

Inspiring Future Scientists and Engineers

AFRL NM STEM ACADEMY

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The Rocket Repor

Career Café

Eagle Ridge Middle School students had a shockingly good time when they visited our booth at the ERMS Career Café on 12 March 2025.

Students explored the movement of electrons with a Van de Graaff generator, and researched their potential movement into certain STEMrelated careers by reading various STEM Career Cards.

They did all this in front of a display Eagle Ridge had put up on their wall, displaying two of the four-foot



last fall in our TECH Mission rocket launch event.

electricity, including making paper

circuit lightsabers, and got zapped

in a group by a Van de Graaff

generator.

CNM Research Challenge and a table where students explored

Fourth/fifth grade science fair participants with interacted STEM Academy staff at the Central NM STEM Research Challenge held at Expo NM on 21 March 2025!

Students rotated through three stations: Making a roadmap, literally, of a possible STEM career path, using markers, trinkets, and shape cutouts; lightening up with a station on manipulating light, including a "double slit" demonstration and a laser maze activity:

Symposium Drops

On 10 April 2025, 20 high school teams from 7 schools competed in the culminating STEM Challenge Symposium event!

Teams rotated through the Performance (launch an egg payload through a hula hoop onto a target 30 feet away), Interview with judges, and game-show-like Quiz Bowl challenges.

This year's Symposium also featured some new On-Site Challenges:

Projectile Range and Precision (using a mini-launcher and a small marble-sized ball to collect data on projectile range, and with carbon paper and

2 Central New Mexico O STEM Research Challenge

measuring rings to decide precision and accuracy), and

Egg Drop (using a bucket of materials to craft an egg protection device for an egg dropped from a claw suspended near the top of a high ceiling).

Awards given included:

- Grade A Egghead-Knowledge is Power (for quiz/Quiz Bowl, and interview points): Team 20, The Remote Throwers;
- Egg-cellent Execution— Launch System Performance: Team 26, Cluck Norris;

Continued on page 3







Mission to Mars For Fifth Graders Mars Gravitational Research Energy Antenna Test (GREAT) Mission 2024-2025

Link-Up Day: Thursday, 24 April 2025

Mars Invitational Going to the Link-Up Day event

on 24 April 2025?

Mars teachers have received invitations and communications including a map and instructions for student drop-off for the Link-Up Day event.



Mars Optim-ism

Elon Musk said recently he hopes to send an unmanned mission to Mars by the end of 2026, carrying his humanoid Tesla "Optimus" robot with it, named after



Your commitment to this mission is crucial to its success

Kahoot! Koncludes

As of 11 April 2025, the Mars Challenge Kahoot! games have concluded!

Thanks, participants, for Kahooting with us (www.afrlnm.com/ stem/missions/mission-to-mars/marskahoot-games/)! It's been a hoot!

Media Coverage/ **Pictures**



All AFRL NM STEM Outreach events may be photographed, filmed, or otherwise recorded, including the Mission to Mars Link-Up Day event.

Parents/legal guardians of particiating students signed a permission form in advance consenting to such photography, filming, or any other recording; and for the usage and shar-

"Optimus Prime" in the Transformers movies.

Musk hopes to start manned missions as soon as 2029. Ready to go, students?



ing of this media on our Facebook/ Instagram page, website, activity reports, and with other interested community partners, to promote STEM outreach and education.

Similar notices will also be posted at the Link-Up Day event.



Not Yet, Anyway

Uber Eats is a great phone app. I mean, food delivered right to your door! What could be better than that? Only problem: Mars is not on their delivery route. Teachers and

Pack Up

Mars can get chilly! Besides heat, remember to pack these items, Habitat Directors, so your crew's not left out in the cold on Link-Up Day:

• Pre-Cut/Fabricated **Plastic Habitat Pieces**

Front Wall with the Airlock (Door Panel) attached,

Back wall with fan tunnel attached.

