



SOUTH AFRICA

EXPLORER CATEGORY 2021 “Energy at Home”

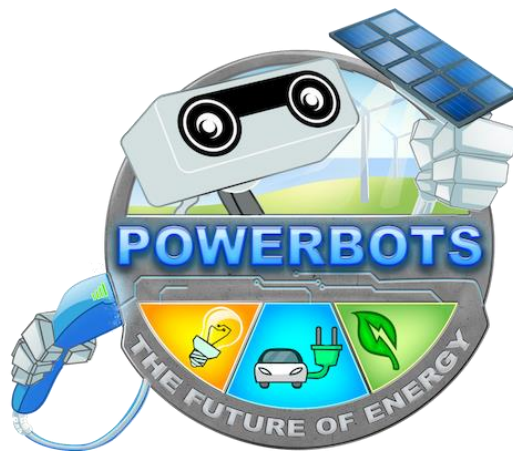
General/Competition Rules

Age Groups –

6 -12 Years – Lite

13 -15 Years – Prime

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WRO International Premium Partners



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Introduction

Robotics is a wonderful platform for learning 21st century skills. Solving robotic challenges encourages innovation and develops creativity and problem-solving skills in students. Because robotics crosses multiple curricular subjects, students must learn and apply their knowledge of science, technology, engineering, math, and computer programming.

The most rewarding part of designing robots is that students have fun. They work together as a team, discovering their own solutions. Coaches guide them along the way, then step back to allow them their own victories and losses. Students thrive in this supportive and immersive environment, and learning occurs as naturally as breathing air.

At the end of the day, at the end of a fair competition, students can say they did their best, they learned, and they had fun.

EXPLORER – Specific Rules

On the playing field of the Elementary age group, the robot helps to modernize a house. The robot will replace old lamps with new energy saving lamps. The robot also needs to mount solar cells on the roof and needs to install intelligent smart home devices

1.1 EXPLORER Description

- “EXPLORER” is based on the WRO Elementary table challenge with simplified tasks and a platform for multiple attempts to keep improving your score
- Explorer competitions will run for 2.5 hours at provincial competitions
- This challenge caters for beginners who would also like to participate in robotics challenges but are not yet ready for WRO.
- The Provincial Explorer Competitions may happen on the Friday afternoon before WRO Provincials on Saturdays due to number of entries. (same venue)
- Explorer challenge is run on the PVC roll up printed mats.
- It is also a great challenge to use for Inter School Competitions. Can be broken up into smaller challenges.
- There will be an “Explorer” category at all the Provincial competitions and qualifiers will get the opportunity to participate at the National Competition.
- The challenge has been designed on the WRO 2021 Elementary competition mat – “Energy at Home”
- Both age groups, Explorer Lite 6-12 years old and Explorer Prime 13-15 years old will participate on the same challenge mat but the level of difficulty for Explorer Prime will change (see Explorer Prime rules)
- There is no Explorer challenge for the 16 –19 years age group. Learners older than 15 years of age will need to participate in the Regular Category Senior challenge.

1.11 EXPLORER Rules

- Teams may have 2-3 members.
- Participants are only allowed to compete in the Explorer Categories Explorer Lite and Explorer Prime once per age group at WRO SA Provincial and National level. *** A participant may participate in Explorer Prime once after having done Explorer Lite, the previous year. They then need to move on to WRO Regular or Open Category.*

Explorer Category General Rules

1. Surprise Rule

- 1.1. A surprise additional rule may be announced on the day of the competition.

2. Material

- 2.1 The controller, motors and sensors used to assemble robots must be from the LEGO® Education Robotics platforms EV3, NXT or SPIKE PRIME. Any other products are not allowed. Teams are not allowed to modify any original LEGO® parts.
- 2.2 Only LEGO branded elements may be used to construct the remaining parts of the robot. WRO recommends use of Education versions of LEGO MINDSTORMS.
- 2.3 Teams should prepare and bring all the equipment, software and portable computers/tablets they need during the tournament.
- 2.4 Teams should bring enough spare parts. Even in the case of any accidents or equipment malfunction, WRO is not responsible for their maintenance or replacement.
- 2.5 **Coaches are not allowed to enter the competition court to provide any instructions and guidance during the competition.**
- 2.6 **Teams are not allowed to bring with them any pre-made programs or programming instructions. Teams must reprogram their robot during the Explorer Competition from a blank programming page.**
- 2.7 It is not allowed to use screws, glues or tape or any other Non-LEGO material to fasten any components on robots. Non-compliance with these rules will result in disqualification.
- 2.8 Control software for the Explorer age group is limited to the LEGO Mindstorms programs and for SPIKE PRIME is LEGO Education SPIKE.
- 2.9 Teams are not allowed to share a laptop and / or the program for a robot on the competition day.
- 2.10 Teams need to run their robots to test and score on their allocated competition table only.

3. Regulations about the robot

- 3.0 **NEW!!**
Teams can arrive with a prebuilt (complete) robot ready to commence with programming when the “START” is announced
- 3.1. The maximum dimensions of the robot before it starts the “mission” must be within 250mm × 250mm, the dimensions of the starting square on the competition mat. After the robot starts, the dimensions of the robot are not restricted.
- 3.2. The controller (SPIKE, EV3, NXT) must be placed in the robot in a way that makes it easy to check the program and stop the robot by a Judge.

