



New Mexico Mathematics, Engineering, Science Achievement, Inc.

39th Annual NM MESA Competition Day

STEM for Health: Explore. Prepare. Care.



**April 29, 2027
Expo New Mexico
Albuquerque, New Mexico
OFFICIAL HANDBOOK**



39th Annual MESA Day Handbook

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MESA COMPETITION GENERAL INFORMATION

The NM MESA, Inc., Annual Statewide Math and Science competitions are designed to encourage the concept of problem solving through teamwork. It salutes NM MESA students for their commitment to academic excellence and reinforces the NM MESA mission of preparing students from historically underrepresented ethnic groups for college majors and careers in math, engineering, and science. In keeping with our mission, advisors are encouraged to assemble teams that are representative of the ethnic and gender diversity of their school and NM MESA enrollment.

COMPETITION OVERVIEW: Our MESA Competition Day will host (2) Competition Tracks, MESA Day and MESA USA. Both tracks will run concurrently during the same event. Please note some guidelines are different for each track.

All of our MESA Day events will address the topic of “STEM for Health: Explore. Prepare. Care.” NM MESA schools are invited to participate in our MESA Day Track as follows:

- On Site Team Competition: MESA Mayhem
- On Site Team Competition: Lab Escape - A MESA Escape Room Challenge
- Prepared Design: NM MESA Medical Transport Challenge
- Optional-School Banner

All of our MESA USA events asks students to identify areas of need in their neighborhood and engineer a solution that will positively affect members of the neighborhood most affected. Teams are required to incorporate a coding element in their prototype. NM MESA schools are invited to participate in our MESA USA Track as follows: Written Communication, Oral Communication, Human Centered Engineering, and Technical Knowledge.

ALL TEAMS: All NM MESA Programs are encouraged to participate in both event tracks. Although scoring is done independently, participation is required as follows: Participation in the MESA USA Track

is optional, BUT at minimum, (1) MESA USA Team is required if the program wants to have more than (1) MESA Day Team participate. Team names MUST be declared as follows: (Track)-(School) (Level) – (Team #). *Example: MESA USA-Mesaville High School – Team #1*

Each school is allowed to have (6) named alternates that can be used on any team, any track. In addition, the day of competition, teams may be condensed if needed to complete teams. Example: Students can be moved from Team 4 to Team 2 in the event of no shows. It is HIGHLY suggested to register full teams, identify alternates, and cross train students in the event a student(s) cannot attend the event. Any team that requires any accommodations must make a request to NM MESA when submitting their registration.

MESA Day Track: The MESA Day competition will run like a MESA Medley. Each team will be composed of 3-6 students. If schools have multiple teams, all events must be filled before building an additional team. *All MESA Day teams are required to participate in all events, including the Prepared Design. All team members will work together on the Prepared Design event and the On Site Team Competitions.*

MESA USA Track: Each team will be composed of 2-4 students. *Because some items are due prior to competition, teams are HIGHLY suggested to be determined by the inspection deadline.*

The 1st Place overall winning teams in both the middle school and high school level will be chosen to represent New Mexico in the 2027 MESA USA National Engineering Design Competition in June, 2027 hosted by Maryland MESA in Baltimore, MD. Only members that attend and participate in the State Competition will be allowed to participate in the National Competition. No changes or additions are allowed.

NMAA ALIGNMENT: NM MESA is now officially an NMAA program as of the 2026-2027 School Year. As such each school participating in NM MESA should be a member in good standing of the New Mexico Activities Association. In addition, all participating students must meet grade and attendance eligibility requirements as outlined in the Verification of Eligibility Form. Membership is required for both middle and high schools.

ELIGIBILITY: All participating teams must come from official New Mexico MESA School Programs. Schools must be considered official, and advisors must enter/submit all A-0 forms by **5 PM MST, March 26, 2027.** Only the students listed on the school roster (have their A-0 submitted) and that meet NMAA eligibility rules will be eligible to participate. **NO EXCEPTIONS!**

Of Special Note to Middle/Junior High Schools serving 9th grade students – Each middle/junior high school that includes a 9th grade class is allowed to have an event team with a maximum of 50% 9th grade students. These teams will compete in the Middle School division **only.** **No** 100% 9th grade teams will be allowed in middle school competition.

ATTENDANCE AND QUALIFICATION: All schools will be allowed to participate in MESA Day as follows. Please use the table to determine the number of teams your school can bring.

MESA Day Track	
Extra Small School: <=15 profiles	Max number of teams=1
Small School: >=16 and <=25 profiles	Max number of teams=2
Medium School: >=26 and <=45 profiles	Max number of teams=3
Large School: >=46 and <=69 profiles	Max number of teams=5
Extra Large School: >=70 profiles	Max number of teams=7
MESA USA Track	
Small School: <= 30 profiles	Max number of teams=1
Large School: >=31 profiles	Max number of teams=2

PLAGIARISM AND ADVISOR POLICY:

Academic honesty and personal integrity are essential to ensure future success as college students and STEM Professionals. As such, NM MESA expects that the work will be solely the work of the students. If the work or ideas of another are used to further students' work, then proper credit must be given to the owner. Failure to do so will result in an act of Plagiarism. If it is determined that a student committed plagiarism, they will be disqualified from the competition and will be ineligible to receive any awards. They may also risk further sanctions from NM MESA and/or MESA USA.

