FIRST LEGO LEAGUE CHALLENGE

ROBOT GAME RULEBOOK

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Welcome!

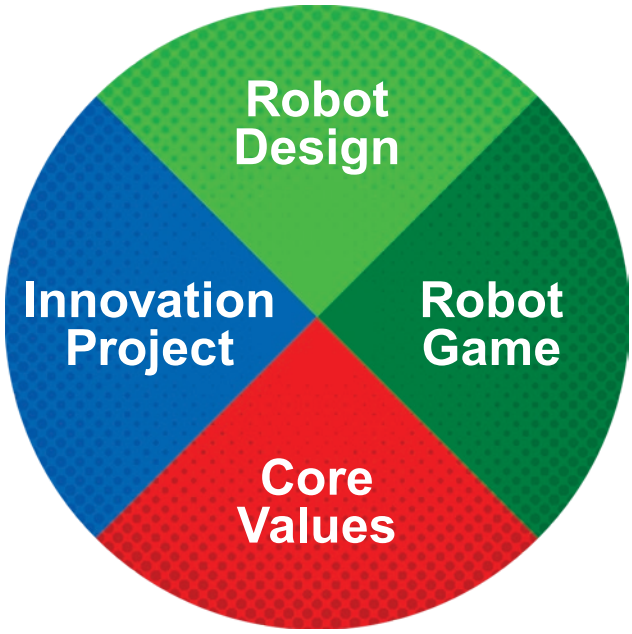
Welcome to the *FIRST*® AGE™ season presented by Qualcomm. This season, your team will work together as you prepare to compete at an event.

This *Robot Game Rulebook* contains the missions, rules, and links to the resources you need to be successful in playing the robot game. In addition to the *Robot Game Rulebook*, teams should use the *Engineering Notebook* to guide your progress throughout the season and to document your team journey, which you will share with judges during the judging session.

Season Resource Page

FIRST® LEGO® League Challenge Events

At an event, your team's performance will be evaluated based on four equally weighted components, each accounting for 25% of your total score. Your team will present your **Robot Design** and **Innovation Project** work during the judging session, and your **Robot Performance** will be evaluated at the robot game. **Core Values** are evaluated in all parts of your work, and you will receive scores from the judges and referees for how you apply them. You should review the scoresheets, judging rubrics, and awards list to see how your team will be scored across all parts of the event.



UNEARTHED™

Get ready to dig deep into history as this year's UNEARTHED™ robot game takes you on an exciting archaeological adventure. Your team will explore a dig site, carefully excavating artifacts hidden beneath layers of rock and soil and uncovering clues that reveal stories of past civilizations. As you journey farther into the dig site, you'll encounter more challenging terrain, fragile ruins, and delicate artifacts that require precision to retrieve without damage.

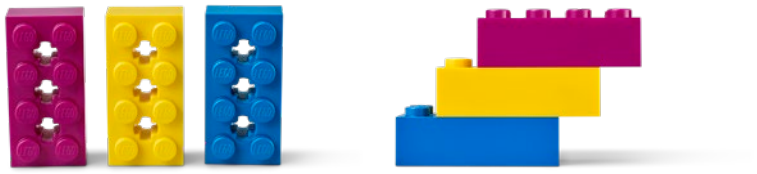
Along the way, you'll decode mysteries and help share stories of the artifacts you find. Prepare to *unearth* hidden treasures and piece together the past as you embark on this thrilling journey of discovery!

