BACKGROUND (with updates to Sep 17, Update #19, updates to Oct 4, Update #28, updates to October 26, Update #31, updates to November 20, Update #33 and updates to November 26, Update #38)

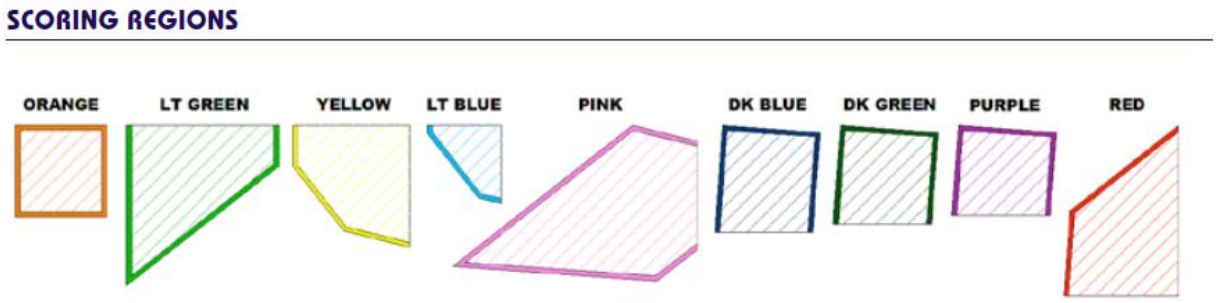
When Earth is viewed from outer space, the texture of even the highest mountain peaks is surprisingly hard to see. Compared to Earth, and even the atmosphere, and the oceans, humans are unbelievably tiny. So when the giant under our feet cracks, it's always interesting, but sometimes disastrous. And when the fluids around us move, it can be
delightful, but too often devastating. It's incredibly challenging to predict, and equally difficult to escape… **Nature's Fury℠!**

Is there anything we can do? Yes! As future scientists and engineers currently on ***FIRST***® LEGO® League teams, you will craft highly intelligent approaches to preparation, safety, and reconstruction when faced with the incredible destructive energy of natural events. Start the innovative thinking now, as you confront and master the symbolic missions of the robot game below.

FRIENDLY WARNING

While it's obvious that everyone needs to become an expert on the details of the Missions below, it's also EXTREMELY IMPORTANT for everyone, vets as well as rookies, to read the OTHER THREE CRITICAL ROBOT GAME PAGES: Field Setup + Rules + Updates and go back to them repeatedly. Look at the benefits…
TEAMS WHO READ EVERYTHING TEAMS WHO DON'T
— have fewer questions — operate in a fog
— have less rework — start over and lose time
— have fewer surprises at tournaments — learn a lot from… referees
— score higher — lose points
— have more fun — get stressed

SCORING REGIONS



Update #35 – BASE IS NOT A SCORING REGION
Scoring Regions are shown and labeled at the bottom of Page 13, and Base isn't on that list. Things can be brought to Base and sent back out, but they're not worth points in Base.

MISSIONS

SUPPLY TRUCK

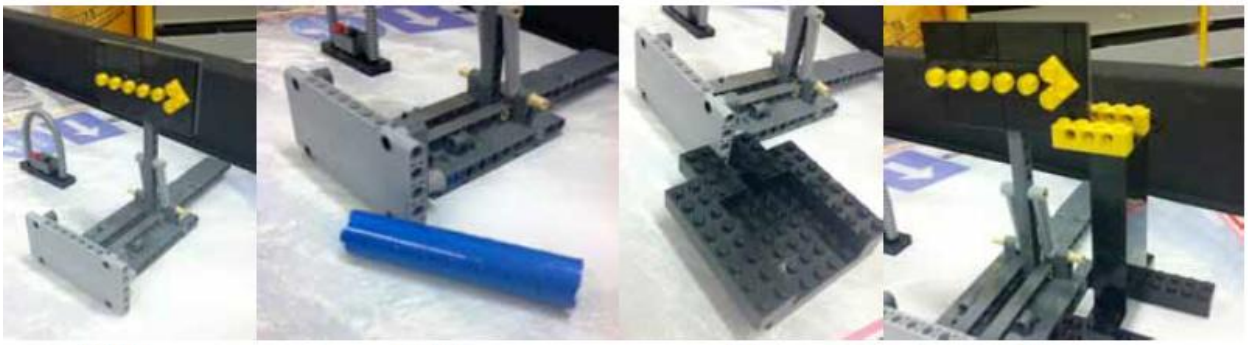
Condition visible at the end of the match:
– The supply truck is touching the mat in the yellow region.
(Note that the LT blue region is in the yellow region.)
Value: 20

EVACUATION SIGN

Conditions visible at the end of the match:

- The sign is obviously up (it doesn't need to be vertical), held in place only by the slider's friction with the mat.
- No part of the sign model is being touched by the robot, or any strategic object.

Value: 30



SCORE SCORE NO NO

Update #15 – SIGN FRICTION

Since the usual friction keeping the sign up comes from the slider against the rest of the model (and not really the mat), please interpret the friction text in the evacuation sign mission to mean that the sign can only be held up by the slider's friction with the mat or the other beams of the sign model.

Update #23 – SIGN HOLDING

Mission models can't be used to hold the sign in place. True, they're not strategic objects, so the 2nd constraint isn't a problem, but they are something other than the model's own friction, so the situation fails the 1st constraint.

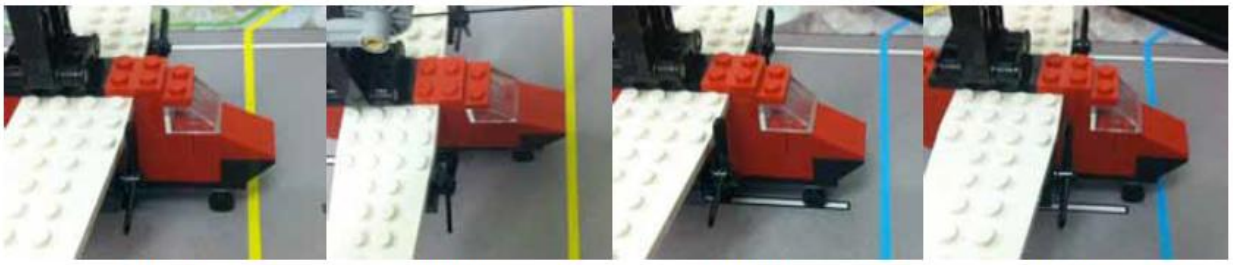
CARGO PLANE

Condition visible at the end of the match:

- The plane is in the yellow region.

