PROBLEM SOLVING

OVERVIEW

Participants use their skills in problem solving to develop a finite solution to a stated problem provided on site. Participants work as a team to provide the best solution, which is measured objectively.

ELIGIBILITY

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

TIME LIMITS

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

ATTIRE

TSA competition attire, as described in the National TSA Dress Code section of this guide, is required.

PROCEDURE

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

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

C. Participants are required to provide their own tool box (with identification [school name, address, and advisor cell phone number]), which is not to 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. The following is a suggested list:

   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 (required)
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 (required)
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, he/she 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) 3" x 5" index cards
3. twelve (12) Popsicle sticks or tongue depressors
4. six (6) 8½" x 11" sheets of printer paper (20 pound bond)
5. three (3) feet of string
6. six (6) drinking straws
7. ten (10) #1 paper clips

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

G. Each solution is tested as soon as possible after the construction phase is completed. (Some problems may require teams to be present for testing).

H. Ten (10) finalists are announced at the awards ceremony.

It is essential that students and advisors routinely check the TSA website (www.tsaweb.org) for updated information about TSA general rules and competitive event guidelines. This information is found on the website under Competitions/ Competition Updates. When students participate in any TSA competitive event, they are responsible for knowing of all updates, changes, and clarifications related to that event.

REGULATIONS

A. All work must be completed in the event area during the time specified for the event.

B. Specific materials related to the on-site problem will be provided by TSA. Only the materials issued to each team by

the event coordinator, or the items that students are required to bring, may be used in the development of the solution.

C. Participants without a tool box will not be allowed to compete. Sharing tools between teams is not permitted.

EVALUATION

Each team's solution is evaluated objectively. A finite measure, such as elapsed time, horizontal or vertical distance, and/or strength, is used to determine the best solution. Solution designs will be used to break ties. Only as a last resort does the event coordinator use subjective measurement, such as originality, to evaluate solutions. Please refer to the official rating form for more information.

STEM INTEGRATION

This event has connections to the STEM areas noted below. Please refer to the STEM INTEGRATION section of this guide.

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.

LEADERSHIP SKILLS

Leadership skills promoted in this event:

- Creative thinking: Students create original designs or apply original interpretations for a common solution. Use leadership activities: *Around the World* and *Open Minded*
- Critical thinking: Students use critical thinking skills to choose the most effective solution. Use leadership activities: *Rebus Puzzles* and *Thinking Like Tarzan*
- Problem solving: Students solve an on-site problem using miscellaneous materials. Use leadership activities: *Finding a Way* and *Including Everyone*

Additional leadership skills promoted in this event:

- Evaluation
- Organization
- Teamwork

TSA AND CAREERS

This competition has connections 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 Career Clusters* grid as resources for information about careers.

CAREERS RELATED TO THIS EVENT

- Computer network specialist
- Detective
- Mechanical engineer
- Nurse
- Project manager

PROBLEM SOLVING
EVENT COORDINATOR INSTRUCTIONS

PERSONNEL

A. Event coordinator

B. Evaluators, two (2) or more

C. Timekeeper/monitors

MATERIALS

A. Coordinator's packet, containing:
   1. Event guidelines, one (1) copy for the coordinator and each evaluator
   2. TSA Event Coordinator Report
   3. List of evaluators/assistants
   4. Stick-on labels for identifying entries
   5. Copies of the tool template, as needed
   6. Stopwatch for timekeeper
   7. Results envelope with coordinator forms

B. A well-written, technologically appropriate problem that can be objectively measured; one (1) for each team

C. Adequate conditions (inside or outside), on-site problem materials, monitoring, and testing devices for the designated problem

D. Tables and chairs for participants

E. Tables and chairs for event coordinator and evaluators

RESPONSIBILITIES

A. Upon arrival at the conference, report to the CRC room and check the contents of the coordinator's packet. Review the event guidelines and check to see that enough evaluators/assistants have been scheduled.

B. Inspect the area or room in which the event is to be 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 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. For participants who violate the rules, the decision either to 1) deduct twenty percent (20%) of the total possible points or 2) disqualify the entry, must be discussed and verified with the evaluators, event coordinator, and CRC manager, who all must initial either of these actions on the rating form.

E. Distribute materials as appropriate, prior to the event.

F. 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. In order to compete, participants must be on the entry list or must have approval of the CRC.

G. Each team will display its tools using the tool template (paper template) provided, as necessary. Only tools displayed will be permitted.

H. Tool boxes must be removed from a team's work table prior to when participants begin the design and construction of the solution.

I. Once teams are seated (checked against the entry list) and general announcements have been made, the event problem will be distributed, reviewed, and time will be started.

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

K. Evaluators will collect the solution design when the team’s solution is submitted for testing. Evaluators will use the designs to break any ties in order to determine the ten (10) finalists.

L. Submit the finalist results and all related forms in the results envelope to the CRC room.

M. If necessary, manage security and the removal of materials from the event area.

Participant/Team ID# _____

PROBLEM SOLVING

2016 & 2017 OFFICIAL RATING FORM — **MIDDLE SCHOOL**

Static Entry (30 points)

CRITERIA	Minimal performance 1-4 points	Adequate performance 5-8 points	Exemplary performance 9-10 points	Record scores in the column spaces below.
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 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.)				
Materials See Procedure E (X1)	Three or more items are missing from the materials, and/or some of the items are not those specified.	Most items on the materials list are present and correct.	All of the specified items are included in the team's materials and are correct.	
Solution to problem (X2)	The solution developed is unable to fully meet the defined problem.	The solution is somewhat developed in an attempt to address the problem.	The solution developed fully and clearly meets or solves the identified problem.	
			SUBTOTAL (30 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 for this event.]

1st - 50 points	2nd - 45 points	3rd - 40 points	4th - 35 points	5th - 30 points
6th - 25 points	7th - 20 points	8th - 15 points	9th - 10 points	10th - 5 points
				SUBTOTAL (50 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 right.

Indicate the rule violated: _____

(To arrive at the TOTAL score, add any subtotals and subtract rules violation points, as necessary.) **TOTAL (80 points)**

Comments:

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

Evaluator

Printed name: _____ Signature: _____