Climate Connections
Robot Game Definitions And Rules

Contents

Background

Competition Values
- You are "Gracious Professionals" learning and competing like crazy, but treating one another with respect and kindness in the process.
- In the spirit of competitive innovation, as long as you're not breaking any rules, there are no "wrong" or "unethical" strategies; only "allowable" and "reversible" strategies.

Participation
- The maximum allowable team size is ten members, not including coaches and mentors.
- See the *FIRST LEGO League Coaches' Handbook* for allowable ages.
- At the tournament, only two team members at a time are allowed right up at the competition table except during repair emergencies.
- The rest of the team must stay back from the table, but close enough for different members to tag in or out as desired at any time. Specific positioning is decided by the head officials running each tournament.

Field
- The field is where the robot game takes place.
- It consists of a field mat, on a table, with mission models arranged on top.
- The field mat and the LEGO pieces for building the mission models are part of your Field Setup Kit.
- The instructions for building the mission models are on a CD, in the same box as the LEGO pieces.
- For all other field setup instructions, click Field Setup.

Robot
- The robot is defined as the main body containing the NXT (or RCX) controller, and any currently installed parts or attachments, whether the installation is a press fit or a loose fit.
- Objects away from the robot are not part of the robot.

Strategic Objects
- Strategic objects are allowed and defined as team-supplied objects other than the robot.
- You may use a strategic object by hand to prepare or aim an inactive robot, but you must let go of it before the robot is allowed to start.
- An active robot may use a strategic object anywhere.

Mission
- A mission is something the robot can try to do on the field to score points.
- The robot starts completely in Base and goes out on one or more trips to work on one or more missions per trip.
- Missions may be tried in any order, alone or in groups, re-tried when possible and allowed, or skipped.
- Points are given if the required results are still visible on the field at the END of the match.

Match
- At a tournament, two Challenge fields are joined back to back, and each team is paired opposite another to compete in a match.
- For 2-1/2 minutes, the robot tries to get as many points as it can by achieving mission results.
- The timer never pauses during a match.
- There is a minimum of three matches, and each one is a fresh chance for you to get your best score.
- No match has anything to do with another, and only your best score counts specifically toward the Performance Award.

Round
- The process of cycling all teams through one match each is called a round.
- Tournaments run at least three rounds.

- Between your match in one round and the next, you usually have time to go to the pit area and work on the robot and its programs as needed, but this time may be limited, depending on the schedule of other proceedings.

Materials

This rule is not only about the robot. It is about everything you bring to the competition area.

- Everything you compete with must be made of LEGO elements in original factory condition, except LEGO string and tubing, which you may cut to length.
- There are no restrictions on the quantity or source of non-electric LEGO pieces, except that wind-up/pull-back "motors" are not allowed. Pneumatics are allowed.
- The electric elements used must be the LEGO MINDSTORMS type, and the total number of electric elements you may use in one match is limited as follows:

For RCX users:	For NXT users:
RCX controller (1)	NXT controller (1)
motors (3)	motors (3)
touch sensors (2)	touch sensors (2)
light sensors (2)	light sensors (2)
lamp (1)	lamp (1)
rotation sensors (3)	rotation sensors (3 minus the number of NXT motors present)
3rd touch OR light sensor (1)	ultrasonic sensor (1)

- Example 1: If your robot has three motors, you may not have any other motor in the competition area, even if it's only for weight or decoration; even if it's in a box, off the field.
- Example 2: If your robot has two motors, but you have multiple attachments to motorize, you must design a way to switch the 3rd motor from one attachment to the next.
- LEGO wires and converter cables are allowed as needed.
- Spare/alternate electrical parts are allowed in the pit area.
- Objects functioning as remote controls are not allowed anywhere.
- Marker may be used for owner identification in hidden areas only.
- Paint, tape, glue, oil, etc. are not allowed.
- Stickers are not allowed except LEGO stickers applied per LEGO instructions.
- Note that it's a violation of this rule to use more than one robot in a single match, but it's okay to use a different robot in a different match.
- If a robot is in violation - of this rule or the SOFTWARE rule - and cannot be corrected, the decision about exactly what to do rests with the head officials at the tournament, but that robot may not win awards.

