



First Nations Launch Rocket Competition 2023

October 18, 2022

ARTEMIS
STUDENT
CHALLENGES

nasa.gov/stem/artemis.html



Partner

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Meet the Team

■ Wisconsin Space Grant Consortium

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■ First Nations Launch Administrative Team

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■ NASA

- Shanessa Jackson, Kennedy Space Center

What is “First Nations Launch”?

- A competition offered to tribal colleges and universities, Native American Serving Nontribal Institutions, in addition to AISES collegiate chapter students, to demonstrate engineering and design skills through direct application in high-power rocketry.
 - The competition requires teams of undergraduate students to conceive, design, fabricate and compete with high power rockets.
 - The restrictions on rocket motors and dimensions are limited so that knowledge, creativity and imagination of the students are challenged.
 - The end result is a great aerospace learning experience unique to the Native American communities.
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NASA Artemis Student Challenge: First Nations Launch



Competition Date

■ April 28, 2023

- Carthage College, Kenosha, WI
 - Welcome Breakfast
 - Motor Build Workshop
 - Breakout Sessions
 - Final Safety Inspection
 - Oral Presentations

■ April 29, 2023

- Richard Bong Recreational Park, Kansasville, WI
 - Launch Day
- Carthage College, Kenosha, WI
 - Closing Banquet

■ April 30, 2023

- Rain date



2023 First Nations Launch (FNL) Teams

- GATEWAY, MOON & MARS CHALLENGES
 - 24 teams
 - 4-6 members per team on average
 - NOI's due October 21, 2022 (Moon & Mars)
 - Proposals and Preliminary Budgets due December 12, 2022 (Moon & Mars)
 - NOI's are due December 16, 2022 (Gateway)
 - Early submissions highly encouraged

Launch 2 Learn (L2L)

Introductory Rocket Workshop

Participate at Carthage College



- *Carthage College (Gateway Challenge/New Teams)*
 - Three individuals per school (one advisor and two students)
 - Travel, lodging, and workshop meals provided, dinner on your own
 - Rocket kit, motor, and Tripoli Rocketry Association Level 1 certification supplied
 - Maximum 15 participants
- *Virtually*
 - Three individuals per school (one advisor and two students) sponsored by WSGC – Maximum 30 participants
 - Rocket kit and supplies provided by FNL
 - Motor and Tripoli Rocketry Association Level 1 certification supplies at TRA Certification Launch

SUBMIT a Notice of Intent to Compete in order to be eligible for L2L

<https://spacegrant.carthage.edu/about/login/>

REGISTER for the L2L Workshop

<https://spacegrant.carthage.edu/first-nations-launch/launch-2-learn-rocket-certification-workshop/>



