[01] zone01.ca Open Robotics Challenge

Image from Mike L, Unsplash

Introduction

You are a young explorer and you have been chosen for a mission through the mysterious portal discovered a few weeks ago by scientists. You prepare for this mission and go through the portal.

You are teleported into what seems to be a parallel universe. Indeed, you are on an island and the vegetation is not green, but... blue?

You can't stay unsettled for long since you have to ensure your survival during your exploration.

Do your best, your life depends on it!

Description of the robot

The robots participating in the challenge must respect the following constraints:

1. Maximum dimensions of the robot at the start: 30cm X 30cm
2. Only one controller (EV3 brick, Spike Prime)

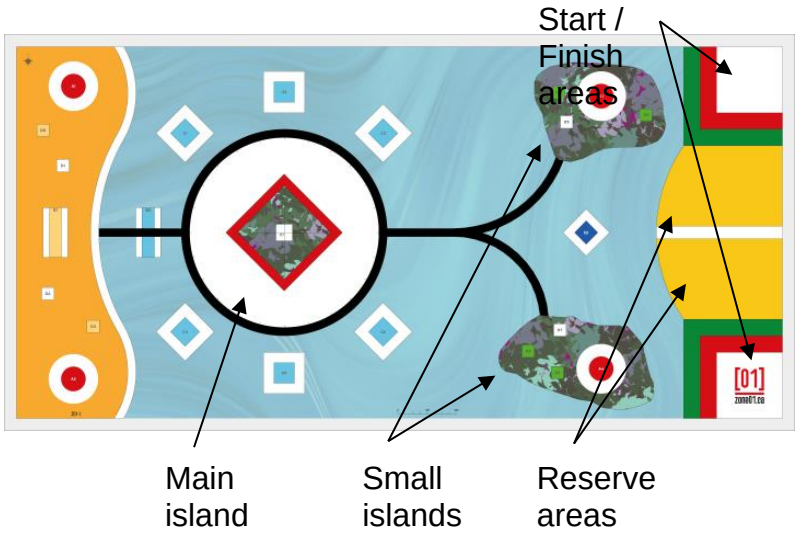
Description of the playing field

Mat used: Z01-J mat

The mat is highly recommended for practicing the challenge, as the colors and lines of the mat define the precise locations of the objects.

The mat is available at Zone01's boutique.

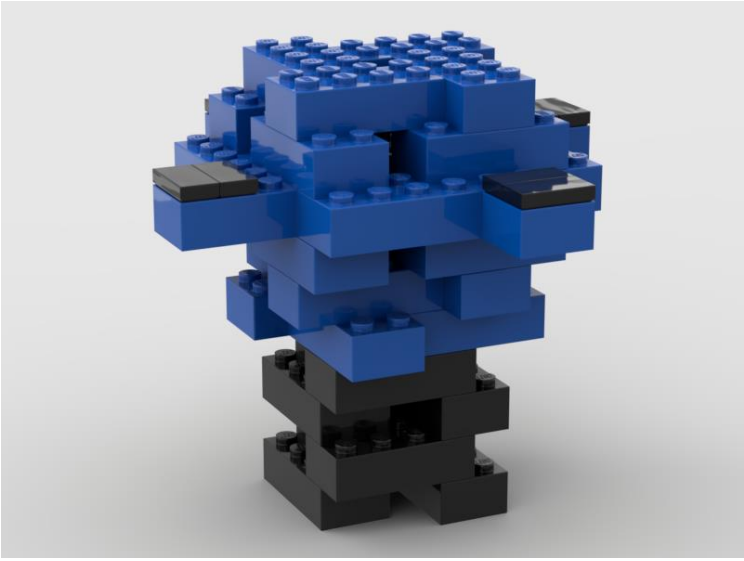
2-dimensional view of the playing field



Description of the game objects

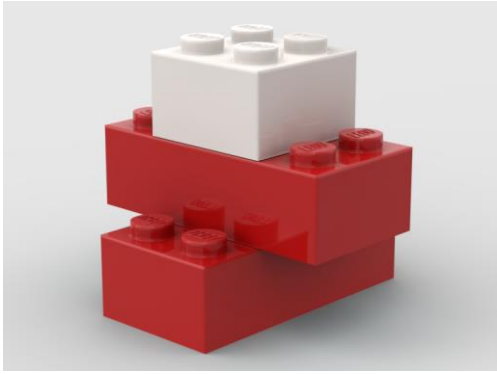
The tree of life

The tree of life is the source of all energy and life forms on the island. It is made of LEGO pieces, 2x4 black and blue bricks and 1x2 black flat plates.



Takis

The takis are the small fruits that grow on the tree of life. Be careful, if you pick more than half of the takis, the tree of life is weakened and the island deteriorates. They are composed of red 2x4 LEGO bricks and white 2x2 bricks. There are 4 takis.

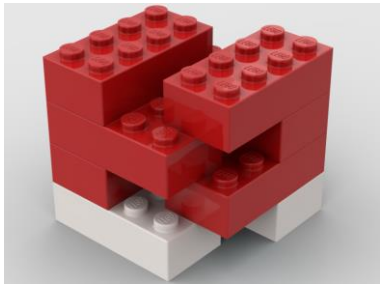


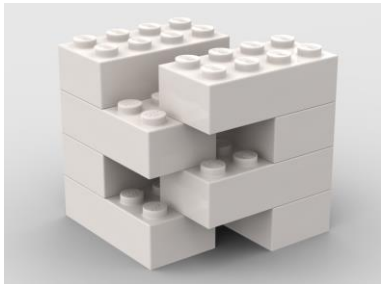
Kesos (pronounce keyzo)

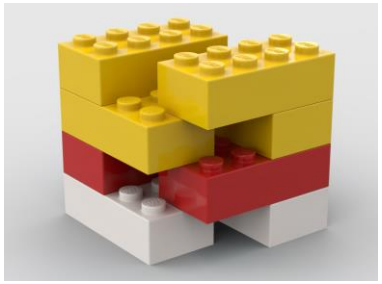
Kesos are foods that grow around the island and they are the biggest food source you have access to.

Kesos grow inside cocoons, and you can find them in many colors. The red ones are ripe, while the white ones are unripe. Yellow kesos are poisonous and should not be eaten at all!

The kesos are made of 2x4 LEGO bricks. There are 3 red kesos, 2 white kesos and 1 yellow keso.

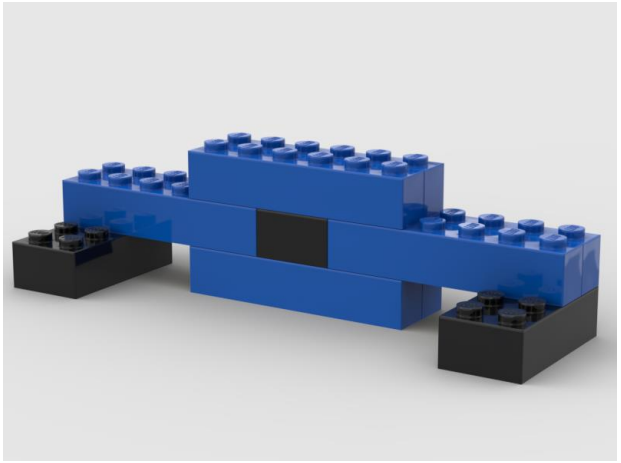


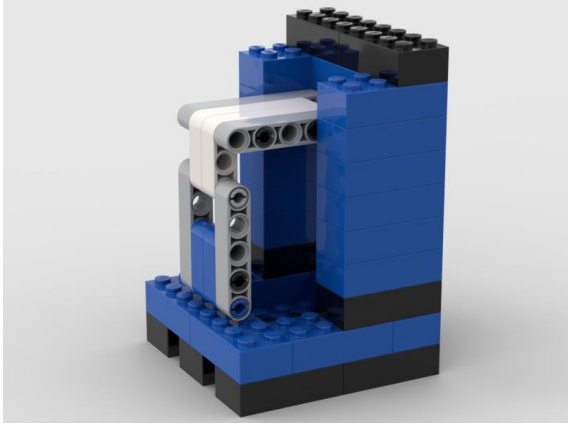




Cocoons

The cocoons produce the kesos and must not be damaged during the collection so that they can continue to produce them. The cocoons are made of blue and black LEGO bricks 2x4 and 1x6. There are 6 cocoons.





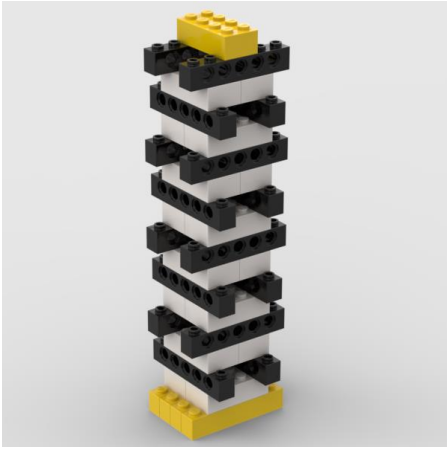
Two blue LEGO 2x2 bricks are the water and will be placed at the top of the waterfall.

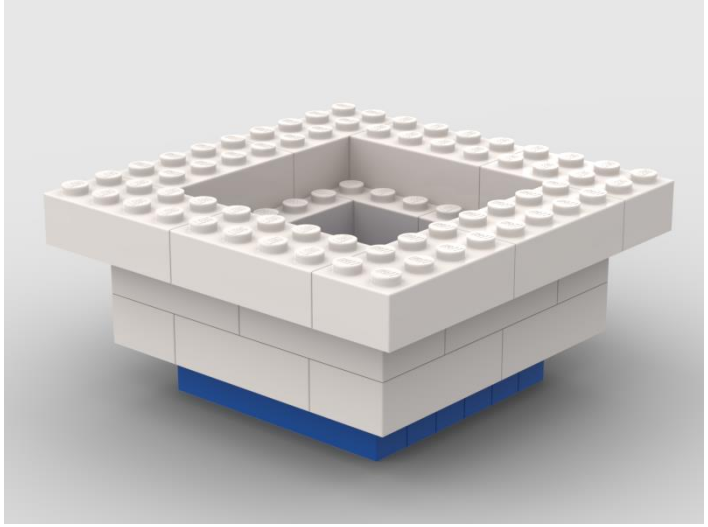
Waterfall

The waterfall is the only source of drinking water on the island. It is made of blue and black LEGO 2x4 bricks as well as 3-beams, 7-beams, L-beams and a few other pieces from an EV3 Mindstorms or Spike Prime kit.

The tower

You have built a tower to create a landmark in this new environment. The tower is made of 2x4 white and yellow LEGO bricks and then 1x6 yellow and black bricks, but the colors are not important to practice.



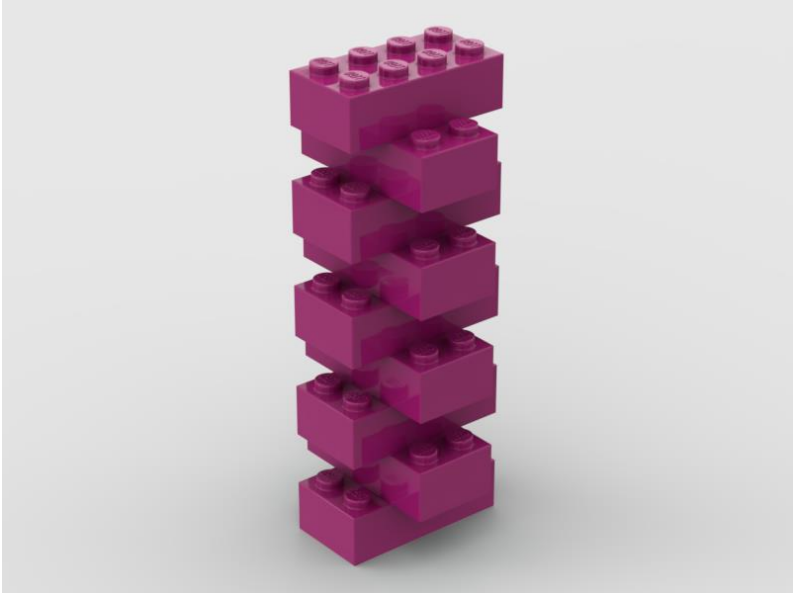


The bucket

The bucket is used to collect water from the waterfall. The bucket is made of white LEGO 2x4 bricks and blue 1x6 bricks.

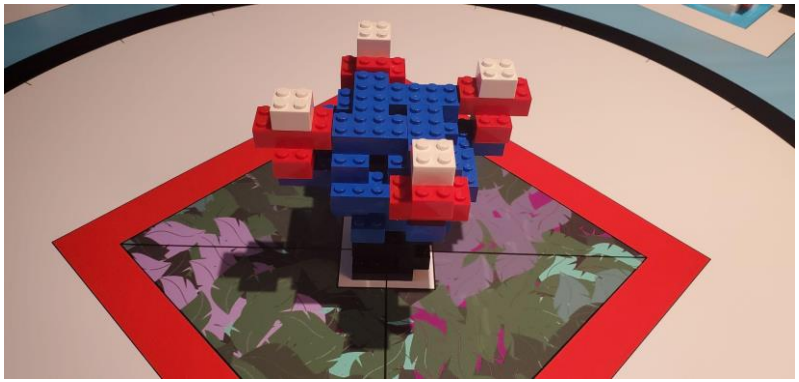
Spiras

Spiras are climbing plants that grow around the islands. They are an integral part of the ecosystem in this new world. They must not be disturbed. The plants are made of blue or magenta LEGO 2x4 bricks, but the color is not important for the practice. There are 2 spiras.



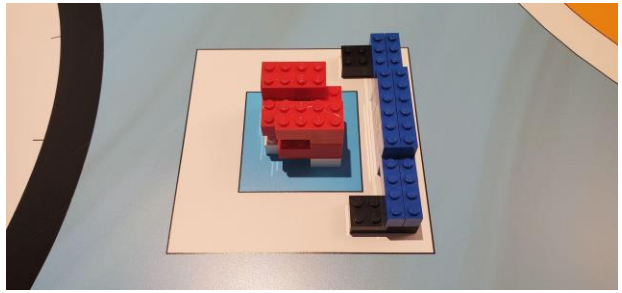
Positioning of game objects

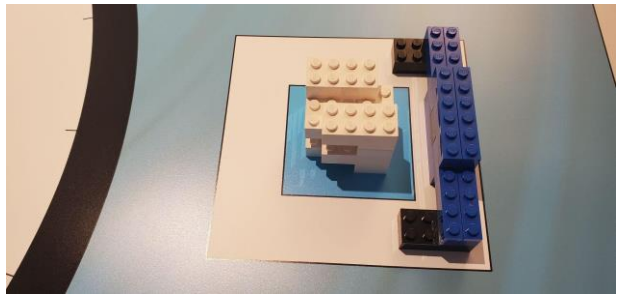
- The tree of life is placed in the white square E1 in the center of the main island. The takis are placed on the branches of the tree of life.

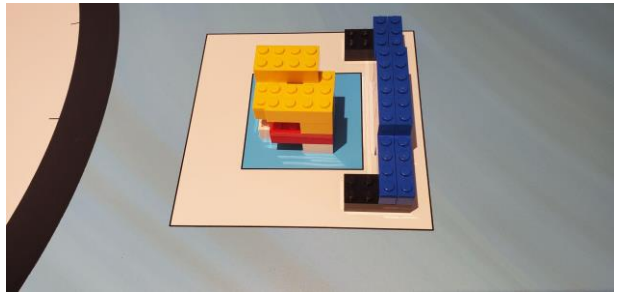


- The kesos are placed on the 6 cyan squares C1 to C6 around the main island.

