In-House Challenge 2: Dirty Digging

Game Rules

WORLD ROBOT OLYMPIAD ™

WRO®

SOUTH AFRICA

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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 1st and 31st of October

Game Story:
Palaeontologists and scientists at a newly discovered research site have requested your team to build and program a robot to assist their research. Your robot must deliver important research tools and materials, move debris from recent digging activities and ensure the storage shed is stocked and ready for the second phase of the dig site. To make things tricky ancient pillars have also been found on the site which your robot must avoid and not damage. Palaeontologists have unearthed a new fossil from the dig site, the fossil is currently in a delicate state and must not be moved or damaged in any way until the palaeontological team deems the fossil safe to move. Can you assist this research and help unearth something new to science?

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.

Level 1 - Research Ready:
1. Collect the debris and move it to the sifting shed.
2. Deliver the unknown fossil crate to the research tent area.
3. Collect and place the guardrails inside the dig site area.
4. Deliver the archaeological artifact to the storage shed area.
5. Dig site fossil must not be moved or damaged.
6. Touch the robot and say STOP to show you have ended your scoring run.

Bonus: Ancient pillars must not be moved or damaged.

3. Game Objects & Positioning

Dig Site Debris (x3)

Three debris elements are placed on the game mat. Two elements in the dig site one on the first and last black square in the dig site area. The remaining debris element is placed in the top left corner of the red square closest to the dig site area.

Starting orientation of the debris elements
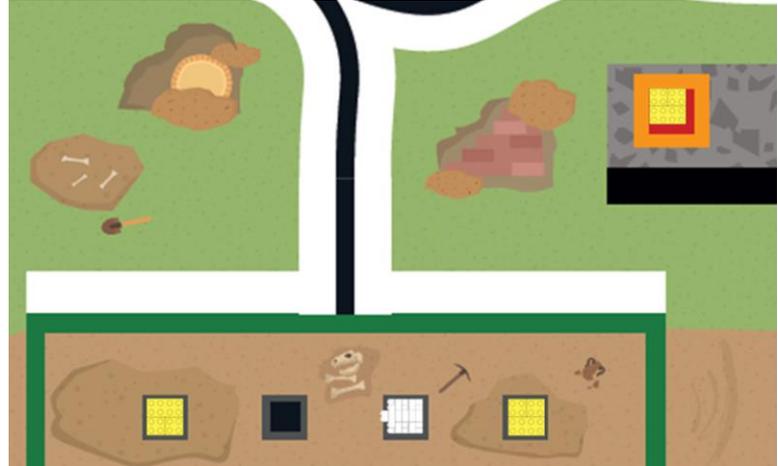
Starting location of the debris elements.

Unknown Fossil Crate (x1)

One unknown fossil crate is placed on the red rectangle in the sifting shed.
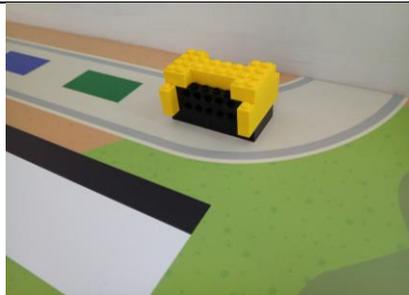
Starting position of the unknown fossil crate.
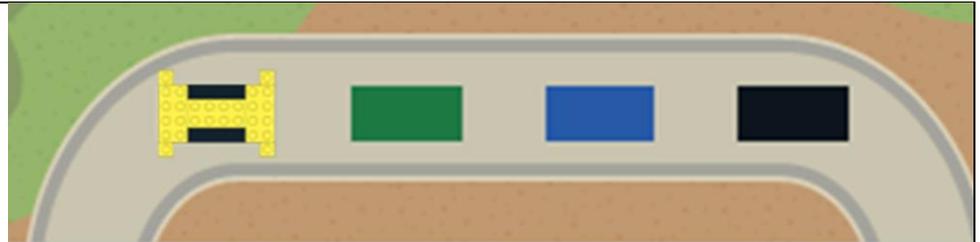
Starting position of the unknown fossil crate.

Archaeological Artifact (x1)

One archaeological artifact is placed in the yellow square to the left of the storage shed.

Starting position of the pallet on the red square.

Starting position of the pallet on the yellow square.

Guard Rails (x2)

Two guard rails are placed on the game mat one in-between the white lines in the top left corner of the game mat. The remaining guard rail is placed in-between the red lines to the right of the research tent.
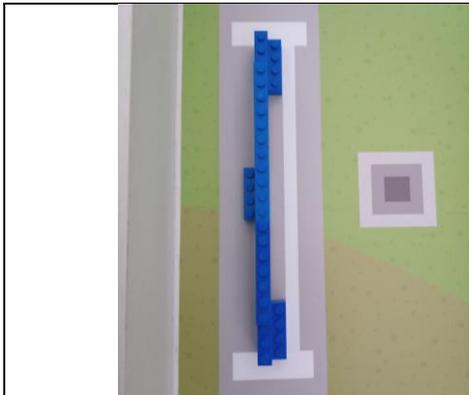
Starting position of a guard rail.
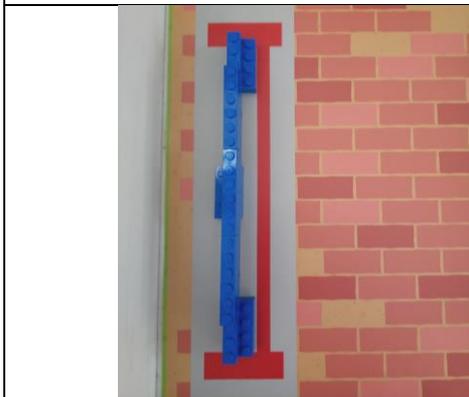
Starting position of a guard rail.
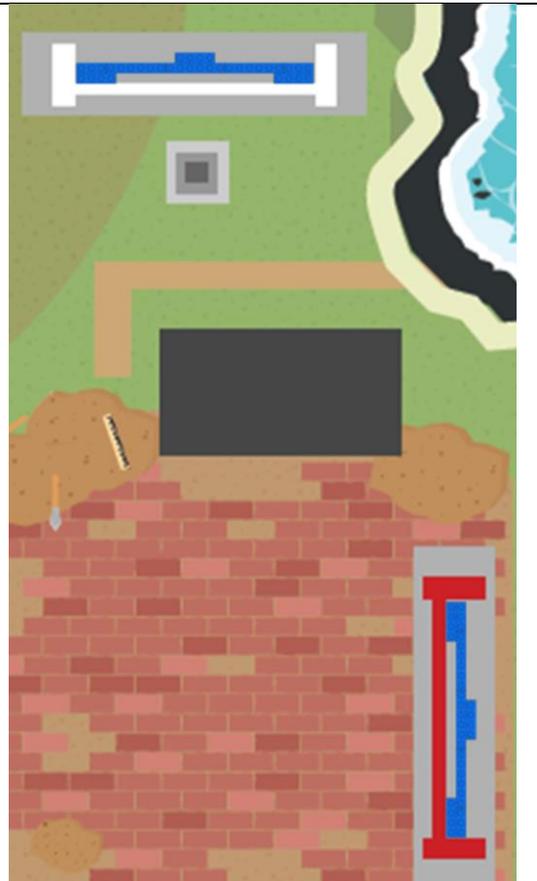
Starting positions of the guard rails.