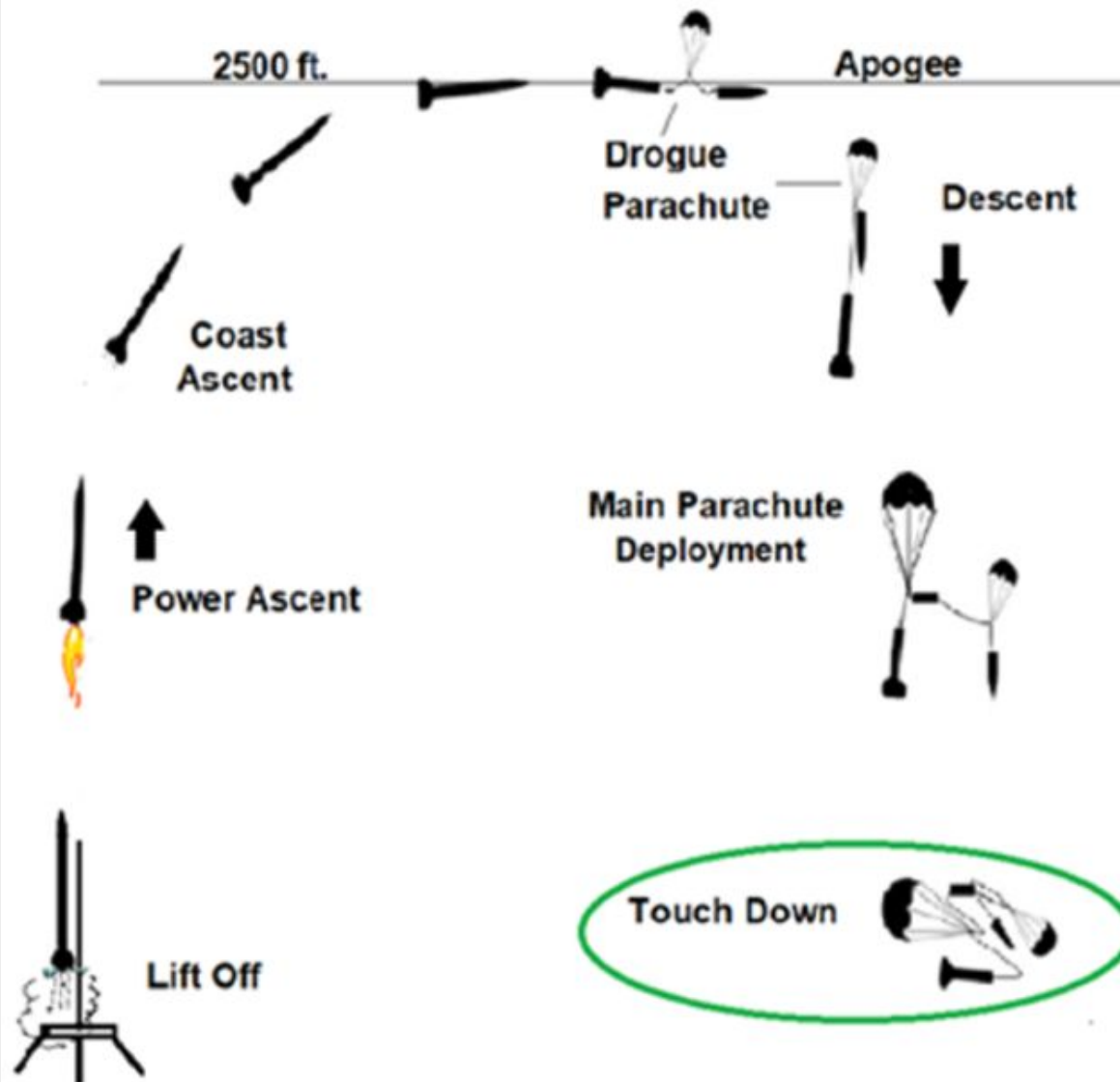
Gateway Challenge



- Teams are required to design and construct a dual deploy high-power rocket from the following list:
 - Mad Cow 4" Diameter Super DX-3 kit
 - Mad Cow 4" Diameter Fiberglass Super DX-3 kit
- Teams may customize their kit with special add-ons provided by the manufacturer.
- Pyro energetics of Jolly Logic altimeter shall be used for main deployment recovery.
- There is no payload associated with this challenge, with focus being on the safe and complete selection, simulation, procurement, assembly/fabrication, and flight of the kit rocket.
- The rocket shall reach an apogee of 2,500ft AGL.