(Points are given for yellow and not LT blue, or for LT blue, but not both.)

Value: YELLOW AND NOT LT BLUE… **20** -OR- LT BLUE… **30**



YELLOW YELLOW YELLOW LT BLUE

Update #13 – PLANE LENIENCY AND OBSTRUCTION (Sep. 9 Clarification; No change)

*This update does not apply when the robot has knocked the plane's rollers off the cord.

If the plane departs and hits nothing, it automatically scores as reaching LT BLUE. If that plane stops short of LT BLUE, the referee pushes it the rest of the way to that zone asap.

If the plane departs and hits only "a little bit" of stuff on the runway, it will automatically score as reaching YELLOW. If that plane stops short of YELLOW, the referee pushes it the rest of the way to that zone asap. If the plane departs and hits "a lot" of stuff on the runway, it stays and scores where it stops unless the robot pushes it to a zone. "A Lot" of stuff is defined in the referee's judgment as an amount that would DEFINITELY have stopped any plane (even a fast-rolling one) from scoring at all. Anything less is "a little bit."

Update #34 – Tower Setup Details

Please observe the 56-1/2″ dimension for locating the plane tower - and don't bother trying to move it to make the cord look perfectly aligned with mat features.

Update #37 – Hook Axle

The hook grabs bare axle - Note that there is NO bushing in the center of the axle where the hook grabs!

TREE BRANCH

Conditions visible at the end of the match:

- The east tree branch is closer to the mat than the electric cables are.
- The tree and the electric cable models are upright, touching the mat.

Value: 30

Update #10 – ELECTRIC LINES IN PLACE

There is a line of text missing, which is not a hidden freedom, but rather a mistake, which will ruin this mission if left unfixed. Since this is only Day 1 into the season, I must fix this, with apologies: To score for tree branch mission, the electric lines must be in their setup place, and in their setup position. It's okay if they're nudged out of place a little, but from a distance they need to look like they're still set the way they were when the match started

Update #17 – BRANCH LOWER THAN LINES

The entire branch including tan, green, black and red pieces must be lower than the lowest molecule of the black electric lines.

Update #30 – OTHER BRANCHES DOWN

If tree branches other than the east one break or fall off, this will not affect your score unless the referee is convinced it happened by strategic design.

TSUNAMI

Conditions visible at the end of the match:

- All three waves are touching the mat.

Value: 20

AMBULANCE

Conditions visible at the end of the match:

- The ambulance is in the yellow region.
- All the ambulance' s wheels are touching the mat.

Value: 25

RUNWAY

Conditions visible at the end of the match:

- Nothing except wave water and/or the plane is touching the mat anywhere on the runway.

Value: 30

Update #3 – RUNWAY CONFLICT

Objects scoring in the YELLOW zone don't count as being on the runway, and won't cause the loss of your clear runway points. When roof debris is in the LT BLUE zone, same thing, it won't ruin your runway points. **Robot too - No problem**

CONSTRUCTION RELOCATION

Conditions visible at the end of the match:

- There are no gray building units anywhere in the LT green region.

Value: 20

Update #38 – GRAY SEGMENT STATUS

Gray segments are not worth points in Yellow. For the Construction Relocation mission, it's the green region with no gray segments in it that's worth points - not the gray segments themselves. This means that gray segments touching the runway at the end of the match do ruin the Runway mission.

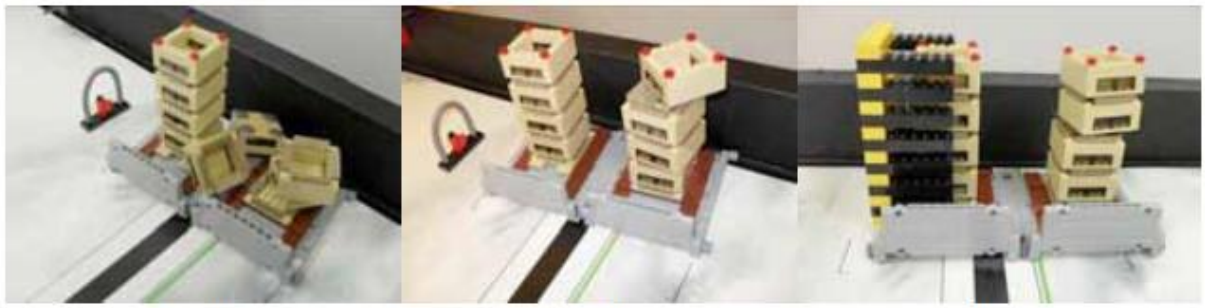
BASE ISOLATION TEST

Conditions visible at the end of the match:

- The west tan building is undamaged: Four segments, 90° to mat, and "perfect" alignment.
- The east tan building is obviously damaged.
- *Nothing is touching either building except the rolling frame.
- *Nothing ever touched either building except the rolling frame.
- The damage was caused purely by movement of the rolling frame.

(*Exception: Fallen segments from the east building may touch the mat and/or the west building by chance.)

Value: 30



SCORE SCORE NO

SCORE REALLY?

