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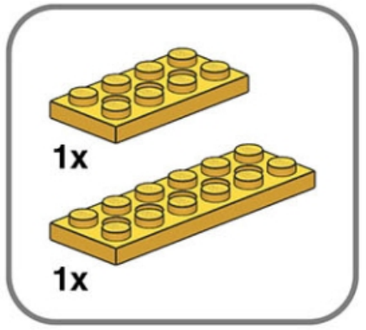

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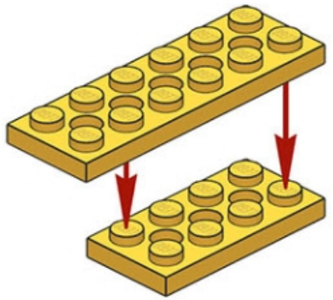

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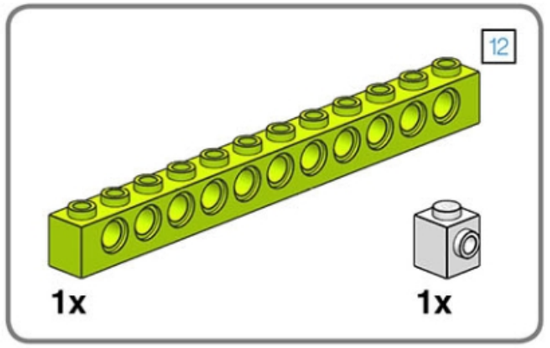

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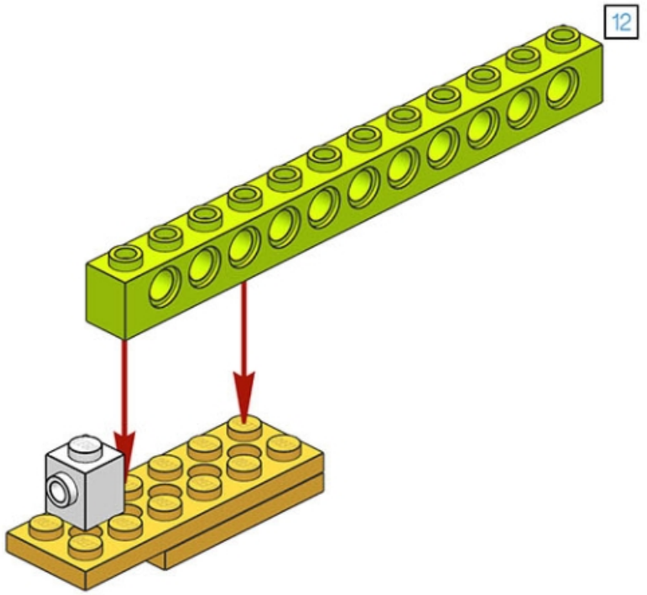

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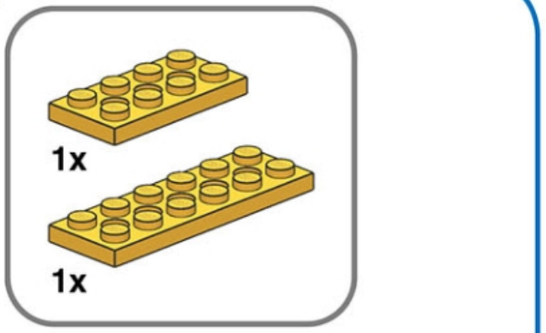

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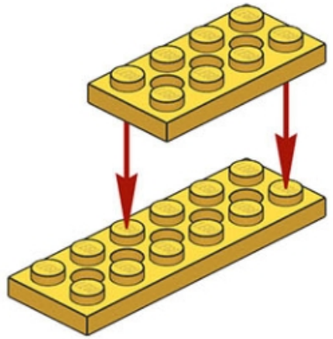

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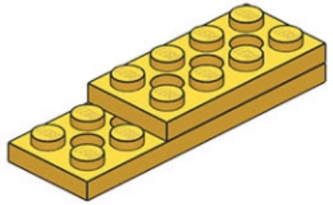

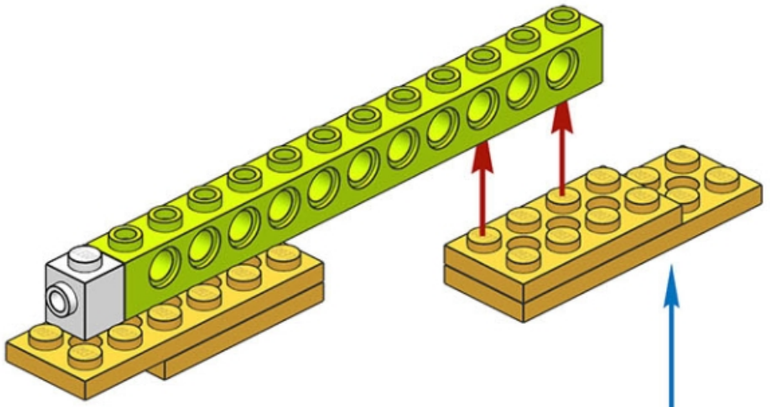

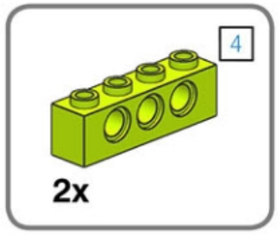

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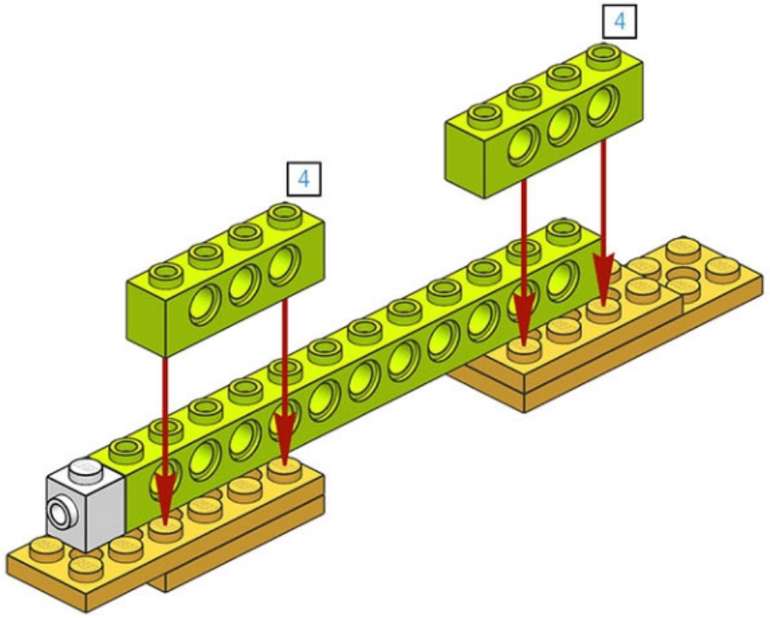

