



# NASA Student Launch ARW Introduction

PRESENTED BY NASA Student Launch

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# NASA STEM

A photograph of three students in dark blue shirts carrying a long, white rocket horizontally across their shoulders. The rocket has a black nose cone and the number "49" and the letters "NMM" are visible on its side. In the background, there is a large American flag on a pole and a white banner with the NASA logo and the words "NASA Student Launch". The scene is outdoors on a grassy field under a clear sky.



## NASA STEM

### Activity Lead

**Fred Kepner**

NASA Office of STEM Engagement

Mr. Kepner joined the Marshall Space Flight Center (MSFC) Office of STEM Engagement in 2010. He currently manages NASA Student Launch, one of NASA's Artemis Student Challenges, and is the Technical Officer overseeing numerous NASA research grants to colleges and universities.

Prior to working at MSFC, Mr. Kepner was the Science Department Chairperson and taught Physics at an all-boys boarding school near Philadelphia, Pennsylvania. Mr. Kepner also mentored the school's rocketry team, SCUBA club, and yearbook staff. He was Scoutmaster of Boy Scout Troop 53 and earned the rank of Eagle Scout in his youth.

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## NASA STEM

### Technical Coordinator

**John Eckhart**

NASA Office of STEM Engagement

Mr. Eckhart graduated from University of Toledo with a dual major in adolescent young adult education and applied mathematics. He then graduated from Purdue University with a Masters Degree in Aeronautical and Astronautical Engineering. Mr. Eckhart taught High School Advanced Placement Mathematics courses for 6 years, served as an Advanced Placement Calculus Reader for College Board. and joined NASA in 2020.

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## NASA STEM

### Logistics Coordinator

Allison Chouinard

NASA Office of STEM Engagement

Ms. Chouinard is STEM Educator and Instructional Facilitator with 15+ years of experience in the high school science classroom. Prior to teaching she graduated from St. Joseph's College for Women with a Bachelors degree in Molecular and Cell Biology. Ms. Chouinard received a Masters of Secondary Science Education from the University of North Carolina at Charlotte and served as an Instructional Facilitator in North Carolina Public Schools before joining NASA in 2020.

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## NASA STEM

### Safety Engineer

Zachary Koch

NASA Office of STEM Engagement

Mr. Koch is a graduate of the University of Alabama in Huntsville with 16 years of Safety Engineering experience at Bastion Technologies at Marshall Space Flight Center in Huntsville, Alabama. He has worked Industrial Safety, Test and Operations, SLS Systems Integration Safety, and has 10 years total experience working with NASA OSTEM for both the Student Launch and Human Exploration Rover Challenge (HERC) programs.

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# What is NASA Student Launch?



- NASA Student Launch (SL) is a researched-based, hands-on activity.
- SL provides relevant, cost-effective research and development of rocket systems.
- SL also provides a real-life STEM experience for students. Modeled after the NASA Engineering Design Cycle
- SL provides NASA-unique opportunities through a national STEM challenge.
- SL reaches middle schools, high schools, colleges and universities across the nation through a 9-month project to design, construct, and fly high-powered rockets with a scientific payload.
- SL teams will share the research results, which can be used in future design and development of NASA projects.



# General Overview



- 9-month commitment (Aug - May)
- Engineering design challenge; teams must send in a proposal and be competitively selected
- Design and build a reusable rocket to a declared altitude above ground level carrying a scientific payload
- Successfully complete milestone reports and flysheets, design reviews, test launches, and a flight hardware and safety inspection
- Provide STEM engagement activities to community participants
- Develop and maintain a social media platform