Gateway Flight Profile

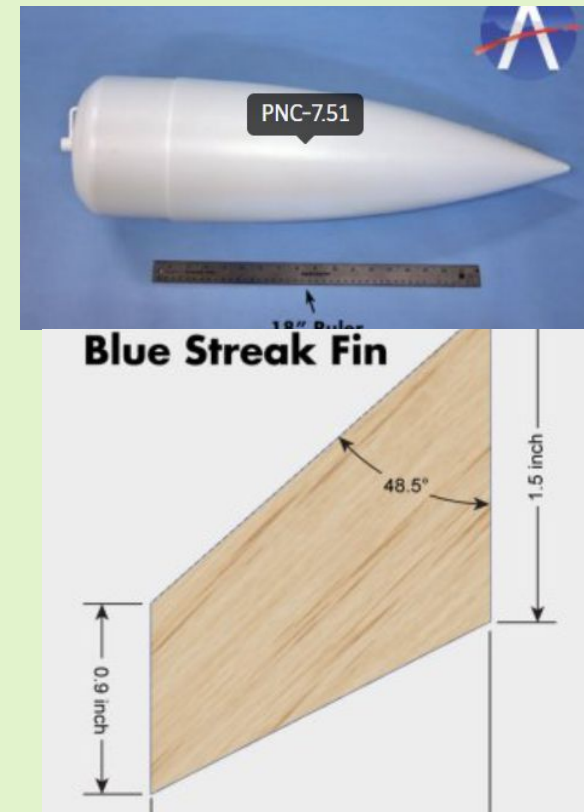


FJN 2023

Moon Challenge

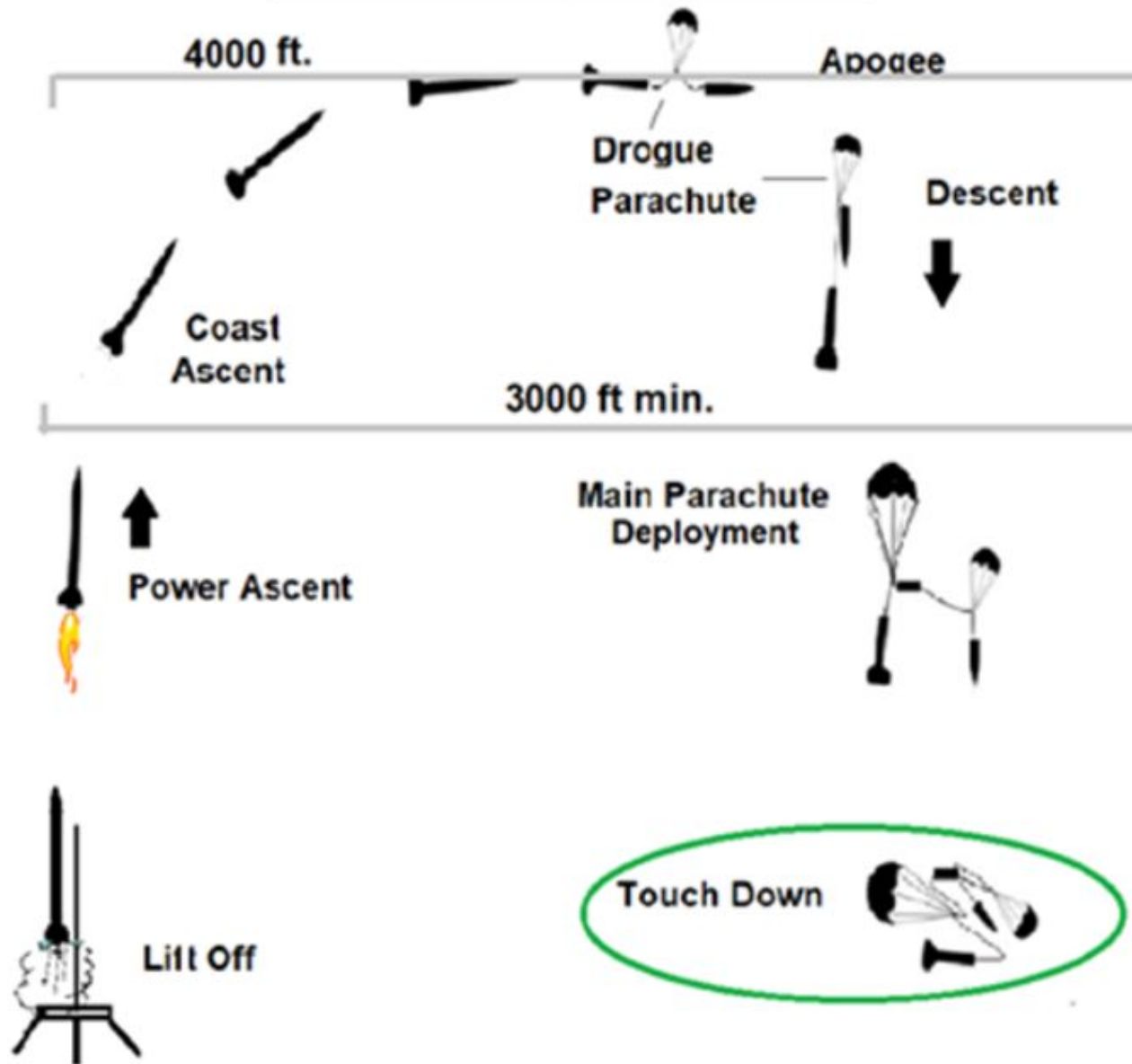


- Moon teams are required to design, test and fabricate specific structural design components:
 - Nose Cone/Shoulders
 - Bulkheads/Centering rings
 - Fins
 - Avionics Sled