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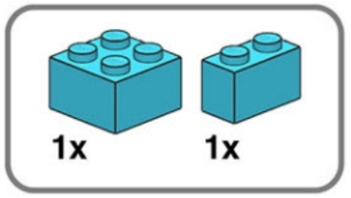

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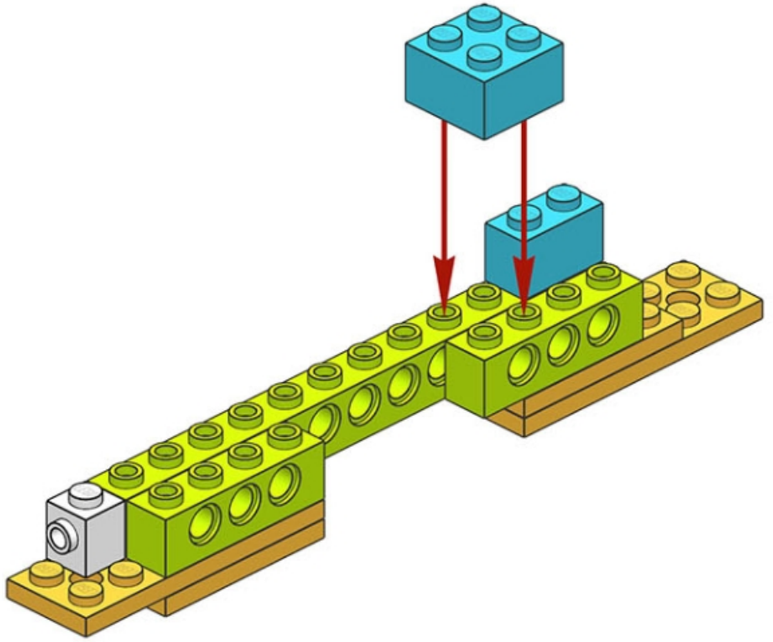

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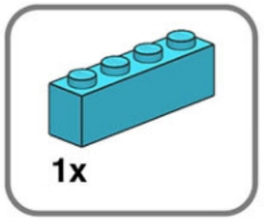

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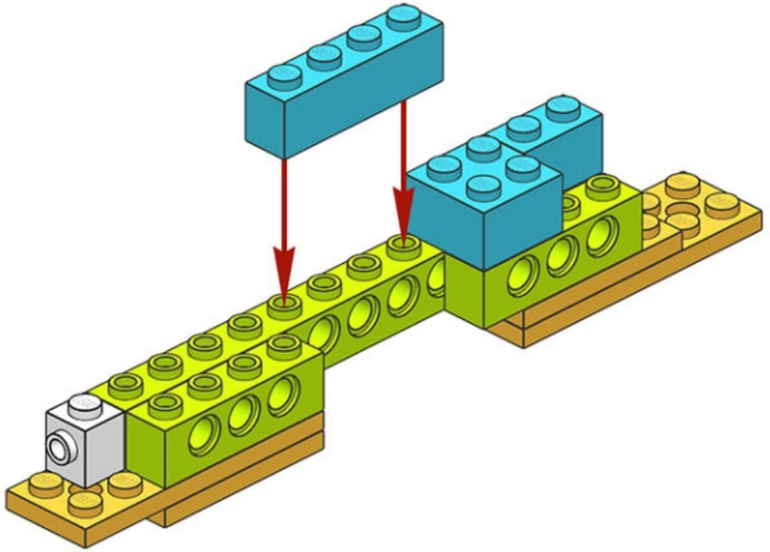

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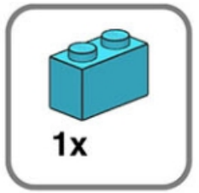

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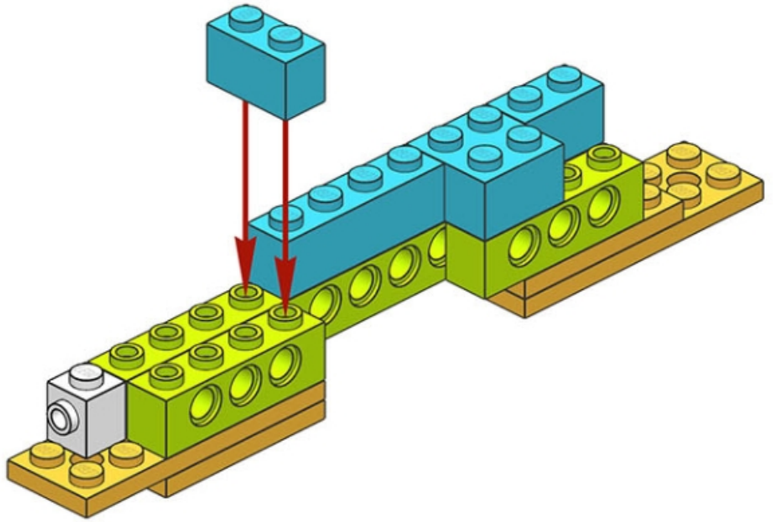

