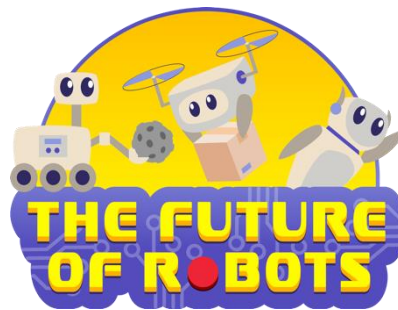




RoboMission

Junior Game Rules
Season 2025



The Future of Robots
Mars Exploration

Official Game Rules for the WRO International Final. Version: December 1st 2024
(Note: Rules for local WRO events may vary!)

WRO International Premium Partner



WRO International Gold Partners



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Important information for reading this document:

- The general rules have changed drastically for 2025. Make sure to read them entirely.
- These game rules are made for local and national competitions.
- National Organizers in WRO countries are allowed to simplify the missions.
- For the International Final, one extra mission will be released on October 8th 2025. The extra challenge will work with the same game mat and brick set. It is not mandatory to do this extra mission to participate in the event.
- Because of possible surprise rules and the extra mission for the International Final, the game field may contain areas and markings that are not used at local or national events.
- For greater clarity, the robot missions are explained in multiple sections. But the teams can decide which missions they will do and which order.
- The game missions have easy and more complicated tasks. This makes the competition suitable for beginning and more experience teams. It is not necessary to solve all missions to enjoy a WRO participation.
- General information on game table setup and fixing of game objects on the field you find in the WRO RoboMission General Rules, chapter 7.

We wish everyone much success and a lot of fun with our WRO 2025 challenges!

Your team of World Robot Olympiad Association

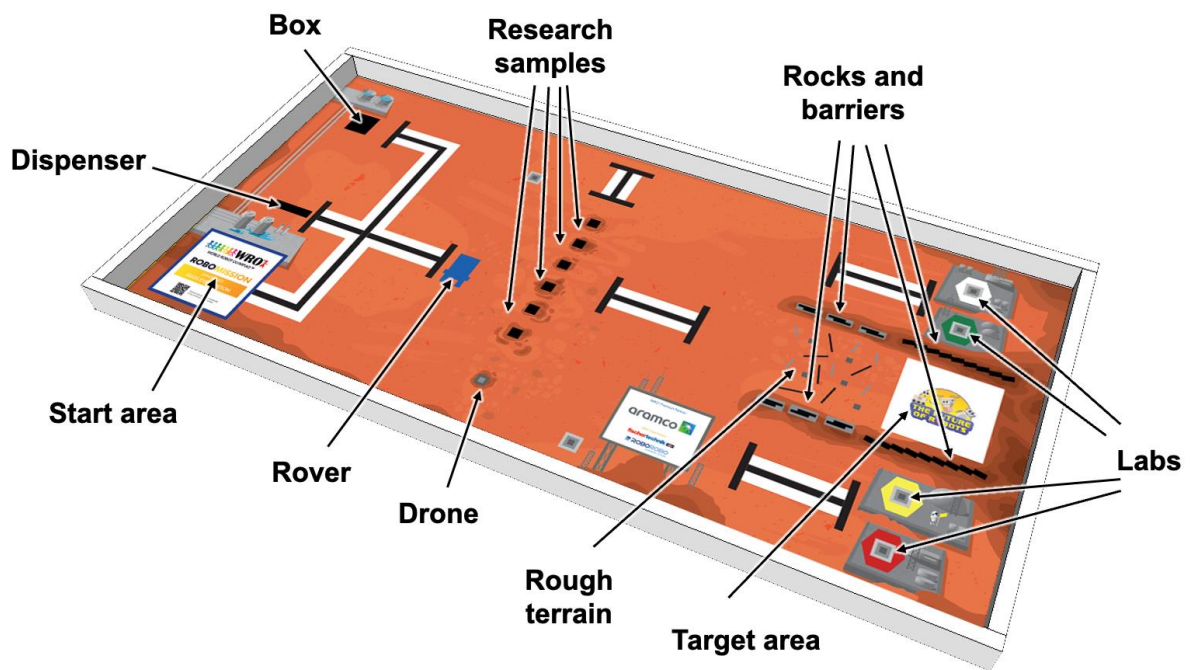
1. Introduction

The exploration and colonization of Mars is a great example of how robots can help us in the future. Robots will play a key role in making Mars missions safer, faster, and more efficient. Once on Mars, robots can assist by building shelters, exploring dangerous areas, and collecting valuable research samples, like soil and rock, that help us understand the planet's history and potential for life. By handling these challenging tasks, robots make it possible for humans to focus on exploration and discovery, showing just how important they will be in helping us build a future on Mars—and beyond.

