

DESIGNER OF THE DAY

- LEVEL:** Middle School/High School
- NUMBER OF TEAMS:** One (1) team per school can participate at the MESA Day state competition.
Three (3) teams can participate at MESA regional events.
- TEAM MEMBERS:** Two (2) to Four (4) Students per Team
- OBJECTIVE:** Using only recycled and re-purposed materials design clothing that can adjust to varying climates, including but not limited to, hot, cold, dry and wet conditions.
- Additionally, students create a 3-5 minute presentation highlighting the design features of their clothing and how their research and testing influenced the selection and evolution of these features.
- Students will also be required to submit their Engineering Design Notebooks during specification check for review and scoring.
- MATERIALS:** Materials must be recycled and re-purposed. Hazardous materials are not allowed.

BACK STORY:

You have survived an apocalypse and have established a basecamp in the mountains near a ruined desert metropolis. You depend on scavenging from the ruins of the city and your favorite scavenging site was formerly a large university. To ensure you can maximize the efficiency of your trip you cannot take much with you, in fact you only have the clothes on your back when you leave.

DESIGN PARAMETERS:

1. Designs will include one or more of the following:
 - a. head covering
 - b. upper body/torso piece
 - c. lower body piece
 - d. shoes and/or socks
2. Clothing must be constructed entirely from recycled and re-purposed materials.
 - a. Materials cannot be new, previously unused materials. They can be purchased from second-hand stores.
 - b. Materials cannot be used for the purpose for which they were designed. I.E. pants cannot be used to construct pants.
3. Clothing must be designed to be adjustable for; comfort in at least the following conditions (additional points are awarded if designs take into account additional climates).
 - a. Hot conditions
 - b. Cold conditions
 - c. Wet conditions
 - d. Dry conditions
4. Clothing will be designed to be:
 - a. Easily put on
 - b. Quickly adjustable for climate changes
 - c. Durable and repairable
 - d. Aesthetically Functional– quality of finished design and aesthetic appeal/functionality
5. Teams will prepare a 3-5 minute presentation highlighting the design features of their clothing and

how their research and testing influenced the selection and evolution of these features. The presentation shall include:

- a. Introduction of team members and their role on the team.
- b. Clear restatement of the objective of the challenge and design parameters
- c. Clear explanation of research that informed at least two of the design choices.
- d. Clear explanation of how design and testing informed at least four design choices
- e. Clear explanation of creative design innovations based on assessment of wearer's needs.

SPECIFICATION CHECK:

1. Immediately upon submission for competition, designs will receive a specification check to determine whether it conforms to dimensions, materials, and construction rules. Any design which fails the specification check will be given a performance score of zero. Designs may not be modified for competition.
2. Designs must be ready for presentation prior to inspection. If designs are disqualified during inspection check, design changes will not be allowed. Only designs passing inspection will be allowed to participate in the presentation.
3. During specification check, teams will check in to the competition area and submit designed clothing items and Engineering Design notebook for impounding.
 - a. Essential components or scored components of the Engineering Design Notebook will be listed and included in a rubric on the reverse side of the score sheet.

TESTING PARAMETERS:

1. At least two team members are required to be present during the presentation.
2. Teams should arrive at least 10 minutes before their presentation time to retrieve their designs from impound and prepare for their presentation. Designs must be worn during the presentation.
3. When the judges are ready, they will ask the teams to begin.
4. When the presentation begins the judges will start the timer and notify students when there is 1 minute remaining and 30 seconds remaining.
5. Teams that go beyond the 5 minute will receive a 5 point deduction.
6. Judges will have the option of asking questions for clarification to assist with scoring.

SCORING CRITERIA:

1. Designs will be judged on their perceived effectiveness for adjusting to the required conditions plus any additional the students include. (25 points)
2. Designs will also be judged on the following (25 points):
 - a. Creativity in re-purposing materials
 - b. Innovative design features
 - c. Usability – ease of use and ability to be adjusted to fit to other persons
 - d. Durability and repairable
 - e. Aesthetics– quality of finished design and aesthetic appeal/functionality
3. Teams will be judged on their presentation of the design, see score sheet for details (30 points)
4. Teams will be judged on their Engineering Design Notebook, see score sheet for details (20 points)



**Event Specifications
Designer of the Day
MESA Day 2017**

School: _____

Student Names: _____

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| Specification Check (circle one): | Pass | Fail |
|--|-------------|-------------|
| Design covers at least one of the following: head, torso, lower body, feet | Yes | No |
| Design is constructed from only re-cycled materials | Yes | No |
| Design is made from re-purposed materials | Yes | No |
| Team has submitted an Engineering Design Notebook? | Yes | No |

If team failed specification check they will only be scored on the Design Notebook.