3.3. The robot is restricted to the following number of LEGO Sensors and Motors.

- 1 x Touch/Force Sensor
- 1 x Colour/Light Sensor
- 1 x Ultrasonic Sensor
- 1 x Gyroscopic Sensor
- 3 x motors (2 x driving motors, 1 x extra medium/large motor)

3.4. It is not allowed for the teams to perform any actions or movements to interfere or assist the robot after the action to start the robot is performed. Teams that violate this rule will get a score of 0 in this particular run.

3.5. A robot must be autonomous and finish the “missions” by itself. Any radio communication, remote control and wired control systems are not allowed while the robot is running. Teams in violation of this rule will be disqualified and must quit the competition immediately.

3.6. The robot can leave on the field any parts of the robot that are not containing main units (controller, motors, sensors) if needed. As soon as the part is touching the field or its game element and does not touch the robot it is considered as a free LEGO element not being part of the robot.

3.7. The Bluetooth function **is allowed to be used by teams using tablets/iPads**. The program must still be downloaded to the robot and started manually by teams. Tablets/iPads/computers must remain in the team’s preparation area and may not be brought to the competition table.

4. Table and game mat specifications

4.1. The dimensions of a WRO mat in an age group are 2362 mm x 1143 mm.

4.2. The internal dimensions of a game table should be 2362 mm x 1143 mm (like the game mat) or max. + / - 5mm in each dimension.

4.3. The height of the borders is 70 +/- 20mm.

4.4. All black lines are at least 20mm.

4.5. The game mat is printed on PVC roll up material.

5. Prior to competing

5.1. Teams can arrive with their prebuilt robot ready to commence programming when “Start” is announced.

5.2. Teams will not be able to score if their robot does not completely fit into the 250mm x 250mm start block.

5.3. Remove all EXPLORER programmes from the laptop/tablet and brick used before. The challenge is about re-programming on the day.

6. Competition

- 6.1. The competition format follows a continuous scoring method with teams able to register a score at any point within the competition by **notifying the judge** when they are attempting a scoring run. Teams must have recorded one scoring run with their table judge within the first hour of the competition and then again with every consecutive hour.
- 6.2. Competitors are not allowed to programme outside of specified competition times
- 6.3. Once “Start” is announced competitors can immediately start the programming and test runs.
- 6.4. **If teams want to make test runs, they need to queue with their robots in hand. No laptops/tablets/iPads should be brought to the competition table and should remain at the seating area.**
- 6.5.1 There is no set time limit for a robot to complete its run.
- 6.5.2 There is no limit on the number of test runs within the allocated time.
- 6.5.3 The scoresheet allows for 4 official registered scores.
- 6.6. The robot must be placed in the starting area so the projection of the robot on the game mat is completely within the start area. The participants are allowed to make physical adjustments to the robot in the starting area.
- 6.7. Once physical adjustments have been made to the satisfaction of the participants, the judge will give the signal for the SPIKE/EV3/NXT program to be selected. The judge will give a countdown “3,2,1, GO” on the word “GO” the robot program must be run.
- 6.8. If there is any uncertainty during the task, the judge makes the final decision. They will bias their decision based on the age group category. For the Explorer Lite (6-12 yrs) Category the judge will base their decision on the best possible outcome. For the Explorer Prime (13-15 yrs) Category the judge will bias their decision to the worst possible outcome.
- 6.9. If a team starts the run early by accident (without any tactical reasons, e.g. because of a nervous situation), the judge can decide that the team can start the run again.
- 6.10. The attempt and time will end if:
 - a. Any team member touches the robot or any mission objects on the table during the run.
 - b. The robot has completely left the game table.
 - c. Violation of the rules and regulations.
 - d. A team member shouts “STOP” and the robot does not move anymore. The robot program must be stopped immediately, and the robot left in the position it stopped on the table.
- 6.11 The score calculation is done by the judges at the conclusion of each scoring run.
- 6.12 Ranking of a team is based on two factors first the highest score out of all attempts and second by the time (of day) this score was registered. For example, if team A scored 200 points in the first 40 minutes of the competition and team B scores 200 points in the first 30 minutes of the competition team B will be ranked first.

7. Team area

- 7.1. Teams must work on and program their robot in an area designated by tournament officials (each team has its own area). People, other than competing students are not allowed to enter the competition area, apart from authorized WRO Organizing Committee staff and special personnel.
- 7.2. The standard of all competition materials and courts are according to what are provided by the committee on the competition days.

8. Prohibited matters

- 8.1. Destruction of competition courts/tables, materials or robots of other teams.
- 8.2. Use of dangerous items or behaviours that may create or cause interference with the competition.
- 8.3. Inappropriate words and/or behaviour toward other team members, other teams, audience, judges or staff.
- 8.4. Bringing a cellular/mobile phone or a medium of wire/wireless communication into the designated competition area.
- 8.5. Bringing food or drink into the designated competition area.
(A table will be placed at the entrance to leave your refreshments)
- 8.6. Competitors using any communication devices and methods while the competition is in process. Anyone outside the competition area is also banned from talking to or communicating with competing students. Teams violating this rule may be penalised. If communication is necessary, the committee may allow team members to communicate with others under supervision by tournament staff or by exchanging a note under permission by judges.
- 8.7. Any other situation which judges might consider as interference or violation of the spirit of the competition.

9. Fairness

- 9.1. If any of the rules mentioned in this document are broken or violated, the judges can decide on one or more of the following consequences:
 - a. A team may be given a time penalty of max. 15 minutes. In this time, teams are not allowed to do any changes on their robot and program.
 - b. A team may get up to a 50% reduced score in one or more runs.
 - c. A team may not qualify for the national final.
 - d. A team may be disqualified completely from the competition.