Can your robot help us to explore and colonize Mars?

2. Game Field

The following graphic shows the game field with the different areas.

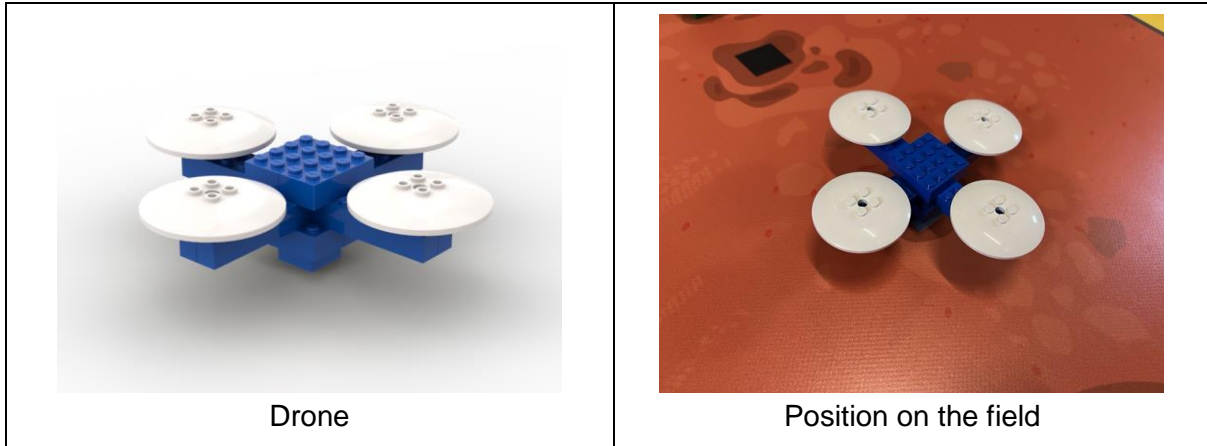


If the table is larger than the game mat, place the mat against the wall with the two sides closer to the start area (in the picture: left and bottom side).

3. Game Objects, Positioning, Randomization

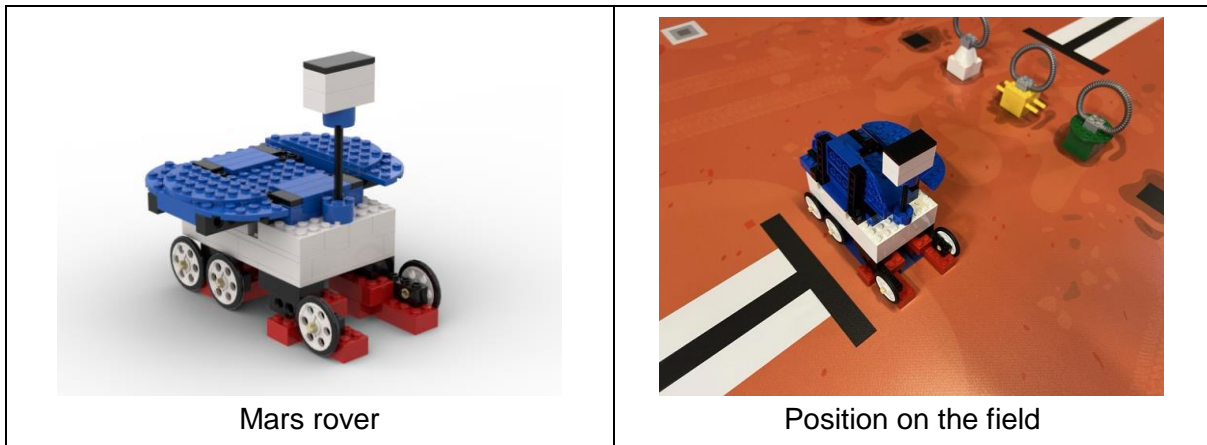
Drone

There is a **drone** on the field. The position on the game field is on the bottom end of the field in the centre.



