

MESA THINK TANK

LEVEL:	Grades 9-12
TYPE OF CONTEST:	Team
COMPOSITION OF TEAM:	2-3 Students per team peer level; Levels: 9 th -10 th ; 11 th -12 th
NUMBER OF TEAMS:	Preliminary – Determined by your MESA Center Regional – 3 for 9 th /10 th and 3 for 11 th /12 th
SPONSOR:	Beatrice Prieto, Director, Fresno MESA Center

OVERVIEW: Have you ever wanted to pitch a MESA Competition to MESA staff/judges? Here is your chance! We are looking for a team that has an innovative STEM Competition that can be piloted in the next MESA Day Competition: **Participation logistics, limits, and competition facilities may vary by host site. Advisors and students are responsible for verifying this information with their center director.**

MATERIALS: The Host Center will provide the following:

- Projector
- Table
- Easel

The student presenter will provide the following:

- Prototype of project competition
- Laptop if needed
- Visual Aid
- Written rules for their competition (3hard copies, one for each judge)
- Hard copy of the itemized budget sheet with proper receipts and documentation.

GENERAL RULES:

1. Project competition must be safe to participants, judges, and audience. If project competition or prototype is deemed unsafe by the judges, team may not proceed with presentation and will be scored up to that point.
2. **Must** be a STEM related or a NAE Grand Challenge competition.
 - a. NAE Challenges can be found at <http://www.engineeringchallenges.org/>
3. **Must** be original work of team. Commercial models/kits may not be used as a competition.
4. Prototype of project competition should be completely built and ready.
5. **Must** be ready to demonstrate how project competition works at presentation.
6. Project competition Prototype cannot exceed 50cm x 50cm x 50cm
7. Project competition prototype cannot exceed more than \$10.00.
 - a. Teams **MUST** include a completed itemized budget sheet of their prototype with their rules. Teams should have proper documentation to support each and every price listed in-case of discrepancies; documentation can be a store receipt or print out of on-line retail prices.

- b. The budget **must** include a list of each and every part and/or material of the prototype and its corresponding unit dimensions, retail price, price per unit, quantity used, total cost and retail source.
 - c. All parts received through barter, trade, donation, recycling, etc. **must** be included in the itemized budget. Retail prices for these items must be researched and documented.
 - d. Receipts or documents must be submitted with Itemized budget sheet.
8. Rules for competition must be written (Computer generated) and include: overview of competition, list of materials, general rules, and three applied mathematics principles related to project and judging guideline. Hard copy of rules must be provided to judges (3 copies in total one for each judge)
 9. Rules for competition **must** include 3 applied mathematics principles.

PRESENTATION GUIDELINES:

1. Must include introduction
2. State which STEM field or NAE Grand challenge was applied (only if it applies)
3. Must have actual prototype of the competition
4. Must provide a visual aid (could be power-point, a handout or poster board, etc.)
 - a. Visual aid must include the steps of the engineering design process to achieving your competition.
5. Demonstrate how your competition will be judged.

JUDGING:

1. Judges will assemble all competing teams of students in the assigned room, read the rules, explain procedures, clarify judges' scoring criteria, and answer any related questions.
2. Judges will determine team order by random drawing and will post the team order prior to the start of competition.
3. Once a team is called the team must give a maximum of three-minute pitch presentation. A one-minute follow-up of questions will be given by judges.
4. Students will be given two minutes to setup before presentation
5. Students must give each judge (Maximum of three judges) a copy of your written rules.
6. Students must give each judge (Maximum of three judges) a copy of your itemized Budget Sheet.
7. Only judges, appointed staff and competing teams will be allowed in the room.
8. Judges will provide time signals for students at these intervals: One (1) minute, Thirty (30) seconds, and Five (5) seconds.

