Abingdon School in partnerships

ROBOCON OXFORDSHIRE

RoboCon Oxfordshire 2027

Quidditch



Clarifications

To ask any questions or for clarifications, please feel free to email support@roboconoxon.org.uk. In all cases, the rules on the documentation website are updated and reflect the most recent state of the game and supersede previous versions including the hard copy. Should we feel any major clarifications to the rules need to be made, they will be published to the websites and we will inform all teams by email. The rules used during the competition will be the rules published on the official docs website: docs.roboconoxon.org.uk. These rules supersede any other format including but not limited to printed copies of the rules.

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Awards

1.1 - The Snitchers

This prize is awarded to teams ranking the first, second and third place in the competition according to their league points.

1.2 - The High Flyers

This prize is awarded to the team with the most technically advanced robot, regardless of the mechanisms working or not, trying to implement such mechanisms would be counted into consideration.

1.3 - The Mighty Quaffles

This prize is awarded to the team with the most team and robot flare. Things like the overall appearance of the robot will be taken into account.
Tip: Matching cloth with the theme of your robot would help.

1.4 - The Elite Broomsticks

This prize is awarded to the team who demonstrates the most perseverance in the face of adversity.

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Arena Specification

- The two small april tags of the same colour represent quaffles stacked top of each other.
- **ALL CUBES SHOWN ARE THE SAME SIZE.**

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Game Specifications

Scoring Areas

The scoring areas which you should look at the arena diagram for the positions of are the places you are aiming to get your quaffle into these areas. The amount each quaffle scores is detailed in the Game Round Specifications Section.

Bludgers

Bludgers are marked out zones also in the arena diagram and have scoring attached to them as shown in the Game Round Specifications Section in the scoring table. These are penalty zones. If a significant portion of your robot is located inside one of these zones when the round ends, you will receive the penalty outlined in the Game Round Specifications Section.

Quaffles

Quaffles are the boxes in the arena which you are trying to gather to score. There are Quaffles which belong to your team specifically and they impact the scoring you get for that Quaffle as outlined in the Game Round Specifications Section. All Quaffles score but Quaffles that belong to your colour area gain more points than Quaffles that don't belong to your team.

The Snitch

The Snitch will drop randomly in a 20 second period beginning 40 seconds before the match ends. The snitch will be worth more points than Quaffles. Snitch scores are also dependent on the scoring zone. See scoring and arena diagram for details.

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Apriltags Markers

The Arena Walls, Quaffles and Snitch are labelled with AprilTag markers. Each marker pattern encodes a number.
Each marker number is associated with a specific feature of the arena and has an associated size. An example AprilTag can be seen below:



Sample markers can be printed on a black and white printer, and their designs can be downloaded from RoboCon Oxfordshire's documentation website, https://docs.roboconoxon.org.uk.

The markers on the arena wall will be 200 x 200 mm in size. They will be 50mm off the floor. The markers on the Quaffles and Snitch will be 100 x 100 mm. Quaffles are identified by AprilTags 0 to 3 and Snitch are identified by AprilTag 4. Example AprilTags are included in the kit.

Each item in the arena is identified by its own unique number.
The Supplies, arena objects and their corresponding identification numbers are as follows:

Feature	AprilTag Range (Inclusive)	Colour
Quaffles	0 - 3	Red
	4 - 7	Yellow
	8 - 11	Green
	12 - 15	Blue
Snitch	16	Gold
Arena Walls	100 - 102, 121 - 123	Red
	103 - 108	Yellow
	109 - 114	Green
	115 - 120	Blue