The Robot Game

The robot game is the exciting culmination of your team's hard work throughout the season. You'll put your creativity, strategy, and teamwork to the test during each 2.5-minute match. To be successful, your team will need to:

- **Develop a Mission Strategy:** It's up to you to determine which missions your team will attempt, the order you complete them, and what attachments and programming you need. You may choose to focus on a few high-scoring missions or aim for a combination of missions to maximize your score.
- **Design and Program a Robot:** Work together to design and build a LEGO® **robot**. The robot must operate **autonomously**, meaning that it will follow pre-programmed instructions written by your team to complete missions on the robot game **field**.
- **Launch from Home:** Your robot must always start from one of the **launch** areas inside home. The robot should be programmed and equipped with the necessary attachments for the missions your team is attempting.
- **Complete Missions:** During a **match**, your team earns points as your robot completes **missions**, or tasks. Missions are represented by LEGO models, referred to as **mission models**, that are positioned around the field. Missions can challenge the robot to manipulate objects, activate mechanisms, or move items to designated areas.
- **Understand Scoring:** Mission requirements must be visible at the end of the match to score, unless otherwise stated. In competitions, you will participate in three matches to show what your robot can do. Each round offers an opportunity to improve your score and strategies. Only your team's best score of the three official matches counts toward awards and advancement at the event.
- **Demonstrate *Gracious Professionalism*®:** The robot game is about not only the robot's performance but also how your team expresses the Core Values through *Gracious Professionalism* and *Coopertition*®. Keep the Core Values in mind as you work on robot game missions and let your sportsmanship and fair play shine.

The above list is meant to help your team understand your goals for competing in the robot game. A glossary of the bold terms and a complete list of rules for the robot game are found on pages 13-18 of this guide.



Inside the Challenge Set

Inside the UNEARTHED™ Challenge Set, you will find a mat, 3M™ Dual Lock™ Reclosable Fasteners, and the mission models. The mission models will come in numbered bags and must be built by your team using the **Mission Model Building Instructions**.

IMPORTANT!

The robot interacts with mission models on the field to score points, so it is important to build the models exactly as shown in the building instructions. Practicing with incorrectly built models can negatively affect your gameplay experience.

Building Instructions Season Resource Page

GETTING STARTED | HELPFUL RESOURCES

- Decide whether to roll out your mat on a table or the floor. Matches will be played on tables at official events. You can use the optional **Table Building Instructions** to build your own table to practice on.
- The table at the bottom of page 7 shows which numbered bags from the Challenge Set correspond with each mission model in the **Mission Model Building Instructions**.
- Set up your field by following the **Field Setup Video**. Additional field setup instructions can be found on page 7 of this guide.
- Watch the **Robot Game Missions Video** and read the complete missions and rules in this guide. The Missions section (pages 8-12) describes each mission model and the points that can be scored. The Rules section (pages 13-18) describes how to play the game, what equipment is allowed, how a match is run, what a team can and cannot do during a match, and how points are calculated.
- Check the **Challenge Updates** often! This list is updated throughout the season to include official rule updates, clarifications, and amendments. It is especially important to read these leading up to your event.
- Practice calculating your match scores using an **Official Scoring Calculator**. There are online and offline calculator tools available.
- For help with building and coding your robot, check out the **LEGO® Education SPIKE™ App**. The app offers a guided mission for the UNEARTHED™ robot game that your team can use as a starting point.

All bold resources and more are available on the *FIRST*® LEGO® League Challenge **Game & Season Resources** page.

Game & Season Resources Page

Home | Left Launch Area | Right Launch Area | Home

GETTING STARTED | FIELD SETUP

Once you have built the mission models, you are ready to set up your field. The following steps are general guidance for setting up your field for the first time. You will also need to watch the **Field Setup Video** on the *FIRST*® LEGO® League YouTube channel.

Field Setup Video

Step 1: Roll Out the Mat

- ☐ Unroll the mat and lay it flat on the floor or table. If you are using a table, align the mat to the bottom wall and center it between the left and right walls.
- ☐ Optional: Tape down your mat along the edges to secure it in place. Thin, matte, black gaffer's tape is recommended for easy removal without damage to the mat.

Step 2: Place the Dual Lock

- ☐ Locate the spots on the mat where Dual Lock is needed. Carefully stick one piece of Dual Lock on each spot with the sticky side down, aligning it carefully to the wireframe. Then, place another piece of Dual Lock on top of each spot with the sticky side up. These pieces will "click" together when the models are placed.

