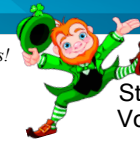


AFRL

NEW MEXICO STEM OUTREACH



Inspiring Future Scientists and Engineers

AFRL NM STEM ACADEMY

There's Easter Eggs in the Easter Eggs!

Star Date: Mar 2024
Volume XXI, Issue 7



The Rocket Report

In This Issue...

The Rocket Report	1
Mission to Mars	2
TECH Mission	2
Robotics Challenge	3
STEM Challenge	3
DoD STARBASE New Mexico	3-4
Other STEM Opportunities	4
STEM Bytes	4
Coming Next Issue...	4

Calling All Alumni



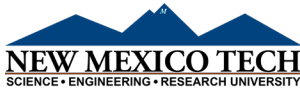
AFRL NM's [Mission to Mars](#) program turns 30 this year and our [DoD STARBASE NM](#) celebrates its 20th year.

To celebrate these milestones, we're asking former participants to share their Mission to Mars and DoD STARBASE NM memories and pictures.

Did you participate in Mission to Mars or DoD STARBASE NM as a student, teacher, or volunteer? Are you a parent of a student who was a participant? We'd love to hear from you.

To share your memories, click [this survey](#).

In partnership with:



Collaborator:



Remember, Teachers:
It's never too early to make bussing arrangements for our classes and events!



Now STREAMING

A paid Summer Internship is now accepting applications!

We're looking for high school students who will be juniors or seniors in the fall of 2024 interested in working as a **Career STREAM intern** this summer.

For more details, see: www.afrlnm.com/stem/stem-opportunities/.



STEM In the Desert

The static was very dynamic at the Desert Willow Inquiry Festival on 8 March 2024.

Students and visitors to our booth explored the hair-raising and shocking adventures of a Van de Graaff Generator, static electricity balloons, and defied gravity with static electricity "magic wands!"



STEMYS Noms Open



Nominations are open now through **10 April 2024** for the 7th annual *New Mexico Excellence in STEM Awards*, aka The STEMYS, for New Mexicans doing exceptional work in support of STEM education. For more details, or to nominate someone, see: www.superstemevents.com/stemys-1.

Mid-Year Meeting Met

Dozens of fifth grade Mission to Mars teachers came to our facility on **22 February 2024** to attend the **Mid-Year Meeting** training.

Mars teachers received a run-down of the procedures for this year's **30th Anniversary Link-Up Day event**, the culminating event of the Mission to Mars, which will be held this year at the **Albuquerque Convention Center on Thursday, 25 April 2024**.



To keep things moving, teachers learned, in-person crews will be split into Blue and Silver Teams when they first arrive on the Red Planet.

Blue Teams will report to the Tech-

Continued on page 2



Mission to Mars

For Fifth Graders

Mars Safeguarding Through Asteroid Redirection Spacecraft (STARS) Mission 2023-2024



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



Mid-Year Meeting-Met

Continued from page 1

nical Briefing Station, Silver Teams will stay with their Habitat Director, mass their astronaut lunches, and lay out the plastic pieces they prepared, at their Habitat site.

Teachers also practiced building a full-sized model of their habitat, and linking it to *another* habitat!

Following that, teachers received duct tape and 6-mil plastic to help



their crews build scale models and pre-fabbed habitat pieces to bring with them to the Link-Up Day event.



A Great Quest

All adventurers go on a great quest. Some seek fortune, some seek fame...and some, like our brave, adventurous Link-Up Day crews, seek *knowledge*.

After the habitat connecting tunnels have been cut, linking the colony section together, the Colony Commander announces it's time for the **Habitat Walk: Knowledge Quest**.

Habitat Directors send half of their student Crew as a group through the Habitat tunnels to begin the Habitat Walk. The rest of the Crew remains in the Habitat to explain their Life Support System model, pose their Mars Facts Riddle, and award Bonus Cards for correct answers, to exploring students and visitors.

Construction Instruction

With dedication, determination, and duct tape, student crews will construct habitats on Link-Up Day.

