FIRST LEGO League - Massachusetts

FLL REFEREE TRAINING
Thank you for agreeing to serve as a referee for a FIRST LEGO® League event!

You were asked to serve as an FLL referee because we believe that your passion and excitement make you an ideal role model for the kids and mentors participating in the program.

You are a hero and we are delighted that you could find the time in your busy schedule to assist us in reaching our mission!
Your role is extra-critical

- Requires the most preparation
- Constant focus for the entire event
- Patience when asked to make tough calls and dealing with the heat of the parents
Being a referee

- Provide teams and children with a positive experience, reinforcing their enjoyment of learning through FLL

- Provide an expert application of the rules

- Sometimes knowing the “correct” thing to do isn’t always the RIGHT thing to do
Referee Responsibilities

Before the tournament

- Read & learn the main documents
  - Field setup
  - Missions
  - Rules
  - Q&A rulings
- Practice
Referee Responsibilities

- During the tournament
  - Inspect the field
  - Govern the action
  - Make judgment calls
  - Record performance
During the Tournament

- Inspect the field
  - Verify the field is setup correctly at the start of each match
  - Ask the team to look over the field and agree to the setup
  - Do not allowed anything to be touched until the robot performance scores have been recorded
During the Tournament

- Govern the action
  - Put the children at ease
  - Allow or Not Allow action
  - Determine where objects are kept after they are moved
Make judgment calls
- Take the wording of rules at face value
- Remember: Fairness is Job #1, but it is not Goal #1

Record Performance
- Consider the condition of the field at end of match only
- Verify the performance score with the children at the table
Never forget....

- It’s about the kids
- The benefit of the doubt always belongs to the team
- If you are unsure about a tough call, consult your head referee or other referees
General Game rules
Team Members at the Table

- Team members are kids on the team
- Only two are allowed unless there is a repair emergency
- Team members may tag in and out during the match
- No adults are ever allowed up at the table
Legal Parts

- Any LEGO elements and only LEGO elements, expect a reference sheet of paper
- No quantity restrictions on non-electric LEGO elements
- Pneumatics are allowed, wind-up/pull back motors are not
- Teams are limited in electrical components mostly by what comes in the base kit
Teams may use the following software:
- LEGO Mindstorms
- RoboLab
- NXT software

On NXT, Bluetooth must be turned off at all times!

It is not the responsibility of the referee to check a team's software before they compete.

If you hear of or see a team in violation of one of these rules, notify the head referee immediately.
Base

- An imaginary box formed by vertical wall extending 16in high from the Base area on the field
- The robot always starts and restarts from Base
- The robot can be prepared and handled in Base
- The team can store extra pieces and other objects in Base
Starting/Returning Position

- Each time a robot wants to start or restart from base, it must comply with the following:

- When a robot is returning to BASE, it is considered IN once any part of the robot or object in its strategic control enter the volume of BASE
Strategic objects are supplied by the team for the robot to use.

Any part of the robot designed to come off during match play is considered a strategic object.

Attachments are parts of the robot designed to be added or removed during the match.

Teams may touch all these objects in base.

A robot part that comes off as a result of unintentional damage may be recovered by hand without penalty.

Strategic objects fall under the LOSS OF CONTACT rule.
Loss of Contact & Stray Objects

- **Loss of Contact**
  - If a robot loses contact with an object, that object must remain where it is until the robot contacts it again
  - These objects cannot be recovered by hand
- **Stray Objects**
  - Objects caused by the robot to be in non-scoring position may be removed by the referee upon request
  - These objects cannot be returned during the match
  - Objects in their original setup position are not stray
  - Objects in scoring position are not stray
Active vs. Inactive Robots

- The moment a robot is started, it is considered ACTIVE.
- The moment a robot is touched, it is considered INACTIVE.
- INACTIVE robots must be carried back to Base, unless they are already there.
Active vs. Inactive Robots

- If an ACTIVE robot and every object in its strategic control is touched COMPLETELY out of BASE
  - A touch penalty object is removed
  - Objects with the robot the last time it left Base go to Base
  - Objects not with the robot the last time it left Base are taken out of play
Active vs. Inactive Robots

- If an ACTIVE robot or any objects in its strategic control are at least partially in Base
  - There is no touch penalty
  - All objects are returned to Base and can be used

- If the only part of your robot in Base at the time of an active robot is a cord, hose, wire, tube, chain, or string, the robot is considered COMPLETELY out of base
Active vs. Inactive Robots

- The field and mission models may only be manipulated by ACTIVE robots (unless the rules indicate otherwise).
- If an inactive robot scores, de-scores, or modifies the field, the referee must return it to its previous state as soon as reasonably possible.
- If a team member modifies the field, the referee must return it to its previous state as soon as reasonably possible.
When the team approaches the table, review the materials they have brought to ensure they are legal, this includes:

- The number and type of LEGO elements
- Any field objects they may have brought from a practice table

Teams must use the mission models and objects from the table and not their own
Final Field Condition

- All scoring and robot performance assessment is done at the end of the match.
- The final field condition is determined by a ‘snapshot’ of the field at the sound of the buzzer.
- If a robot or team member alters the field after the buzzer, the referee must do their best to return the field to its previous condition.
- Teams should place all objects which score in Base back in Base at the conclusion of the match.
Scoring

- During robot performance assessment, the specific games rules must be used to determine whether or not a mission is to be scored.
- The mission rules will use words like “IN” or “TOUCHING” to define scoring.
Scoring – “IN”

