Rover In-House

Game Rules

2023

WORLD ROBOT OLYMPIAD™

WRO®

SOUTH AFRICA

Date: 24 February 2023

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PART ONE – GAME DESCRIPTION

1. Introduction

The Rover In-House challenge is for children from the ages of 6 years to 10 years. The Rover In-House challenge is developed in South Africa and has no international or national final component. The In-House challenge is unique in that coaches run and score their own competition event during the challenge week and upload the teams highest score to the WRO SA website to receive certificates based on the teams achievements.

The Rover In-House challenge is designed in a way to make robotics fun and accessible to as many young roboticists as possible. The challenge is open to any robotics hardware from LEGO Spike Essential to Bee-Bots, teams may use any robot and programming software they are comfortable with.

The 2023 challenge week is set from the 11th of October to the 20th of October. Coaches have until midnight on the 20th of October to submit their team scores to the WRO SA website. In order to participate in the Rover In-House challenge coaches must register their school or club with WRO SA and pay the entry fee. Schools or clubs not registered will not receive certificates and teams will not appear on any achievement lists.

The week before the challenge week a special rule set will be sent to registered coaches. This rule set will contain any changes to rules, information on the score submission and the special surprise rule.

The Rover In-House challenge is designed to encourage participation in robotics. As such coaches may adjust the game rules to suit their teams as long as all teams are given the same challenge and treated fairly. Teams are challenging themselves to score the highest number of points possible. We encourage coaches to inspire, nurture and care for a team's interest in robotics, if there are items which are too difficult for your teams simply change the challenge, your submitted team scores will still be accepted by WRO SA.

Please check the website www.wrosa.co.za for the latest event updates.

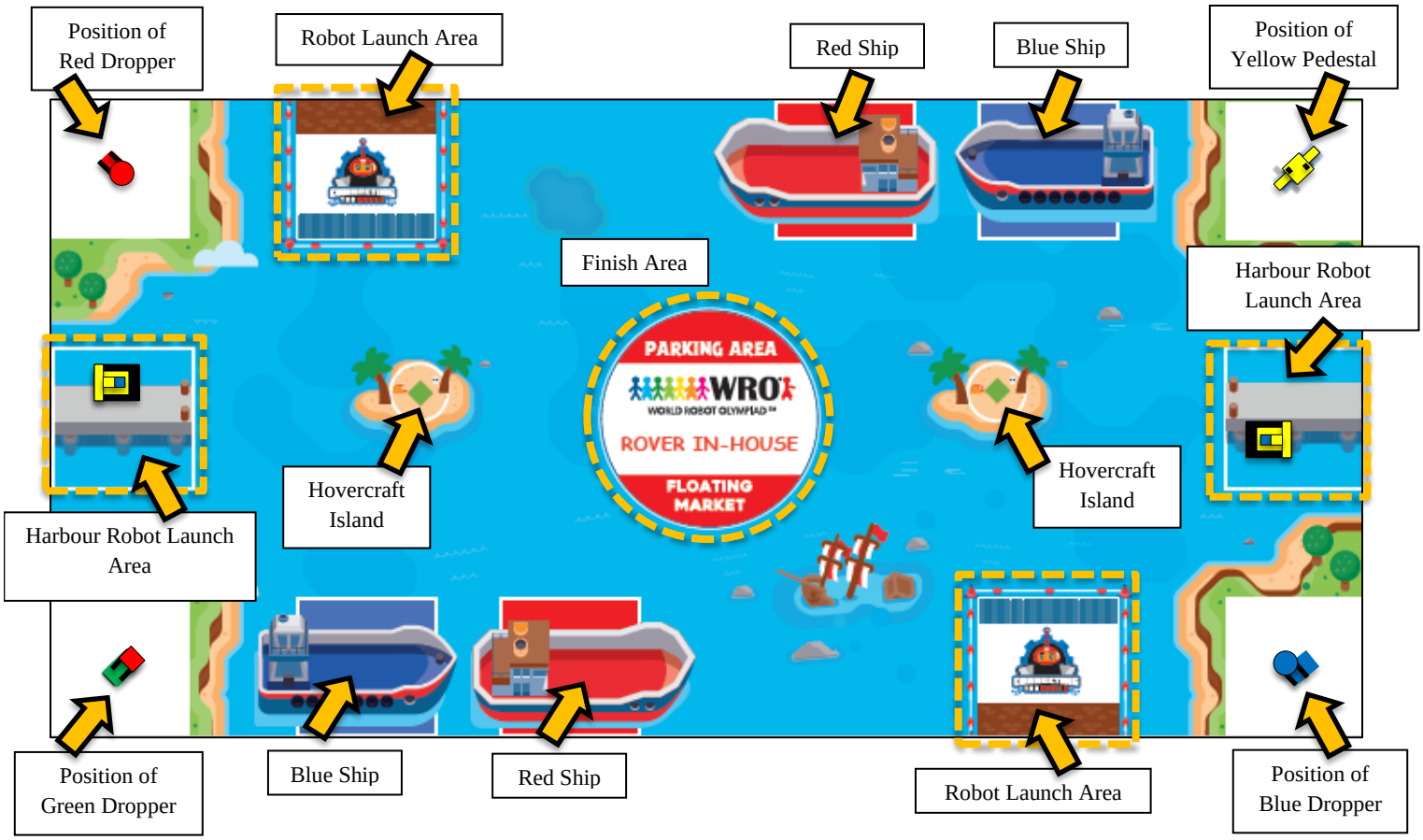
2. General rules

There are a few rules within the Rover category which must be adhered to.

1. Teams consist of a maximum of three (3) team members and a minimum of two (2) team members.
2. Competitions must take place between the set competition dates the 11th to 20th of October 2023.
3. All scores must be submitted before the closing of the online score submission system at midnight on Friday 20th of October. No video evidence or score sheets will be required to submit scores.
4. All schools/clubs participating must be registered using the WRO SA registration system and fees paid before participating in the Rover event.
5. LEGO elements from the WRO Elements box 45811 are used to construct the table elements for the Rover competition.
6. Any robotic device and programming software may be used to compete in the Rover In-House challenge.

3. Game Field

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



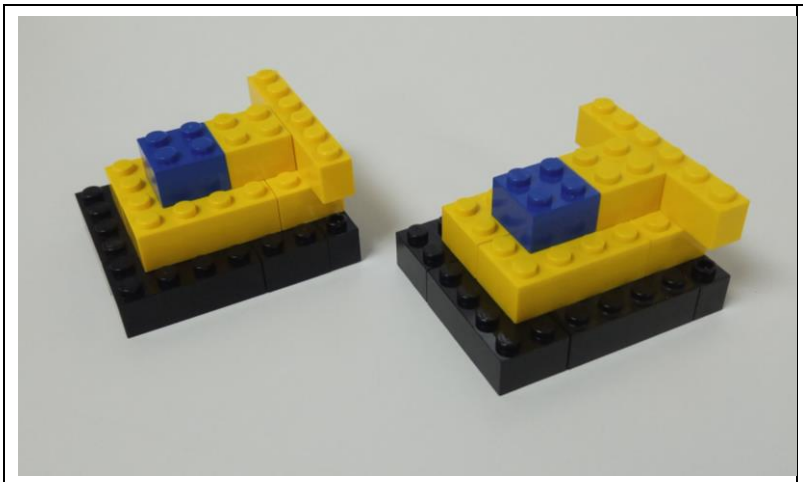
Brief explanation of tasks:

1. Move the hovercraft from the harbour robot launch area into the white circle on the islands.
2. Collect the red ball from the red dropper.
3. Collect the blue ball from the blue dropper.
4. Deliver the red ball to the red ship with the red pedestal.
5. Deliver the blue ball to the blue ship with the blue pedestal.
6. Collect the red luxury cube from the green dropper.
7. Deliver the red luxury cube to the yellow pedestal area.
8. Use your hand to place the red luxury cube onto the yellow pedestal.
9. Yellow pedestal must remain standing and not have fallen over.
10. Finish with your robot inside the Rover In-House circle.