CODE CONSTRUCTION

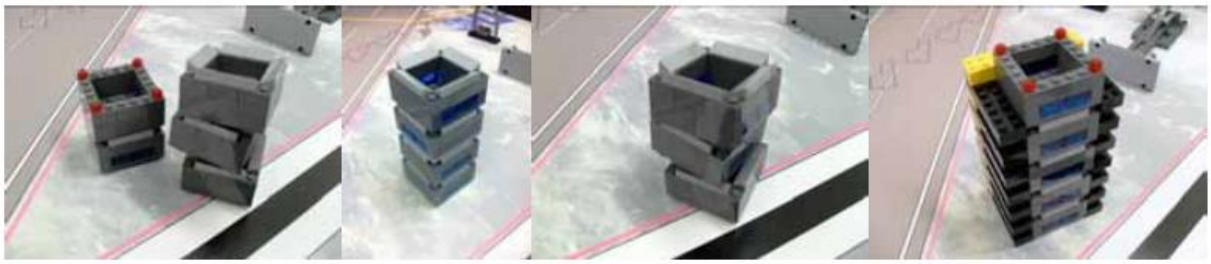
Conditions visible at the end of the match:

- A multi-story building is in the pink region.
- The building is made of building segments only.
- The finished building does not rely on strategic objects or the robot in any way.

(Perfect nesting and alignment are not needed for this building.)

(If there are multiple buildings, only the highest score-worthy one scores.)

Value: 5 EACH SEGMENT OF HEIGHT



H = 3 H = 4 H = 3 NO

OBSTACLES

*Condition visible DURING the match:

– The robot has crossed completely over the west line of the noted region, from the west only.

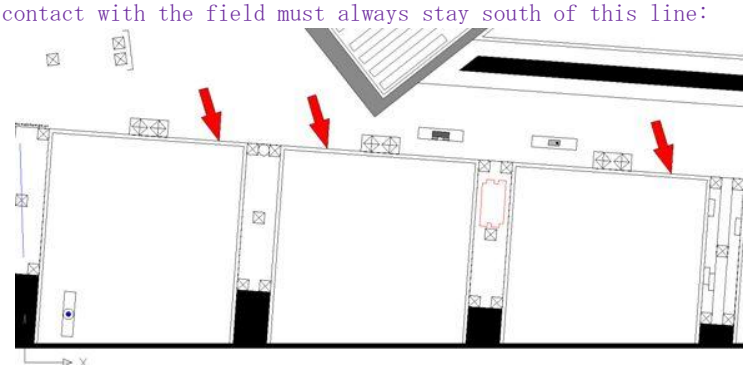
(This mission involves exceptions to the Rules...)
(This mission may be repeated as desired, in hopes of improved results.)
(Points given are permanent unless a better result replaces them later in the same match.)
(Points are given only for the best result achieved.)
(The robot may be rescued from this mission as needed, successful or not, without penalty.)
(Points given are permanent even if the robot later leaves or is rescued from the region.)

Value: DK BLUE…**10** -OR- DK GREEN…**16** -OR- PURPLE…**23** -OR- RED…**31**

NO DK BLUE DK BLUE

Update #11 - CROSSING OBSTACLES

Lenient clarification: When crossing obstacles, the robot may have parts that extend (in the air) over their north ends, but any contact with the field has to stay south of the northern ends of the obstacles the entire way. All contact with the field must always stay south of this line:



Update #12 – CRUMBLING WATER

The construction optimization between the river obstacle's prototype stage and production stage weakened it – a lot. *Tournaments are asked to beef up the underside of the river model with extra Dual Lock as needed to stop the model from crumbling. Do not use LEGO plates, as they would change the height of the model. *Teams are also encouraged to make this fix, so that you're practicing under tournament conditions.

Update #18 – DARK BLUE WATER (Sep. 9)

If your eastbound robot has the water from the DK BLUE zone and you pick your robot up while it's crossing an obstacle or otherwise seems to be attempting the Obstacles mission, you can keep the water. Cargo seizure by the referee is described as a penalty in Rule 31, and the mission does say "without penalty."

Update #19 – BROKEN OBSTACLES (Sep. 9)

Obviously the "obstacle" models are fragile. Because the breakage is due to their design, if they break you will NOT get a call of "model damage" at tournaments. At the same time, the damage is predictable (you've been dealing with it all season), so it is considered a variable for you to expect and consider while you design. Also please understand that the models are repaired by humans... If you see that any

model isn't built correctly, Rule 19 gives you the ability and responsibility to ask that it be corrected before the match starts.

Update #27 – SOUTH OF OBSTACLES

As long as the robot doesn't touch the field north of the northern zone lines, its path is score-worthy. It can use the mat south of the obstacles and it may even run along the top of the wall. Wall teams: You are reminded that wall heights can range high and low as described in the Field Setup pages.

Update #28 – OBSTACLE EXCEPTION APPLICATION

The touch-penalty exception shall apply even when the robot successfully crosses the last obstacle, and even if the robot has made a delivery into RED as part of an obstacle-crossing trip. It shall not apply any time the referee believes the robot has exited the obstacle sequence northward AND under control.

HOUSE LIFT

Conditions visible at the end of the match:

– The house is locked in its high position.

Value: 25

PROGRESS

Conditions visible at the end of the match:

– The pointer has reached colors as a result of red lever motion only (moving left in the picture).

(Points for this mission are awarded to both teams, no matter who operates the model.)

(No points are awarded if this model has not been operated.)

Value: COLORS REACHED…**2** EACH

LT GREEN

LT GREEN

Update #22 – POINTER MODEL IS CENTERED EAST-WEST

The field instructions say this model is at the "center of a competition setup," which means centered by any measure, including east-west.

Update #24 – POINTER VALUE

The pictures of pointer value examples are correct. Each counts as LT GREEN. Your score is the last color the pointer obviously/definitely reached. You get benefit of the doubt if the white piece has reached and the pointy end has not. And as usual, you get benefit of the doubt when the ref "can't tell for sure."

FAMILY

Conditions visible at the end of the match:

– At least two people are together in any colored region.

(Points are awarded for 2, or 3, but not both.)

Value: 2…**33** -OR- 3…**66**

WATER

Conditions visible at the end of the match:

– At least one person is together with (bottled) water in the same region.

Value: PEOPLE WITH AT LEAST 1 WATER…**15** EACH

Update #8 – PEOPLE WITH WATER

"People with at least one water = 15 points each" means the more people who have water, the more points you get. You get 15 points per PERSON with [any amount of] water. Examples: 1P+1W=15, 1P+2W=15, 3P+2W=45

Update #20 – TSUNAMI WAVES DON'T COUNT AS WATER

The only models that count as water with people are the little water bottles. The tsunami cylinders don't.

