

## Robotic Tug O' War

<b>LEVEL:</b>	Middle/Junior High
<b>TYPE OF CONTEST:</b>	Team
<b>COMPOSITION OF TEAMS:</b>	2-4 students per team
<b>NUMBER OF TEAMS:</b>	3 teams per Center
<b>SPONSOR:</b>	

**OVERVIEW:** Students will design and build a robot that will pull another robot when connected with a string in a tug of war contest across a center line.

**MATERIALS:**

**Legal**

LEGO robotic controllers

LEGO or other mechanical and structural components, which may include, but are not limited to: Plastic, metal, wood, rubber bands, string, wheels, gears and pulleys (note: metal components, such as VEX, though not illegal, may exceed weight requirements)

**Illegal**

Any 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

LEGO or other modular pieces may not be glued together.

**The following materials will be provided by the Host Center:**

- Two 8' foot or larger tables or smooth, level surface for competition
- Ruler
- Stop watch
- Tow-String: 60cm, with small paperclips on each end, marked in the middle
- Elimination Chart

## **RULES:**

- 1) Robots begin approximately 30 cm from the centerline (approx. 60 cm apart). The line may be marked with tape.
- 2) The tow-string should have slack (not tight) and should be centered. The string must be 60 cm long, with a mark at its midpoint, and small paperclips on each end. No part of the robot shall extend past the paperclip when the round begins.
- 3) Robots must be safe. A robot should not be a danger to competitors, other robots, or the competition arena. They should not have sharp parts, and should not have pieces that shoot or could fly off.
- 4) If any part of a robot crosses the centerline, or any part comes off a robot, that robot loses that round.
- 5) After being triggered, a robot must wait at least 5 seconds before moving.
- 6) If, after 1 minute, no robot has crossed the centerline, the round is to be considered a draw.
- 7) A robot must win 2 out of 3 trials.
- 8) In the case of a draw, where neither robot is successful in pulling the other across the line, the winner is determined by holding a tie-breaking round. In this round, the winner is determined by measuring the distance of each robot from the centerline at the end of the time limit. The robot closest to the line loses.
- 9) If the judge determines that a robot is incapable of pulling the other robot across the line (for example a robot can't move or pull at all), that robot will be disqualified.
- 10) Competitors and spectators may not touch robots, the arena, or otherwise interfere during the match. They should not be close enough to the arena to interfere with sensors.

## **JUDGING:**

### **Checking Specifications:**

- 1) Robots mass not to exceed 1000 grams.
- 2) Robots are not limited in size.
- 2) Tow-bar must allow tow string to be connected with a small paperclip.
- 3) No part of robot can extend past the paperclip.
- 4) A robot may have its own string to connect to the tow-string between the robots, which may be useful for some kind of reel-like device. However, this string and any hook or tow bar attached to it are considered to be part of the robot.
- 5) Wheels and other parts may not be treated with any fluids, glue or other substances.

**Running a Competition:**

- 1) A separate judge should be responsible for timing each round.
- 2) 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.
- 3) 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 are given for 1st, 2nd and 3rd place teams.