



2010-2011 Season Competition Rules

1.0 INTRODUCTION

1.1 NRL

The National Robotics League (NRL) provides a national structure for educational robotics competitions for the purpose of increasing traffic to manufacturing-related career opportunities and to provide NRL chapters with a program that will invigorate and grow the organization. Qualifying robotics programs join NRL which offers a fair, safe and cost effective environment from which to build, design and compete. Student teams compete regionally to qualify for the national competition in search of being the league grand champion. In addition to students being introduced to the world of manufacturing technology, teachers and parents will be trained to support their team and also become much more orientated to the manufacturing industry.

1.2 NRL Mission

The North American Robotics League Educational Experience's Mission Statement is to support the NRL challenge of introducing students to manufacturing career opportunities by having them design, build and test a product in a real life challenge.

1.3 Yearly NRL Competition

The National Competition will be yearly in the spring. Dates and location will be determined by the NRL Robot Team. The Regional Competitions will be decided by each Region and posted on the website.

1.4 Contacting NRL

For questions, comments, requests and clarifications regarding the competition rules, technical regulations and procedures in any NRL document, contact NRL at the following:

Rob Akers
National Robotics League
201 Centennial Drive, Unit A-2
LaPlata, MD 20646
Phone: (216) 264-2828
FAX: (240) 776-4059
Email: rakers@goNRL.org
Website: www.goNRL.org

For questions, comments, requests and clarification regarding a specific regional competition, contact your Regional Event Organizer.



2.0 General Information

2.1 Competition

- 15 lb. robots compete against each other in a head-to-head match.
- The match will last 3 minutes or until one robot is knocked out or taps out.
- The National Competition will be a double elimination.
- Regional Competitions may choose to offer double elimination or round robin depending on the number of robots competing.
- Multi-bots are allowed. A multi-bot is two or more bots that when combined, equal 15 lbs. or less. They fight together against their opponent. The heaviest bot will be considered the "primary" bot. If both (or all) bots weigh the same, the team will need to decide prior to the competition which bot is the "primary" bot.

2.2 Classes

The goal of NRL is to have separate classes for middle school, high school and post-secondary. Currently we will be combining all three classes for competitions until there are a sufficient number of robots in each class to separate the classes.

2.3 Teams

A Team is defined by its name and its affiliated school or youth organization. A team includes at least three *students* and at least one adult *Coach* and a *Technical Advisor*. There is no limit to the number of students allowed on a team. If the number exceeds 10, please contact the Event Organizer prior to the Competition to find out available space in the pits area. Definitions and responsibilities are as follows:

- a) The *Coach* is ultimately responsible for the students and should be at least 18 years old and affiliated with the school or organization. An individual may only coach one team.
- b) A *Technical Advisor* is someone that assists the team and offers them advice. They may be from the school or organization or they may be from a local company. There is no limit to the amount of teams a *Technical Advisor* helps.
- c) *Students* on the team must be in middle school, high school or a post secondary educational institution. Each *Student* must have contributed to the design and construction of the robot. They may be asked questions about the robot by a NRL representative during a competition. A *Student* may only be a member of one team.

It is assumed that the students do the majority of the work on the robot with adult supervision when necessary. All teams are expected to be responsible, safe, follow NRL rules and be respectful. Fighting, unruly behavior, and disrespectful behaviors will result in immediate expulsion from the competition.

2.4 Robot Eligibility

Robots may be used multiple years until the team decides to retire it or the robot wins the National Competition two times. We highly encourage changes and improvements to the robot if used multiple years.



2.5 Resolving Problems

Any issues that need to be resolved should be brought to the attention of the NRL Executive Director at the National Competition or to the Event Organizer at the Regional Competition. If it is a *Protest*, the rules set forth in 9.0 of this document will be followed. For anything else, the Event Organizer will bring the issue to the NRL Advisory Board members to discuss a resolution. This will be done as soon as possible. In the event that there are no other NRL Board members available, the Event Organizer will decide the outcome. Their decision will be final.

2.6 Insurance

All events will have basic accident insurance coverage. Teams are advised to have their own coverage when not at an event.

2.7 Photographs and videotaping

NRL allows individuals to photograph and videotape the competitions. Any use of photographs or videos taken at a NRL event need to have the NRL logo displayed. Teams will sign a waiver stating their consent to videotaping and photography while at the competition.

