

IDE SERIES

2020 SINGAPORE

IDE MECH WARS 2020

Competition Manual

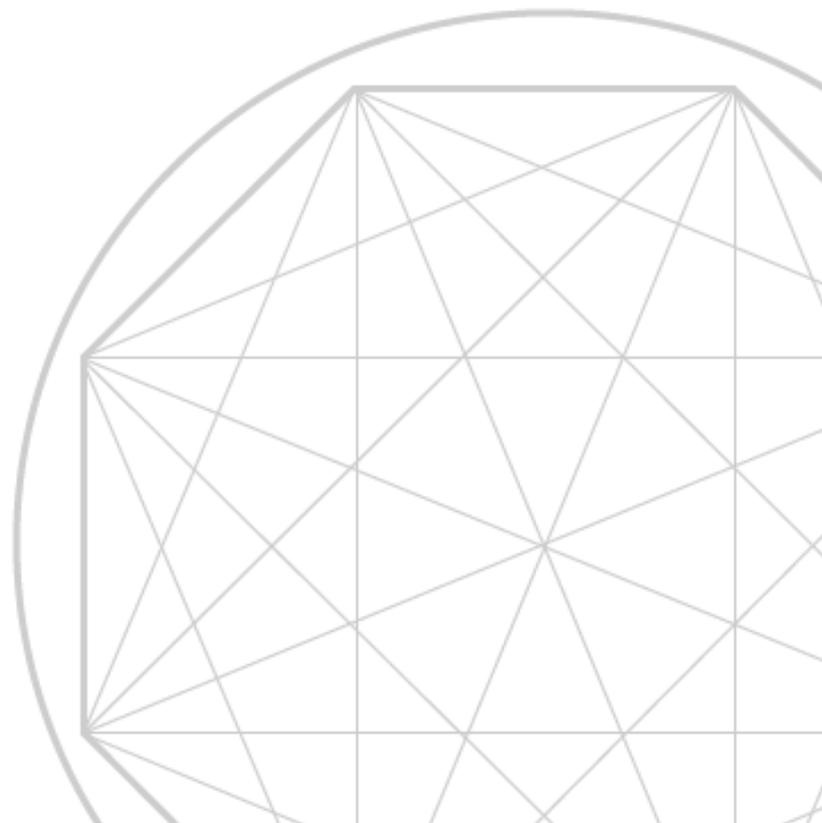
Event Organiser:



Official Hardware Sponsor:



Education Partner:



IDE MECH WARS

Scope of Competition

The IDE Mech Wars is a competition of coordinated teamwork, strategic planning and mechanical ingenuity. Students will form teams of 3 robots utilising the LEGO® Mindstorms platform and they will control their robots through wireless controllers to complete mission objectives around the field.

Mech Wars Playfield

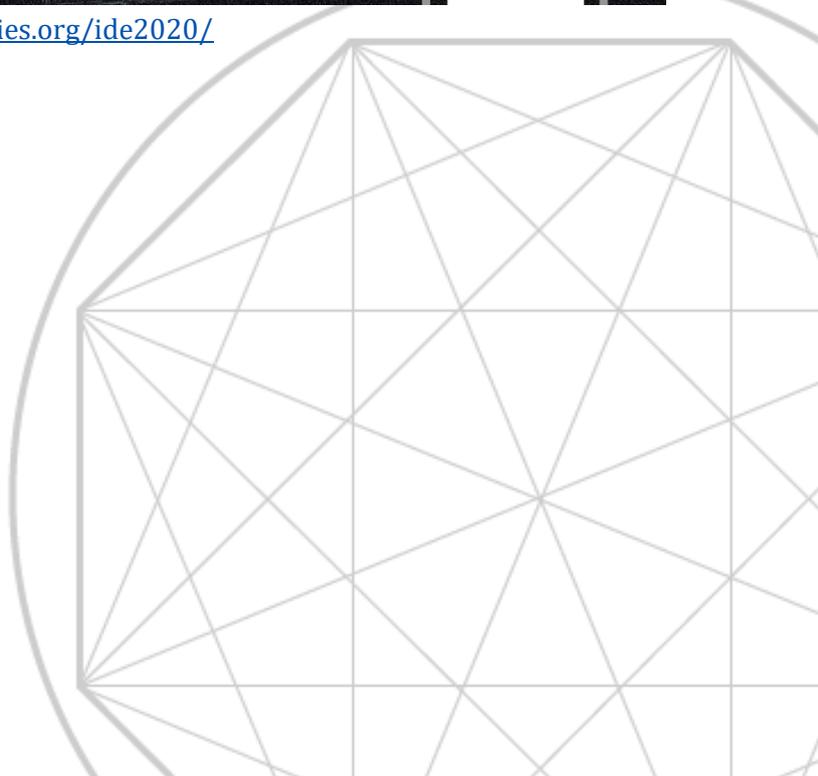
The IDE Mech Wars makes use of a playfield with interactive prop elements and terrain. Students will need to consider the various objectives, their robot design, as well as their role in the team in order to score as much points as possible.