Ancient Pillars (x2)

Two ancient pillars are placed on the game mat. One pillar in the grey square between the start area and the storage shed. One ancient pillar on the red square with orange outline closest to the storage shed.
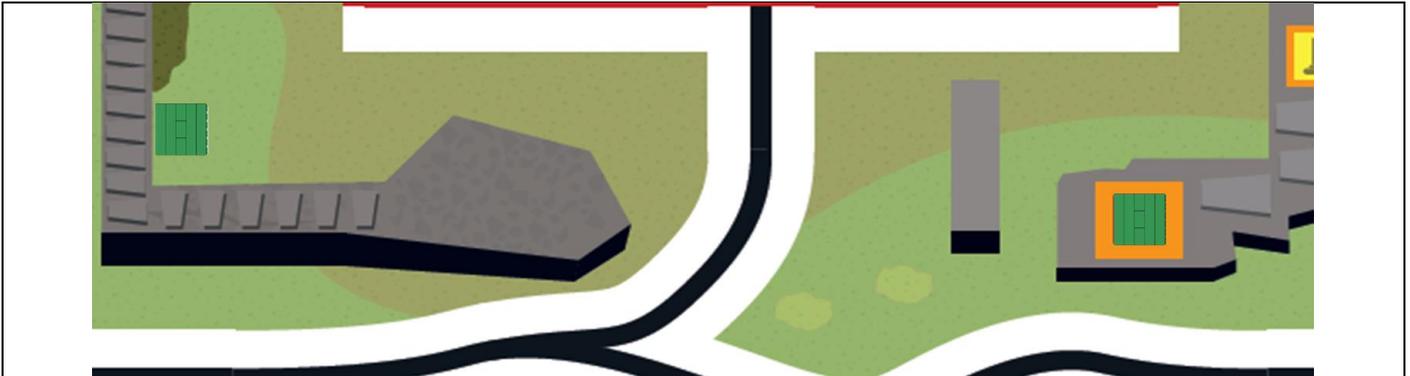
Starting locations of the ancient pillars

Starting position of the pillar closest to the start area.
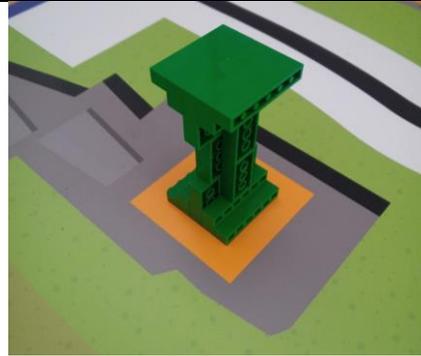
Starting position of the pillar furthest from the start area.

Fossil (x1)

One white fossil element is placed on the third black square furthest from the start area inside the dig site area near the dinosaur fossil image.
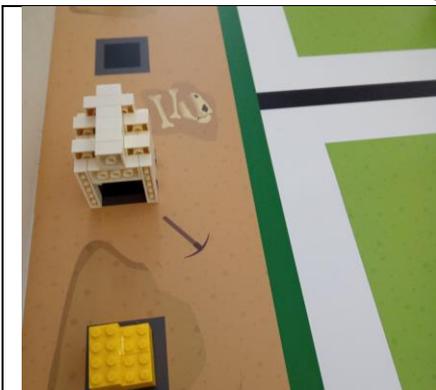
Starting position of the fossil.
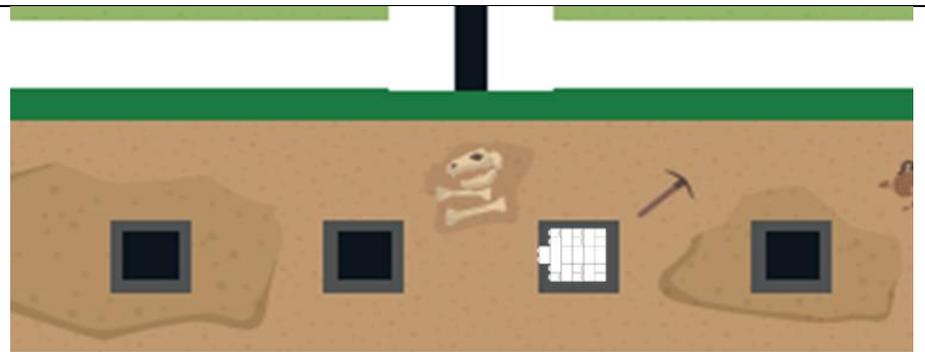
Starting position of the fossil

Research Tent (x1)

One research tent is placed in the research tent area. No part of the tent should touch outside of this area. The tent is placed with the roof slope facing the long sides of the game table.
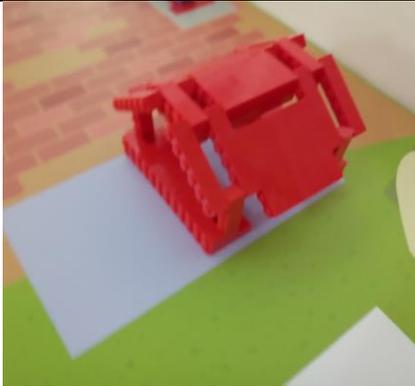
Starting position of the research tent.
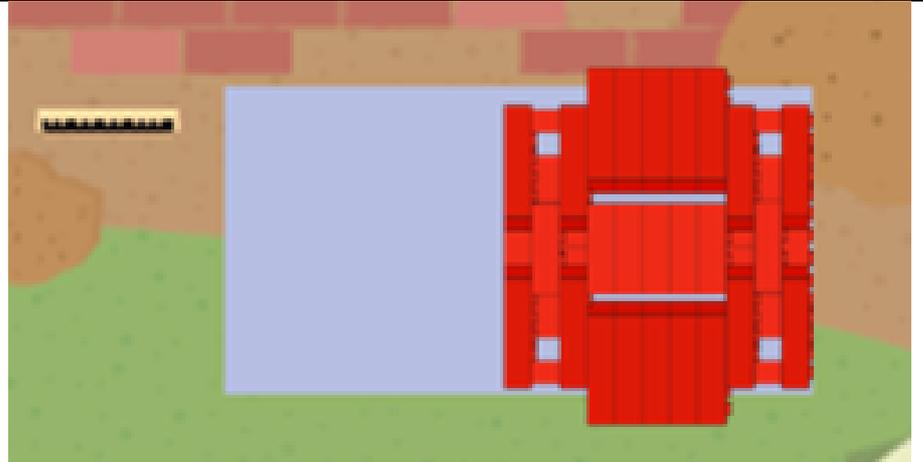
Starting position of the research tent

4. Robot Missions

4.1 Move the debris

Palaeontologists have started working in the dig site and at a new archaeological site nearby. Your robot must collect the debris left over from the excavations and deliver it to the sifting area to be checked for material.

4.2 Deliver the unknown Fossil Crate

Palaeontologists have found an unknown fossil fragment inside some of the previous debris fields. Your robot must collect the unknown fossil crate and deliver it to the research tent for further studies. The crate should be placed completely inside the research tent area. The research tent must not be moved or damaged

4.3 Move the archaeological artifact

Archaeologists have recently found an interesting artifact. Your robot must collect the artifact and place it in the storage shed for later research. The artifact must be completely inside of the storage shed and upright.

4.4 Place the Guard Rails

Excavations in the dig site area have made sections of the dig site dangerous. Your robot must deliver guard rails to the teams at the site.

4.5 Ancient Pillars

Two ancient pillars are found in the operational area. Do not damage these pillars or move them from their original starting positions.

4.6 Fossil

The fossil the palaeontologists are working on is now exposed. Do not move or damage the fossil.

4.7 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 adaptions:

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 adaptions 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

Tasks:	Points	Scoring	
Guardrail scoring:			
Guardrail <u>touching</u> dig site area.	10 each	0 1 2	
OR			
Guardrail <u>completely inside</u> digsite area.	30 each (Max 60)	0 1 2	
Pallets Scoring:			
Unknown fossil crate <u>touching</u> research tent area.	10 each	0 1	
OR			
Unknown fossil crate <u>completely inside</u> the research tent area.	30 each (Max 60)	0 1	
Other Scoring:			
Debris <u>completely inside</u> the sifting area.	20 each (Max 60)	0 1 2 3	
Archeological artifact completely inside the storage shed and upright.	30	0 1	
Touched the robot and ended the program	30	0 1	
Bonus Points: (bonus points are always awarded unless the conditions have not been met.)			
Ancient Pillars not moved or damaged.	15 each (Max 30)	0 1	
Fossil not moved or damaged.	30	0 1	
Unknown Extra Task: (check the game rules for ideas. If not attempting, score the team these points anyway.)			
Unknown extra task completed	30	0 1	
	330 Max	TOTAL SCORE:	

In-House Level 2: Scoresheet

NOTES:
In-House is about having fun and learning. Coaches are allowed to change the rules as long as the rules are fair for all teams.
Coaches can develop their own extra tasks. If no extra task is used award the 30 points for the task to the team anyway.

Certificate levels:	Bronze 0-79 points	Silver 80 - 179 points	Gold 180 - 279 points	Diamond 280+ points

School/Club Name:

Team Name:

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.

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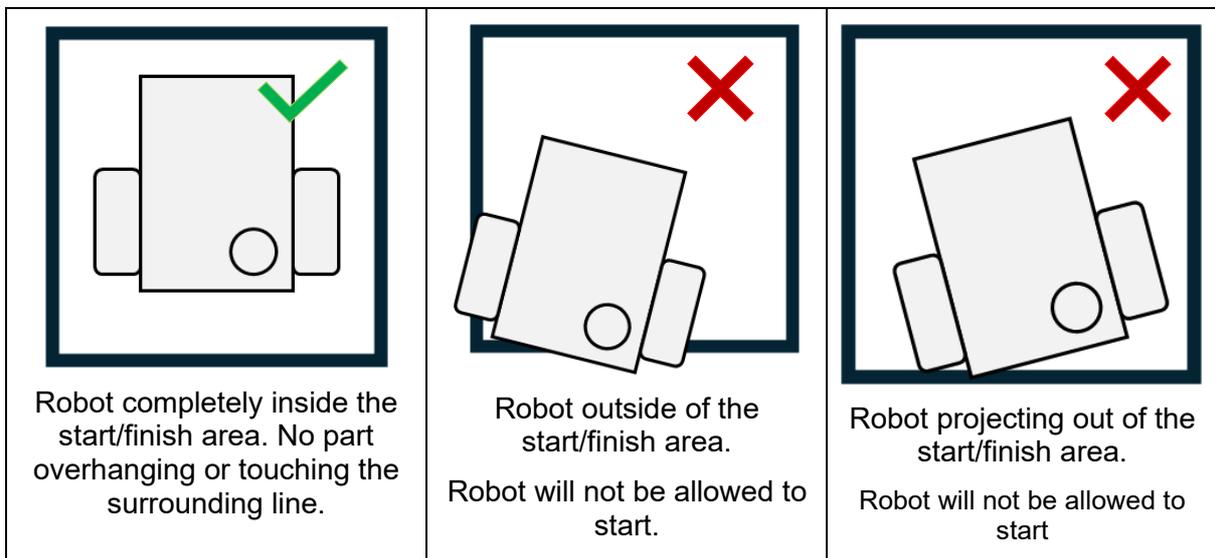
Debris:

The below images apply to the debris in the sifting shed.

Debris completely inside the sifting shed area. 30 points	Debris touching the sifting shed area. 30 points	Debris outside of the sifting shed area. 0 points
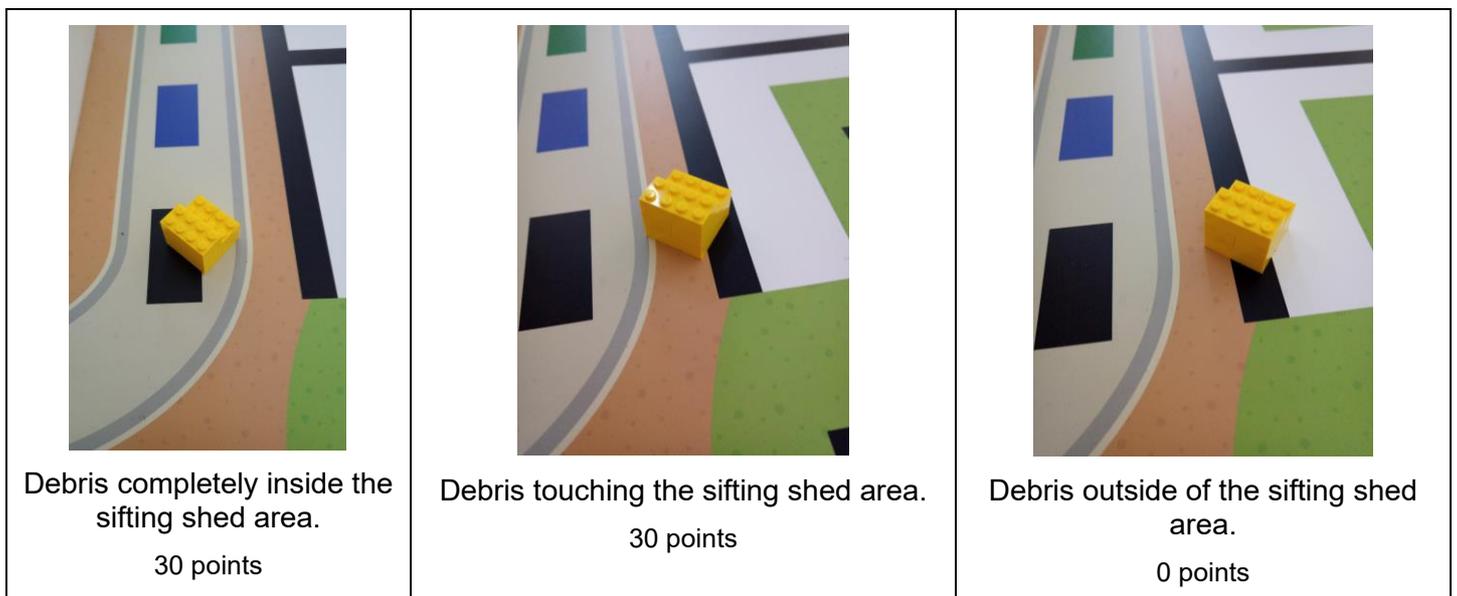
Unknown Fossil Crate:

The below images apply to the unknown fossil crate in the research tent area.
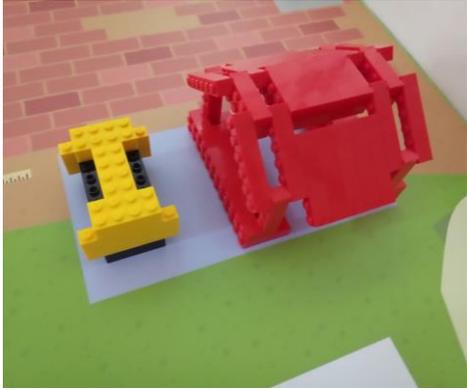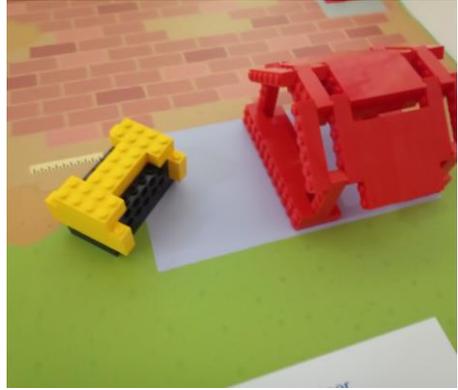
Unknown fossil crate completely inside of the research tent area.

30 points

Unknown fossil crate touching inside of the research tent area.

