ROBOTICS

OVERVIEW

Applying leadership and 21st century skills, participants design, build, assemble, document, and test an open-source vehicle according to stated specifications and to meet the challenge of the yearly theme/problem. The annual theme will be posted on the TSA website under *Themes & Problems*.

ELIGIBILITY

Three (3) teams of two to six (2-6) members per state may participate.

TIME LIMITS

A. Ten (10) minutes prior to assigned times teams can set up their assigned pit area.
B. Thirty (30) minutes session to test and correct any problems. During this time judges will also perform a safety check.
C. Ten (10) minutes running clock to complete the challenge.
D. Ten (10) minutes for semifinalist interview

ATTIRE

TSA competition attire, safety glasses, and safety vests are required for this event.

PROCEDURE

PRE-CONFERENCE

A. Participants review the TSA Honor Statement for Competitive Events found in the General Rules and listed in the individual competitive event rules.
B. Participants access the annual theme on the TSA website under *Themes & Problems*.
C. Participants prepare their design, build, and test their robots.
D. Drones are not permitted in this event.

PRELIMINARY ROUND

A. Participants will sign up for a setup and testing time at the time and place stated in the conference program.
B. While wearing safety glasses and safety vests, participants attend a fifteen (15)-minute orientation meeting at the time and place stated in the conference program.
C. Students will arrive at the assigned place and time to:
    1. Set up their pit areas
    2. Set up their robot
D. Entries are reviewed by judges to determine safety.
E. Safe robots will be given an opportunity to test.
F. Top sixteen (16) scores on robot testing will have a semifinalist interview
G. A list of sixteen (16) semifinalists (in random order) is posted.

SEMINFINAL ROUND

A. Participants report at the time and place stated in the conference program to sign up for an interview time.
B. Participants report at the assigned time and place for the ten (10) minutes interview.
C. Challenge, and interviews scores are combined with testing points to determine the final standings.
D. 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.

PRELIMINARY ROUND

A. Participants must check for the current year's design challenge specifications on the TSA website under *Themes & Problems*.
B. Participants must wear safety glasses and safety vests at all times during the event.

Robotics Pit and Safety Procedures

A. Pit Area Assignment. The Event Coordinator will provide a designated area for robotics teams to work on and prepare their robots for the challenge.
   1. If the team brings any type of powered tool or soldering iron, the teams are required to bring two (2) welding blankets (4' x 6' minimum) to cover the table and floor in their pit area. In this case, failure to bring the two (2) welding blankets will result in an automatic disqualification.
   2. Teams bring to pit area, for inspection, robot, radio controller(s), chargers, batteries, tools box, power strip, 3-prong electrical extension cord, replacement parts, spare parts, and tools.
   3. All necessary computers and associated software for the competition.
   4. All equipment, tools, chargers, and computers are to be arranged for inspection and safety check. The use of tools with combustible fuel sources is prohibited.
   5. In the pit area, battery chargers and batteries, as they are being charged, must be placed on the fireproof welding blanket in the pit charging area.

B. When the Robot is out of the competition area, all batteries must be removed. NO EXCEPTIONS.

C. When a team member enters the competition tent field, only at the direction of the event coordinator may the team members attach the battery cable and turn on their robot. When a robot is outside of the competition tent area, all batteries must be unplugged. NO EXCEPTIONS.

D. The judge will inspect the robot to ensure safe operation.

E. When the competition is taking place and when a practice session is under way with a robot in the competition area, all robots in the pit area or outside the pit area must be POWERED OFF. This is an automatic ten (10) point deduction if this occurs.

F. All batteries will be inspected prior to practice and the competition.

G. All robots must be driven ONLY in the Competition field.

Robot Specifications

A. The robot must be assembled from open-sourced parts. The robot can be purchased as a kit that can be built, reconfigured, changed, and modified with different components.

B. The robot structure can be made from plastic, metal, wood, 3D printed materials (carbon fiber, PLA plastic, ABS plastic, resin, metal combined plastic or resin). Parts can be purchased commercially and modified.

C. Battery packs must only be commercially available lithium-ion or lithium-ion polymer batteries that are purchased from open-sourced 3rd parties (i.e., Amazon, hobby shops, etc.).

D. The robot will have to navigate through a level course. Depending on the location the surface may change so designs must take that into consideration. Teams may choose to use legs, tracks, wheels, or other methods developed by the team.

E. At the start of the challenge robots must fit in a 16" x 16" x 16" cube. Once the challenge has begun the robot can exceed that size.

F. Robots must have removable part/coverings for internal inspection.

G. A camera may be incorporated into the design if needed to help complete the assigned task.

EVALUATION

PRELIMINARY ROUND

A. Robot testing

SEMINFINAL ROUND

A. The interview

Refer to the official rating form for more information.

TSA HONOR STATEMENT

All work must be created and completed by individual competitors or teams. Plagiarism, the use of Generative Artificial Intelligence (GenAI) software, copyright violation, cheating, and falsification of information are prohibited. Participants may NOT use any generative artificial intelligence (GenAI) tools (e.g. ChatGPT, Google Gemini, GitHub Copilot, etc.). Any attempt to gain an unfair advantage will not be tolerated. Competitors at any level of TSA competition understand and agree to abide by the TSA Honor Statement.

