



Texas *4-H Robotics* Contest



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GEAR Robotics Challenge
General Rules

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GEAR Robotics Challenge
General Rules

SPECIAL NOTE

These rules have been adapted for Texas 4-H with permission from the GEAR Robotics. These rules are specific to Texas 4-H Robotics competition and should not be used in conjunction with other non 4-H GEAR Robotics competitions.

Definitions

Starting Configuration	The maximum allowable dimension (12" long, 12" wide, and 12" tall) allowed for a robot prior to the start of the match.
Competition Configuration	The maximum allowable dimension (16" long, 16" wide, and 16" tall) a robot may expand to after the start of the match.
Playing Field	The official game table used by the tournament consisting of up to four playing areas for the contestants.
Possession	An item that is in control by the robot and that is not touching the playing field surface. An item is considered in possession if the robot is fully supporting (item not touching the playing field surface) the item, and changes speed or direction cause the item remain in the same position in relative to the robot.
Preloading	The act of loading game element onto the robot prior to the start of the match.
Match	A single 2-minute game played on one playing area.

4-H Team Divisions

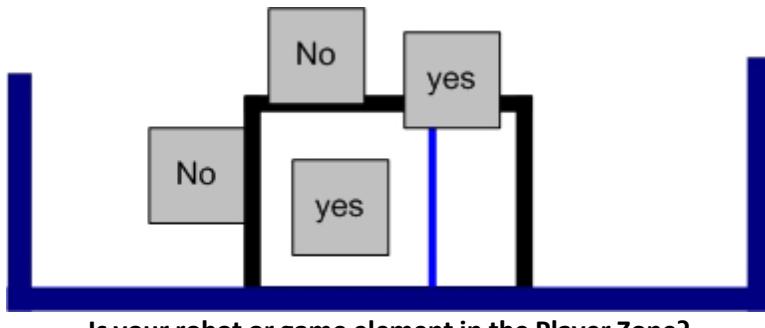
- * Teams will be divided into two age divisions:
 - Juniors: includes Texas 4-H juniors and intermediates (4-H age of 8-13 years old)
 - Senior: includes Texas 4-H seniors (4-H age of 14 to 19 years old)
- * Participants must be actively enrolled in Texas 4-H in order to compete.
- * Age is determined as of August 31 of the current 4-H year.
- * Teams consists of 2-6 members within the same age division

General Rules

- * Only one robot per team will be allowed in the tournament. Backup robots will **NOT** be allowed. Teams found in violation will not be allowed to compete in the tournament and will forfeit any point accumulations until they satisfy this rule requirement.
- * Matches are two minutes in length. The match will begin with a 3, 2, 1 countdown, blow of a whistle, or other sound. The match will end with a 3 second countdown, blow of a whistle, or other sound.
- * No rematches will be awarded unless it is deemed that there is a failure of GEAR provided field materials.
- * No time-outs will be allowed for any reason, unless determined by tournament officials.
- * All scoring disputes must be settled before the team leaves the field.
- * Robots must remain in the start box in the player zone and conform to the starting configuration until the match starts. Once the match starts the robot can be moved to any location within the player zone and assume the competition configuration.
- * Robot attachments and components may extend into the robot zone from the player zone after the start of the match. Prior to the start of the match, the robot and all components (attachments, etc.) must be within the player zone.

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- * Robots will be allowed to cross robot zone boundaries; however the robot belonging to that zone will have right of way. The referees will monitor robots outside their robot zones. If the referee determines that a robot is on a collision course or will block the opposing robot, the referee will remove the out-of-zone robot and place it back in the respective player zone.
- * Contact with the robot or game elements is limited to the player zone. Robots and game elements are considered in the player zone when any part of the robot or game element is located within the white space of the player zone. Items in possession by the robot may be touched by the players without penalty as long as the robot is considered to be in the player zone.



Is your robot or game element in the Player Zone?