Two side walls with connecting tunnels attached,

A floor, and a ceiling.

• Life Support System Model You'll need this for your students must eat the nutritious lunch they prepared in advance.

lust No

Students should not run, jump over, or go behind tunnels after construction is complete, or unplug fan power cords as pranks. Teachers, remind students in advancemission-focused astronauts should be on task as they work to colonize the Red Planet.

Link-Up Day Date/Site

Date	Site	Habitats
24 April 2025	Albuq Conv. Ctr.	54

Technical Briefing-and to survive on Mars! Temperature being one of eight possible systems to share.

• Link-Up Day Lunch

Without Lunch on Mars, the look students might give you could be rather icy.

Other Items

For a complete list, see the Manifest List in the Link-Up Day Guide.



ECH Mission For Middle Schoolers

Technology and Engineering Challenges—Rocketry and Satellites Missions

they sort M&Ms by color...under

Upon reflection, they discover it

gets harder to sort the multicol-

ored M&Ms under colored lights,

because our eyes are merely light sensors in our heads, and they only process the color wavelengths of

different colored lights.

In Living Color

Students in Spring TECH Mission Day 2 study light, lenses, color, and little micro:bit sensors.

First, they get light on their feet with the help of lightboxes and lenses. Light likes to travel in a straight line, unless it encounters an object like a convex or concave



By the Tuesday of the week before the first class in the series, session, or semester, 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.

which lens. can deflect the lines' course.

> Students get to explore chocolate-flavored STEM when

light that reflect off the delicious candy-coated shells.

Satellites and micro:bit microcontrollers also have sensors in them.

Students program their micro:bit to use its sensors to determine the temperature of the room, how much light is in the room, and turn the LED screen into a kind of "night light" if the room is really dark.









www.afrlnm.com/stem

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Robotics Challenge For Middle Schoolers

Expo R&D

The Robotics Expo is right around the corner on 9 May 2025. With that in mind, it's time for a little Expo R&D.

The "R" stands for Robotics Readiness, and the "D" stands for Design, Dance, and Decoration.

So actually, it's more like Expo R&R with D&D&D.

Design

Robotics Expo teams will have a banner with their team name and logo on it on display. Therefore, to prepare for the Expo, teams should come up with a team name and design a logo. They could even incorporate team member names and symbols representing team members, like a NASA misson patch.



Dance

One of the Challenge Courses at the Expo event is called Dance Your Circuits Off! This is the only challenge

teams will prepare a complete program for *before* the event. Teams can edit previously saved code, or write *new* code, to create a dance routine that uses motion, lights, sound, sensors, props, and/ or music.

The dance routine should have a loop that repeats twice in no more than 1 minute.

Decoration



There will be a robotic "beauty pageant" at the Expo. Based on the team name and logo, what

costume could the robot wear that would help identify it as part of the team?

Other Prep

There will be six **Challenge Courses:** Clear Debris, Fireball Freeway, Dance Your Circuits Off!, Line Following, Escape the Maze, and Navigation.

Teams should understand and save some basic programs in a folder called Expo on their flash drive: <u>Basic/Line Following/PING Sensor Navigation</u>; plus any completed <u>challenge files</u> that might help.

The Canvas quizzes also help prepare students for the Quiz Bowl portion of the Expo.

Questions? Suggestions? Contact <u>stem@afrlnewmexico.com</u> for more information.

STEM Challenge For High Schoolers

Symposium Drops

Continued from page 1

- Egg-gineering Expert— Impromptu Implementer (for On-Site Challenge points): Team 03, C.O.I.L.; and the vaunted
- *Golden Egg Award* for most points overall:

Team16,AngryBirdswonthe GoldenEgg award this year!Guess it's true what they say...

The angrier the bird, The goldener the egg.





The Winners!





Egg-cellent Execution Award





Egg-gineering Expert Award



fingerprint types

in class, to see

if the *whorl* is

greater than the

sum of all arches.

