

# In-House Challenge 1: Off-World Offloading Game Rules



**Date: 02 April 2025**

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## PART ONE – GAME DESCRIPTION

### 1. Introduction

Robotics is a wonderful platform for learning 21st century skills. Solving robotic challenges encourages innovation and develops creativity and problem-solving skills in students. Because robotics crosses multiple curricular subjects, students must learn and apply their knowledge of science, technology, engineering, math, and computer programming.

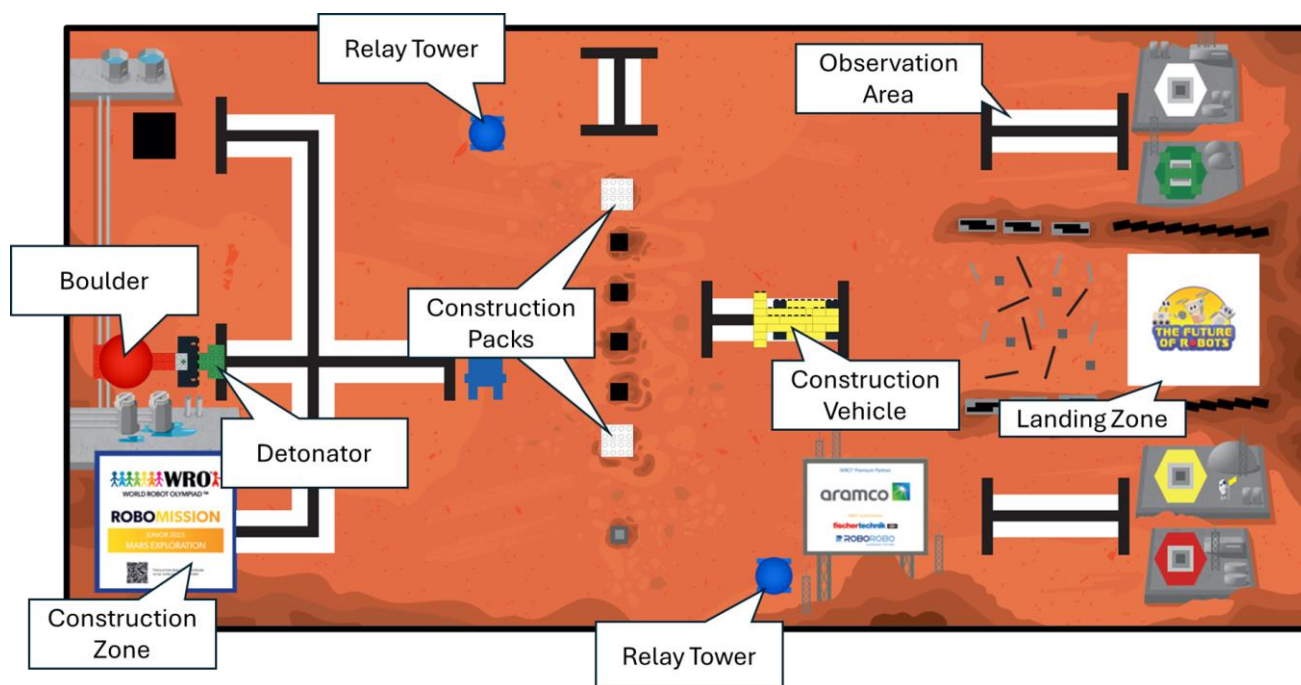
The most rewarding part of designing robots is that students have fun. They work together as a team, discovering their own solutions. Coaches guide them along the way, then step back to allow them their own victories and losses. Students thrive in this supportive and immersive environment, and learning occurs as naturally as breathing air. At the end of the day, at the end of a fair competition, students can say they did their best, they learned, and they had fun.

**There is no international component for the In-House challenge.**  
**The In-House challenge is run by coaches in their own capacity.**  
**Score submission takes place between the 1<sup>st</sup> and 31<sup>st</sup> of October**

## 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 on the wall with the start area side touching the table wall.

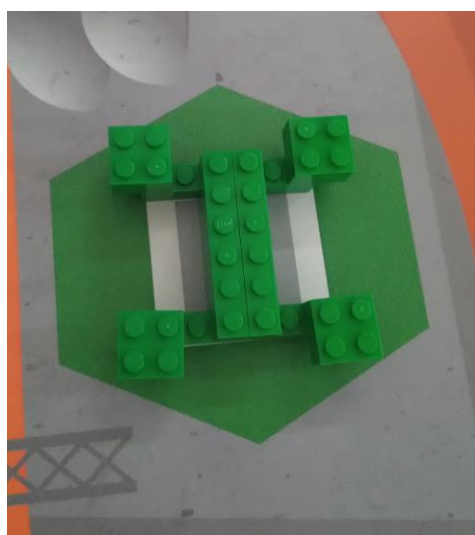


1. Robot must leave the landing zone.
  2. Green drone delivered to the observation area.
  3. Mining detonator switch flipped to touch red.
  4. Boulder (red ball) touching the game mat.
  5. Construction vehicle is touching only the mars surface.
  6. White construction packs inside the construction zone.
  7. Touch the robot and say STOP to show you have ended your scoring run.
- Bonus:** Blue relay balls not touching the game mat.

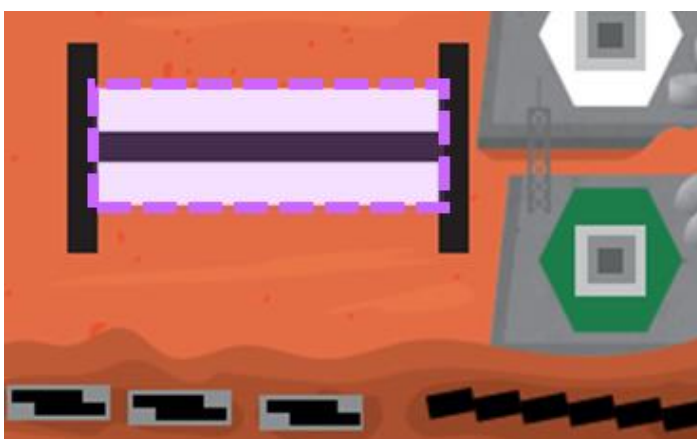
### 3. Game Objects & Positioning

#### Drone (x1)

One green drone is placed on the game field in the green area above the landing zone.



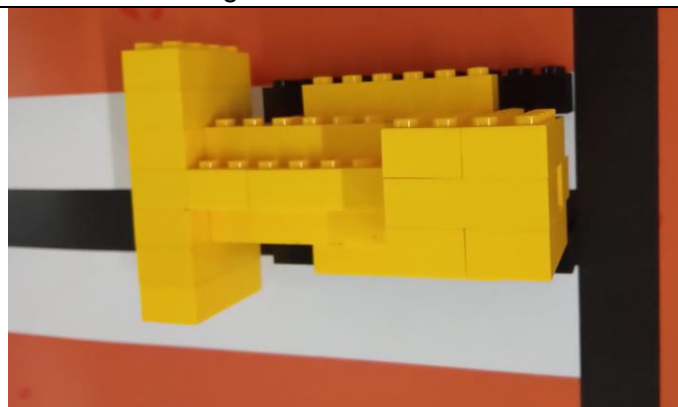
Drone starting position



Drone observation area.  
(scoring zone)

#### Construction Vehicle (x1)

One construction vehicle is placed on the game mat with the rear of the vehicle closest to the landing zone.



Starting position of the construction vehicle.



Starting location of the construction vehicle.

### White Construction Packs (x2)

Two white construction packs are placed on the game mat in two of the six black squares in the middle of the game mat. One construction pack is placed on the top black square and one construction pack is placed on the bottom black square.



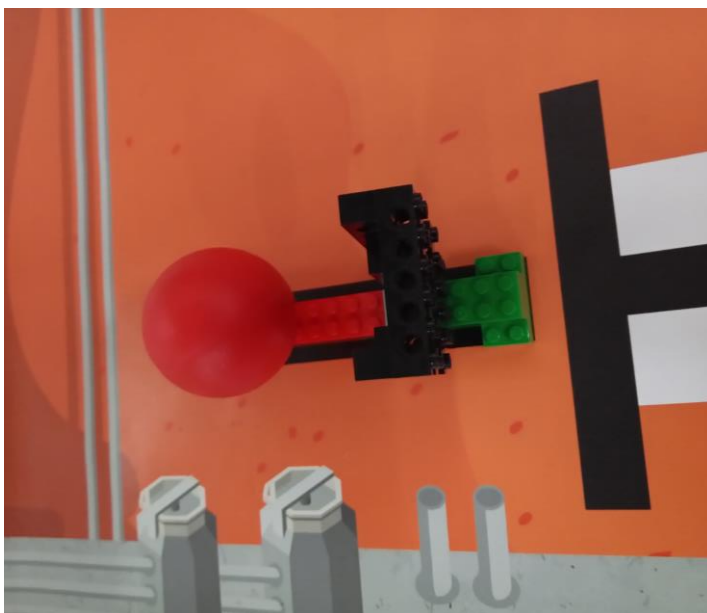
Position of the White Construction packs.