- * Items not in possession by the robot must cross into the player zone before players are allowed to pick up those items without penalty. Items are considered in the player zone when any part of the item is located within the white space of the player zone. Use diagram above to determine if the item is in the player zone.
- * Players may contact the robot in the robot zone, however the robot **MUST** be returned back to the player zone. Items in possession by the robot may be kept on with the robot as it returns to the player zone. All other items will remain in the robot zone wherever the robot left them at the time of pickup. Contact will result in a penalty.
- * Stealing or interfering with other player's game pieces is not allowed and will result in disqualification from the match. Unintentional interference may be possible (robot veering off course, etc.). Referees will have sole discretion on whether the interference was unintentional or not, and should reset any game element back to its state prior to the interference. This rule only applies to game elements belonging to the opposing team.
- * Players may preload the robot with game elements that originate from the player zone prior to the start of the match without penalty as long as it does not violate a previous rule. Preloaded game elements may not extend beyond the robots starting configuration.
- * Teams may bring a container to hold attachments and game elements to the field. The container should not be greater than 24" long, 12" wide and 12" deep. Containers should be presented at the time of inspection for compliance and may be randomly checked by the referees at any time. Containers may be randomly inspected during the tournament to insure compliance. Teams who violate this rule will not be allowed on the field until they are in compliance with the rule.
- * Teams **must return** all game elements to the field prior to leaving the game table. Violation will result in an **immediate** delay of game penalty.
- * Attachments not being used by the robot, must remain in the player zone, or may be stored off the field in a container. Attachments are subject to player zone rules. Any attachment deemed to be in the robot zone must be retrieved by the robot before it can be used.
- * Robots may interact with game elements on the field by dragging, grabbing, lifting, pushing, pulling, storing onboard or other method as long as legal parts are used in such action. Interactions with game elements should not cause damage to the game element during the process.

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- ⌘ Teams may use alignment guides during the match. Alignment guides **may not extend** into the robot zone at any time. Light emitting from laser pointers will be considered as extending into the robot zone. Violation will result in loss of use of the alignment guide during the match and a 10 second penalty.
- ⌘ Teams may ask the referee to retrieve the robot from the robot zone; however you will only be allowed 4 penalty free requests. After the fourth request, the team will be subject to penalty rules regardless as to who is picking up the robot in the robot zone.

Scoring Rules

- ⌘ The referees make all decisions regarding scoring and have final authority during the competition. **Referees will not review recordings of the match.**
- ⌘ Final scoring will not be tabulated until after the end of the match unless otherwise noted in the game rules.
- ⌘ Students will initial the score sheet indicating that they agree the score is correct. **Once this process happens there will be no further review of the score.**
- ⌘ All scoring must be done by the robot under its own power and control unless otherwise noted in the game rules
- ⌘ All game elements will be scored on their final resting place at the conclusion of the match. Items in possession by the robot will not be scored unless the robot is in the player zone when the match clock expires.
- ⌘ Game elements being touched or supported by the robot at the end of the match will not be scored unless otherwise noted in the game rules, or the robot is in the player zone.

Penalties

- ⌘ Delay of game penalty will incur a 5 point deduction. Violations include:
 - Taking longer than a minute to setup on the field.
 - Taking longer than one minute to remove the robot from the field (*unless the referee is still scoring the field*).
 - Removing a game element form the playing field area.
 - Team not present in the cuing area when called for the next match. Referees may use discretion on this rule in the event that the team has been delayed by a judge's interview, or some other action. It will be up to the head referee to determine if a penalty should be assessed in cases not specifically listed on this rule.
- ⌘ Placing of a game piece in a scoring area (bin, platform, etc.) by a human player will incur a 10 point deduction. Any game pieces placed by the human player will be removed from the game area for the remainder of the match and the piece will not be scored.
- ⌘ Picking up the robot in the robot zone during the course of the match will incur a 5 point deduction.

