

- LEVEL:** Middle School/High School
- NUMBER OF TEAMS:** One (1) team per school can participate at the MESA Day state competition. Up to three (3) teams can participate at MESA Regionals, if applicable.
- TEAM MEMBERS:** Three (3) to Six (6) members per team.
- OBJECTIVE:** Teams will demonstrate teamwork and creative problem solving skills by working collaboratively to design, construct and test a given objective/device within a specific period of time.

CAREER BACKGROUND:

Engineering has been called the “invisible” or “stealth” profession. Everything around you and that you use every day has been engineered in some way yet you may not see the engineers behind the scenes or know much about engineering.

Both math and science are key tools that engineers use to invent, design, and build things that matter. Effective engineers are team players with independent minds who ask questions like, “How can we develop a better recycling system to protect the environment?” or “How can we design a school that can withstand an earthquake?” By designing creative and practical solutions, engineers are changing the world all the time.

- Text adapted from <http://www.discoverengineering.org/>

- PARAMETERS:** Provided the day of the competition
- MATERIALS:** Provided on-site
- SCORING:** On competition day, judges will review design parameters with the student teams, distribute materials and monitor the progress of each team.
- TESTING CONDITIONS:** This event will run the full course of the competition time at MESA Day. All participating students will be sequestered for all hours of the MESA testing period and, therefore, will be unable to be present at other competitions during MESA Day.
- Introduction and Review.* Judges will have approximately 15 – 30 minutes to review design parameters with all teams.
- Design Process.* Once the review is complete, judges will specify the amount of time that will be allocated for teams to engineer their best design prototypes (e.g. 2 hours).
- Specification Check.* Teams will present their entries to the judges who will determine each design’s eligibility.
- Judges’ Evaluation of Design Performance and Process.* Each team will then test their designs based on pre-determined rules as set forth by the judges. Teams may also be asked to respond to a series of questions which aim to assess the quality of each team’s overall design process and the reasoning behind each major design choice.
- Teams not adhering to rules will be subject to immediate disqualification. **Arbitration will not be allowed and judges’ decisions are final.**

School: _____

Student Names: _____

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Specification Check:

Pass Fail

a. Specification Check Notes:

Design Performance Testing:

a. Design details/notes:

b. Design Performance Score: _____

Design Process Testing:

a. Design details/notes

b. Design Process Score: _____

TOTAL TEAM SCORE: _____ (design performance + design process)

Lead Judge Signature: _____

Student Signature: _____

Comments:

**Design Process Reflection
Brief Sample Questionnaire***

School: _____

Student Names: _____

Please answer the following questions as a team. Make sure to write legibly. Illegible answers will receive a score of zero. Response will be scored using the following scale:

0 – No Response attempted or illegible, 1 – Attempted, 2 – Adequate, 3 – Thorough Response

1. In your own words, define today's design problem.
2. What prior knowledge did your team draw from to assist you in creating your design?
3. What design element(s) or variables were the most important to focus on?
4. What design elements or variables did you not focus on and why?
5. What were your design's top three strengths – and shortcomings?
6. How did each team member contribute significantly to your design process?
7. How did your team address any differences that you had in your design ideas?
8. After your first design, how many major modifications did you make? Why did you make them?

* The questions above reflect the kinds of questions judges may ask at MESA Day. While other design questions may be posed, all questions will focus on the quality of your design process.