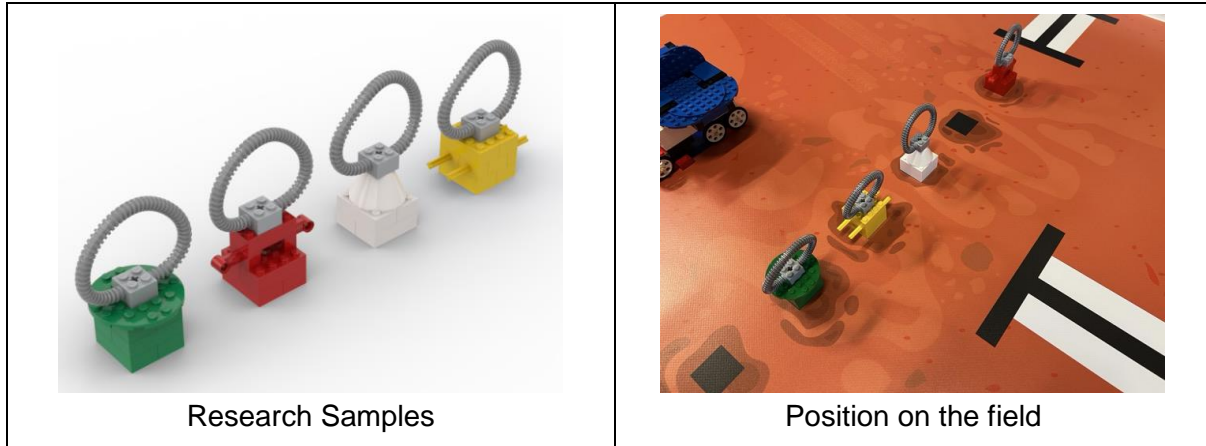
Mars rover

There is a **mars rover** on the field. The position is marked in blue on the field.