For IDE Mech Wars 2020, teams will compete on the playfield as individual teams (compared to past years where it is a team versus format).

This is the playfield for IDE2020 Mech Wars:

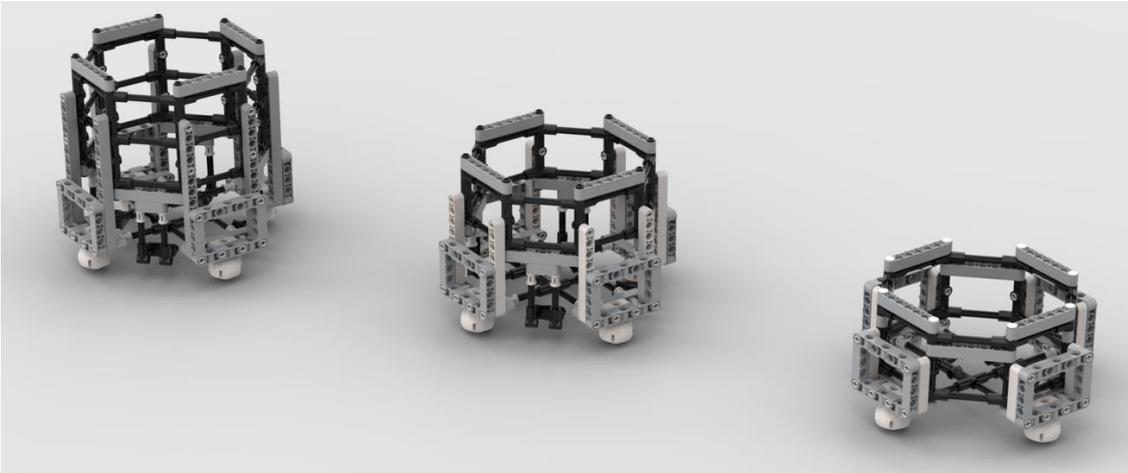


Download printable playfield from <https://ideseries.org/ide2020/>



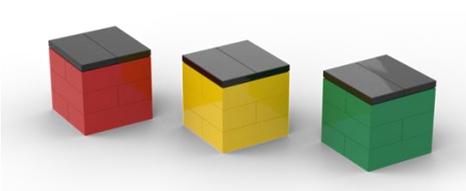
Props and Mechanics

Baskets

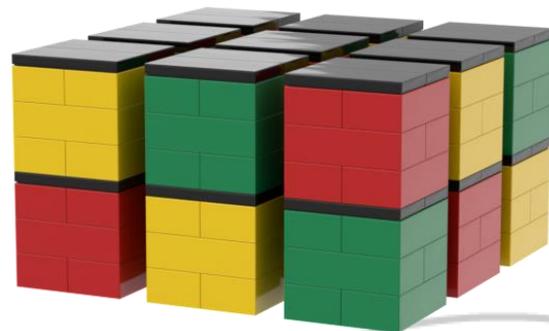


1. The baskets come in three sizes and are moveable.
2. Cubes and Balls are to be placed into the baskets by the robot to score points.