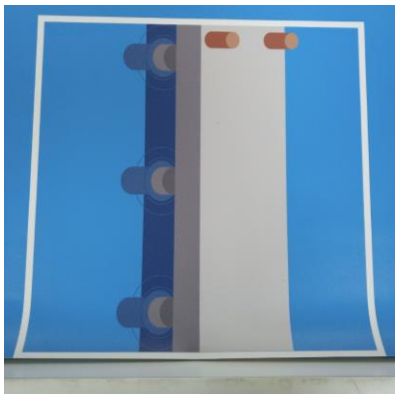
4. Game Objects, Positioning, Randomization

Hovercraft (2x)

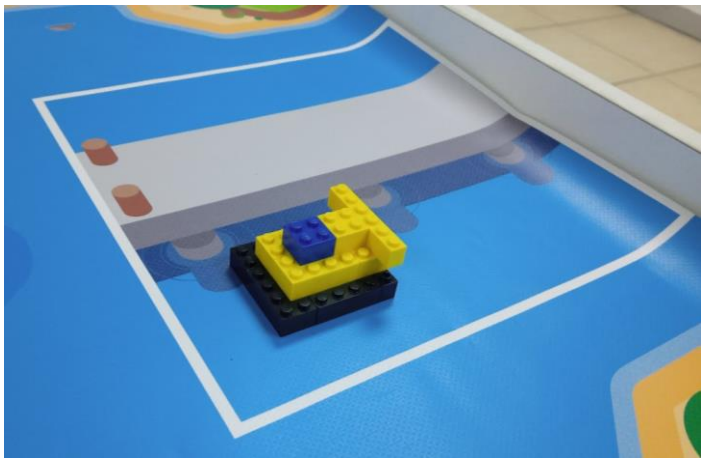
There are two hovercraft elements. One hovercraft starts in one harbour robot launch area and the other in the opposite harbour robot launch area. A hovercraft may be placed by hand onto the robot while in the harbour area.



Hovercraft elements



Harbour Robot Launch Area Starting position for the hovercraft

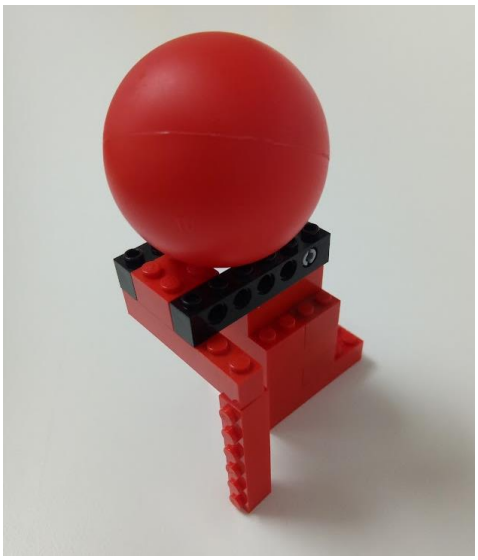


Example of the hovercraft in the harbour robot launch area.

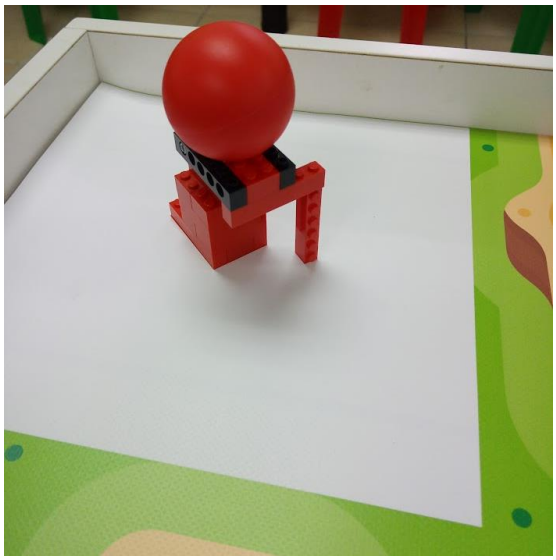
Example of hovercraft in harbour robot launch area with a robot.

Red Dropper

The red dropper is placed on the red rectangle on the game mat. A 1x6 red beam is used to hold the dropper mechanism and prevent the red ball from falling until knocked over by the robot.



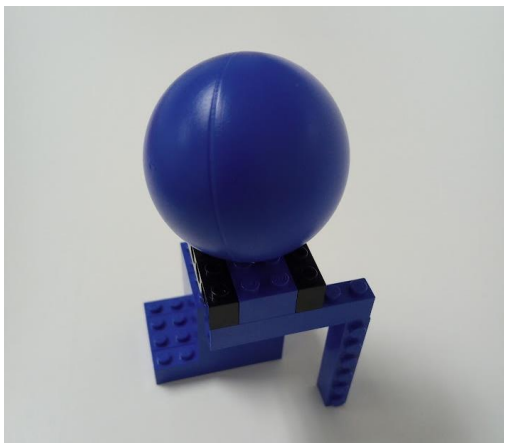
Example of the red dropper element.



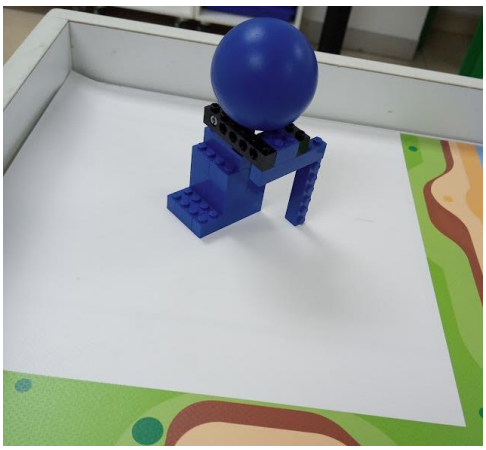
Setup of the red dropper element and red ball on the game mat.

Blue Dropper

The blue dropper is placed on the green rectangle on the game mat. A 1x6 blue beam is used to hold the dropper mechanism and prevent the blue ball from falling until knocked over by the robot.



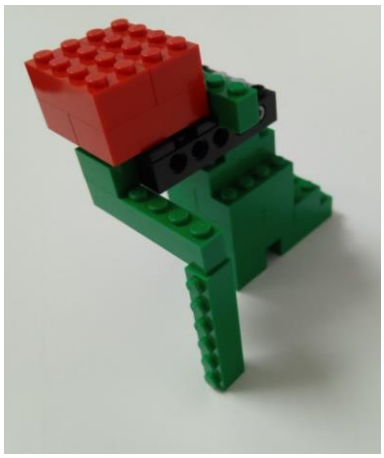
Example of blue dropper element.



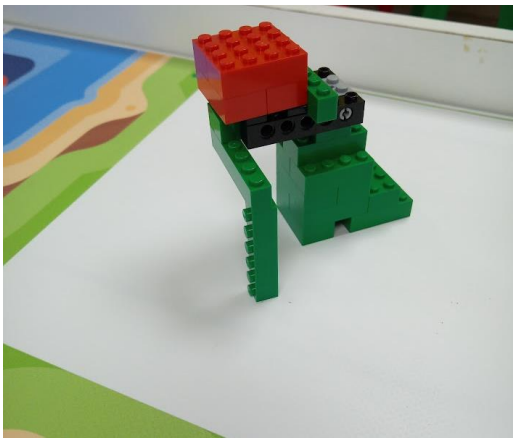
Setup of the blue dropper element and blue ball on the game mat.

Green Dropper

The green dropper is placed on the black rectangle on the game mat. A 1x6 green beam is used to hold the dropper mechanism and prevent the red luxury cube from falling until knocked over by the robot.