- A is IN area B if any bit of A is over area B
- Barely IN is considering IN unless the rules say COMPLETELY
- Direct contact/touching is not considered IN
- Objects in a container are ruled individually
- Exception is Base: all objects are considering IN Base once any part in IN
Scoring – “TOUCHING”

- A is TOUCHING B only if A is making direct contact with B
- Any amount of direct contact counts as touching
The restriction against attaching things to mission models has been removed. The robot and everything it has, can now be pulled into Base as soon as any of it reaches Base. Stray objects must now be taken off the table if they’re going to be moved at all. Shifting is not allowed. A tethering rule allows tethering while preventing teams from using it to avoid a touch penalty. The definition of ON has been removed.
Final Thoughts

- Read the rules and think about situations that may come up. Test your knowledge!
- If you are unsure of a call, engage the head referee as soon as possible
- Stay focused on the robot and table at all times during the match. Ignore calls from crowd or other team members
- Be consistent – yourself and with other referees
2009 Challenge – Smart Move

- The Smart Move Robot Game gives you first-hand experience in getting a sensor-equipped vehicle (your robot) to *gain access to places and things*, while *avoiding or surviving impacts*, all in a test environment...
Missions & Matches

- **Missions**
  - Teams are allowed to try them in any order they want
  - Teams are allowed to re-try missions, however they do not get reset during the match

- **Matches**
  - Each match is 2.5 minutes long
  - Each match is a new chance for the team to try for a high score
Mission: Gain Access to Places

Final Position of Robot
Mission: Gain Access to Places 1

- Choose 1 of 3, must be in position at end of round
- **TARGET SPOT**
  - Required Condition: Parked with its drive wheels or treads touching the round target.
- **Value:** 25 points.

Before | Scoring Example | Scoring Example
Choose 1 of 3, must be in position at end of round

**YELLOW BRIDGE DECK**

- Required Condition: Parked with drive wheels or treads touching yellow bridge decking, but not touching any red decking or the mat.

**Value: 20 points.**

Before Scoring Example Scoring Example
Mission: Gain Access to Places 3

- VEHICLE SHARING
  - Required Condition: Parked with its drive wheels or treads touching your red bridge decking, but not touching the mat.
  - Value: 25 points.
Mission: Gain Access to Things

Access markers
Mission: Gain Access to Things

- **ACCESS MARKERS**
  - Required Condition: Access markers need to be in their “down” position.
  - Value: 25 points each (total of 4).

*Before Scoring Example*  *Scoring Example*  *Scoring Example*
Mission: Gain Access to Things

Loops
Mission: Gain Access to Things

- **LOOPS**
  - **Required Condition:** Loops need to be in Base.
  - **Value:** 10 points each.
    - **Bonus 1:** team can place by hand 1 red loop in base if all 3 gray loops have been returned to base
    - **Bonus 2:** team can place by hand 1 loop of any color in base if all red loops have been returned to base

Before | Scoring Example | Scoring Example
Mission: Avoid Impacts

Warning Beacons
Mission: Avoid Impacts

- **WARNING BEACONS**
  - Required Condition: Warning beacons need to be upright (square to the mat).
  - **Value: 10 points each.**

Before Scoring Example

Scoring Example

Scoring Example
Mission: Avoid Impacts

- Warning beacons are the touch penalty objects for the Smart Move Robot Game. This means each time you touch your vehicle while it’s completely out of Base, the referee removes one upright beacon. The beacons are removed in order from south to north, then from west to east. If there are no upright beacons at the time of the touch, there is no penalty.
Mission: Avoid Impacts

Sensor Walls
Mission: Avoid Impacts

- SENSOR WALLS (AVOIDANCE OPTION):
  - Required Condition: Sensor walls need to be upright (square to the mat). Any 4 walls can count. Only 4 walls can count. Each upright sensor wall also requires a “down” access marker.
  - Value: 10 points each, max 40.
Mission: Avoid Impacts

- **SENSOR WALLS (IMPACT OPTION)**
  - Required Condition: No (zero) sensor walls are upright.
  - **Value: 40 points.**
Mission: Survive Impacts

VEHICLE IMPACT TEST
Mission: Survive Impacts

- **VEHICLE IMPACT TEST**
  - Required Condition: The truck needs to no longer touch the ramp’s red stopper beam. Your entire vehicle needs to be completely out of Base when doing this, else the referee removes 2 upright warning beacons (in the same manner as 2 touch penalties).
  - **Value:** 20 points.

Before | Scoring Example | Scoring Example
**Mission: Survive Impacts**

- **SINGLE PASSENGER RESTRAINT TEST:**
  - Required Conditions: The crash-test figure must be on your vehicle for the entire match. If the figure becomes separated, the referee removes it. Any constraint system is okay if the figure can be separated quickly post-match.
  - **Value: 15 points.**

Before  |  Scoring Example  |  Scoring Example
Mission: Survive Impacts

MULTIPLE PASSENGER SAFETY TEST
Mission: Survive Impacts

- MULTIPLE PASSENGER SAFETY TEST
  - Required Condition: All four people are sitting or standing in or on a transport device of your design, and some portion of that object is in the round target area.
  - Value: 10 points.

Before  Scoring Example  Scoring Example
Thank you for taking the time to volunteer for FLL! We hope you find the experience rewarding and fun!

Special thanks to John Pilvines and Jack Gregory for their assistance in creating and delivering this training.