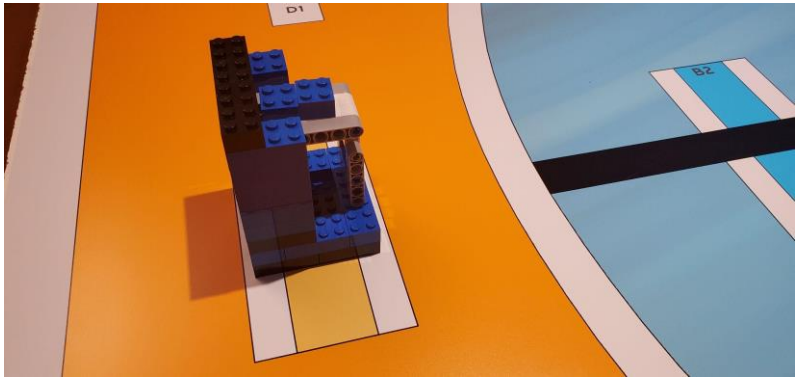
- The cocoons are placed on the white border around the cyan squares C1 to C6 in which the kesos are placed.





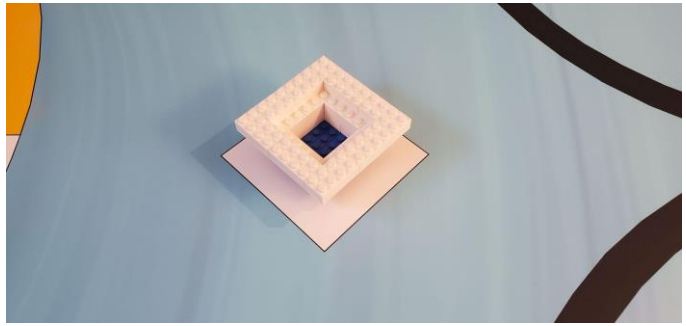


- The waterfall is placed with water in the center of rectangle B1 and faces the main island.

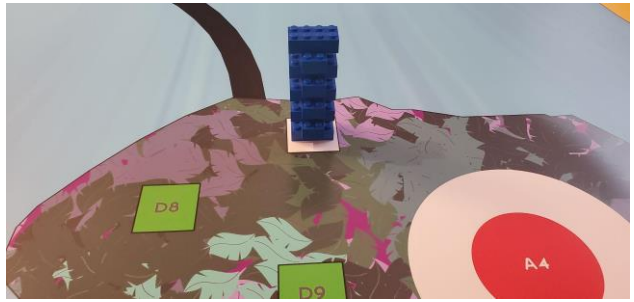


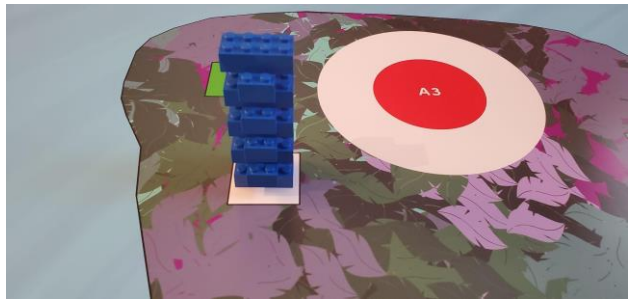
- The tower is placed by the team anywhere in the green stripe of the starting area.

- The bucket is placed on the blue square E2.



- Spiras are placed on the white squares D5 and D7 on the small islands. There is one spira on each island.



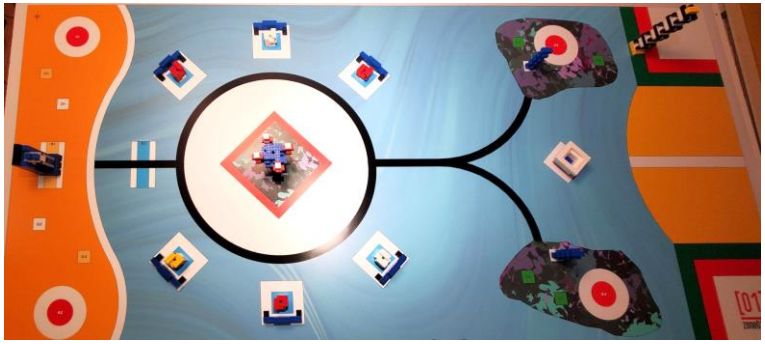


Detailed challenge description

The robot is placed completely inside one of the two starting areas, chosen by the team. The starting areas are formed by a white square, a red stripe and a green stripe.

There are 2 levels of difficulty for this challenge, White and Black.

Level	WHITE	BLACK
Kesos	The location of the kesos in the cyan squares is fixed and does not change	The location of the kesos in the cyan squares is decided randomly once the robot is ready to start



Playing field with game objects (White level)

At the judge's signal, the team presses the button on the brick and the robot begins its missions in any order.

Missions:

1. Pick only half of the takis on the tree of life and bring them to one of the reserve areas.
2. Pick the ripe kesos (the red ones) and bring them to one of the reserve areas.
3. Push the poisonous keso completely into the water.
4. Collect two liters (blue cubes) of water in the bucket.
5. Place the bucket containing the liters of water in one of the reserve areas.
6. Place the tower standing in the white circle on the island opposite the start area.
7. Finish completely in the starting area.

The challenge is completed when a team member says "Stop", when the time is up (max 2 minutes) or if the tree of life is moved out of its square.

Scoring table

Missions	Pts max
Pick takis from the tree of life (6)	12
Bring the takis in one of the reserve areas (5)	10
Pick the ripe kesos and bring them to one of the reserve areas (12)	36
Push the toxic keso into the water (10)	10
Fill the bucket with water (7)	14
Bring the water in the bucket to one of the reserve areas (4)	8
Place the tower in the right white circle (8)	8
Return to the starting area at the end (6)	6
Solve the surprise rule	20

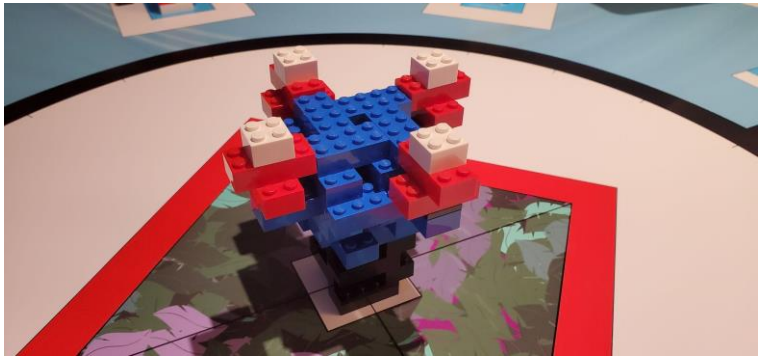
Points bonis	Pts max
Cocoons not moved (2)	12
Spiras not moved (2)	4

Penalties	Pts max
Damage the waterfall of move it out of its white rectangle (-5)	-5
Move an unripe keso (-7)	-14
Pick up an extra taki (-3)	-6
Damage the tree of life or move it out of its white square	-15

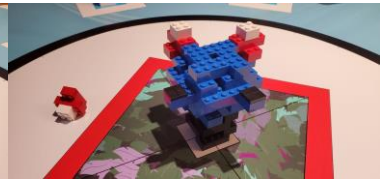
Total points	**140**

Scoring in images

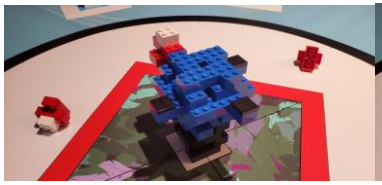
- Takis picked

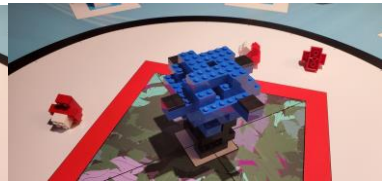


No taki picked = 0 point



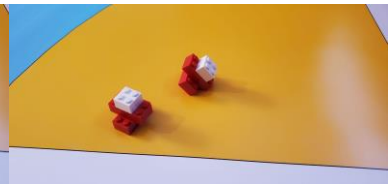
1 taki picked = 6 points 2 takis picked = 12 points





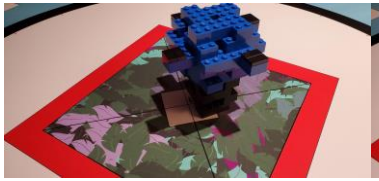
3 takis picked = 9 points 4 takis picked = 6 points

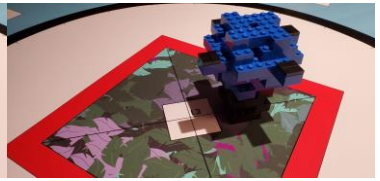
- Takis in a reserve area



1 taki = 5 points 2 takis = 10 points

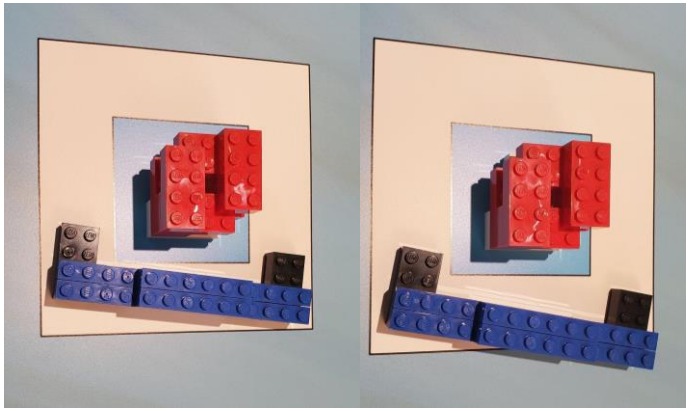
- Tree of life moved out of its white square





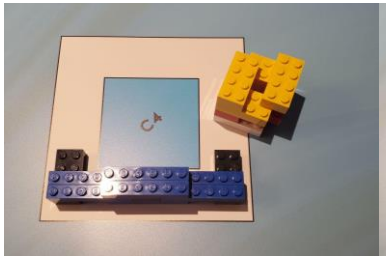
Inside or partially inside = Ok Outside = -15 points

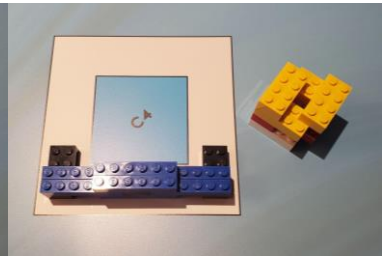
- Cocoons not moved



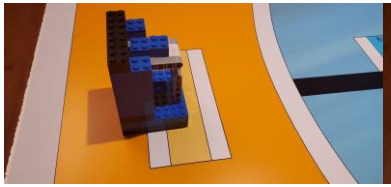
Cocoon ok = 2 points Cocoon moved = 0 point

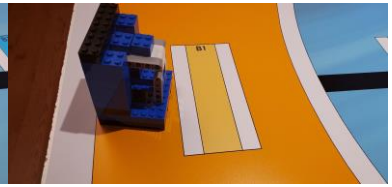
- Push toxic keso into water


Partially = 0 point

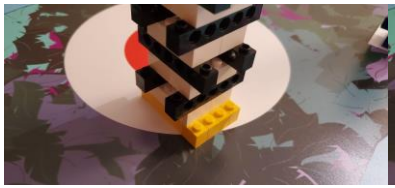

Completely = 10 points

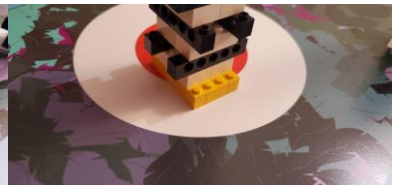
- Waterfall moved of of its white rectangle


Partially moved = OK

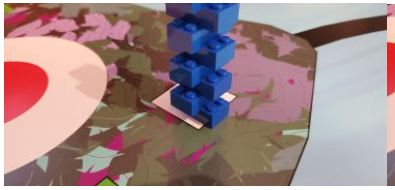

Outside = -5 points

- Tower in the right white circle


Partially = 0 point

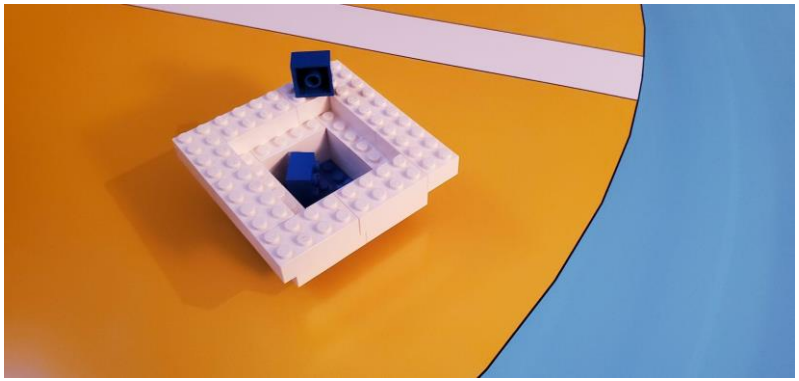

Inside = 8 points

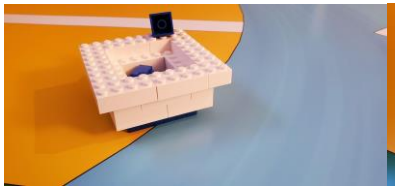
- Spiras not moved

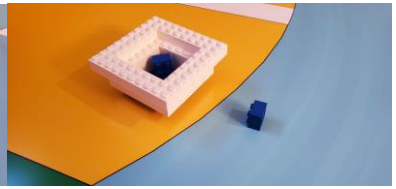

Partially = 0 point

Inside = 2 points

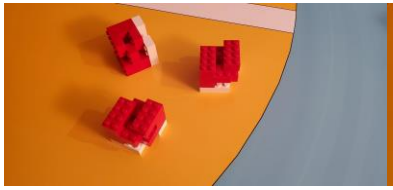
- Water in the bucket in a reserve area

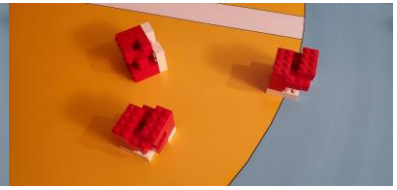

2 liters in the bucket in a reserve area = 22 points

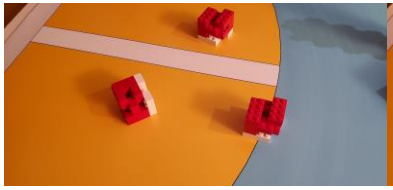

2 liters, partially = 14 points

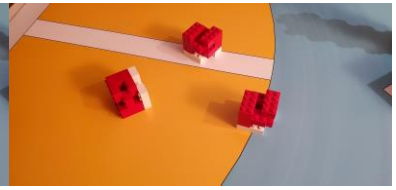

1 liter, inside = 11 points

- Ripe keso in a reserve area

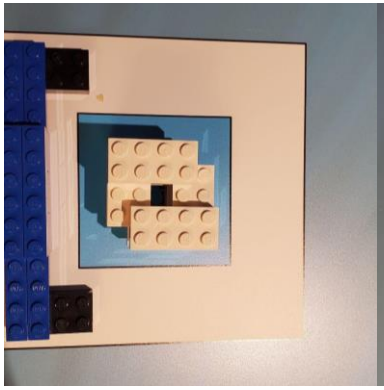

3 ripe kesos = 36 points

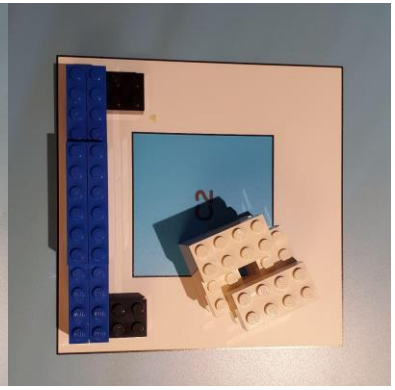

2 ripe kesos = 24 points


2 ripe kesos = 24 points


1 ripe keso = 12 points

- Unripe Keso moved

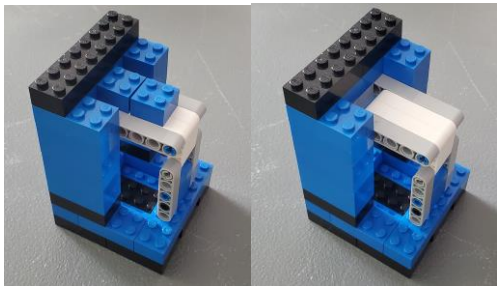

Inside the square = OK


Partially = -7 points

Frequently asked questions

Q1. How are the water cubes placed on the waterfall?

A1. Here is the waterfall with and without the water cubes



Building instructions

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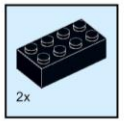

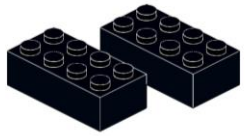

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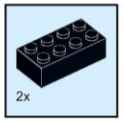

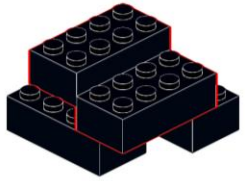

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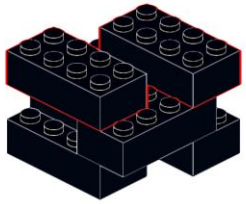

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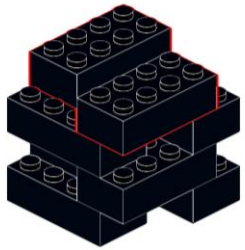

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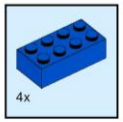

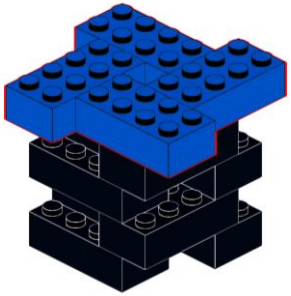

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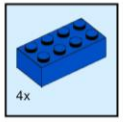

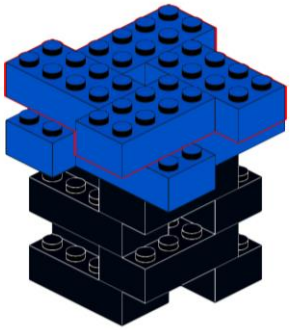

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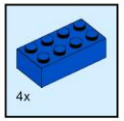

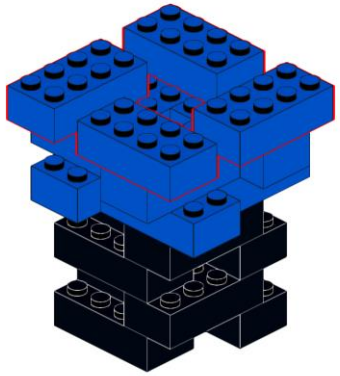

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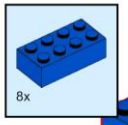

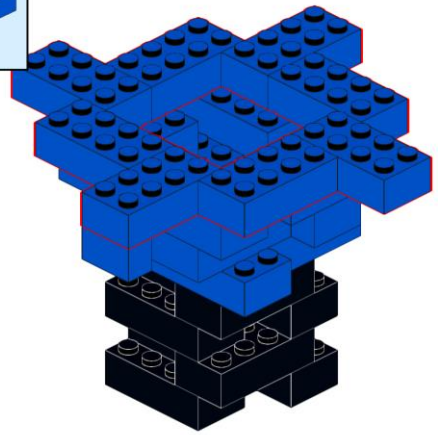

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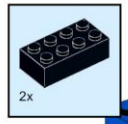

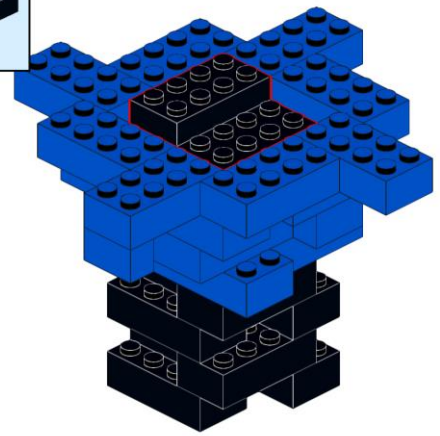

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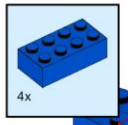

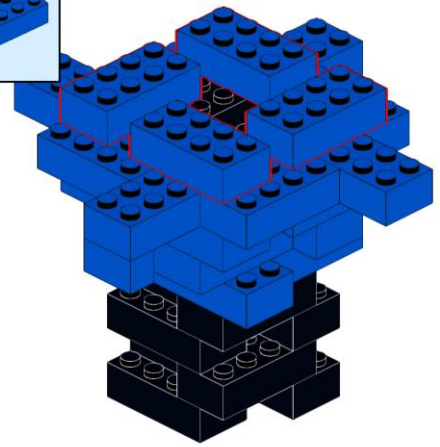

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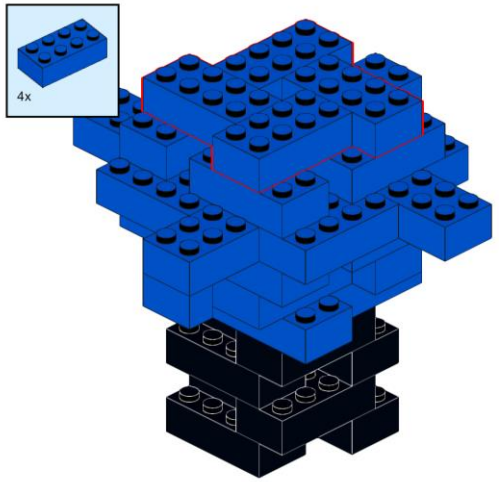

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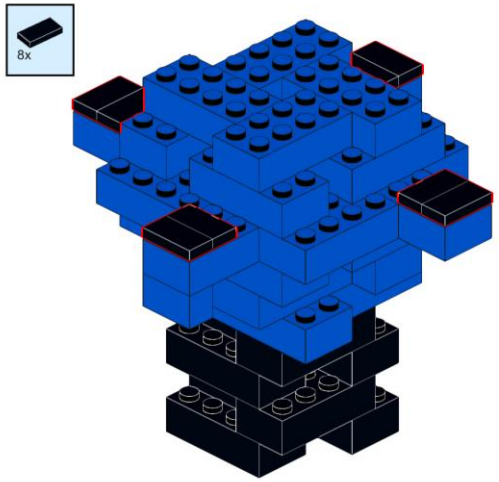

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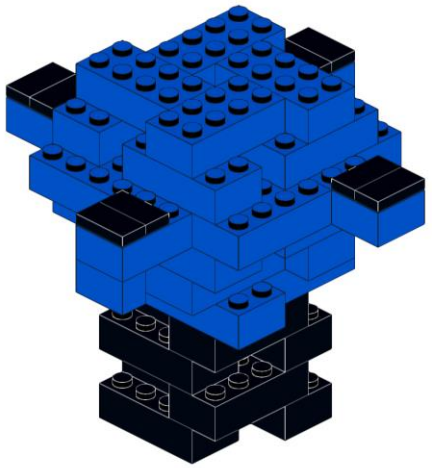

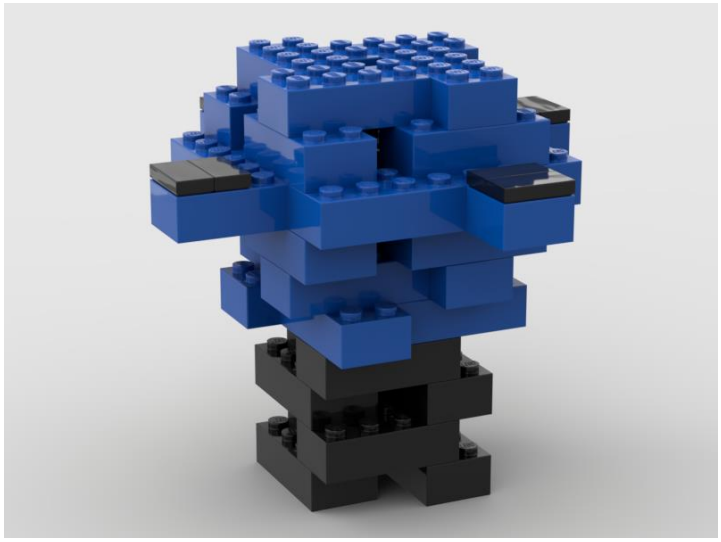

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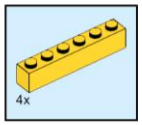

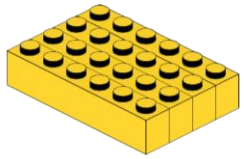

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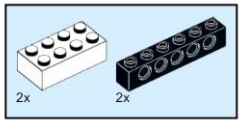

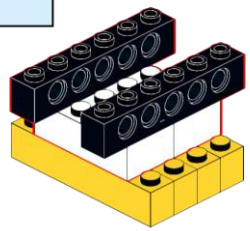

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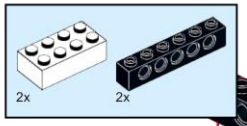

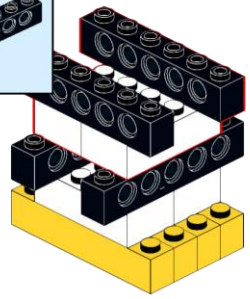

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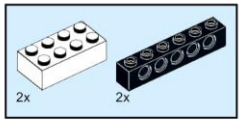

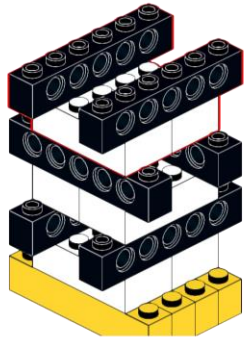

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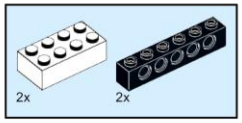

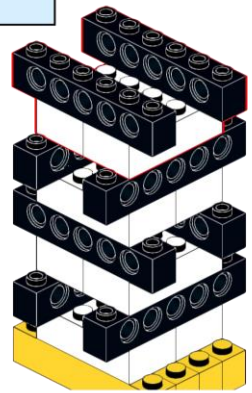

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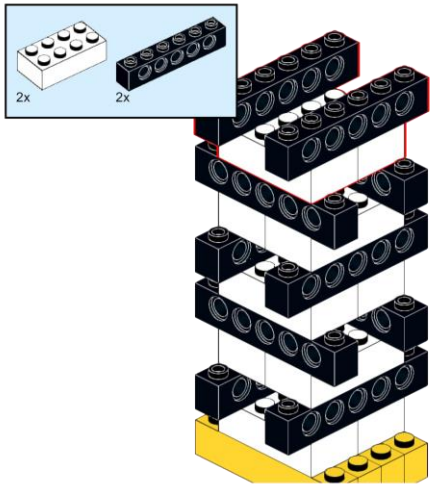

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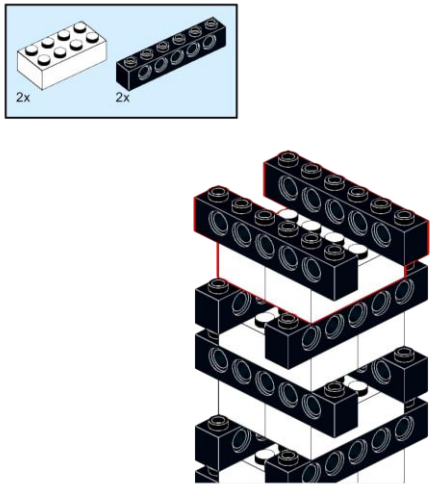

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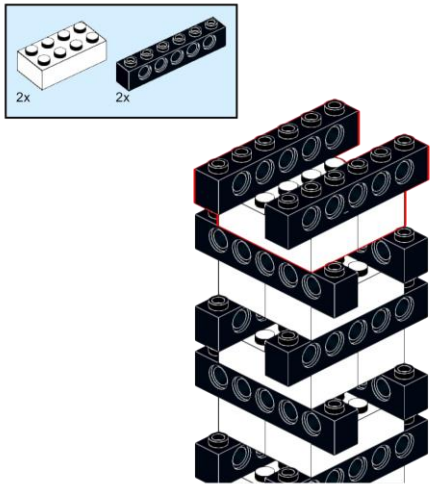

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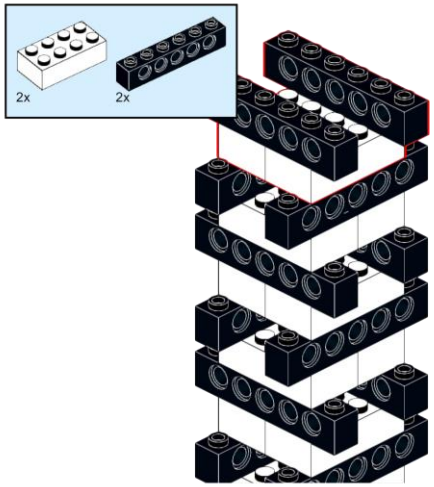

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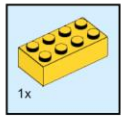

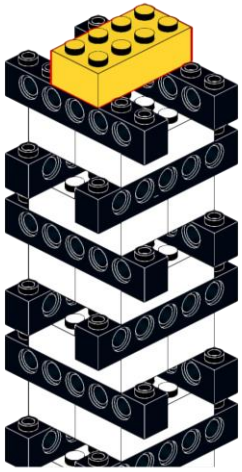

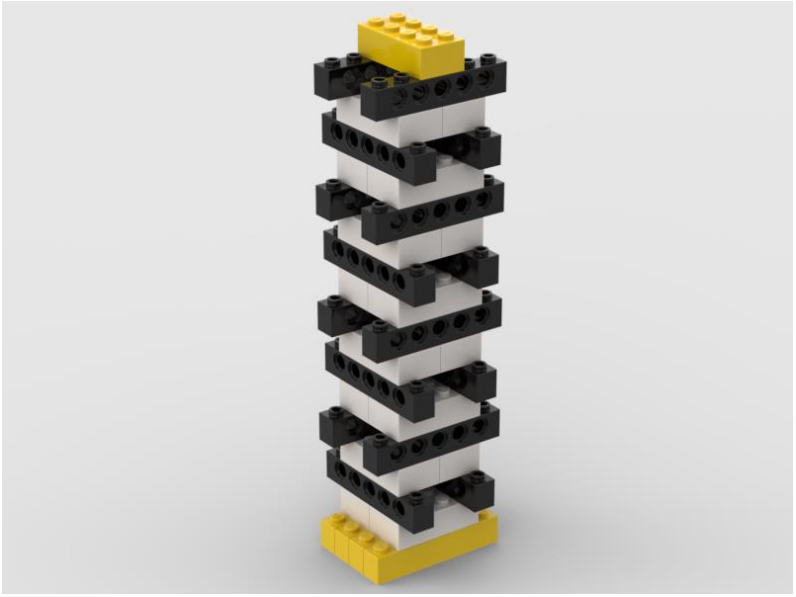

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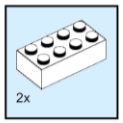

