

2012 NRC - RULES AND REGULATIONS

General Guidelines

1. A school team should comprise of 2 or 3 students and one teacher.
2. Each school can send a maximum of 5 teams for each category.
3. All rules and regulations are subject to change without any prior notice.

Competition Format

1. Regular Category

Category	Date of Birth	Event
Primary School	After 1 Jan 2000	ROBOT ORGANIZER
Lower Secondary	1 Jan 1997 - 31 Dec 1999	ROBOT COLUMBUS
Upper Secondary	1 Jan 1993 - 31 Dec 1996	ROBOT VAN GOGH

**The events and format for the final competition may differ from the above. Information will be given to the finalists at a later date.*

2. Open Category

Theme: Robots Connecting People

Category	Date of Birth
Primary School	After 1 Jan 2000
Lower Secondary	1 Jan 1997 - 31 Dec 1999
Upper Secondary	1 Jan 1993 - 31 Dec 1996

**The events and format for the final competition may differ from the above. Information will be given to the finalists at a later date.*

General Rules – Regular Category

1. The competition rules of the 2012 National Robotics Competition are constituted by the organizing committee of the National Robotics Competition (“the tournament” for short in the following paragraphs), and they apply to the tournament.
2. Regulations on materials used:
 - (a) Except for special designations in competition rules, materials used by the teams to assemble their robots must be from 9797 LEGO® MINDSTORMS™ Education Base Set, 9695 MINDSTORMS™ Education Resource Set, 9648 Education Resource Set, 9794 LMFS Team Challenge Set, and 9649 Technology Resource Set. The shapes and the colours must be exactly the same.
 - (b) The control program must be written using the ROBOLAB or LEGO® MINDSTORMS™ Education NXT software. Teams that use materials and control programs that are not certified by the tournament will be disqualified from the competition.
 - (c) Teams should prepare and bring all the equipment (software, portable computers, batteries, extension wires, etc.) that they need during the tournament. Teams should not use any flammable materials as part of their designs.
 - (d) Teams should bring enough spare parts. In the event of accidents or equipment malfunction, the organisers are not responsible for any maintenance and replacement of equipment. Mentors are not allowed to enter the quarantine area and give instructions or guidance to their teams during assembly time.
 - (e) Teams are allowed to bring only one NXT/RCX controller into the quarantine area.
 - (f) Batteries used during the competition can be 6 pieces of AA batteries or lithium batteries of LEGO® MINDSTORMS™ NXT. Other power supply devices which are not authorised by the organisers are not allowed to be used.
 - (g) All the parts for the robot should be in the initial states (not pre-built) when the assembling time starts. For example, a tire cannot be put on a wheel until the assembling time begins.
 - (h) Contestants may not refer to any instruction sheets in any form including written, illustrated or pictorial.
 - (i) Teams are allowed to pre-program the robot or store the program in the laptop before the competition.

- (j) No screws, glues or tapes are to be used to fasten any components of the robot.
Non-compliance with this rule will result in disqualification from the competition.
- (k) Modification of any original parts, for example, RCX Intelligent Brick, NXT Intelligent Brick, motors, sensors, etc. is not allowed. Violation of this rule will result in disqualification.

3. Regulations concerning the robot:

- (a) The maximum dimensions of the robot before it starts the “mission” must be within 250mm X 250mm X 250mm. After the robot starts, the dimensions of the robot are not restricted.
- (b) Except for special designations in competition rules, the amount of motors and sensors used during the competition are not restricted.
- (c) Teams are allowed to use only one controller (RCX or NXT).
- (d) Except for special designations in competition rules, any action or movement deemed as interference or assistance to the team while the robot is functioning is disallowed. Violation of this rule will result in disqualification from the competition.
- (e) Use of radio communication, remote control and wire control systems to control the robot is not allowed. Violation of this rule will result in immediate disqualification of the team from the competition.
- (f) If the robot uses the NXT Intelligent Brick as its controller, the Bluetooth™ function must be switched off.

4. Regulations on the competition event:

- (a) The competition consists of 2 rounds.
- (b) Assembly time for 1st round is 120 minutes and maintenance time for 2nd round is 30 minutes.
- (c) Contestants can only start to assemble, program and test their robots after the announcement of the tournament. Teams must place robots in their designated inspection area when assembly or maintenance time ends, after which the judges will assess if the robot conforms to all regulations. Upon successful inspection the robot will be allowed to compete.
- (d) The score calculation is done by the judges after each match. The contestants must sign the score sheet after each match if they have no fair complaints.