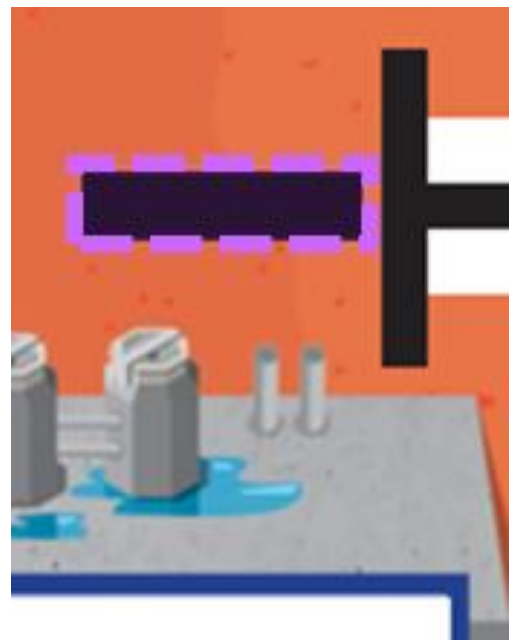
Starting position of the two white construction packs

### Mining Detonator & Boulder (x1)

A boulder and mining detonator are placed on the game mat in the black rectangle closest to the construction area. The boulder (red ball) is placed on the grey 2x2 place on the detonator switch.



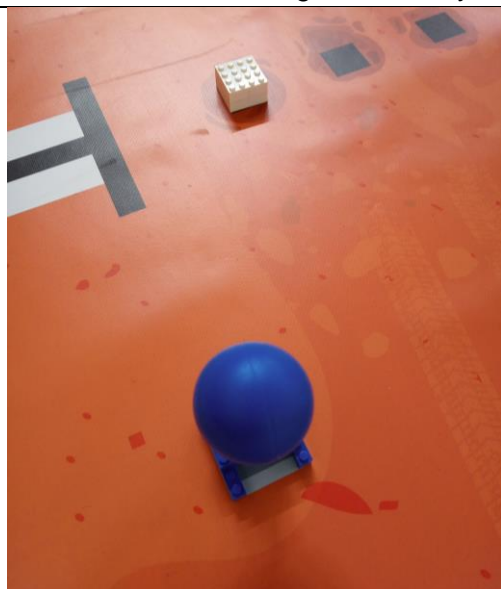
Placement of the detonator and bolder.



Starting position of the Mining Detonator.

## Relay Towers (x2)

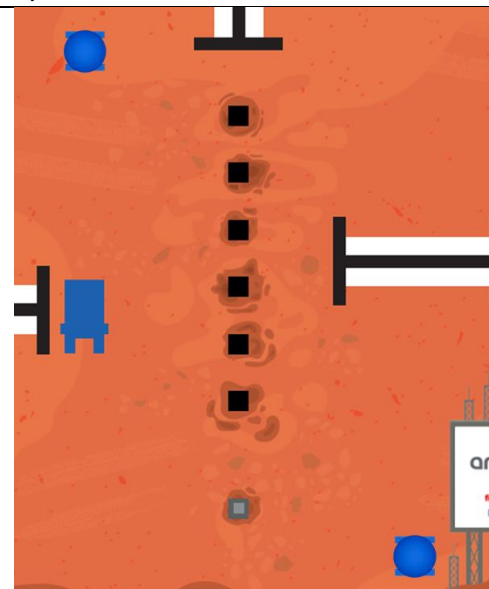
Two relay towers are placed on the game mat. One relay tower in the square to the left of the Aramco logo. One relay tower to the left of the top white construction pack.



Starting position of relay tower.



Starting position of relay tower.



Starting position of relay towers.

## 4. Robot Missions

### 4.1 Move out of the landing zone.

The landing zone (where the robot starts) must be empty so more shuttles may arrive. Your robot should completely leave the landing zone for points to be awarded.

### 4.2 Deliver the Green Drone

The green drone must be deployed in the observation area. The drone only needs to touch this area for points to be scored but must remain upright (original starting state).

### 4.3 Mining Detonator

The mining detonator switch should be moved from the green part of the switch to the red part of the switch. Note: Moving the switch from green to red will knock the boulder onto the game mat.

### 4.4 Construction vehicle moved

Move the construction vehicle so it touches only the Martian surface. The vehicle must not touch any lines, squares or mat images other than the red/brown mat surface.



#### **4.5 Boulder Removed**

The red boulder (red ball) must touch the game mat. The ball must remain on the game mat is not allowed to be removed by hand.

#### **4.6 White Construction Packs.**

The robot must collect the two white construction packs and deliver them to the construction area.

#### **4.7 Blue relays are undamaged**

The blue relay balls are not touching the game mat and still on their towers.

#### **4.8 Stop the robot.**

One team member must touch the robot while saying “STOP” and end the program to indicate their run has finished. The robot should remain in the position the team stopped it in and not have been moved anywhere else on the game table.

#### **In-House rule adaptations:**

**The In-House challenge is designed for teams to have fun, test their abilities and to encourage robotics in schools and clubs.**

**NB:** Coaches may alter the rules to assist their teams if the coach deems it necessary. For example, where elements must be completely inside to score a coach may determine that elements only need to touch the scoring areas to score full points. All teams should be judged fairly and in the same way with the same rules.

Changes or adaptations of these rules do not need to be checked by WRO SA or agreed upon by WRO SA for teams to have scores submitted during the challenge week.

## 5. Scoresheet

### Challenge 1 - Off-World Offloading

Team Name: \_\_\_\_\_

Task	Each	Points	1st Score	2nd Score	3rd Score	4th Score	
Robot has left the landing zone.	Yes / No	20					Diamond 300+ points
Green Drone has been moved to its observation zone.	Yes / No	40					Gold 226 - 299 points
Mining detonator switch has been flipped touching red.	Yes / No	40					Silver 151 - 225 points
Boulder (red ball) touching the game mat.	Yes / No	20					Bronze 76 - 150 points
Construction vehicle has been moved to only touch the red martian surface.	Yes / No	40					Participation 0 - 75 points
White construction packs moved completely inside the construction zone.	0 1 2	40 each (Max 80)					
Team touched robot, ended program and said STOP to indicate the run is over.	Yes / No	20					
<b>Bonus Points:</b>							
Blue relay balls not touching the game mat.	0 1 2	20 each (Max 40)					
Surprise rule:	Yes / No						
Teams should be given a maximum of 3 hours to program, test and score.	Total:	300 Max:					

Judge Name: \_\_\_\_\_ Team Member Signature: \_\_\_\_\_

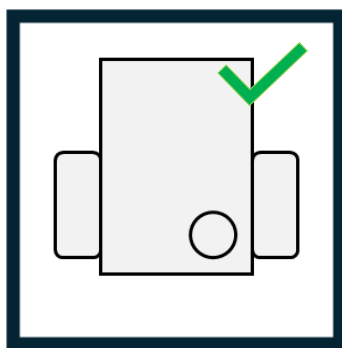
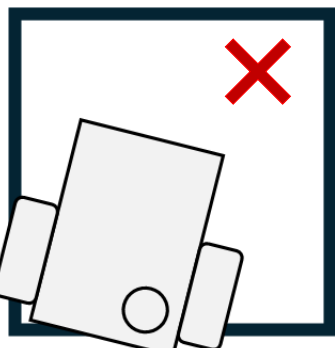
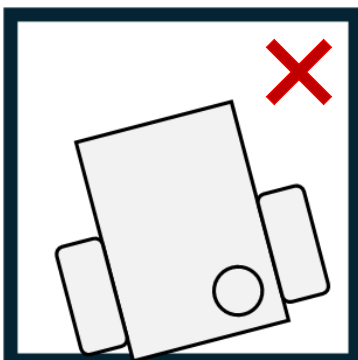


## 6. Scoring Interpretation

The images in this section will help to explain the scoring options available to teams. In cases where scoring is unsure the judge must bias their decision to the best possible outcome of the team.

