



# The Rocket Report

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## Rocket Blast

See? It *is* just like the story of the Three Little Pigs. Our TECH Mission Rocket Launch event was originally scheduled for 26 October 2021, but the Big Bad Wolf huffed and he puffed and he blew the whole event all the way into the *following week!*

Can't launch when it's too windy. But on 4 November, the weather was *gorgeous*, so we did our

Rocket Launch event, on *that* day.

One thing we learned: It's much more fun to watch rockets go *Zoom!* than it is to *talk* about rockets *on Zoom*.

Students from six middle schools plus several homeschool families, wearing bright red TECH Mission uniforms, with help from several volunteer AFRL mentors, launched their team rockets into the November sky.

*Continued on page 3*



In partnership with:



Collaborator:



### Remember, Teachers:

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



## Your students will gobble up TURKEY CODING!



1. Arrange some jingle bells, chairs, and/or other obstacles on the floor/ground in your classroom, gym, or another suitable indoor/outdoor area.
2. Designate one side of the area as the "Entrance," and one as the "Exit!"
3. Divide your students up into teams of two: One student is the Programmer, and one is the Turkey!
4. With their eyes closed, the Turkey has to find the exit following the Programmer's commands, to escape the Thanksgiving dinner table!

For more Thanksgiving STEM challenges:  
[www.vivifsystem.com](http://www.vivifsystem.com)



## Bio Blast

We're STEMming so hard, we needed to add some more *STEM-inistas* to our family. You may have already seen some of these new faces in our facility:

### Katherine "Boba" Jones



Classroom Assistant Katherine "Boba" Jones graduated from Florida State College of Jacksonville in December 2019 with an Associates in General Education and a minor in Fine Arts, so she could be flexible in her career path.

Well, that "flexible career path" has led her to...STEM! She moved, with her Air Force husband, to Albuquerque, NM in July 2020, recently heard we were hiring Air Force spouses, and thought it sounded *super fun!*

Science was always one of her favorite subjects, and now she's thrilled to be able to share the possibilities STEM can offer with these students. "Seeing them get excited to work with our robots, or perform science experiments, makes all the behind the

scenes work worth it," she says.

She chose "Boba" for her call sign because she loves going on "Boba Tea" dates with her husband. Can you blame her? I mean, a whole *tea* named after Boba Fett! Can't beat that, not even with a cup of Darth Vader Hot Chocolate.

### Amanda Salazar



STEM Outreach Specialist Amanda Salazar, from northern New Mexico, has loved math for as long as she can remember. During middle and high school, and even into college at UNM, she attended or worked at math and science camps every summer.

After working a few years as a photographer, she went back to school and graduated with a degree in mathematics and education in 2018. Which adds up; once the math bug bites, it never lets go.

Teaching high school math in California was great, but a traditional classroom was not where she saw herself long term. She heard about an available opening with us and

quickly moved back to her home state of New Mexico to take it. Bonus: She's closer to family!

"I am very excited to work as a STEM Outreach Specialist and see students' love for STEM grow," she says.

### Kellye "Sunshine" Sealy



Classroom Assistant Kellye "Sunshine" Sealy is an Air Force spouse with two wonderful, active children. They have lived in Albuquerque since 2018.

Her daughter gave her the call sign "Sunshine," and trust me, it fits. She brightens up every room she's in.

She has volunteered heavily at her children's school activities, from robotic competitions and science fairs to Girl Scout cookie booths. Since starting with us, she has learned many things, including how to launch a rocket!

"I love being in the classrooms and seeing all the kid's reactions when they are completing various STEM Challenges," she says.



## The Returning And the New

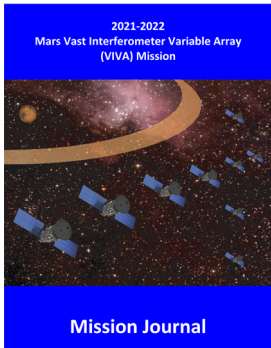
Our Mission to Mars teacher trainings this year, on 19 October and 9 November 2021, featured the returning and the new.

On 19 October, the teacher training was for returning teachers, but the format was the newer, high-tech pandemic friendly Zoom meeting version.

On 9 November, the training was for new Mission to Mars teachers, but the meeting was held the old-fashioned way: In person.

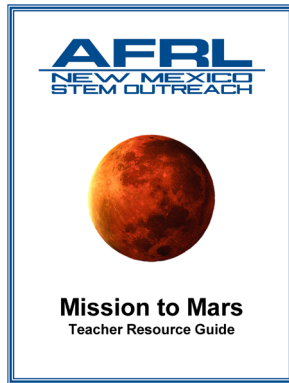
At both training sessions, Mission to Mars teachers learned that much of the mission format was (hopefully) returning to its old pre-pandemic format.

