

## OVERVIEW

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

## ELIGIBILITY

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

## TIME LIMITS

### PRELIMINARY ROUND

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

### SEMIFINAL ROUND

Semifinalist teams will participate in a LEAP interview that will last a maximum of five (5) minutes.

## LEAP

A team LEAP Report is required for this event and must be submitted at event check-in (see LEAP Program).

## ATTIRE

TSA competition attire is required for this event.

## PROCEDURE

### PRELIMINARY ROUND

1. Participants report to the event area and submit a LEAP Report at the time and place stated in the conference program.
2. The problem, evaluation criteria, and materials are distributed.
3. Teams are allowed two (2) hours to design and construct a solution.
4. Each solution is tested as soon as possible after the construction phase is completed. (Some problems may require teams to be present for testing.)
5. A list of twelve (12) semifinalist teams (in random order) will be posted.

### SEMIFINAL ROUND

1. Semifinalist teams will report at the time and place stated in the conference program to sign up for an interview time.
2. Semifinalists participate in a LEAP interview.
3. Judges independently evaluate the LEAP Report and interview.
4. The top ten (10) finalists will be announced at the awards ceremony.

## REGULATIONS

- A. All work must be completed in the event area during the time specified for the event.
- B. Specific materials related to the onsite problem will be provided by TSA.
- C. Only the materials issued to each team by the event coordinator, or the items that participants are required to bring, may be used in the development of the solution.
- D. 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. Must contain all items needed to fabricate the solution/entry. The following is a suggested list, with some required materials indicated:
    - 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; unless otherwise stipulated in the problem statement given at the competition
    - 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. Prescription eyewear will need to have side shields to be considered safety eyewear.
  - b. Should a team member remove his/her eyewear, s/he will be reminded once to replace it.
  - c. If there is a second infraction, the team will be asked to leave the competition.
  - d. Sunglasses are not suitable eyewear.
5. Each team is required to bring the following items:
- a. one (1) roll  $\frac{3}{4}$ " masking tape
  - b. twelve (12) 3" x 5" index cards
  - c. twelve (12) Popsicle sticks
  - d. six (6)  $8\frac{1}{2}$ " x 11" sheets of printer paper (20-pound bond)
  - e. fifteen (15) sheets of  $8\frac{1}{2}$ " x 11" cardstock (65-pound weight)
  - f. six (6) standard drinking straws, straws (shall be no larger than  $\frac{1}{4}$ " diameter x 9" in length)
  - g. six (6) Styrofoam trays; trays should be no larger than 7" x 10"; foam core board or similar materials are not allowed. Perform an Internet search for 'Standard Supermarket Food Trays' to meet this requirement.
- E. Participants without a toolbox will not be allowed to compete.
- F. Once tool box sizes are evaluated, teams will self-examine their competitor's tools and materials using the Verifications sheet provided by the event coordinator. If there is a dispute, a judge will be summoned to determine a final ruling. Any disallowed tools or materials will be held by the event coordinator until the contest is complete.

G. Sharing tools between teams is not permitted.

### SEMIFINAL ROUND

#### A. The LEAP Report

1. Teams document the leadership skills that they developed and demonstrated while working on this event, and on a non-competitive event leadership experience.
2. Teams will respond to questions about the content of the LEAP Report.
3. Specific LEAP Report regulations can be found in the LEAP Program section of this guide and on the TSA website.

### EVALUATION

#### PRELIMINARY ROUND

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

#### SEMIFINAL ROUND

The content and quality of the LEAP Report and interview will be evaluated.

Refer to the official rating form for more information.

### STEM INTEGRATION

This event aligns with the STEM educational standards of Science, Technology, Engineering, and Mathematics.