If the walls of the habitat don't line up perfectly, duct tape is the students' best friend. The crew tapes/joins the connecting tunnels

on *both* sides of the habitat together, except for the ones at either end of the neighborhood that have only one tunnel.



After Link-Up Day, Habitat Directors take completed habitats **with** them to reuse/recycle when they "get back" to Earth.



Kahoot! Kontinues

The Mars Fact Challenge Kahoot! games are continuing. Challenge #5 will be up through 22 March 2024, and then it's on to Challenge #6!

Congratulations to all the students who are getting a perfect score and following nickname protocol directions!

See <https://afrlnm.com/stem/missions/mission-to-mars/mars-kahoot-games/>.



Mars Facts Knowledge Check #3 Champions!

Congratulations to the Grade Elementary School team who achieved the most perfect scores on the Kahoot! Mars Facts Knowledge Check #3.



Pre-Fab Prep

Pre-fab *before* Link-Up Day!

Silver Teams, why rush to finish incomplete pre-fab on Link-Up Day?

Base Operations crews should attach the door panel and fan/connecting tunnels to the appropriate walls *before* Link-Up Day.



Students tape the **door panel** on the inside front wall of the habitat.

The **fan tunnel** goes in the middle of the back wall *near the ground, taped and flanged, and cut open*.

Attach the **connecting tunnel** to the habitat, *as close to the floor as possible*. Think *short and fat tunnels*. **30 years** is a "pretty fab" Link-Up Day anniversary!

TECH Mission

For Middle Schoolers
Technology and Engineering Challenges—Rocketry and Satellites Missions

Spectacular Spectacle

Spring TECH Mission Day 2 makes a spectacular STEM satellite spectacle of itself!

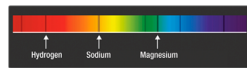
See, satellites scanning space rely on sensitive STEM sensors to leverage certain special, specific aspects of the *electromagnetic spectrum*. Stupendous!

Visible light that our human eyes can see represents only a small portion of the full electromagnetic spectrum. For example, our eyes can't see infrared

(heat) waves, but a *Forward-Looking Infrared (FLIR)* camera can...and a FLIR camera on a satellite can reveal information in outer space that visible light cannot!

TECH Mission Day 2 students see themselves through a FLIR camera the same way a satellite might.

Different elements have different *spectral signatures*, so, satellites, and the scientists who work with them, also study objects on Earth



and in space using *spectral analysis* to study the electromagnetic signatures they emit.

Day 2 students use a *spectrometer* to study the spectral signatures of gases, and record the patterns in their student logs.

Things get even hotter when stu-

dents (carefully) take turns flame-testing various chemical elements, and identifying the element based on the color of the flame.

Students also explore light, lenses, color, and the temperature and sound sensors on a *micro:bit microcontroller*...

...but that's a story for another day.

Prior to the first session, we will ask you for the name, driver's license number/state of issue, date of birth, and the FULL Social Security Number, of every adult coming through the base gate for that series of classes.





Robotics Challenge For Middle Schoolers

It's a Cyber:bat, Man



Bats use a process called *echolocation* to navigate, where they emit a sound and listen for its echo to return, helping them pinpoint their location in relation to other objects!

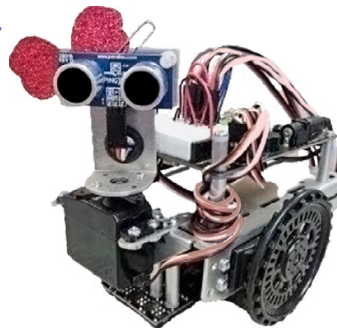
As Robotics Challenge teams work through **Module 3, Building and Controlling a Robot**, students attach a PING sensor to their cyber:bat, I mean *cyber:bot*, and, like a bat, help it use *echolocation* to avoid walls

and obstacles in its path.

Robotics teams, we are seeing excellent progress, so we just wanted to remind you that your quizzes count for points towards qualifying for the Expo!

It's a pretty tight race, and it may come down to a difference of only a point or two to determine if your team makes the Top 30. Don't forget about those quizzes, every point counts!