Software

- The robot must be programmed using LEGO MINDSTORMS, RoboLab, or NXT software (any release).
- Patches, add-ons, and new versions of the allowable software from the manufacturers (LEGO and National Instruments) are allowed.
- Text-based and/or "outside" software is not allowed.
- The point of this rule is the same as that of the MATERIALS rule: Since we can't ensure equal coaching for all teams, we can/must lessen this unfairness by capping the power of the tools.

Wireless Signals (At Tournaments Only)

- Downloading programs to robots is not allowed in the competition area.
- Teams downloading to an RCX robot must make sure the process is shielded, that there are no other RCX robots in range, and robots should be turned off when not in use.
- Teams downloading to an NXT robot must do so by cable. Bluetooth must be switched off at all times.

Base
- Base is an imaginary box formed by vertical walls that rise from the perimeter of the Base area, including the inside surface of the border walls, and by an invisible ceiling 16 in (40 cm) high.
- Base is a VOLUME—not an area.
- Base is the place for the robot to be prepared, started from, and serviced if needed.
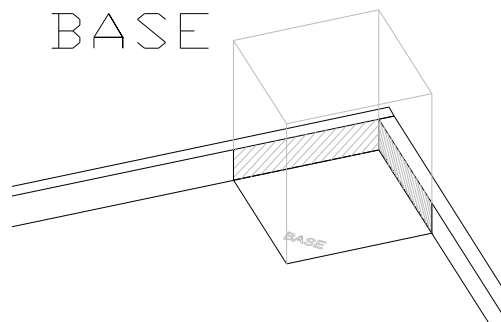
Housekeeping
- Objects in Base not currently being moved or used by the robot are okay for you to shift partially out of Base, out of the way, as long this action is not strategic in any way.
- Objects may also be held in hand or in a box by one of the two team members at the table.
- Objects eligible to score in Base should be placed in Base when the match is over so the ref can score them.
- Team members not at the table may not hold competition objects of any type.

Required Methods
Usually, no specific method is required for achieving mission results, and you are free/encouraged to be creative, but when a specific method *is* required for achieving a result, you must use that method or the ref will reverse the results.

If A Detail Isn't Mentioned, Then It Doesn't Matter
Assuming you have read all the missions, rules, and Q&A carefully...
- If no particular method is required, then any method is okay.
- If something is not required, then you don't have to do it.
- If there's no restriction against something, then it's allowed.
- There are no hidden requirements or restrictions.

Precedence
- When there is conflict between a mission and a rule, the mission takes precedence, but the current Q&A page on the web takes overall precedence. MAKE SURE TO CHECK BACK THERE OFTEN.
- The head ref is not obligated to consider calls made at previous tournaments unless those calls have been added to the latest Q&A.

Variability
As you build and program, keep in mind that our suppliers, donors, and volunteers make every effort to ensure that all fields are correct and identical, but you can expect some variability, such as:
- texture/bumps under the mat.
- waviness in the mat itself.
- flaws in the border walls.
- variety in lighting conditions.

- variety in light rigging and screw heads at the table ends.

You should direct questions about variable conditions at a particular tournament to that event's head officials.

Procedure

Pre-Match Preparation
- When you walk up to a field to compete on time, you're allowed at least one minute to prepare and arrange your inactive robot and any objects it will be moving or using.
- You must use the mission models supplied by the tournament and may not bring duplicates to the competition area.
- You may *NOT*:
  ο take mission models apart.
  ο lock or attach mission models to the robot.
  ο lock or attach mission models to each other.
  ο lock or attach anything to mission models.
  ο touch mission models out of Base for any strategic purpose.
  ο download anywhere near the competition area.

The "Locked Or Attached" Test
- The ref must be able to pick up any single, non-Dual-Locked, mission model directly and freely, against no other force than gravity, and walk away with it, without any other object coming too...
- Or instead, the ref must be able to pick up the "other" object directly and freely, against no other force than gravity, and walk away with it, without the mission model coming too.

