

Engineering Innovation Challenge

Middle and High School

TEAM EVENT – 3 to 4 people maximum

Overview

The 2010 Engineering Design Challenge is in its third year at SkillsUSA at UW-Stout Leadership and Skills Competition. This new challenge will involve a team solution to a current and relevant engineering problem being faced by engineers, scientists, and society. The team solution to the design problem will be demonstrated by a presentation and a design notebook. In addition, the engineering design challenge team will make a formal presentation to a panel of judges regarding their challenge solution and demonstrate their problem solving skills during a timed open-ended problem solving activity.

Purpose

Develop an outstanding engineering design innovation for the solution of the challenge project. Through the application of science, technology, engineering, and mathematics, the engineering design challenge team will demonstrate the effectiveness of their solution. The solution must assess the impact on society, economics, and the environment.

Scope and Contest

An engineering design challenge team may be made up of 3 to 4 students. The solution of the engineering design must be designed and constructed by students. Materials presented in the solution must meet the judging criteria and teams should refer to the official Engineering Innovation contest Rating Form for additional information.

Project

The 2010 engineering innovation contest requires teams to gain an understanding of the challenges faced by individuals with exceptional needs. People with exceptional needs include those individuals with cognitive disabilities, learning disabilities, attention deficit hyperactivity disorder, emotional disabilities, autism, traumatic brain injury, speech and language disorders, visual and hearing loss, physical or other impairments.

It is often easy to take for granted the ease with which one functions in society and their own community, however, for individuals with exceptional needs, unique challenges can arise in everyday life which requires novel solutions.

Whether it is environmental, financial, social, or cultural, each design choice can have positive impacts in some areas while having negative consequences in others. The engineering innovation challenge requires teams to find practical solutions in your community without ignoring the larger impacts your action or inaction can have on your life or around the world. As each solution is unique, each team will determine the balance between all issues. Teams must consider all parts of choices.

Teams will need to meet each of the engineering innovation contest requirements:

- Investigate the unique challenges faced by individuals with exceptional needs in your community. Identify a specific challenge faced by such individuals in your area. Analyze any and all available data about the challenge, and discover what your community is doing about it.
- Discuss the various ways individuals with exceptional needs are affected within your community. Consider talking with individuals who have exceptional needs or professionals who work with individuals with exceptional needs.

- Based on the information you've gathered, create innovative solutions or improvements to existing solutions to address an exceptional needs issue you have identified.
- Consider the potential impacts of each of your proposed solutions to your exceptional needs challenge. Determine your final solution by talking with experts to see what solutions are already being developed or used and by considering how your solution can be adapted in your community and others.

Share your research and solution

Once you have researched and developed your solution, get out there and share it with your community. Event judges will expect you to explain how you showed the community your short- and long-term solutions and the information you have to back up your ideas. Sharing of your idea should include a news article in one media form of publicity, such as a local newspaper, a school district newspaper or newsletter, or possibly TV or radio coverage. In addition, one form of public venue, such as girl scouts, boy scouts, school board meeting, or community service group meeting, should be utilized as a means of sharing with your community. The more you share your ideas, the better chance of influencing your community's acceptance and practice of it!

Judging Criteria

Each engineering innovation team will be judged according to its own merits and compliance with the listed criteria. Participants should read the guidelines carefully and make sure the project presentation, a complete design notebook, and a table display covers all the criteria.

- **Poster Display.** The poster display must be contained within a 48"wide x 48" high area. The poster display will be judged during the time of team presentation and will be available throughout the SkillsUSA competition in the Great Hall.
- **Presentation.** Students should demonstrate appropriate mastery of their engineering innovation challenge solution. Each student must take an equitable role during the allotted time. The presentation should reflect excellent presentation skills, clear communication and explain technical process related to the engineering innovation challenge. The use of presentation equipment and software is highly encouraged to convey a clear presentation.
- **Integration of business and industry.** The project must demonstrate evidence of the integration and involvement of community organizations, business, and industry related to the engineering innovation challenge. This involvement might take many forms (i.e., technical assistance of experts in the field), but must be evident during the presentation process.

- **Design Notebook.** The design notebook [a standard three-ring binder with clear plastic insert cover] must include the following:

Executive summary

Problem solving steps followed

Team member responsibilities, roles and contributions to the solution

Evidence of research conducted

Documentation of brainstorming

Descriptions and illustrations of possible solutions, including concise evaluation of the merits of each

Detailed descriptions of the final solutions, including the assessment of its impact on society, economics, and the environment

Technical or CAD drawings and/or renderings of the solution as required

Team Problem Solving Activity.

During the competition, each team will be given a short open-ended problem to solve. Teams will be observed by the panel of judges during this activity and will be evaluated on their ability to work effectively as a team, the integration of their prior knowledge, and the effective use of a problem solving approach.

Community Sharing

The solution developed should be shared in a public venue and a news article with your community. Sharing of your idea must include at least one news article in one media form of publicity, such as a local newspaper, a school district newspaper or newsletter, or possibly TV or radio coverage. In addition, one form of public venue, such as girl scouts, boy scouts, school board meeting, or community service group meeting, must be utilized as a means of sharing with your community.

Equipment and Materials

SkillsUSA at UW-Stout will provide:

- A space for the poster display -One standard 8' table for use during the Team Problem Solving Activity
- Projection system for laptop hookup during presentation
- Elmo projection system for hardcopy paper projection during presentation

Contestant teams will provide:

- All poster display materials -Laptop for presentation use (if desired)

**2010 Engineering Innovation Contest
Judging Rubric**

Each individual criterion below will be evaluated with this rubric.	Excellent	Very Good	Good	Fair	Basic	Not Observed
Rating Scale:	5	4	3	2	1	0

-Creative Presentation
(Presentation - 20%)

Unique/Different Presentation
Style

Incorporated Problem, Research
&

Solution into Effective Presentation

Effectiveness of Poster Display Design

Overall Impact of Presentation

Creativity & Innovation of Display

Evidence of Collaborative Teamwork during Presentation

Appearance & Quality of Display

-Research Quality (Design - 10%)

-Organized Design Notebook (Design Notebook - 5%)

Data Collection and Supporting Materials

Executive Summary

Data Utilization & Analysis

Problem Solving Steps Followed

Visual Aids & Overall Design

Team Member Responsibilities, Roles & Contributions

Evidence of Research Conducted

-Innovative Solution (Design - 10%)

Brainstorming Documentation

Solution Defined and Supported by Data

Possible Solution Descriptions/Illustrations (including concise eval. of merits of each)

Original/Important Insights of Solution

Final Solution Detailed Description (including assessment of societal, economic, and environmental impacts)

-Project Impact (Community Sharing - 10%)

-Global Climate Problem (Team Problem Solving Activity - 15%)

Impact of Solution & Follow Through

Ability to Work As A Team

Information Sharing & Action Taken

Use of Prior Knowledge

Problem Solving Approach

-External Stakeholders (Community, Business & Industry - 10%)

Integration of Community, Business & Industry

Involvement of Community, Business & Industry

-Poster Display Quality (Table Display - 20%)