Due to the nature of some events, the event will be done with the trust that all students will abide by this policy. The prepared design event and other advance materials should be completed by the entire student team and be the original work of the students.

Advisors (or non-competitors) are NOT allowed in any competition unless there is a designated viewing space. All advisors are expected to assist their teams with meeting deadlines, register their teams, assist their students to ensure they are where they need to be, etc. Any complaints and/or appeals need to be addressed by the students to the Event Coordinator during the event.

SCORING SUMMARY: Final team rankings will be based on the total score, which is derived by adding all of the component scores. *NOTE: Results are not final until overall results are reported.*

MESA Day Track:

On Site Team Competition 1	100 points
On Site Team Competition 2	100 points
Prepared Design	150 points
TOTAL	350 points

MESA USA Track:

Written Communication	Oral Communication	Human Centered Engineering	Technical Knowledge	Total
62 points	78 points	68 points	76 points	284 points (100%)

AWARDS: (Middle and High School –Each Track) Overall Teams: Placing 1st-3rd Overall

Trophies will be awarded to the top 3 overall teams (1st-3th Place). Awards will be presented to individual team members placing 1st – 3rd Place overall. Awards will be presented to the top team in each individual event (1st Place).

- 1st Place-\$100 Gift Card
- 2nd Place-\$75 Gift Card
- 3rd Place-\$50 Gift Card

High School MESA Day Track Only:

- 1st Place-Will also receive a NMAA Championship Banner

MESA USA Track Only:

- 1st Place-Will also represent Team New Mexico at the Nationals Competition.

- NOTE: A team must accept representing New Mexico at our National Competition to receive the 1st place package. Otherwise, they will forfeit to the next level winner and will receive a different prize package.

At the conclusion of the event, an awards form will be collected from each student electronically that has won an award. It is HIGHLY suggested that students use a non-school email for gift card receipt as many school domains reject outside emails. *Awards will not be issued to any student that does not submit the required award form by the given deadline and awards will not be re-issued due to failure to receive them (by using an email that is incorrect or that does not accept the award).*

IMPORTANT: Awards will not be presented at the live MESA Competition. To ensure accuracy and to accommodate all traveling schools, final scoring will occur upon the conclusion of the event and a live virtual announcement will be done at **4:00 PM on April 30, 2027.**

DISQUALIFICATION: Individual event teams can be disqualified for the following:

- Any team member that is not eligible for NMAA participation
- Any team member not having an A0 on record
- Anyone else completing or helping with task that is not the registered student
- Prohibited advisor, parent, or other “outside” assistance in events
- Lead judge disqualifies an event team for not following event guidelines
- Unauthorized use of cell phones during event(s) to include phone calls, internet, and/or texts
- An event team is found to have violated event guidelines after competition has concluded
- General inappropriate behavior at any time during the competition
- If after the competition is concluded, it is found that any team violated rules or requirements for any event, they may be disqualified from competition and will forfeit any qualification or placement spots they may have earned.

ADDENDUMS AND EVENT RESOURCES: There are several addendums and resources which will be useful in preparing for Competition. All addendums will be available on the NM MESA-MESA Competition Event Website. These include:

- Any Final Logistical Information
- Event Resources and Helpful Preparation Information
- Final MESA USA National Handbook
- MESA Day and USA Frequently Asked Questions (FAQ)
 - Will be changed throughout year as questions arise

It is the responsibility of the school program to periodically check for resources and updates. Before competition date, it is STRONGLY encouraged as the FAQ section will contain any clarifications and/or addendums to the event handbook and these will be followed at competition. The FAQ document is an official MESA Day Document and is the official addendum to this handbook.

TRAVEL LOGISTICS:

Food: Lunch will be provided to competing students and official school advisor(s). Students are NOT to leave the Expo New Mexico (NM) Campus. Expo NM will have adequate vendor set ups that will have general breakfast, snack, and lunch concession items. In addition, outside food is allowed to be brought to the event. There is sizable outdoor and open space to gather.

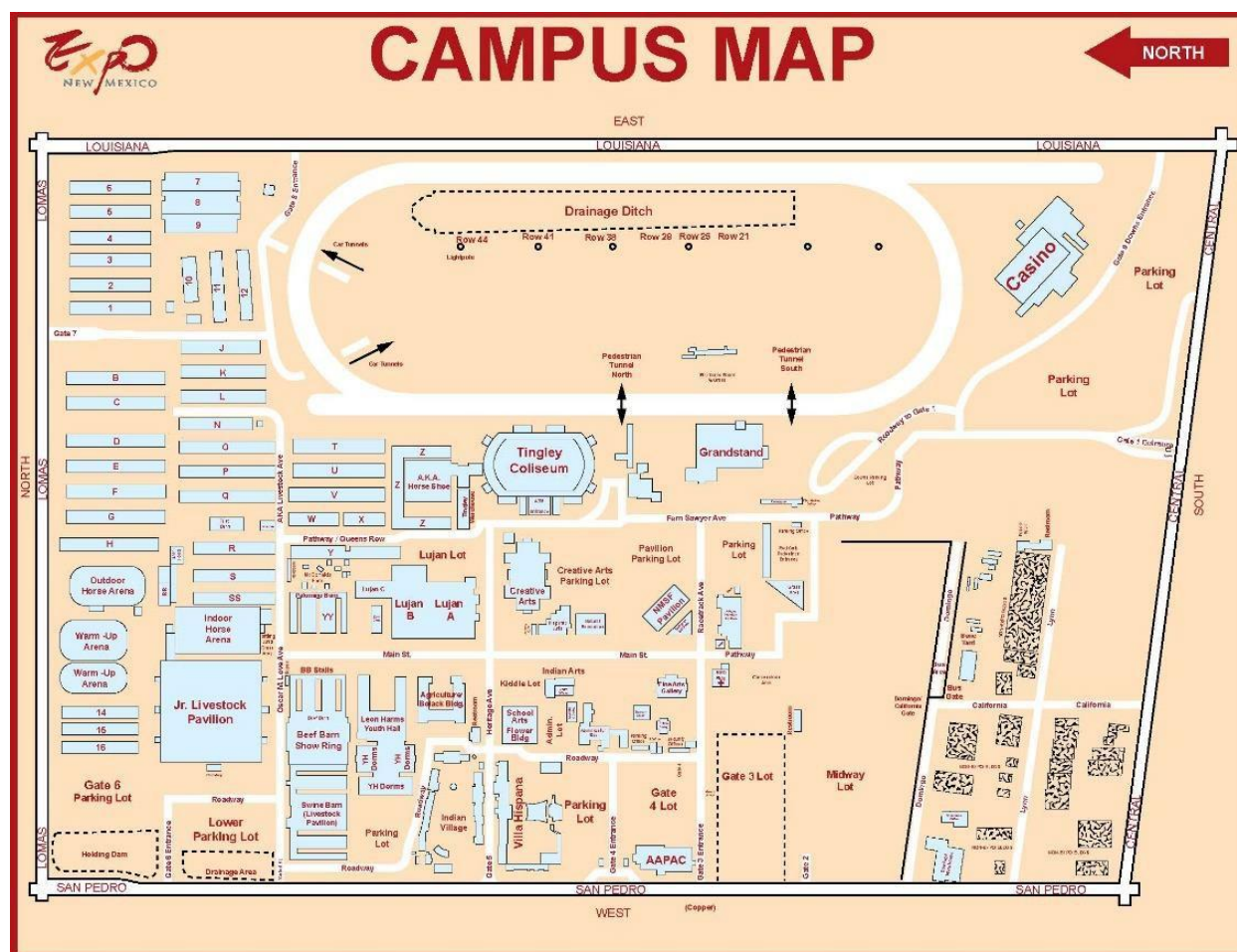
Because of the large campus, there are to be no unattended students. Students are not to be left alone to wander if your group splits and this may require additional supervision. Student teams in violation of this may be disqualified and unable to participate in future NM MESA events.

Lodging: Lodging will not be provided for participants in the MESA Competition Event.

Transportation: Transportation will be provided according to the current NM MESA Transportation Policy and reasonable bus-pooling will be expected with other schools from their district and/or area schools. If a school district has specific requirements that NM MESA is unable to accommodate, they will be responsible for financial assistance with transportation. Smaller vehicles and/or suburban use is recommended for smaller teams.

Parking: Expo NM will have open and available parking for busses and vehicles to accommodate all staff, volunteers, spectators, and school travel.

Closer to the event, final instructions will be provided for bus loading/unloading and vehicle parking. There will be requirements and specific gates used for entry.



Cell Phone usage –Advisors are asked to follow and remind their students about appropriate cell phone protocol. Judges will repeat this cell phone usage reminder at the beginning of each competition and will relay what is allowed and not allowed. Failure to comply may lead to disqualification.

MESA COMPETITION REGISTRATION: This is required for any team wanting to participate. All registration and submittal of materials will be done with a direct link on the MESA Competition Event Page on the NM MESA Website. **ALL REGISTRATION WILL NEED TO BE SUBMITTED ELECTRONICALLY BY MARCH 26, 2027 at 5PM.**

The morning of the event, advisors will be asked to submit any modifications to attendance list during event check in. NM MESA STAFF has the authority to cancel attendance for any team if they do not have completed projects and/or are not prepared to attend the competition up to the date of the event. All projects must be new and original.

Teams cannot continue working on a project started in previous years.

There is not a registration form collected in hard copy, but the following information will be needed to complete on-line registration. (1) Registration will be done per school and will collect all needed information. Regional Coordinators will work with school teams to determine transportation once they are approved to attend. Final transportation requests will be submitted at registration.