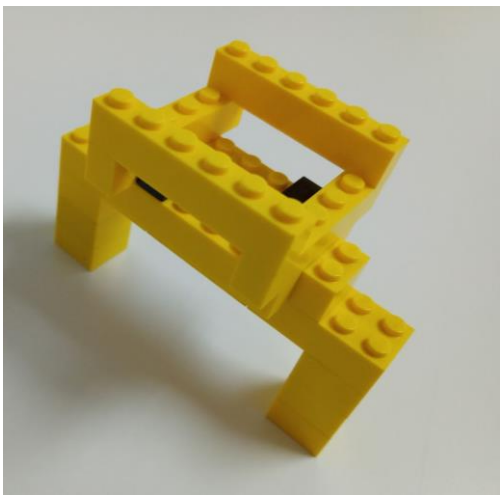
Example of green dropper element.



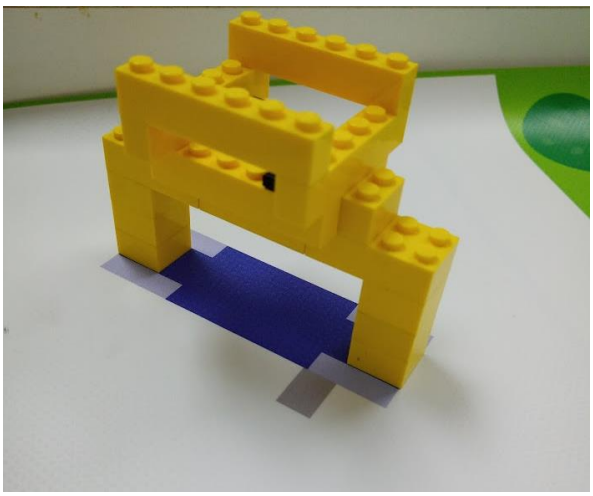
Setup of the green dropper element and red luxury cube on the game mat.

Yellow Pedestal

There is one yellow pedestal on the game mat placed on the blue starting point.



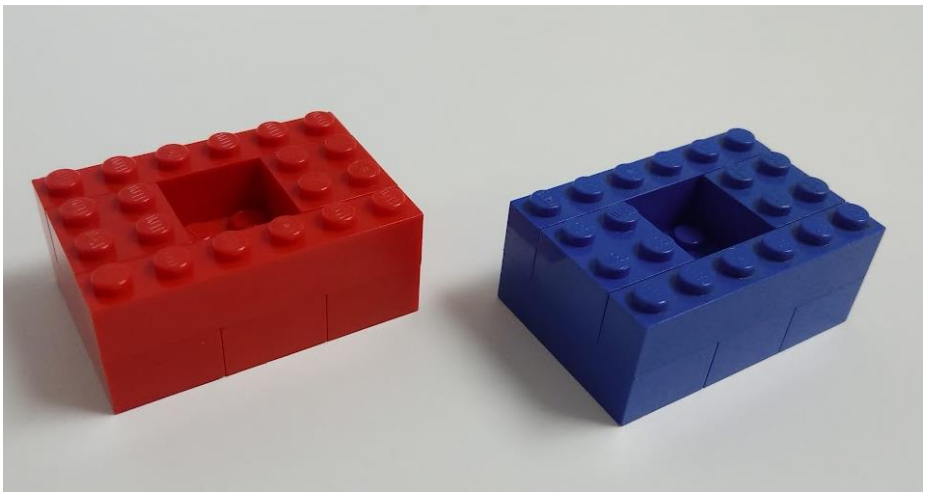
Example of the yellow pedestal.



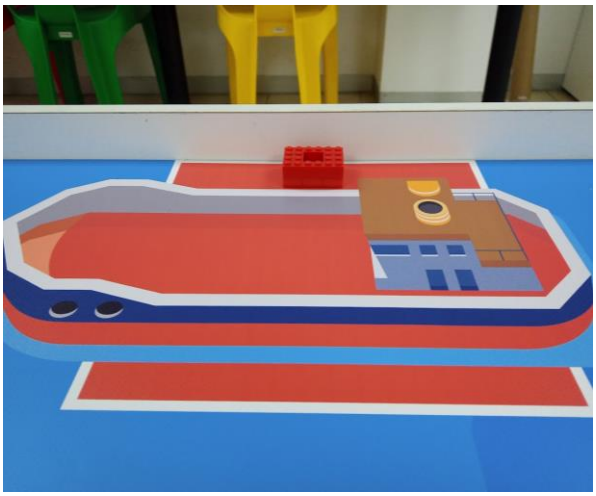
Setup of the yellow pedestal on the game mat.

Red and Blue Pedestals

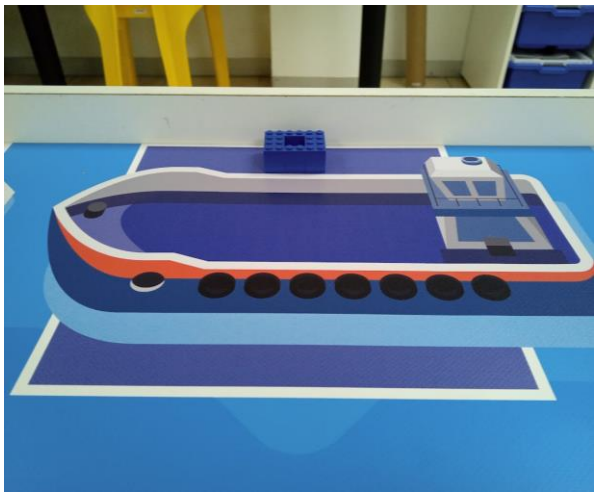
A red and blue pedestal are placed onto a matching colour ship to indicate which ship the ball needs to be taken to. Once the ball is delivered to the ship it may be picked up by a team member by hand and placed on the pedestal.



Example of the red and blue pedestal.



Red pedestal placed on a red ship to receive the red ball.



Blue pedestal placed on a blue ship to receive the blue ball.

5. Robot Missions

5.1 Move the hovercraft to the islands.

There are two hovercraft elements on the game mat, one per harbour robot launch area. The hovercraft must be moved by the robot from the harbour robot launch area to the islands. For placing the hovercraft completely inside the circle on an island the team will score more points.

5.2 Collect the red and blue ball.

A red and blue ball have been placed on their matching-coloured dropper elements. The robot must collect the red and blue ball from the dropper elements. If the ball drops into a collection mechanism and moves with the robot i.e. The robot controls the movement of the ball the team will score more points. If the ball falls off the pedestal and rolls around the game mat not controlled by the robot the team will score less points and may lift the ball with their hand and place it in a robot launch area of their choice.

5.3 Deliver the balls to the marked coloured ships.

The robot must deliver the red and blue ball to the matching red and blue ship where the pedestal have been placed. Two ships will be marked with a pedestal, when the robot enters the ship area the ball may be picked up by hand by a team member and placed onto the pedestal in the area. For example, if the robot drives with the red ball into the red ship area and stops where the pedestal is placed, a team member may then lift the ball and place it on the pedestal while the robot moves to its next destination.

The pedestals must remain on the same ship for all scoring runs for all teams.

5.4 Collect the red luxury cube.

The robot must collect the red luxury cube from the green dropper. If the cube drops into a collection mechanism and moves with the robot i.e. The robot controls the movement of the cube the team will score more points. If the cube falls off the pedestal and lands on the game mat not controlled by the robot the team will score less points and may lift the cube with their hand and place it into the closest robot launch area to the robot.

5.5 Deliver the red luxury cube to the yellow pedestal area.

The robot must deliver the red luxury cube to the yellow pedestal area. The cube is not allowed to be moved by hand from one robot launch area to another. The robot may have to drive with the cube from one launch area to another before delivering the cube to the yellow pedestal.

The cube is considered delivered when all parts of the cube enter the yellow pedestal area.