The last day to submit challenges and quizzes on Canvas for consid-



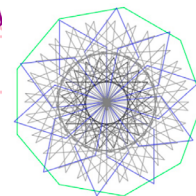
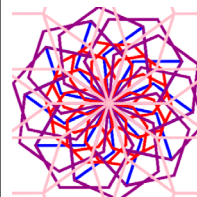
eration in the Expo is **5 April 2024**, but Canvas will remain open after that date!

Questions? Suggestions? Contact:

caitlin.everhart@afri.newmexico.com

Mosaics

More Module 1 turtle mosaics! See the [Turtle Mosaics](#) page in the Robotics Challenge section of our website.



STEM Challenge For High Schoolers

Don't Let This Part Slide!

Timeline: March

It's egg-citing! The students' challenge, should they accept it, is to **prepare** for next month's **STEM Challenge Symposium**, held **11 April 2024**, 8:30 am -1:30 pm.!

Using PowerPoint, Google Slides, or similar, for 500 points, students create **five slides** that show:

1. Team Identity
2. Building and testing the launching device
3. Building and testing the payload protection device

4. Launching Device characterization
5. Payload Protection Device characterization

Student teams can fill the slides with pictures, graphs, data, whatever works best...and they are free to get a little creative! *If* they qualify for the Symposium (only the top 30 teams will get invited!), *this* will be the information they use.

During the Symposium, student teams are competing in three different sections: Performance, Quiz Bowl, and Interview.



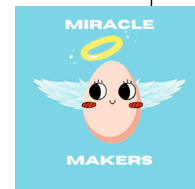
Performance is how well they fling their eggs through the hoop and onto the target. *Quiz Bowl* is like a most egg-cellent game of STEM Challenge Jeopardy!

For the *Interview* portion, teams present their STEM Challenge process, and answer questions in four categories from interviewers, using the slides for reference.

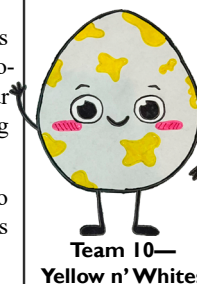
28 March 2024 is the last day to submit challenges and earn points to qualify for the Symposium.

More Logos

More Module 1 logos are hatching, and they're *still* cuter than baby chicks!



**Team 7—
Miracle Makers**



**Team 10—
Yellow n' Whites**



DoD STARBASE NM For Fifth Graders



Not a Drag, Not Even a Little Bit

Sir Issac Newton said that for every action, there's an equal and opposite reaction.

In DoD STARBASE NM, now in its [20th year](#), our fifth grade student engineers in Day 2, Physics, learn that STEM is the action, and learning is the reaction.

Day 2 students put Newton's "force equals mass times acceleration"

second law to the test when they get fizz-ical with CO₂ dragster racecars.

Students also run the STEM circuit by transferring a little bit of energy from a battery in a Power Bit component, into little littleBits® components like Input and Output Bits, running current over Wire Bits.

Beats getting a shave and a haircut, two bits.

The students invent all kinds of little gadgets with these things! Imagine what he could have invented if Thomas Edison had had some littleBits to play with!



Prior to the first session, we will ask you for the name, driver's license number/state of issue, date of birth, and the FULL Social Security Number, of every adult coming through the base gate for that series of classes.





AFRL NM STEM Academy
PO Box 9556
Albuquerque, NM 87119
(505) 846-8042

AFRL.RDOX.NMSTEMOutreach@us.af.mil

Website:
www.afnlm.com/stem

YouTube Channel:
<https://www.youtube.com/channel/UC-QuOSdIXTKYuXPONZwIAIHQ/videos>

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Mr. Steve Burke, Technical Writer.

