



Fraser Coast
Technology Challenge
Inspiring Young **m**inds

Saturday 15th of September 2018

2018 Fraser Coast Technology Challenge: Scratch Coding and Robotics Challenge

Challenge Resources and Support Page –

[StemAcademy](#)

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1. GENERAL INFORMATION

A cordial invitation is extended to schools and individuals to participate in the Scratch Coding and Robotics Competition as part of the Maryborough Technology Challenge introduced for the first time in 2006. Our aim is to allow students to have "Fun with Technology" and ask teachers/parents to ensure their robots and their programs are largely the competitors' own work. Please note that for all divisions, the competition is open to any microcontroller platform you wish such as LEGO RCX/NXT/EV3, Makeblock, Arduino, Sphero, eBot, Edison, Picaxe etc.

For tutorials and resources please go to StemAcademy

Event Coordinator: Tony Grudzinski, tony@steminbox.com.au, 0421 468 429

2. COMPETITIONS AND DIVISIONS

This event is comprised of two separate challenge competitions: Scratch Animations & Games and Sumo Plus. Only Sumo plus has divisions being Midget and Monster divisions.

2.1 Scratch Coding Challenge: Create an awesome animation or game with Scratch. Maximum 4 minutes judging presentation slot.

2.2 Sumo Plus Competition: Design and construct an autonomous robot to push all three victims (cans) and the mad robot (opponent) out of the ring.

2.2.1 Midget Division: Robots will be categorised into the Midget division if the robots weigh less than 750 grams.

2.2.2 Monster Division: Monster robots are categorized as weighing larger than 750 grams but less than 1250 grams.

	Divisions	
Competition	<i>Midget</i>	<i>Monster</i>
<i>Sumo Plus</i>	Robot < 750g	750g ≤ Robot < 1250g

Size Restrictions: 160mm width by 250mm length – no height restrictions

All competitions are combined Primary/Middle/High School

3 AWARDS/RESULTS

- 3.1 Medals will be provided for winners of Scratch Animations & Games, Inventors and the Sumo Plus Competition – Midget and Monster Divisions.
- 3.2 Certificates will be provided for first, second and third in each competition division.
- 3.3 Participation certificates will be distributed for all participating students.
- 3.4 Presentations will be made at the end of the day at competition end approximately 2:00pm competition. Results will continuously be updated during the competition and displayed at the competition venue.

4 REGISTRATION AND SCRUTINEERING

- 4.1 Competitors are to register online (<https://www.frasercoasttechnologychallenge.com/entry-portal>).
- 4.2 Upon arrival, students are to confirm their registration and present their robot for division scrutineering.

5 **PRIVACY/PERMISSION**

5.1 Media including Maryborough Chronicle, Courier Mail, Channel 7 News, and Channel 10 are usually in attendance. All schools are asked to have parent/guardian permission for such publicity. Please notify the co-ordinator if such permission is not granted.

6 **Scratch Coding Challenge**: Create an awesome animation or game with Scratch. Examples, tutorials and judging criteria available at stemacademy.

7 **Presentation and Judging Guidelines for Scratch Coding and Inventors Challenges**

7.1 *Participant presentation guidelines for Scratch Coding and Inventors Challenges*

Presentation (4 minutes) must include:

- Project summary (audience and purpose)
- Algorithm description
- Demonstration
- Key achievements
- Design improvements

7.2 *Judging criteria for participant presentations - Scratch Coding and Inventors Challenges*

Project presentations will be awarded a maximum of 30 points based on the following criteria:

- Planning, problem solving and communication (10 points)
- Coding accuracy, complexity and efficiency (10 points)
- Utilisation of hardware and software technology (10 points)

8. **SUMO Plus Challenge**:

8.1 Sumo Plus Introduction:

Examples and tutorials available at stemacademy

Your team's mission for the Sumo Plus Competition is to; design and construct an autonomous robot to push all three victims (cans) and the mad robot (opponent) out of the ring.

