

OVERVIEW

Applying leadership and 21st century skills, participants design, build, and test a robot that will be used to throw out the first pitch at the Rockies baseball game May 5, 2022. See design challenge description below.

MANDATORY REQUIREMENTS

All participants must be members of an affiliated TSA chapter in Colorado. Communication regarding this event is done through Colorado TSA ONLY. **Do not** contact the Colorado Rockies. Questions and document/video submissions will be completed on the COTSA website: coloradotsa.org under the STEM at the Rockies tab, Submission deadline April 15, 2022

ELIGIBILITY

Open to high school TSA chapters.

One (1) team of two to six (2-6) members per chapter may participate. Only four (4) students are allowed on the field.

ATTIRE

TSA competition attire is required.

PREPARATION

- A. Participants must understand the fundamental concepts and principles of the challenge. Research shall focus on:
 - a. Analysis of current spaceflight and space exploration programs.
 - b. Future goals of space exploration.
 - c. Benefits and consequences of space exploration.
 - d. Timeline of preparation and travel to outlying planets within the Solar System.
- B. Participants prepare a video presentation according to the regulations.

REGULATIONS AND REQUIREMENTS

Students will work to develop their leadership and 21st century skills in the process of preparing for and participating in this Colorado 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. The Documentation Portfolio
 - a. The documentation portfolio must be saved as a single, multi-page PDF document with the pages presented in the following order:
 - i. Title page with the high school chapter, advisor name and the team members names
 - ii. Description of the design that includes an explanation of the inspiration for the design, materials, batteries.
 - iii. Photographs of the process of designing, constructing, and demonstrating of the robot.
 - iv. Initial design sketches as well as final detailed drawings, complete with dimensions and parts clearly labeled
- B. The Video Presentation
 - a. The team video presentation should not exceed 7 minutes.
 - b. The physical robot must be designed and constructed prior to the event.
 - c. Physical robots can be built from recycled, salvaged, or commercial materials. Any robotics platform or vendor can be used. Any robot control system can be used. Commercial kits can be used, combined, adapted, and re-engineered for the Design Challenge.
- C. Submission
 - a. Participants submit the multi-page PDF of the documentation portfolio and hyperlink to the digital display to the designated submission file.
 - a. Submission information will be provided on the Colorado TSA website under the STEAM at the Rockies tab.
 - b. If a URL link is provided, the URL must point directly to the participant's entry. Entries that require software download, or a request that access be granted, will not be judged.
 - c. Entries received, or changes made to the submitted entries after the deadline will not be judged.
- D. Judges score the entries based on creativity and ability.
- E. Three (3) semifinalists are announced.

SEMIFINAL ROUND

- A. The Trials
 - a. Participants will demonstrate their robots' abilities to the spectators on the Rockies field.
 - b. The spectators will choose one winner to throw the first pitch.

EVALUATION

PRELIMINARY ROUND

- A. The documentation portfolio
- B. The video presentation

SEMIFINAL ROUND

- A. Practice pitches at Rockies field, May 5, 2022, at 10:30.

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:

DESIGN CHALLENGE:

Colorado TSA is seeking your robotic design for the upcoming STEM Day at the Rockies. This is a unique opportunity for COTSA students to demonstrate their creativity and love for technology and engineering. Please read the following carefully.

Robot must use an "arm" to throw a regulation baseball 51 feet. Be creative

Must weigh no more than 100 pounds

Must be stationary. Students will need to carry the robot on and off the field. No more than four (4) students on the field. Robot needs to stay self-contained.

If power is needed, use alternative power as no plugs are available on the field

DO NOT:

Make a potato gun or pitching machine type robot.

No – compressed air, chemicals, combustibles, or tire shoot

Damage the field

- 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:

- Biomedical engineer
- Civil engineer
- Electronics engineer
- Environmental scientist
- Geophysicist
- Manufacturing consultant
- Mechanical engineer
- Data scientist
- Robotics engineer