**NEIRG Sumo Rules**

**LEGO Class**

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**Introduction**

The Sumo Wrestling Competition pits your creation, your autonomous robot, against another robot in a field of battle, where brute strength and cat-like reflexes combine to create the ultimate conflict! The challenge is to create a robot, using only LEGO parts, that can seek out the enemy robot and push, throw, flip, drag, or otherwise remove its opponent from the sumo ring within three minutes, while preventing the opponent from doing the same to it.

**Chapter 1: Definition of Bouts, Matches and Competitions**

**Article 1.1 - Definitions**

1. **Bouts**: A **Bout** involves two contestants who manage their autonomous robots in the sumo ring (*Dohyo*) according to the competition rules. The goal: to actively seek out the opponent’s robot, and remove it from the sumo ring. A **Bout** begins 5 seconds after the Referee announces that operators must turn on their robots, and continues until a (*Yuko*) point is scored by one of the contestants, or Match time has elapsed. The Referee will make the decision on when a point is scored.

1. **Matches**: A **Match** is comprised of up to three **Bouts and can usually last up to 3 minutes**. The winner of a **Match** is generally the first person to earn two Yuko points during these **Bouts**. The winners and losers of **Matches** will move forward in the **Competition** as appropriate.

1. **Competition**: The name of the specific robot contest, usually describing a specific division, such as “LEGO Stock Sumo.” The NEIRG Sumo **Competitions** are double-elimination tournaments. Winners and losers of **Matches** move through the two brackets of the **Competition**, allowing all robots a chance to lose one **Match**, and still win the **Competition**. Generally, a First, Second and Third place robot is awarded for each **Competition**.

Notes: All Matches must end with a winner. Everyone will have at least two Matches. During the Competition, the top robots should expect to face anywhere from 5 to 10 opponents, for up to 40 minutes of active wrestling. No flash photography during Bouts.  Extra batteries on hand are recommended.

**Article 1.2 – Classes of Competition**

1. There are 2 Sub-Classes of Competition for LEGO Sumo Wrestling.

**a.  Stock** - Only the parts available in one LEGO MindStorms Invention Set 2.0.

**b.  Open** - Only the parts available with one or more LEGO MindStorm Invention Systems and also any other LEGO brand piece or component.

2.  Chapter 3 describes these robot specifications in detail. The LEGO Stock Competition is also held on a 3 foot Dohyo instead of 5 foot.

3.  Age has not proven to be as critical as the available parts, so there are no currently no divisions based on age for the LEGO Classes.

**Chapter 2: Sumo Ring (Dohyo) Specifications**

**Article 2.1 - Sumo Ring (Dohyo) Specifications**

1. The Dohyo is a plywood cylinder, painted black, with a height of (2 in.) and a diameter of 60 in. Exception: The Stock LEGO Dohyo has a 36 in. diameter, with no other changes in the below information.
2. The Dohyo folds up, and thus, there is a slight crack down the center. If the Referees feel that that part of the surface is uneven, black tape will be placed over it to make it more even.  Exception: The Stock LEGO Dohyo is one complete piece.
3. The starting lines are indicated as two parallel brown (color ratio - blue : red : yellow = 4 : 4 : 2) lines with a width of 2 cm (25/32 in.) and a length of 20 cm (8 in.). The outside edge of each line is 20 cm (8 in.) apart, and they are centered on the Dohyo.
4. The outer edge of the Dohyo, the borderline, is indicated as a white circular ring with a width of 5 cm (2 in.) and an outside diameter of 60 in. The borderline is defined as being on the Dohyo.
5. During the games, it is up to the Referee to decide whether the Dohyo can continue to be used or whether it should be replaced.

