

## SUMO BOTS

1. **DESCRIPTION:** Students will design and construct a robot (bot) that will attempt to move an opponent's robot from a ring.

**A TEAM OF UP TO:** 2      **IMPOUND:** Yes      **APPROXIMATE TIME:** 2 min. competition time.

2. **CONSTRUCTION OVERVIEW:**

- b. Remote control cars may be used if the car is modified. Modified means something has been altered on the car (e.g. different body, wheels, or additions like scoops, arms, or other offensive devices.)
- c. Robots must be controlled by radio remote, no cords or wires will be permitted. The bot must be able to operate on three frequencies. (See at <http://www.soinc.org> for details).
- d. Robots must be powered by electricity, no fuel or combustion engine designs will be allowed.
- e. The robot's maximum dimensions will be 40 cm long by 40 cm wide by 40 cm high at any time during the competition. Teams must include the school name on the bot.
- f. The maximum weight of the bot is 2.0 kg, including batteries. The weight of the remote is excluded.
- g. The combined voltage of all batteries located inside the bot cannot exceed 14.4 volts.
- h. The robot may have devices to remove the opponent from the square except any projectiles tethered or untethered, flames, sharp objects, and magnets. Pneumatic devices are not allowed.
- i. Impounded batteries are restricted to the batteries that run the bot and spares for running the bot.
- j. Event supervisors may require teams to submit the 3 frequencies their bot can use prior to the competition.

3. **COMPETITION:**

- b. Competition will proceed in tournament fashion; double elimination with random pairings for the first round. If preliminary rounds are necessary, the top two teams from each of the preliminary rounds will have two (2) bonus points added to their score and will advance to the final round.
- c. When a round of the double-elimination tournament has an odd number of teams, one team will be randomly selected to receive a bye. A bye does not count as either a win or a loss. No team will receive more than one bye in a tournament unless a round is reached with an odd number of participants and all participating teams have already received a bye, in which case the second bye will be issued on a random basis.
- d. Once called to compete, teams will have a maximum of 90 seconds to prepare their bot. If frequency needs to be changed, teams will be given an additional 30 seconds in prep time. Any bot not ready to compete within 90 (or 90 + 30 seconds) of being called will forfeit the match.
- e. After impound, teams cannot work on their bots prior to being called for their first bout.
- f. No recharging facilities will be provided by the event supervisor.
- g. The ring will be a five foot by five foot square with designated starting points in opposite corners.
- h. Bots will start facing each other in opposite corners of the square.
- i. Teams will have two minutes to force the opponent from the arena. If no robot has been declared a winner at the end of the two minutes, then the lighter of the two will be declared the victor.
- j. Any bot damaging or depositing foreign substances on the surface of the ring will forfeit the match.
- k. If a part falls off during the competition, the clock will be stopped, piece(s) removed, and the competition will continue.
- l. If any judge determines that a bot is taking a defensive posture or is backing away continually for 15 seconds, time will be called and that team will receive a stalling penalty. If this is the team's first stalling penalty of the match, the team will receive a 15 second penalty and competition will resume where it left off. If it is the second stalling penalty, the team will forfeit the match.
- m. If bots become entangled so that neither bot can move for 10 seconds, the judges will stop the clock, the teams will place their bot at the ring's start position, and competition will resume.
- n. A judge may call time if either of the bots is obviously experiencing radio interference. If the cause of the interference cannot be determined, the team may ask to change their frequency.

- o. Any team that continues to operate their bot after time has been called will forfeit the match.
- p. Except as described in sections 3. k, l, m and n, once the match has started, there will be no time outs allowed until the match is over.
- q. Definition of “out of ring:” A bot is declared the winner when the other bot is completely out of the ring.
- r. Any bot inadvertently leaving the ring under its own power must re-enter the ring within five seconds. If the bot outside of the ring cannot re-enter within five seconds it forfeits the match. If both bots are outside of the ring (due to driver error) for five seconds, the lighter of the two bots will be declared the victor. Note: 1) any bot inside the ring may attempt to prevent reentry of the bot outside of the ring. 2) If a judge determines that a bot is leaving the ring as a stalling tactic, stalling penalties will be enforced.
- s. If a robot is damaged during competition, the students may make repairs to the bot between matches.

#### 4. **SCORING:**

- b. Any team that deliberately attempts to do physical damage to an opponent’s bot will be disqualified.
- c. Final rankings will be determined as follows: the team that wins the tournament will be awarded first place. The team defeated by the winning team in the last bout of the tournament will be awarded second place. All other teams will be ranked by each team’s number of wins. Ties will be broken by: 1) the total of their losing times divided by the mass of the bot (high score wins), 2) the mass of the robots (lower mass wins).
- d. Bots that do not meet specs cannot compete against bots that meet specs. If more than one team fails to meet construction specs, these teams may compete against each other to determine their rank (if preliminary hours are used, teams may be required to change their competition time to compete against other teams). Teams that do not follow the rules and cannot compete against any similar teams will be ranked by their mass. Teams who fail to follow the rules will be ranked behind all those who did.
- e. Students may take their bot with them when they are eliminated from the tournament. Note: no appeals may be filed once the team has removed the bot from impound.
- f. Any bot that is determined by the event supervisor to be unsafe shall be disqualified.

**Recommended Resources:** All reference and training resources including the **Sumo Bots DVD** are available on the Official Science Olympiad Store or Website at <http://www.soinc.org>