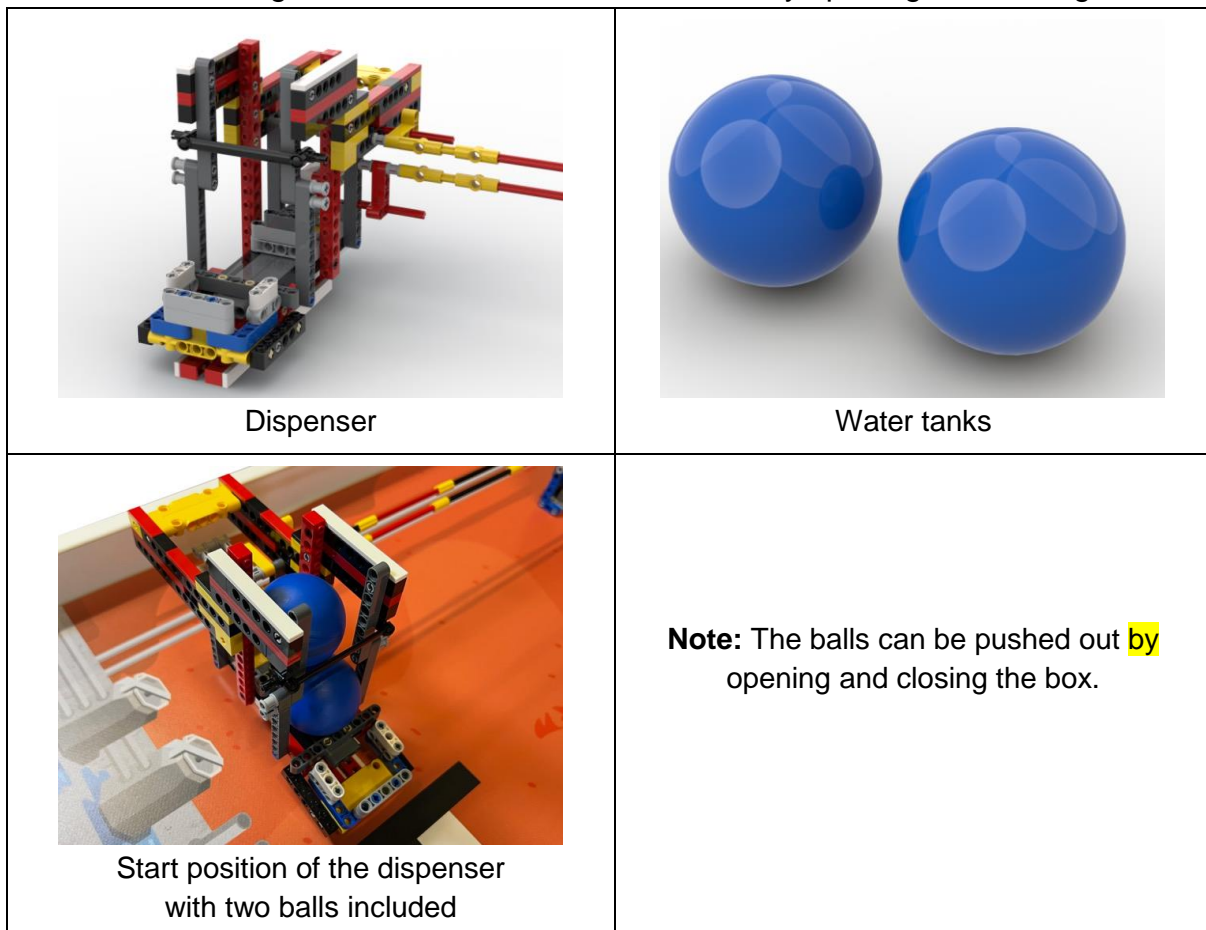
Research samples

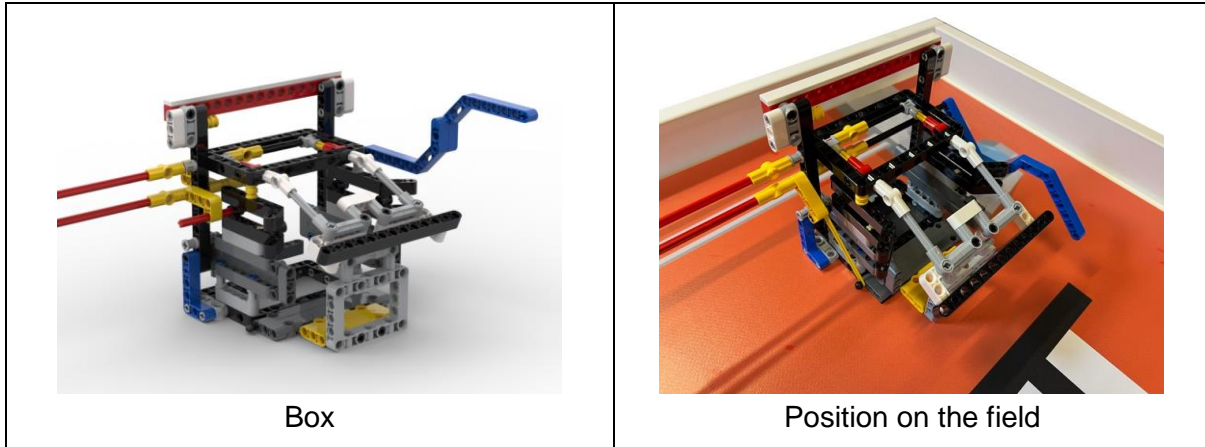
There are **4 research samples (green, red, white and yellow)** on the field. The position in the middle of the field. The four samples are randomly placed on the 6 available positions.