5.6 Place the red luxury cube onto the pedestal.

Once the robot has entered the yellow pedestal area and the robot stops. A team member may lift the cube with their hand and place it into the yellow pedestal container. The pedestal is not allowed to be held, only the red cube is allowed to be held by a team member and placed into the pedestal. To score these points the pedestal must remain upright.

5.7 Robot Finish

The robot must finish inside the Rover In-House circle in the middle of the mat. The robot must be completely inside the circle and have stopped to count as finished. A team does not need to have completed all tasks to score these finishing points. If a team completes one task and moves their robot into this area the team will score points for finishing.

5.8 Yellow pedestal is upright.

The yellow pedestal must remain upright and not have fallen over. The pedestal is allowed to have been moved outside of its starting area by the robot.

Rover In-House Scoring

The scoring for Rover In-House is designed to allow teams to score multiple times. A team must ask the judge when they would like to score. Once the run has been made and total counted the judge will record the result. A score may only be recorded if it is higher than the last scoring attempt. For example, if a team's first run scores 60 points and the second run scores 30 points the second run will not be recorded giving the team another chance to score.

6. Scoresheet

Rover In-House

Team Name:
Team Member 1:
Team Member 2:
Team Member 3:

Task	Each	Points	1st Score	2nd Score	3rd Score	4th Score
Hovercraft is touching the island and completely inside the white circle.	0 1 2	20 each Max 40				
Hovercraft is touching the island and not completely inside the white circle.	0 1 2	10 each Max 20				
Red or Blue ball off of their starting pedestal, controlled by robot.	0 1 2	30 each Max 60				
Red or Blue ball off of their starting pedestal, not controlled by robot.	0 1 2	15 each Max 30				
Ball delivered to correct matching coloured ship. Blue ball to blue ship, red ball to red ship. Balls placed on pedestal.	0 1 2	20 each Max 40				
Red luxury cube off of starting pedestal, not controlled by robot.	Yes / No	15				
Red luxury cube off of starting pedestal, controlled by robot.	Yes / No	30				
Red luxury cube delivered to the yellow pedestal area.	Yes / No	40				
Red luxury cube placed by hand onto the yellow pedestal and pedestal is still standing. Robot must have delivered the red luxury cube to the area.	Yes / No	25				
Yellow pedestal still standing and not fallen over	Yes / No	25				
Robot finishes in the centre Rover In-House circle. All parts of the robot are inside the circle.	Yes / No	20				
Surprise Rules	Yes / No	20				
	Total:	300 Max:				
Time is the time the score was recorded. For example 14:37		Time:				

Diamond 300 points

Gold 225 - 295 points

Silver 155 - 220 points

Bronze 90 - 150 points

Team Member Signature: _____

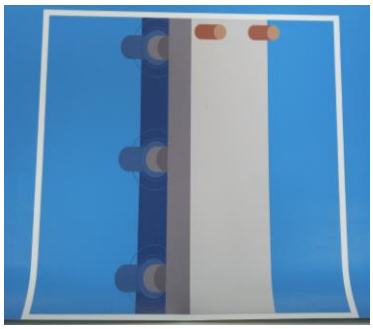
Judge Signature: _____

7. Scoring Interpretation

Robot Launch Areas

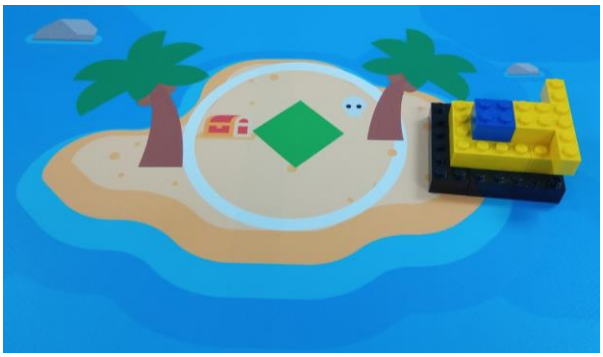
There are four (4) possible robot launch areas. The robot must start completely inside of these areas and can be moved from one area to another if the robot has entered a launch area. For example, a robot that enters a harbour launch area can be picked up by a team member and taken to another launch area to continue the table missions.

<table>
<tr>
<td colspan="2">

Robot Launch Area</td>
<td> 
Harbour Robot Launch Area
Starting position for the hovercraft</td>
</tr>
<tr>
<td>
Example of a robot in the harbour robot launch area.
Team may pick up and move the robot to another robot launch area.</td>
<td>
Example of a robot entering the harbour robot launch area.
Team may pick up and move the robot to another robot launch area.</td>
<td>
Example of a robot outside of the harbour robot launch area.
Team may not pick up the robot.</td>
</tr>
</table>

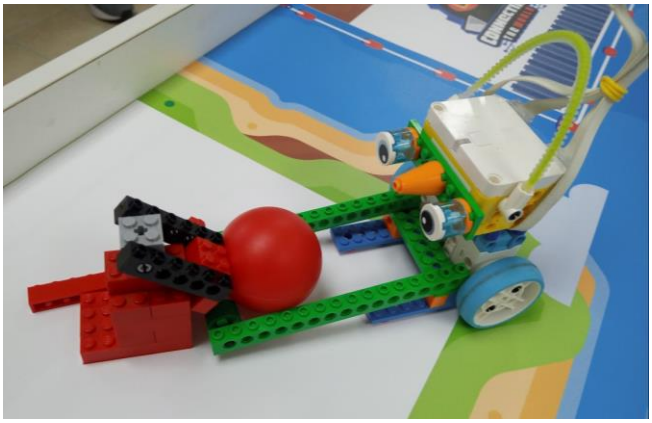
Hovercraft Scoring

The two hovercraft pieces must be taken to the islands and placed completely inside of the two white circles on the islands.

 Hovercraft moved onto island. 10 points	 Hovercraft moved onto island but not completely inside of white circle. 10 points
 Hovercraft moved onto island and no part is touching outside of the white circle. 20 points	 Hovercraft moved onto island and placed completely inside white circle. 20 points

Ball Droppers

The red and blue balls are positioned on top of two dropper mechanisms. The robot should knock over the supporting beam and collect the two balls to deliver to the ships.

	
Robot collecting a ball from a dropper. The ball is controlled by the robot inside of a carrying mechanism. 30 points	Robot collecting a ball from a dropper. The ball is free on the mat and not controlled by the robot. Team can pick up the ball and place it in any robot launch area. 15 points

Delivering the red and blue ball to the ships.

The red and blue ball must be delivered to the matching colour ship with the red or blue pedestal.

Robot delivering the red ball to the red pedestal on the red ship. The ball is completely inside the red ship area.	Red ball picked up by hand from the robot and placed onto the red pedestal. 20 points

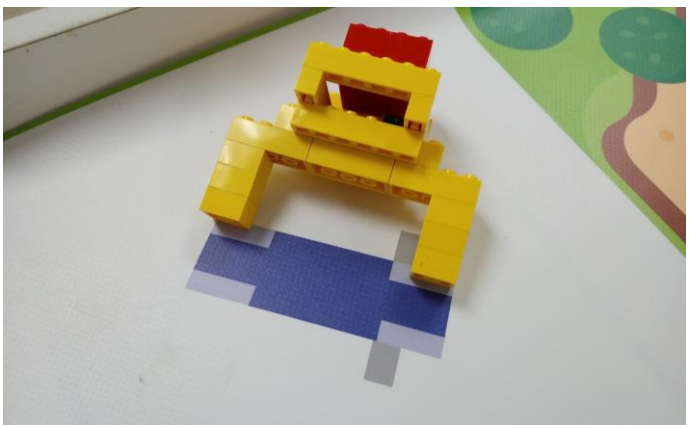
Green Dropper – Red Luxury Cube

The big white container must touch the deck of the white ship area.