AWARDS:

- Medals will be awarded per grade level: 9th/10th (1st, 2nd, 3rd) and 11th/12th (1st, 2nd, 3rd)

ATTACHMENTS/APPENDIX:

9th-12th grade Presentation Rubric
Rules of Sample
Itemized Budget Sheet

MESA Tank Rubric

Student Names: _____

School: _____

MESA Center: _____

Excellent = 5 *Good = 4* *Average = 3* *Fair = 2* *Poor = 1*

Part I: Presentation

Rate the presentation on each point:

1. Introduction gained attention and interest	3	2	1	0
2. STEM or NAE Grand Challenge clearly stated	3	2	1	0
3. Prototype of project competition demonstrated	5	4	3	2
4. Clearly explained the process of how competition will be judged	5	4	3	2

TOTAL POINTS _____

Part II: Visual Aid

Rate the visual aid on each point

1. Visual aid is easy to follow and read	5	4	3	2	1	0
2. Overall Engineering Design Process is clearly outlined	5	4	3	2	1	0
a. Goal is clearly stated	3	2	1	0		
b. Brainstorm and research clearly stated	3	2	1	0		
c. Diagrams, sketches of prototype included	3	2	1	0		
d. Where steps clearly stated of how they tested project competition	3	2	1	0		
e. Are improvements and changes included	3	2	1	0		

TOTAL POINTS _____

Part II: Competition Rules

Rate the rules on each point

1. List of Materials is included	5	4	3	2	1	0
2. General Rules are clearly stated	5	4	3	2	1	0
3. Judging guidelines are clearly stated	5	4	3	2	1	0
4. Three applied mathematics principles are included in the rules	5	4	3	2	1	0
5. Rules are written in the correct format	5	4	3	2	1	0
6. Itemized budget sheet is complete and accurate	5	4	3	2	1	0
7. Receipts/proper documentation is attached to budget sheet	5	4	3	2	1	0

TOTAL POINTS _____

Label Penalty _____

Deduct 10 points if demo and rules are not clearly labeled with student names, grade, school and MESA Center

GRAND TOTAL _____

Maximum Points is 55



MESA TANK RULES FORMAT SAMPLE

Name of Competition

Student Names: _____ Grade: _____ SCHOOL: _____
 _____ Grade: _____ CENTER: _____
 _____ Grade: _____

OVERVIEW:

This section is designed to give a *brief* overview of the contest. It's encouraged to use technical language, such as *design, construct, build, etc.* This should be no more than 2-3 sentences at most.

MATERIALS:

List all legal/illegal materials here as necessary. This should be in bullet form and with as much specific details as possible.

- i.e. Large, fresh, raw, white, chicken eggs
- i.e. "Victor" brand standard-size mousetrap

GENERAL RULES:

- 1) Rule #1
- 2) Rule #2
- 3) Rule #3
- 4) As many rules as necessary

Note: The rules in this section should primarily pertain to the construction of the device, model, etc. as well as the rules for academic components such as **applied mathematics principle**.

JUDGING:

- 1) Rule #1
- 2) Rule #2
- 3) Rule #3
- 4) As many rules as necessary

Note: The rules in this section should primarily pertain to judging and event procedures, as well as explanation and samples of any scoring formulas that will be used.

AWARDS:

- Define what places will be awarded
- If there are multiple categories (i.e. Distance, Creativity), define which category advances to regional competition.

ATTACHMENTS/APPENDIX:

- Name of Attachment #1
- Name of Attachment #2

This section is for additional documents or appendix items that aren't necessarily rules, but provide further details that may add clarity to the rules.

Examples are:

- Diagrams/pictures of what a legal joint is versus an illegal one
- Track/contest area specifications
- Scoring Rubric
- Specification Checklist Guide: **Note-** If you include this, please add a statement that defines this list as simply a guide for students, and not an official judging document.

If you do not have any additional Attachments, simply omit this section altogether.

MESA Tank Itemized Budget Sheet Sample

School: _____

Center: _____

Student Name: _____ Grade: _____

Student Name: _____ Grade: _____

Student Name: _____ Grade: _____

Part	Unit Dimension	Retail Price	Price per Unit	Quantity Used	Total Cost	Retail Source
TOTAL COST						