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Rules and Regulations

1. The Head Referee has the final say in any circumstance.
2. Robots will be referred to as Robots.
3. No remote-controlled systems are permitted.
4. RoboCon Oxfordshire is a non-contact competition, and no Robots should be engineered with harming other Robots in mind.
5. Robots may not deliberately damage anything. This includes the arena, Quaffles and Snitch, and other Robots. At the Head Referee's discretion, teams who engage in collisions deliberately or do not take sufficient precautions to avoid collisions may be disqualified from rounds until the issue has been resolved. The Head Referee decides whether or not this action was deliberate.
6. Robots may not deliberately leave debris in the arena.
7. Teams must not imitate any features of the arena in a way that could potentially confuse other teams' Snitchers.
8. RoboCon Oxfordshire reserves the right to examine your Robots's software and hardware at any time, to verify that rules are being followed.
9. Assistance from RoboCon Oxfordshire is provided with no guarantees.
10. All kits handed out by RoboCon Oxfordshire remain the property of RoboCon Oxfordshire. The kit must be returned to RoboCon Oxfordshire at the end of the competition in acceptable condition.
11. Robots must pass a safety inspection by a RoboCon Staff before they are permitted in the arena.
12. At the beginning of each round, Robots must fit into a cube with internal dimensions of 400 x 400 mm on each side. During the round, the Robots may extend beyond this size.
13. For everyone's safety, the Robots's power switch must always be red and easily accessible while the Robots is active – including throughout the game.
14. The Robots is to be started in the arena using a physical start button. You must position this where a team member can reach it from outside of the arena.
15. You may use custom hardware to enhance your Robots's electronics, but all power must be drawn from the connectors on the Brain.
16. All wires connected to the Robots's ground (0V line) must be black. Black wires must not be used for anything else. It is strongly recommended that all wiring is neat and removable, as this will reduce the time required to debug problems, and teams may be asked to tidy their wiring before a member of RoboCon Oxfordshire will approach any issues with their Robots.
17. All electronics should be securely fixed to the Robots (not able to be shaken loose) and should also be easily removable if required.
18. It must not be possible to injure oneself on the Robots. This may be tested using a Frankfurter sausage to simulate a finger – anything that could cause harm, such as high-speed rotating parts, should be suitably shielded.
19. The lithium polymer battery provided in the kit must be shielded from mechanical and thermal harm. This includes ensuring that it is protected from harm in the case of

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accidental collision with another Robots. Teams found to be in violation of this rule will have their batteries confiscated until they have demonstrably rectified the issue.

20. Robots may not include additional radio transmitters or receivers to those in the Brain.
21. Attaching a GoPro or similar small video recorder to your Robots to record a round is permitted, but it must be powered by its own internal batteries and cannot be connected to any of the other electronics of the Robots. It must fit within the internal dimensions defined in Section 3.1.
22. A USB port must remain free and accessible for use during rounds. If you want to use a USB device such as an Arduino, you will need to provide your own USB hub.
23. The Brain is supplied as a sealed unit. It must not be tampered with. If you need access to the contents of the Brain, you must contact us so that we can help you with your plans.
24. If teams wish to use batteries, chargers, or cables other than the ones provided with the kit, they must seek approval from RoboCon Oxfordshire through support@roboconoxon.org.uk first.

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Game Round Specifications

1. A round of the game lasts for 180 seconds
2. There will be no more than 4 Robots in each round.
3. A round may be ended prematurely if all participating teams state to the Head Referee that they are happy for the round to end.
4. Scoring will begin 10 seconds after the end of each round.
5. The round will not be started until all teams have left the arena. Robots must be placed in the arena before this time.
6. Teams must not, under any circumstances, enter any body part or object into the arena during a round, except to press the start button on their Robots at the beginning of each round.
7. Interfering with any Robots, Quaffles, or parts of the arena during the round will result in the offending team's disqualification, and they will be asked to leave the arena.
8. At the end of a round, the Head Referee will total the score for each competing team. Teams must not enter the arena or touch any Robots or game items in the arena during this time in order to ensure fair scoring. Touching any Robots or item before the Head Referee 'releases' the arena may result in the offending team's league points for the round being forfeit.
9. Scoring is judged according to the state of the arena at the end of the round.
10. Robots must not be programmed to interfere with other Robots. Accidental contact between Robots is expected – we reserve the right to review your code to ensure it complies with this rule.
11. A Robots is in possession of a Quaffles if it touches or encloses the Quaffles. If a Robots possessing a Quaffles is enclosed by another Robots, then the innermost Robots is considered in possession of the Quaffles and the outer Robots(s) is not.

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Condition	Score	
Leaving the Home Area	+1	
Robot has a Quaffle in its possession, not in scoring area, at the end of the match	+1	
Quaffle	**Your Colour**	**Not Your Colour**
In Normal Scoring Area	+3	+2
In Home Area	+5	+3
In Bludger Zone	+2	+1
Snitch <u>in contact</u>	x3 to all accrued quaffle points	

12. If more than half of your Flyer at the end of the match is within the bounds of your bludger zone then you will lose 1 point from your points accrued from scoring with quaffles if the number of points accrued from quaffles is > 0.
13. The Snitch will drop at a random point between the last 40 and 20 seconds of the match.
14. The term possession is defined as a Robot which has control of the box in such a way that if another robot intended to take it there would be suitable levels of resistance to them taking the box.
15. The Snitch must be in possession for the multiplier to be counted.