 Robot collecting the red luxury cube from the dropper. The cube is controlled by the robot inside of a carrying mechanism. 30 points	 Robot collecting the red luxury cube from the dropper. The cube is on the game mat and not controlled by the robot. Team can pick up the cube and place it in the closest robot launch area to the robot. 15 points

Placing the Red Luxury Cube

The red luxury cube after delivery to the yellow pedestal area must be picked up by hand by a team member and placed onto the yellow pedestal. The pedestal must be standing for these points to be awarded. If the pedestal is knocked over either by the robot or by hand when placing the cube no points will be awarded.

 Red luxury cube placed onto the yellow pedestal after the robot has delivered it. Pedestal remains standing. 25 points	 Red luxury cube placed onto the yellow pedestal after being delivered by the robot. The pedestal has fallen over and is no longer standing. 0 points

Delivering the Red Luxury Cube

The red luxury cube must be taken to the yellow pedestal area by the robot. The cube must be transported to the yellow pedestal area completely by the robot. The cube is not allowed to be picked up by hand in one robot launch area and placed on the robot in another robot launch area. The robot will need to transport the cube from one robot launch area to another before delivering it to the yellow pedestal area.

Robot delivering the red luxury cube to the yellow pedestal area. The cube is completely inside of the yellow pedestal area.

40 points

Robot delivering the red luxury cube to the yellow pedestal area. The cube is completely inside of the yellow pedestal area. The pedestal has been moved but not fallen over.

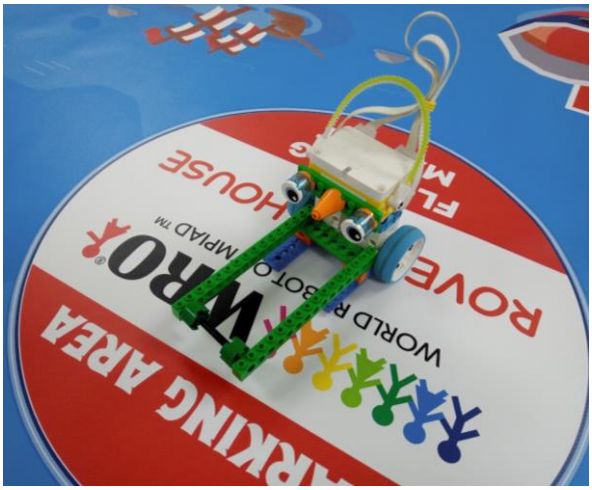
40 points

Robot delivering the red luxury cube to the yellow pedestal area. The cube is not inside of the yellow pedestal area.

0 points

Robot finishing area.

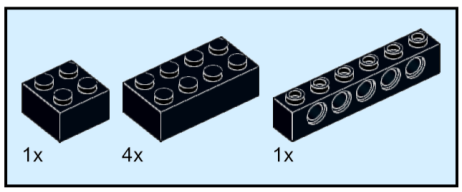
The robot must be completely inside of the Rover In-House circle for points for finishing to be scored. A team does not need to complete all challenges for these points to be scored.

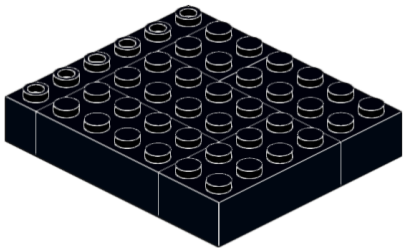
 Robot completely inside the Rover In-House circle. standing. 20 points	Robot not completely inside of the finish area. Parts of the robot are outside of the circle. 0 points

PART TWO – ASSEMBLY OF GAME OBJECTS

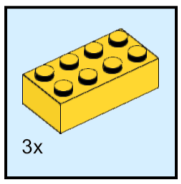
Hover Craft (x2)

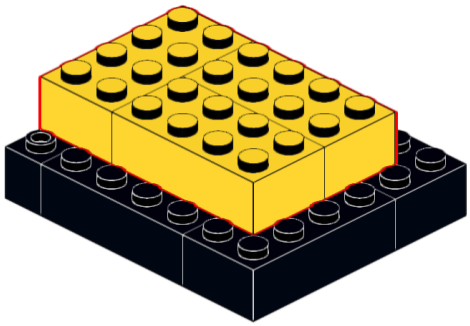
1



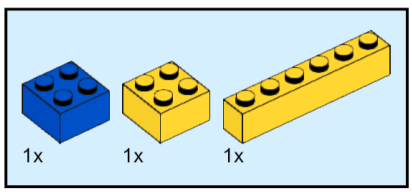


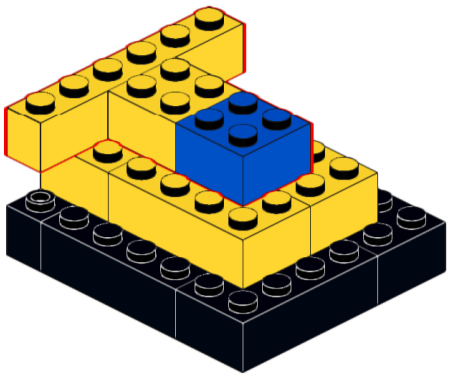
2



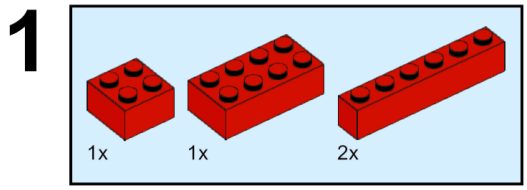


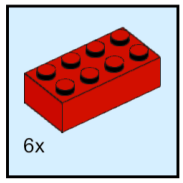
3

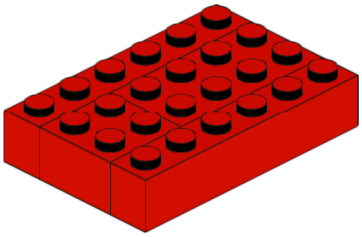


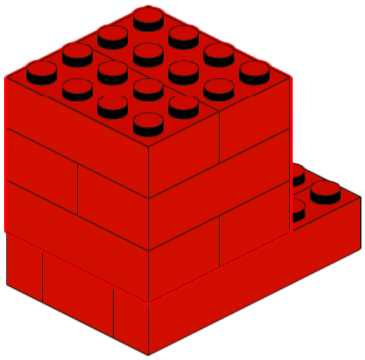


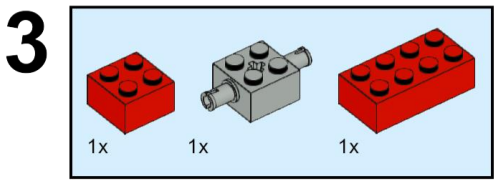
Red ball dropper (x1)