**Chapter 3: Robot Specifications**

**Article 3.1 – Specifications**

1. The robot must be able to fit in a box with a width and depth of 30.5 cm (12 in.). There are no restrictions on height. The robot will always start or reset a Bout in this configuration. Robots may move and expand to any size after the 5-second delay.
2. Weight (including accessories) must not exceed 3 lbs. for the LEGO Open Class or 2 lb. for the LEGO Stock Class.
3. Robots should be based on the LEGO MindStorm Invention Set 2.0 kit, in original factory condition (no purposefully mutilated, modified or re-engineered pieces). Pieces will not be held together by any other means than standard LEGO construction methods (no stickers, glue, tape). Pieces may not be coated in foreign substances (paint, oil, cloth). No “made-for-LEGO” non-brand LEGO pieces allowed.
4. Specifically, Stock LEGO Class robots may use no more than the specific number and type of pieces provided in one LEGO MindStorms Invention System 2.0 kit, plus 6 AA batteries. This includes even the smallest of pieces. Note: RIS 1.0, 1.5 and RoboLab kits are nearly the same-please check the parts list for any differences.
5. Open LEGO Class robots will be based on the MindStorms kit, but can use any and all LEGO brand pieces, in original factory condition. Thus, rotation sensors and other LEGO-made sensors are available in this Class, as well as unusual pieces like LEGO people and trees from children’s LEGO sets.
6. An autonomous robot must be designed to begin action no earlier than five seconds after the contestant presses the robot's start button.
7. All robots must be capable of some form of movement across the Dohyo.

**Article 3.2 - Restrictions on Robot Design**

1. The robot may attempt to confuse or mislead the opponent’s sensors, but may not otherwise interfere with the electronic functioning of the opponent’s robot, such as reprogramming the opponent’s robot. In Open LEGO Class, for instance, a bright LEGO light, used to confuse an opponent’s light sensor, would be considered legal.
2. The robot will not include any parts that might damage or deface the Dohyo.
3. The robot will not include a device that insufflates any liquid, powder, or gas.
4. The robot will not include an inflaming device.
5. The robot will not include a throwing device.
6. The robot will not include any part that fixes the robot to the Dohyo surface and prevents it from moving (such as suckers, glue, and so on).

**Chapter 4: Bout and Match Principles**

**Article 4.1 – Bout and Match Principles**

1. A Match consists of up to three Bouts with a maximum of three minutes per match. A Bout generally ends when a robot earns a Yuko point, or three minutes have elapsed.
2. The first contestant to win two Yuko points is the winner of the Match, which may occur before three Bouts have been played; or,
3. If a winner cannot be determined per above, the contestant who has the most Yuko points at the end of the Match will be judged as the winner; or,
4. If neither contestant receives any Yuko points, or if both contestants have one Yuko point, an extra three-minute Sudden Death Match may be announced by the Referees; or,
5. If too much time would be needed to find a victor that way, the Referees have discretion to award the victory to the player with an obvious superiority, or may resort to a coin toss as a last resort.

**Chapter 5: Match Procedure**

**Article 5.1 - Beginning of the Match**

Before the Match, the contestants shake hands and then place their robots behind their starting lines on the Dohyo, as indicated by the Referee. Operators will prepare to begin their three Bouts. The Referee will check that the robots are indeed the correct ones competing in this Match, and that the timekeeper and scorekeepers are ready.

**Article 5.2 - Beginning of the Bout**

1. Robots will be placed parallel to each other, in opposite directions, as close to the brown starting lines as possible without touching them. Thus, they will be in either a clockwise (A) or counter-clockwise (B) orientation to each other. These orientations will flip after each Bout.
2. The tournament bracket will predetermine these orientations. Thus, the three Bouts will follow an A-B-A or B-A-B sequence.
3. The contestant must press the start button on the robot at the Referee’s signal and immediately take several steps back. The Bout begins five seconds after the Referee’s signal. The robot may not move at all until the 5-second delay is over.

**Article 5.3 – Finishing the Bout**

After a Yuko point is earned, or some other event ends the Bout, the Referee will announce that the current Bout has ended, and that the next Bout, as appropriate, should begin.

The operators will place their robots in their starting positions, in the reverse starting orientation as the previous Bout, and await the signal to press their start buttons.

30 seconds are available between Bouts for contestants to repair their robots without receiving a Warning.

**Article 5.4 - End of the Match**

The match ends when the Referee calls the winner, who will generally be the operator whose robot first earns 2 Yuko points or when 3 minutes of Match time has elapsed. Both contestants shake hands after removing their robots.

