

# PROBLEM SOLVING



## OVERVIEW

Participants apply leadership and 21<sup>st</sup> century 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

One (1) team of two (2) individuals per chapter may participate.

## TIME LIMITS

Ninety (90) minutes for the design and construction of the solution are permitted.

## ATTIRE

TSA competition attire is required.

## PROCEDURE

### ON-SITE CHALLENGE

- A. Participants report to the event area at the time and place stated in the conference program with their team tool box and safety eye glasses.
- B. The problem, the evaluation criteria, and the materials are distributed.
- C. Teams will be given a two (2) hour window to begin construction of a solution
- D. Teams are allowed ninety (90) minutes to design and construct a solution.
- E. Each solution is tested as soon as possible after the construction phase is completed. Some problems may require teams to be present for testing.
- F. The top ten (10) finalists are announced at the awards ceremony.

## REGULATIONS AND REQUIREMENTS

Students will work to develop their leadership and 21<sup>st</sup> century skills in the process of preparing for and participating in this TSA competitive event. The development and application of those skills must be evident in their submission, demonstration, and/or communication pertaining to the entry.

- 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.
- C. Only the materials issued to each team by the event coordinator may be used in the development of the solution. Exceptions are adhesives (glue) and masking tape from each team's toolbox.
- D. Participants are required to provide their own tool box/container, which must:
  1. Include identification (school name, address, and advisor cell phone number).
  2. Not exceed twenty (20) inches (508 mm) length x ten (10) inches (254 mm) width x ten (10) inches (254 mm) height.
  3. Contain all tools and materials needed to fabricate the solution. The following is a suggested list:
    - a. Cutting devices; NONE may be electric
    - b. Adhesives:
      - i. Aerosol and electric applicators are not allowed
      - ii. A bottle of Uncure or Debonder is recommended
    - c. Temporary fastening devices
      - i. Straight pins
      - ii. Clamps
      - iii. Tape (only masking tape may be used as a construction material of the final solution)
    - d. A cutting surface that prevents table-top marring (required)
    - e. Rulers, straightedges, and/or measuring scales
    - f. Marking devices (pens, pencils, etc.) and sharpener
    - g. Sheet of wax paper, (up to 9 square feet)
    - h. Pliers, wrenches, nut drivers, as needed
    - i. Safety glasses and side shields, as required
    - j. One (1) roll masking tape no wider than ¾"

- E. Participants without a tool box will not be allowed to compete.
- F. As teams enter the competition area, each will be given a copy of the Verifications Sheet. The Verifications Sheet is a list of tool box contents as listed in Rules and Regulations D3 a-k.
- G. Sharing tools between teams is not permitted.
- H. Participants are required to provide and wear safety-approved eyewear for this event.
  - 1. Safety eyewear shall be worn at event check-in.
  - 2. Prescription eyewear will need to have side shields to be considered safety eyewear.
  - 3. Should a team member remove his/her eyewear, he/she will be reminded once to replace it.
  - 4. Sunglasses are not suitable eyewear.

### EVALUATION

- A. Each team's solution is evaluated objectively.
- B. A finite measure, such as elapsed time, horizontal or vertical distance, and/or strength, is used to determine the best solution.
- C. Ties shall be broken according to the entry with the earlier testing time given the advantage

Refer to the official rating form for more information.

### STEM INTEGRATION

This event has connections to the STEM areas of Science, Technology, Engineering, and Mathematics.

### LEADERSHIP AND 21<sup>ST</sup> CENTURY SKILLS DEVELOPMENT

This event provides opportunity for students to build and develop leadership and 21<sup>st</sup> century skills including but not limited to:

- Communication
- Collaboration/Social Skills
- Initiative
- Problem Solving/Risk Taking
- Critical Thinking
- Perseverance/Grit
- Creativity
- Relationship Building/Teamwork
- Dependability/Integrity
- Flexibility/Adaptability

### CAREERS RELATED TO THIS EVENT

This competition has connections to one (1) or more of the careers below:

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

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## 2024 & 2025 OFFICIAL RATING FORM

### MIDDLE SCHOOL

Judges: Using minimal (1-4 points), adequate (5-8 points), or exemplary (9-10 points) performance levels as a guideline in the rating form, 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.) A score of zero (0) is acceptable if the minimal performance for any criterion is not met.

#### Go/No Go Specifications

- Before judging the entry, ensure that the items below are present; indicate presence with a check mark in the box.
- If an item is missing, leave the box next to the item blank and place a check mark in the box labeled ENTRY NOT EVALUATED.
- If a check mark is placed in the ENTRY NOT EVALUATED box, the entry is not to be judged.

- ☐ Tool box is present and meets size requirements
- ☐ Safety glasses are worn by each team member
- ☐ ENTRY NOT EVALUATED

#### TESTING OF SOLUTION (60 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: 60 Points	2nd: 55 Points	3rd: 50 Points	4th: 45 Points	5th: 40 Points	6th: 35 Points
7th: 30 Points	8th: 25 Points	9th: 20 Points	10th: 15 Points	11th: 10 Points	12th: 5 Points

#### TESTING OF SOLUTION SUBTOTAL (60 points)

Rules violations (a deduction of 20% of the total possible points for the above sections) must be initialed by the judge, 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 (60 points)**

Comments:

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

**JUDGE**

Printed name: \_\_\_\_\_ Signature: \_\_\_\_\_

# PROBLEM SOLVING EVENT COORDINATOR INSTRUCTIONS

## PERSONNEL

- A. Event coordinator
- B. Judges:
  - 1. Preliminary round, two (2) or more
- C. Timekeeper/monitors, one (1) or more

## MATERIALS

- A. Coordinator's packet, containing:
  - 1. Event guidelines, one (1) copy for the coordinator and for each judge
  - 2. TSA Event Coordinator Report
  - 3. List of judges/assistants
  - 4. Stick-on labels for identifying entries
  - 5. Stopwatch for timekeeper
  - 6. 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 judges
- F. Tool Box Verifications Sheet, one (1) copy per team

## RESPONSIBILITIES

### AT THE CONFERENCE

- A. Attend the mandatory event coordinator's meeting at the designated time and location.
- B. Report to the CRC room and check the contents of the coordinator's packet.
- C. Review the event guidelines and check to see that enough personnel have been scheduled.
- D. 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.

- E. At least one (1) hour before the event is scheduled to begin, meet with judges/assistants to review time limits, procedures, regulations, evaluation, and all other details related to the event. If questions arise that cannot be answered, speak to the event manager before the event begins.

### ON-SITE CHALLENGE

- A. Distribute materials as appropriate, prior to the start of the event.
- B. Begin the event at the scheduled time by closing the doors and checking the entry list.
- C. All participants and judges should be in the room at this time.
- D. Late participants and/or entries are considered on a case-by-case basis and only when lateness is caused by events beyond the participant's control.
- E. In order to compete, participants must be on the entry list or must have approval of the CRC.
- F. Each team will submit their tool box to the coordinator and judges for size verification.
- G. 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.
- H. Judges and monitors observe the entire construction phase, with judges measuring solutions as soon as appropriate.
- I. Decisions about rules violations must be discussed and verified with the judges, event coordinator, and the CRC manager to determine either:
  - 1. To deduct twenty percent (20%) of the total possible points in this round
  - 2. To disqualify the entry
 The event coordinator, judges, and CRC manager must initial either of these actions on the rating form.
- J. Submit the semifinalist results to the CRC room.
- K. If necessary, manage security and the removal of materials from the event area.