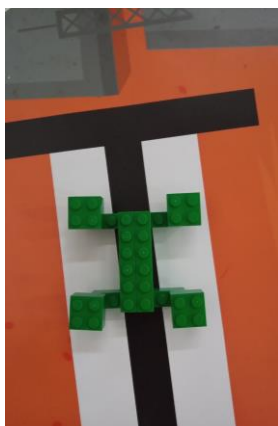


### Robot start area

The robot must start completely inside the start/finish area. All parts of the robot must fit into this area **including robot cables**. No part of the robot is allowed to project outside of the start/finish area or into the surrounding line. The start/finish area is defined as the white area only and not the surrounding different colour line/square.

 <p>Robot completely inside the start/finish area. No part overhanging or touching the surrounding line.</p>	 <p>Robot outside of the start/finish area. Robot will not be allowed to start.</p>	 <p>Robot projecting out of the start/finish area. Robot will not be allowed to start</p>
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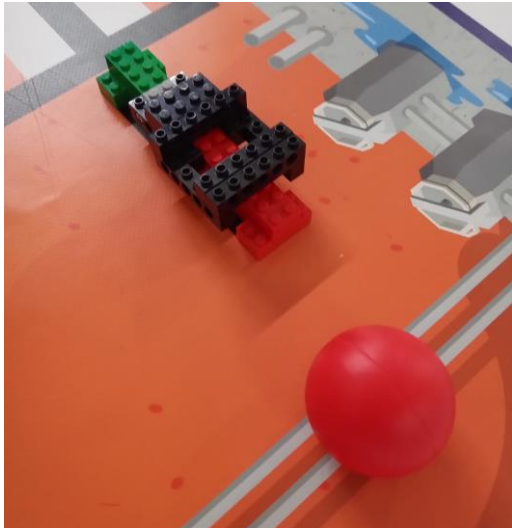
### Drone:

The below images apply to the drone element in the observation area.

 <p>Drone completely inside the observation area. 40 points each</p>	 <p>Drone touching inside the observation area. 40 points</p>	 <p>Drone inside the observation area and drone is damaged. 0 points</p>
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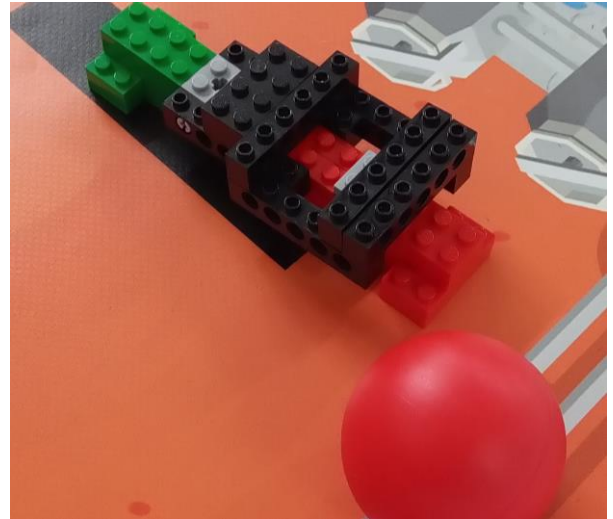
### Mining Detonator:

The below images apply to the mining detonator switch.



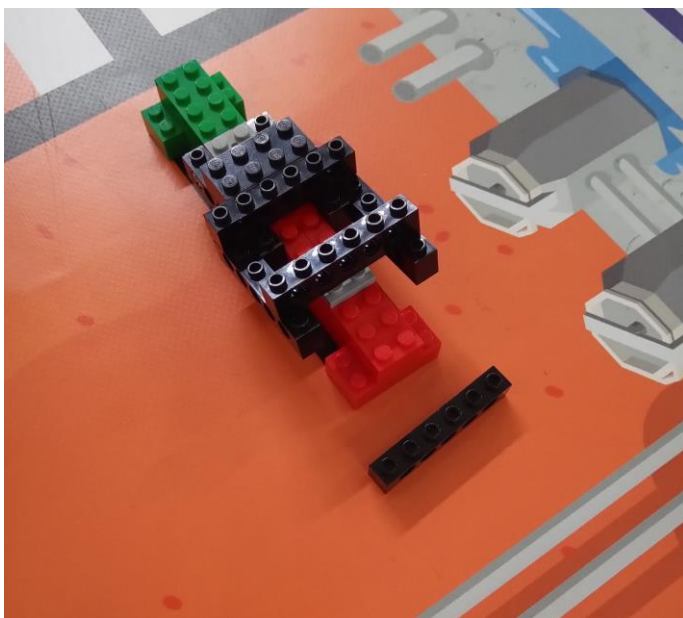
Mining detonator switch is down and touching the red part of the switch. The switch is still completely inside its starting area.

40 points



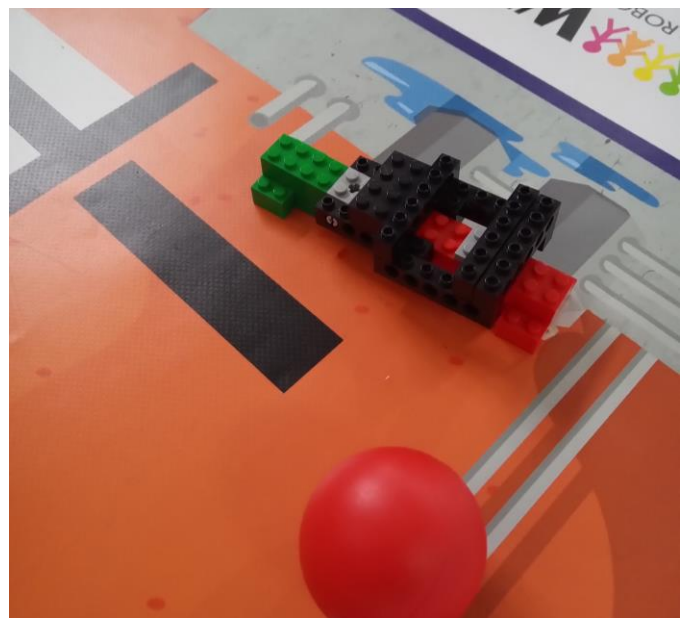
Mining detonator switch is down and touching the red part of the switch. The switch is moved and touching outside of its starting area.

40 points



Mining detonator switch is down and touching the red part of the switch. The switch is damaged.

0 points each

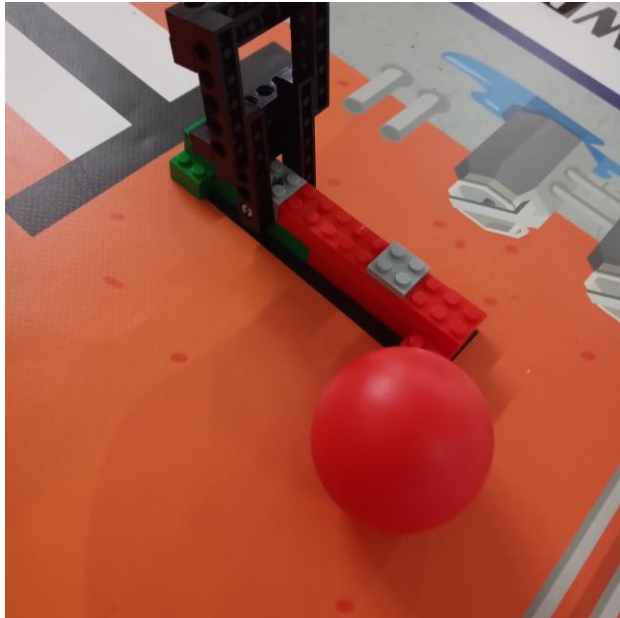


Mining detonator switch is down and touching the red part of the switch. The switch has been moved completely out of its starting area.

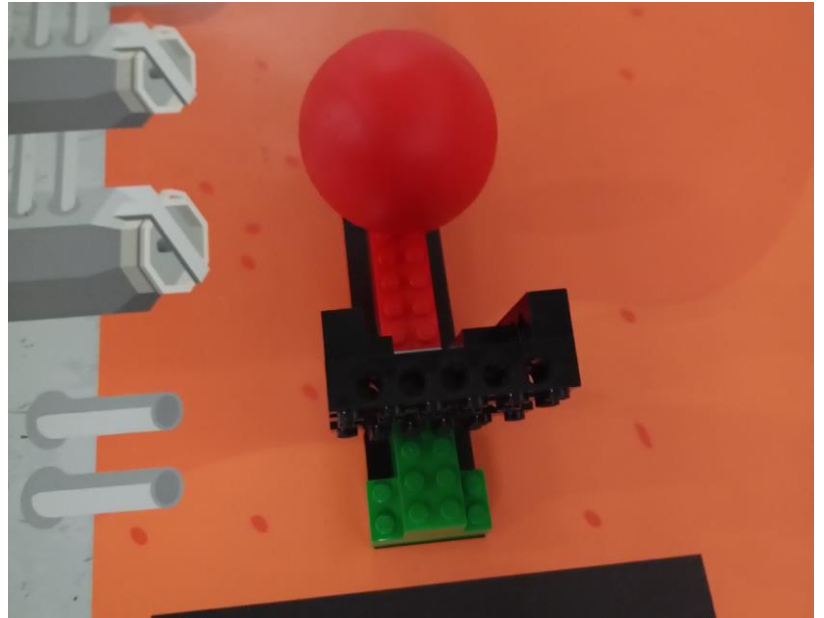
0 points

### **Boulder:**

The below images apply to the red boulder (red ball).