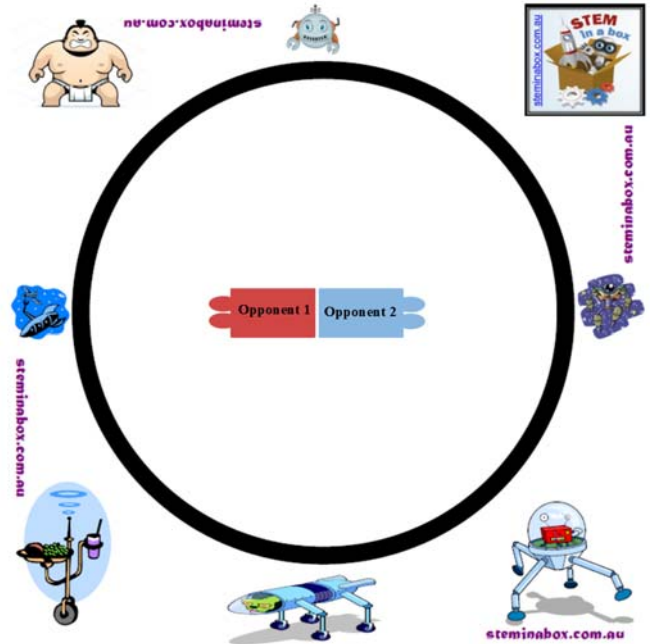
Points are awarded to competitors as per the below table. A 90 second time limit applies to game play.

Challenge	No. of Challenges	No. of Points	Total Points
Victims (cans)	3	10	30
Opponent	1	70	70
Grand Total			100

The number of preliminary rounds will be at the discretion of the Robotics co-ordinator depending on the number of entries etc.

8.2 SUMO PLUS PLAYING FIELD

- 8.2.1 Robots must begin back to back opposing each other in the center - start location is shown on the sumo mat picture.
- 8.2.2 Points are attained as indicated in above table.
- 8.2.3 The referee may call a force restart after 5 seconds of "locked robots" at their discretion.
- 8.2.4 Robot handlers must not touch their robots unless instructed by the referee.
- 8.2.5 Rounds will be held on a vinyl mat with a 95cm diameter white circle and 5cm black border (shown right).



9. LIGHTING

Teams must come prepared to calibrate their robots based on the lighting conditions available at the venue. Every effort will be made to keep ambient light to a low level with infrared (IR) source from incandescent lights and natural lighting minimized.

10. ROBOT DESIGN RULES

- i. Robots must be controlled autonomously and must be started manually by humans. The use of a remote control of any kind is forbidden.
 - ii. Competitors may mark or decorate their robots to identify them.
 - iii. Any robot kit or building blocks may be used, including pre-constructed robots such as Edison. Construction from raw electronic and hardware components is also allowed.
 - iv. All robots must be able to be placed in some configuration in a box 160mm wide by 250mm long - with no height restriction - without touching the sides.
 - v. There are no size restrictions on extendable components in any plane beyond this size limit once the game has started. However extendable components but be fully autonomous and must self-deploy after game play has commenced.
 - vi. Robots will be divided into two divisions based on weight – Midget and Monster. Robots will be categorized into the Midget division if the robot weighs less than 750g. Monster robots are categorized as weighing larger than 750g but less than 1250g.
 - vii. Articulating or moving components are allowed as long as they fit the above design rules however the no intentional harm rule applies- this means that flippers and skid plates are fine but deliberately destructive mechanisms such as abrasive spinners or hammers etc are not allowed.
- b. INSPECTION - The robot must be scrutineered by a panel of referees upon arrival to ensure that the robot meets the robot design constraints listed in ROBOT DESIGN RULES.
- c. RULES FOR EACH ROUND
- i. At the instruction of the referee, the robot's handler is to start the program on the robot.

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ROBOTICS RULES AND REGULATIONS

- ii. 10 points are awarded for each victim (can) your robot pushes out of the ring and 70 points for pushing your opponent out of the ring.
- iii. Scoring is the same for all games including the finals.
- iv. Competitors are allowed to re-compete a particular mat in a round once all other competitors have finished the round and if time still remains prior to beginning the next round. – A maximum limit of 3 attempts applies.
- v. The overall rankings will be determined by adding the points for each preliminary round. The team with the most points will be ranked first.
- vi. During rounds, the referee's decisions will be final.

d. **FINALS** - The top four ranked teams based on points will be in the 2 finals matches

- 1st ranked team vs 2nd ranked team
- 3rd ranked team vs 4th ranked team

10 MENTORS – Mentors and teachers are allowed in the programming area and reasonably assist students but not directly write or program code for students. Additionally, experienced robotics mentors will be available to assist teams during the day.