- The focus is on material science, fabrications, and understanding material properties and strengths.
- Teams shall design their rockets for an expected apogee of 3000' - 4000' AGL.



Photos courtesy of Apogee Rockets

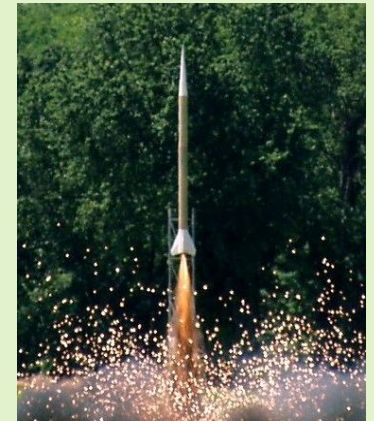
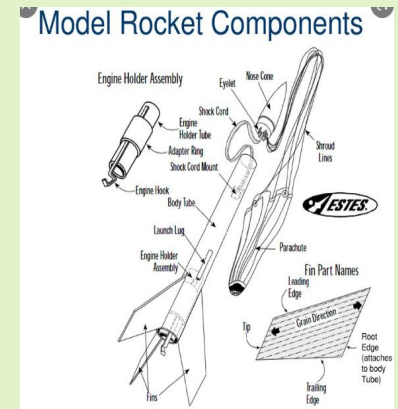
Moon Flight Profile