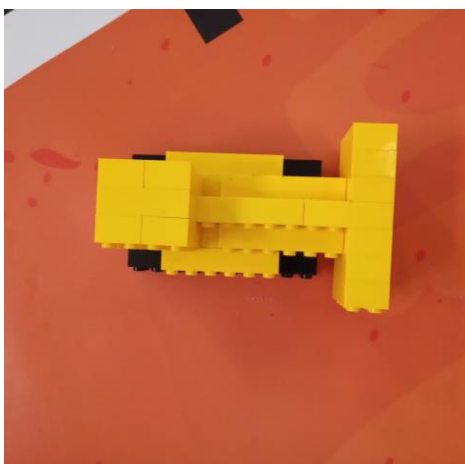
Red boulder touching the game mat  
20 points



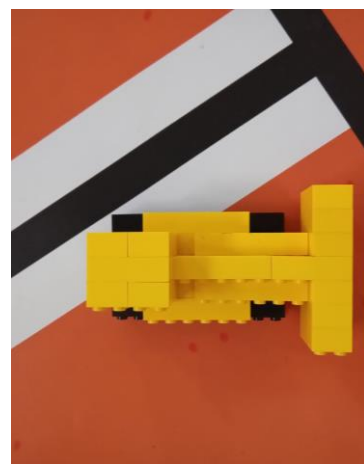
Red boulder still in starting position, not touching the game mat.  
0 points

### **Construction Vehicle**

The below images apply to the construction vehicle.



Construction vehicle completely touching only the mars surface.  
40 points

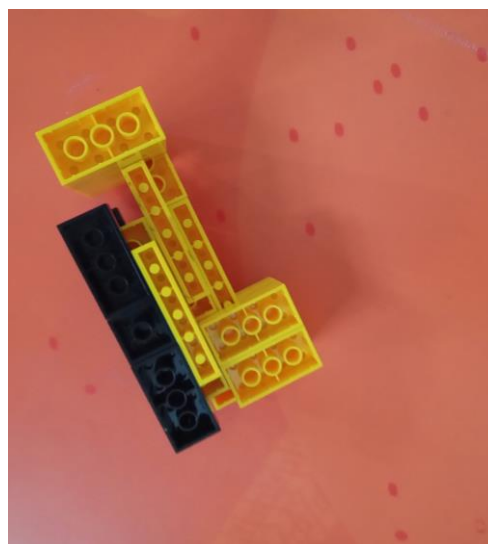


Construction vehicle moved, not touching only the mars surface.  
0 points



Construction vehicle moved, not touching only the mars surface. (touching another image on the game mat).

0 points



Construction vehicle moved, touching only the mars surface. Vehicle is not upright.

0 points

### White construction packs

The below images apply to the white construction packs in the construction zone.



White construction packs completely inside the construction zone.

40 points each



White construction packs completely inside the construction zone. One construction pack on its side.

Total 80 points – (40 points each)



White construction packs completely not inside the construction zone.

Total 80 points – (40 points each)



## **Relay Towers**

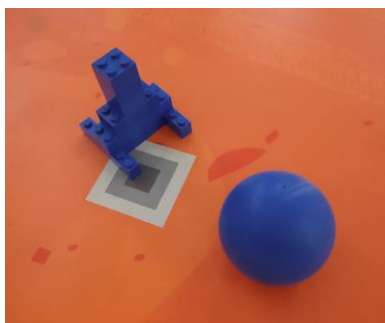
The below images apply to the tree and red ball elements.



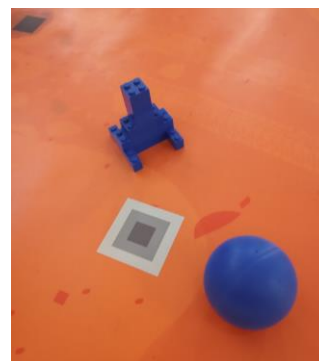
Blue ball on top of relay tower.  
20 points



Blue ball touching the game mat. Not on top of relay tower.  
0 points



Blue ball touching the game mat. Relay tower base has moved.  
0 points



Blue ball touching the game mat. Relay tower base has moved.  
0 points

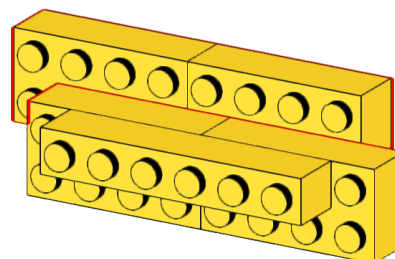
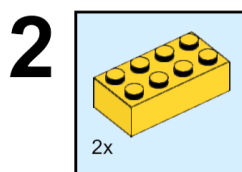
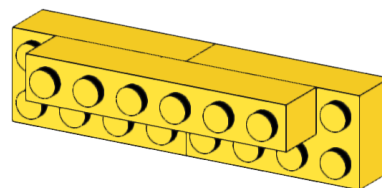
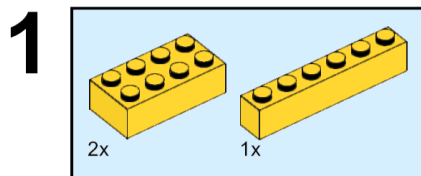
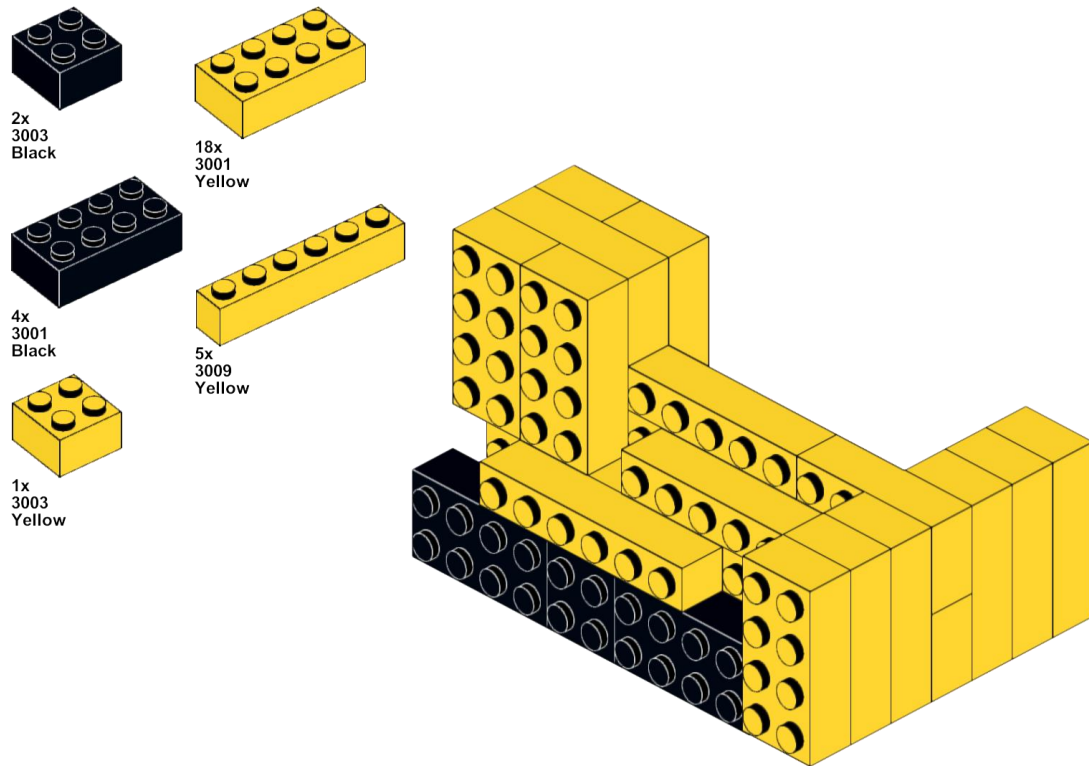
## **Robot finishing points**

The team must touch the robot and say stop to indicate the robot has finished its run.