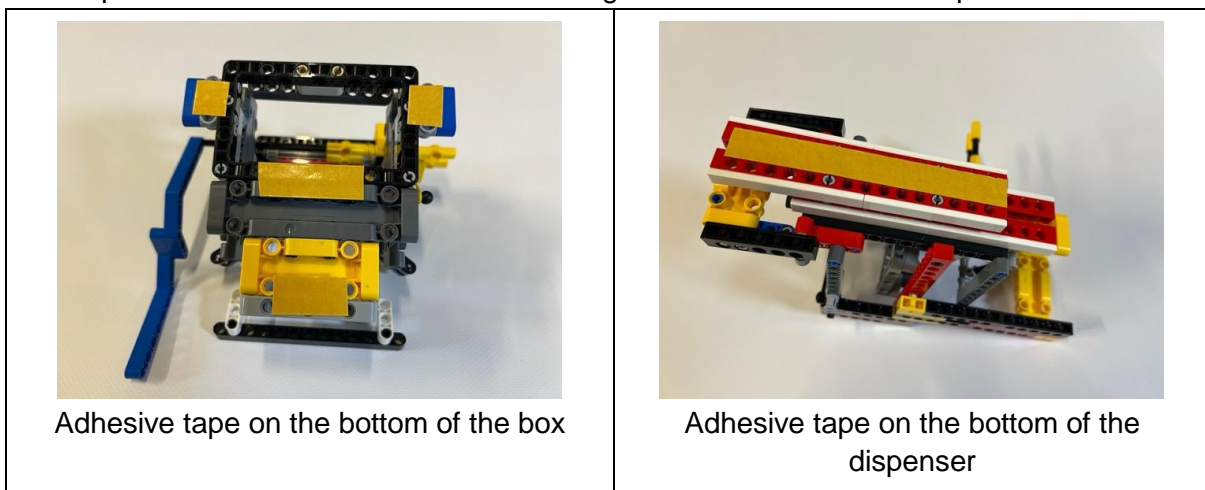
Water storage system

The **water storage system** is placed on the left end of the field. It consists of a **dispenser** with **2 water tanks** and a **box** as receiver. The dispenser and the box are connected with long axels and the release of the balls by opening and closing the box.



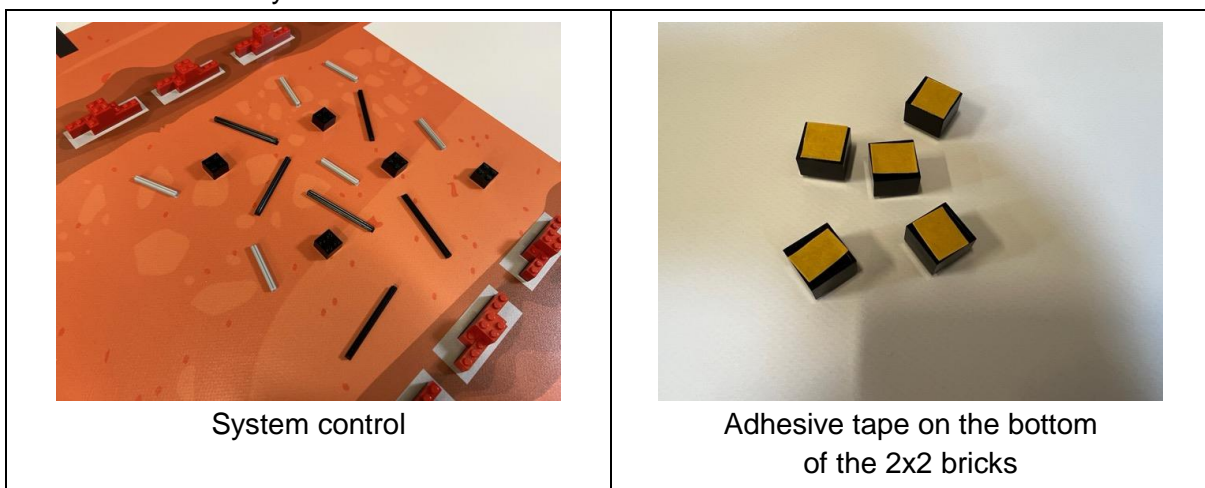


The dispenser and the box will be fixed to the game field with adhesive tape.