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League Points and Knock Out Rounds

League Points

1. Only teams with Robots present in the area at the start of a round can score league points from that round.
2. League point scoring:

Score	League points
Highest score	8 League points
Second highest score	6 League points
Third highest score	4 League points
Fourth highest score	2 League points

3. In the case of a draw, in which two or more teams score the same, each of the teams will gain the average number of points of their places. For instance, if two teams score equally and are therefore in joint first place, they will both score the mean of the first and second place scores – 7 league points.
4. Teams whose Robots were disqualified from a round will earn no league points for the round.

Knock Out Rounds

5. Once the league has been completed, a knockout competition will begin. The positions of the teams in the league will seed the positions of teams in the knockout rounds.
6. Each round in the knockout competition involves up to 4 teams. The teams that come 1st and 2nd in each knockout round will continue to the next round of the knockout.
7. In case of a tie in a knockout round, the team ranked highest in the league will go through.
8. If there is a tie in the final for first place, then a rematch may be played at the Head Referee's discretion.

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Kit Return

Each team will be provided with a kit which contains a disclaimer form detailing your obligations with respect to assembly, use and return of the kit, which is lent to you for the duration of RoboCon Oxfordshire 2027. Each team is issued with a kit with the following parts, which is to be returned at the end of the competition.

Please visit https://docs.roboconoxon.org.uk/kit-list for the latest version of the Kit List. The items below are for reference only.

- **Electronic Kit:**
  - ☐ 1x RoboCon Brain*
  - ☐ 1x Power switch- latching (red switch, black connector)
  - ☐ 1x Start Button- momentary (Black switch, green connector)
  - ☐ 1x 6-pin GPIO connector
  - ☐ 1x 2-pin 12V Accessory connector
  - ☐ 2 x 2-pin motor connector
- **Batteries**:
  - ☐ 2 x 3S (11.1V nominal) LiPo Battery
  - ☐ 1 x B3 PRO imaxRC Compact LiPo Charger
- **Computer**:
  - ☐ Apple Mac Laptop*
  - ☐ Power brick and lead*
- **Other**:
  - ☐ 1x 12L Really Useful Box*
  - ☐ 1x Really Useful Box Lid
  - ☐ 1x screwdriver set
  - ☐ 2.5mm allen key
- **Components**:
  - ☐ 1x components box
  - ☐ 1x IR sensor
  - ☐ 1x RGB LED
  - ☐ 1x LED
  - ☐ 1x contact switch
  - ☐ 2x male to male connectors
  - ☐ 4x male to female connectors

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- [ ] 1x ultrasonic sensor
- [ ] 1x pink micro servo 9g MG90S

- **Additional items to be returned if still in working order:**
  - [ ] 1x robot acrylic plate
  - [ ] 2x robot wheels
  - [ ] 4x 3D printed motor mount with 8x M3 bolts and nuts
  - [ ] omniball “wheel”
  - [ ] 3D printed omniball mount with 2x M3 bolts and nuts
  - [ ] 1x cardboard box with AprilTag
  - [ ] 1x retroflective tape sample
  - [ ] 2x motors with connection wires
  - [ ] 6 x AprilTags (quaffles and snitch)
  - [ ] 1x Arena marker (taped to kit box)

*Tagged

If possible, the kit should be returned at the competition, but in no case should it be returned later than 14 days after the competition. If you wish to keep the kit beyond that, this must be arranged prior to the competition date via an email to support@roboconoxon.org.uk

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Thanks

We would like to thank Dr. Peter Willis, Mr. Oliver Lomax, Mr. Graeme May, all the student volunteers and the partners listed below, without whom we would not have been able to run this competition.

“When students design, build, program and test their own Robot, and then repeat this cycle, solving the problems that have emerged and designing improvements, they are taking part in Engineering. It is a process that involves teamwork skills and project management, as well as combining technical expertise from Design and Technology, Electronics, and Computer Science.”,

~Dr. Peter Willis, Head of Computer Science at Abingdon School

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