Match Play

- ⌘ Teams will be randomly drawn to compete in a round. A round consists of 4 matches, playing on each of the 4 playing fields. Check with your local tournament coordinator on what format is planned for your tournament.
- ⌘ Teams start with zero points at the start of match play and accumulate points based on the results of their matches. The lowest match score of the 4 will be dropped to make up the match play score. The final team score will include match play plus presentation/interview score. (See Educational Presentation/Technical Interview section)
- ⌘ Up to four teams will compete per match.
- ⌘ The top 4 teams with the highest final team scores (per age division) will advance to the final round. *If there are fewer than 4 teams in an age division, there will be no final round for that age division.*

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- ⌘ In the event that there is a tie at the conclusion of match play rounds, the following criteria (in order) will be used to determine finals qualification:
 1. The team with the higher single round score during the match play will be selected.
 2. If a tie remains, the team with the higher presentation/interview score will be selected.
 3. If a tie remains, the lowest number of penalties incurred during match play will be selected.

Final Round

- ⌘ The top four (4) teams from match play will compete in the final round.
- ⌘ Team scores will be reset back to zero.
- ⌘ Only final match play scores will be used to determine the top 4 placings.
- ⌘ In the event that there is a tie at the conclusion of the semi-final matches, the following criteria (in order) will be used to access the rank order for the final matches:
 1. The team with the higher presentation/interview score will be selected.
 2. If a tie remains, a single sudden “death match” will be played and the team with the higher score will be selected.
 3. If a tie remains, the lowest number of penalties incurred in the “death match” will be selected.

Educational Presentation/Technical Interview

- ⌘ Educational Presentation:
 - Junior - Presentation will be directly related to the theme of the contest, with emphasis on real world problem, and tested design of workable robot related task to assist in problem solving identified by the team. Presentation will be a maximum of eight (8) minutes in length and can be open to any type of live communication. Pre-recorded media of prototype (prototype designed, built, and programmed by the intermediate team) demonstration will be allowed, but will count against the total time limit.
 - Senior - Presentation will be related to a self-selected topic relating to the theme of the event. Emphasis on real world problem identification and workable robotics related task to assist in problem solving. Presentation will be ten (10) minutes in length and can be open to any type of live communication. Pre-recorded media of prototype (prototype designed, built and programmed by the team to identify key issues the prototype robot can assist in solving) demonstration will be allowed, but will count against the total time limit.
- ⌘ Technical Interview:
 - Junior and Senior - Technical Interview will be restricted to engineering principles employed to build, test and redesign robot, and teamwork in preparation of all components of the contest. Programming of the robot will also be part of the technical interview. There is five (5) minute time limit for the technical interview.
- ⌘ Teams will receive from 0 (zero) to 150 points.

The Robot

Definitions

Robot	An autonomous device designed and built by students to perform specific tasks as dictated by the game challenge. It is electrically powered by the onboard RCX, NXT or EV3 controller. It uses various electrical and mechanical systems from the Lego or additional materials listed in rule RC6 to accomplish its tasks.
Additional Materials	A list of additional items that are not part of the Lego RCX, NXT or EV3 kits, but are legal to use in the construction of the robot.

Robot Construction Rules

- ⌘ Only students are allowed to design, build and program the robot. Adults may assist with troubleshooting design problems.
- ⌘ Robots must fit in a box 12" long, 12" wide, and 12" high prior to the start of each match. Robots may expand up to 16" long, 16" wide, and 16" high after the match starts.
- ⌘ The "minimum robot" that may be used in the tournament must contain the following parts:
 - RCX, NXT or EV3 controller brick.
 - Up to three motors
 - Up to three sensors
 - Associated cabling for motors and sensors
 - Batteries (including rechargeable)
 - Any structural component currently available in the RCX , NXT or EV3 Lego kits
- ⌘ The following sensors may be used: accelerometer, compass, gyroscopic, light/color, rotation sensor, sound sensor, touch sensor, and ultrasonic sensor.
- ⌘ Pneumatic systems will **not** be allowed.
- ⌘ Teams may use the following materials in the fabrication of the robot:

NOTE: There will be no restriction on the quantities or sources of non-electric Lego components, however all Lego components must be in original factory condition. Use of non-Lego components will be prohibited (I.E. Megablocks components), except for the additional items listed below.

