

AGROBOTICS CHALLENGE

ENTRY DEADLINE: DECEMBER 1, 2022

Superintendent: Derrick Bruton, Dr. Tamra McGaughy

CHALLENGE SCHEDULE

Game Release <i>by Texas 4-H</i>	Thursday	September 15	12 PM	Online
Registration	Thursday	February 16	7:30 AM	EXPO2
Orientation	Thursday	February 16	8:30 AM	EXPO2
Build Time	Thursday	February 16	9 AM	EXPO2
Robot Challenge	Thursday	February 16	10:30 AM	EXPO2
Lunch Finalists	Thursday	February 16	following prelims	
Challenge Finals	Thursday	February 16	following lunch	
Awards	Thursday	February 16	following finals	

This show is subject to the San Antonio Stock Show & Rodeo General Rules, Junior Rules and Special Rules listed in this section.

CONTEST DESCRIPTION

This is a challenge-based contest. A pre-determined set of known challenges will be released September 15th prior to the contest, and the remaining on contest day. Teams must build and program their robot for known challenges prior to the contest. On contest day, the remaining unknown challenges will be revealed, and teams will be given time to build and program the robot to account for the unknown challenges. Known challenges and study resources are posted at <https://texas4-h.tamu.edu/projects/robotics/>.

SPECIAL RULES

- Entry:** Entries and payment must be submitted online and any necessary official San Antonio Stock Show & Rodeo forms must be completed. 4-H Clubs/FFA Chapters may submit a check if selected at entry checkout. There is no limit on the number of team entries entered per club/chapter, but a contestant may only participate on one team. However, due to time and facility restraints, entries may be selected by random drawing. If an entry is not selected, entry fees for the respective entry will be refunded.
- Eligibility:** Contestants must meet all Junior Show Rule Requirements. The San Antonio Stock Show & Rodeo makes available to CEAs, ASTs and CTE/STEM Directors in charge of 4-H Clubs, FFA programs or High School CTE/STEM Programs, respectively, the opportunity to enter members of their programs in the Agrobotics Challenge, subject to these rules. The Agrobotics Challenge is also an invitational contest to statewide CTE/STEM programs. Entries in the Agrobotics Challenge must be submitted in the name of the county 4-H club, FFA chapter or high school by the respective CEA or AST or CTE/STEM director. Contestants must be bona fide members of a Texas 4-H Club, Texas FFA Chapter or a student of a Texas high school. They must be enrolled in and attending public, private or home school elementary or secondary schools in Texas at the time of the event.
- Teams:** Each team will consist of at least three (3) and no more than four (4) members. Team may not include members from different age divisions. Team members may only compete on one team.
- Age Divisions:** The contest is divided into two (2) divisions (*Age as of August 31, 2022*):
 - Junior (Team Competition) Ages 8-13
 - Senior (Team Competition) Ages 14-18
- Registration Forms:** Team registration forms are available [here](#). Coaches are encouraged to bring completed forms to the registration table the day of the respective contest in order to expedite registration.

- 6. Minimum Construction Skills and Proficiency:** Competitors must be capable of designing and building a functioning Lego Mindstorm robot that includes the use of:
- Motors
 - Light/color sensor
 - Touch sensor
 - Ultrasonic sensor
 - Levers, arms, claws, etc.
 - Incorporating non-Lego parts into robot design and/or function
- 7. Minimum Programming Skills and Proficiency:** Competitors must be capable of programming a Lego Mindstorm robot in order for the robot to:
- Move
 - Turn
 - Lift
 - Maneuver attachments effectively
 - Use sensors appropriately and effectively
- 8. Equipment:** Each team must supply their own equipment for the challenge. Each team may only bring the supplies listed in the table below. Equipment will be checked by contest officials as teams check in for the contest. Any extra equipment or item that does not meet specifications will be returned to the team coach. No infrared beacons (remote) or sensors allowed.

UPDATED

Unlimited Quantity	Lego® Mindstorm® NXT, EV3, Spike Prime, or Inventor building pieces (excludes brick, motors, and sensors)
Unlimited Quantity	Backup rechargeable batteries or sets of AA batteries
1	Lego® Mindstorm® NXT, EV3, Spike Prime, or Inventor brick/hub
Unlimited Quantity	Lego® Mindstorm® NXT, EV3, Spike Prime, or Inventor motors
Unlimited Quantity	Lego® Mindstorm® NXT, EV3, Spike Prime, or Inventor ultrasonic sensor
Unlimited Quantity	Lego® Mindstorm® NXT, EV3, Spike Prime, or Inventor touch/force sensor
Unlimited Quantity	Lego® Mindstorm® NXT, EV3, Spike Prime, or Inventor light or color sensor
Unlimited Quantity	Lego® Mindstorm® EV3 gyro sensor
1 or 2	Laptop computer or tablet with programming software (Lego® or non-Lego® is acceptable)
1	USB Cable (for robot-computer connection)
Unlimited Quantity	Build Plans (paper or digital)
1	Plastic container or cardboard box for transporting robot to and from game area
1	Ruler or tape measure
Unlimited Quantity	Pencils and notepad with blank paper for design and note-taking purposes

*No two-prong extension or powers strip plugs allowed.