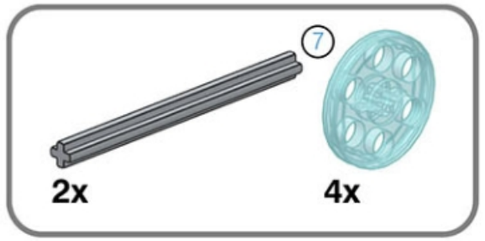

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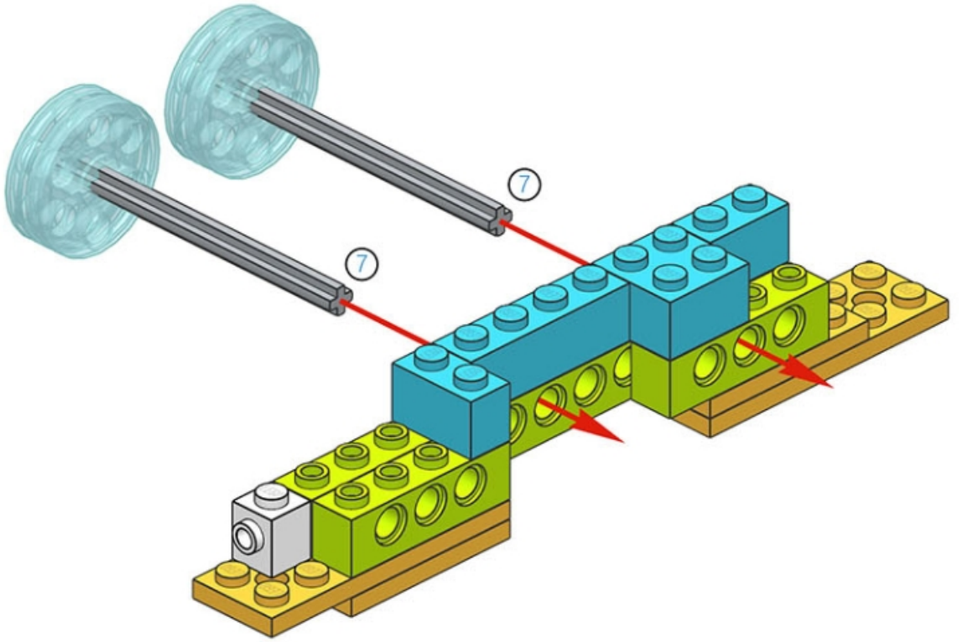

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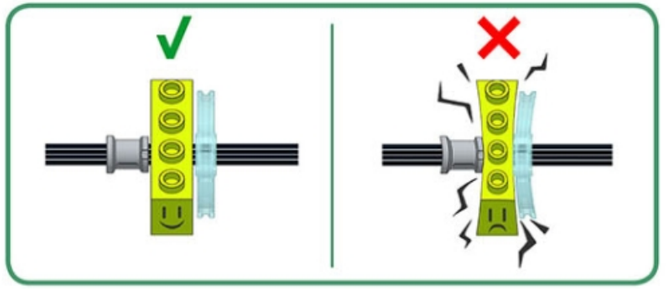

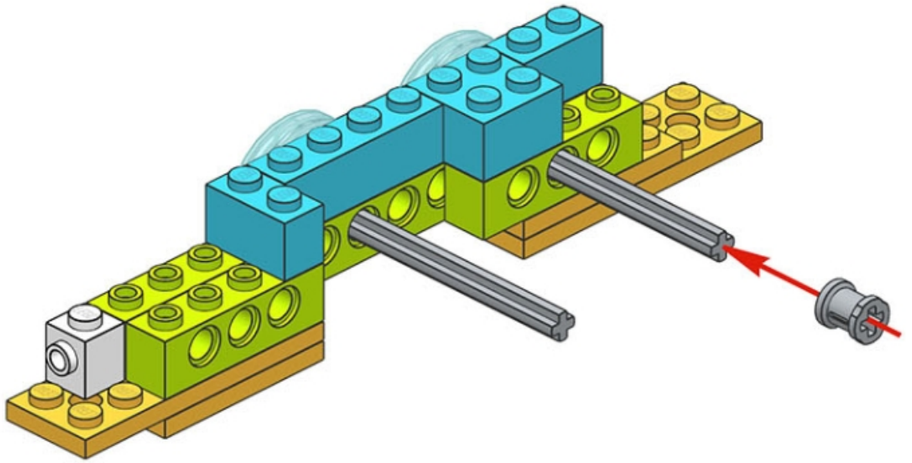

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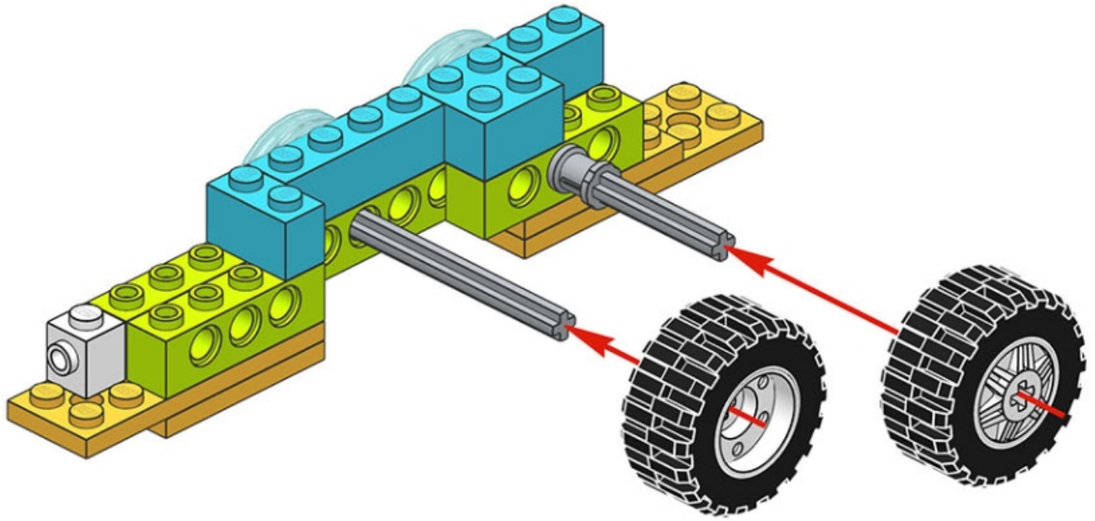

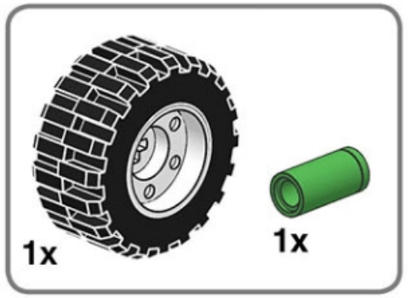

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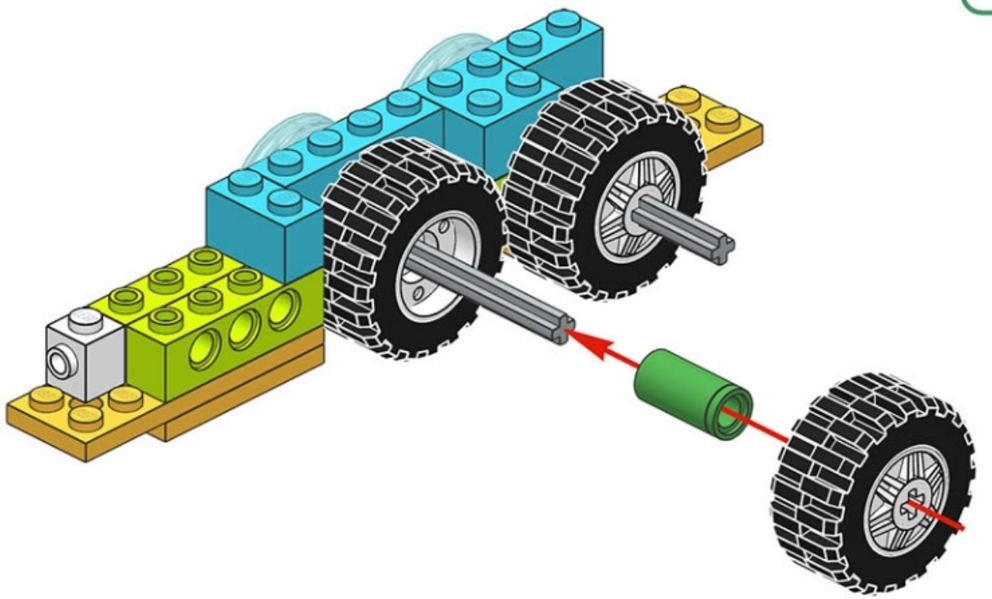