Step 3: Place the Mission Models

- ☐ Watch the **Field Setup Video** to see how to place each mission model onto the mat. Align each model exactly to the mat wireframe.
- ☐ Gently press down on the model until you hear a "click" to engage the Dual Lock.

Step 4: Set Up for a Match

- ☐ Before any match, double-check that each mission model and any loose pieces are in their correct starting positions.
- ☐ At an event, volunteers do their best to ensure the field is set up correctly before the team arrives. Teams should check the field and let the referee know if any changes need to be made before the match begins.

IMPORTANT!

Tournament setups at events may differ from your practice setup, including variations in table construction, surface smoothness, or shared mission interactions. Be prepared to adapt and approach these scenarios with *Gracious Professionalism*® if they occur.

Bag #	Mission Title
1, 2	Angler Artifacts
3, 4	Tip the Scales
5	Map Reveal
6	Statue Rebuild
7	Surface Brushing
8, 9, 10	Mineshaft Explorer
	Careful Recovery
11	Forum Site Marking
12	What's on Sale?
13, 14	Who Lived Here?
15, 16, 17	Forge
	Heavy Lifting
18, 19	Silo
20, 21	Salvage Operation
22	Precision tokens, season tiles and coach pins

Missions

Scan here to watch the Robot Game Missions Video.

Mission 15 Targets

No Equipment Constraint: When this symbol appears in the top-right corner of a mission, the following rule applies:

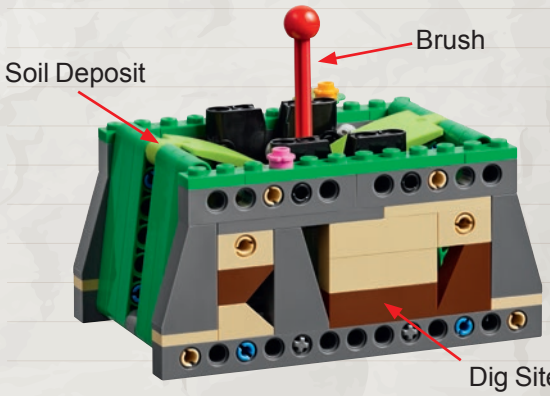
"A mission model cannot earn points if it is touching equipment at the end of the match."

This rule applies only to the specific mission in which the constraint appears. If the same mission model is used in another mission where the constraint does not apply, it can earn points as usual. Each mission model is evaluated separately within its respective mission.

Equipment Inspection

Before the match, there will be an equipment inspection. If your robot and all equipment fit completely in one launch area and under a height limit of 12 in. (305 mm) during this inspection. **20**

Mission 01:
Surface Brushing



You'll need special tools to clean and uncover buried artifacts without damaging them. Brush away sediment to uncover a piece of this civilization's past.

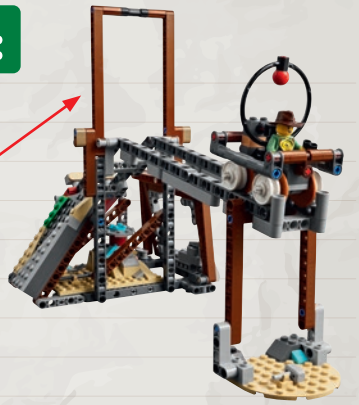
Soil deposits are completely cleared, touching the mat.	10 each
Archaeologist's brush is not touching the dig site.	10

Mission 02:
Map Reveal

Archaeologists work hard to unearth important clues about how a civilization once lived. Shift and remove topsoil to reveal sections of a hidden map.

Topsoil sections are completely cleared.	10 each

Mission 03:
Mineshaft Explorer



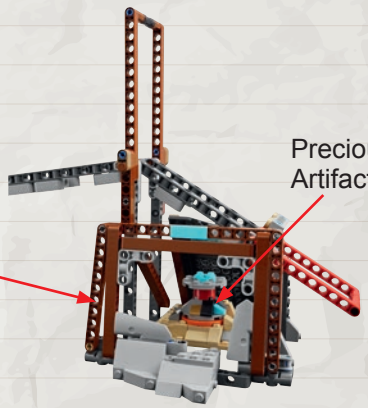
Ayyana the archaeologist is on a mission to discover every secret of the dig site and share what she finds with her team.