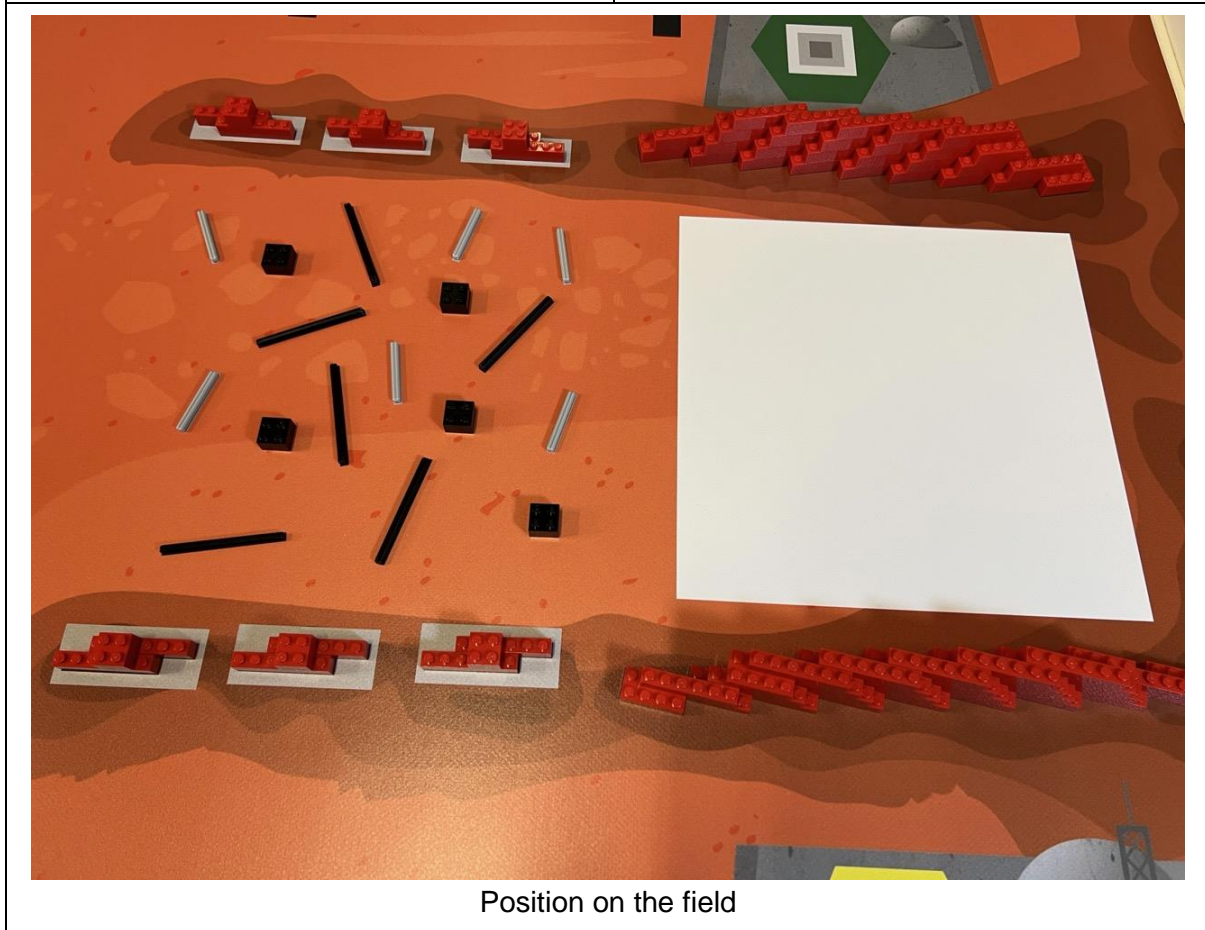
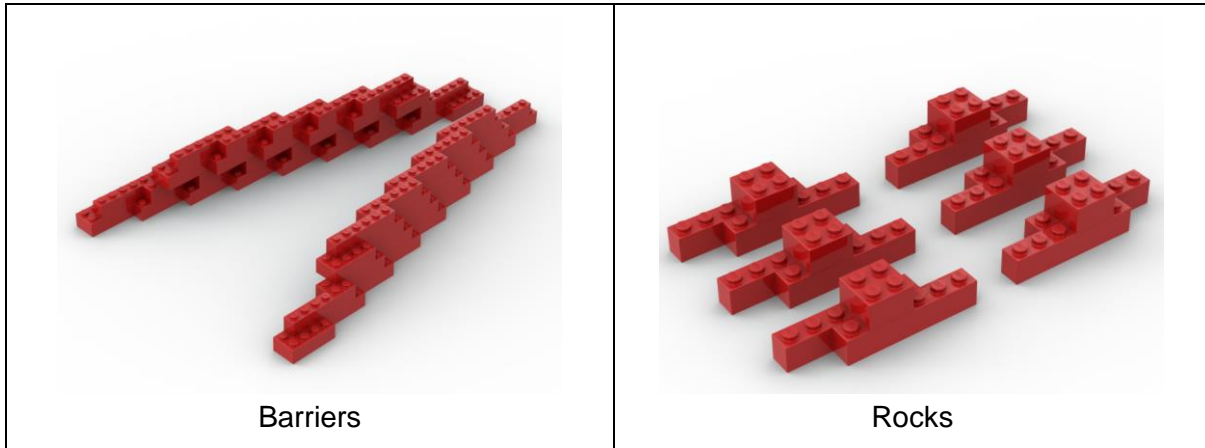
Rough terrain

The field contains an area with rough terrain. The terrain contains out of multiple axels and 2x2 black bricks. The 2x2 bricks are fixed on the table with adhesive tape. The axels aren't fixed and can be moved by the robot.