SAFETY

Conditions visible at the end of the match:

– At least one person is in a region colored red or yellow.

(Points for people in red and people in yellow are combined.)

Value: PEOPLE IN YELLOW…**12** EACH, PEOPLE IN RED…**18** EACH

PETS

Conditions visible at the end of the match:

– At least one pet is together with at least one person in any colored region.

Value: PETS WITH AT LEAST 1 PERSON…**15** EACH

SUPPLIES & EQUIPMENT

Conditions visible at the end of the match:

– At least one non-water item is in a region colored red or yellow.

(12 Possible: 2-way radio, battery, generator, 2 fuel, grain, bread, medicine, boom box, flashlight, dirt bike, helmet)

Value: ANY IN YELLOW…**3** EACH, ANY IN RED…**4** EACH

Update #16 – LOOP MODEL BREAKAGE

If a loop model breaks and it was probably accidental, as long as any piece of the model is in a scoring zone at the end of the match, it will count.

Examples: Kitten but no loop = ok, Loop but no battery = okay.

Update #25 – BROKEN SCORING OBJECTS

A broken object can score unless there is no question the breakage was intentional, but it can only be worth points in one place – the lesser if a choice is needed.

Update #26 – SUPPLIES IN RED ON ROBOT / IN CONTAINER

Q: Can supplies/people/pets/water count in a scoring zone if they're on the robot or in a container and not touching the mat?

A: Please see Rules 31, 37, and 38.

Rule 31: To determine if an object is "in" a scoring zone, the referee will look at:

1) the object.

2) the mat.

If the object crosses the line, even *barely, it's "in." The presence or absence of the robot or a container is irrelevant. Practical example: If the FRONT of your robot is in RED but the cargo is at the BACK of the robot, the cargo doesn't score. The picture at the bottom of Page 23 applies anywhere.

37 & 38: When "in" is the requirement (as with these objects), touching the mat is not needed.

*(Exception: For the Obstacles mission, barely isn't good enough.)

Update #29 – LOOP MODELS

Objects in loops *must stay on their loop structures.

- Rule 14: You can't take models apart.
- Rule 34: Breaking models can cause point loss.

- Update 25: Leniency if it's an obvious accident.

Update #36 – WATER BOTTLE STATUS

Water bottles don't score as units of "Supplies & Equipment."

SAFE PLACE

Conditions visible at the end of the match:

– The robot is in the red region at the end of the match.

Value: 25

SCORE NO

Update #4 – SAFE PLACE EXTENSION

Text missing from the Safe Place mission, added here to go along with the picture on the right: If the only part of the robot in the RED scoring zone at the end of the match is obviously designed/added to the robot purely for extension, the condition doesn't score.

GAME PENALTY

If a penalty is earned (as described here and in the Rules), the ref places a roof debris model on the west-most possible roof mark which is completely empty. Placement is expected to be closely aligned on the mark, but may not be perfect. For penalties after the 4th, the west-most debris is placed as far as possible into the northeast corner of the LT blue region. The robot may not remove debris from the LT blue region.

Value: ANY IN LT BLUE…—**– 13** EACH, ANY OUTSIDE LT BLUE…—**– 10** EACH

Update #21 – CALCULATING ROOF PENALTIES

You can get up to eight sprawl and/or touch penalties, as represented by the roof debris on the mat. The Missions page is unclear on the following fact: Here is the cost for penalty accumulation: 1=10, 2=20, 3=30, 4=40, 5=53, 6=66, 7=79, 8=92. Sorry for the confusion. This far into the season I would normally be unable to make such a serious correction, but I trust no one was developing a penalty-based strategy.

Update #31 – ROOF DEBRIS CHAOS

The referee depends on the final locations of the penalty roof debris pieces as an accounting system. Therefore: If the robot moves a roof debris piece into or out of Lt Blue, the referee will shift it back over the Lt Blue line in the direction it came from.

Robot Game — Rules

(Including Philosophies, Definitions, and Procedures)

1 - GRACIOUS PROFESSIONALISM®

· You are "Gracious Professionals." You are competing hard against PROBLEMS, while treating PEOPLE with respect and kindness - people from your own team, as well people from other teams.
· You build onto other people's ideas instead of resisting or defeating them.

2 - PARTICIPATION

· Allowable ages vary by region. Contact your operational partner for specifics if needed.
· 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. Exact positioning is decided by the tournament officials.

3 - INTERPRETATION

· Robot game text means exactly and only what it says, so it should be taken literally whenever possible.
· Do not interpret text based on your assumption about intent, or on how a situation might be in "real life."
· If a detail isn't mentioned, then it doesn't matter.
· There are no hidden requirements or restrictions. If you've read everything, then you know everything.
· Examples:
- If a mission is for the robot to "be on the stairs," that doesn't mean the robot needs to climb the steps, and it
Doesn't mean the robot has to go to the top.
- If an ocean is drawn on the mat, but never mentioned anywhere, then you don't have to ask if the robot's allowed to drive on it... It is. **"Nothing says it can't"**
- If a mission is for the cup to "be on the table," upside down is just as good as right side up.
- If the robot must use a robotic arm to empty the trash, this will be clearly stated. If not, then any method is fine.
- If the robot must "use a robotic arm to empty the trash," it doesn't matter whether the arm reaches in and grabs the trash, or instead turns the can upside down.
· You're encouraged to think this way - Please learn the requirements and constraints very well, and then realize the many FREEDOMS that are left.