10 points
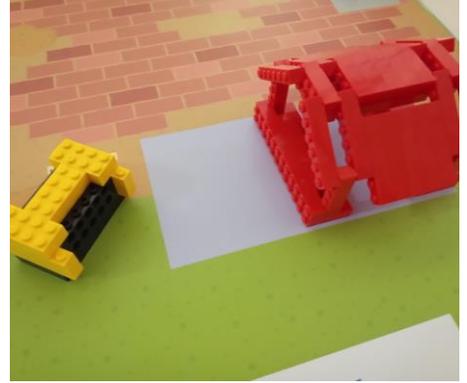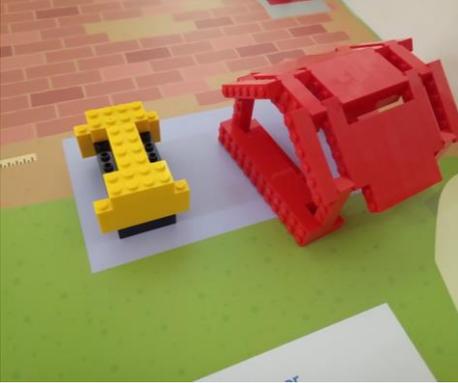
Unknown fossil crate not touching inside of the research tent area.

0 points

Unknown fossil crate completely inside of the research tent area. Research tent is touching outside of the area.

0 points

Archaeological Artifact:

The below images apply to the archaeological artefact in the storage shed area.

Artifact completely inside the storage shed.	Artifact touching the storage shed.	Artifact not touching or inside the storage shed.
30 points	0 points	0 points

Ancient Pillars

The below images apply to the two ancient pillars.

Ancient pillar not moved or damaged. Still in its original starting position.	Ancient pillar not moved or damaged. Still in its original starting position.	Ancient pillar moved. No longer in its original starting position.	Ancient pillar moved. No longer in its original starting position.
15 points	15 points	0 points	0 points

Fossil

The below images apply to the fossil in the dig site area

Fossil unmoved and damaged. Still in its original starting position	Fossil moved. No longer in its original starting position	Fossil damaged no longer in its original starting position
30 points	0 points	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.

In-House game rules and In-House challenge developed and written by Duncan Beaton for WRO SA.

PART TWO – ASSEMBLY OF GAME OBJECTS

Debris (x3)

1

10x
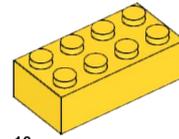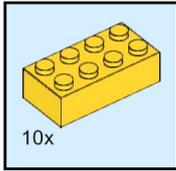
10x
3001
Yellow
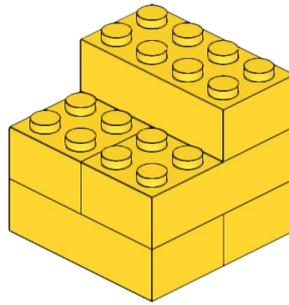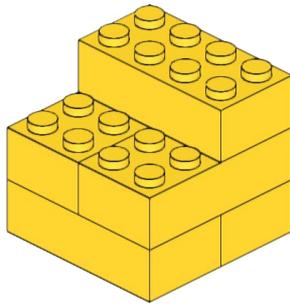
Ancient Pillars (x2)
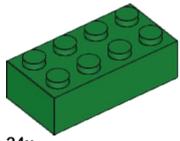
24x
3001
Green

24x
3009
Green

1

3x   3x

2

3x

3
3x

4
2x

5
2x

6
3x

7 2x

8 3x

Fossil (x1)

2x
3003
White

11x
3001
White

6x
3009
White

1

4x 2x

2

1x 1x 2x

3

3x

4

2x 2x

5

1x

6

1x
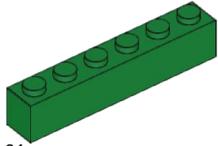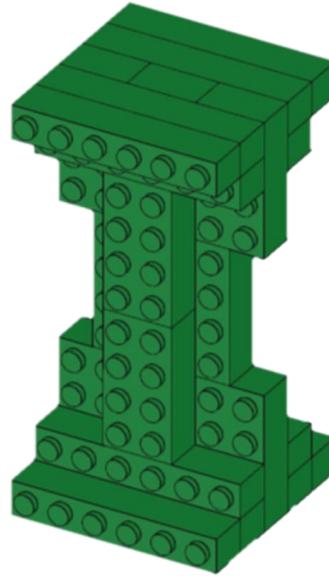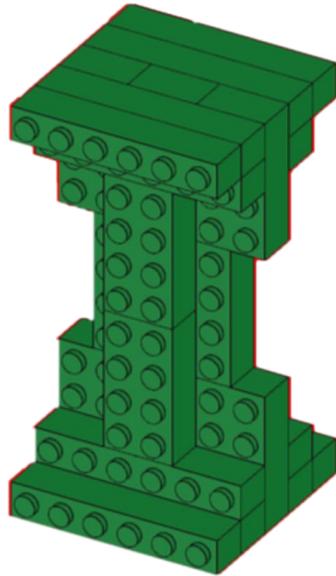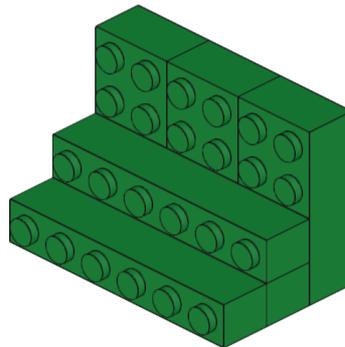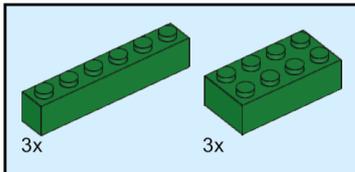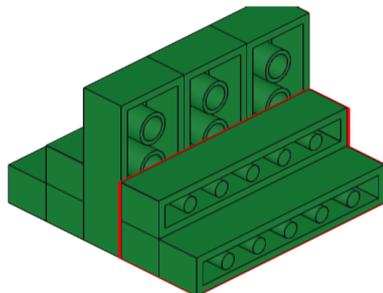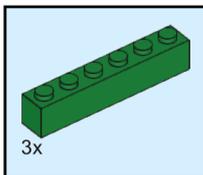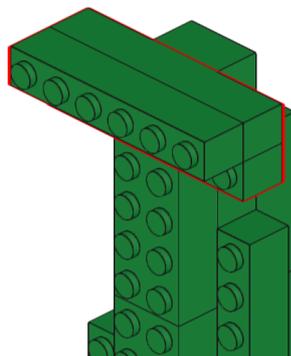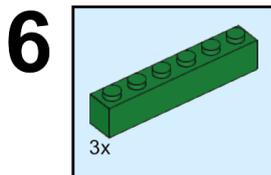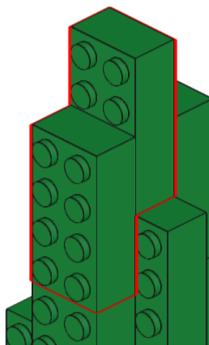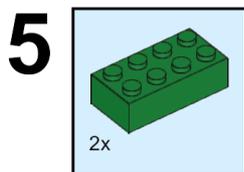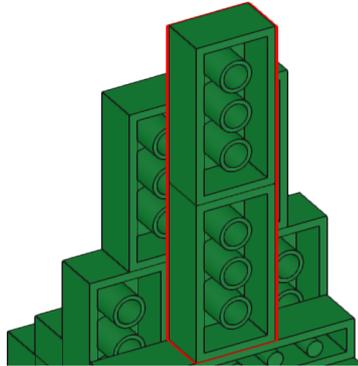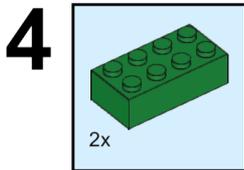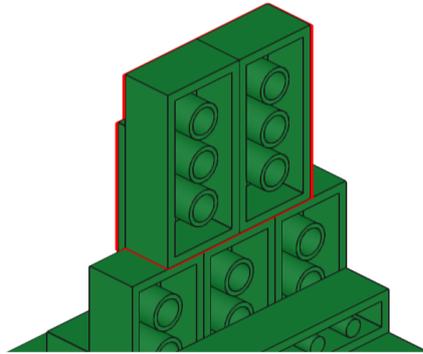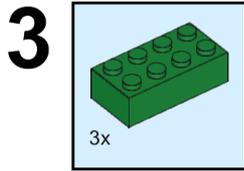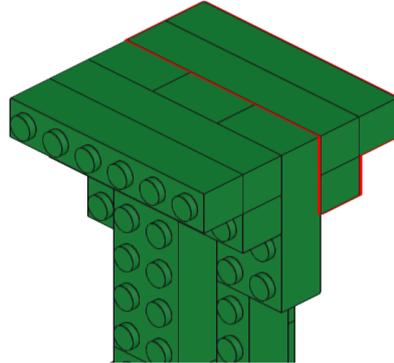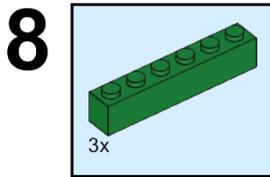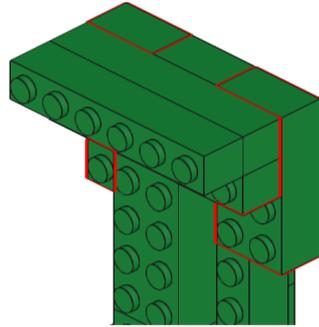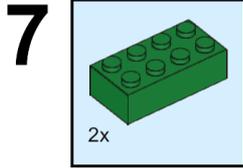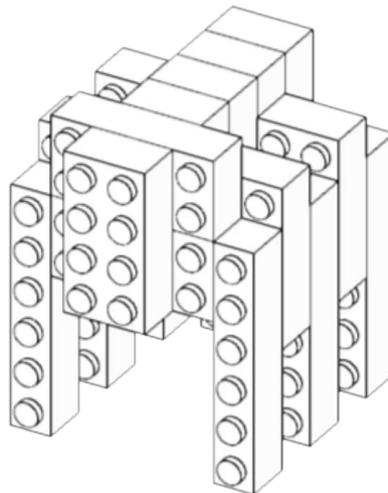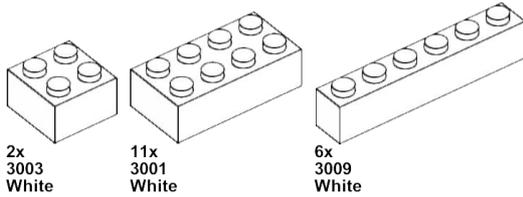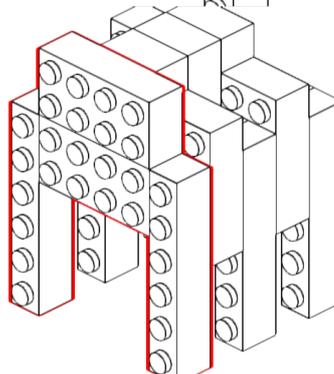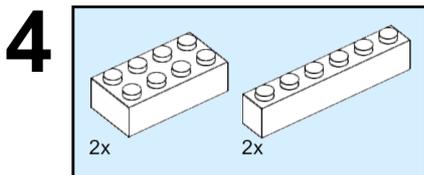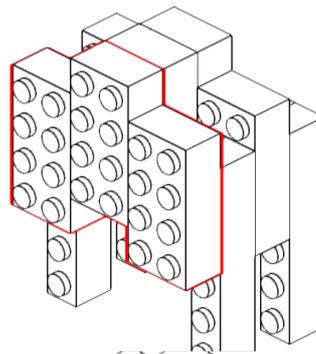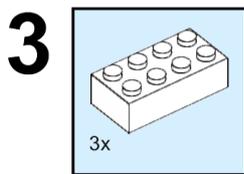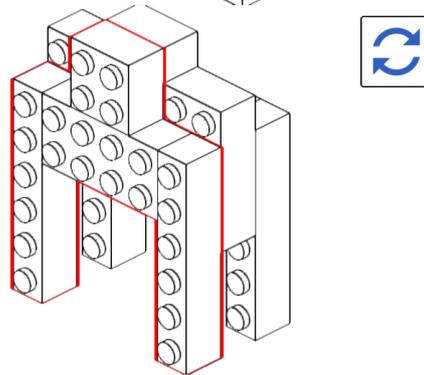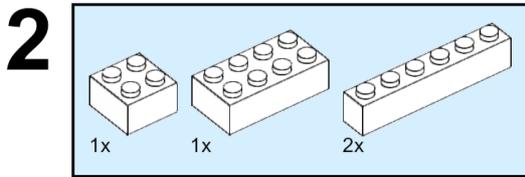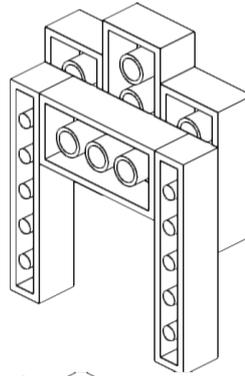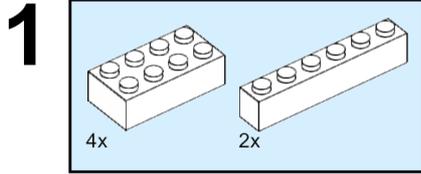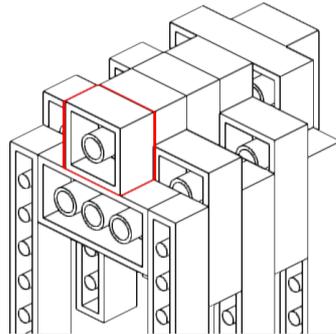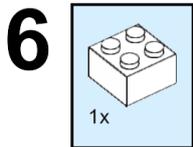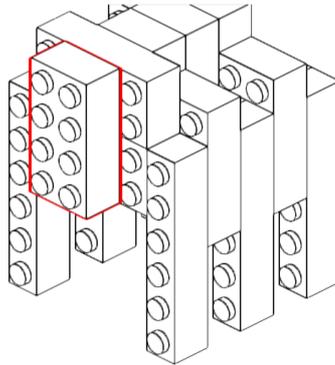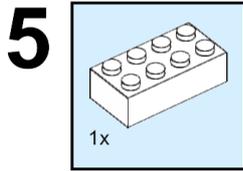
Unknown Fossil Crate (x1)

4x
3001
Black

4x
3894
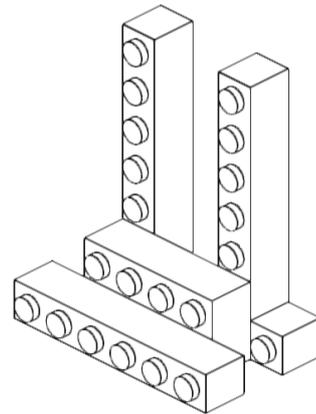Black
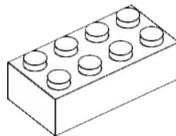
2x
3001
White
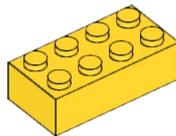
3x
3001
Yellow

4x
3009
Yellow

1 4x

2 2x

3 4x

4 4x

5

2x

6

1x
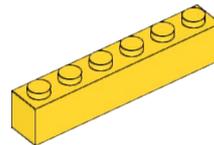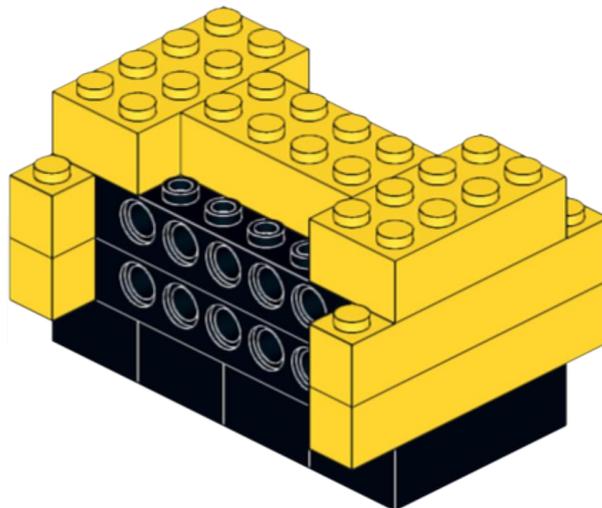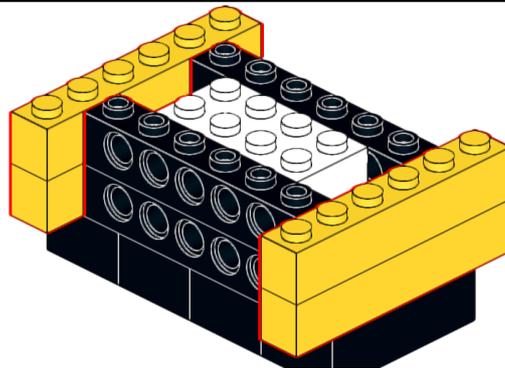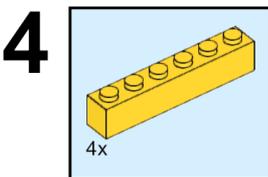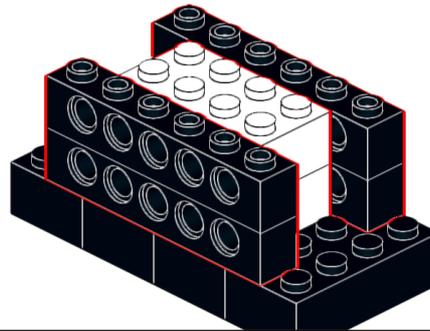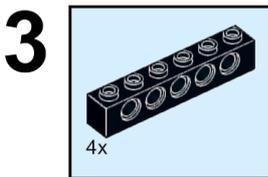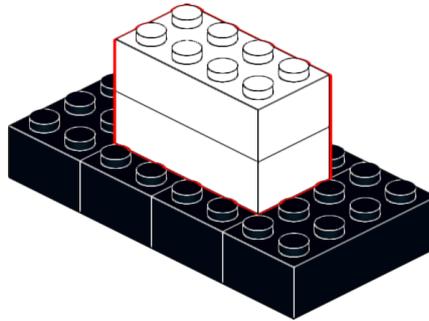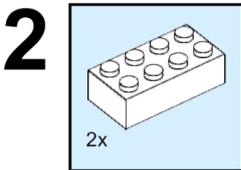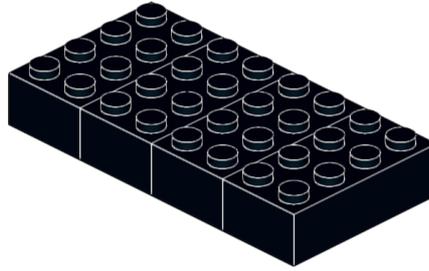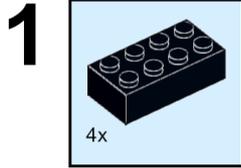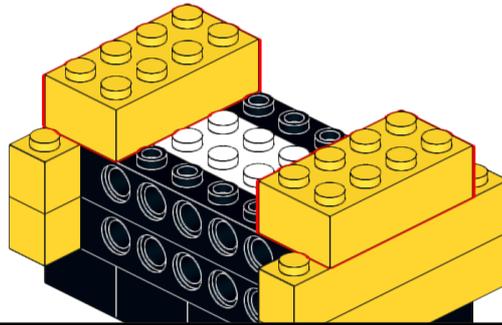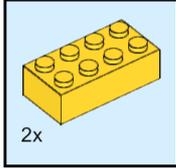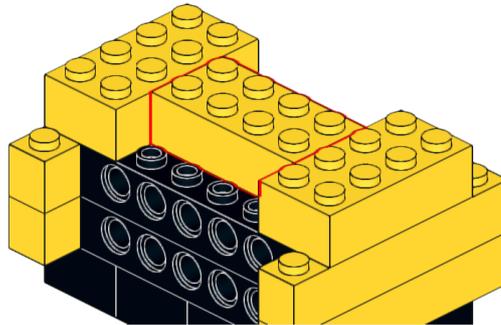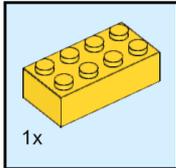
Tent (x1) (all building material found in the tent build A and B from level 1)
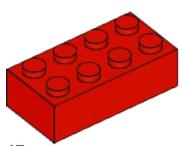
17x
3001
Red

26x
3009
Red

1 5x

2 2x

3 2x

4

5

6

5x

7

2x

8

2x

9

10

11

1x   2x

12

5x

13

4x

14

5x

15

2x

16

2x

17

18

19

4x
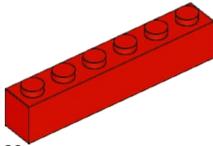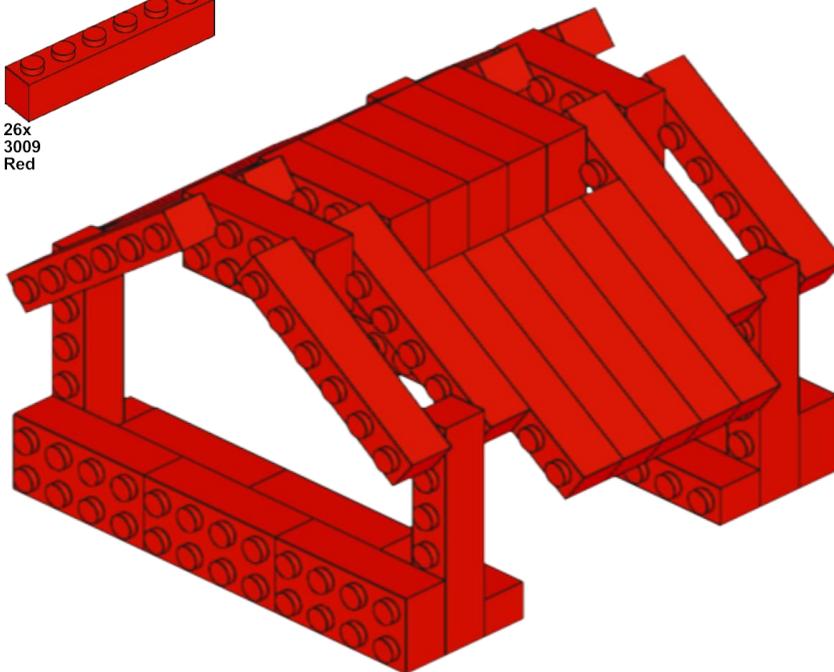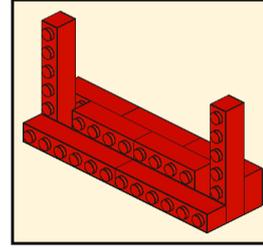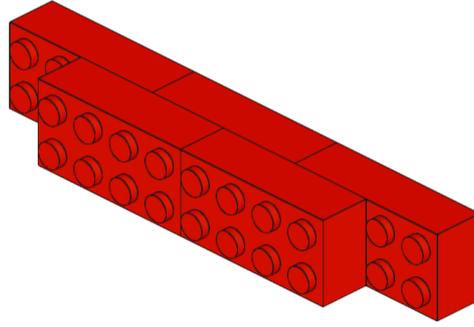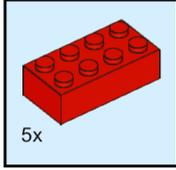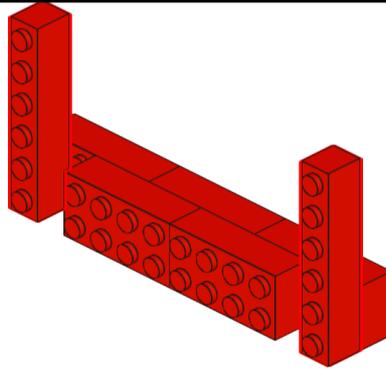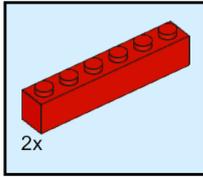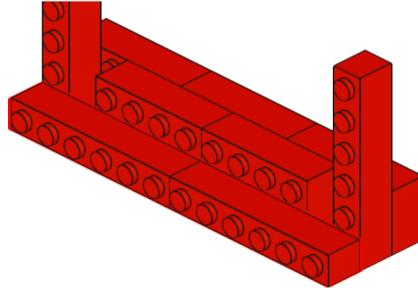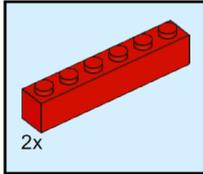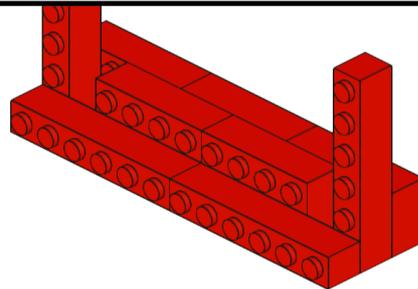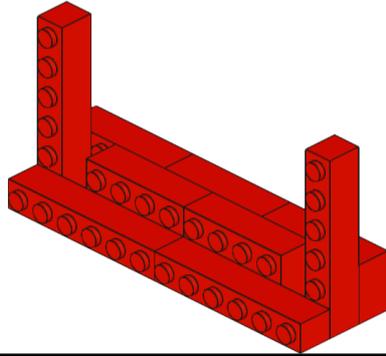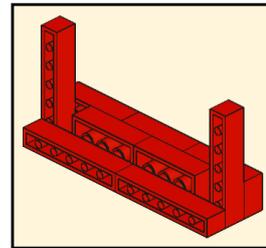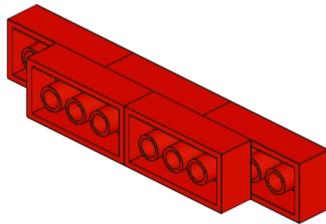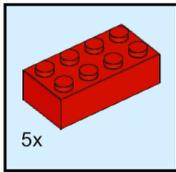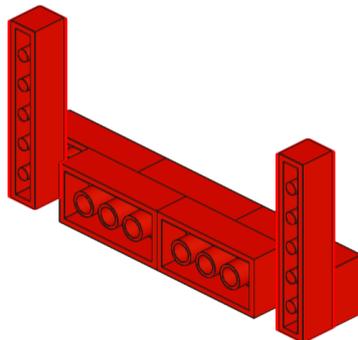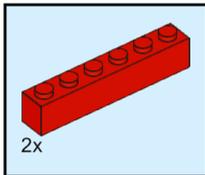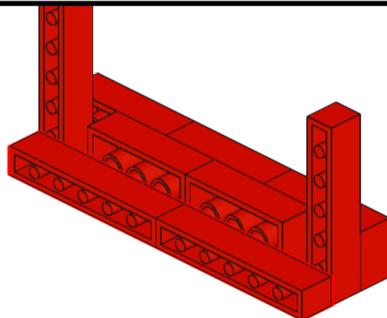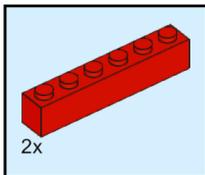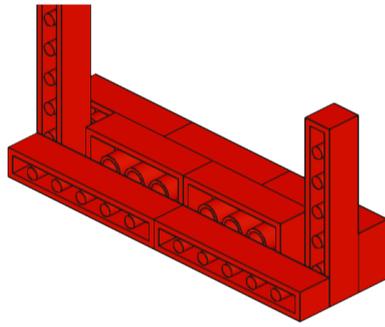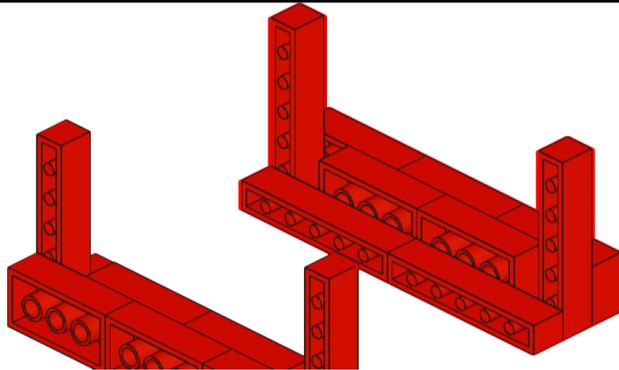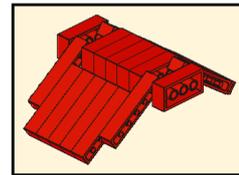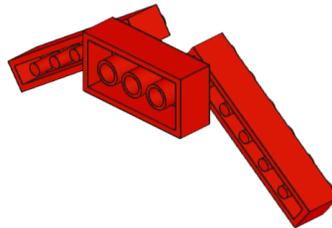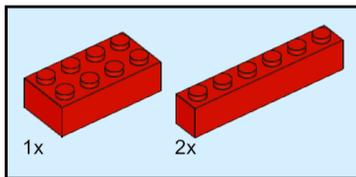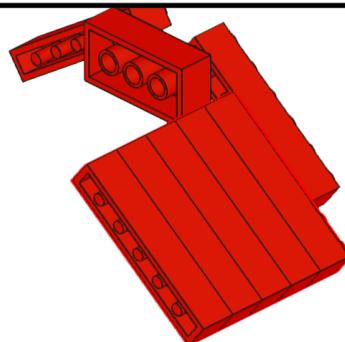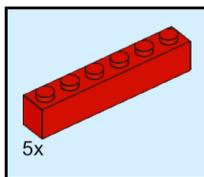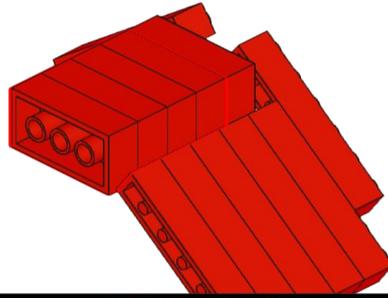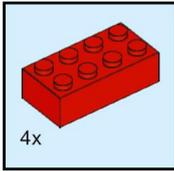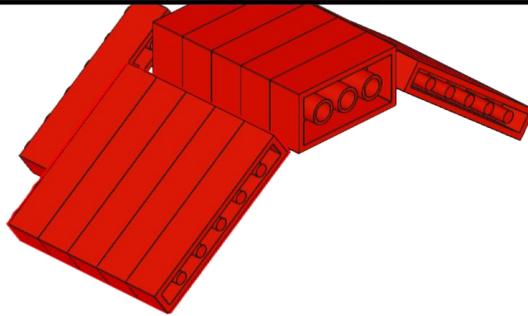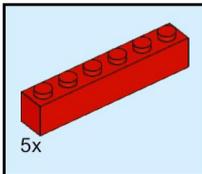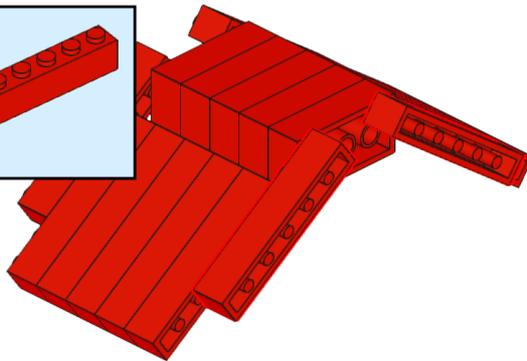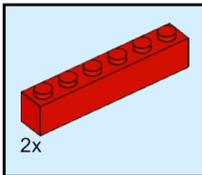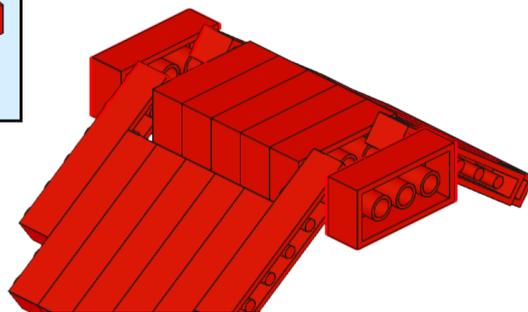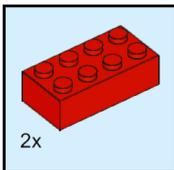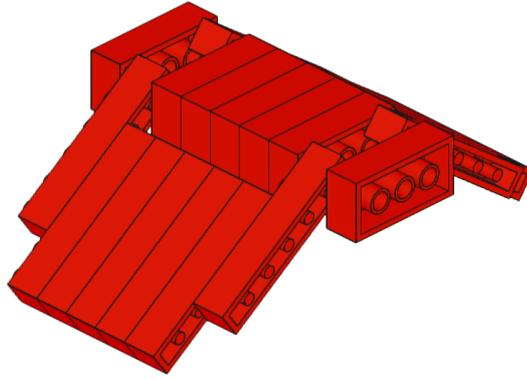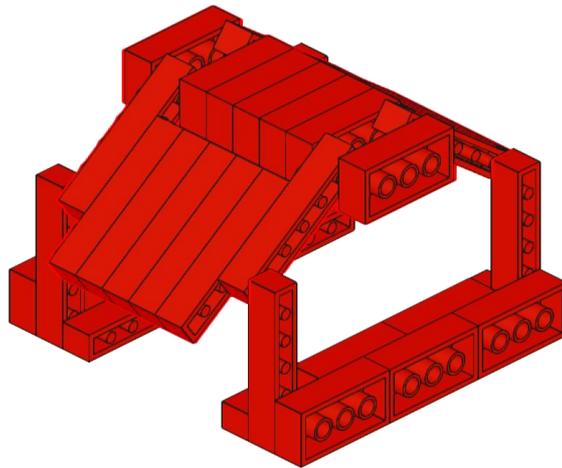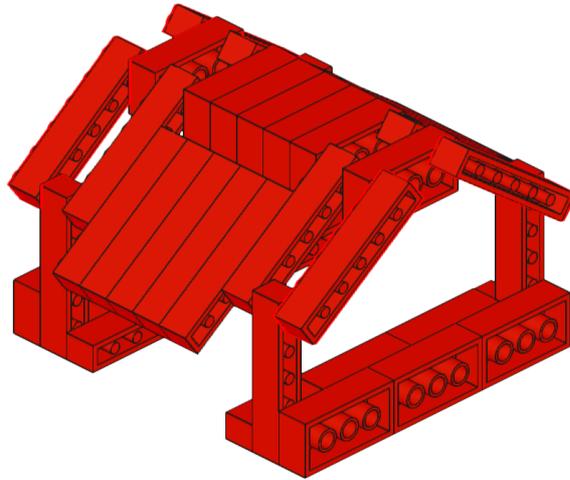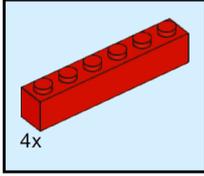
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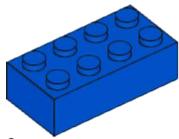
6x
3001
Blue