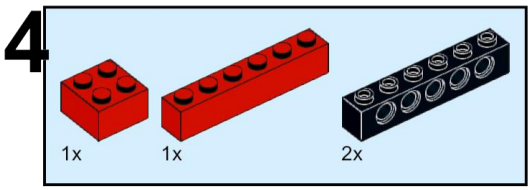


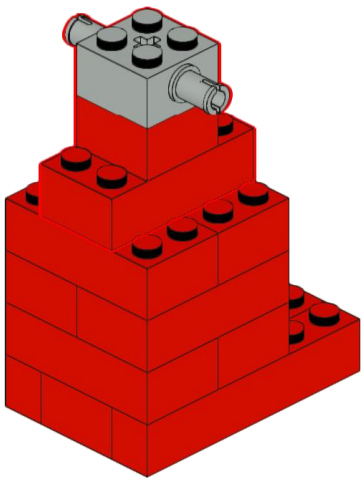


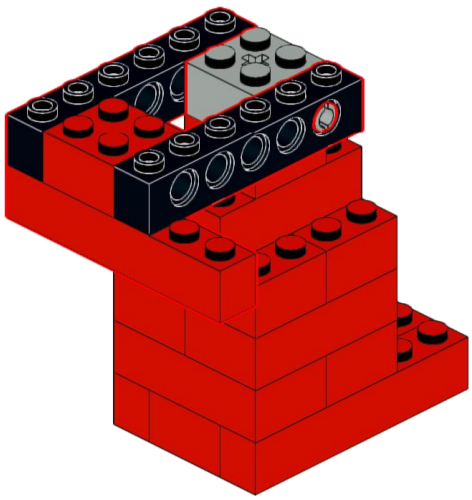


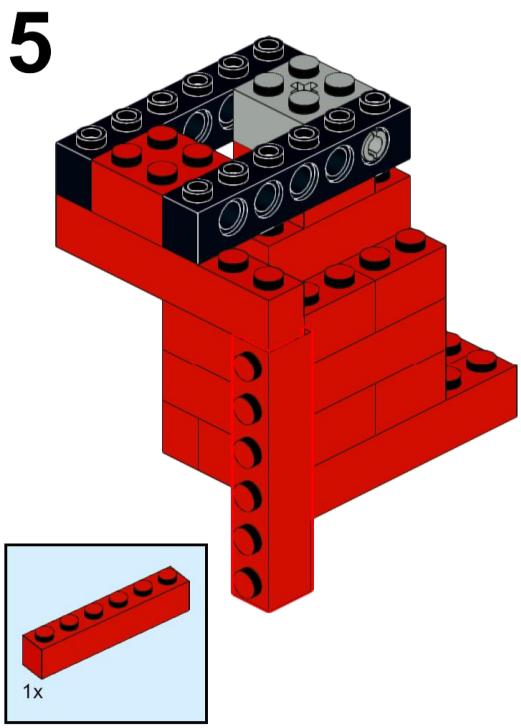


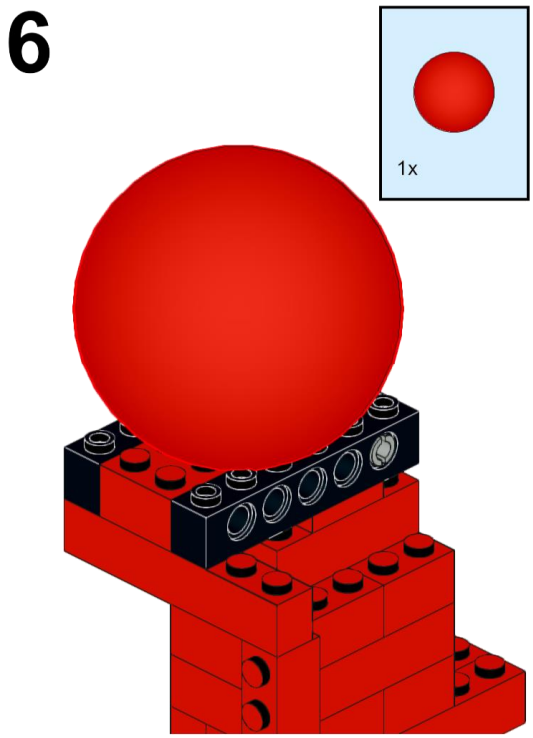




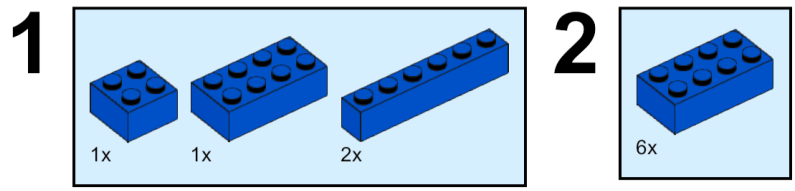


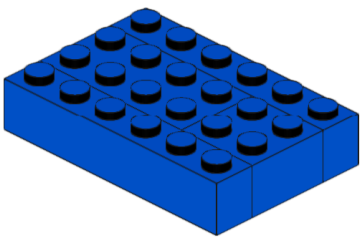


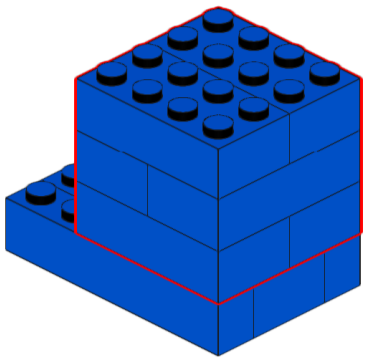




Blue ball dropper (x1)







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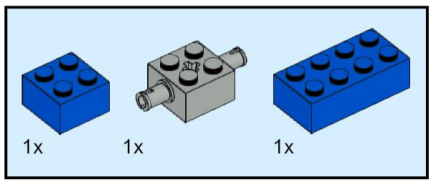

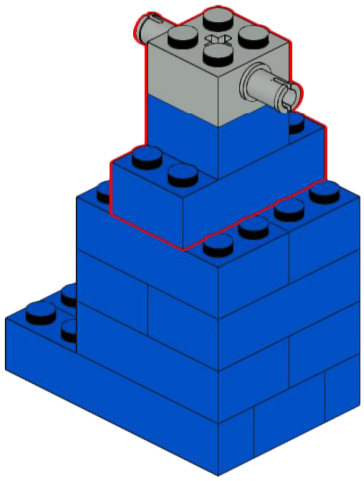

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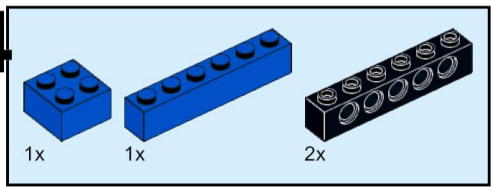