Cubes

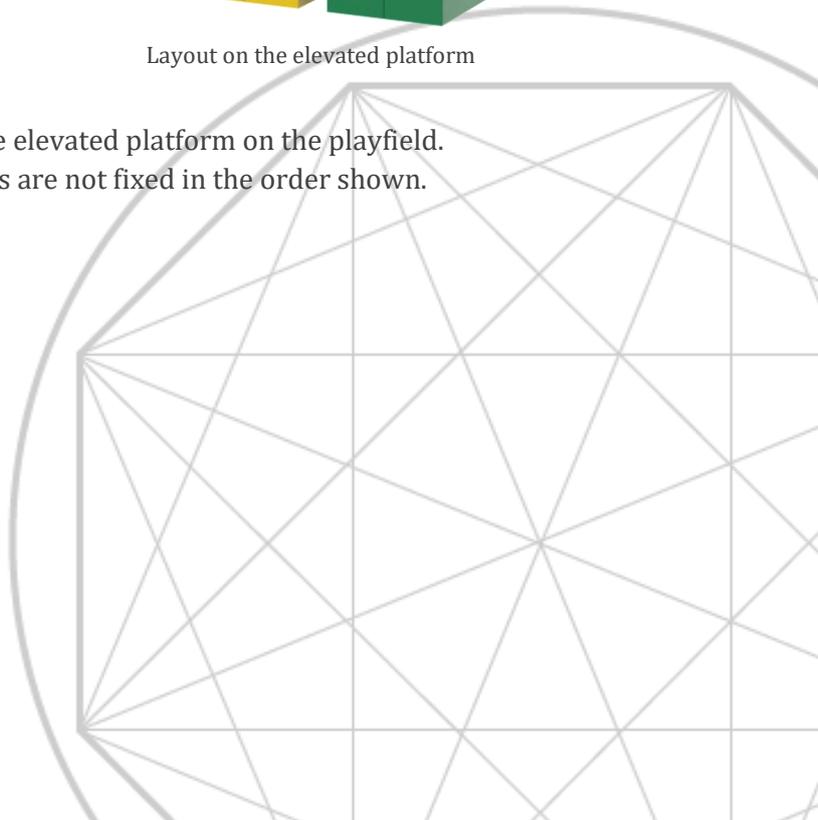


3 different coloured cubes: Red, Yellow, Green



Layout on the elevated platform

1. There will be 6 cubes of each colour on the elevated platform on the playfield.
2. It will be stacked as shown above – colours are not fixed in the order shown.



Balls



3 different coloured balls: Red, Yellow, Green



Press-mechanism to release the balls

1. Will be electronically dispensed from a catchment area when 3 buttons are pressed simultaneously.

Gameplay

1. Each team will get 2 competition runs, each lasting for 2 minutes and 30 seconds.
2. Before the start of the run, the team will roll a die to decide the team's colour for that match. The colour will change for every run.
3. All the team robots are to be within the red quadrant before the start of the match.
4. The game will start when the judge says "Ready...Set...Go!". Only then are the robots allowed to move out of the quadrant.
5. No more wireless controlled movement is allowed when the referee says "Time's up!". All wireless controllers are expected to be placed away from the player to prevent overtime manoeuvres by any robot in the field. The judge will then tabulate the score at the end of game play. The judge has the full discretion to award penalty points for non-compliance to instructions.
6. No one is to use any human body parts or tools to flip back an overturned robot during gameplay. Only wirelessly controlled allied robots are allowed to attempt to flip back an overturned robot.

Wireless Controllers

Participating teams need to prepare their own wireless controllers. There are no restrictions to the 3rd party wireless controllers allowed for use in the Mech Wars segment. Teams may also choose to control their robots via Bluetooth through their handphones or mobile devices. It is advisable for participants to test the pairing of controllers before the competition day itself. Teams are also solely responsible for charging and ensuring that the battery levels of their wireless controllers are sufficient for the practice/actual competition rounds.

Teams who attempt to interfere with the wireless controllers of other teams during pairing or gameplay **will be** disqualified.

Scoring

The Scoring matrix is as such:

Item \ End of Game Position	Touching White Area (Not in Basket)	Low Basket (Anywhere)	Mid Basket (Anywhere)	Tall Basket (Anywhere)	Possible Quantities
Team's Colour Cube	2	4	6	8	X6
Other Coloured Cubes	1	2	3	4	X12
Team's Colour Ball	10	20	30	40	X1
Other Coloured Balls	5	10	15	20	X2

Notes

- Points are awarded as long as the cubes and balls balanced independently and not touching the ground.
- All baskets do not need to end at their starting position by the end of the run.