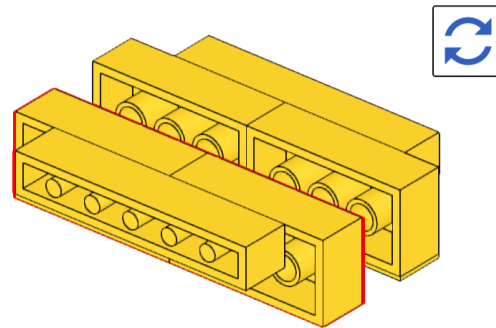
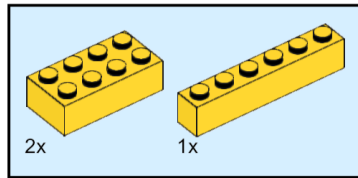
The robot program must be ended, and the robot must no longer move. The robot must remain on the game table until the judge requests the robot to be removed.

## PART TWO – ASSEMBLY OF GAME OBJECTS

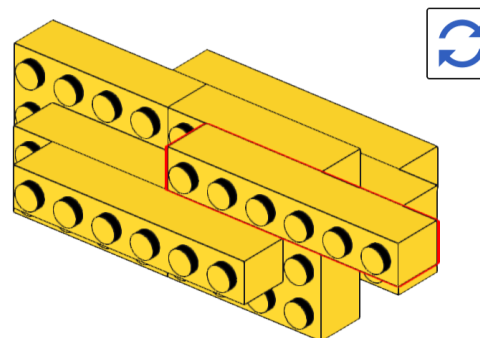
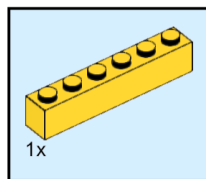
### Construction Vehicle (x1)



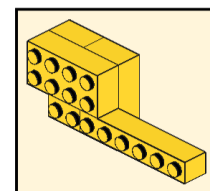
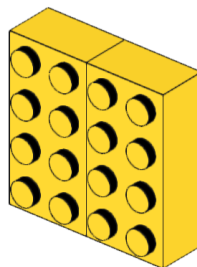
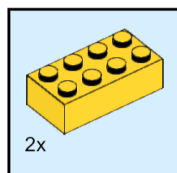
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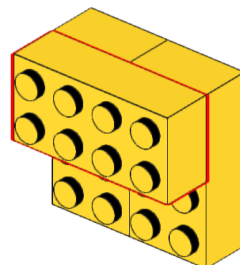
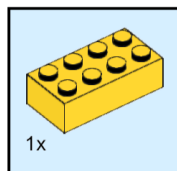
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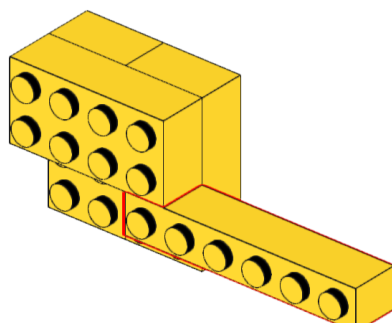
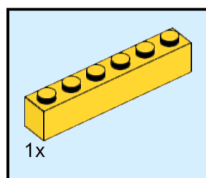


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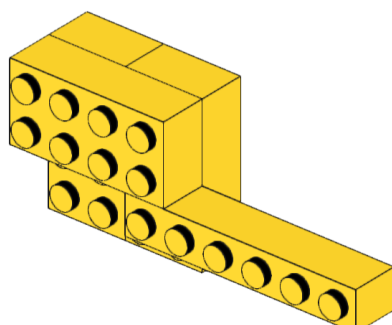




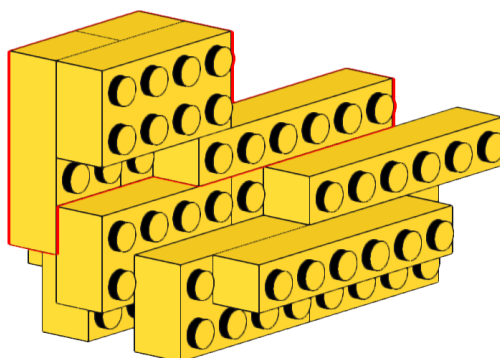
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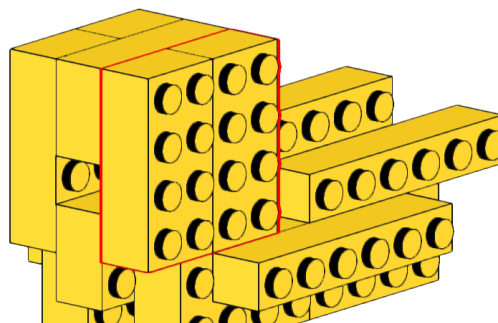
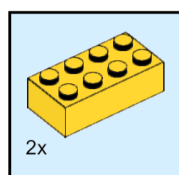
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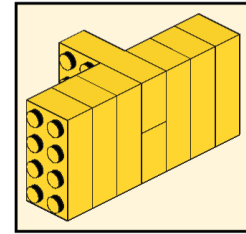
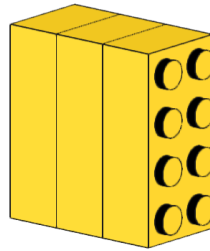
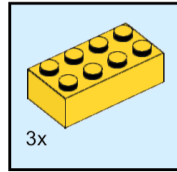
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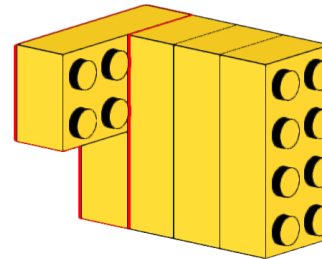
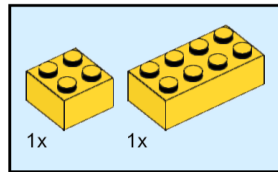
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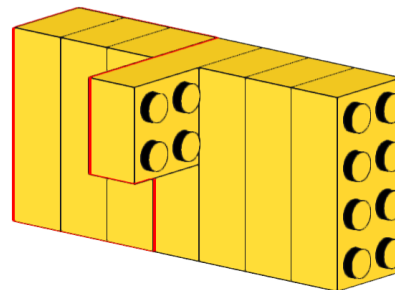
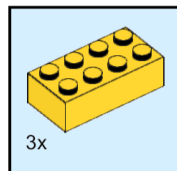
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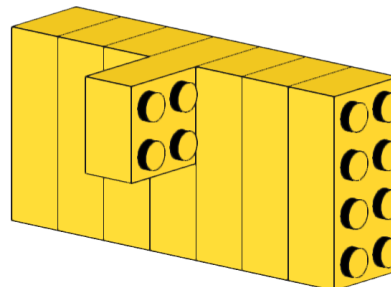
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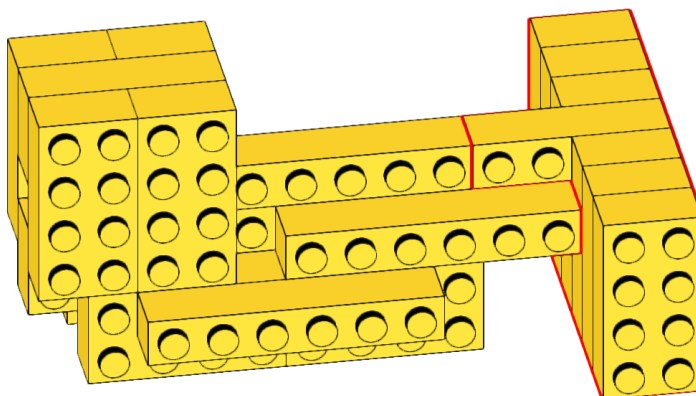
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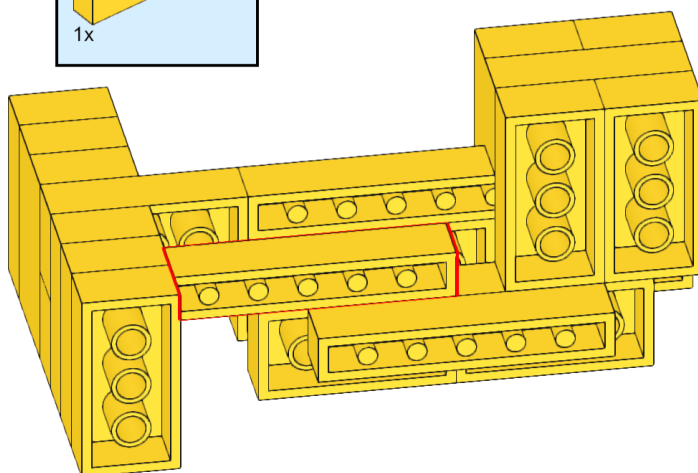
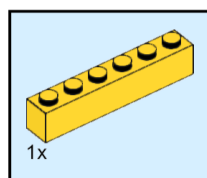
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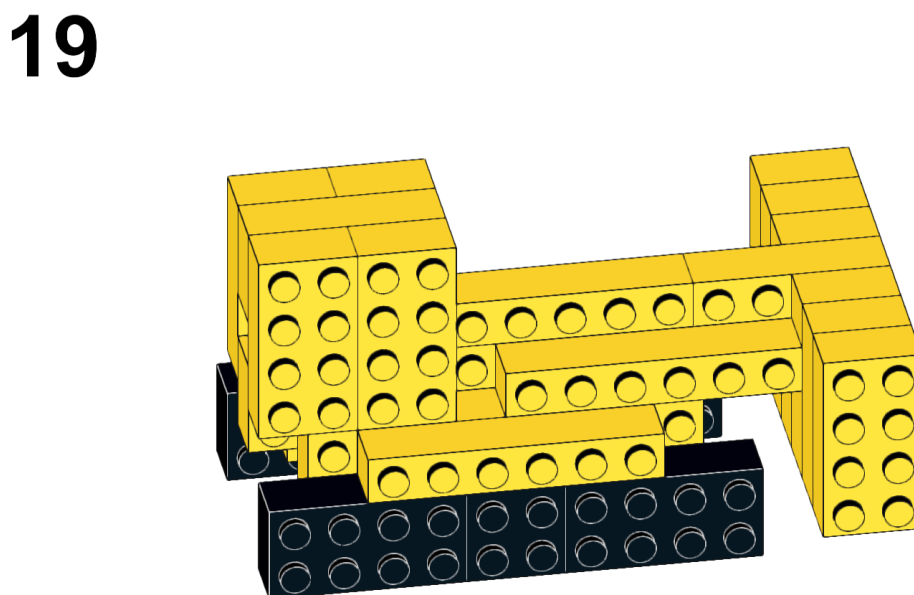
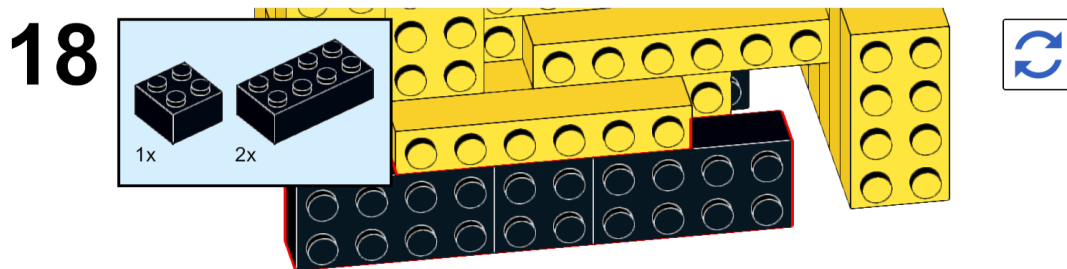
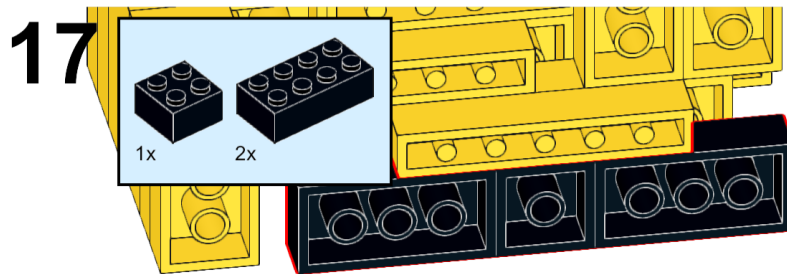