Muscle Action
- You may not cause anything but the robot to leave or extend even partially out of Base, except as described in the Start Procedure and Housekeeping rules.
- If something does leave Base against this rule, the ref simply puts it back.
- You may place objects completely in Base for an active robot to interact with, but only if you have obviously let go of them before the robot contacts them.
- However, dropping something on an active robot is considered an indirect touch and forces a restart.

Start Position
- For all starts and restarts throughout the match, every bit of the robot and any objects it is about to move or use must fit completely in the Base area.
- Nothing is allowed to be poking through the imaginary box of Base.
- The robot is allowed, but not required, to touch objects it is about to move or use.
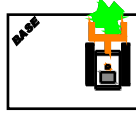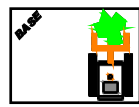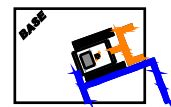
START POSITION
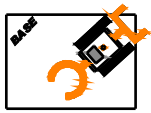
| NO | NO | YES | NO | YES | NO | YES |

Start Procedure
- To be ready to start, the robot must be motionless in start position, and you must not be touching it, or any object it is about to move or use.
- When this is plain to see, and you say you're ready, the referee (ref) will signal your field's readiness to the announcer. As the countdown starts, you may reach in with one hand, and at the exact start time, either touch a button, or signal a sensor, to start/resume the robot's program.
- You may not handle the robot, or anything it's about to move or use, during or after the countdown. If you do, the ref will have you restart. The point of this rule is to ensure that your only influence on the robot is to get its program running.

Start Timing
- When teams and refs are ready, the announcer will provide a countdown, such as "Ready, set, GO!"
- The exact time to start is at the beginning of the last word in that phrase.
- If a different signal is used, the start is at the beginning of that signal.

Active Robot
At the moment the robot is started, it is considered "active" and remains so until you next touch it or touch any model or strategic object it is moving or using.

Active Robot Touched
- Any time you touch an active robot, or object it is moving or using, the robot is immediately considered "inactive" and must be carried to Base if it's not already there.
- The inactive robot in Base may then be handled, adjusted, reconfigured, and otherwise prepared as needed for restarting.
- If any models or strategic objects were being strategically moved by the robot at the time of the touch:
  o Those being moved from Base go back to Base with the robot, eligible for continued use.
  o Those encountered out of Base are taken out of play (off the field).
- Also, if the robot happens to be completely out of Base at the time of the touch, then a "touch penalty object" is taken out of play if one is available.
- Anything done by an inactive robot is reversed by the ref, to the extent possible, as soon as possible.

Loss Of Contact
- If an untouched robot loses contact with an object, that object stays where it is unless/until the robot regains contact with it. Such objects may not be recovered by hand.
- For exceptions, see the Stray Objects and Robot Damage rules.

Stray Objects
- An object caused by a robot to be in the way of either team's robot performance may be moved by the ref, upon team request, if that can be done without a direct effect on scoring.
- Objects in scoring position may be shifted by the ref to equivalent scoring positions if this can be done with no other strategic benefit, and worthless objects may be taken off the table.
- Objects in their original "setup" positions are not considered stray.

Robot Damage

At any time during a match, you may recover robot parts that come off as a result of obviously unintentional damage. You may do this by hand or request help from the ref.

Field Damage
- The robot is not allowed to break mission models or separate Dual Lock.
- If a mission model breaks, malfunctions, moves, or is activated by anything other than allowable action, the ref reverses the change as soon as possible (if possible).
- Field damage too severe to reverse is left as is and could fall under the Stray Objects rule.
- If points are earned along with field damage that occurs due to faulty model design, construction, or setup, you keep those points.
- Field damage that obviously occurs because of the team or robot, whether intentional or not, draws a warning. Repeats could make associated missions worthless.