However, they learned, there are some new changes to be aware of.



The new Student Mission Journal, introduced last year during the pandemic shutdown, is returning, revised and updated for the new year and the new VIVA mission.

Likewise, the Mission to Mars website (<https://afrlnm.com/stem/missions/mission-to-mars/>) has been updated for the new school year.



The Teacher's Resource Guide manual has also been updated and revised to focus on Base (classroom) Operations only.

A separate Link-Up Day guide will be provided later.

Other new changes to the Mission to Mars this year include:

- The Telecommunications activity has been replaced with a Colony Location form.
- Plastic bags and tape will be provided for each student to construct a mini-habitat.
- Most food packaging gives measurements in grams, so our Link-Up Day Lunch and lunch waste will be measured in grams this year, too.

Teachers also learned we plan to do an in-person Link-Up Day at the Albuquerque Convention Center like we usually do, but everyone should be prepared to pivot to an alternative Link-Up Day format, pending circumstances.

Some things *never* change: New teachers got a full hands-on overview of many of the Mission to Mars activities the students perform, including building and inflating a colony of habitats; and of course, everyone always has a great time.



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



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.

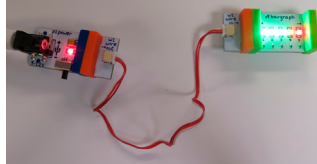
## Techno-Junkies

DoD STARBASE Day 3 Technology students are a little bit like techno-junkies.

*Technology* is anything created by humans to solve problems and make life easier.

For example, students use computers and Onshape CAD software to help an astronaut named Marigold repair and improve her little bit of technology known as a space station, after it was damaged in a meteor shower.

With the help of a little bit of circuitry and energy transfer, students



use littleBits electronic components to construct little technological devices.



Students get into a little bit of robotics and have a ball, programming a spherical robot named

Sphero to navigate a course looking for the lost Astro, the Space Puppy.



## This is Better

Why tell people you can't hear them because they're muted on Zoom when you can attend a rocket launch in person and *hear* the rocket go Zoom!

That's what Albuquerque School of Excellence (ASE) and Albuquerque Institute for Math and Science (AIMS) STARBASE 2.0 students are doing. They've already started practice launches for this year's Team America Rocketry Challenge (TARC).

Like the commercial says:

*Zoom, zoom, zoom.*





# TECH Mission For Middle Schoolers

Technology and Engineering Challenges—Rocketry and Satellites Missions

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.

## Rocket Blast

*Continued from page 1*



The rockets they launched were about four feet long and reached an estimated altitude of 1000 feet, with names such as *Phoenix*, *Atlas*, *Apollo*, and *Gemini*.

They were built beforehand by the students at an earlier visit to AFRL NM STEM Academy,



where they also simulated the launch on a computer program called *RockSim*.

The students divided up into teams, much like a real world rocket crew would, to prep and launch their rockets.

The Assembly Team added a parachute and a motor to the rocket.



The Range Safety Officer students checked with Meteorology students to make sure the Big Bad Wolf wasn't still huffing and puffing, checked with the Spotter Team that skies were clear of aviation, and counted down the launch.

The Launch Control Officer student pushed the Launch button, and the rocket took off...*whoosh!* An



on-board altimeter tracked how high the rocket flew.

The Spotter Teams tracked the rocket's flight and directed the Recovery Teams to where it landed. Some rockets were easier to find than others!

Data was collected from the rocket, which was then disassembled to retrieve reusable parts (like parachutes and altimeters).

Later, the students will compare this data to their *RockSim* simulations and try to figure out why data from real-life launches differs from predicted computer model results.



## Robotics Challenge For Middle Schoolers

### Spinning Up

*To everything (turn, turn, turn) There is a season (turn, turn, turn) And a time for every module, until the Expo.*

Well, it's November, it's the season of STEM, and the time is now:

The Robotics Challenge mission is *spinning up (turn, turn, turn)!*

What a great way to increase student interest in science, STEM content, STEM degrees, and STEM career fields, through robotics-related project-based



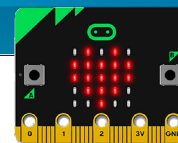
applications, by having students explore the basics of systems engineering, computer science and robotics through assembling and programming small robots to complete tasks!

A Coach Orientation session was held recently. At the session,

Coaches learned that the Robotics Challenge mission is broken up into four modules and a culminating Expo event:

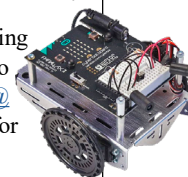
- **Mission Module 1: Intro to Programming**
- **Mission Module 2: The micro:bit Microcontroller**
- **Mission Module 3: Robots**
- **Mission Module 4: Robotics Challenge Expo Readiness**

The top 30 point-earning teams will be invited to the **Robotics Expo on 6 May 2022**.