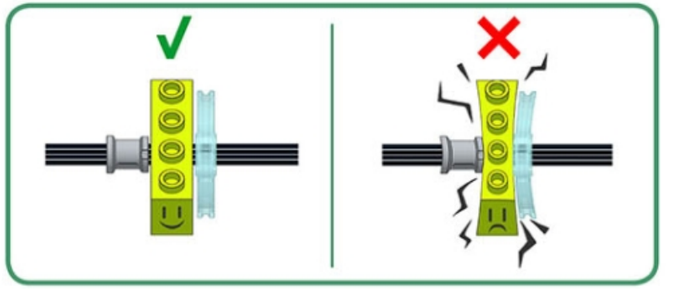

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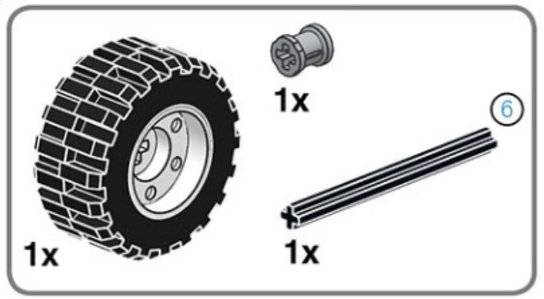

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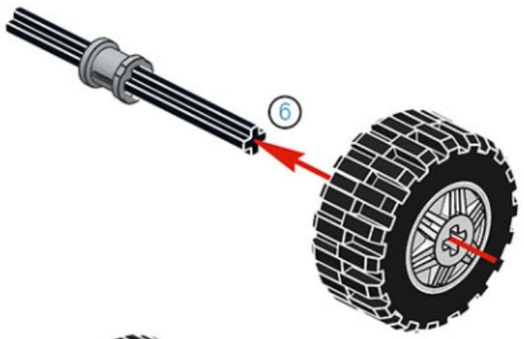

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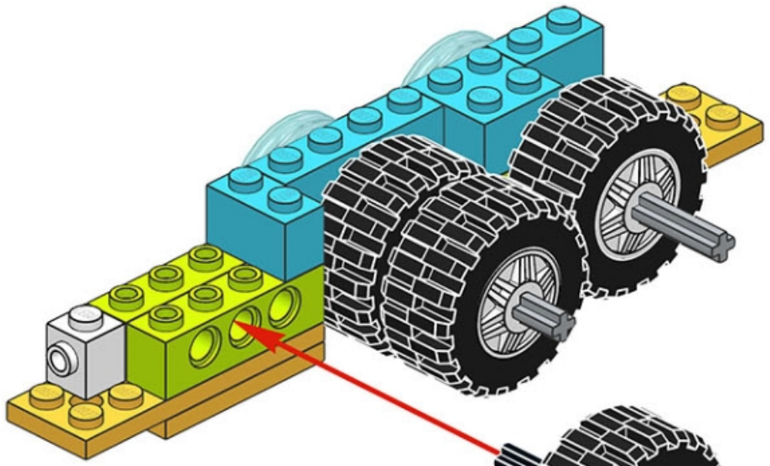

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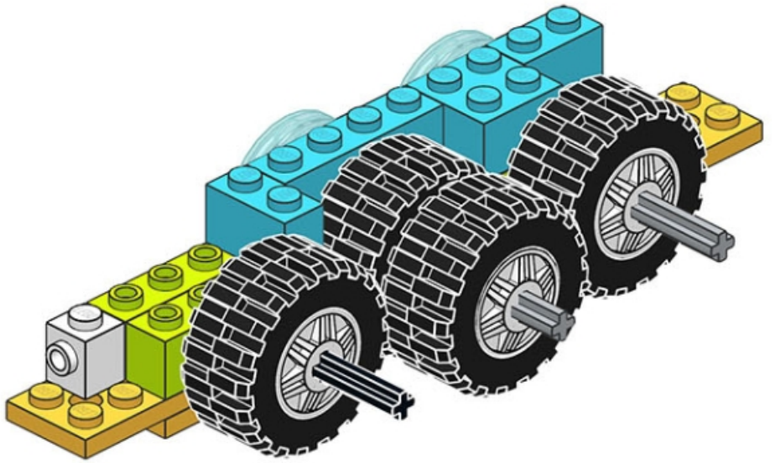

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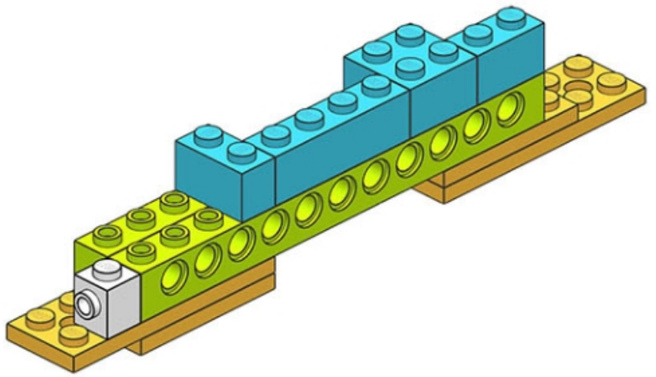

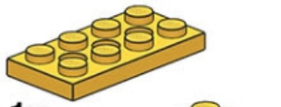

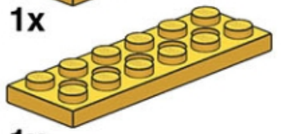

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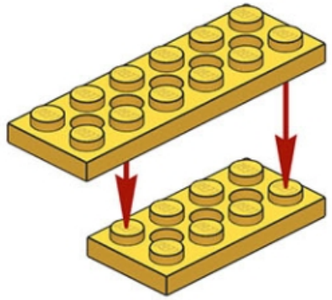

