through the solar system. After a long journey through space, one of these rocks occasionally lands on Earth, although this is a very rare occurrence these days.



Scientists can tell they came from Mars because the chemical signature of the rocks and the Martian atmosphere match.

See <http://news.yahoo.com/ap-newsbreak-mars-rocks-fell-africa-last-july-150634302.html> for more information.

Coming Next Issue...

Take a look at what's coming in the next exciting issue of this newsletter:

- Habitat construction instruction
- DoD STARBASE Flight robots patrol Washington, D.C.
- STEM Challenge Phase III



Watch for it!