Information You Will Need Per School Registration:

- How many teams you are bringing (and eligible for)
- Unique Email Address
- School Name, Level (HS or MS), Region
- Advisor Information and Contact information (phone, email, mailing address)
- Completed NMAA Sanctioned Activity – Verification of Eligibility Form
- Roster of Participating Students – Approved in Accordance with NMAA form
 - Up to (6) Students per Eligible MESA Day Team
 - Up to (4) Students per Eligible MESA USA Team
 - Up to (6) Student Alternates
- Transportation Information (In Lieu of a B4)
 - Vendor Name, Email, Address
 - Amount of Transportation
- Any specific team requests and/or information

MESA Day Track Only:

Team Submittals You Will Need to Upload Per Team in School Registration:

- Prepared Design Inspection Video
 - MUST be submitted in a link that can be viewable

MESA USA Track Only:

Team Submittals You Will Need to Upload Per Team in School Registration:

- Design Proposal Completed Template:
 - MUST be submitted in Portable Document Format (.PDF) as (1) Document.
- Academic Poster
 - MUST be submitted in Portable Document Format (.PDF) as (1) Document.
- Coding:
 - MUST be submitted in Portable Document Format (.PDF) as (1) Document.

Required Team Inspection: March 29, 2027-April 9, 2027

- **MESA USA:** By the Registration Deadline, schools will register for an inspection appointment with the MESA. Projects will be evaluated by the same committee to ensure requirements are met and assess team readiness.
- **MESA Day:** By the Registration Deadline, Each team must submit one continuous video link no longer than 3 minutes. The video is used for rule verification, preliminary inspection, and engineering communication. It does not contribute points but is required for participation. If a team needs further inspection or there are team questions, in person times will be available.

MESA Day Track: Required Video Prompts

- 1. Introduce Your Team:** State the school name, team number, participant names, and division.
- 2. Name and Describe Your Device:** Give the device name and briefly explain how it moves.
- 3. Identify the Propulsion System:** Explain each propulsion system installed on the device, including mechanical systems and the one-battery/one-motor system if used.
- 4. Demonstrate Device Dimensions:** Show the device against a ruler/tape, within a 12 x 12 x 12 measuring space, or another clearly measurable reference.
- 5. Show Device Weight:** Place the complete device on a scale and clearly show the reading.
 - If unable to show a scale, you must weigh independently and state the weight. Understand if it is not in compliance for competition it will be disqualified
- 6. Identify Construction Materials:** Briefly identify the primary materials and purchased individual components.
- 7. Explain One Engineering Challenge:** Describe one problem encountered and how the team changed or improved the design.
- 8. Explain Payload Placement:** Show where medical payloads will be carried and how the design supports or retains them.
- 9. Demonstrate Reset Procedure:** Show how the device is reset or re-energized between missions/runs.
- 10. Describe a Future Improvement:** Explain one improvement the team would make with additional time.



MESA COMPETITION SERIES GENERAL AGENDA
Thursday, April 29, 2027 – Middle and High School
Expo New Mexico – Albuquerque, New Mexico
MESA DAY TRACK

TIME	Description	Location
7:00 AM	MESA Staff Report	<i>Sponsor Building</i>
7:30 AM-9:00 AM	School Check in and Arrival	<i>Lujan Exhibit Hall A</i>
	Prepared Design Drop Off and Banner Inspection	
8:00 AM	Volunteer Judges Report for Event Orientation	<i>Sponsor Building</i>
9:00 AM	Welcome Instructions and Opening Ceremony	<i>Lujan Exhibit Hall A</i>
	Banner Parade of Schools	
	MESA Day High School:	
9:45AM-12:00 PM	Prepared Design Inspection and Performance Judging	<i>Lujan Exhibit Hall A</i>
	Discovery Fair	
9:45 AM-10:45 AM	MESA Day Middle School:	<i>Lujan Exhibit Hall B</i>
	On Site Team Competition-MESA Mayhem	
11:00 AM-12:00 PM	MESA Day Middle School:	<i>Lujan Exhibit Hall C</i>
	On Site Team Competition-Lab Escape	
12:00 PM-12:45 PM	Lunch and Activities	<i>Students-Hall A</i>
	MESA Day Middle School:	<i>Judges-Sponsor</i>
12:45 PM-3:00 PM	Prepared Design Inspection and Performance Judging	<i>Lujan Exhibit Hall A</i>
	Discovery Fair	
12:45 PM-1:45 PM	MESA Day High School:	<i>Lujan Exhibit Hall B</i>
	On Site Team Competition-MESA Mayhem	
2:00 PM-3:00 PM	MESA Day High School:	<i>Lujan Exhibit Hall C</i>
	On Site Team Competition-Lab Escape	
3:00 PM	Event Dismissal	
EVENT LOCATIONS:		
	MESA Day Prepared Design	<i>Lujan Exhibit Hall A</i>
	MESA Day On Site Team Competition-MESA Mayhem	<i>Lujan Exhibit Hall B</i>
	On Site Team Competition-Engineering Financial Freedom	<i>Lujan Exhibit Hall C</i>