Interference
- Your robot is not allowed to have any effect on the other team's robot, field, or strategy except by directly meeting the scoring requirements of missions in areas that are shared between the two sides by design of the Challenge.
- There is always at least one mission where you and the opposing team are set up to interact in some way, either competitively or cooperatively.
- As a matter of luck, that team may be able to out perform you on that mission or may fail to cooperate with you there. This is not considered interference.

Scoring

Score Determination

- To minimize controversy about what happened during a Match, THE SCORE IS DETERMINED* AT THE END OF THE MATCH, BY THE CONDITION OF THE FIELD AT THAT TIME ONLY. *At the end of the match, the ref carefully examines the field to note the conditions and locations of objects.
- This means that points are not given for accomplishments that the robot accidentally trashes before the match ends, and this is why the ref reverses "illegal" results as they happen.

"In" (Operational Definition)
- A is "in" area B if any bit of A is over area B.
- Direct contact does not matter.
- Objects in a container are ruled individually and independent of their container.
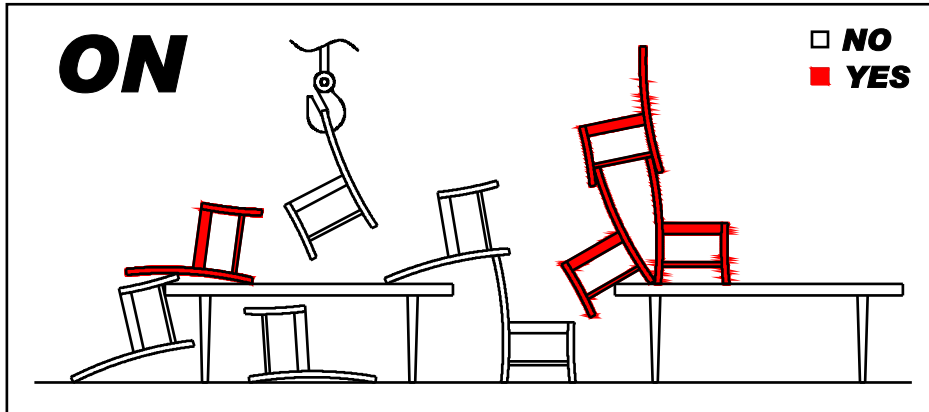- If an object's location is hard to call, you get the benefit of the doubt.
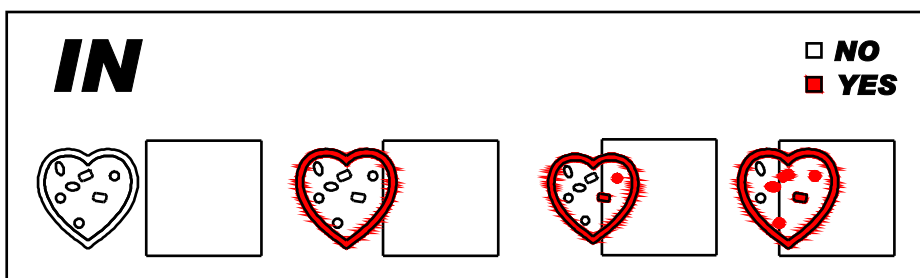
"On" (Operational Definition)

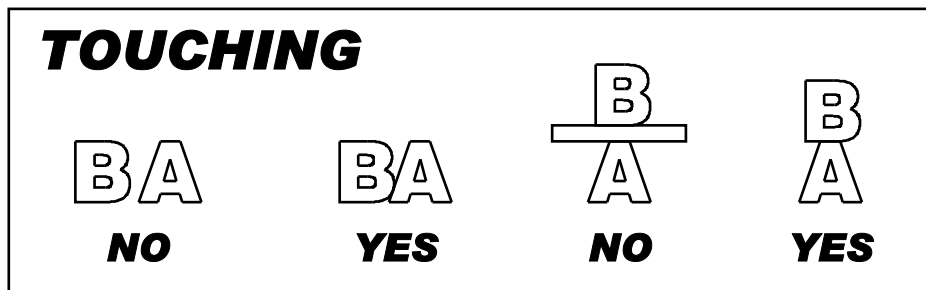A is "on" B if either of these is true:
- 100% of A's weight goes through B.