The Expo is an opportunity for students to compete on robotics courses, vote for the most stylish robot, participate in a Quiz Bowl, check out guest robots, program robots to perform in a dance-off, enjoy a pizza lunch, and attend an awards ceremony!

Interested in participating as a coach or an Expo judge? Contact [Lynn@afrlnewmexico.com](mailto:Lynn@afrlnewmexico.com) for more info.



## STEM Challenge For High Schoolers

### Investigation Initiation

**Suggested Timeline: Nov/Dec**

It's time for STEM Challenge students to initiate the **Launching Device Investigation** (600 points). See the handbook for more information.

**Launching Device Construction/ Design:** Build your launching device, using either the kit you received from the AFRL NM STEM Academy or an original design that your Coach has had approved.

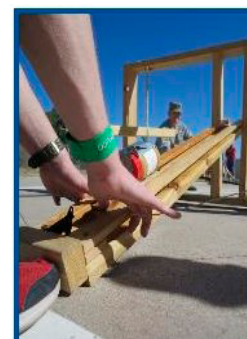
Take photos (or video) to document the construction process. Make sure one of the photos shows the trigger mechanism attached to your launching device. OR:

Take photos (or video) of a launching device you already have. These photos should capture the key parts of the launching device design. Make sure one of the photos shows the trigger mechanism attached to your launching device.

**Launching Device Performance Characterization Data Collection:** Now it's time to explore how your launching device works. Your Coach has a hacksack that you can use as a payload to test your device. The hacksack has about the same mass as a raw hen's egg. The mass you use is important because the object you will be launching for the competition is a raw hen's egg.

First, you will need to determine how far the target is from your launch point....

Coaches, please review the team's work before they submit it for points.



Check Out NM Tech's STEM Website

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Website:

[www.afrlnm.com/stem](http://www.afrlnm.com/stem)

YouTube Channel:

<https://www.youtube.com/channel/UC-QuOSd1XTkYuXPONZwAIHQ/videos>

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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

**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

**VIVA:** Mars Vast Interferometer Variable Array Mission 2021-2022

**Remember, Teachers:**  
Get those EPA  
Modification forms in!

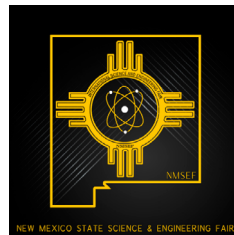


Check out New Mexico Tech's STEM Outreach website, located at [www.nmt.edu/stem](http://www.nmt.edu/stem).

They have information on a variety of STEM topics, including:

• **New Mexico State Science and Engineering Fair.** The middle and high school 70th Annual New Mexico Science and Engineering Fair will be held 1-2 April 2022 on the NM Tech campus in Socorro.

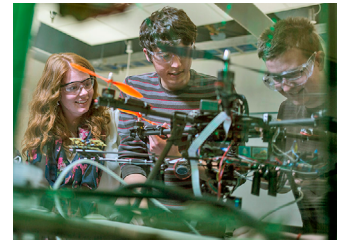
• **New Mexico Science Olympiad.** Science Olympiad is nationwide competition. Students compete in 23 events that include earth science, biology, chemistry, physics, and engineering. The New Mexico State Science Olympiad tournament will be held 26 February 26th,



2022, hopefully in person, at NM Tech.

• **Combat Robots.** This program's mission is to promote interest in STEM education at all levels of education through the thrilling sport of robot combat. Next tournament 23 April 2022.

• **NM Tech's NEW STEM Outreach Monthly Newsletter!** Volume 1, November 2021 is out now.



Hey, congratulations on your first STEM Newsletter, NM Tech!

Welcome to the club!



**Mars/Space News**

- Astronomer makes cool solar system animations on YouTube
- Int'l astronauts simulate Mars Mission in Israeli Desert
- Inflatable Crewed Commercial Space Station (a Mars Habitat in space) by 2027
- NASA contest: K-12 students to create moon digging robot
- NASA Psyche spacecraft will be powered by solar

electric thrusters

- NASA's "Armageddon" DART Mission scheduled to launch this month
- New phase of water, known as "superionic ice," discovered inside planets
- North Carolina's Discovery Place Science has interactive Apollo exhibit
- One of the men who went with William Shatner to space has died in a plane crash.

See [www.space.com](http://www.space.com).



**New Theme**

Discover-e Engineer's Week has announced its theme for 2022: *Reimagining the Possible.*

See [www.discovere.org/our-programs/engineers-week](http://www.discovere.org/our-programs/engineers-week).



**Coming Next Issue...**

- MM Patches, Facts, and Sagas
- TECH Flight Day 3
- News, Info, Fun... and Holidays!

**Watch for it!**