If it is determined that a student violated the TSA Honor Statement, a rules violation of twenty percent (20%) will be incurred.

STEM INTEGRATION

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

LEADERSHIP AND 21ST CENTURY SKILLS

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, and Flexibility/Adaptability.

Participant/Team ID# _____

ROBOTICS

2026 & 2027 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.

☐ Robot is present

☐ ENTRY NOT EVALUATED

PRELIMINARY TESTING OF ROBOT (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-16th:** 5 Points	
					PRELIMINARY TESTING OF ROBOT SUBTOTAL (60 points)	

Rules violations (a deduction of 20% of the total possible points in the semifinalist section) 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: _____

PRELIMINARY SUBTOTAL (60 points)	

SEMIFINAL INTERVIEW (40 points)				Record scores in the column spaces below.
CRITERIA	Minimal performance	Adequate performance	Exemplary performance	
	1-4 points	5-8 points	9-10 points	
Knowledge (X2)	Participants seem to have little understanding of the concepts in their project; answers to questions may be vague.	Participants exhibit a general understanding of the concepts in their project.	Participants show clear evidence of a thorough understanding of the concepts in their project.	
Articulation (X1)	Communication of the project is unclear, unorganized, and or illogical; leadership and/or 21st century skills are not evident.	Communication of the project is somewhat logical and clear; leadership and/or 21st century skills are somewhat evident.	Communication of the project is clear, concise, and logical; leadership and/or 21st century skills are clearly evident.	
Team Participation (X1)	The majority of the delivery is made by one (1) member of the team; the partners may be disengaged from the Interview.	Team members are generally engaged in the process, though one member may take on more responsibility than the others.	Team members are actively involved in the Interview and responses to interview questions; there is shared responsibility on the part of team members.	
			SEMIFINAL INTERVIEW SUBTOTAL (40 points)	

Rules violations (a deduction of 20% of the total possible points in the semifinalist section) 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: _____	
SEMIFINAL SUBTOTAL (40 points)	
To arrive at the TOTAL score, add any subtotals and subtract rules violation points, as necessary. **TOTAL** (100 points)	

Comments:

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

JUDGE

Printed name: _____ Signature: _____

ROBOTICS
EVENT COORDINATOR INSTRUCTIONS

PERSONNEL

A. Event coordinator
B. Judges, two (2) or more
C. Pit Area Judge/Inspector (1)
D. Assistants, two (2)

MATERIALS

A. Coordinator's packet and box, containing:
    1. Event guidelines, one (1) copy for the coordinator and for each judge
    2. TSA Event Coordinator Report
    3. Stick-on labels for entries, as needed
B. Time trial record sheet
C. Qualifier interview time slot sheet
D. Interview questions
E. Testing Arena- 1" PVC pipe setup to the year's theme
F. Course materials based on theme
G. Table with power for the Pit Area for the competitors
H. Table for inspection and tabulation
I. 2-Step ladder with platform for judging
J. Stations or caution tape to separate spectators and participants
K. Safety glasses and vests for judges and coordinators
L. Blue and red tamper proof tape for indicating frequency of controllers
M. Fire extinguisher

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.
C. Review the event guidelines and check to see that enough personnel have been scheduled.
D. Inspect the area(s) in which the event is to be held for appropriate set-up, including room size, tables, chairs, etc. Notify the event manager of any potential problems.
E. At least one (1) hour before the event is to begin, meet with judges and 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.
F. Ensure the judges have access to the online judging system.

EVENT CHECK-IN

A. Participants report to the time and place stated in the conference program and check in and sign up for setup/testing time
B. Late entries are considered on a case-by-case basis and only when the lateness is caused by events beyond the participant's control.
C. In order to compete, participants must be on the entry list or must have approval of the CRC.
D. If check-in is on the first day of the conference, requirements for attire do NOT apply during check-in.
E. Secure the entries in the designated area.

PRELIMINARY ROUND

A. Assist judges with the check in/setup of pit area.
B. Assist judges with the Robot of the event.
C. 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
    2. To disqualify the entry

    The event coordinator, judges, and CRC manager must initial either of these actions on the rating form.

D. Begin the time trials at the scheduled time.
    1. Every Robot that is compliant with rules should have the opportunity to be tested.
    2. Public viewing is allowed.
    3. Announce at starting time: The challenges must be completed in the allotted ten (10)-minute window. If necessary, repairs or adjustments to the robot or its components can be made, but the clock will not stop and no additional time will be awarded to complete the challenges.
E. Position a judge on either side of the testing area to view the trial.
F. If a time is not properly recorded, a rerun may be ordered at the discretion of the event coordinator.
G. Record preliminary times on a time trial record sheet.
H. The testing of the robot times will determine the top sixteen (16) results.
I. Create the semifinalist sign-up sheet.

SEMIFINAL ROUND

A. Post the top sixteen (16) teams with interviews times.
B. Robot builders report to the designated area posted time for a ten (10)-minute Robot Team interview.
C. Conduct interviews with the qualifying top sixteen (16) Robot Teams.
D. Begin the semifinals at the scheduled time.
E. Discuss rule violations (e.g. 20% deduction, disqualification) and have all relevant parties initial the rating form.
F. If necessary, manage the security and removal of materials from the event area.