- All objects diverting A's weight around B could be removed without A falling (as tested or estimated by the ref).

ON

□ **NO**
■ **YES**

"Touching" (Operational Definition)
A is "touching" B if A is making direct contact with B.

TOUCHING

B A	B A	B / A	B / A
NO	**YES**	**NO**	**YES**

Benefit Of The Doubt
- You get the benefit of the doubt in situations that are too close to call, such as:
  - when a split-second or the thickness of a (thin) line is a factor.
  - when a situation could "go either way" due to confusing, conflicting, or missing information.
  - when anyone other than the challenge designer claims to know the "intent" of a requirement or constraint.
- If you disagree with the ref and can respectfully raise sufficient doubt in his/her mind, the ref meets with the head ref, and the resultant decision is final.
- This rule is not an order for the refs to be lenient, but it is a license for them to make judgment calls in your favor when it's reasonable to do so.

After The Match
- At the end of each match, the ref needs time to concentrate and record the condition of the field, so no one is allowed to touch anything.

- You (kids only, please) and the ref look at the field together and come to agreement about what points were scored or missed and why, and to be sure you're not walking away with any mission models.
- Finally, the ref gives the okay for field reset.

Communication

Challenge Questions/Support
- For official answers to questions about the Robot Game part of the Challenge, including rulings on special strategies or situations, e-mail flltech@usfirst.org (most efficient) or call 1-800-871-8326, x118 (less efficient).
- For best results, be sure you have read the four documents listed under READ THIS FIRST.
- When e-mailing, be sure to put "Challenge" in the subject line, and please state your role on the team (member, coach, parent, mentor).
- When calling, please first leave your contact information slowly, your role on the team, and YOUR QUESTION on voicemail.
- flltech does not answer questions about building or programming the robot (that's your Challenge).
- flltech can not support LEGO product.
- For NON-game-related technical support for LEGO product (RIS, RoboLab, NXT), call 1-866-349-5346.
- The FLL International Forum is great for sharing ideas and getting tips from each other, but it is NOT AN OFFICIAL SOURCE OF ANSWERS about anything.

Information Sharing And Consistency
- Since individual victory need not come at the expense of collective excellence, all official answers given through Challenge support are subject to public posting in the Q&A, including answers about ALLOWABLE strategies.
- Also, the only documents given to the refs for reference to conduct matches and make calls are the same four documents you and every other team have access to all season.
- If a strategy is questionable for you, chances are it will be questionable for the ref too, and guarding it until the tournament is risky.
- No new Q&A entries will be posted after 3PM (eastern U.S.) on Fridays.

Coaches' Meeting
- If a question does come up right before the tournament, your last chance to ask it is at the "Coaches' Meeting" (if there is one) the morning of the tournament.
- The head ref and coaches meet to identify and settle any differences *before* any matches start.
- For the rest of the day, the ref's calls are final when you leave the table.

Summary Of Significant Content Changes For 2008
- New Competition Values rule - sets the moral tone for competition and good will to co-exist.
- Participation rule - now expressly allows tagging in/out.
- Start Position rule - shows that it is now okay for an aiming jig to be left in place during starting.
- Start Procedure rule - now allows the robot to contact/interact with strategic objects while leaving Base, and does not require the robot to leave Base.
- New Start Timing rule - promotes precision/consistency/fairness
- New Active Robot rule - substitutes a hand-input as the start of autonomy instead of the robot being completely out of Base as the start of autonomy. It also replaces preparation, transition, and autonomy modes with "active" or "inactive."
- New Active Robot Touched rule - eliminates placement-by-touch and retrieval-by-touch loopholes.
- Strategic Objects rule - now explicitly allows the robot to use strategic objects in Base.
- Materials rule - now excludes wind-up/pull-back motors.
- Housekeeping rule - now requires Base-scoring objects to be in Base at the end of the match and it also rules that only the two team members at the table can hold objects.