- 9. Agriculture:** The challenge will include various components focused on agricultural industry knowledge. This will include but is not limited to the basics of livestock breeds and crop production. Students should be familiar with basic agricultural concepts.

10. **Scoring:** Point values for each separate challenge may vary, depending on the level of challenge difficulty. Penalties will also depend upon challenge design, but examples may include: knocking over pieces, restricted human interaction with robot or game pieces, excessive retrievals, etc. Points will be awarded or deducted for each round of match play. Additionally, a teamwork score will be assessed by a panel of judges and added to the match scores to form the preliminary team score. The preliminary team score determines qualifiers for finals. After each match, the team captain will initial the score sheet, indicating agreement to the points awarded. Once signed, the match score is final and cannot be challenged. The contest tabulator will review the score sheet and will correct any mathematical inaccuracies.
11. **Bluetooth and Internet Connectivity:** Bluetooth connections can be made and utilized during the Build Time. It is not allowed during the competition phase while the robot is on the playing field. No internet connectivity will be provided. Teams are advised to make sure their computer's operating system, software, and robot firmware are up to date prior to the contest.
12. **Awards:** Placings awards will be determined by the committee and are based on sponsorships. Special awards may also be given based on sponsorships and committee decision. The contest results, as announced, will be final.
13. **Participants with Disabilities:** Any competitor who requires auxiliary aids or special accommodations must contact the Livestock Office at least two weeks before the competition.
14. **Rules of Play:**
 - a) Teams must pre-build and program a robot prior to the competition.
 - b) Teams will report to the designated location for check in and submit their robot and additional pieces/equipment for inspection.
 - c) Each team will be directed to a team pit (one 6' or 8' table and chairs). Each pit will have access to electricity to power laptops and robot batteries.
 - d) An orientation will be provided for all participants where show management will review the challenge, rules and scoring.
 - e) The design of the game and designated number of challenges will be released in advance of the contest. There will be 3 to 4 additional unknown challenges revealed contest day, during orientation.
 - f) Each team will have 1.5 hours for additional designing, building, programing, and testing of their robot.
 - g) Teams will practice and compete on the same game table.
 - h) If time permits, teams are allowed to make alterations to their robot design and/or program between matches.
 - i) Teams must report immediately to the playing field when called.
 - j) The robot must perform challenges autonomously.
 - k) Only registered contestants and contest officials will be allowed in the pit Robot Challenge areas.
 - l) Teams that may experience any equipment malfunction(s) may not replace the equipment with supplies outside the contest area (from leaders, volunteers, county Extension agents or contest officials). Instead, team members must work together and be creative in completing preparation without the malfunctioning equipment or visit with other teams to borrow the needed part.
 - m) Depending on the challenges, contest officials may provide non-Lego items that can be incorporated into the design of the robot.
 - n) Coaches will be permitted to meet with their team for a 10-minute time period prior to Build Time. This time should be used to help team members develop a plan and foster positive youth development. Due to space limitations, there will not be a spectator area available until the finals.
 - o) No cell phones or other types of communication devices are allowed in the pit or contest areas. Exceptions include the approved items listed in the Participant Rules. During Build Time and Robot Challenge, contestants are not allowed to communicate with spectators (including coaches and parents).
 - p) A match will range between 1 and 3 minutes in length, depending upon the challenges designed for competition. The specific time limit will be announced during the orientation. Contest officials will make periodic announcements regarding time remaining in Build Time.
 - q) Teams will have two preliminary matches in which to earn points. The sum score of the two matches plus the teamwork score will determine teams that qualify for the finals. The top 3 teams in each age division will advance to the final match. If there are fewer than 3 teams in an age division, no finals will take place. The total score from the preliminary matches (match + teamwork scores) will be used for preliminary placings.

- r) Finals will consist of two additional matches. The two match scores from the final round will be added to the total preliminary score. Finalist teams will be ranked based on their total scores. Judges' results are final.
 - s) Tie-breaker procedures will be announced during orientation.
 - i. Teams must clean up their pit areas prior to the awards ceremony. Teams not making the top 5 are free to leave once their pit area has been cleaned and are dismissed by contest officials.
15. **Scholarships:** Refer to the Junior Livestock Show Scholarship section of the 2023 Competitive Events Premium List.

(Specific challenge and score values will be detailed at the contest)

TEAM NAME/NUMBER:			ROUND 1 2 (circle one)		AGE DIVISION Jr. Sr. (circle one)	
CHALLENGE NAME/DESCRIPTION		POINT VALUE PER ITEM	POINTS AWARDED	PENALTY POINTS DEDUCTED	TOTAL POINTS	
1. Will be noted on the day of competition		TBD				
2. Will be noted on the day of competition		TBD				
3. Will be noted on the day of competition		TBD				
4. Will be noted on the day of competition		TBD				
5. Will be noted on the day of competition		TBD				
6. Will be noted on the day of competition		TBD				
7. Will be noted on the day of competition		TBD				
8. Will be noted on the day of competition		TBD				
9. Will be noted on the day of competition		TBD				
10. Will be noted on the day of competition		TBD				
11. Will be noted on the day of competition		TBD				
12. Will be noted on the day of competition		TBD				
13. Will be noted on the day of competition		TBD				
14. Will be noted on the day of competition		TBD				
				TOTAL (maximum =)		

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