3.0 Registration Requirements

3.1 Registration Agreement

The NRL Registration Agreement is used to document the organization, team name, robot name, and the names of the participants. This document and the payment must be turned in to NRL before competing.

3.2 Registration Fee

The Registration fee for the season is \$100 per robot.

3.3 Documentation

The mission of NRL is to introduce students to manufacturing career opportunities. Robot Documentation is used to show the process of building your robot and also as a learning exercise. The documentation includes schematics, drawings, photos, timelines, journals, etc. that show the process of building your robot. Documentation must be sent to the Director one week prior to the competition. Your robot will not be allowed to compete if you do not have documentation. Each individual team member may be interviewed by a NRL representative regarding the building process of their robot.

3.4 Manufacturing Survey

This Survey is used to show the progress of NRL in educating students about the opportunities available today in the manufacturing field and to track the career choices of students.



4.0 Safety Rules

4.1 Safety Glasses

Safety glasses must be worn at all times when in the pits area. Coaches and Advisors should be setting the example. Safety is the responsibility of everyone. Non-compliance will result in expulsion.

4.2 Robots on Blocks

Robots must always be on an approved block, so that the wheels cannot touch the ground/table when they are in the pits area.

4.3 Restricted/Prohibited Activities

Fighting, foul language or any unruly behavior is not allowed. Any violation of this may result in expulsion of the offending person or persons from the competition. Any team involved may also lose their privilege to compete.

4.4 Smoking Prohibited

Smoking is prohibited in the pits, welding and competition areas. Depending on the venue, smoking may be prohibited in all indoor areas.

4.5 Alcohol and Drugs

The use of alcohol or illegal drugs is prohibited anywhere at an NRL Competition.

4.6 Pits Area Restrictions

Only team members are allowed in the pits area. Team members will be required to wear the ID that the event provides. This could simply be a wrist band or an ID on a lanyard. Guests may be allowed in the pits area, if given permission from a NRL official. There may be restrictions on the amount of people allowed in the pits area, depending on the venue. Teams with over 10 students should check with the Event Organizer before a competition to find out the pits restrictions.

4.7 Footwear

All persons in the pits area are required to wear shoes. No sandals or open-toed shoes will be allowed.

4.8 Adult Supervision

When any team member is working on a robot, a supervising adult needs to be present. The coach is ultimately responsible for their team members at all times.

4.9 Robot Testing

All robots drive and weapon tests need to be performed in a test box or arena, **NOT** the pits area.

4.10 Robot transportation to the arena

Any robot being transported from the pits area to the arena, or transported anywhere, must have safety covers and restraints in place and be completely deactivated.



5.0 Matches

5.1 Match Length

Each match length will be three minutes, unless a robot is knocked out or taps out before that time. In the case of a multi-bot, this is true only when it is the "primary" bot that is knocked out or taps out.

5.2 Tournament Placement

The placement of your robot in the tournament brackets will be random.

5.3 Judging

Matches are judged on three criteria: Aggression, Control and Damage. If the match goes the full three minutes, the judges will decide the winner. The winner will be the robot or multi-bots with the most judges' votes. There are three judges and each judge has one vote. Judges will be using a scoring card to track the match. All judges must attend training before participating at a competition.

5.4 Robot Stuck Rule

Each robot is allowed one release during the match, if they were not obviously placed there by the other team. This means if your robot is stuck on the floor or the bumper, a NRL official will stop the match, release the robot, and then restart the match. In the case of a multi-bot, they are only allowed one release total, not one for each bot. If both teams' robots are stuck on each other they will be released as often as needed.

5.5 Robot Pinning

If a robot pins or traps the other robot, they must release it after 20 seconds.

5.6 Robot Unable to Move

If a robot is unable to move during the match, a 10 second countdown will be started. If that robot cannot move by the end of the countdown, it will be considered a loss, and the other robot will be the winner of the match. The referee will decide whether the robot shows sufficient movement. In the case of a multi-bot, this is true if it is the "primary" bot. If it is not the "primary" bot, the match continues and there is no countdown.

5.7 Tap Out

If a team wishes to stop the match at any time, they may loudly declare "*Tap Out.*" This will be an automatic loss for that team. The other team will not be allowed to attack them after they have declared a *Tap Out.*

5.8 Postponements

Each team receives one postponement. There is a maximum time period for each postponement; your fight will be rescheduled after 10 minutes have expired. You will then have to forfeit the match if the robot is not ready. The other robot is declared the winner of the match.