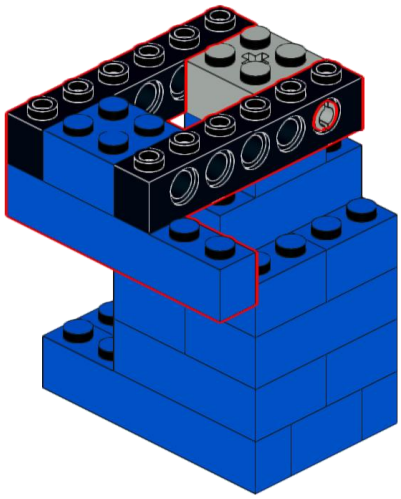

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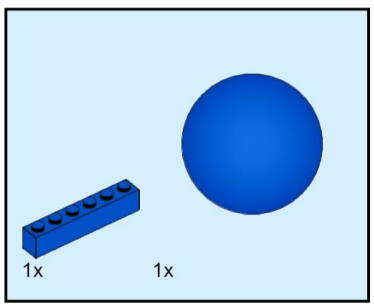
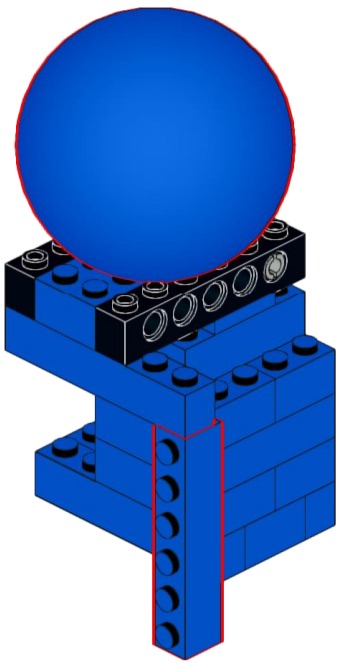
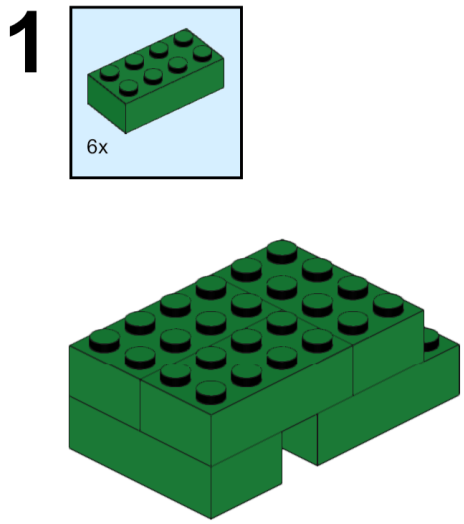
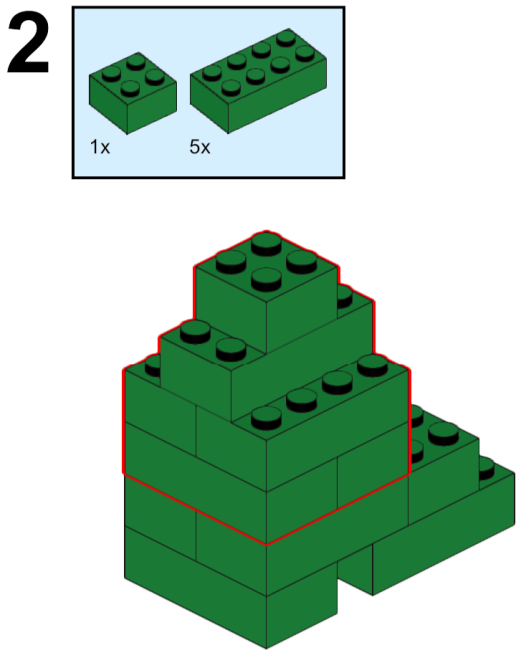
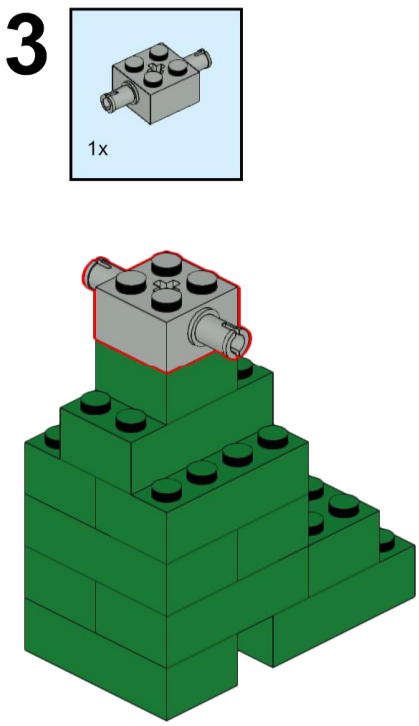


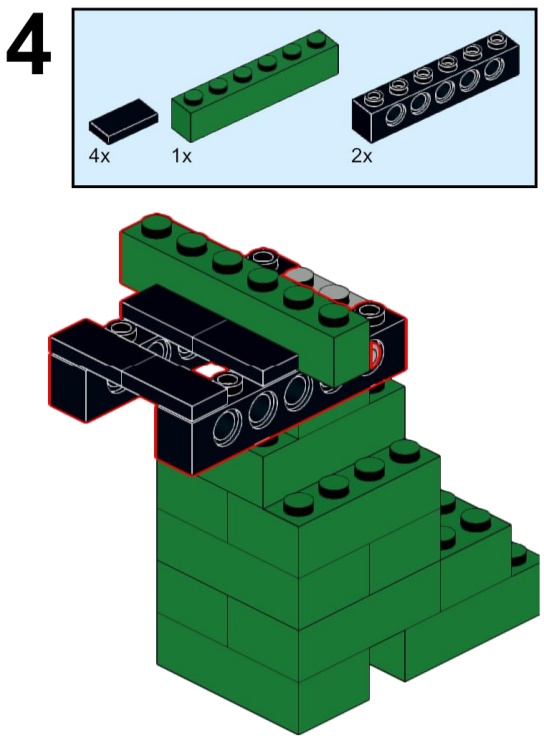


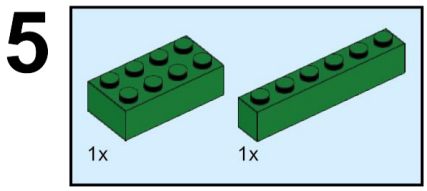
Green ball dropper (x1)







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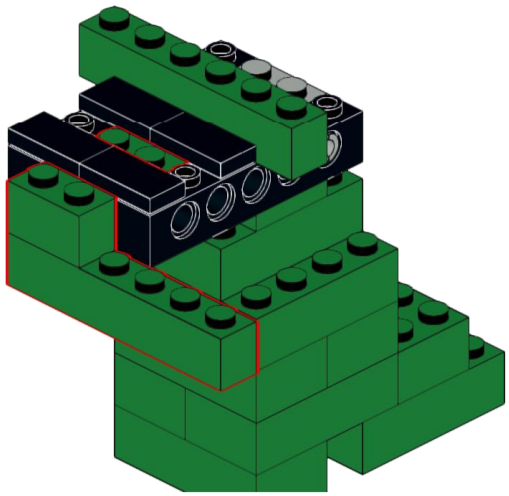
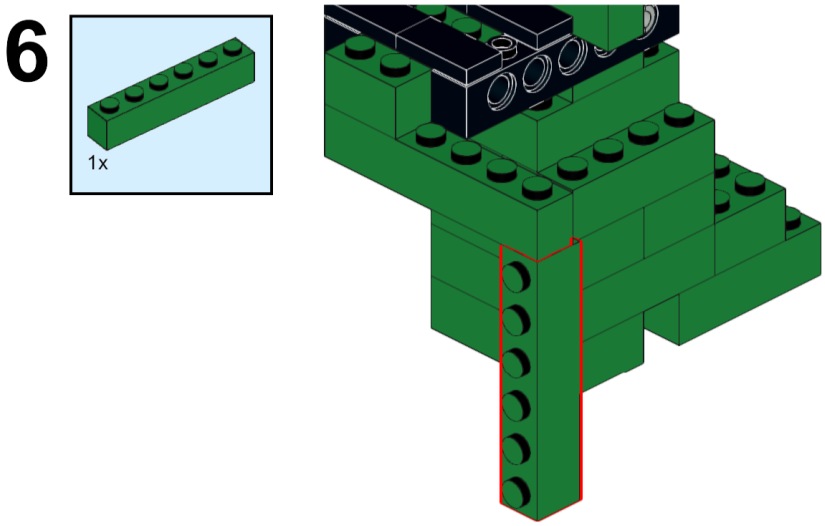
1x
1x