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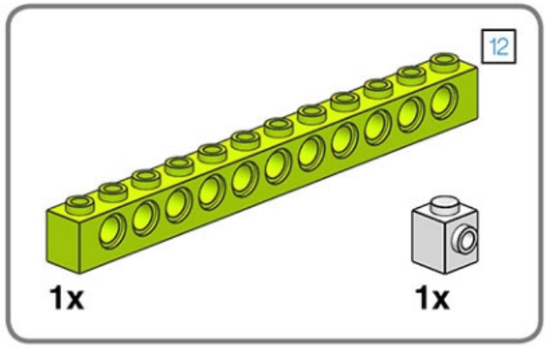

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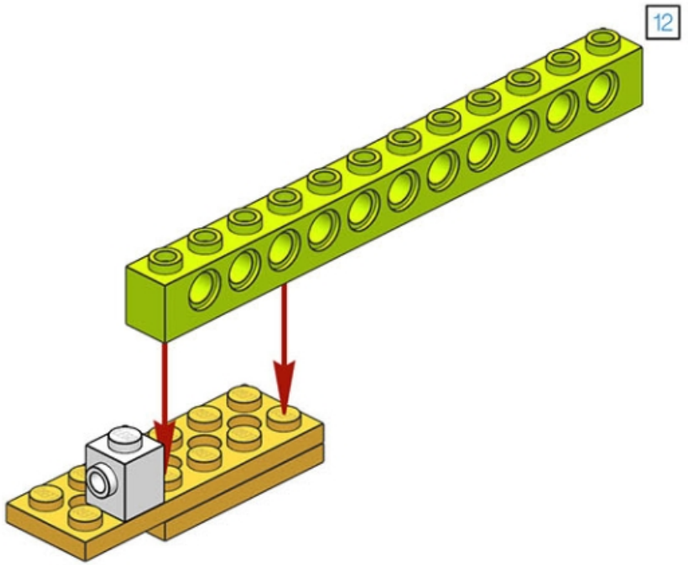

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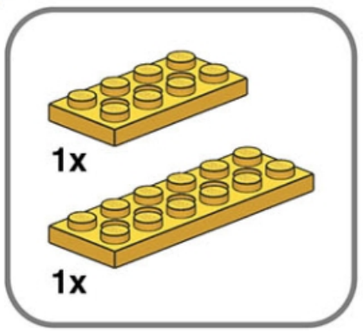

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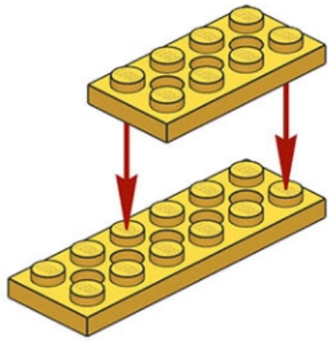

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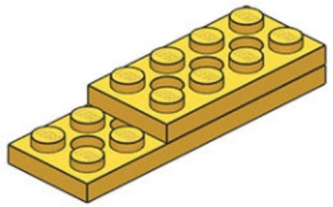

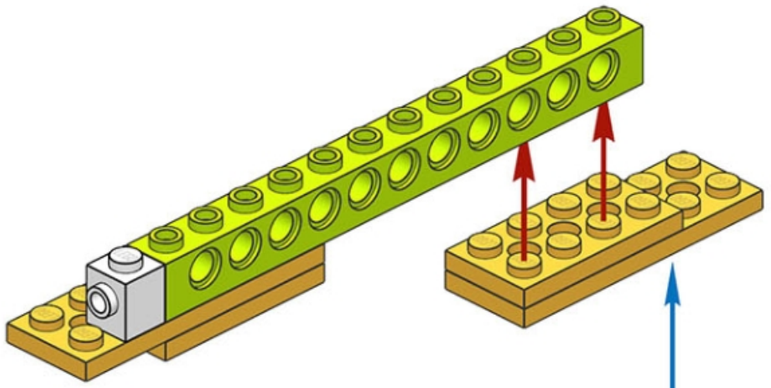

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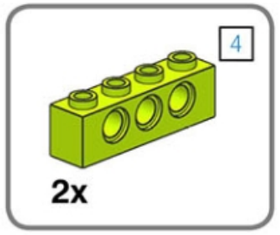

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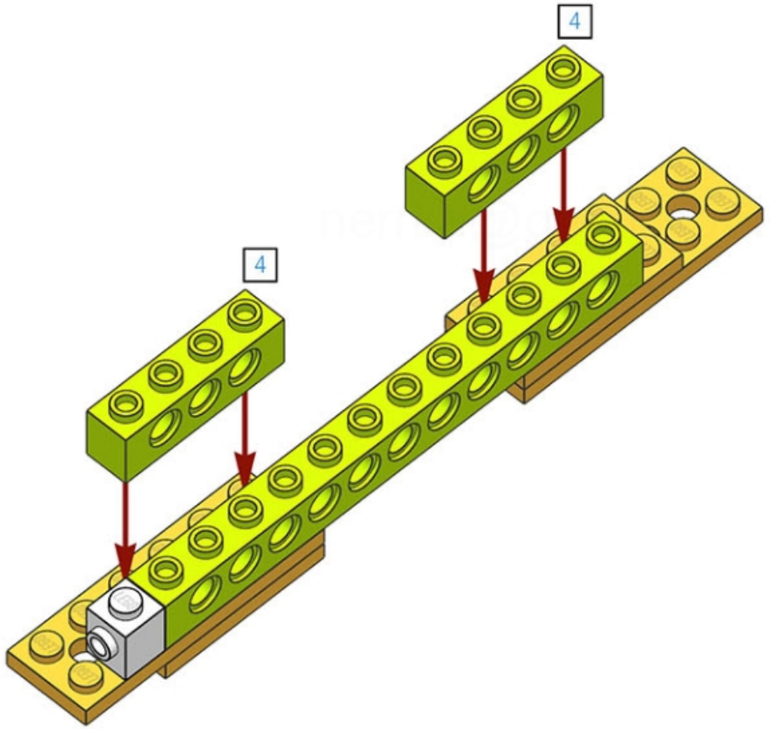

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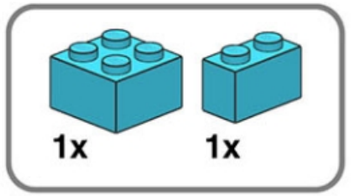