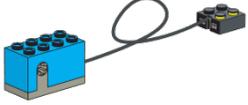
- (e) Contestants should take good care of their robots to avoid malfunction. If programs cannot be downloaded to the robot due to ill-safekeeping, accidental bumping, falling or other causes, assembly time or maintenance time will not be extended.
- (f) If a violation is found at the inspection, the judge will give the team 3 minutes to correct the violation. If the violation is not corrected during the time given, teams will not be allowed to compete.
- (g) When assembly time is over, neither modification (for example, downloading programs, changing batteries) of robot, nor request for time-out is allowed. In the case of a robot breaking down accidentally, the contestant may be given maintenance time by the judges but the contestant is not allowed to add any parts, nor download any program.
- (h) The ranking of team is decided by their best score of a round. If competing teams acquire the same points, the ranking is decided by the time recorded. If teams still remain tied, rankings will be determined by consistency of performance by examining which team achieved the next highest score during previous rounds.

5. Regulations on the playing field:

- (a) Teams must assemble their robots in the area (each team has its own area) designated by the tournament. Only the contestants, NRC organising committee staff and special personnel are allowed to enter the competition area.
- (b) All models and playing fields are according to the standard provided by the tournament on the competition day.
- (c) As you build and program, keep in mind that our organizers make every effort to ensure that all fields are correct and identical, but you should always expect some variability, such as:
 - i. Variety in lighting conditions
 - ii. Judge's shadow on the field
 - iii. Judges will walk around the field during judging
 - iv. Texture/bumps under the mat
 - v. Waviness in the mat itself – at many tournaments, it is possible for the mats to be rolled out in time to lose their waviness. Location and severity of waviness varies. It is very important to consider this while designing.

6. Regulations on behaviour:
Behaviours listed below are prohibited and may result in disqualification:
 - (a) Causing damage to the competition playing fields, models or robots of other teams.
 - (b) Bringing a cellular phone or a medium of wired/wireless communication device into the court.
 - (c) Using dangerous items or displaying behaviours that disrupt the competition.
 - (d) Using inappropriate words or behaving inappropriately towards other teams, audience, judges or the tournament.
 - (e) Creating situations which judges deem unacceptable or interfering.
7. The judges have the utmost authority during the tournament. Their decisions are final and shall not be changed. As such, they may not change their decision even after viewing the competition video.
8. When a team is considered disqualified by any judge, the robot of the team concerned must quit the match immediately, and the team will get no score for the match.
9. The tournament has the right to revoke the qualification of any team if the team violates the rules.
10. Any communication devices and methods are strictly restricted while the competition is in progress. Anyone who is outside the competition area is prohibited from talking or communicating with the contestants in the competition area. Team(s) violating this rule will be disqualified and required to quit the competition immediately. However, under certain circumstances and with permission from the judges, an urgent message can be conveyed through a tournament staff.
11. If the competition is delayed due to electricity breakdown, unavailability of Playing Fields/models or difficulty in determining the scores, the judges may hold a return game, and the contestants shall not raise any objection.
12. The tournament has the right to photograph and videotape the event and the right to reproduce, modify and use the photographs and video tapes for various media.
13. If there is any inadequacy or alteration in the rules, the final decision shall be announced by the judges at the tournament. The judges have the utmost authority to amend the rules and regulations.
14. Penalty will be imposed to the team if there is any violation to the General Rules.