14x
3009
Blue

1

7x

2

3x
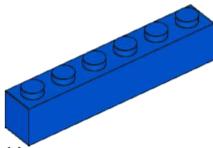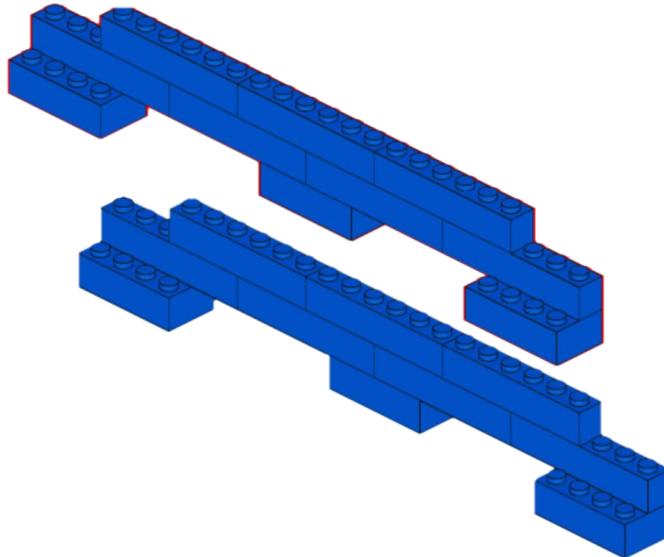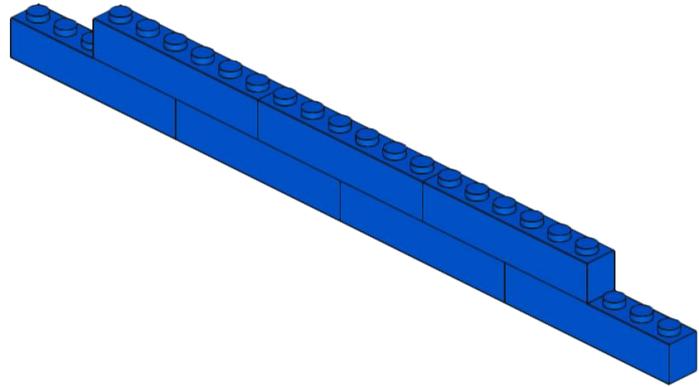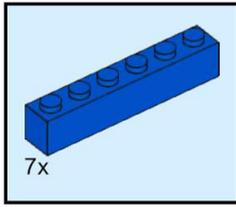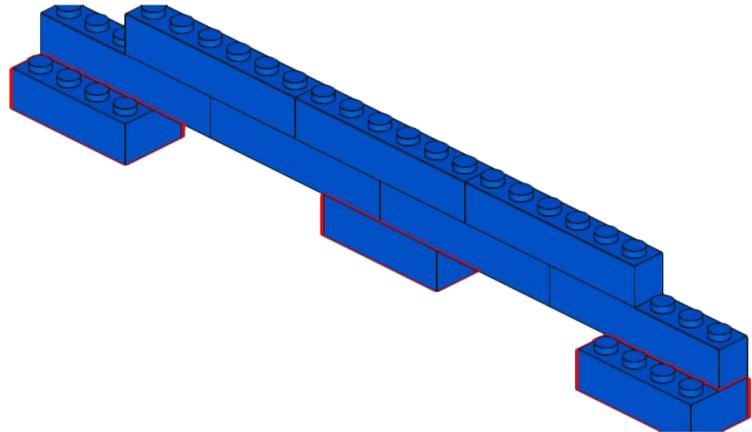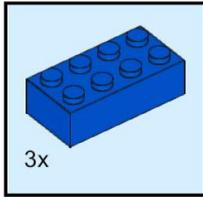
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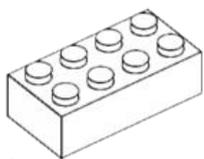
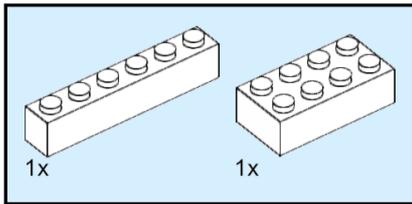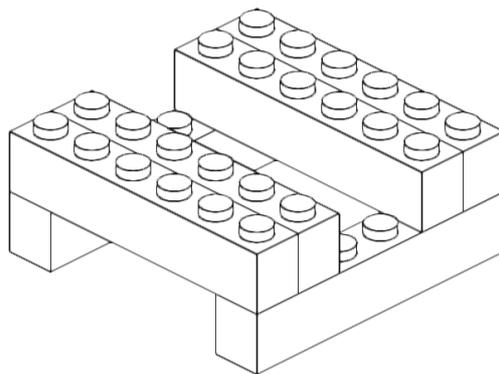3x
3001
White

13x
3009
White

1

1x 4x

2

1x 1x

3

6x

4

5

2x   1x