Your team's minecart is on the opposing team's field.	30
Bonus: and the opposing team's minecart is on your team's field.	10 added

Your team's minecart must pass completely through the mineshaft entry to score points for this mission.

It is not possible to earn the bonus if there is no opposing team or in remote competitions.

Mission 04:
Careful Recovery

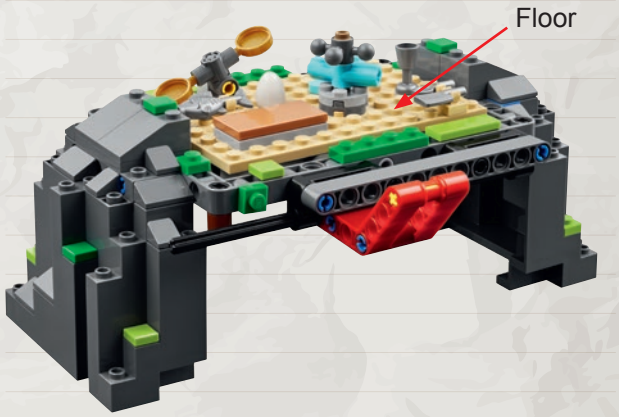


When parts of a site are too dangerous for humans, technology can help safely recover artifacts. Carefully extract the precious artifact from the mine, ensuring the site remains stable.

Precious artifact is not touching the mine.	30
Both support structures are standing.	10

Mission 05:

Who Lived Here?

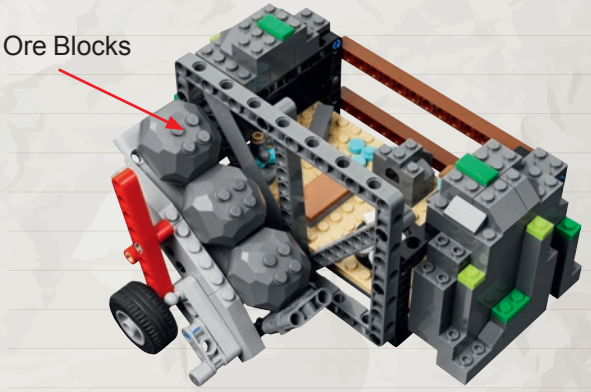


Rebuild the structure to restore a vital part of the village where people once lived.

Structure floor is completely upright.	30

Mission 06:

Forge



Ayyana's team believes this forge was used to smelt ore and craft tools. Release the ore blocks and search carefully – one block holds a mysterious artifact waiting to be discovered.

Ore blocks are not touching the forge.	10 each

Technicians may open ore blocks by hand to reveal the fossilized artifact when completely in home (see Mission 14).

Mission 07:

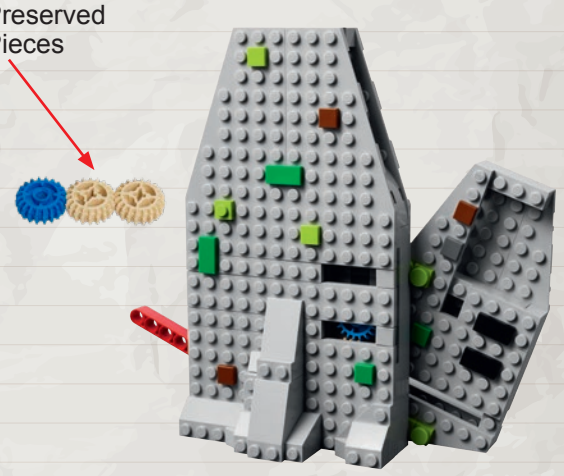
Heavy Lifting

This millstone enabled people to process grain and gives insight into their daily lives. Due to its size and weight, moving this artifact could prove to be a challenge.

