

TECHNOLOGY PROBLEM SOLVING



OVERVIEW

Applying leadership and 21st century skills, participants in problem solving to develop a finite solution to the 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

Two (2) hours for the design and construction of the solution are permitted.

ATTIRE

TSA competition attire is required for this event.

PROCEDURE

ON-SITE CHALLENGE

- 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. Teams are allowed two (2) hours for the construction of a solution.
- D. Each solution is tested as soon as possible after the construction phase is completed. (Some problems may require teams to be present for testing.)
- E. The top ten (10) finalists are announced at the awards ceremony.

REGULATIONS AND REQUIREMENTS

Students will work to develop their leadership and 21st 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 are provided by TSA. Only the materials issued to each team by the event coordinator may be used in the development of the solution. Note: Exceptions are Adhesives (glue) and masking tape from each team's tool box.
- C. Participants are required to provide their own tool box:
 1. Must include identification (school name, address, and advisor cell phone number)
 2. Must not exceed twenty (20) inches (508 mm) length x ten (10) inches (254 mm) width x ten (10) inches (254 mm) height.
 3. Contains all items needed to fabricate the solution/entry. 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 construction material, all other tape may only be used as a temporary fastening or hold down device)
 - d. A cutting surface that prevents table top marring (required)
 - e. Rulers, straightedges, and/or measuring scales
 - f. Abrasive sheets/sandpaper, sanding sponges, sanding boards (i.e. emory boards or similar)
 - g. Marking devices (pens, pencils, etc.) and sharpener
 - h. Sheet of wax paper, as large as is needed for the competition
 - i. Pliers, wrenches, nut drivers, as needed
 - j. Safety glasses and side shields (required)

4. Participants are required to provide and wear safety-approved eyewear for this event.
 - a. Safety eyewear shall be worn by participants at event check-in and remain on until leaving the event venue.
 - b. Prescription eyewear needs to have side shields to be considered safety eyewear.
 - c. Should a team member remove his/her eyewear, s/he will be reminded once to replace it.
 - d. If there is a second infraction, the team will be asked to leave the competition.
 - e. Sunglasses are not suitable eyewear.
- D. Participants without a toolbox are not allowed to compete.
- E. Once tool box sizes are evaluated, teams self-examine their competitor's tools and materials using the Verifications sheet provided by the event coordinator. If there is a dispute, a judge is summoned to determine a final ruling. Any disallowed tools or materials are held by the event coordinator until the contest is complete.
- F. Sharing tools between teams is not permitted.

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 aligns with the STEM (Science, Technology, Engineering, and Mathematics) educational standards.

LEADERSHIP AND 21ST CENTURY SKILLS DEVELOPMENT

This event provides opportunity for students to build and develop leadership and 21st 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 software engineer
- Mathematician
- Criminal investigator
- Air traffic controller

TECHNOLOGY PROBLEM SOLVING

2021 & 2022 OFFICIAL RATING FORM

HIGH 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.

- ☐ Safety eyewear is present
- ☐ The tool box is present
- ☐ 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.

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

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: _____

TESTING OF SOLUTIONS SUBTOTAL (60 points)

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: _____

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 on 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 being held.
- C. Judges, two (2) or more
- 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.

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. Identification tags or stick-on labels to identify entries
 - 5. Stopwatch
 - 6. Results envelope
- B. Tables and chairs for participants
- C. Tables and chairs for judges, to be used for tools/materials distribution and evaluation
- D. Well-written, technologically appropriate problem that can be objectively measured; one (1) copy per team and judge
- E. Adequate conditions, tools, materials, monitoring, and testing devices for the problem

RESPONSIBILITIES

AT THE CONFERENCE

- A. Attend the mandatory coordinator's meeting at the designated time and location.
- B. Report to the CRC room and check the contents of the coordinator's packet.

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 submits their toolbox 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 is distributed, reviewed, and time is started.
- H. Judges and monitors observe the entire construction phase, with judges measuring solutions as soon as appropriate.
- I. Judges collect the solution design when the team's solution is submitted for testing.
- J. Judges use the designs to break any ties.

- K. Decisions about rules violations must be discussed and verified with the judges, event coordinator, and CRC manager to determine either:
 - 1. To deduct twenty percent (20%) of the total possible points in this round or
 - 2. To disqualify the entryThe event coordinator, judges, and CRC manager must initial either of these actions on the rating form.
- L. Judges determine the ten (10) finalists and discuss and break any ties.
- M. Submit the finalist results and all related forms in the results envelope to the CRC room.
- N. If necessary, manage security and the removal of materials from the event area.