Mars Challenge

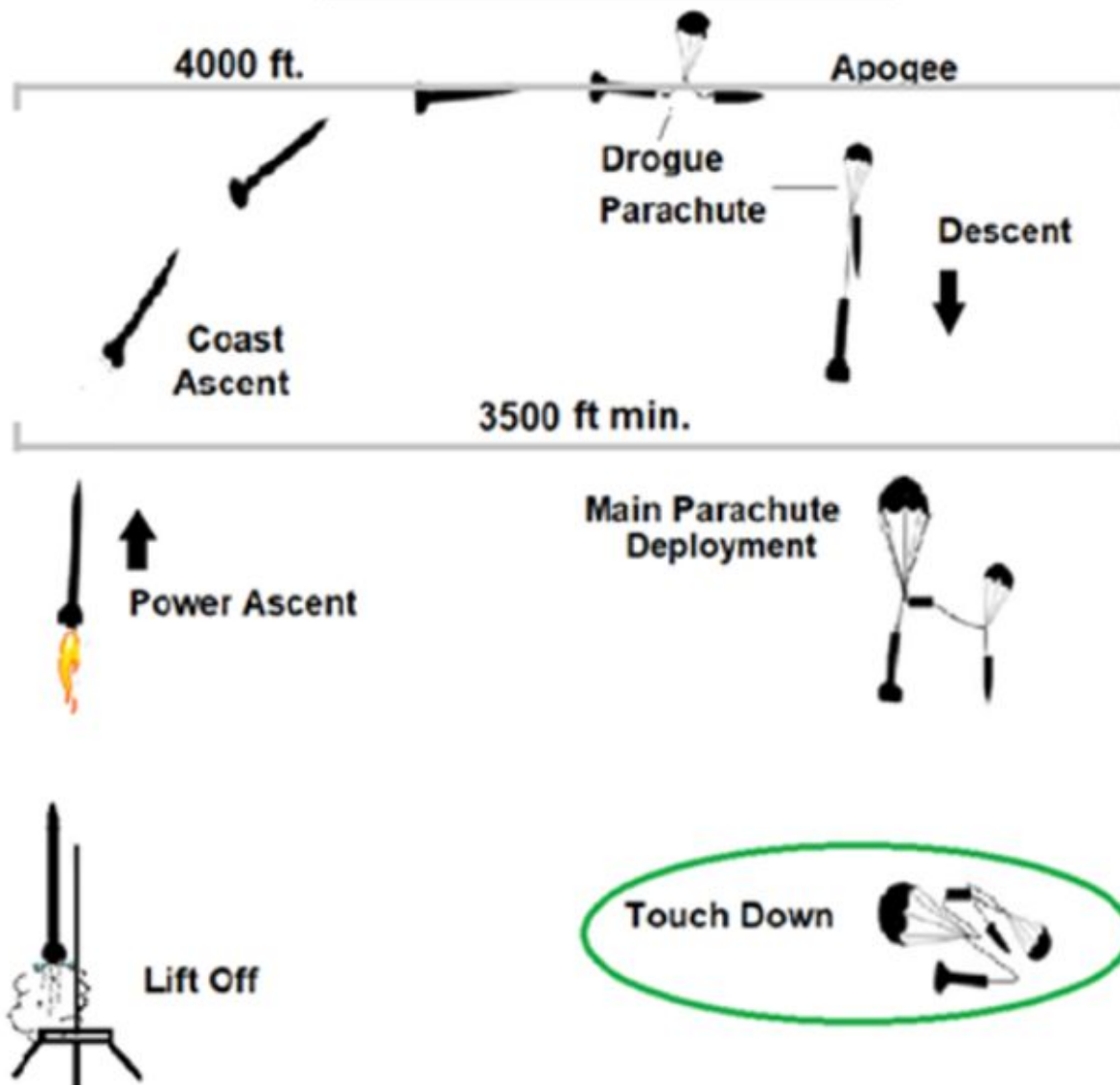


- Select a 'base' dual deploy kit from our pre-selected list.
- Design, test, and fabricate all structural dual deploy rocket components:
 - Airframes (body tubes)
 - Couplers (internal tubes)
 - Nosecones / shoulders
 - Bulkheads / Centering Rings
 - Fins
 - Avionics sled
- Utilize a COTS motor mount tube.
- Select a motor from those listed in our handbook.
- Design their rockets for an expected apogee of 3500' - 4000' AGL.



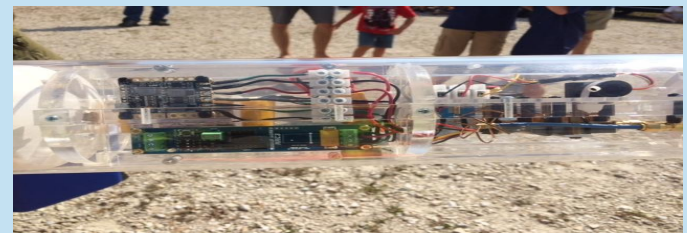
Photos courtesy of PLTW and Wikipedia

Mars Flight Profile



Competition Scoring Summary

- Projects are judged on:
 - Written design reports
 - Virtual presentations (including launch weekend presentation)
 - Launch day flight/challenge performance
- These coincide with project milestones:
 - Proposal, PDR, CDR, FRR and PLAR
- Bonus points may be earned through outreach efforts
- An example of one item (among dozens of items scored on launch weekend) include:
 - Electronic payload bays are judged on neatness and simplicity at launch weekend