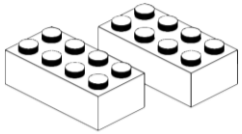

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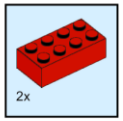

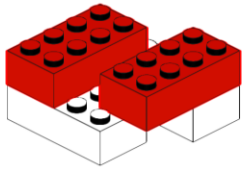

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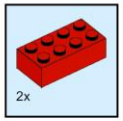

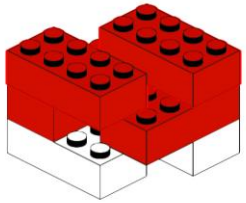

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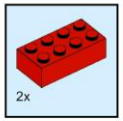

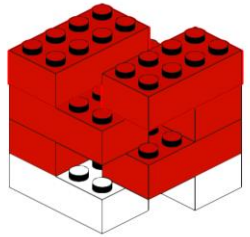

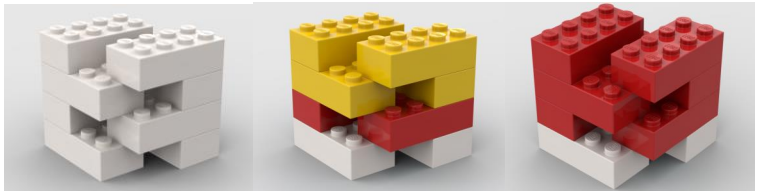

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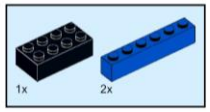

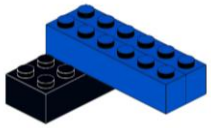

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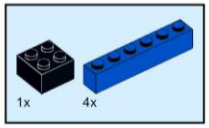

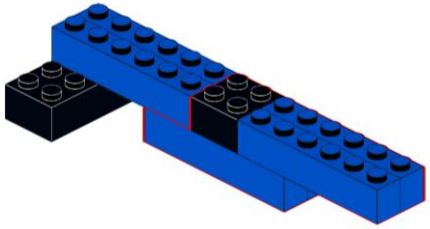

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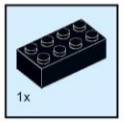

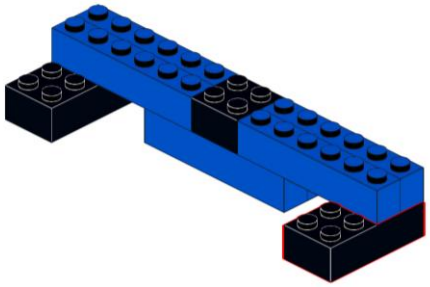

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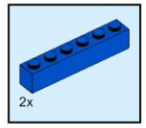

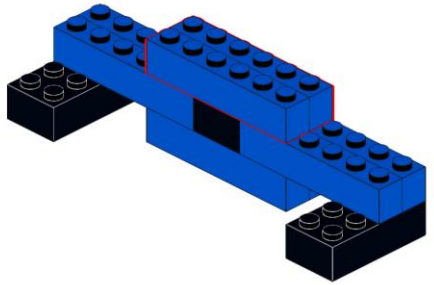

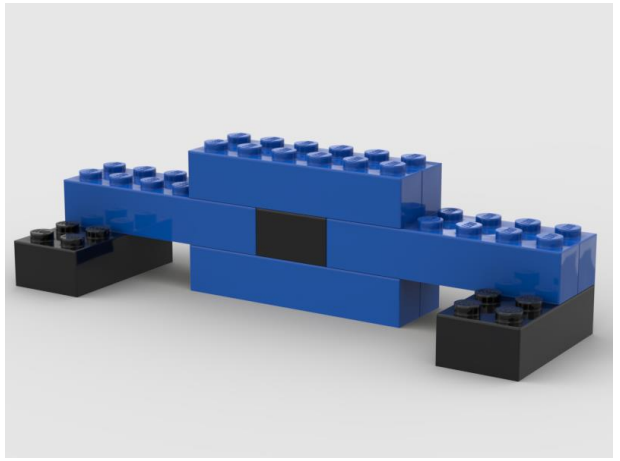

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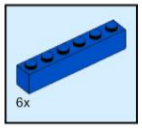

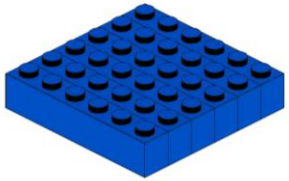

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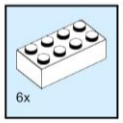

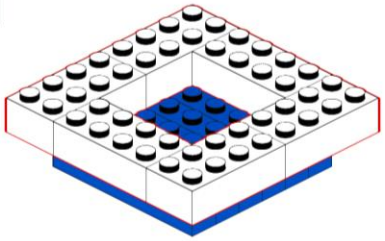

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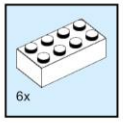

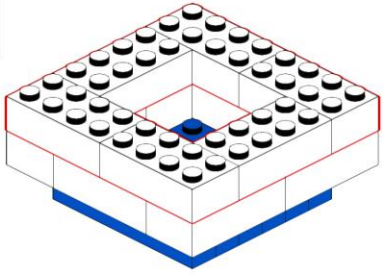

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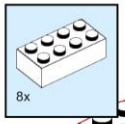

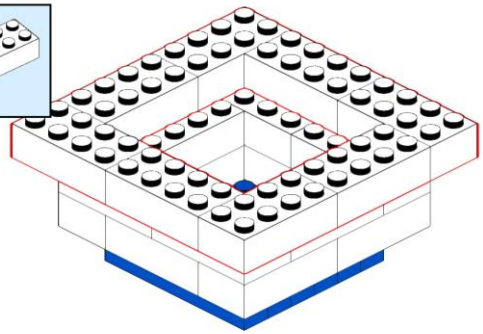

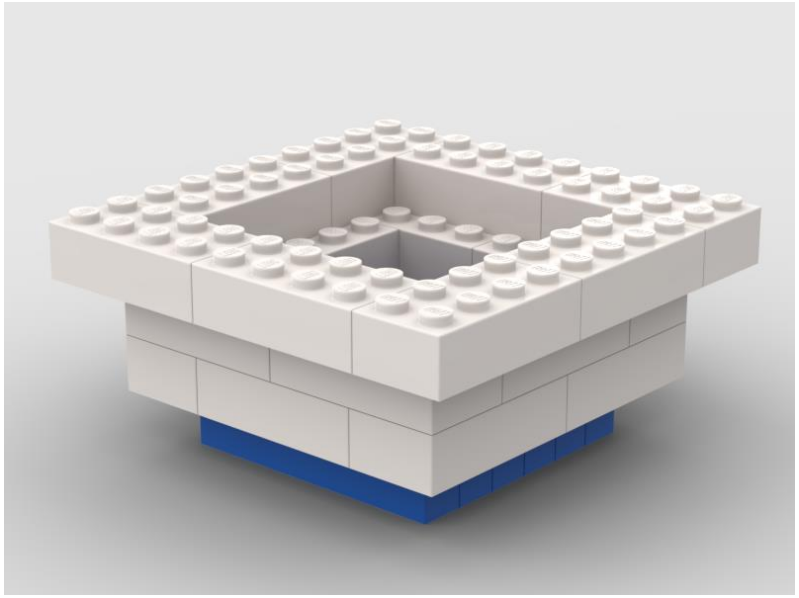

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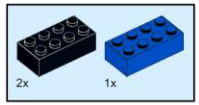