Friday, April 30, 2027

4:00 PM	Awards Ceremony: All Participants Log In as Desired	<i>Zoom ID: TBD</i>
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MESA COMPETITION SERIES FINAL AGENDA
Thursday, April 29, 2027 – Middle and High School
Expo New Mexico – Albuquerque, New Mexico
MESA USA TRACK

TIME	Description	Location
7:00 AM	MESA Staff Report	<i>Sponsor Building</i>
7:30 AM-9:00 AM	School Check in and Arrival	<i>Lujan Exhibit Hall A</i>
	MESA USA Drop Off: Prototype, Display, and Presentation	<i>Creative Arts</i>
8:00 AM	MESA USA Judges Report for Event Orientation	<i>Sponsor Building</i>
9:00 AM	Welcome Instructions and Opening Ceremony	<i>Lujan Exhibit Hall A</i>
9:45 AM-10:45 AM	Technical Pitch and Poster – Group 1	<i>See Locations</i>
10:45 AM-11:45 PM	Technical Pitch and Poster – Group 2	<i>See Locations</i>
12:00 PM-12:45 PM	MESA USA Exhibition*	<i>Creative Arts</i>
11:00 AM-2:00 PM	Lunch and Activities	<i>Students-Hall A</i>
12:45 PM-1:00 PM	Technical Pitch and Poster – Group 3	<i>Judges-Sponsor</i>
1:00 PM-2:00 PM	Technical Pitch and Poster – Group 4	<i>See Locations</i>
2:00 PM-3:00 PM	Technical Pitch and Poster – Group 5	<i>See Locations</i>
3:00 PM	Event Dismissal (or when done with events)	<i>See Locations</i>

Event Locations

MESA USA Middle School Technical Pitch	<i>Creative Arts - 1</i>
MESA USA High School Technical Pitch	<i>Creative Arts - 2</i>
MESA USA Symposium and Academic Poster	<i>Creative Arts</i>

Friday, April 30, 2027

4:00 PM	Awards Ceremony: All Participants Log In as Desired	<i>Zoom ID:</i>
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MESA Day Track Information:

For On Site Events: Additional information for all on-site challenges will NOT be provided in advance, beyond what is below.

For Prepared Design: Teams will be inspected at the registration deadline and will need to bring their project the day of competition.

On Site Team Competition (All Team)

MESA Mayhem

Think fast. Move smart. Work together. Embrace the mayhem! MESA Mayhem is a high-energy team challenge designed to test students' creativity, communication, problem-solving, coordination, and STEAM skills. Teams will tackle a series of challenges that encourage physical activity, decision-making, emotional well-being, teamwork, and resilience. From creative challenges to tests of dexterity, communication, and critical thinking, teams will use healthy habits to perform at their best. Stay focused, support your teammates, and rise to the challenge as you compete for MESA Mayhem glory!

On Site Team Competition (All Team)

Lab Breakout: A MESA Escape Room Challenge

The MESA Innovation Lab has just been sealed by its own security system, and only sharp mathematical thinking can get everyone out. Teams race the clock through algebra, geometry, logic, and pattern-based puzzle stations, uncovering pieces of a secret override code hidden throughout the room. Teamwork, clear communication, and creative problem-solving under pressure count just as much as getting the math right. Middle school and high school teams each face a track built for their grade level, so everyone gets a fair shot at cracking the code before time runs out. Do you have what it takes to escape?

Optional Event (All Team)

School Banner

Attending teams will be allowed and encouraged to bring a banner to represent their school and its participation in MESA Day. While this is encouraged to show team spirit, it is not a requirement, and it will have no effect on team participation scores for the day. The school banner can be either handmade or professionally produced. One banner per school will be allowed. If there are multiple teams, they will all use the same banner for their school. Banners will be included in school roll call during opening ceremonies and will be hung in a visible location at the venue for all participants to celebrate. Additional Guidelines are below.

- 1.) No glitter or messy materials may be used, and banners must not damage the facility.
- 2.) Maximum Size Limit of 3 ft x 4 ft
- 3.) Hanging putty and command strips/hooks will be available, but if additional hanging materials are needed please bring (string, tape, etc.)
- 4.) Banner content is limited to school information (name, logo, mascot, team names, etc.) and STEM related content, New Mexico themes, and/or community related information (mountain range, city information, etc.).
- 5.) No profane, vulgar, political content allowed. NM MESA retains the right to determine appropriate content.
- 6.) Teams will be responsible for picking banner up at the end of the day.

Prepared Design Challenge (All Team)

Medical Transport Challenge

Many communities throughout New Mexico face long travel distances, mountainous or rural access roads, and limited access to emergency medical resources. Teams will address this real-world problem by creating a mechanical transport device that can:

- deliver fragile emergency supplies quickly and safely;
- transport the greatest quantity of standardized Medical Supply Units;
- navigate a standardized Rural Access Road to complete a delivery to a remote clinic.

Overview:

The Medical Transport Challenge is a prepared design engineering competition in which students design, build, test, and optimize one transport device capable of completing three medical logistics missions. The same device is used throughout the competition and may incorporate approved mechanical propulsion systems and, under the hybrid rules, one battery-powered motor.

Device Requirements:

Size and Weight

1. Maximum dimensions: 12 in x 12 in x 12 in at inspection.
2. Current maximum weight: 5 lb.
3. The device should be safely portable by one team member.

Construction

1. The device must be primarily student-built from scratch materials.
2. Individual commercially available components may be purchased (for example: wheels, axles, bearings, springs, fasteners, or other parts).
3. Teams may not purchase and assemble a complete vehicle kit as their competition device.
4. 3D-printed or custom-fabricated individual components are permitted.

Approved Propulsion Systems

The device may use approved mechanical propulsion systems. Teams may use one or more approved propulsion systems in the same device. A device that contains more than one approved propulsion method is considered a hybrid vehicle. Hybrid vehicles may include approved mechanical systems and one battery-powered electric motor. Only one propulsion method may actively power the device during each official mission run. No Arduino, programmable controller, remote control, or other electronically controlled propulsion is permitted.

Approved Examples

- rubber bands or wound elastic cord
- springs or torsion systems
- mousetrap mechanisms
- wound string
- gravity
- flywheels
- balloon propulsion or other approved stored mechanical energy systems
- one electric motor powered by one AA battery
 - a. Maximum Power Output: Mini Electric Hobby Motor 3V -12V 25000 RPM

Hybrid Vehicle Limits

1. All propulsion equipment used for a mission must be installed on or contained within the device before release.
2. No external energy or assistance may be added after the run begins.
3. If electric propulsion is used, the device is limited to one battery and one motor.
4. No team member may push, pull, guide, tow, launch, or otherwise assist the device after release.
5. Only one propulsion method may actively power the vehicle during a mission run. Teams may select a different installed propulsion method for different missions. Hybrid vehicles receive no scoring advantage and are evaluated under the same performance rules as all other devices.

Prohibited Energy Sources and Systems

1. more than one battery or more than one electric motor; Arduino, programmable controllers, microcontrollers, remote-control systems, or other electronic control systems
2. combustion or chemical reactions
3. compressed gas or CO2 cartridges
4. pyrotechnics
5. external launchers, towing systems, winches, or outside energy applied after release

Hazardous materials may not be used in the construction or operation of the device. Teams should consider travel constraints when building their devices to be able to transport as needed.

Impound and Event Day-Inspection:

All devices must pass inspection before official competition runs. Inspection is intended to be quick, objective, and consistent.

1. fits within 12 x 12 x 12 in maximum dimensions
2. weighs 5 lb or less
3. uses only approved propulsion systems and, if electric propulsion is present, no more than one battery and one motor
4. contains no prohibited energy source, programmable/electronic control system, or remote control
5. complies with scratch-build / no complete-kit rule
6. required video submission status is verified

Event Procedure:

Teams will be called up in groups to perform all three missions. Once called:

1. Team will have a minimum of 5 minutes to prepare device for 1st mission.
2. Each team will report to their 1st mission test and teams will be allowed 2 runs per mission.
3. Teams must be in ready position when called by the judge. If not, the run will be declared a mistrial.
4. Judge will signal teams to ready their device (place at the start line) and then will indicate when to GO.
5. Upon completion of 1st run, each team will ready their device for the 2nd run.
6. Upon completion of the 2nd run, the team will then move to their next assigned mission and repeat the process.
7. Teams will have 1 minute to ready their device between runs and missions.
8. Once teams have completed all runs for all missions they will exit the testing area. The order of missions will be random.

Mission 1 – Emergency Delivery Run

Deliver fragile emergency medical supplies across a 12-foot course as quickly and safely as possible.

Course length	12 ft
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Lane width	36 in
Surface	Waxed concrete at Expo
Payload	3 ping pong balls representing fragile medical supplies
Primary measurement	Adjusted completion time; distance recorded for incomplete runs
Time Score	25 points Maximum The fastest device receives 25 points, and every other device receives points proportional to how close its time is to the fastest. Each team that completes the course will receive a minimum of 10 points for time
Time Score Formula	$\text{Score} = \max\left(10, 25 \times \frac{\text{Fastest Time}}{\text{Device Time}}\right)$
Payload Score	25 points Maximum 10 points for Mission participation (some movement on the course) 5 points per ping pong ball that completes the course

Mission 1 Rules

1. Timing begins when the front edge of the device is released.
2. Timing ends when the defined front edge of the device crosses the finish line.
3. If the device does not complete the course, only mission participation points will be awarded.
4. A run will end after 3 seconds without measurable forward progress or if all ping balls are dropped.
5. No touching or redirecting is allowed after release.
6. The run ends if the entire device leaves the 36-inch lane.

Mission 2 - Supply Transport Challenge

Deliver the greatest quantity of standardized Medical Supply Units across a 12-foot course to a rural medical distribution point.

Course length	12 ft
Lane width	36 in
Surface	Waxed concrete at Expo
Payload	Standardized classroom hexagon weights (g) supplied by judges and treated as Medical Supply Units
Payload Link	Learning Resources Hexagon Weights: https://a.co/d/00GoBFJ7
Primary measurement	Medical Supply Units delivered; distance recorded for incomplete runs
Time Score	15 points Maximum The fastest device receives 15 points, and every other device receives points proportional to how close its time is to the fastest. Each team that completes the course will receive a minimum of 5 points for time
Time Score Formula	$\text{Score} = \max\left(5, 15 \times \frac{\text{Fastest Time}}{\text{Device Time}}\right)$
Payload Score	35 points Maximum <50g = 0 points; 50g-74g = 10 points; 75g-99g = 12.5 points; 100g-149g = 15 points; 150g-199g = 20 points; 200g-249g = 25 points; 250g-299g = 30 points; 300g (all weights in kit) = 35 points

Mission 2 Rules

1. Timing begins when the front edge of the device is released.
2. Timing ends when the defined front edge of the device crosses the finish line.
3. If the device does not complete the course, no mission points will be awarded.
4. A run will end after 3 seconds without measurable forward progress or if all weight is dropped.
5. No touching or redirecting is allowed after release.
6. The run ends if the entire device leaves the 36-inch lane.

7. Teams choose the quantity of Medical Supply Units they wish to attempt.
8. Only weight crossing the finish line counts, not attempted weight.

Mission 3 - Rural Clinic Delivery Challenge

Deliver a standardized medical supply payload to a remote rural health clinic by successfully navigating the Official NM MESA Rural Access Road. This mission represents steep or difficult access routes that can affect delivery of essential supplies to rural and mountainous New Mexico communities. The engineering focus is traction, climbing ability, stability, cargo retention, and energy management.

Designated product	VEVOR 2-pack automotive service / oil-change ramps (ASIN B0FTZWYW5Y)
Product link	Amazon - designated Rural Access Ramp
Material	Impact-resistant polypropylene (PP)
Listed incline	17 degrees (per event planning product description). Ramp has 22 built in notches that will be used for marking.
Listed lift	6.7 in (per event planning product description)
Surface	Honeycomb / grooved traction surface
Storage	Lightweight, portable, stackable
Competition use	NM MESA supplies official ramp; teams do not bring their own
Official approach	2 ft before the base of the Rural Access Road (ramp edge)
Challenge Score	50 points Maximum 10 participation points for reaching Notch 1, then an even increase through Notch 22, with a 5 point completion bonus for reaching the end.
Challenge Formula	For Notches 1–22: $\text{Score} = 10 + 35 \times \frac{\text{Notches Reached} - 1}{21}$ END = 50 points.

Mission 3 Rules

1. A run will end after 3 seconds without measurable forward progress.
2. No touching or redirecting is allowed after release.
3. The run ends if the entire device does not reach Notch 1 or leaves the ramp.
4. Teams choose the quantity of Medical Supply Units they wish to attempt.
5. The device begins 2 ft before the standardized Rural Access Road on the competition surface, providing a fixed approach before entering the ramp.
6. Device contact with the ramp sidewalls is permitted.

Scoring Summary: Final team rankings will be based on the total score, which is derived by adding all of the component scores.

Mission	Engineering Goal	Maximum Points
Mission 1 - Emergency Delivery Run	Speed + fragile payload stability	50
Mission 2 - Supply Transport Challenge	Cargo capacity + optimization	50
Mission 3 - Rural Clinic Delivery Challenge	Traction + climbing + propulsion choice	50

Total Points: 150 points

DEVICE PERFORMANCE CHALLENGE – JUDGE SCORESHEET

School + Team #:

Division:

MISSION 1 – TIMED RUN + PING PONG BALLS

Record completion time and number of ping pong balls finished with (0–3). Each run may receive 10 participation points.

Run	Mistrial	Did Not Complete	Time (sec)	Ping Pong Balls Finished (0–3)	Participation Points (0 or 10)	Student Initials
Run 1						
Run 2						

MISSION 2 – TIMED RUN + PAYLOAD

Record completion time and payload finished with (50–300 g). Payload below 50 g does not qualify; 300 g earns full payload points.

Run	Mistrial	Did Not Complete	Time (sec)	Payload Attempted (g)	Payload Finished (g)	Student Initials
Run 1						
Run 2						

MISSION 3 – RAMP CLIMB

Record the highest notch completed (1–22). Select END if the device completes the ramp. Mark Did Not Reach Notch 1 when applicable.

Run	Mistrial	Did Not Complete	Highest Notch / END	Completion to Top	Student Initials
Run 1					
Run 2					

JUDGE:

JUDGE COMMENTS

MESA USA Track Information:

INTRODUCTION:

MESA USA understands that our young engineering students think deeply about the world and are genuinely interested in helping their communities. The National Engineering Design Competition asks students to identify areas of need in their neighborhood and engineer a solution that will positively affect members of the neighborhood most affected.

Your neighborhood is the space where you live and interact with on a daily basis. It does not live in a vacuum, and these changes can affect a wider area. A starting point is looking at the needs of those around you.