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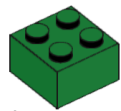


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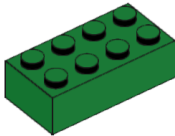




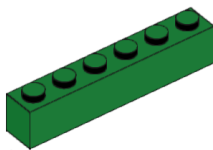
## Drone (x1)



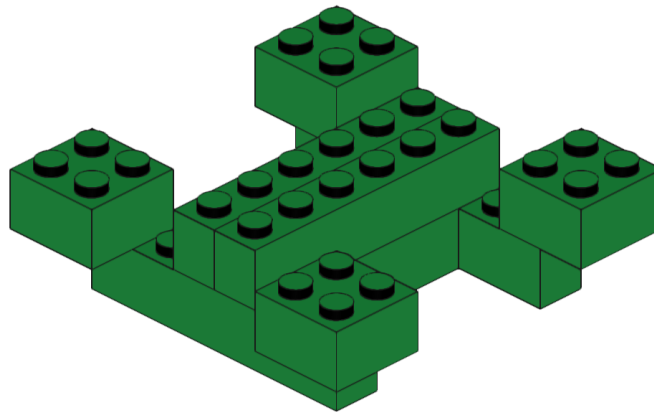
4x  
3003  
Green



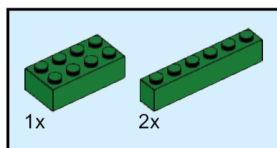
1x  
3001  
Green



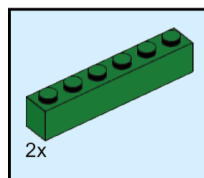
4x  
3009  
Green



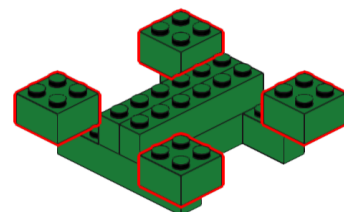
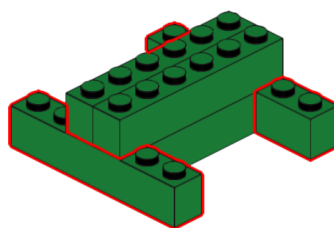
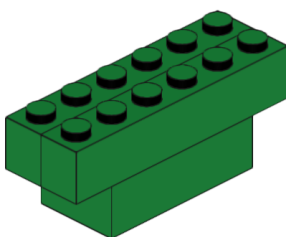
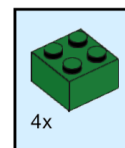
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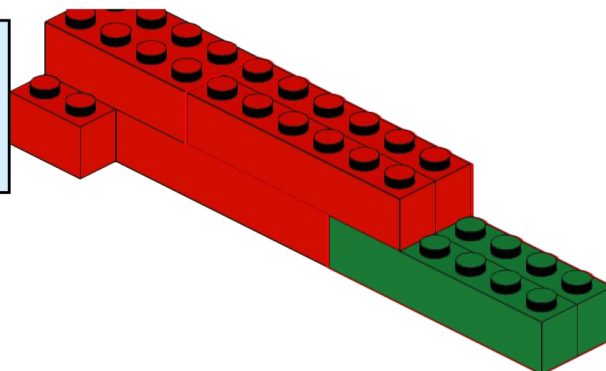
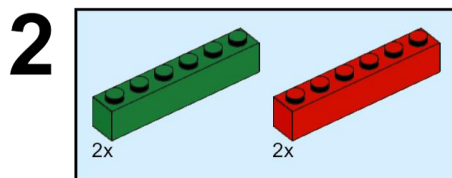
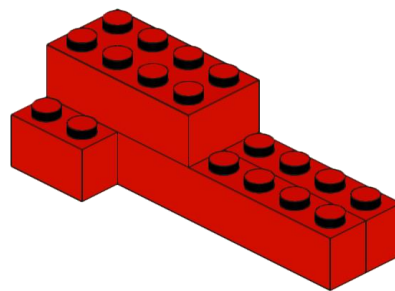
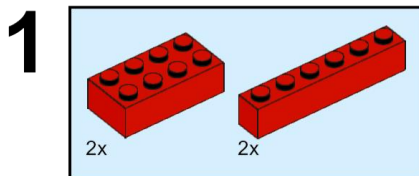
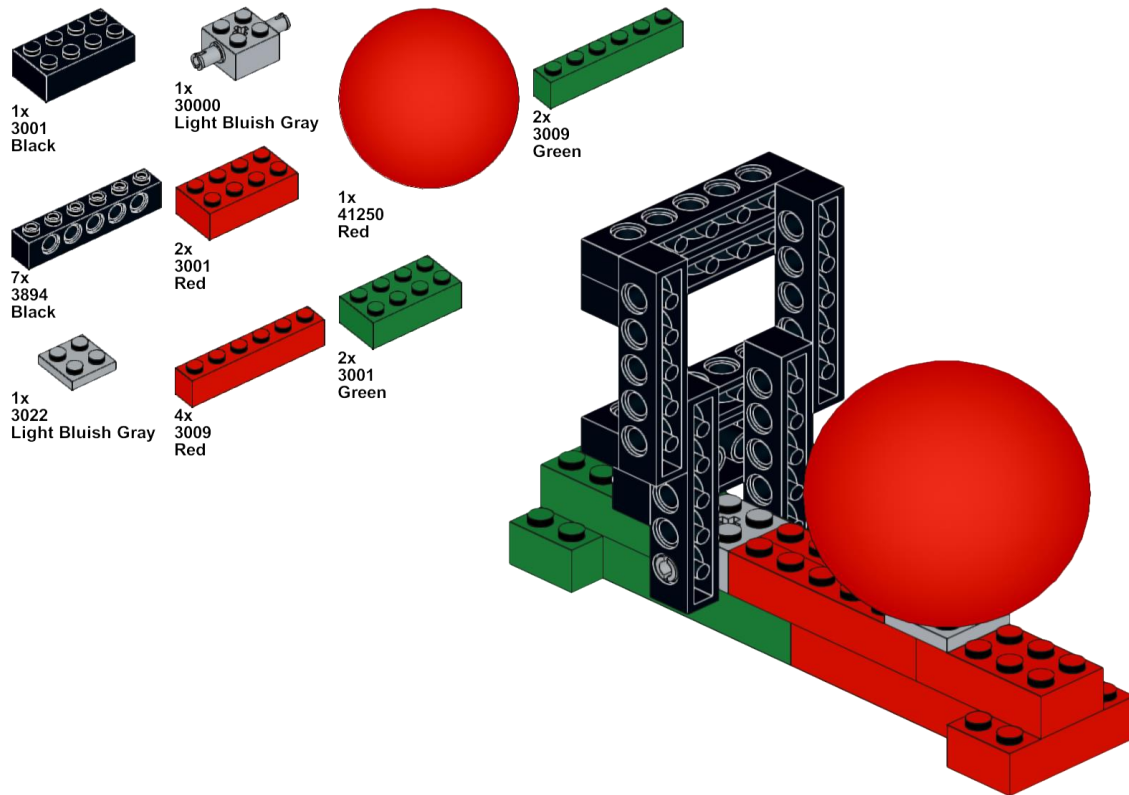
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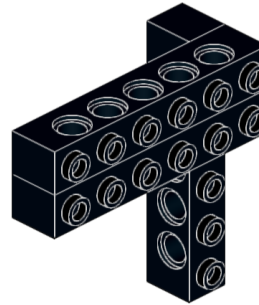