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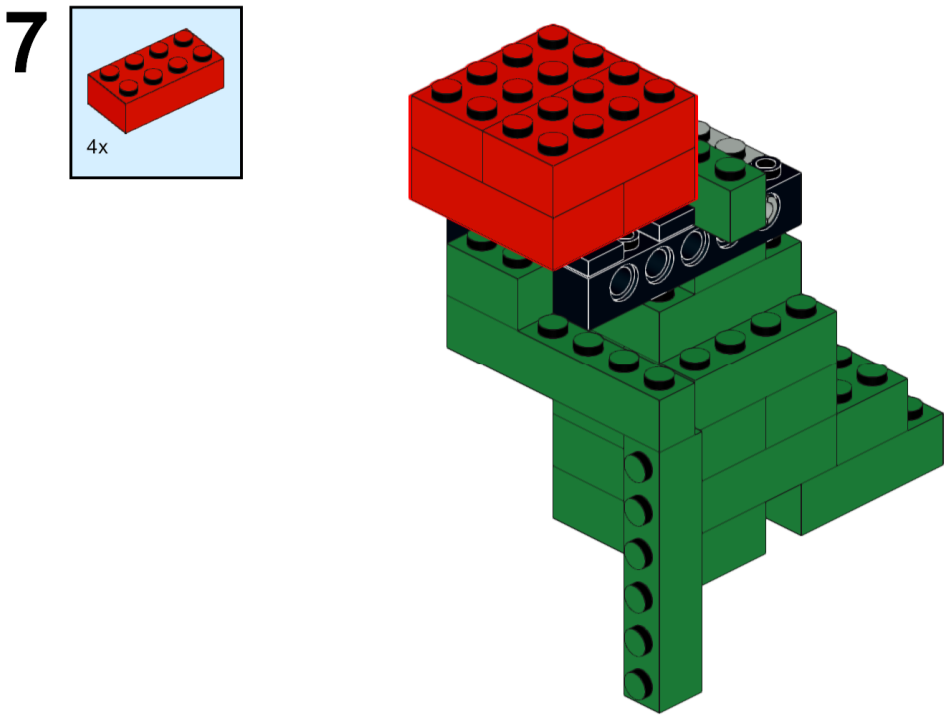
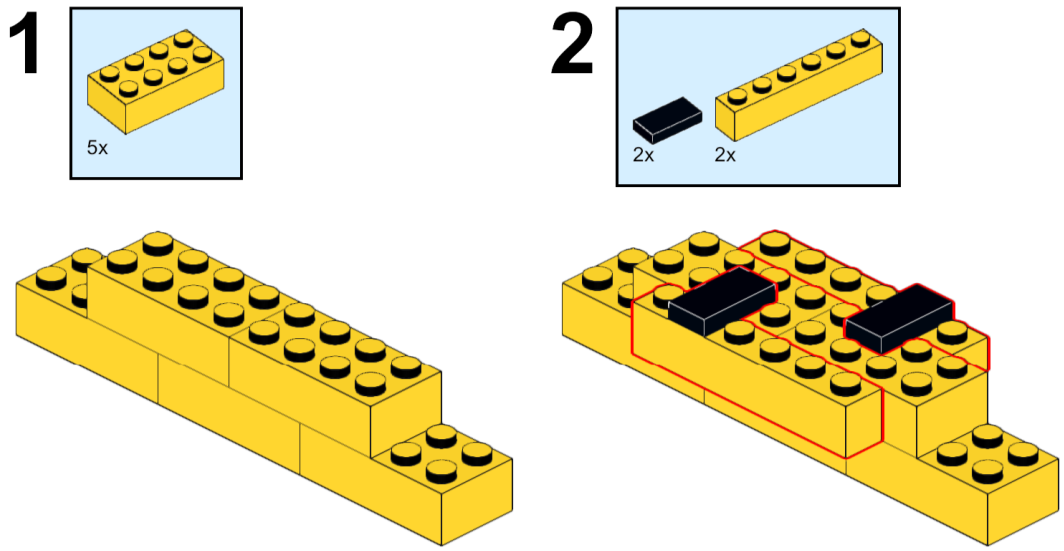
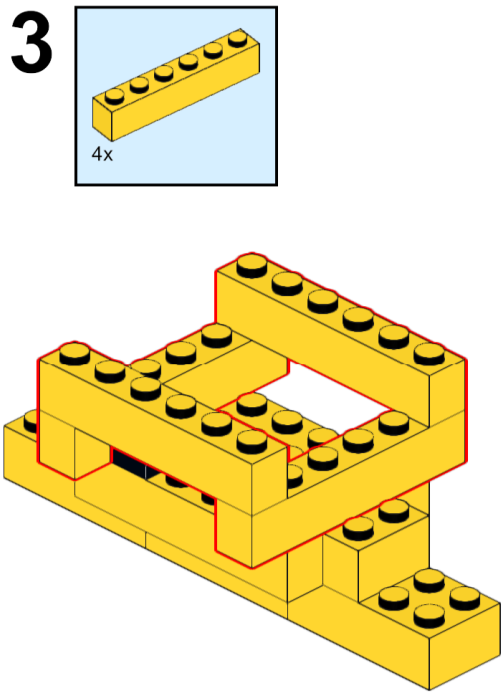
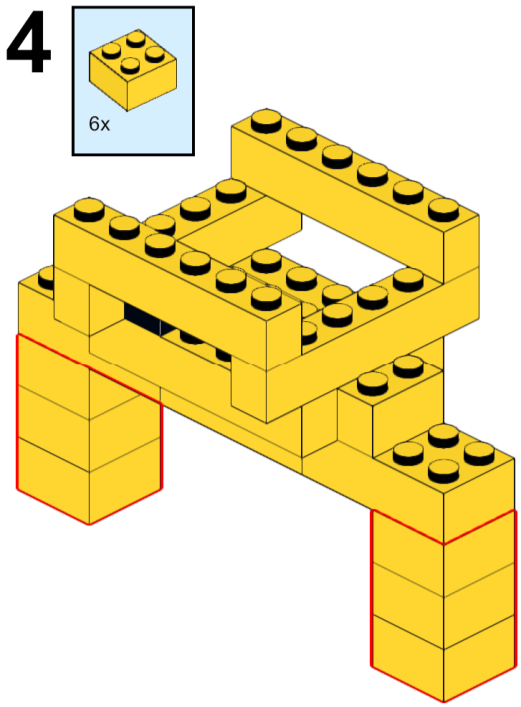
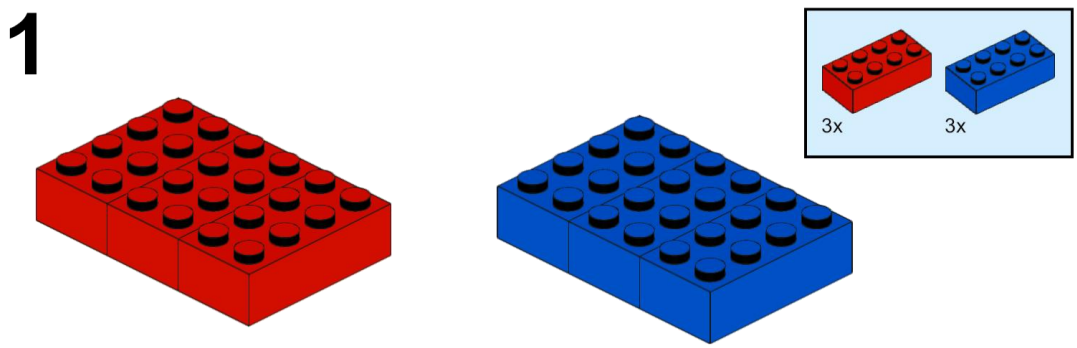
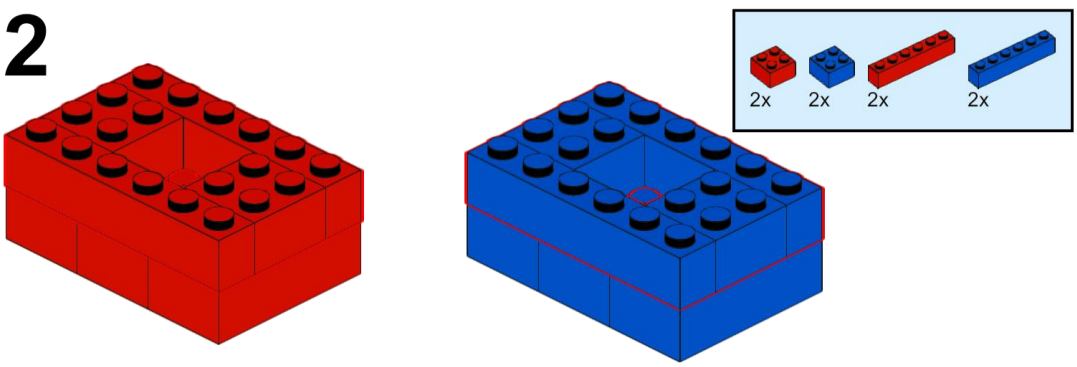


Yellow Pedestal (x1)







Red and Blue Pedestals