COMPETITION OVERVIEW

Each competing team must consist of 2-4 students who are active members of a MESA program affiliated with the MESA USA national organization. The first-place middle and high school teams from State events will participate in the National Competition. This National Competition event will occur in June 2027 in Maryland.

SCORING CATEGORIES

Scoring Area	Total Points Across Competition	What It Measures
Written Communication (W)	62	How effectively students write about their user, needs, project, research, results, etc.
Oral Communication (O/C)	78	How effectively students explain, present, discuss, and defend their project verbally.
Human Centered Engineering (HE)	68	How meaningfully the user is incorporated throughout the design process and how user input influences decisions.
Technical Knowledge (TK)	76	Technical understanding of the prototype: design, functionality, materials, coding, testing, engineering processes, hardware/software, etc.

NEW MEXICO COMPETITION SPECIFIC INFORMATION:

New Mexico MESA will conduct its competition in accordance with all National MESA USA event rules and scoring. Please see the official MESA USA 2026-2027 National MESA USA Handbook for event specifics. Below are additional logistical differences for the New Mexico competition. All other national requirements, rubrics, and rules apply.

Design Proposal, Academic Poster, and Coding:

Teams are required to submit these items in advance for grading by the registration deadline of March 26, 2027 at 5PM.

Format:

- Teams must use the Design Proposal Template and submit as a PDF.
- A poster template is recommended and available.
- When completed, teams must save each document as a PDF and submit the PDF for competition.
- Any documents not submitted as a PDF will not be graded.

Technical Pitch

The technical pitch will be open to the public during the New Mexico competition.

Materials Provided:

- A table for display and/or demonstration and electricity will be available for the Technical Pitch.
- Wireless internet may be available but is not guaranteed.

COMPETITION DETAILS:

Full details are available in the official MESA USA NEDC Handbook but below is a summary of competition components.

Component	What Students Do	Main Scoring Areas
1. Design Proposal	Written proposal completed before building	Written Communication + Human Centered Engineering
2. Academic Poster	Professional research/engineering poster documenting the completed project	Written Communication + Technical Knowledge + Human Centered Engineering
3. Technical Pitch	10-minute formal presentation/demonstration	Oral Communication + Human Centered Engineering + Technical Knowledge
4. Poster Symposium	3-minute verbal abstract + judge discussion/Q&A using STAR	Oral Communication + Technical Knowledge + Human Centered Engineering
5. Coding	Functional coding component incorporated into prototype	Technical Knowledge + Written Communication



New Mexico Activities Association

NMAA Sanctioned Activity – VERIFICATION OF ELIGIBILITY

This form, attached to a roster of participating students, must be signed by a school administrator and submitted to the Activity Liaison (also referred to as the state advisor) prior to the state competition.

This form verifies the minimum requirements set forth by the NMAA. Individual schools and/or activities may enforce stricter eligibility requirements (NMAA 6.1.4 D). Schools allowing an ineligible student to participate will forfeit any contests/activities that student(s) participated in (NMAA 6.10.1).

School Information

School:			
Activity:			
Sponsor/Coach Name:			
Cell Phone Number:			
Email Address:			
Name of Event Attending:			
☐ Regular Season	☐ Tournament	☐ State Competition	☐ Non-Competitive
Event Start Date:	Event End Date:		
Location of Event:			

Administrative Verification

By signing below, I verify that the students attached are academically eligible according to NMAA Rule 8.1.1:

Name	Title
Signature	Date

8.1.1 Interscholastic Eligibility: Scholastic Requirements

A. Academic Eligibility

1. A Student shall have a 2.0 grade point average with no F's, based on a 4.0 grading scale, or its equivalent, for the semester grading period immediately preceding participation. For students not eligible at the semester, the next six or nine week grading period can be used to regain eligibility. Grades earned during a summer session must be placed on a student's transcript by the school registrar prior to the first day of the Fall semester in order for the course to be utilized for eligibility purposes.
 - a. All class work counted for eligibility must be acceptable for graduation.
 - b. The GPA is based on a 4.0 scale with an allowance for consideration of honors points.
 - c. Cumulative provision
 1. A student who is ineligible at the end of a semester may utilize the cumulative provision.
 2. Only semester grades can be used, and all semester grades starting with the 9th grade year must be utilized. (As cumulative grades start with the 9th grade year, the cumulative provision cannot be used for middle school/junior high Students.)
 3. The cumulative provision may not be applied if a Student has more than one "F" in the semester grading period immediately preceding participation.
 4. A student must have passed a minimum of 51% of coursework taken by a full-time student in the semester grading period immediately preceding participation to take advantage of the cumulative provision option.
 - d. Stricter guidelines may be imposed by the school/district.
2. A Student must be enrolled in at least 51% of the member school's regular class schedule in courses that will be counted towards his/her graduation and in regular attendance during the current as well as the previous semester.
3. Pursuant to State Statute 22-12-2.1.: Interscholastic extracurricular activities; student participation:
 - a. No student shall be absent from school for school-sponsored interscholastic extracurricular activities in excess of fifteen days per semester, and no class may be missed in excess of fifteen times per semester. Participation in state and national competitions is exempt.