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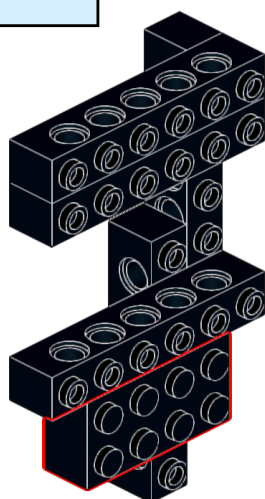
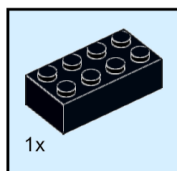
## Detonator Switch & Boulder (x1)



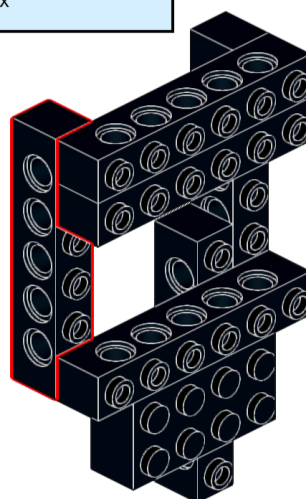
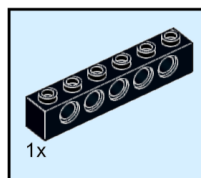




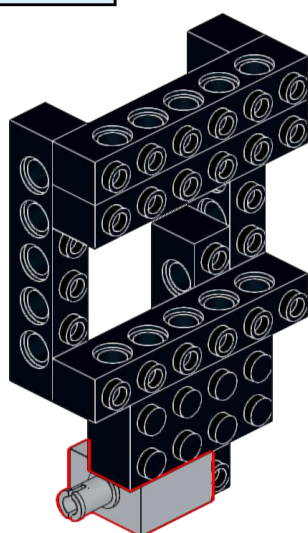
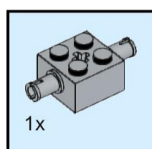
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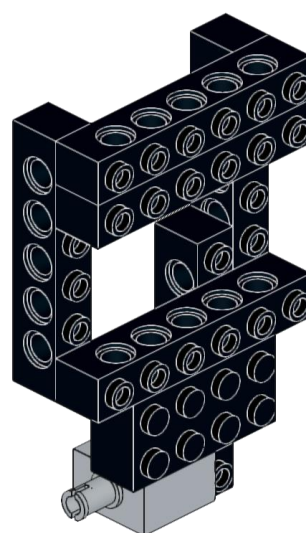
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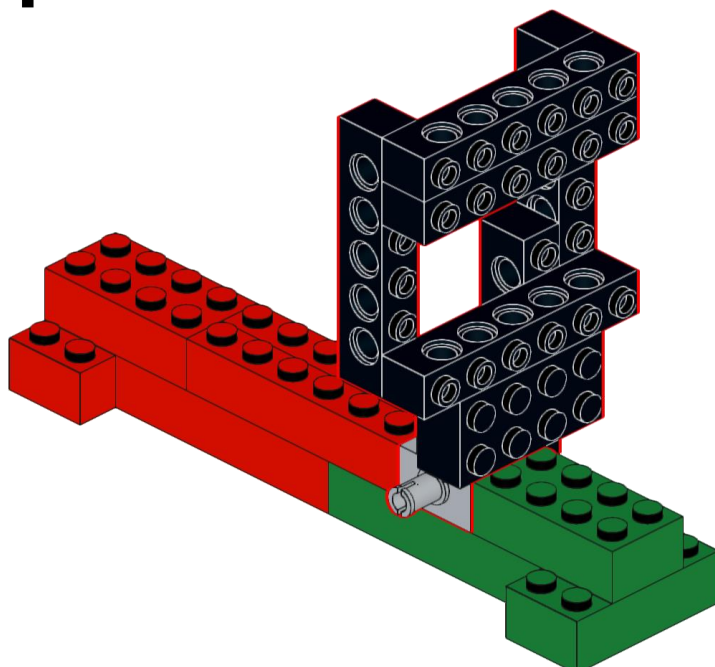
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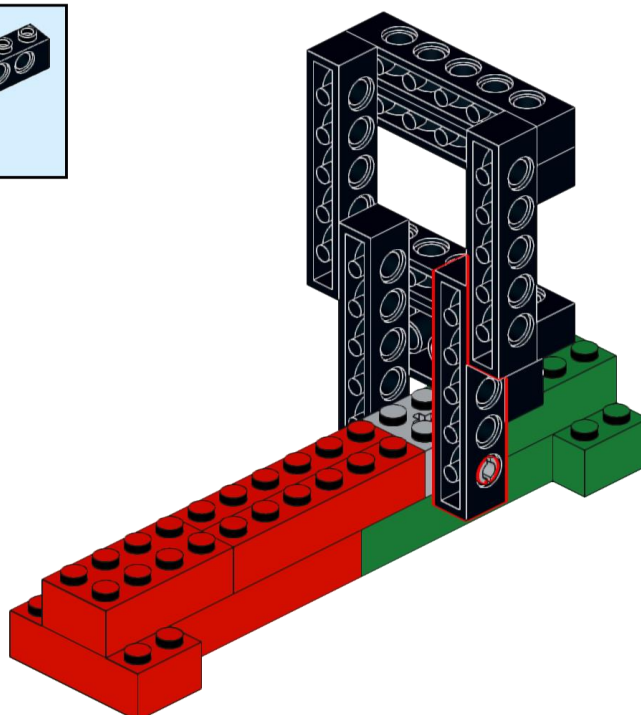
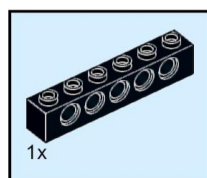
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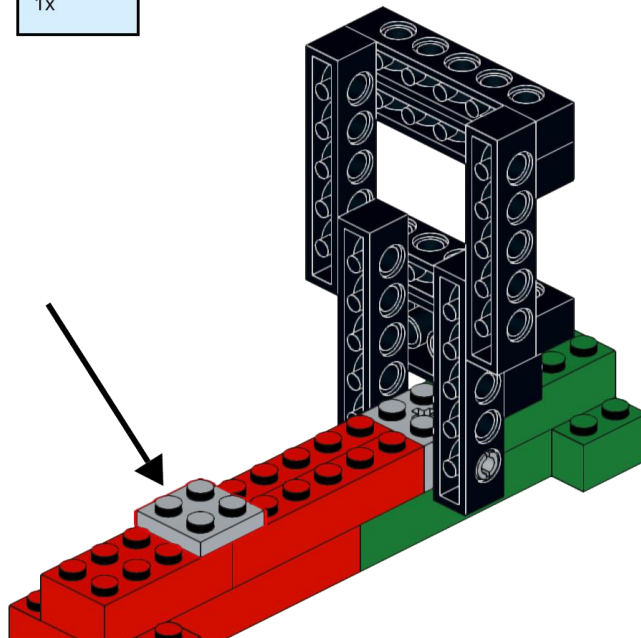
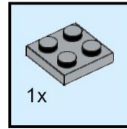
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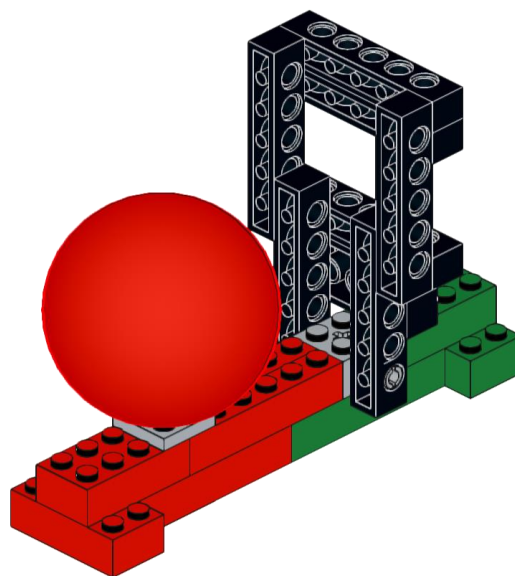
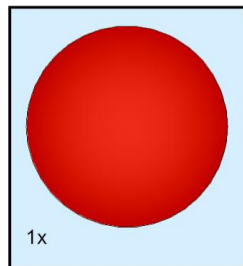
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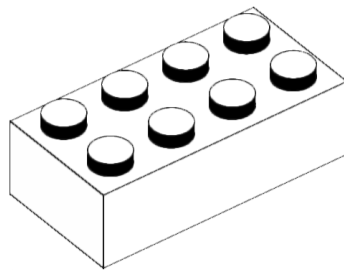
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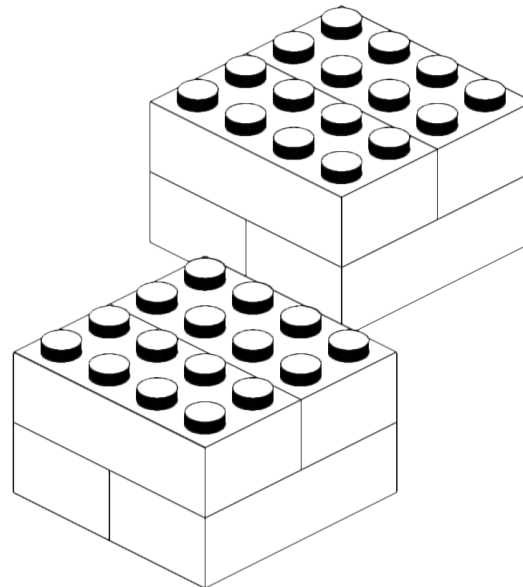
14