5.9 Time Between Matches

There is no set time between matches, however, each team will be allowed at least 20 minutes between matches if needed. An NRL official will inform someone in your pit area about your scheduled matches. Please have someone present in your pit area to be notified. Failure to be available could cause your team to forfeit.

5.10 Double Elimination

The National Competition will be double elimination. You will be guaranteed two matches. Regional Competitions will decide if they want to have double elimination or round robin depending on the number of teams competing.

5.11 Round Robin

Regional Competitions may use the Round Robin style Tournament. In a Round Robin Tournament, each robot fights all of their opponents. The winner is decided by the total number of matches won. In the case of a tie, the two robots tied will have a final match to determine the winner.

5.12 Grudge Match

If the Event Organizer feels there is time, they may announce the opportunity for a Grudge Match. Teams then sign up to fight a specific opponent. Both teams have to agree to the match, and both robots need to have been eliminated from the Competition already. They will have a regular three minute match and the audience will decide the winner. This is purely for fun and will not affect any tournament results.

5.13 Rumble

If the Event Organizer feels there is time, they may announce the opportunity for a Rumble. Teams then sign up to fight against an unspecified amount of opponents. All the teams entering their robots must have already been eliminated from the Competition. The Rumble will go five minutes and the robot with the most functionality at the end will be declared the winner. No tap-outs will be allowed. This is purely for fun and will not affect any tournament results.

6.0 Radio Operation Rules

6.1 Spread Spectrum Radios Only Allowed

No FM radios are allowed. Spread spectrum radios are required.

6.2 Procedure Changes

Changes to the Radio Operation Rules may be made at the discretion of the NRL officials due to safety issues. These changes will be announced at the Competition.



7.0 Inspection Procedure

7.1 Safety Inspector

Each Competition will have a Safety Inspector. This person will be responsible for the scheduling of the inspections and keeping the Inspection sheets for each robot. This person will be the main contact for any Safety Inspection related questions or comments.

7.2 Internal/Functional Inspection

Each robot must pass both Internal and Functional Inspection before competing. Internal Inspection involves inspection of all of the components in a robot. Functional Inspection involves a demonstration that the robot can safely be controlled and meets the fail-safe requirement listed in the Technical Regulations. A copy of the Inspection form will be provided to each team at registration to use as a checklist.

7.3 Official Scale

NRL will have a specific scale designated as the official scale for that event. Your robot must make weight using that scale.

7.4 Inspection Time Schedule

Safety Inspection will take place during a specified time period prior to the start of the competition. This will be posted prior to the event.

7.5 NRL Right to Inspect/Disqualify

NRL reserves the right to inspect or re-inspect your robot at any time during the competition. Any additions or changes to the robot must be re-inspected before competing, as well as after any significant damage during a match. If NRL officials feel a robot is unsafe for any reason, and it cannot be made safe, it will be disqualified and not allowed to compete.

7.6 Non-Compliant

If, as the result of re-inspection, a robot does not comply with the Rules and Regulations, NRL officials will determine the outcome as follows:

- a. If the non-compliance was not intentional and would not have affected the outcome of a previous match in which it fought, the previous match results will stand; however, the robot will need to be modified to make it compliant for future matches.
- b. If the non-compliance was not intentional, but could have affected the outcome of a previous match in which it fought, the NRL officials can disqualify that robot and reverse the decision of the previous match if necessary. The robot will then need to be modified to make it compliant for future matches if that loss did not eliminate them from the competition.
- c. If the non-compliance was intentional, the robot will be disqualified and any previous matches will be reversed if necessary. That robot will not be allowed to compete in any NRL competition for the entire year.
- d. If the non-compliance was intentional and endangered any personnel at the competition, the entire team will be asked to leave the competition. That team will not be allowed to compete in any NRL competition for the entire year.



7.7 Building Cautions

Combat robot systems can be dangerous if not designed, constructed and tested properly. Damage during matches can render the robot unsafe. It is ultimately the responsibility of robot teams to ensure the safety of their system design.

8.0 Rules Enforcement

8.1 Rules Compliance

In all matters of compliance with the Rules, and any applicable civil or criminal laws, NRL and its officials reserve the right to disqualify a robot or to warn, fine or expel any team or individual from the Competition.

8.2 Expelled Individual

If an individual is expelled, they must leave the premise and turn in any IDs, pit passes, etc. This individual will not be allowed to compete in any NRL event for the rest of the year. If the individual expelled is the adult supervisor, the entire team must also leave the premise.