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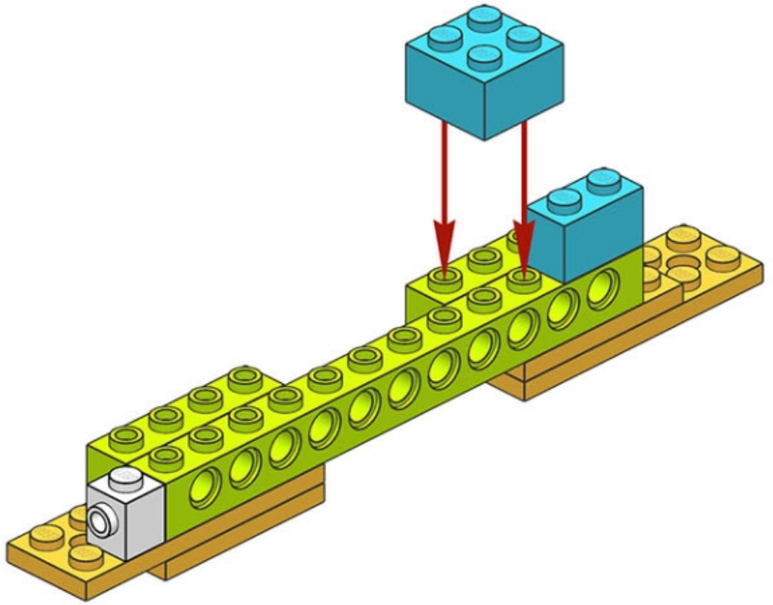

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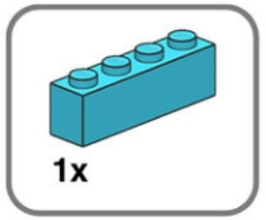

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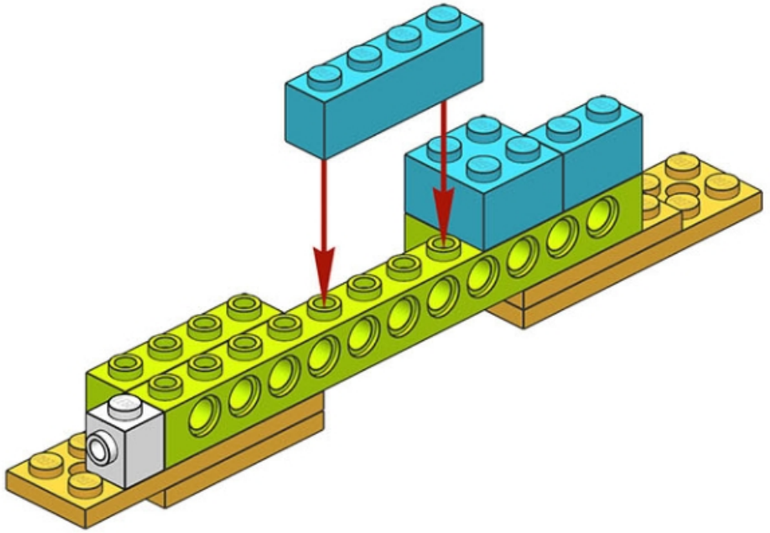

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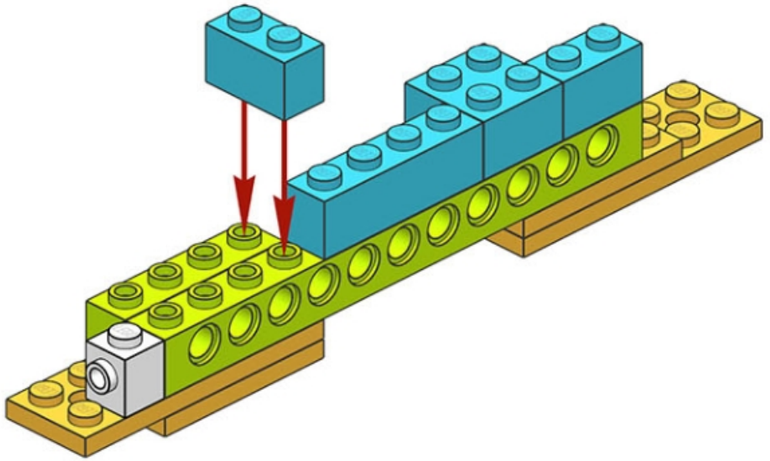

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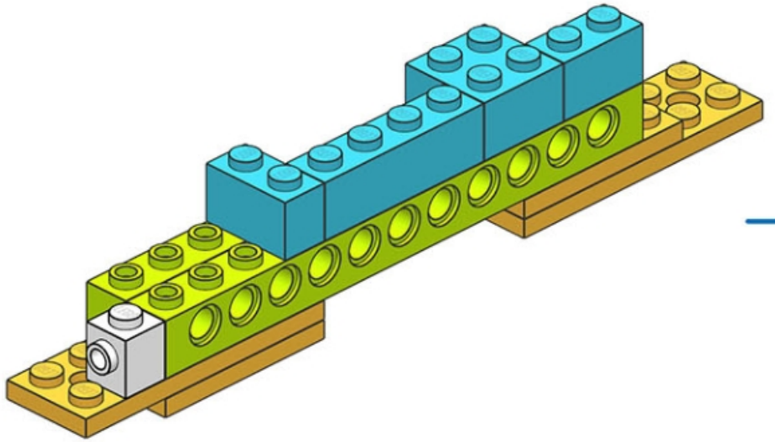

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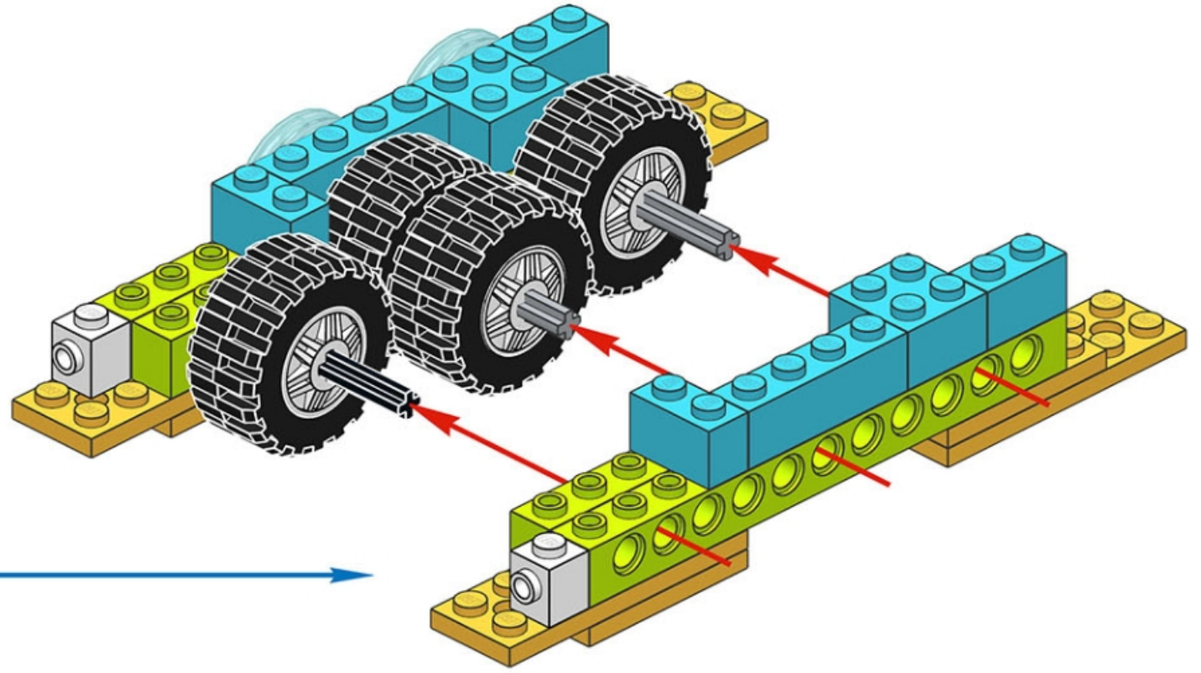