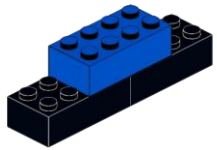

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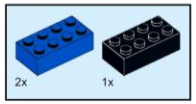

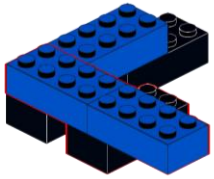

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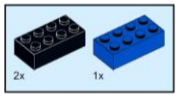

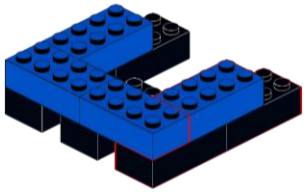

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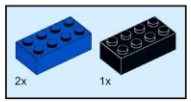

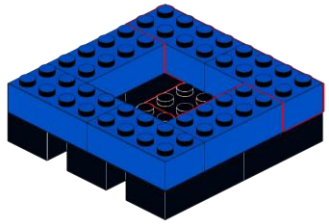

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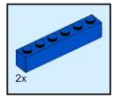

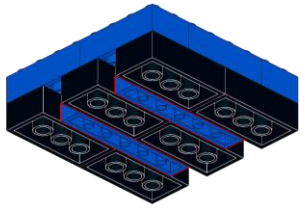

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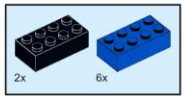

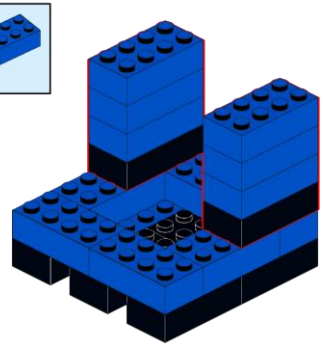

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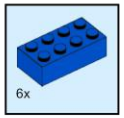

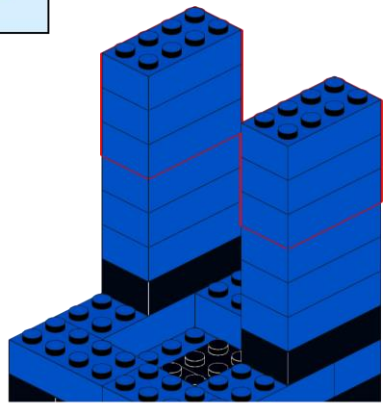

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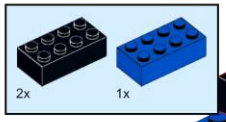

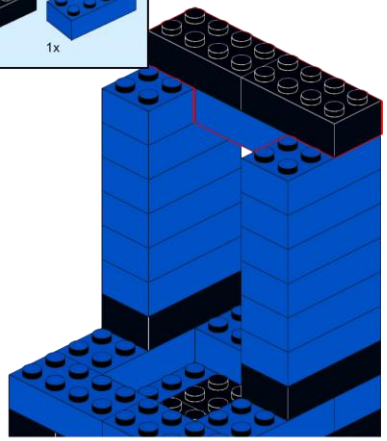

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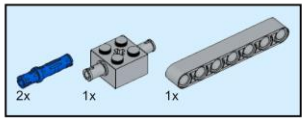

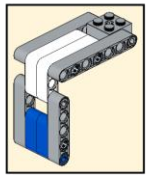

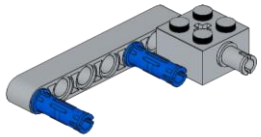

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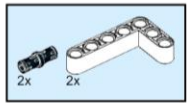

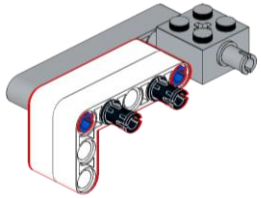

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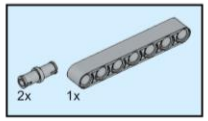

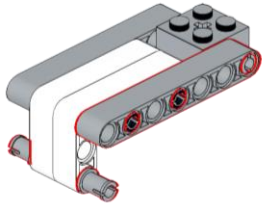

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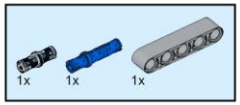

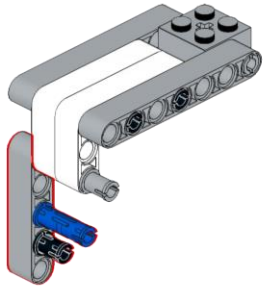

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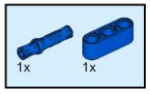

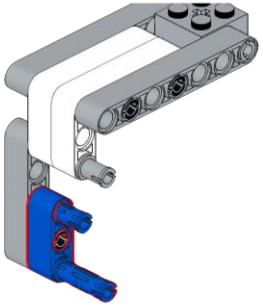

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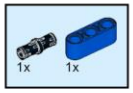

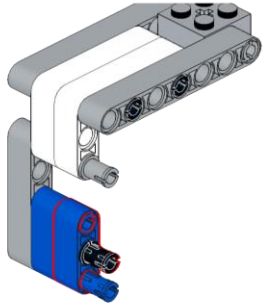

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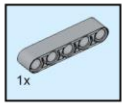

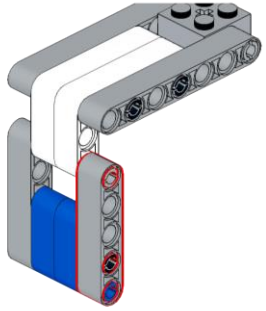
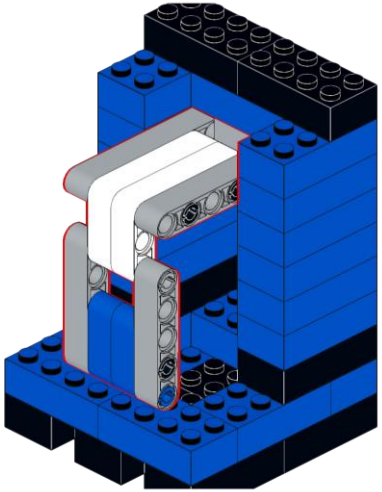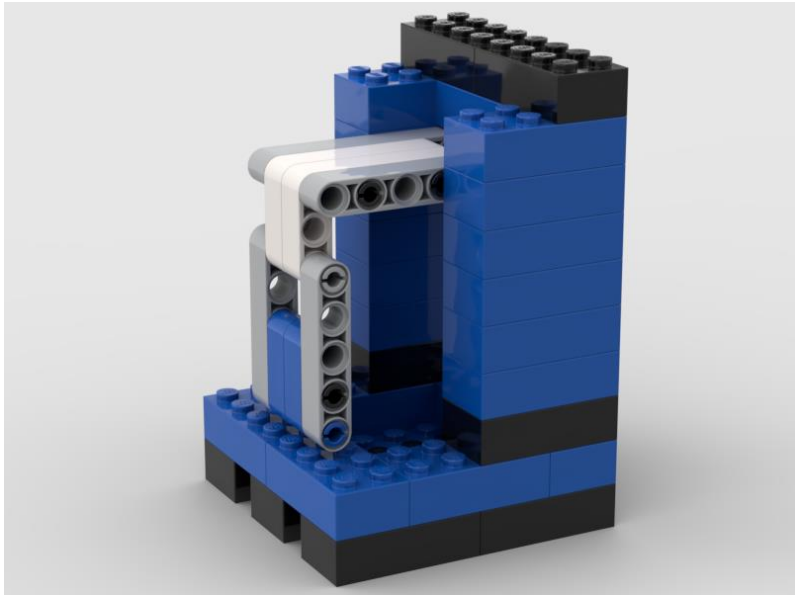
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