Millstone is no longer touching its base.	30

Mission 08:

Silo



Empty the silo of the preserved food so it can be analyzed at the lab.

Preserved pieces are outside the silo.	10 each

Mission 09:

What's on Sale?

Restore the market stall and reveal items that were once traded between the village and its visitors.

Roof is completely raised.	20
Market wares are raised.	10

Mission 10:

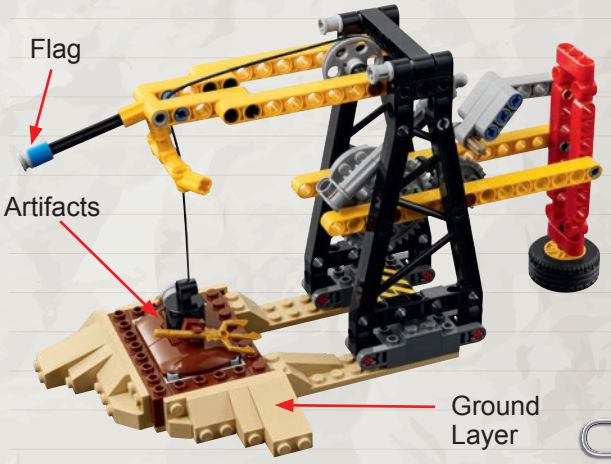
Tip the Scales

This ancient tool ensured that each item received a fair and balanced price.

Scale is tipped and touching the mat.	20
Scale pan is completely removed.	10

Mission 11:

Angler Artifacts

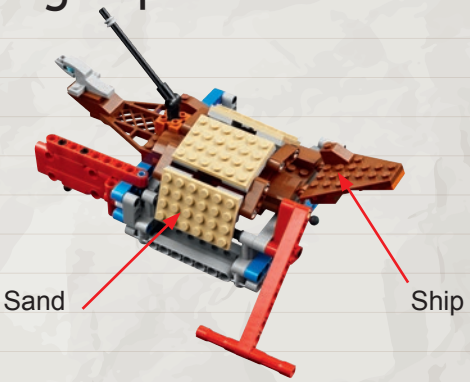


Your team has discovered some interesting artifacts at the port. Use the crane to excavate the site.

Artifacts are raised above the ground layer.	20
Bonus: and the crane flag is at least partly lowered.	10 added

Mission 12:

Salvage Operation



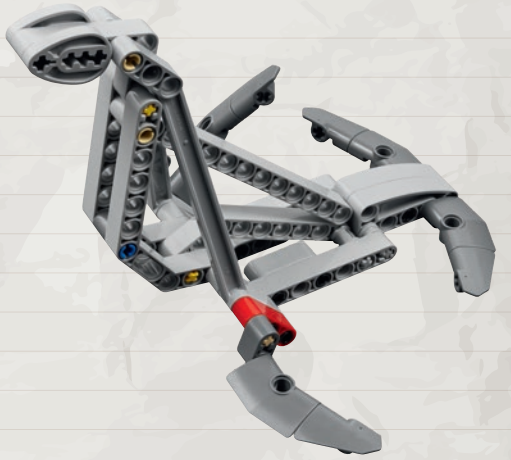
An ancient ship discovered at the beach is at risk of further decay. Excavate the vessel without damaging its delicate structure.

Sand is completely cleared.	20
Ship is completely raised.	10

Sand is considered completely cleared when the pull activator is past the line on the mat.

Mission 13:

Statue Rebuild



Reconstruct the statue to help piece together its historic significance.