8.3 Expelled Team

If an entire team is expelled, they will be asked to leave the premise and turn in any IDs, pit passes, etc. They will also need to clear their pit table. They will not be allowed to compete in any NRL event for the rest of the year.

8.4 Criminal Offenses

If any person is in apparent violation of any Federal, State or Local laws, that person will be turned over to the local authorities.

9.0 Protests

9.1 Allowable Protests

The following items may be protested:

- a. The Safety Inspector's decision to fail a robot during inspection
- b. A match forfeit due to non-availability
- c. Disqualification due to an inadvertent rules violation

9.2 Unallowable Protests

The following items may not be protested:

- a. The Judge's decision on a match
- b. Disqualification due to an intentional safety violation
- c. Disqualification due to failure to obey a NRL official's instruction



9.3 Protest Procedure

The procedure for protesting is as follows:

1. The protest must be lodged within 15 minutes of the time the event occurred.
2. The protest should be brought to the Executive Director or the Event Organizer.
3. All parties involved will be given a maximum of 5 minutes to present their side of the case.
4. After all parties have presented their side of the case, the Executive Director or the Event Organizer will make the final decision within one hour after the presentations.
5. The decision made by the Executive Director or the Event Organizer will be final.

Glossary of Terms for NRL

Aggression – The frequency, severity, boldness, and effectiveness of attacks deliberately initiated by one robot against an opponent. If a robot appears to have accidentally contacted an opponent, that act will not be considered Aggression.

Arena – The enclosed area that the robots fight in.

Bye – A robot does not have to compete in a Round and is automatically advanced to the next Round. Byes occur in an Elimination Tournament when it is not possible to schedule a competitor in the current Round.

Control – The ability of the robot to move in a specific and deliberate manner. Control means a robot is able to attack an opponent at its weakest point, use its weapons in the most effective way, and avoid being struck by the opponent or its weapons.

Damage – Through deliberate action; reduce the functionality, effectiveness or defensibility of an opponent. Damage is not considered relevant if a robot inadvertently harms itself. Also, if a robot fragment strikes the opposing robot it will not be considered “deliberate”.

Disqualification – A robot is no longer allowed to compete in the tournament.

Eliminations – The standard Tournament format composed of successive Rounds of competition. The league format is Double Elimination through the final round.

Event Organizer – The main contact person for a particular competition.

Forfeit – A robot loses a match because it was not ready to compete at the scheduled time.

Grudge Match – A one-on-one non-competition match between robots in the arena. This is reserved for two robots that have each had two losses. It will follow the standard three minute Match rules. Grudge Matches will be allowed when and if there is time.

Incapacitated – A robot is not responsive. The Referee is the final authority on this call.

Knock-Out – Occurs when the attack or deliberate actions of one robot cause the opponent to become incapacitated.

Match – Any competition between robots in the arena. This includes the standard three minute Match, a Grudge Match, and a Rumble.

Multi-bot – Two or more robots that together meet the weight requirements. They compete as a team against their opponent. One of the bots must be designated as the “primary” bot. This bot must be functional for a match to continue.



Pit Crew – The students, coaches and advisors allowed in the pits area.

Postponement – Occurs when a specific Match is delayed from the originally scheduled time due to a request by one of the teams. A 10 minute time period will be given for a postponement. A robot may only use one postponement per event.

Round Robin – A Tournament style that allows each robot to fight all of its opponents once. The winner is decided by the total number of wins.

Rounds – One set of Matches, where all remaining competitors are paired off and compete (or receive Byes), in order to advance in the Eliminations.

Rumble – Any competition between multiple robots in the arena. This is reserved for multiple robots that have all had two losses. It will follow different rules. There are NO Tap Outs, NO unstuck opportunities, and the match is 5 minutes long. There is also no judging. The winner is determined as the robot that has the most functionality remaining. Rumbles will be allowed when there is time in between the regular competition.

Scoring – Three criteria are used to determine the winner of a match that completes the 3 minute time limit (Aggression, Control, & Damage). Judges will be using a scoring card to track the match.

Spread Spectrum – We strongly recommend using the Spektrum DX6 or DX7 controller with the BR6000 receiver. The BR6000 receiver was made specifically for the DX6 & DX7 transmitter so it would failsafe.

Tap Out – Occurs in a Match when a driver of a robot decides that they no longer want to continue the Match, and concede the win to the opponent. At the time of the tap out, all contact must stop.