4 - EQUIPMENT

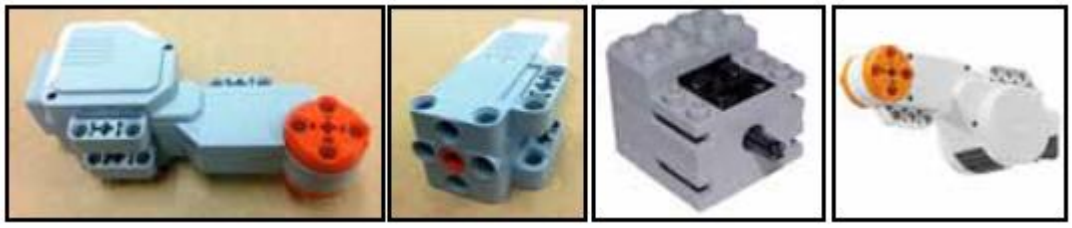
· **EVERYTHING** - Everything you use in the competition area directly or indirectly for strategy (mission-related activity) must be made entirely of LEGO-manufactured elements in original factory condition. Stickers are not allowed, except LEGO stickers, applied per LEGO instructions. Paint, tape, glue, oil, zip-ties, etc. are not allowed.
- Exception 1: You may reference a paper list to keep track of robot programs.
- Exception 2: LEGO string and tubing may be cut to length.
- Exception 3: Marker may be used only in hidden areas, for ownership identification.
- Exception 4: Carts, trays, and boxes may be used for carrying and storing your equipment, off the table only.
· **REGULAR ELEMENTS** - You may use as many non-electric LEGO elements as you like, including pneumatics, rubber bands, and string, and they may be from any source or set (MINDSTORMS®/TECHNIC/DUPLO®/BIONICLE™/STAR WARS™/HARRY POTTER™/etc.). Exception: Factory-made wind-up/pull-back "motors" are not allowed.

· **CONTROLLERS** - You are allowed a maximum of one controller in the competition area in any one match. Choose one of the three LEGO-manufactured types shown here. No other controller is allowed.

· **SENSORS** - You are allowed as many sensors as you like, but the types are limited as follows:
- They may only be touch, light, color, rotation, ultrasonic, or gyro.
- They must be LEGO-manufactured MINDSTORMS types as shown below.

WARNING 1: The fact that a sensor was/is being sold by an official LEGO shopping source does not mean that sensor was made by LEGO. Example: "HiTechnic" products are nice products, but they are made "for" LEGO and not "by" LEGO.
(HiTechnic products are not allowed.)
WARNING 2: The presence of the LEGO logo on a sensor does NOT mean it was made by LEGO.
- Be SURE any sensor you buy or use looks exactly as shown here.

· **MOTORS** - You are allowed a maximum of four MINDSTORMS motors in the competition area. Choose your favorite combination from among the LEGO-manufactured types shown here. No other motors are allowed.



· Quantity limits don't just apply to what's on your robot "right now." The referee (the "ref") adds up everything
you have with you in your boxes, your hands, your trays, and on the table. All of it counts towards your total.
- Example: If you have three motors permanently built into your robot, but wish to cycle through several motorized attachments during the match, your design needs to allow the last (4th) motor to be traded in and out from one attachment to the next when needed.
- A fifth motor in the competition area is not allowed, no matter what.
- Even if you plan to run only four motors at a time, a fifth motor is not allowed.
- Even as a spare, a weight, or a decoration, a fifth motor is not allowed.

· You may not use more than one robot in any one match, but it's okay to use a different robot in a different match.
· LEGO wires and converter cables are allowed as needed.
· No other electric elements nor devices are allowed for use in any way in the competition area.
· Spare electrical parts are allowed in the PIT area.

· Objects functioning as remote controls are not allowed anywhere, any time.
· **SOFTWARE** - The robot may only be programmed using LEGO MINDSTORMS, RoboLab, NXT-G, or EV3 software (any release). No other software is allowed. Patches, add-ons, and new versions of the allowable software from the manufacturers (LEGO and National Instruments) are allowed, but tool kits, including the LabVIEW tool kit, are not allowed. This rule puts a cap on software-related unfairness, and put a cap on what we can reasonably ask tournament judges to become versed in - thanks for your understanding!
· **VIOLATION** - If the robot is in violation of the equipment rule and cannot be corrected, the decision about exactly what to do rests with the tournament officials, but it is possible the team may not be eligible for awards.

5 - MISSION

· A mission is a condition/result the robot produces (sometimes in a specific way), for points.
· You decide the order in which to try the missions, and how many to try with each program on the robot.
· You don't have to try every mission.
· You may re-try missions when that's possible, but the field is not reset for that purpose. Example: If a mission is for the robot to topple a stack eastward, and the robot doesn't reach it, you could try again later, since the stack is undisturbed. But if the autonomous robot topples the stack westward, since the stack doesn't get reset, the mission is impossible to re-try.

6 - MATCH

· At a tournament, two robot game fields are joined back to back, and you are paired opposite another team to compete in a match. There are at least three matches. Here's the process:
· You get to the competition table and have at least one minute to prepare your equipment.
· The match starts and the timer runs for 2-1/2 minutes without stopping
· You start and restart the robot from Base as described below.
· Whenever the robot is in Base, you can prepare/work on it.
· Each match 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 Robot Performance Award except when breaking ties. "Playoffs" if held, are just for added fun.
· If it is known in advance that you will not have another team opposite you, a volunteer or "house" team substitutes. If not, and you compete against an empty table, you get the points for any missions you tried but could not complete because the other team was missing.
· With few exceptions, your score comes from the condition of the field at the END of the match.

7 - ROUND - The process of cycling all teams through one match each is called a round.

8 - 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 12" (305mm) high.
· This means Base is not just an area on the mat - it's a VOLUME.
· The lines that define Base are in Base.
· Usually there is a gap between the mat and a side border wall… Base includes this gap (pictured in red).
· Anything even barely in Base counts as being in Base unless the robot moves it completely out.
· Anything in the team's possession is understood to count as being in Base, and is okay to store or handle.

9 - FIELD

· The field is where the robot game takes place. It consists of mission models on a field mat on a table.
· The field mat and the LEGO elements for building the mission models are part of your Field Setup Kit.
· The instructions for building the mission models are posted on the web.
· All details about how to set up the mission models after they've been built are on the Field Setup page.

10 - ROBOT - The robot is the controller and anything joined with it by hand (any method, any configuration) which is designed not to separate from it except by hand.

11 - ATTACHMENTS - These are features which qualify as part of the robot while installed, but are not installed for the entire match.

12 - STRATEGIC OBJECTS

· These are team-supplied objects which serve a mission-related purpose, but never qualify as part of the robot.