A Whorld of Code

In STARBASE NM Day 3, Technology, students learn how to code some code using nontyping types.

They "code the road" when they place various two, three, or four-block *color codes* along the path their Ozobot[®] robots are following, making the Ozobot turn, dance, flash its lights...

They also block off some time to help a LEGO[®] robot find Astro the Space Puppy, who is Lost in Space, using *block coding*.



In Day 4, Chemistry, students are asked to participate in "cool" chemistry activities, like an *interactive cryogenics demonstration*. Why? Just to get a *reaction* out of them. Namely, the "I really like STEM!" reaction. Day 4 students also put on their CSI: Crime Scene Investigation hats. While investigating which of four markers was used to write graffiti, students test ink *soluability* (dissolving in water ability) of the four inks, to increase the *solvability* of the "crime."

Time permitting, they also count and ratio out all the

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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

GREAT: Mars Gravitational Research Energy Antenna Test Mission 2024-2025

KAFB: Kirtland Air Force Base, Albuquerque, NM

MM: Mission to Mars

S&Es: Scientists and Engineers

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 Participation forms in!

DoD STARBASE NM (continued)

Advance Qualifiers

Our launches are done; we're just waiting to see if any of our teams' scores qualified for the national American Rocketry Challenge (ARC).

We had some good scores, too, so...fingers crossed!

STEM Bytes

AWhirlwind of Birthdays

Computing has had a whirlwind of major birthdays recently!



Director Turns 70

You've probably heard of operating systems such as Microsoft Windows, or Mac OS.

They tell the computer the basics of how to function.

Summer Fly By Want to make summer fly by?

Here's how.

The local Tuskegee Airmen, Inc. (TAI) is hosting their annual Aviation Camp, 2-6 June 2025. The General "Fig" Newton Aviation Camp is a five-day camp engaging students in aviation "Ground" School," flight simulator training, aviation career tours, and physical interaction with actual aircraft. It helps students form deep aviation community partnerships.

Space News

- James Webb recently spotted some "little red dots" in the early universe.
- NASA recently launched a new space telescope called SPHEREx.
- The two astronauts "stranded" on the ISS for nine months splashed down safely in a SpaceX Dragon



It looks like you're trying to read a newsletter

Would you like some help?





Popular Electronics



It all started 50 years ago this past January, when Paul Allen saw the cover of the January 1975 issue of Popular Mechanics.

The cover featured a revolutionary new "microcomputer" called the Altair 8800, built in Albuquerque by a couple of engineers named Ed Roberts and Forrest Mims III, who worked for what's now called AFRL on Kirtland AFB.

Even before MS-DOS, Micro-Soft's very first project was creating an operating system for the Altair 8800 called Altair Basic ... and thus created an Altairnet reality.

Signing Day Open

Day is open until

Registration for this year's STEM Signing



STEM Camp Open

up for the rising 5th-6th grade STARBASE Summer STEM Camp, 2-5 June 2025!



Coming

- Mars GREAT Mission accomplished, which is pretty great
- TECH D3--Soldering
 - Robotics EXPO!

Held 3-6 June 2025, for rising 7th-12th grade girls, it features hands-on activities, demonstrations, and presentations by aviation professionals.

25 April 2025. 🚱 Or, girls can join <u>STEM San-</u> ta Fe's popular Aviation and

There's still time to sign



Next Issue...



8 March 1955 to be exact, the very first com-

puter operating system was created; a program called Director, for an early computer system called Whirlwind I. This was the direct predecessor of a similar Air Force computer system, and led to the computers of the 1960s.

Microsoft turns 50

Gates and Paul Allen.

on 18 March

See www.space.com.

were

greeted by a pod of dolphins.

2025...and

STEM



years ago this month, on 4 April 1975, that a little company called "Micro-Soft" was founded in Albuquerque, NM by two guys not long out of high school named Bill

Aerospace for Girls camp.