Statue is completely raised.	30

Mission 14:

Forum


Brush


Minecart


Scale Pan


Topsoil


Ore with Fossilized Artifact


Millstone

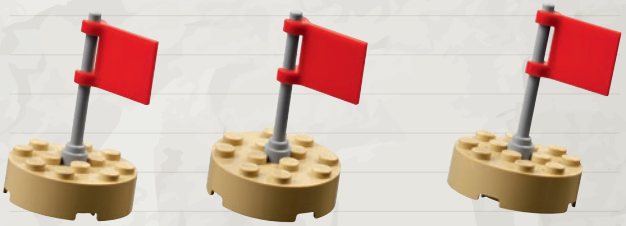

Precious Artifact

Deliver artifacts to the forum and choose a significant item to display. Consider what these artifacts tell you and what mysteries remain.

Artifacts touching the mat and at least partly in the forum: • Brush • Topsoil • Precious Artifact • Opposing Team's Minecart • Ore with Fossilized Artifact • Millstone • Scale Pan	5 each

Mission 15:

Site Marking



There's so much yet to be discovered at this dig site. Place flags to mark locations for further study.

Sites with a flag at least partly inside and touching the mat.	10 each

Sites are outlined on the mat wireframe.

Precision Tokens:

You begin the match with six precision tokens worth 50 total points. If you interrupt the robot outside of home, the referee will remove one token. You earn points for the number of tokens remaining at the end of the match. If the number remaining is:

(See Rules 15 and 17.)

1: 10, 2: 15, 3: 25,
4: 35, 5: 50, 6: 50

Rules

Challenge Updates Season Resources Page

IMPORTANT!

- All robot game wording means precisely and only what it says. If a detail is not mentioned, it does not matter.
- If a situation arises that makes the referee's decision unclear or hard to call, teams get the benefit of the doubt.
- The official *FIRST*® Challenge Updates, Field Setup Video, Robot Game Mission Video, and *Robot Game Rulebook* pictures and text will be the only sources of authority. Referees will combine these materials to arrive at the best possible call.
- If rules, missions, or field setup need adjustment or clarification, a challenge update will be issued during the season superseding previous materials. It's important to note that updates will apply only to events occurring after their release and should not be used to alter the results of past events.
- At an event, your head referee makes the final decision.

Glossary

- **Match:** A timed period of 2.5 minutes during which the robot autonomously completes as many missions as possible to earn points.
- **Equipment:** All items that teams bring to the match, including the robot, attachments, and any other materials specified in the rules. (See "Rules: Before the Match" for more details.)
- **Field:** The playing area defined by border walls, including the mat, mission models, and home areas. It serves as the environment where the robot performs missions.
- **Mission:** One or more tasks that can be completed for points. Teams may try missions in any order or combination.
- **Mission Model:** The LEGO® models placed on the field, designed to represent a real-world concept or challenge. The robot interacts with mission models to complete missions and earn points.
- **Robot:** The controller and any attached equipment that is intended to remain connected, unless intentionally separated by hand.
- **Technicians:** The team members standing at the competition table who are responsible for managing and handling the robot during a match.
- **Launch:** The act of activating the robot from rest when completely within its designated launch area to cause it to move autonomously.
- **Interruption:** Any interaction by technicians with the robot or objects in contact with the robot after it has been launched.
- **Autonomous:** The ability to operate independently, without human intervention.
- **Pseudocode:** A simple representation of a robot's plan using plain language or simple diagrams instead of code.

BEFORE THE MATCH | EQUIPMENT

The equipment a team brings to the robot game field, such as the robot and its attachments or accessories, must meet the following guidelines:

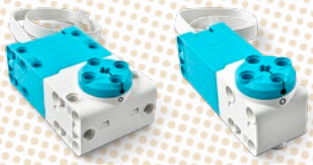
1. All equipment must be LEGO® building pieces, in original factory condition.
   Exception: LEGO string and pneumatic tubes may be cut to length.

2. Teams may use as many non-electric LEGO pieces from any set as they'd like.

3. Electric LEGO equipment is allowed only as described and shown below. (The LEGO® Education SPIKE™ Prime is shown, but LEGO Education SPIKE Essential, MINDSTORMS® EV3, MINDSTORMS Robot Inventor, Powered Up, and equivalent NXT and RCX are also allowed.)