Important Terms and Acronyms

AF: Air Force

AFB: Air Force Base

AFRL: Air Force Research Laboratory

AFRL NM: AFRL New Mexico (AFRL/RD and AFRL/RV), on KAFB

AFRL/RD: The Directed Energy Directorate of the AFRL

AFRL/RV: The Space Vehicles Directorate of the AFRL

DoD: Department of Defense

KAFB: Kirtland Air Force Base, Albuquerque, NM

MM: Mission to Mars

S&Es: Scientists and Engineers

STARS: Mars Safeguarding Through Asteroid Redirection Spacecraft Mission 2023-2024

STEM: Science, Technology, Engineering, and Math

TECH: Technology and Engineering Challenges

USAF: United States Air Force

USSF: United States Space Force

Remember, Teachers:
Get those EPA
Modification forms in!

Advance Notice

This is to put STARBASE Advanced teams on notice: Only a few weeks left until the 8 April 2024 deadline to perform your qualifying launches for submission to The [American Rocketry Challenge](#) (ARC).

The challenge: Build a model rocket that carries one large hen egg to an altitude of 820 feet, stays airborne between 43 and 46 seconds, and returns the rocket to the ground

safely, with the egg unbroken. Simple, right?

ARC is the world's largest rocket contest with nearly 5,000 students nationwide competing each year.



STEM Bytes

STEM for Kids

We are now registering kids for our annual **STEM Summer Camps!**

- For rising 3rd-4th graders from the [community](#) and [KAFB](#), there's **Space Camp**, 3-6 June and 10-13 June, respectively.
- For rising 5th-6th graders from [KAFB](#) and the [community](#), there's **STARBASE Camp**, 10-

13 June and 17, 18, 20, and 21 June, respectively.

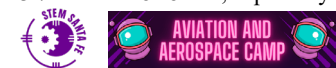
- For rising 7th-9th grade students, there's **STARBASE Advanced Camp**, 17, 18, 20, and 21 June.

For more information on these camps, contact miranda.gabaldon@afnlnewmexico.com or call (505) 853-8110.

For older students, the [local chap-](#)



[ter of the Tuskegee Airmen, Inc. \(TAI\)](#) is hosting their annual **Aviation Camp** and **Space Camp**, 3-7 June and 18-28 June, respectively.



STEM Santa Fe is also hosting their **Aviation and Aerospace for Girls** camp, for rising 7th-12th grade girls, 3-7 June 2024.

Gonna be a busy summer!

STEM for Adults

Who says kids are the only ones who get to have fun?! There's STEM events coming up for the *big* kids, sometimes erroneously referred to as "Adults," too!



The [National Museum of Nuclear Science and History](#) will host an adults-only "[Discovery After Dark](#)" STEM night on Friday, 12 April 2024.

Guests ages 21 and over enjoy the Nuclear Museum's exhibits and explore their inner child with mind-blowing science experiments ranging from making slime to liquid nitrogen ice cream. Tickets: \$15.

STEM News

There's enough STEM and space news to block out the sun!

- Oldest living astronaut Jim Lovell (Tom Hanks in *Apollo 13*) turns 96 on 25 March 2024.
- The big solar eclipse is coming 8 April 2024.
- Intuitive Machines landed its *Odysseus* lander on the moon, the first successful American moon landing since 1972...and it promptly tripped on a moon rock and fell over.



- NASA is fighting to maintain communications with *Voyager 1*.
- NASA's *Osiris-Rex* craft returned twice as much asteroid rubble as they were trying for.
- Scientists have recently discovered a new kind of magnetism, and a new phase of matter.

See www.space.com.

[NASA](#) is now seeking applicants for its Mars **CHAPEA II** mission simulation (deadline: 2 April 2024), and [astronauts](#) for its Artemis missions (deadline: Also 2 April 2024)...and the astronaut position pays \$152,258/year! Not too shabby!



Teachers: Need help with the Mission to Mars, Robotics Challenge, or STEM Challenge missions?

There's Zoom "office hours" with our staff every Thursday (excluding holidays) from 4:00 – 5:00 pm.

Email caitlin.everhart@afnlnewmexico.com.

Coming Next Issue...

- LUD things to know/bring
- STARBASE Days 3 and 4
- Symposium Symposed
- Expo in May

Watch for it!