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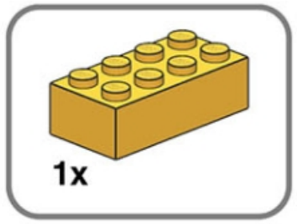

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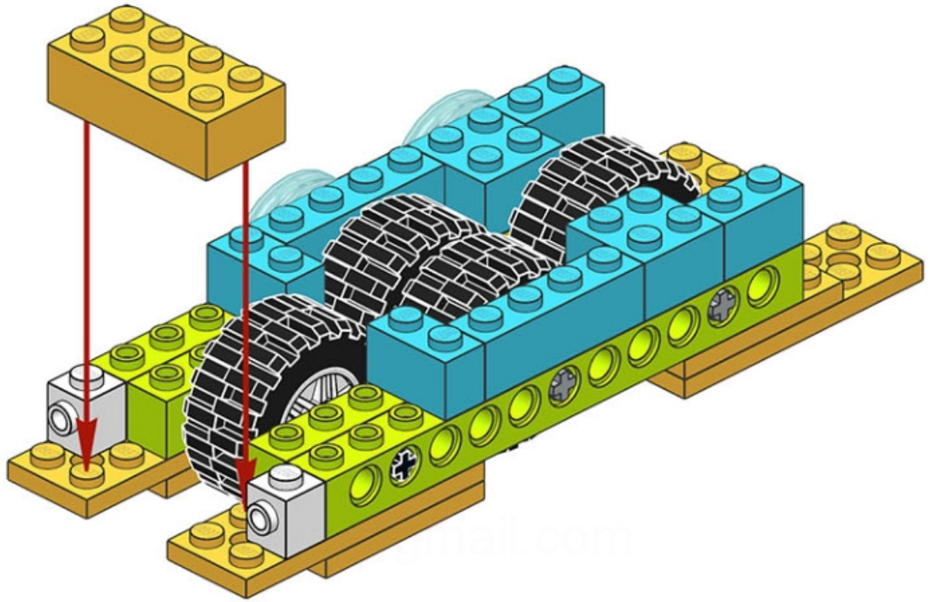

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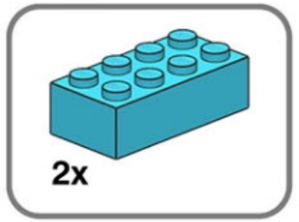

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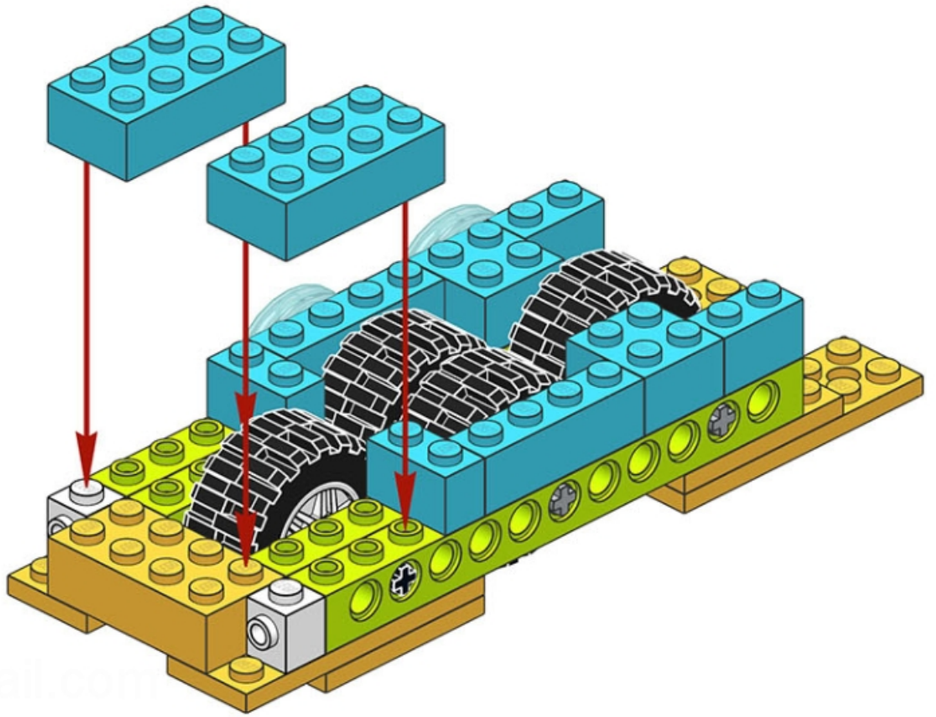

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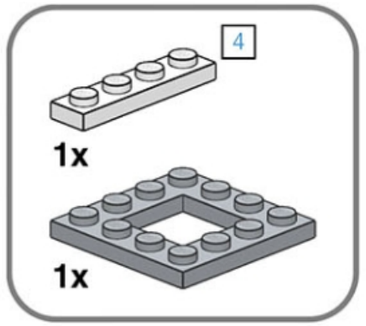