Controller
Maximum of one in any one match.

Motors
Maximum of four (any mix) in any one match.



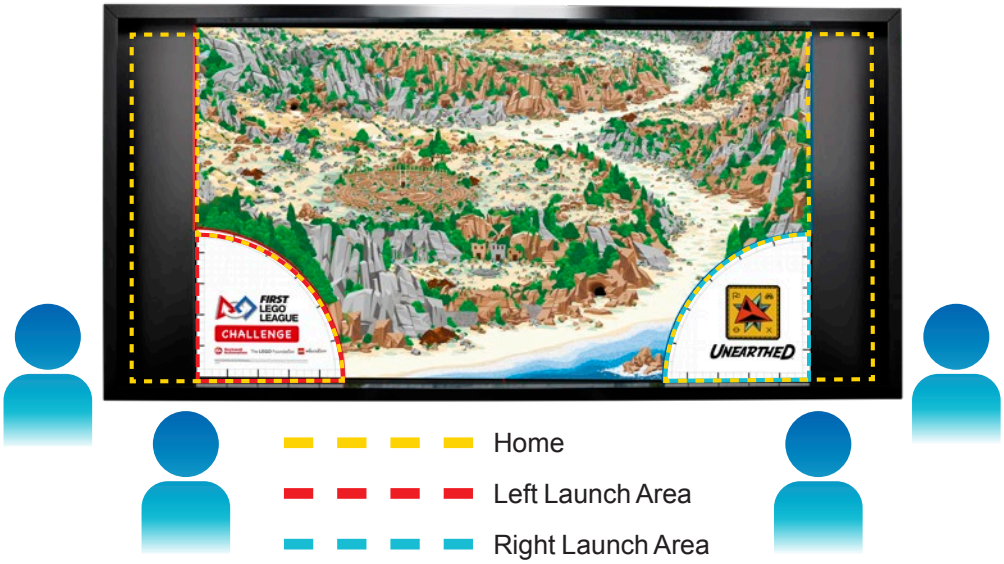
Sensors
Only touch/force, color, distance/ultrasonic, and gyro sensors are allowed (any mix and number) in any one match.

4. Teams can also use LEGO wires, one controller's power pack or six AA batteries, and one microSD card.

5. Teams can use any software or programming language. Robots must be autonomous during the match, outside of home. No remote controllers of any type are allowed.

6. Teams may bring one sheet of notebook paper per home area for program notes. This does not count as equipment.

7. Additional or duplicate mission models are not allowed.



BEFORE THE MATCH | MATCH SETUP

At events, matches will be played on official tables. Before the match begins, teams will need to pass the pre-match inspection and set all their equipment in place.

8. During the pre-match inspection, the referee will check that all team equipment fits within the two launch areas and under a height limit of 12 in. (305 mm). If the team can fit all their equipment into just one launch area under a height limit, they will earn 20 points.

9. Teams will not be given additional storage space. Everything must stay on the table or in the hands of the technicians at the table. The areas to the left and right of the mat can be used to store equipment; they each measure approximately 6.75 in. (171 mm) by 45 in. (1,143 mm) (actual measurements may vary). Equipment stored on the table may extend past the left and right walls only, as needed.

10. After the team has passed inspection, they will be given a couple of minutes to set up. They start by distributing their equipment and loose mission model(s) provided in home between the two home areas. Next, they place their robot into the launch area they wish to start from. Any remaining time should be used to adjust the robot and equipment for the first launch, to calibrate sensors using any part of the mat, and to ask the referee to check anything on the field.

11. Team members must then divide into two groups and position one group on each side of the field (left and right). These members cannot switch sides during the match. Teams of:

a. Four or more: Position two technicians at each home area. All other team members must stand back. Teams may never have more than two technicians at a single home area, but a team members may swap places with a technician from the same side at any time.

b. Three: Position two technicians on one side and one on the other (team choice).

c. Two: Position one technician on each side.

