TECHNOLOGY
PROBLEM SOLVING

OVERVIEW

Participants work together to develop and create a solution to a problem using the limited materials provided and the tools allowed. Completed solutions will be objectively measured and judged to determine the best and most effective solution for the stated problem.

PURPOSE

Participants are provided with the opportunity to demonstrate their ability to effectively use problem solving skills in the development and creation of a solution to a specific problem.

ELIGIBILITY

Participants are limited to one (1) team of two (2) members per chapter.

TIME LIMITS

The allotted time for design and construction of the solution is two (2) hours.

ATTIRE

Competition attire, as described in National TSA Dress Code (www.tsaweb.org/Dress-Code), is required for this event.

PROCEDURE

A. Participants report to the event area at the time and place stated in the conference program.

B. The problem, evaluation criteria, and materials are distributed.

C. Participants are required to provide their own tool box (with identification (school name, address, and advisor cell phone number), which should not exceed twenty (20) inches (508 mm) length x ten (10) inches (254 mm) width x ten (10) inches (254 mm) height. The box must contain all items needed to fabricate the solution/entry. The following is a suggested list:
Technology Problem Solving

1. Cutting devices; NONE may be electric
2. Adhesives
   a. aerosol and electric applicators are not allowed
   b. a bottle of Uncure or Debonder is recommended
3. Temporary fastening devices
   a. straight pins
   b. clamps
   c. tape
4. A cutting surface that prevents table top marring
5. Rulers, straightedges, and/or measuring scales
6. Abrasives sheets, sponges, boards
7. Marking devices (pens, pencils, etc.) and sharpener
8. Sheet of wax paper, as large as is needed for the competition
9. Pliers, wrenches, nut drivers, as needed
10. Safety glasses and side shields, as required

D. **Participants are required to provide and wear safety-approved eyewear for this event.** Prescription eyewear will need to have side shields to be considered safety eyewear. Should a team member remove his/her eyewear, s/he will be reminded once to replace it. If there is a second infraction, the team will be asked to leave the competition. Sunglasses are not suitable eyewear.

E. Students also are required to bring the following items:
   1. one (1) roll ¾” masking tape
   2. twelve (12) each 3” x 5” index cards
   3. twelve (12) each Popsicle sticks or tongue depressors
   4. six (6) each 8½” x 11” sheets of printer paper (20-pound bond)
   5. fifteen (15) sheets of 8½” x 11” cardstock, 65-pound weight
   6. six (6) each drinking straws
   7. six (6) styrofoam trays; trays should be no larger than 7” x 10”

F. Teams have two (2) hours to design and construct a solution.

G. Each solution is tested as soon as possible after the construction phase is completed.

It is essential that students and advisors routinely check the TSA website ([www.tsaweb.org](http://www.tsaweb.org)) for updated information about TSA general rules and competitive events. This information is found on the website under Competitions/Updates and Clarification. When students participate in any TSA competitive event, they are responsible for knowing of updates, changes, or clarification related to that event.

REGULATIONS

A. All work must be completed in the event area during the time specified for the event.
B. Only the toolbox items in Procedure C, the materials in Procedure E, and any items supplied by the coordinator may be used in the development of the solution.

EVALUATION

Each team's solution is evaluated objectively. A finite measure - such as elapsed time, horizontal or vertical distance, and/or strength - will be defined in the problem and is used to determine the best solution. Second-best attempts or other objective criteria are used to break ties when possible. Only as a last resort does the event coordinator use subjective criteria, such as originality, to evaluate solutions.
STEM INTEGRATION

This event aligns with the STEM educational standards noted below. Please refer to the STEM Integration section of this guide for more information.

Science, Technology, Engineering, Mathematics

COMMON CORE STATE STANDARDS (CCSS) INTEGRATION

Please refer to the Common Core State Standards (CCSS) Integration section of this guide for more information.

PRIMARY LEADERSHIP SKILLS

Leadership skills promoted in this event:

- ORGANIZATION — Students organize their ideas and materials to produce an effective solution. Suggested leadership lessons: Effective Gains and Whose Birthday Is It?
- PROBLEM SOLVING — Students find the best solution to a problem, based on time and limited materials. Suggested leadership lessons: Debate It and Effective Brainstorming
- TEAMWORK — Students prepare in advance to work efficiently on site. Suggested leadership lessons: Stepping Stones and The Gift

Additional leadership skills promoted in this event: communication, critical thinking, evaluation, organization

TSA AND CAREERS

This competition connects to one or more of the career areas featured in the TSA AND CAREERS section of this guide. Use The 16 Career Clusters chart and the TSA Competitions and The 16 Career Clusters grid as resources for information about careers.