Example Only

Supplied by WSGC to Teams

- Marketing Materials
 - Posters and Postcards
 - Rocketry Workshop (Up to 3 members per team)
 - Level 1 Rocketry Workshop during October (in-person at Carthage College) and January (Virtual)
 - Project Travel Award of \$4000
 - Reimbursements issued through Carthage College
 - Additional travel funds for teams traveling from Mountain, Pacific, Hawaiian, or Alaska time zones
 - Two (2) Rocketry Reference Books (New College/Universities)
 - Modern Rocket Design and Construction
 - Modern High Powered Rocketry 2
 - Report Feedback
 - Teams will receive report feedback one (1) week prior to next report
 - Low-Powered Rocket for Demo Flight
 - Each team to fly low-powered demo flight
 - Motors (1) and Casing at Competition
 - Competition motor and a motor build workshop during Competition Launch
 - Ejection Charges at Competition
 - Hotel Accommodations Launch Weekend
 - Max three (3) rooms for three (3) nights at select hotel
 - Select Meals Launch Weekend
 - Friday breakfast and lunch, Saturday lunch and dinner
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Scoring Breakdown for MARS / MOON Teams

Competition Proposal	Written Report	5 pts.	75 pts overall
Preliminary Design Review (PDR)	Written Report	15 pts.	
PDR Presentation w/ judges	Virtual Presentation	5 pts.	
Critical Design Review (CDR)	Written Report	15 pts.	
CDR Presentation w/judges	Virtual Presentation	5 pts.	
Flight Readiness Review (FRR)	Written Report	15 pts.	
FRR Virtual Safety Inspection	Virtual Presentation	5 pts.	
Post-Launch Assessment Review Report (PLAR)	Written Presentation	10 pts.	
Launch Weekend Oral Flight Readiness Presentation		5 pts.	5 pts
Launch Weekend- Mission Performance		10 pts.	20 pts overall
Launch Weekend- Challenge		10 pts.	
TOTAL		100 pts	
Conduct an Education Outreach Project			Up to 10 pts
Submit Education/Public Outreach Form			
BONUS			

Submissions received after 11:59 pm CST on the due date will receive a deduction of 20% for each day they are late.

Design Reports Overview

- Purpose:
 - To communicate the engineering and design effort involved
 - To perform analysis of predicted performance
 - To compare actual to predicted performance
 - To SHOW the design and construction (pictures, diagrams, etc.)
- Reports are due when posted on website calendar:
 - <https://spacegrant.carthage.edu/first-nations-launch/calendar/>
- Must use the Report / Presentation templates:
 - <https://spacegrant.carthage.edu/first-nations-launch/rubric/>
- There are 5 reports and 3 presentations for the year