2012 NRC Eligible Motors and Sensors for the Regular Category:

PID	Product Picture	Product Name
5225		9V Motor with Gear Reduction
9758		Light Sensor
9842		Interactive Servo Motor
9843		Touch Sensor
9844		Light Sensor
9845		Sound Sensor
9846		Ultrasonic Sensor
9889		Temperature Sensor (9V)
9891		Angle Sensor (9V)
9911		Touch Sensor and Leads
9694		NXT Colour Sensor

General Rules – Open Category

1. The competition rules of the 2012 National Robotics Competition are constituted by the organizing committee of the National Robotics Competition (“the tournament” for short in the following paragraphs), and they apply to the tournament.
2. A participant may only participate in Regular or Open Category. Not both.
3. The competition will be categorised into 3 different age groups:
 - (a) Primary School (7 - 12 years old)
 - (b) Lower Secondary School (13 - 15 years old)
 - (c) Upper Secondary School (16 - 19 years old)
4. There is no restriction on the use of non-LEGO® materials. However, the final project must be operated or controlled by the RCX Intelligent Brick or NXT Intelligent Brick.
5. Any programming languages are allowed to be used.
6. The robots may be pre-assembled and the software program may be pre-programmed.
7. The size of the whole project, including booth decorations, must not exceed 2 meters (L) x 2 meters (W)
8. The team must decorate the booth with at least one poster, not less than 150 cm (H) X 100 cm (W), introducing the project together with a video clip.
9. Each team will undergo the following:
 - (a) Test and assemble the final robot at a designated location.
 - (b) Decorate the booth with posters or anything that is related to the theme.
 - (c) Demonstrate the project to the judges.
 - (d) Participate in a ‘Question and Answer’ (Q & A) session with the judges.
10. A report (hard copy & soft copy in CD/DVD), summarizing the whole project, must be submitted to the registration counter on registration day. The description must be supported by pictures showing different angles of the robotic creation and examples of the program. The CD/DVD must include a video (maximum of 2 minutes) demonstrating the robot.
11. In the 10-minute session with the judges, 5 minutes will be given to the team for demonstration and 5 minutes for a Q & A session with the judges.

Judging Criteria

1. Video Presentation (Yes/No)
 - (a) Provide judges with a good overview of the robot's purpose, design and operation.
2. Justification (10 points)
 - (a) Justification is provided, as to why the robot should be considered to be "connecting people". This justification should be provided in written form in the report and/or orally in the verbal presentation.
3. Report (40 points)
 - (a) Submission of report electronically prior to competition in English, as directed. (Yes/No)
 - (b) Maximum of 1500 typed words in good English. (10 points)
 - (c) The report should outline the design process the team went through to develop their robotic solution. It should acknowledge the contribution of team members and coach. (10 points)
 - (d) As per the competition rules, the report should include a visual description of the robot. It should be illustrated with photographs, pictures and or diagrams as well as contain clear concepts and understandings. It should summarize what the robot can do, and in which way the robot is unique. (15 points)
 - (e) Quality and presentation of the report. (5 points)
4. Presentation (50 points)
 - (a) Oral presentation and demonstration of robot (20 points)
 - (b) Team spirit and energy (10 points)
 - (c) Overall appearance of the booth and team (10 points)
 - (d) Use of poster/s and their quality (10 points)
5. Robot's Technical Design (50 points)
 - (a) Good Engineering
 - (b) Stable Structure
6. Robot's Creative Design (50 points)
 - (a) Creative appearance
 - (b) Unique, complex, interactive behavior
7. Penalties
 - (a) NO RCX or NXT (Minus 100 points)
 - (b) No Poster (Maximum of 30 presentation points can be awarded)

- (c) No Report (No report points awarded)
- (d) No Video (Minus 30 points)
- (e) Failure to be available or prepared for judging (Minus 50 points)
- (f) Lack of adherence to rules regarding display area and use of booth space (after warnings have been issued and ignored) (Minus 100 points and possible disqualification)

Content Sample of the Project Documentation

1. Acknowledgement.
2. Project Mission, Vision & Objective
3. Particulars of team members and mentor
4. Introduction about the project in detail
5. Synopsis of the project
 - (a) Background
 - (b) Robot functionality
 - (c) Uniqueness and interactive behaviour
6. Designing and Building Process
 - (a) Concept and Implementation
 - (b) Brainstorming and solution to the problem
 - (c) Engineering and stability of the structures
 - (d) Pictures of the project (at each stage)
 - (e) Final model and pictures depicting different angles
 - (f) Related charts
7. Programming
 - (a) Concept
 - (b) Brainstorming and solution to problem
 - (c) Printed programming with explanations
8. Appendices
 - (a) Interviews (if any)
 - (b) Gantt chart
 - (c) Softcopy of the whole project must be burned in CD/DVD (e.g. report, programming, slide show, video clip and etc.)