Barriers and rocks

There are **2 barriers** and **6 rocks** on the field. The barriers are next to the target area. The rocks are around the rough terrain.



Summary randomization

On this field, the following objects are **randomly placed in each round**:

- 4 samples randomly on the 6 positions for samples in the middle of the field.

You can see one possible randomization here (only randomized objects are marked):







Robot Missions

3.1 Collect the drone

A drone is placed on the lower end of the game field in the middle. Collect the drone and bring it into the starting area.

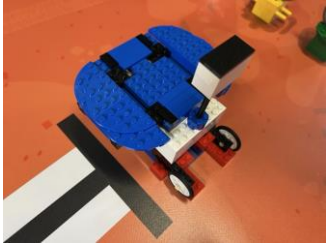
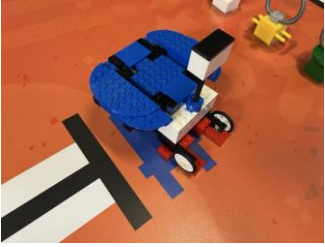
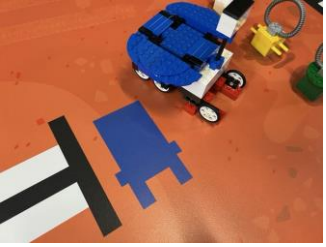

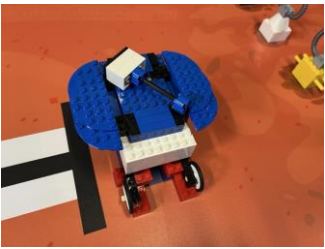
- Definition “completely in”: Completely means that the game object is touching the corresponding area only.

	Each	Max.
The drone is completely in the start area.	10	10
The drone is touching in the start area.	5	
 <p>10 points (completely inside)</p>	 <p>10 points (completely inside)</p>	 <p>5 points (partly inside)</p>
 <p>0 points (not in start area)</p>		

3.2 Help the stranded rover

A stranded rover is placed in the middle of the field. One of the rovers’ solar panels could not unfold automatically. Help the rover to unfold the solar panel.

	Each	Max.
Unfolded solar panel and rover still touching the area.	10	10

 <p>10 points (panel unfolded and rover in starting position)</p>	 <p>10 points (panel unfolded and rover moved but still touching the starting position)</p>	 <p>0 points (panel unfolded but moved completely outside of starting position)</p>
 <p>0 points (panel still jammed)</p>	 <p>0 points (rover is broken)</p>	<p><i>Hint: The solar panel needs to be completely horizontal to score points.</i></p>

3.3 Support research on mars

There are multiple research samples in the middle of the game field. Collect the samples and bring them to the hexagonal research lab of the corresponding colour.

- Definition “completely in”: Completely means that the game object is touching the corresponding area only.
- Only one element scores points per target area.

	Each	Max.
Research sample is completely in the corresponding coloured research lab.	15	60
Research sample is touching any lab <u>or</u> completely in the wrong-coloured lab.	10	

<p>15 points (completely inside and correct colour)</p>	<p>15 points (completely inside and correct colour)</p>	<p>10 points (only touching and colour of lab does not matter)</p>
<p>10 points (only partly in and colour of lab does not matter)</p>	<p>10 points (completely inside, colour does not match)</p>	<p>0 points (not touching the research lab)</p>

3.4 Water supply

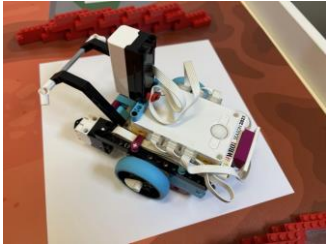
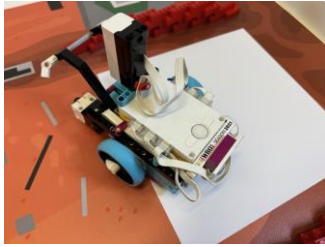
The water supply is needed for the survival of humans on mars. Help with the transportation of water tanks. A water tank counts as in the box, when it only touching the box or another water tank but nothing else.