– Example 1: You may use a LEGO frame/"jig" to help aim your robot in Base.

– Example 2: The robot may carry a LEGO ramp out to help itself cross a barrier.

· Strategic objects powered by stored energy are allowed, but the ROBOT must activate them.

· A strategic object outside Base stays there unless the robot brings it to Base (per Rule 33).

· JUNK PENALTY - At the end of the match, each strategic object outside Base is considered a throwaway and causes a game penalty. Objects smaller and/or lighter than the robot cost **5 points** each, and those obviously larger and/or heavier than the robot cost **13 points** each. In unclear situations, you pay the smaller penalty.

13 - CARGO - Cargo is anything the robot has with it for transport or release.

14 - MISSION MODELS

· Mission models are the objects that are already on the field when you walk up to it.

· You may not bring duplicate mission models to the table if they could confuse scoring.

· You may not take mission models apart, even temporarily.

· You may never assemble anything to a mission model by hand. This includes loose elements, strategic objects, other mission models, and the robot.

· You may never entangle or entrap a mission model in anything by hand.

· To be sure you have not assembled, entangled, or entrapped, a model illegally, take the "gravity test."

15 - GRAVITY TEST

· Any time you join a mission model with anything by hand, gravity alone should be able to separate them if the heavier were picked up and/or turned over.

· In the case of identical models, it doesn't matter which is picked up.

· The team performs this "gravity test," only if asked by the ref, and only when failure looks probable.

· The ref does not allow a start unless all mission models in Base could pass the gravity test.

· Only if there is no hand-help at all, the ROBOT is allowed to cause models to fail the gravity test.

16 – STATEGIC/PRECISION STOP - If your eyes are doing the work of a sensor… If the window of execution for a touch of the robot grab is conveniently precise (3, 2, 1, GRAB NOW!)… If a new scoring condition is produced or preserved by the precision of the grab… and these things are obvious to the ref, missions benefitting are marked scoreless. Example: If the robot needs to push a lever somewhere between Position 3 and Position 4, and you touch your "healthy" robot while the lever is STILL MOVING between those positions… No score.

17 - AUTONOMOUS <> DEAD ROBOT

· After each start, the robot is considered "autonomous" and remains so until the next time you touch/influence it. · At the moment of that touch, the robot becomes "dead" and is immediately picked up, brought to Base/storage, and hand-prepared for restart from Base.

· The robot may pass in/out/through Base, and if you don't touch/influence it, you don't have to restart it.

18 - CALIBRATION - During your pre-match setup time only, you may calibrate light & color sensors outside Base.

19 - QUALITY CONTROL - During your pre-match setup time only, you may ask the ref to double-check that a particular setup is correct/within spec, but you may not request any custom setup, in or out of the specified setup range.

20 - SENDING/HANDLING OBJECTS OUTSIDE BASE

· Your hands may not directly or indirectly strategically place, poke, roll, topple, drop, throw, eject, slide, shoot, or otherwise send or extend things out of Base except by properly starting the robot.
· Your hands may not directly or indirectly strategically change the shape, position, motion, quantity, or other status of things outside Base except when storing things, or by properly starting the robot.
· If you break this rule, by accident or not, see Rules 34 & 35.

21 - STORED OBJECTS - You may at any time, in Base, or other storage areas, handle stored objects the robot is not currently touching or using. Stored objects are not allowed to make contact with anything outside Base except other stored objects.

22 - DEAD ROBOT HANDLING - During setup, and whenever else the robot is dead, you may repair it, aim it, switch attachments, charge pneumatics, select programs, reset features, and load/unload cargo in Base, or other storage areas.

23 - AIMING - You may use a frame/"jig" to aim the robot, but its use must be completely in Base at all times, and you must let go of it prior to starting/restarting.

24 - STAGING - You may at any time place objects completely in Base for the autonomous robot to move or use.

25 - CHAIN REACTIONS - If the (hand) movement of the dead robot will unavoidably allow/cause the movement of any non-cargo object outside Base, such as something being "held up" or "held back," the movement of that restrained object (the chain reaction) must be kept to an absolute minimum. Allow the stored energy to dissipate slowly over as little distance as possible. Missions obviously benefitting from hand-help are marked scoreless.

26 - TOUCHING THE AUTONOMOUS ROBOT

· If you touch the autonomous robot or anything it is moving or using... At the time of the touch...
· No matter what, you must bring the robot back to Base (if it wasn't already there), for restart.
· If the robot and any cargo were in Base... No problem.
· If either the ROBOT or any CARGO was OUTSIDE Base... See Rule 31.

27 - BROKEN ROBOT - You may at any time recover pieces of an obviously broken robot.

28 - STORAGE AND WORKSPACE

· Once the ref inspects your equipment, you may store things as needed in Base, or in a box, or by hand, or possibly on a stand, if stands are allowed at your event (decided by your tournament's officials - check with them in advance).
· If you feel crowded in Base, storage and handling of the robot and other objects may extend over/outside Base lines, as long as there is absolutely nothing strategic or disruptive about the placement.
· Mission models and objects worth points in Base must always stay in view of the ref.

29 - START/RESTART POSITION

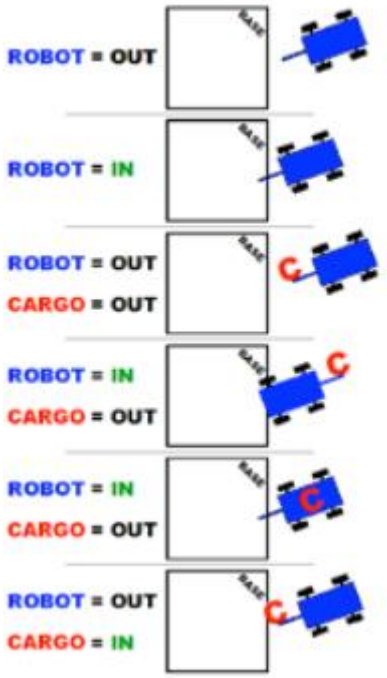
· For the match start and all restarts, EVERY BIT of the robot, including its installed attachments & wires, everything touching it, and any objects it is about to move or use, must ALL fit COMPLETELY in Base.
· YOU may NOT be touching the robot or any objects the robot is touching.
· YOU may NOT be touching objects the robot is about to move or use.
· The ROBOT MAY be touching objects it is about to move or use.
· The robot's program may or may not already be running, but everything must be motionless.
· All mission models in Base must be able to pass the gravity test.

