SkillsUSA at UW-Stout Leadership and Skills Competition February 27, 2026

Team Engineering Challenge - Middle School and High School

TEAM CONTEST - Maximum of three individuals per team

Purpose
To evaluate a team of students' ability to work together, using creative and critical thinking and the decision-making process to solve a problem. The contest is intended to foster creativity, innovation, teamwork, and problem-solving skills.

Eligibility
This contest is open to active SkillsUSA members. A team consists of 3 students for the same local chapter. There is no national contest in this event.

Equipment and Materials

1. Supplied by the students: **(These MUST be supplied by the participants)**
    a. Drawing equipment (team's choice – for example straightedge, t-square, triangle, scale, pens/pencils/markers).
    b. Safety glasses
    c. Calculator
    d. Ruler
    e. Scissors and/or Exacto-knife or equivalent and cutting board (able to cut cardboard)
    f. Note pad

    Note: Cell phones, computers, or other digital devices with access to the internet will NOT be allowed.

2. Materials supplied by the technical committee:
    a. All tools, materials, and supplies necessary to solve the contest problem except those items listed above.
    b. All necessary information and furnishings for judges and technical committee.

Contest Procedures

1. Contestants will be identified by number only. The number will be assigned during the pre-contest briefing.
2. Contestants will take a quiz about the information presented at the beginning of the event.
3. The technical committee will provide each team with the problem and the contest supplies at the time of the pre-contest briefing.
4. Each team's solution will be constructed on site.
5. Contest judges will interview each member as a part of the contest.

Scope of the Contest
Virtually all occupations require some level of problem-solving skills. In addition, navigating the challenges of everyday life often requires people to solve a variety of problems. In most cases, several people working together can find a better solution to a problem than can one person working alone.

The Team Engineering Challenge event will allow SkillsUSA members to demonstrate their ability to work together to solve a problem. This year's problem is selected from the infrastructure area.

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Designing for a Sustainable Future
The theme of this year's problem-solving competition will focus on designing a solution to a problem using sustainable development concepts. The contest asks students to create a prototype for their solution that fulfills a given function and identify the secondary processes that will go into creating the real item. Students can prepare by researching current news events related to the design topics.

Students participate in teams of up to 3 students. The competition is divided into three parts. The first part requires students to demonstrate their knowledge of engineering problem solving and sustainable development on a written objective test. The second part will ask students to design and build a model that reflects their solution to a given problem. Lastly, students will be required to present their solution to the problem.

Each segment of the contest will be evaluated. The major components of the grading criteria will include three different sections. The first section of the grading will be based on the contestants scores on a short quiz following the engineering presentation. The second important portion of the competition will come from the work they do in a design portfolio that describes their thought process (e.g. thumbnail sketch, anecdotal notes, final sketch, reflections) and the extent to which their model addressed the problem that was solved. The last important portion will be based on the extent to which the individuals work and present as a team.
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The Written Objective Test
After a short orientation, students will be asked to put their group number on the upper right-hand corner of an envelope. Students will then be asked to one retrieve test and an answer sheet The team will work together on the test, recording their answer on the answer sheet. When the group has completed the test, they will return the test and answer sheet to the team envelope and will sit quietly until everyone has finished the test. The tests will be scored by a panel of judges.

The concepts addressed on the tests can be found in most middle school and introductory textbooks for the study of technology. Participants may want to visit the following websites as well:
- Engineering Design Process
- Sustainable Development Goals

Laboratory Portion
Each team will be given an engineering design problem that has more than one viable solution. Their challenge will be to develop the optimum solution to the problem within a given set of constraints. These constraints will include specific design specifications, material restrictions, and a time limitation. To solve the problem, each team will need to analyze the problem, generate alternative solutions to the problem, select and refine the optimum solution, construct a prototype of their solution, and test their solution to the problem.

The problem-solving process will start with an examination of a problematic situation. The problem will be presented to students in the form of a design brief. A design brief is a short narrative that describes a situation, which is usually hypothetical, that features a problem that needs to be solved. In addition to describing a problem, each design brief will provide students with important contextual information that will add meaning to the learning experience. It will also define the important design considerations or

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specifications that need to be accounted for during the problem-solving process. Lastly, the design brief will encourage students to think creatively, allow for a variety of alternative solutions, and initiate the problem-solving process.

Each team will also be required to develop a design portfolio that will be included in the judging process. The term "design portfolio" is a generic name for several formats that can be used to encourage students to document their problem-solving process. The primary purposes of the design portfolio are to:

- Record the students' ideas which can assist them in planning and executing the problem-solving process, recalling important information and problem specifications, and developing the best solution to the problem.
- Show a lineage of the students' progress from the inception of the problem to its solution.
- Document the students' thought processes and provide concrete evidence of what the student has learned.
- Enable the judges to assess how well the student understands the important concepts associated with the problem as well as the problem-solving process itself.

Presentation Portion

Students conclude the competition by making a three-to-five-minute presentation about their solution to include a demonstration/test of their solution's performance. Judges will be evaluating both the team's design and their communication skills. Judges will be looking for evidence of teamwork in the presentation portion of the competition.