Presentation:

| | | | | | | |
|---|---|---|---|---|---|---|
| Creative introduction of team members and responsibilities | 0 | 1 | 2 | 3 | 4 | 5 |
| Clear restatement of problem with key design parameters/constraints and sufficient background (key facts and previous work) | 0 | 1 | 2 | 3 | 4 | 5 |
| Clear explanation of how team's research informed at least two (2) design choices. | 0 | 1 | 2 | 3 | 4 | 5 |
| Clear explanation of how design & testing informed at least four (4) design choices. | 0 | 1 | 2 | 3 | 4 | 5 |
| A clear explanation of creative design innovations based on assessment of needs. | 0 | 1 | 2 | 3 | 4 | 5 |
| ALL students share equally in presentation. ALL voices heard & understood. Eye contact is distributed across the audience. Engineering Design Notebook used as a visual aid. | 0 | 1 | 2 | 3 | 4 | 5 |
| Total | | | | | | |

Design:

| Climate Adjustability | Hot | Cold | Wet | Dry | Other | Subtotal |
|--|-----|------|-----|-----|-------|----------|
| 0 Not Included | | | | | | |
| 1 Feature is briefly mentioned and has no evidence to support need or effectiveness | | | | | | |
| 2 Feature is discussed but little evidence presented to support need or effectiveness | | | | | | |
| 3 Feature is discussed and has adequate evidence to support need or effectiveness | | | | | | |
| 4 Feature is presented well and has good evidence to support need or effectiveness | | | | | | |
| 5 Feature is excellently presented and has great evidence to support need or effectiveness | | | | | | |
| Total | | | | | | |

| Design Quality | Creativity in re-purposing of materials | Innovative Design Features | Usability | Durability, Repairable | Aesthetics |
|---------------------------------|---|---|---|---|---|
| 0 | No re-purposing done | None | Not usable | Not durable or repairable | Unfinished and visibly unsuited for use |
| 1 | Minimal, re-purposing of materials. Slight modifications made | Minimal, design features are typical and show little creativity in implementation | Minimal, would be difficult to put-on and is specific to one user | Minimal, can be damaged beyond repair easily and repairs would be extremely difficult | Minimal, needs a lot of work to be completed and is visibly unsuited for intended use. |
| 2 | Insufficient, re-purposing was attempted but ineffective | Insufficient, features are slight adjustments from typical and are not implemented well | Insufficient, inconvenient to put-on and can only be used by a few body types | Insufficient, can be damaged easily although still usable. Repairs would be difficult | Insufficient, needs some obvious work to be completed, ineffective attempt to make visibly appealing and suited for intended use. |
| 3 | Adequate, materials were re-purposed | Adequate, features show some creativity but implementation needs improvement | Adequate, can be easily worn and adjusted for a variety of body types | Adequate, resists damage, repairs would not be too difficult | Adequate, it is a finished product, visibly acceptable and suited for use in described conditions |
| 4 | Good, materials used for a purpose other than what it was designed for and is effective | Good, creativity is evident and feature are implemented well. | Good, can be easily and comfortably worn and used for many body types | Good, damage would not occur easily, repairs can be done easily and quickly | Good, it is finished and of good quality, visibly appealing and well suited for described conditions |
| 5 | Excellent, materials re-purposed in an innovative fashion and is very effective | Excellent, features are innovative and implemented very well. | Excellent, very easy to wear and very comfortable. Can be used by almost all body types | Excellent, damage is unlikely, repairs are simple and quick | Excellent, high quality product, visibly very appealing and extremely suitable for described conditions |
| Score | | | | | |
| Total (25 point maximum) | | | | | |

| | |
|--|--|
| Presentation Score (30 points) | |
| Climate Adjustability Score (25 points) | |
| Design Quality Score (25 points) | |
| Engineering Design Notebook Score (20 points) | |
| Total Score (100 points) | |

Lead Judge Signature: _____

Student Signature: _____

Comments:

Rubric for Engineering Design Notebooks (EDN).

| EDN Goals | 3 | 2 | 1 | 0 |
|--|---|------------|---------------|-------|
| 1. Explore | | | | |
| 1.1 Problem Statement. Accurately describes, in your words, the design objective (includes success criteria, constraints constants and variables) | Specific description of problem, success criteria, constraints, variables and constants | Basic... | Weak... | No... |
| 1.2 Depth of Free exploration. Prior knowledge, brainstorming & hands-on exploration documented. | Numerous examples of brainstorming and hands-on exploration observations. | Regular... | Few... | No... |
| 1.3 Research in Design: Research ideas about your design that might be useful. Record information using different sources (e.g. books, websites, interviews from experts). | Clear analysis of other design pros/cons. | Basic... | Scant... | No... |
| 2. Design | | | | |
| 2.1 Design Plan. Includes reasoning on your design choices (materials used, modifications, etc.). Use data from past trials, research and design considerations. | Clear reasons given (based on data or research) for each design choice. | Basic... | Scant... | No... |
| 2.3 Design sketching and/or photos. Prior & during build, team sketches, 2-D or 3-D perspective drawings. | Numerous representations of each design iteration. | Regular... | Scant... | No... |
| 3. Test | | | | |
| 3.1 Observation. Data & written observations (tables, graphs, labeled drawings, etc.). | Numerous presentation of quantitative & qualitative data, graphs & charts follow design progression. | Regular... | Scant... | No... |
| 3.2 Reflection/Analysis. Assesses pros and cons of design/materials, testing procedure, etc. Apply test results and analysis to pose a theory, recommend and argue for a next step, or draw an insightful conclusion. Restate the purpose in your conclusion. | Detailed reflection shows how design considerations and logic flowing from research, test analysis, etc. | Basic... | Scant... | No... |
| 4. EDN Organization | | | | |
| 4.1 Structured. Includes Table of Contents with key elements. Elements of EDN can be used to answer judges questions easily | Clear organization utilizes defined sections. | Basic... | Minimal.. | No... |
| 4.2 Labeled. Clearly labeled with School and Team Members names. | | | Yes | No |
| Column Totals (for selected categories) | | | | |
| Subtotal (out of 25) | | | | |
| Modifier | | | (S ÷ 25) x 20 | |
| Score (out of 20) | | | | |

Comments/Suggestions: