



**Mississippi  
Robotics**

# STEM/Sumo Robotics Competition

## March 12, 2022

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### Competition Rules & Events

#### **Competition Divisions.**

3<sup>rd</sup> – 5<sup>th</sup> grade Division A (small robots or equivalent) all dimensions under 14” Field Size: 6’x6’

6<sup>th</sup> – 8<sup>th</sup> grade Division B (small robots or equivalent) all dimensions under 18” Field Size: 10’x10’

9<sup>th</sup> – 12<sup>th</sup> grade Division C (small robots or equivalent) all dimensions under 18” Field Size: 10’x10’

Other SUMO competition division will be made, at the Competition Directors discretion, only if there are extremely small vehicles, extremely large vehicles, Extremely heavy vehicles, or vehicles over 18”

**SUMO Driver-controlled Robots.** All vehicles (robots or R/C cars) must be remote controlled. No wires. All dimensions of the robot must be under the designated size. Robots can be made from standard kits or custom built. In addition, adhesive, tape, cardboard, wood, string, glue, or tie wraps are allowed. Robots can be modified and rebuilt between matches as long as the robot stays within the category size limits. No part of the robot shall be considered sharp and/or dangerous by the judge/referee. Robots shall be designed to push, shove, and lift the opponent robot but not to physically harm or destroy it.

The match shall be two minutes without the clock stopping except for Bluetooth connection issues, not battery issues. Batteries must be kept charged during matches. Vehicles in a stalemate shall be separated by the judge after 10 seconds. Vehicles that leave the play area or after points are scored shall be restarted in the center area. Every time a point is scored the vehicle’s are restarted in the center area. Points cannot be scored in a row without a restart in the center area. The opponents wiring cannot be used for lifting. Robots are highly encouraged to have a covered body with decorations and sponsor ads from the SUMO Banner Ad fundraiser. Please have modified robots re-inspected. All robots must have the inspection sticker before competition.

**Robot Communication.** All driver-controlled communication shall be from a remote device. All robots shall have a unique name so as to not cause any communication confusion. This will be checked before competition.

**SUMO Autonomous.** The SUMO Autonomous event has the same built rules as the driver-controlled event. The SUMO Autonomous is performed on a 4 ft x 4 ft field for Division A and a 6 ft x 6ft field for Division B & C. The mats will be black with a white strip of tape around the edges. The robots are self-programmed with a light sensor to stay within the play area unless pushed off the mat or turned over or disabled for 10 sec.

**Playfield.** Divisions A-C playfield sizes are listed above. Each corner of the playfield shall have an object the robots can knock off the playfield. Each team will score when their colored object is knocked over or out of the playfield by either team. The first colored object knocked over is 20 points and the 2<sup>nd</sup> 10 points. If a robot knocks over the opponents object the points will go to the opponent. For overtime sudden victory round the corner blocks will be removed.

**Tournament Game Strategy.** The robot shall be controlled by a cell phone, joystick enable from a laptop, or a remote device. Each match shall be a running 2 minutes unless stopped by the referee due to loss of Bluetooth or remote-control connection. Scoring does not stop the time. At the beginning of the match and after any score the robots will be started in the center square facing opposite directions. No match can score two scores in a row

without a restart. If two scoring situations occur then the referee must determine which was first or declare no points and restart.

The goal is to disable your opponent by turning them over, lifting them, or by pushing them outside the field. One wheel off the mat and touching the floor is considered off. 30 points is scored when you disable your opponent on the mat, 20 points when you push your opponent off the mat, 20 and 10 points for the corner objects. The owner of the colored corner object gets the points. Any part assembly (one piece or several attached) that falls off your robot is -5 points. The referee will remove the part from the mat. The match will not stop when parts fall off. Based on the referee decision, robots partially disabled will be given a maximum of 10 seconds to right themselves and continue play.

Robots that are locked in a stalemate for more than 10 seconds, or at the referee discretion, shall be separated by the referee and restarted in the center square. When both robots are turned over or exit the playfield simultaneously the referee will decide which, if any, was first and points given accordingly. If no decision can be made the referee will restart the robots with no score given. Matches will not be stopped for dead batteries. Charge your batteries between matches.

Two sets of points cannot be scored at the same time. Any score will stop play and restart in the middle. For example, if robot A pushed a corner block off the mat for 10 points and then robot B pushes robot A off the mat for 20 points, the 2<sup>nd</sup> 20 points will not count.

Clock is only stopped when any wireless connection is lost. Clock will continue when the connection is made.

**Competition Events.** There will be a maximum of five (5) events for each student. Two are required and a sixth event will be a demo event. All events are listed below. Changes MIGHT be made previous to competition day but no changes can be made on competition day.

**Math Problems.** Each student will be given a set of 20 math problems based on their grade level. They will have 15 minutes to work all 20 problems. Each problem is worth 5 points. Credit may be given if the student shows their work. Math is a required event to earn prizes.

**Science Questions.** Each student will be given a period of time to observe and match the names of 25 science related objects, pictures, or experiments. Science ID is a required event to earn prizes.

**Tool ID.** Each student will be given a period of time to observe and write the name of 25 basic tools. Correct spelling will earn the maximum points.

**Virtual Reality.** This is a demo event. Students doing this event will earn 100 points. It will be a VR puzzle game designed for Mississippi Robotics.

**SUMO Wrestling Robots.** Driver-controlled or Autonomous. Student can select one or none, but not both.

**Point Award Determinations.** STEM Points are given for all events. All 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup>, and 4<sup>th</sup> in Mystery. STEM Points certificates will be issued and redeemed at our STEM Store after the competition for a large variety of prizes.

### **Guidelines and Suggestions.**

1. This is a STEM competition based on critical thinking skills and on robotic build and drive strategy. Each event requires focus and attention to accomplish the best results.
2. In the SUMO tournament students should consider the various possible methods for disabling their opponent and pushing them off the mat. Sometimes a defensive strategy works very well.

3. A robot with a front-end scrapper or with a rounded body should do well. Top heavy robots are easy to turn over and disable. A motor controlled or fixed extension arm to right your robot should work well. Be creative.
4. Tie down all of your wires using tie wraps or tape.
5. Tape parts that seem to fall off often.
6. Protect your wheels from being lifted.
7. There are several Bluetooth remote control apps available, some free and some paid. Select the best app for you. Different apps can be used for each event. Teams can change remote control apps at any time. Teams can switch cell phones or tablets or laptops for controlling at any time.
8. Robots can be modified in between matches and events as long as they stay within the required size. Any competing team and any referee/judge can challenge the size of a robot.
9. Teams are encouraged to have common t-shirts, banners, poster boards, novelty handouts for other teams, crazy hats, etc. Each organization/school will have a Pit Area table.