# 2024 Activity Timeline: [Link](#)



August	<ul style="list-style-type: none"><li>• Student Launch Handbook release &amp; request for proposals: <b>August 14, 2023</b></li></ul>
September	<ul style="list-style-type: none"><li>• Team proposals submitted: <b>September 11, 2023</b></li><li>• Participating teams selected.</li></ul>
October	<ul style="list-style-type: none"><li>• Participating teams announced: <b>October 4, 2023</b></li><li>• Activity year kick-off informational session</li></ul>
November	<ul style="list-style-type: none"><li>• Preliminary Design Reviews (PDR) milestone</li><li>• Team submit flysheet, report and present to the NASA SL Management Team</li></ul>
January	<ul style="list-style-type: none"><li>• Critical Design Reviews (CDR) milestone</li><li>• Teams have completed subscale test launch</li><li>• Teams submit flysheet, report and present to the NASA SL Management Team</li></ul>
March	<ul style="list-style-type: none"><li>• Flight Readiness Reviews (FRR) milestone</li><li>• Teams have completed or are completing full scale Vehicle Demonstration Flight and Payload Demonstration Flight</li><li>• Teams submit flysheet, report and present to the NASA SL Management Team</li></ul>
April-May	<ul style="list-style-type: none"><li>• Launch Week Events in Huntsville, AL</li><li>• Launch at Home window for teams not traveling</li><li>• Teams submit Post Launch Assessment Review (PLAR)</li></ul>





# Divisions



<b>Student Launch Initiative (SLI) Middle and High School Teams</b>	<b>University Student Launch Initiative (USLI) University and College Teams</b>
<p>Middle/high school teams must place in the top of the America Rocketry Challenge (ARC) or Rockets for Schools to be eligible.</p>	<p>Any University can submit a proposal to participate in the USLI competition.</p>
<p>Must have one teacher or mentor who has attended the Advanced Rocketry Workshop (ARW).</p>	<p>No ARW requirement.</p>
<p>SLI is not a competition, but several awards are given.</p>	<p>USLI is a competition and awards are given.</p>
<p>Must use commercial ammonium perchlorate motors. Motor size limited to K class.</p>	<p>Must use commercial ammonium perchlorate motors. Motor size limited to L class.</p>
<p>Team chooses scientific payload with NASA's approval. *can opt to complete USLI Payload Challenge</p>	<p>Team must complete a mission challenge defined by NASA.</p>



# General SLI Requirements



Students will do 100% of the project, including design, construction, written reports, presentations, and flight preparation (except for energetics, see below)

## ALL SLI Teams must have a Rocketry Mentor:

- Mentor must maintain Level 2 NAR/TRA certification and must have flown AND successfully recovered at least 2 flights in the motor to be used by the team or a higher impulse class.
- Only the team mentor can handle motor, black powder or any variant of ejection charges, and prepping/installation of electric matches
- The mentor is designated as the owner of the rocket for liability purposes and must travel with the team to launch week and at-home launches and testing.
- Mentor must be an adult. Student team members with HPR certifications are NOT permitted to be team mentors or carry out any duties of the mentor as outlined above.

## ALL SLI Teams must have an Advisor:

- Advisor must be an adult (ex: educator, parent etc.). We do not recommend that the same person be both the team's advisor and mentor



# General SLI Requirements



## The NASA SLI Team's vehicle shall...

- carry a scientific payload of the team's discretion (approved by NASA).
- fly to a declared altitude, to be determined by team, at PDR.
- be designed to land within 2500 ft of the launch pad.
- have a dual-deployment recovery system that is fully redundant.
- contain electronic tracking devices on every un-tethered section.
- use only commercially available, certified motors and altimeters.
- be flown with team-provided motors and energetics (NASA does not provide motors or energetics)



## More than rocketry:

- Technical writing
- Application of classroom lessons
- Presentation skills
- Budgets / Purchasing
- Timelines & schedules
- Community outreach
- Educational engagement
- Teamwork

Building a future workforce:  
TARC > SLI > USLI > Internships > Workforce



# Launch Week 2024 – April 10 - 14



## Schedule:

Wednesday April 10 – Team Arrival Day  
Thursday – Friday April 11 & 12 – All-Day Activities  
Saturday April 13 – Launch Day  
Sunday April 14 – Back-Up Launch Day

## Launch Week Activities Location:

Von Braun Center – 700 Monroe St. Huntsville, AL

## Launch Day Location:

Bragg Farms – 1800 Grimwood Rd. Toney, AL

## Huntsville International Airport

1000 Glenn Hearn Blvd. Huntsville, AL

[Huntsville Visitors Bureau](#)