	Each	Max.
Water tank is in box	20	40
<p>20 points (one ball in the box)</p>	<p>2x 20 points (two balls in the box)</p>	<p>2x 20 points (two balls in the box, no matter if open or closed)</p>

3.5 Cross rough terrain

An interesting research target is located behind rough terrain. Cross the terrain and park the robot in the target area.

- Definition “completely in”: Completely means that the robot is touching the corresponding area only.

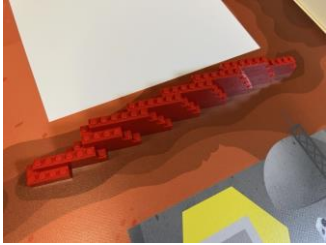
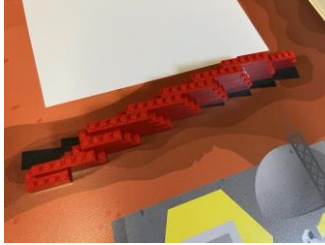
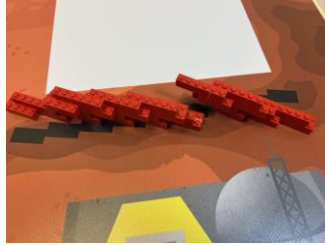
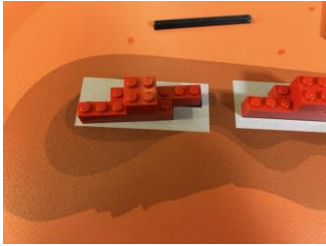
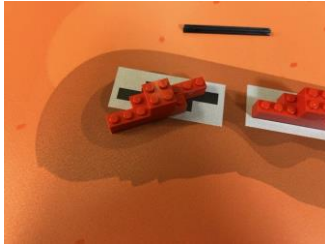
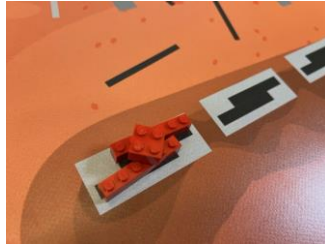
	Each	Max.
Robot is completely in target area	12	12
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>12 points (robot is completely in target area)</p> </div> <div style="text-align: center;">  <p>0 points (robot is touching outside of target area)</p> </div> <div style="text-align: center;"> <p>Hint: It is not allowed to remove the black bricks from the mat by force.</p> <p>Hint: The position will be checked at the end of the run after the robot stopped.</p> </div> </div>		

3.6 Bonus for rocks and barriers

The navigation on mars needs precision. It is not allowed to move or damage rocks and barriers. The playing field does not provide any tolerances for moving the barriers. Minimal shifts that may have been caused by imprecise positioning before the run, have to be counted in favour of the team in case of doubt. Final decision of this is with the judge.

- Definition “damaged”: Any situation that means that the game object is not exactly like at the start of the run, e.g. a brick fell off.
- Definition “moved”: The game object is considered as moved if a part of the game object is touching the mat outside of the defined areas.
- Only one element scores points per target area.

	Each	Max.
Barrier is not damaged or moved	8	16
Rock is not damaged or moved	3	18

 <p>8 points (barrier still on starting position)</p>	 <p>0 points (barrier moved)</p>	 <p>0 points (barrier damaged)</p>
 <p>3 points (rock within grey area)</p>	 <p>0 points (rock moved)</p>	 <p>0 points (rock damaged)</p>

4. Scoring Sheet

Team name: _____

Round: _____

Tasks	Each	Max.	#	Total
Collect the drone				
The drone is completely in the start area.	10	10		
The drone is touching in the start area.	5			
Help the stranded rover				
Unfolded solar panel and rover still touching the area.	10	10		
Support research on mars				
Research sample is completely in the corresponding coloured research lab.	15	60		
Research sample is touching any lab <u>or</u> completely in the wrong-coloured lab.	10			
Water supply				
Water tank is in box	20	40		
Cross rough terrain				
Robot is completely in target area	12	12		
Bonus for barriers				
Barrier is not damaged or moved	8	16		
Rock is not damaged or moved	3	18		
Maximum Score		166		
Total Score in this run				
Time in full seconds				