Robotics- Sumo

LEVEL: High School

DIVISION(S): Grades 9th -12th combined

COMPOSITION OF TEAMS: 2-3 students per team

NUMBER OF TEAMS: Preliminary – Determined by your local Center
Regional – Not eligible

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OVERVIEW: Sumo is a test of engineering design, as well as programming and strategy. Two autonomous robots try to push each other out of a circular ring board.

MATERIALS: LEGAL:
LEGO EV3 or NXT built with LEGO parts ONLY!

ILLEGAL:
1) Components that may be hazardous to participants, the board, or other robots, including, but not limited to:
   • Sharp or pointed edges
   • Strong magnets
   • Liquids
   • Shooting parts
   • Any kind of flame or flammable component
   • Any kind of device or component that may interfere with the autonomous functioning of robots, including any kind of remote or jamming device

2) LEGO or other modular pieces may not be glued together.
3) Non-LEGO pieces may be NOT be used (ex. tape, paper, cardboard, rubber bands, string, etc.)
   Note: Tape may only be used for identification purposes only (New Rule)
4) Controlling a robot with a remote control or other device is NOT ALLOWED.

The following materials will be provided by the Host Center:
   ● Sumo Board (circular ring board)
   ● Stop watch
   ● Elimination Chart
   ● Weight scale capable of measuring 2kg with 1g or greater precision
   ● 30cm X 30cm Square
RULES:

1) Robots must be safe. A robot should not be a danger to competitors, other robots, or the competition ring. They should not have sharp parts, and should not have pieces that shoot or could fly off. If so, the robot whose piece falls off will forfeit the round.

2) Sumo Board: The ring is a 36” Diameter board, 3/4” thick, painted with an interior black circle 32” in diameter, with a 2” white border (ring size may depend on material availability). The board must be placed on a level surface.

3) Competitors are randomly listed on a single elimination or in a round-robin tournament bracket, please check with your center director about the type of bracket that will be used at MESA Day. Matches are announced by judges, competitors must be present (a minimum of one team member) at the time their match, in order to compete.

4) Participants place their own robots in the ring. Robots begin back to back facing opposite directions. After each round, opponents switch sides. (New Rule)

5) After the judge announces “On your marks, get set, go,” Robots are triggered to begin by the competitors. However, Sumo Robots must wait 5 seconds before moving.

6) After 5 seconds, Robots must travel away from their competitor, moving towards the white edge of the ring, use the color sensor to then turn around BEFORE attempting to push the opponent out of the ring. (New Rule)

7) A robot may push, shove, lift, or knock over the other robot while attempting to push it out of the ring.

8) The robot that pushes another robot out of the ring is the winner. If both robots fall out of the ring, the first robot to fall out of the ring loses. If any part of a sumo robot touches the floor or table surface outside of the ring, that robot loses the round.

9) Each round, Sumo robots attempt to push each other out of the circle. Rounds are 1 minute. A robot that wins 2 out of 3 rounds is the winner, and will advance. If no robot has won after 1 minute the round is considered a draw. Judges may decide to do rounds over if there is a draw.

10) If robots become entangled, or stuck in a prolonged pushing match, the judge will halt the bout, and the robots will be restarted at their starting positions.

11) Competitors and spectators may not touch robots, the ring, or otherwise interfere during the match. No one should be within 1 meter of the Sumo ring, so as not to interfere with sensors. After triggering their robots to start, competitors should step back away from the ring.

12) Competitors (not adults or anyone else) may make minor repairs or adjustments to their robots between rounds, such as changing programs or moving adjustable components. However, competitors may not delay matches. Delaying a match may lead to forfeit.
JUDGING:

Checking Specifications:

1) Mass Limit: maximum **1000 grams**

2) Horizontal Dimensions: maximum **30 cm X 30 cm** – use a pre-measured square No Height Limit!

3) Robots must be safe. During prejudging, judges must determine if a robot could be a danger to competitors, other robots, or the competition ring. They should not have sharp parts, and should not have pieces that shoot or could fly off.

4) Judges must randomly place competitors on a single elimination chart, attempting to minimize the number of byes.

Running a Sumo Competition:

1) It is helpful to have multiple judges watching a match to help determine when a robot has left the ring.

2) A separate judge should be responsible for timing each round. If the round needs to be paused, because of the immobility of both robots, the timer should stop to allow the robots to be separated and repositioned.

3) Delays: If a robot requires repairs or adjustments between rounds or matches, competitors must make those repairs as quickly as possible. Judges should not wait more than 2 minutes between rounds or matches beyond the amount of time it takes to set up each round.

4) Robots should win 2 out of 3 rounds. In the case of a draw, the lead judge should allow another round to determine the winner.

AWARDS: Awards will be given for the 1st, 2nd and 3rd place teams.
ATTACHMENTS: Ring Diagram

Initial Positions:

Inner Circle Color: BLACK
Outer Ring: WHITE