30 - STARTING PROCEDURE

· For the match start, the ref checks that things are in proper starting position, then signals your readiness to the announcer.
– As the countdown starts, you reach in with one hand, ready to either touch a button or signal a sensor to prompt the robot's program.
– During the countdown: Except for the button/signal prompt, you may not handle the robot or anything it's touching, or about to move or use.
– The exact time to start is at the beginning of the last word in the countdown, such as "Ready, set, GO!"
– If a non-word signal is used, like a beep or buzzer, the start is at the beginning of that signal.
– At the exact starting time, you either touch a button or signal a sensor to start or prompt the robot's program. The robot is now considered to be started and autonomous.
· For all other starts (called restarts), there's no countdown. The ref watches to be sure things are in proper starting position, and you activate the robot whenever you like.
· If the robot enters and leaves Base with no interruption or influence from you, this is not considered a restart, so starting procedure doesn't apply.
· Once autonomous, the robot can go and/or extend in any direction until the next touch and restart.

31 - TOUCH PENALTY (This rule is about hand-touching the robot while it's autonomous.)

· If you touch the autonomous robot or anything it's touching while the ROBOT is completely outside Base, there is a penalty," as described on the Missions page.
· If you touch the autonomous robot or anything it's touching while its CARGO is outside Base...
– If the robot had the cargo the most recent time the robot was in Base, the cargo goes back to Base.
– If not, the ref keeps the cargo.



SO: Avoid touching a robot entering Base until its cargo has also reached Base!

· Exception 1: If the only part of the robot in Base at the time of the touch is a cord, hose, wire, tube, chain, string, or other feature obviously used purely for reaching Base from a distance and avoiding a touch penalty, you get a game penalty anyway.
· Exception 2: If the robot is outside Base, straining its motors, and no longer traveling, you may non-strategically shut it off and leave it in place with no penalty.

32 - SPRAWL PENALTY - If the robot is obviously twice the width of Base, either when it is touched, or when the match ends, there's a game penalty, even if the robot was in Base.

33 - LOSS AND CHAOS (This rule doesn't involve a hand-touch.)
· Anything your AUTONOMOUS ROBOT does to your field outside Base (good or bad) stays that way, unless the ROBOT changes it. "Accidents," "mistakes," and "failures" are the same thing in engineering!
· Cargo the robot loses contact with is left wherever it comes to rest. If it goes off the table, the ref keeps it.
· This means the robot can ruin its own opportunity to accomplish tasks, and it can even spoil previous results.
· Exception: Robot parts which separate due to obviously accidental DAMAGE may be recovered by YOU, by hand, at any time, even if they have cargo (gift: you keep any cargo in question).

Update #33 – STRANDED OFF ROLLERS

Exception: When the robot has knocked the plane's rollers off the cord AND the plane has not reached a scoring region, AND not hit anything, the referee will push the plane along... How far? Until just before it either reaches yellow, or something that would have definitely stopped it, whichever comes first. The Cargo Plane mission is then marked scoreless.

34 - MODEL DAMAGE
· This is when a model outside Base is made defective and/or its Dual Lock is separated by an autonomous robot.
· Model damage is not repaired during the match.
· If a model is manipulated into a scoring condition, but gets damaged
– during the process, the condition is marked scoreless.
– during an obviously unrelated action later (even seconds later), as long as the scoring condition is visible it can still score.
· Any scoring success which obviously depended on model damage is marked scoreless.
· This means the robot can ruin its own opportunity to accomplish tasks, and it can even spoil previous results.
· Any model damage obviously due to poor setup or lack of maintenance is scored with benefit of the doubt.

Update #32 – CORD STAYS ON FIELD

The cord is like any other fixed mission model on the field - it doesn't get taken down.

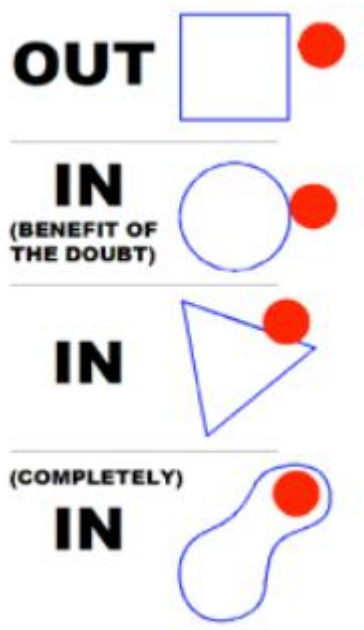
35 - REVERSIBLE ACTION
· When things such as a sleeve, table-bump, renegade DEAD ROBOT, or illegal action disturb the field in a non-trivial way, the ref physically reverses the change if he or she feels that's easy. If the change is too hard to undo…
– if the accident was the team's fault, negative scoring effects stand, and positive scoring effects do not.
– If the accident is not the team's fault, the team gets benefit of the doubt on all related scoring questions.

36 - INTERFERENCE
· Your robot may not have any effect on the other team's robot, field, or strategy, unless it's allowed in a mission.
· Any points you or your robot potentially cost the other team are given to them automatically.
· If two robots become entangled, they are both allowed to restart without penalty. Any cargo involved is given to the team in Base, whether or not it has ever been there before.

· As a matter of luck, the other team might out-perform you in a competitive interactive mission, or might fail to help you in a cooperative interactive mission. The net effect is the same, and this is not considered interference.

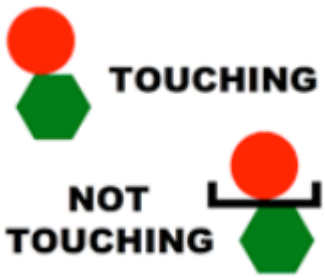
37 - IN

· **Red** is "in," "into," or has "reached" **Blue** if any bit of **Red** is directly over or under **Blue**.
· To be "in" an area is to penetrate the volume over that area.
· Barely "in" is considered "in" unless "completely "in" is required.
· **Red** can be "in" **Blue** without touching **Blue**.
· Objects are ruled on independent of each other, and independent of their transports/containers.
· "Outside" is the opposite of "in" and means completely out.