DURING THE MATCH | INSIDE HOME

12. Home is divided into two sections, each with its own launch area. Technicians may use their hands to handle the robot, equipment, and mission models when these items are completely within their respective home area.

13. Technicians may not:

- Hand anything from one home area to the other.
- Touch anything outside of their home area, except for interrupting the robot.
- Cause anything to move or extend outside this area, except for launching the robot.

Points scored in these ways will not count.

14. When launching:

- Technicians may not keep anything from moving.
- The robot and anything it is about to move must fit completely inside the launch area.

DURING THE MATCH | OUTSIDE HOME

After any launch, technicians should allow the robot and anything it is in contact with to return completely into home before interrupting it.

15. If technicians interrupt the robot, it must be relaunched. If the robot or any object it was in contact with during the interruption was outside home (even partly), the team loses one precision token.

a. Partly outside home: If the robot **or** any object it was in contact with at the time of interruption is partly outside the home area, they must be returned to that same home area.

b. Completely outside home: If the robot and all objects it was in contact with are completely outside of home at the time of interruption, the team may place them in either home area.

The team keeps the robot and any objects it originally launched with. However, any objects obtained outside of home after the robot's last launch must be handed to the referee for the remainder of the match.

Exception: If the team does not intend to launch again, they may stop their robot in place without losing a precision token. The robot and anything it is in contact with should remain in place where it was interrupted.

16. Teams may not interrupt their robot in such a way that they earn points from it. Points scored in these ways will not count.

17. If a piece of equipment or a mission model is dropped or left outside of home by the robot, wait for it to come to rest. If it rests:

a. Completely outside home: It stays as is unless the robot moves it.

b. Partly inside home: It stays as is unless the robot moves it. Alternatively, at any time, the technicians may remove it by hand. If the object removed by hand is a mission model, it must be given to the referee for the remainder of the match. If the object is equipment, it must be taken into that home area, and the team will lose one precision token.

18. Teams may not separate the Dual Lock, take models apart, or break a mission model. Points scored in these ways will not count.

19. If a mission model is combined with anything (including the robot), the combination must be loose or simple enough that a technician can free the mission model in perfect original condition in a single motion, if requested. Points scored using combinations that fail this test will not count.

20. Teams may not interact with the opposing team's field, robot, equipment, or any mission models/interactions that span both fields unless there is a mission exception. Points failed or lost due to interference will score automatically for the other team.

AFTER THE MATCH | SCORING

21. After 2.5 minutes, the match ends. Technicians must stop their robot and touch nothing else. This is when scoring begins.

22. For scoring, all mission requirements must be visible at the end of the match unless a method was required in the mission.

23. When something is required to be "in" an area, the lines and airspace above that area count as "in" unless otherwise mentioned.

Download Scoresheets

24. If a team cannot run their robot, they can still gain *Gracious Professionalism*® points by explaining the situation or being present at the match.

25. The referee will document the results of the match with the team. When there is agreement on the results, it becomes official. If no agreement is reached, the head referee makes the final decision. Only the team's best score of the three official matches counts toward awards and advancement. Ties are broken using second and third best scores. In the case of a three-way tie, local tournament officials will decide what to do.

GRACIOUS PROFESSIONALISM® AT THE ROBOT GAME

DEVELOPING	ACCOMPLISHED	EXCEEDS

Gracious Professionalism points will be added to the total Core Values score from judging.

Every team starts each match with an **ACCOMPLISHED** score (3 points), and this is the score most matches will yield. The score changes only if a referee observes above-and-beyond sportsmanship, awarding an **EXCEEDS** score (4 points), or lesser sportsmanship, awarding a **DEVELOPING** score (2 points).

If a team does not show up for their match, they will score no points for *Gracious Professionalism*. However, if a team arrives and does not run the robot but does explain what has happened, they can get a *Gracious Professionalism* score of 2, 3, or 4 points depending on the *Gracious Professionalism* they demonstrate.