- ⌘ Quantities listed are per-tournament (not per match). Items limiting length or quantity mean that you can only use that amount to carry you through the entire tournament.
 - Lego RCX, NXT, or EV3 components (*does not matter if it is a retail kits, educational kits, or expansion sets*)
 - 1 – foam, paper, or plastic cup up to 32 oz. in size
 - 20 – Paper clips, any size.
 - 10 –Rubber bands, up to 6 inches in size
 - 1 - 8.5" x 11" file folder
 - 1 - Empty tissue box. Any size
 - 2 - Wooden pencils – not to exceed 8" in length and $\frac{1}{4}$ " in thickness (Example: standard #2 pencil)
 - 1 - Paper towel, or toilet paper tube
 - String (not to exceed a length of 2 feet)
 - 2 feet of masking tape. Tape may not exceed 2 inches in width
 - Paper glue
 - 5 - Drinking straws
 - 4 – CD ROM disks
 - 1 – CD ROM plastic case or cardboard sleeve
 - 12 – Craft pipe cleaners (12" in length)
 - Staples, not to exceed $\frac{1}{2}$ " long by $\frac{1}{4}$ " deep. Staples should be properly folded and not pose a puncture or safety hazard
 - Non-slip carpet padding (up to 1 square foot) Brand example: Ultra Stop Non-Slip Indoor Rug Pad

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- ⌘ The robot may be decorated using materials not listed; however these materials must be non functional, meaning that they can be removed without affecting the performance of the robot. Robot size rule will apply to non-functional decorations.
- ⌘ No remote control (wired or wireless) devices of any kind. Tethering devices will be considered as remote control devices and are therefore not allowed.
- ⌘ Devices whose sole intention is to impede/disable another robot will not be allowed. Teams employing such tactics will be **disqualified** from the tournament.

Robot Inspection

- ⌘ All robots must pass inspection before they are allowed to compete in the tournament. Robot inspections will take place on the day of the tournament.
- ⌘ Robots may be re-inspected at any time during the tournament to insure compliance.
- ⌘ The following criteria will be used to determine compliance:
 - Robot conforms to a 12" long, 12" wide, and 12" high footprint.
 - The largest attachment does not cause the robot to exceed a 16" wide, 16" long, and 16" high dimension.
 - Robot meets the "minimum robot" requirements
 - Robot is constructed using only allowed materials
 - Non functional materials do not enhance robot capabilities
 - Attachment or game element containers must not exceed 24" long, 12" wide and 12" deep.

Questions, Updates, Etc.

Game or rules related questions	Please use the game Q&A form on the gearrobotics.org website if you have a question about the game or need clarification on a game rule or general rule. Please read the Q&A regularly as the Q&A will take precedence over any rule in the game or general rules.
Non-game related	Please contact your local county Extension office for non-rules related questions (deadline, tournament date, etc.).
Be a volunteer!	The success of our 4-H Robotics is due to our volunteers. Contact your local County Extension Agent on how to become a volunteer for the tournament.

Awards

1 st – 4 th	Awards given to the top 4 teams in each age division, determined by the final round.
High Point Presentation/Interview	Award given to the highest scoring educational presentation/technical interview team score in each age division.
High Point Match	Award given to the team in each age division that scores the highest points in a single match (excludes final round matches).
Contest Specific Award	Contest officials may award another category of specially named awards for their contest to adequately recognize youth who have made a personal decision to increase their knowledge of science, engineering and technology.