Timetable

Date	Activity https://spacegrant.carthage.edu/first-nations-launch/calendar/
Sep 13, 2022	Informational Meeting @ 4:00 pm CDT (Zoom)
Sep 26, 2022	Early Bird Non-binding Notice of Intent to Compete Due (Moon/Mars) Launch 2 Learn Level I Rocket Certification Workshop@ Carthage College Request Due
Oct 7, 2022	Visit FNL at the AISES Conference https://conference.aises.org/
Oct 18, 2022	Informational Meeting @ 4:00 pm CDT (Zoom)
Oct 21, 2022	Non-binding Notice of Intent to Compete Due (Moon/Mars) Early Bird Non-binding Notice of Intent to Compete Due (Gateway)
Oct 22-23, 2022	Launch 2 Learn Level I Rocket Certification Workshop @ Carthage College (registration required)
Oct 25, 2022	TRA/NAR Mentorship Requirement Webinar @ 4:00 pm CDT (Zoom)
Oct 28, 2022	Award Announcement (Moon/Mars/Gateway)
Nov 1, 2022	Kick-off Meeting @ 4:00 pm CDT (Zoom) (Moon/Mars)
Nov 8, 2022	Proposal, Budget, and Design Review Development Webinar @ 4:00 pm CST (Zoom) (Moon/Mars)
Nov 14, 2022	Award Acceptance Material Due (Moon/Mars)
Nov 15, 2022	Structures Webinar @ 4:00 pm CST (Zoom)
Nov 22, 2022	Project Management Webinar @ 4:00 pm CST (Zoom)
Nov 29, 2022	Introduction to RockSim Webinar @ 4:00 pm CST (Zoom)
Dec 12, 2022	Proposal Due (Moon/Mars) Preliminary Budget Due (Moon/Mars) Flysheet Due (Moon/Mars); RockSim Due (Moon/Mars)
Dec 13, 2022	Build & Assembly Techniques Webinar @ 4:00 pm CST (Zoom)
Dec 16, 2022	Notice of Intent to Compete Due (Gateway) Request Virtual Rocketry Workshop Due

Timetable

Date	Activity https://spacegrant.carthage.edu/first-nations-launch/calendar/
Jan 2, 2023	Award Announcement (Gateway)
Jan 3, 2023	Kick-off Meeting (Gateway) at 4:00pm CST (Zoom)
Jan 10, 2023	Grant Management Webinar @ 4:00 pm CST (Zoom)
Jan 12, 2023	Launch 2 Learn Kit Reveal @ 4:00 pm CST (Zoom)
Jan 16, 2023	Award Acceptance Material Due (Gateway)
Jan 17, 2023	Avionics/Altimeters Webinar @ 4:00 pm CST (Zoom)
Jan 20-21, 2023	Launch 2 Learn Rocket Certification Virtual Workshop (Registration Required)
Jan 23, 2023	Preliminary Design Review (PDR) Report Due (Moon/Mars); Flysheet Due (Gateway/Moon/Mars); RockSim Due (Gateway/Moon/Mars) Flight Demo Due - Upload rocket demo flight video on Facebook and/or Twitter
Jan 24, 2023	Recovery Webinar @ 4:00 pm CST (Zoom)
Jan 30- Feb 2, 2023	PDR Virtual Presentations (Zoom) (Gateway/Moon/Mars)
Feb 6, 2023	Final Requests Due to Change to Different Competition Challenge
Feb 20, 2023	Patch Design Due
Feb 21, 2023	Advisor/Mentor Meeting @ 4:00 pm CST (Zoom)
Feb 27, 2023	Critical Design Review (CDR) Report Due (Moon/Mars); Flysheet Due (Gateway/Moon/Mars); RockSim Due* (Gateway/Moon/Mars) Final Motor Selection Due (Gateway/Moon/Mars) Official Team Roster & Lodging List Due (Gateway/Moon/Mars) Team Bio Due (Gateway/Moon/Mars) Team Photo Due (Gateway/Moon/Mars) All Team Member Registration on WSGC Website & FNL Application Due (Gateway/Moon/Mars)
Mar 6, 2023	Reimbursements Due (First payout) (Gateway/Moon/Mars)
Mar 6-9, 2023	CDR Virtual Presentations/Initial Virtual Safety Inspection with WSGC (Zoom) (Gateway/Moon/Mars)
Mar 28, 2023	Launch Operations Webinar @ 4:00 pm CDT (Zoom)

