

MESA Think Tank

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|-----------------------------|---|
| LEVEL: | Grades 9/10 and 11/12 |
| TYPE OF CONTEST: | Team |
| COMPOSITION OF TEAM: | 2-3 Students per team |
| NUMBER OF TEAMS: | Preliminary – Determined by your MESA Center Regional – 1 for 9 th /10 th and 1 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 (3 hard 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 teams. 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 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 pure math concepts and 3 applied math problems.

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 two-minute pitch presentation. A 30 second follow-up of questions will be given by judges.
4. Students will be given one minute 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 Think Tank (High School) Inspection and Scoring Sheet

Student Names: _____

School: _____

MESA Center: _____

Section below to be completed by Judges

| Inspection List: | Yes | No |
|--|------------|-----------|
| 3 sets of rules are provided along with the project prototype | _____ | _____ |
| Project prototype is safe for judges and competitors | _____ | _____ |
| Project prototype is STEM or a NAE Grand Challenge | _____ | _____ |
| Project prototype is original work and NOT a commercial model or kit | _____ | _____ |
| All parts of project prototype fit in 50cm x 50cm x50cm area | _____ | _____ |
| Project prototype does NOT exceed the \$10 pre-tax limit | _____ | _____ |

Part I: Competition Rules *(Rate the rules on each point)*

| | | | | | | |
|--|---|---|---|---|---|---|
| 1. Overview of Competition is clearly stated | 5 | 4 | 3 | 2 | 1 | 0 |
| 2. List of Materials is included | 5 | 4 | 3 | 2 | 1 | 0 |
| 3. General Rules are clearly stated | 5 | 4 | 3 | 2 | 1 | 0 |
| 4. Judging guidelines are clearly stated | 5 | 4 | 3 | 2 | 1 | 0 |
| 5. 2 Math Concepts are included | 5 | 4 | 3 | 2 | 1 | 0 |
| 6. 2 applied math problems are included | 5 | 4 | 3 | 2 | 1 | 0 |
| 7. Rules are easy to understand and follow | 5 | 4 | 3 | 2 | 1 | 0 |

TOTAL POINTS _____

Part II: Itemized Budget Sheet *(Rate sheet on each point)*

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|--|----|---|
| 1. Calculations on Itemized budget sheet are ALL correct | 10 | 0 |
| 2. ALL materials are included in budget sheet and have proper documentation | 10 | 0 |

TOTAL POINTS _____

Part III: Presentation (*Rate the presentation on each point*)

| | | | | | | |
|--|---|---|---|---|---|---|
| 1. Introduction gained attention and interest | | | | 2 | 1 | 0 |
| 2. Prototype of project competition demonstrated | 4 | 3 | 2 | 1 | 0 | |
| 3. Clearly explained the process of how competition will be judged | 4 | 3 | 2 | 1 | 0 | |

TOTAL POINTS _____

Part IV: Visual Aid (*Rate the visual aid on each point*)

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|--|---|---|---|---|---|---|
| 1. Visual aid is easy to follow and read | 5 | 4 | 3 | 2 | 1 | 0 |
| 2. Overall Engineering Design Process is clearly outlined: | | | | | | |
| a. Goal is clearly stated | | | | 2 | 1 | 0 |
| b. Brainstorm and research clearly stated | | | | 2 | 1 | 0 |
| c. Diagrams, sketches of prototype included | | | | 2 | 1 | 0 |
| d. Steps of how project completion was tested are clearly stated | | | | 2 | 1 | 0 |
| e. Improvements and changes are included | | | | 2 | 1 | 0 |

TOTAL POINTS _____

TOTAL POINTS FROM PARTS I-IV: _____

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 80

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 |
|-------------------|----------------|--------------|----------------|---------------|------------|---------------|
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| TOTAL COST | | | | | | |