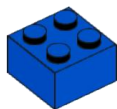
## Construction Packs (x2)



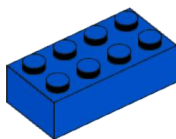
8x  
3001  
White



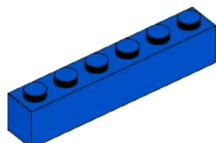
## Relay Towers (x2)



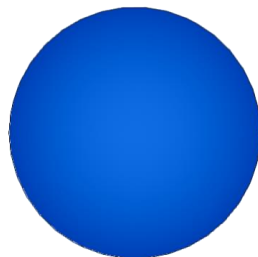
6x  
3003  
Blue



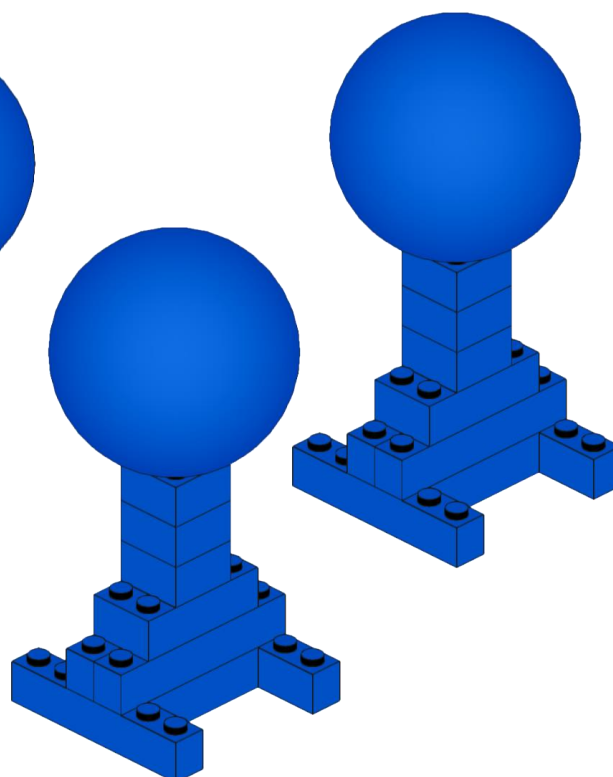
4x  
3001  
Blue

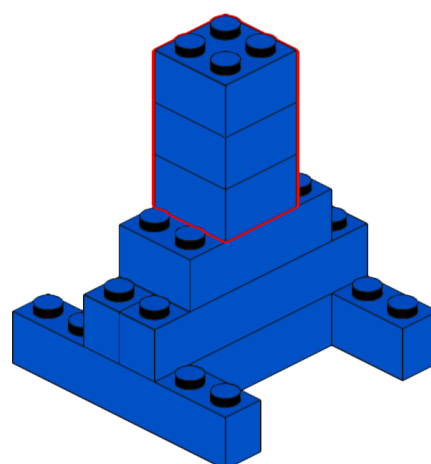
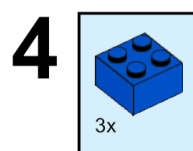
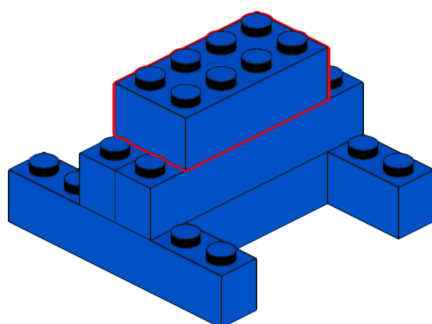
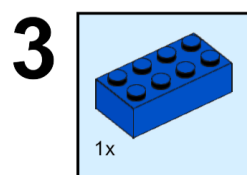
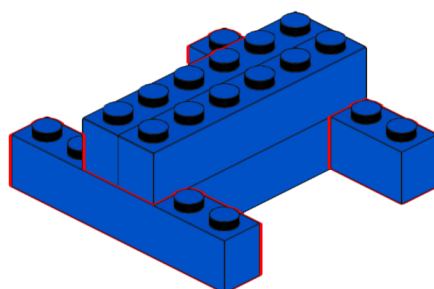
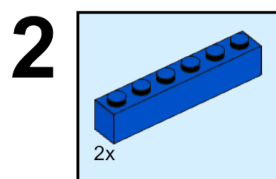
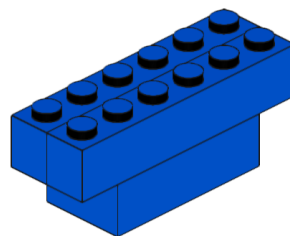
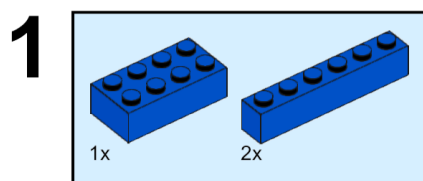


8x  
3009  
Blue



2x  
41250  
Blue





**5**