CAREERS RELATED TO THIS EVENT

Computer software engineer
Mathematician
Criminal investigator
Air traffic controller
TECHNOLOGY PROBLEM SOLVING
EVENT COORDINATOR INSTRUCTIONS

PERSONNEL

A. Event coordinator

B. Assistants for set-up, monitoring, and clean-up of on-site activity; two (2) or more per 100 teams
   1. Depending upon the problem, one of the assistants may need to serve as timekeeper.
   2. Not all assistants are needed for set-up and clean-up, but all are needed while the on-site activity is taking place.

C. Evaluators, two (2) or more per 100 teams

MATERIALS

A. Coordinator’s notebook, containing:
   1. Event guidelines, one (1) copy for the coordinator and for each evaluator
   2. Official rating forms
   3. List of entries with finalist report
   4. List of evaluators/assistants
   5. ID tags or stick-on tabs to identify entries
   6. Results envelope

B. Tables and chairs for participants

C. Tables and chairs for evaluators, to be used for tools/materials distribution and evaluation

D. A copy of a well-written, technologically appropriate problem for each team that can be objectively measured

E. Adequate conditions (inside or outside), tools, materials, monitoring, and testing devices for the problem

F. Stopwatch or clock for timekeeper

RESPONSIBILITIES

A. Upon arrival at the conference, report to the CRC room and check the contents of the coordinator’s notebook. Review the event guidelines and check to see that enough evaluators/assistants have been scheduled.
B. Inspect the area(s) in which the event is being held for appropriate set-up, including room size, chairs, tables, outlets, etc. Notify the event manager of any potential problems.

C. One (1) hour before the event is scheduled to begin, meet with your evaluators/assistants to review time limits, procedures, and regulations. If questions arise that cannot be answered, speak to the event manager before the event begins.

D. Check tools, materials, and monitoring and testing devices.

E. Begin the event at the scheduled time by closing the doors and checking the entry list. All participants and evaluators should be in the room at this time. Participants not present may be disqualified. In order to compete, participants must be on the entry list or must have approval of the CRC chairperson.

F. Once teams are seated and general announcements have been given, distribute and review the problem and start the time.

G. Evaluators and monitors observe the entire construction phase, with evaluators measuring solutions as soon as appropriate.

H. For participants who violate the rules, the decision either to deduct 20% of the total possible points or to disqualify the entry must be discussed and verified with the evaluators, event coordinator, and a CRC manager; all must initial either of these actions on the rating form.

I. Ensure that all solutions have been measured and all rating forms completed before evaluators are dismissed. Evaluators discuss and break any ties in order to determine the ranking of the ten (10) finalists.

J. Complete and submit the finalist report, which includes a ranking of the ten (10) finalists, and all related forms in the results envelope to the CRC room.

K. If necessary, manage security and the removal of materials from the area.
## TECHNOLOGY PROBLEM SOLVING

### 2015 & 2016 OFFICIAL RATING FORM

#### SOLUTION DEVELOPMENT (30 points)

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Minimal performance (1-4 points)</th>
<th>Adequate performance (5-8 points)</th>
<th>Exemplary performance (9-10 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Three or more items are missing from the materials, and/or some of the items are not those specified.</td>
<td>Most of the specified items are included and are correct.</td>
<td>All of the specified items are included in the team's materials and are correct.</td>
</tr>
<tr>
<td>Solution to problem</td>
<td>The solution developed is unable to fully meet or solve the defined problem.</td>
<td>The solution is somewhat developed and attempts to meet or solve the problem.</td>
<td>The solution is fully developed and clearly meets or solves the identified problem.</td>
</tr>
</tbody>
</table>

Evaluators: Using minimal (1-4 points), adequate (5-8 points) or exemplary (9-10 points) performance levels as a guideline, record the scores earned for the event criteria in the column spaces to the far right. The X1 or X2 notation in the criteria column is a multiplier factor for determining the points earned. (Example: an “adequate” score of 7 for an X1 criterion = 7 points; an “adequate” score of 7 for an X2 criterion = 14 points.)

#### TESTING OF SOLUTIONS (50 points)

**Evaluation**
A finite unit of measure, such as elapsed time, linear distance, and/or strength, etc. is used to determine ranking.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>50</td>
</tr>
<tr>
<td>2nd</td>
<td>45</td>
</tr>
<tr>
<td>3rd</td>
<td>40</td>
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<tr>
<td>4th</td>
<td>35</td>
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<td>5th</td>
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<td>9th</td>
<td>10</td>
</tr>
<tr>
<td>10th</td>
<td>5</td>
</tr>
</tbody>
</table>

Subtotal (80 points)

Rules violations (a deduction of 20% of the total possible points) must be initialed by the evaluator, coordinator, and manager of the event. Record the deduction in the space to the far right.

Indicate the rule violated: __________

(To arrive at TOTAL score, add any subtotals and subtract rules violation points, as necessary. Check your math twice!) TOTAL (80 points)

Comments:

I certify these results to be true and accurate to the best of my knowledge.

Evaluator
Printed name: __________________________ Signature: __________________________