Timetable

Date	Activity https://spacegrant.carthage.edu/first-nations-launch/calendar/
Apr 3, 2023	Flight Readiness Review (FRR) Report Due (Moon/Mars); Flysheet Due (Gateway/Moon/Mars); RockSim Due (Gateway/Moon/Mars) Educational Outreach Forms Due (Gateway/Moon/Mars)
Apr 10-14, 2023	Final Virtual Safety Inspection with Tripoli Rocketry Association (Zoom) (Gateway/Moon/Mars)
Apr 18, 2023	Advisor/Mentor Meeting @ 4:00 pm CDT (Zoom)
Apr 24, 2023	Oral Presentations PPT Due (Gateway/Moon/Mars)
Apr 27, 2023	Teams Arrive in Wisconsin
Apr 28, 2023	Welcome Breakfast/Competition Kick-off @ 8:00 am CDT - Carthage College, Kenosha, WI Team Workday, Motor Build Workshop, Breakout Sessions, Final Safety Inspection @ 9:30 am – 4:00 pm CDT – Carthage College Oral Presentations @ 6:00 – 9:00 pm CDT – Carthage College (Gateway/Moon/Mars)
Apr 29, 2023	Launch Day @ 7:30 am- 3:00 pm CDT - Richard Bong Recreational Park, Kansasville, WI Closing Banquet @ 6:30 pm CDT - Carthage College
Apr 30, 2023	Launch Rain Date
May 8, 2023	Final Reimbursements Due Post Launch Assessment Review (PLAR) Report Due (Gateway/Moon/Mars) 2-3 Team Project Photos Due
Jun 1, 2023	Notification of Winners
Summer TBD, 2023	RockOn! 2023 @ Wallops Flight Facility (Moon Next Step Award 2023)
Summer TBD, 2023	Grand Prize Trip to a NASA Center (Moon and Mars Challenge Grand Prize Winners)

Reach for the Stars

- Each team may request a “Reach for The Stars National Rocket Competition” kit.
- The team will then conduct a Reach for the Stars outreach event for 15 students age 10-18.
- RFTS participants will be eligible for the RFTS National Winners’ Celebrations at the U.S. Space and Rocket Center in Huntsville, Alabama.

■ <http://www.rocketcompetition.com/index.html>

Key Changes for 2023

- FNL website now has video series of instructional videos and webinars
<https://spacegrant.carthage.edu/first-nations-launch/rocket-instructional-videoswebinars/>
- Only one competition motor provided per team
- New Awards
 - Top Advisor
 - Top Team Lead
 - Rookie Team
- Reach for the Stars
- Challenges build off each other
 - Gateway ➡ Moon ➡ Mars

Team COVID-19 Safety Plan

- Local Launch Site
- Local Mentor
- Local TRA/NAR Prefecture

Note: As the coronavirus (COVID-19) situation continues to evolve, FNL will closely monitor and follow guidelines from federal, state and community officials regarding on-site competitions. Protecting the health and safety of team members, staff and judges is our primary priority. Challenge managers will be in contact with participants on specifics and changes to the challenges, if any.

FNL COVID-19 Safety Plan

- Launch Site Protocol
- Carthage College Protocol
- Virtual, Hybrid, and In-Person Planning

Note: As the coronavirus (COVID-19) situation continues to evolve, FNL will closely monitor and follow guidelines from federal, state and community officials regarding on-site competitions. Protecting the health and safety of team members, staff and judges is our primary priority. Challenge managers will be in contact with participants on specifics and changes to the challenges, if any.

Advisor Support (Abotossaway)

- New Advisor Mentorship
 - Can pair up new - experienced Advisors
 - Team Outreach Efforts
 - Can provide outreach ideas/support
 - Team NAR / TRA Rocketry Mentor (required)
 - Will assist with finding your area rocket club
 - Next Step Opportunities
 - NASA Student Launch Initiative, NASA RockOn!, Spaceport America Cup
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Additional Resources

- FNL Website:
<https://spacegrant.carthage.edu/first-nations-launch/>
 - Tools and Tips
 - Calendar
 - FAQ
 - Application Process
 - Report Templates and Scoring Rubrics
 - Patch Contest
 - Competition Prizes
 - Awards
 - History
-



2023 @ Kansasville, WI

Q & A