COMPETITION RULES

Rules and Regulations

General:

1. During the competition, all teams must look after their own personal property, team construction and materials. Any member(s) of the competition who is/are caught in the act of sabotage, theft or mischief, whether to cause harm to other participating teams or not, will be dealt with by the competition organisers and may subject the team to disqualification.
2. No external help is to be rendered in this competition. This includes receiving direction, contribution, construction of any kind from any party or person not belonging to the team. Failure to comply with this rule will be dealt seriously and may subject the team to disqualification.
3. All students and Teacher Mentors (TMs) will be quarantined from each other during the competition preparation time. No communication between TMs and students is allowed during this period.
4. All decisions by the competition officials and organising parties are final.
5. Each team will be provided separate tables that are adequately spaced apart during the competition. Teams are **NOT** allowed to mingle with other teams on the competition day and are to ensure safe distancing between teams at all times during the competition.
6. Display markers will be placed for teams to queue for their robot testing on the playfields.

Parts and Restrictions

1. Teams are expected to bring their own LEGO® Mindstorms NXT or EV3 Sets, batteries and laptops. No sharing of robots between teams allowed.
2. Each team will comprise of exactly 3 robots.
3. Each robot is allowed to use one controller (either Mindstorms NXT or Mindstorms EV3). However, the number of motors and sensors is not restricted. No multiplexing of motor or sensor ports allowed.
4. List of Approved Sensors and Motors ([Table 1](#))

 NXT Large Motor	 NXT Light Sensor	 NXT Touch Sensor	 NXT Ultrasonic Sensor	 NXT Color Sensor
 EV3 Large Motor	 EV3 Light/Color Sensor	 EV3 Touch Sensor	 EV3 Ultrasonic Sensor	 EV3 Gyro Sensor
 EV3 Medium Motor	 Hi-Technic Color Sensor			

5. Only LEGO® branded elements may be allowed to be used for the robots.
6. Before each run, an inspector will check the robots for any non-LEGO® or non-approved parts/accessories. Team may face possible disqualification or point deduction if the parts cannot be removed.
7. The size of each robot will be strictly limited to 25cm x 25cm x 25cm at the starting area. All extensions beyond the size limit must be deployed autonomously.
8. Robots that are damaged or deemed unplayable during a Mech Wars round are not allowed to be recovered or retrieved during gameplay.
9. Playfield elements that leave the playfield or is damaged during a Mech Wars round will not be returned or repaired to the playfield in the same round.
10. Teams are **NOT** allowed to share robots and the organiser reserves the right to disqualify any offenders.

Operational Rules

1. Once the competition preparation time is over, no further work or modifications may be done to the robots.
2. Failure to quarantine the robot by the stated time will result in disqualification.
3. During each run, only the members operating the robots of each team will be allowed in the designated playfield area as designated robot operators.
4. During a run, only the designated robot operators may operate the robots.
5. A re-run may be held if the robots cannot complete the course due to an outside interference, such as a referee accidentally obstructing the path of the robots, or collision with a robot from a neighbouring playing field. A re-run may also be held if a malfunction of the playing field occurs.

6. To request a re-run, the designated robot operator must notify the referee before leaving the playing area. **Battery failure will not be a valid reason for rematch.** Durability of a team's robot will not be a valid reason for a rematch. Teams will be entirely responsible for ensuring that the robots are in full working order before the run.
7. The Referee will start the time as the robots are exiting the green bases. At any time during the mission, robot operator(s) may signal the Referee to stop the time with an upraised hand combined with the verbal signal "Stop". The timer will be stopped and points will be counted up to the moment where the signal to stop was clearly given.

Violations

1. The Referee(s) have the ultimate authority during the competition. Their decisions are final. Referees will not review recorded replays after a match is completed.
2. If a referee disqualifies a team, the robot is turned off for the remainder of the match and will not score any points for the match.
3. A team may not win a match through an advantage gained by breaking a rule, even accidentally.
4. If one team intentionally damages another team's robot they will be disqualified. If the damaged team's robot is considered poorly built due to a decision flaw, the other team may not be disqualified. The ultimate decision lies with the Chief Referee.
5. Deliberately damaging the playing field, robots, or altering the LEGO® pieces is strictly illegal and will result an immediate disqualification.
6. Team members, except for the operator(s), are not allowed in the designated playing area until the referees have completed the scoring procedures.
7. Team members must not interfere or assist the robots in any way during its run. No wireless robot communication apart from the designated remote controls are allowed during the 2 competition runs. Teams found in violation will be immediately disqualified.