38 - TOUCHING

· **Red** is "touching" **Green** only if **Red** is making direct contact with **Green**.
· Any amount of direct contact counts as touching.



39 - MATCH-END SCORING

· Unless a specific method for producing a scoring condition is required, your score comes from **the conditions at the exact time the match ends only**.
· Points are not given for results the robot produces during the match but then trashes before the end.
· Points are not given nor taken away for results produced after the match end signal ends.
· When a mission is required to be achieved through a specific method, but is achieved by some other method, it is marked scoreless.

· When the match ends, PLEASE DON'T TOUCH ANYTHING! The ref first needs time to record the condition of the field on a score sheet and come to agreement with you (kids only) about what points were scored or missed and why.
· If you agree with the score, you sign the sheet, and the score is final.
· If you don't agree, DO (nicely) let the ref know. Referees can be wrong, and when they are, they want to know.
· After a short discussion, if the ref is not sure about the score, the head ref must make the final decision.
· Please don't try to show video to the refs.
· The scores are tallied by computer.
· Ties are broken using 2nd, then 3rd highest scores.
· In the rare occasion of a tie across all three matches, tournament officials decide what to do. Options include simply awarding multiple same-place awards.
· Don't walk away with mission models from the competition area. Bring them back if you do. Thanks.

40 - BENEFIT OF THE DOUBT

· You get the benefit of the doubt when:
- incorrect/poor model setup or maintenance is the probable cause.
- a split-second or the thickness of a (thin) line is a factor.
- a situation could "go either way" due to confusing, conflicting, or missing information.
- a ref is tempted to rule based on the "intent" of a requirement or constraint.
- no one's really sure WHAT just happened!
· Speak up! If you (kids, not coach) disagree with the ref and can respectfully raise sufficient doubt in his/her mind during your post-match chat, you are given the points in question.
· This rule is not an order for the refs to be lenient, but for them to rule in your favor when they've done all they can to rule correctly, yet the answer's still unclear.

41 - DOWNLOADING

· Downloading programs to robots may take place in the pits only - never in the competition area.
· Always download by cable. Bluetooth must be switched off at all times.

42 - 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 should always expect some variability, such as:
- flaws in the border walls.
- variety in lighting conditions, from hour to hour, and/or table to table.
- texture/bumps under the mat.
- presence or absence of tape at the East and West edges of the mat.
- waviness in the mat itself. At many tournaments, it is impossible for the mats to be rolled out in time to lose their waviness. Location and severity of waviness varies. You are being warned here. Consider this while designing.
· Two important building techniques you can use to limit the effects of variability are:
- Avoid steering systems that involve something sliding on the mat or border walls.
- Cover your light sensors from surrounding light.
· Expect and design around interference where poles for lights and cameras might be mounted to walls.
· Questions about conditions at a particular tournament should only be directed to that tournament's officials.

43 - PRECEDENCE/AUTHORITY

· You get information about the robot game from more than one place. Once in a while, information from different places conflicts. So here is the order of precedence for the sources:
1 = CURRENT Robot Game Updates, 2 = Missions and Field Setup, 3 = Rules, and 4 = Video.
· If something on a page conflicts with something else on the same page, the most sensible interpretation is assumed. If two interpretations seem equal, the interpretation most favorable for the team is assumed.

· On all pages, videos and pictures are for guidance and example only. Often they can not express complete information, and are therefore misleading. When there is conflict between pictures/videos and text, the text takes precedence!
· The head ref at a tournament is required to base decisions on the information above, in the order shown above. No other source of information has standing (E-mails from official Robot Game Support are only for guidance.)

44 - ROBOT GAME SUPPORT

· The best first place to go for Robot Game support is the Robot Game Updates.
· If that doesn't help, expert support is available directly from the designer/author (Scott - Hi!) at fllrobotgame@usfirst.org (usual response in 1-2 business days).
· When e-mailing, please state your role in FLL (member, coach, parent, mentor, referee, Partner).
· No question is a bad question, but some are much better than others!
· If it's obvious you're not at least a little familiar with the text of the various important pages, you'll be referred to it.
· If you're not sure how to interpret or apply a particular bit of text, you'll be told how a good referee likely would.
· If you expose missing or problematic text so common or severe as to potentially cause problems at events, an addition, correction, or ruling will be posted on the Updates page.
· Questions organized into short simple parts get the fastest and most useful answers.
· The ref is not obligated to read individual response e-mails.
· No new Robot Game Updates are posted after 3PM (eastern U.S.) on Fridays.
· You won't get help/advice about building or programming (that's your challenge).
· Questions about LEGO product in general get redirected: Instead call (U.S.) 1-866-349-LEGO.
· Questions posted in the discussion forum are not seen nor responded to by Robot Game Support.
WARNING: The forum is great for sharing ideas and getting tips from other teams, but it is not an official source of answers about anything.

45 - 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 the first match.
· For the rest of the day, the ref's calls are final when you leave the table.

SIGNIFICANT CHANGES FOR 2013

· Rule 4 - MINDSTORMS EV3 is allowed. It has obvious improvements over NXT, but not enough to amount to a meaningful advantage, or to warrant scaling of scores, especially since there are many sources and seven years' worth of training and support for NXT.
· Rule 4 - A 4th motor is allowed, since the EV3 set has one.
· Rule 4 - The EV3 "Angle Sensor" is allowed, but is not considered an advantage. While it's useful, its usefulness in a competition setting is unknown.
· Rule 4e - A camera (any type) is allowed onboard the robot. Today's technology is small and light, it won't cause an advantage, and it's flat-out fun.
· Rule 8 - The ceiling of Base is lower...
· Rule 12 - The "Junk Penalty" is introduced...
· Rule 32 - The "Sprawl Penalty" is introduced...
These are to renew emphasis on the engineering concepts of navigation and efficient use of parts.