**Article 5.5 – Bout Cancellation and Resets**

A Bout will be stopped and a Reset will be started under the following conditions:

1. The robots are locked together in such a way that no more action appears to be possible or they rotate in circles several times, per Referee’s discretion.
2. Both robots touch the exterior of the Dohyo at the same time.
3. Any other conditions under which the Referee judges that no winner can be decided.

In case of a Reset, maintenance of competing robots is prohibited until a Yuko is observed, and the robots must be immediately put back to the location specified in Article 5.1. Robots will be returned to their starting conditions and started, with their 5 second delays, after the Referee signals the start. The 3-minute Bout clock will continue to count down during this process. Any interruption in this procedure will likely result in a Warning from the Referee.

If neither of the competing robots win nor lose after a Reset, the Referee may reposition both robots to a specified location and restart. If even that does not yield a winner, the Bout may continue at any location decided by the Referee, until the time limit is reached.

**Chapter 6: Scoring Yuko Points**

**Article 6.1 – Yuko (Effective) Points**

The following conditions are determined as Yuko (effective) points:

1. When a robot ejects its opponent off the Dohyo with a fair action. As soon as a connected part of the opponent’s robot touches the ground, it is considered ejected.
2. When the opponent's robot falls off the Dohyo on its own (for any reason).
3. When the opponent's robot is disqualified or has had more than one Violation or Warning.

**Chapter 7: Penalty Types**

**Article 7.1 – Warnings**

A contestant who takes any of the following actions will receive a Warning when:

1. The operator or any part of the operator touches the Dohyo before the Referee’s call ends the Bout.
2. Preparation for the start of a Bout takes more than 30 seconds. If this Warning has already been given, a Yuko will be given if the player is not ready after 90 seconds.
3. Preparation for a Reset of a Bout is not immediate.
4. An autonomous robot begins action (physical expansion or moving) before five seconds have elapsed after the Referee’s start command.
5. Any other actions that may be deemed unfair occur.
6. When a contestant receives two Warnings, the contestant's opponent will be awarded one Yuko point.

**Article 7.2- - Violations**

Any of the following actions is determined as a Violation and the offender's opponent, or both robots, will get a Yuko point:

1. A part (or parts) of the robot that exceed(s) a weight of 10 grams is separated and dropped from the robot. (If such a part is still connected via a connector or wire, and leaves the Dohyo, the robot is now considered removed from the Dohyo.)
2. The robot stops moving on the Dohyo. This includes mechanical failures and circumstances such as being flipped on one’s back.
3. Both the robots are moving, but don't contact each other.
4. The robot emits smoke.
5. When the opponent's robot gets stuck on the border line and cannot move off the border line on its own.

**Article 7.3 - Loss by Violation**

A contestant who takes any of the following actions will lose the Match by Violation:

1. A contestant does not attend the appointed Dohyo when called at the beginning of the Competition.
2. A contestant ruins the Match or Competition, such as by intentionally breaking, damaging, or defacing the Dohyo.

**Article 7.4 – Disqualification**

A contestant who takes any of the following actions will be disqualified and forced to leave the Competition:

1. A contestant's robot does not meet the robot specifications stated in Article 3.
2. A contestant makes a robot using a method restricted in Article 5.
3. A contestant displays un-sportsmanlike behavior. For example, using violent language or slandering an opponent or a Referee.
4. A contestant intentionally injures the opponent's operator.

**Chapter 8: Injury and Accidents**

**Article 8.1 - Request for Suspension**

When a contestant is injured due to the operation of the robot or the robot has an accident, and the Bout or Match cannot be continued, a suspension can be requested by the contestant.   
  
A Referee must take immediate necessary action in response to this situation.

**Chapter 9: Objections**

**Article 9.1 - Objections to the Referee**

No objections to the judgment of the Referee can be raised. The referee’s call is final.

**Article 9.2 - Objections to the Rules**

A contestant who has an objection to the operating rules must express dissent to the Tournament Committee before the end of the Competition.

**Chapter 10: Resources**

**Article 10 – Web Resources**

1.  LEGO MindStorms    [http://mindstorms.LEGO.com/](http://mindstorms.lego.com/)