### CAREERS RELATED TO THIS EVENT

- Computer software engineer
- Mathematician
- Criminal investigator
- Air traffic controller

# TECHNOLOGY PROBLEM SOLVING

## 2019 & 2020 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.

- Students have safety eyewear.
- The toolkit is present.
- Additional required items are present.
- Completed LEAP Report is present.
- ENTRY NOT EVALUATED

| TESTING OF SOLUTION (60 points)   |                |                |                 |                 |                |
|---|----------------|----------------|-----------------|-----------------|----------------|
| <b>Evaluation:</b> 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 |
| <b>TESTING OF SOLUTIONS SUBTOTAL (60 points)</b>  |                |                |                 |                 |                |

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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: \_\_\_\_\_

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**PRELIMINARY SUBTOTAL (60 points)**

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| SEMIFINAL LEAP INTERVIEW (6 points)                          |   |  |   |
|--|---|--|---|
| CRITERIA   | Minimal performance   | Adequate performance   | Exemplary performance   |
|  | 1-4 points  | 5-8 points   | 9-10 points   |
| <b>LEAP Report/ Interview</b><br>(10% of total event points) | The team's efforts are not clearly communicated, lack detail, and/or are unconvincing; few, if any, attempts are made to identify and/or incorporate the SLC Practices and Behaviors. | The team's efforts are adequately communicated, include some detail, are clear, and/or are generally convincing; identification and/or incorporation of the SLC Practices and Behaviors is adequate. | The team's efforts are clearly communicated, fully-detailed, and convincing; identification and/or incorporation of the SLC Practices and Behaviors is excellent. |
| <b>SEMIFINAL LEAP INTERVIEW SUBTOTAL (6 points)</b>          |   |  |   |

Record scores in the column spaces below.

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## TECHNOLOGY PROBLEM SOLVING

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: \_\_\_\_\_

**SEMIFINAL SUBTOTAL (6 points)**

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

**TOTAL (66 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 onsite 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 onsite activity is being held.
- C. Judges:
  - 1. Preliminary round, two (2) or more
  - 2. Semifinal round, two (2) 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. Pre-populated flash drives for judges
  - 5. Identification tags or stick-on labels to identify entries
  - 6. Stopwatch
  - 7. Results envelope
  - 8. Envelope for LEAP Reports
  - 9. LEAP Interview Judging Protocol
- 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

1. Attend the mandatory coordinator's meeting at the designated time and location.
2. Report to the CRC room and check the contents of the coordinator's packet.
3. Review the event guidelines and check to see that enough judges/assistants have been scheduled.
4. 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.
5. At least one (1) hour before the event is scheduled to begin, meet with judges/assistants to review time limits, procedures, and regulations. If questions arise that cannot be answered, speak to the event manager before the event begins.

#### PRELIMINARY ROUND

1. Begin the event at the scheduled time by closing the doors and checking the entry list.
2. All participants and judges should be in the room at this time.
3. Anyone reporting who is not on the entry list may check in only after official notification is received from the CRC.
4. Distribute materials as appropriate, prior to the start of the event.
5. Each team will display its tools using the tool template (paper template) provided, as necessary.
  - a. Only tools displayed will be permitted.
  - b. Tool boxes must be removed from a team's work table prior to when participants begin the design and construction of the solution.
6. 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.

7. Judges and monitors observe the entire construction phase, with judges measuring solutions as soon as appropriate.
  8. Judges will collect the solution design when the team's solution is submitted for testing.
  9. Judges will use the designs to break any ties in order to determine the twelve (12) semifinalists.
  10. Decisions about rules violations must be discussed and verified with the judges, event coordinator, and CRC manager to determine either:
    - a. To deduct twenty percent (20%) of the total possible points in this round or
    - b. To disqualify the entry
    - c. The event coordinator, judges and CRC manager must initial either of these actions on the rating form.
  11. Review and submit the semifinalist results and all related forms in the results envelope to the CRC room.
  12. If necessary, manage security and the removal of materials from the event area.
6. Review and submit the finalist results and all related forms in the results envelope to the CRC room.
  7. If necessary, manage security and the removal of materials from the event area.

### SEMIFINAL ROUND

1. At least one (1) hour before the event is scheduled to begin, meet with judges/assistants to review time limits, procedures, and regulations. If questions arise that cannot be answered, speak to the event manager before the event begins.
2. Conduct the LEAP interviews.
3. Judges will independently evaluate the LEAP requirements.
4. Decisions about rules violations must be discussed and verified with the judges, event coordinator, and CRC manager to determine either:
  - a. To deduct twenty percent (20%) of the total possible points in this round or
  - b. To disqualify the entry
  - c. The event coordinator, judges and CRC manager must initial either of these actions on the rating form.
5. Judges determine the ten (10) finalists and discuss and break any ties. (Determine the procedure for breaking ties before the onsite competition begins.)