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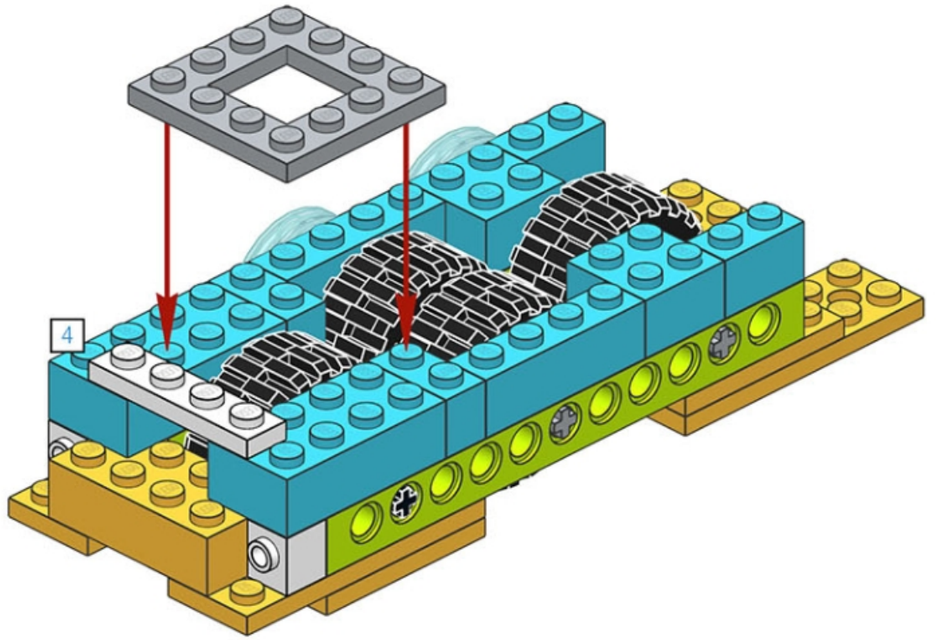

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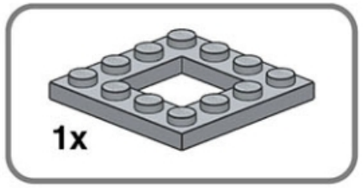

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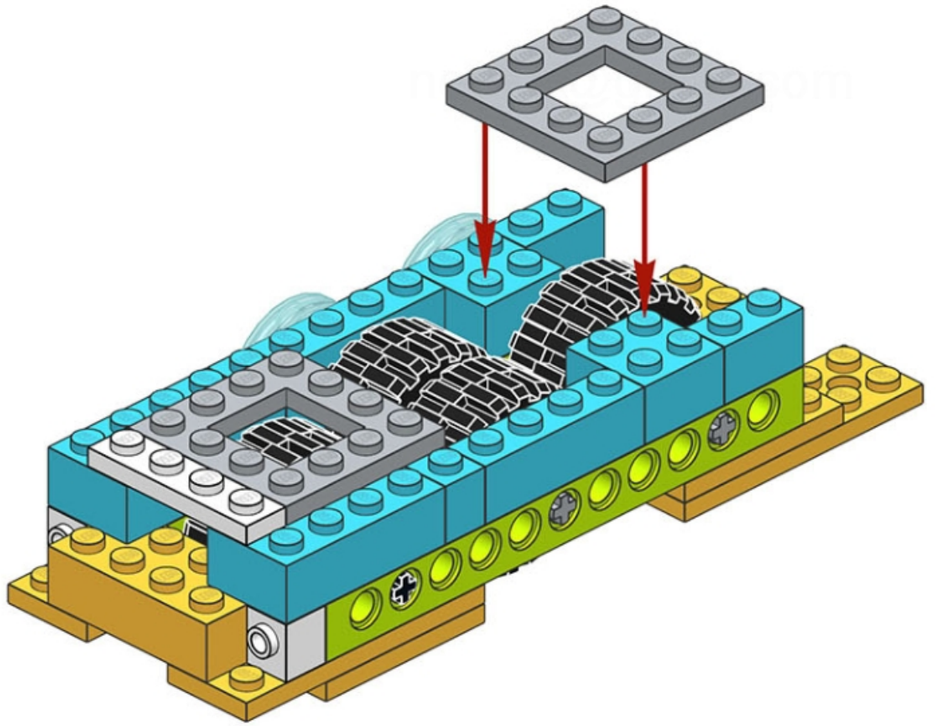

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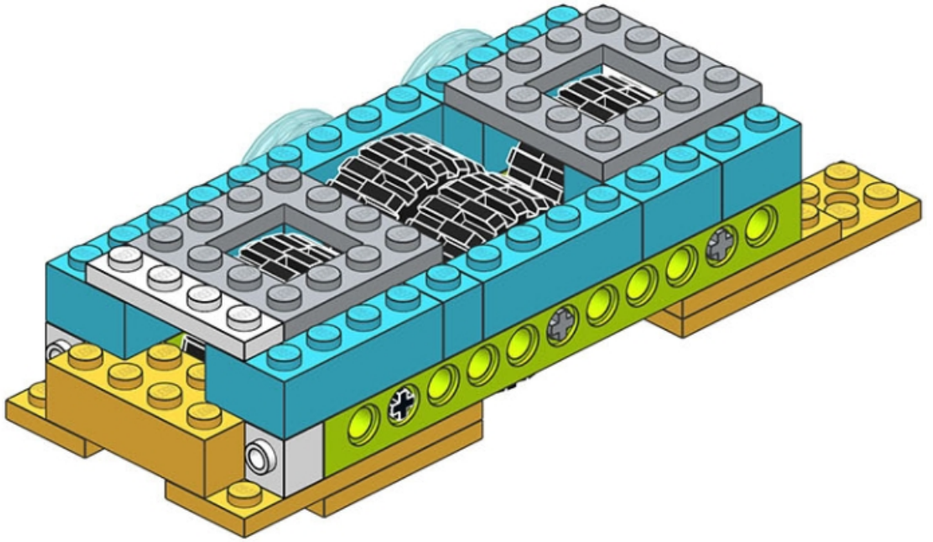

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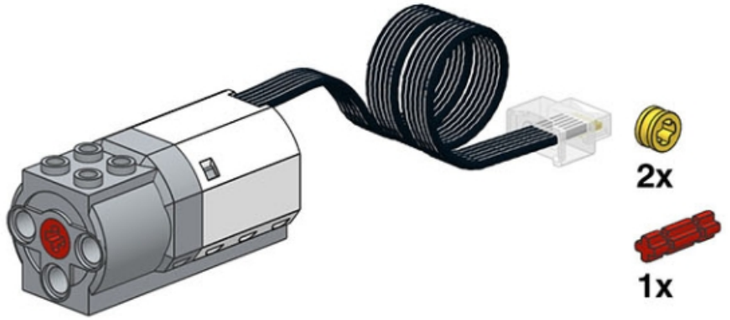

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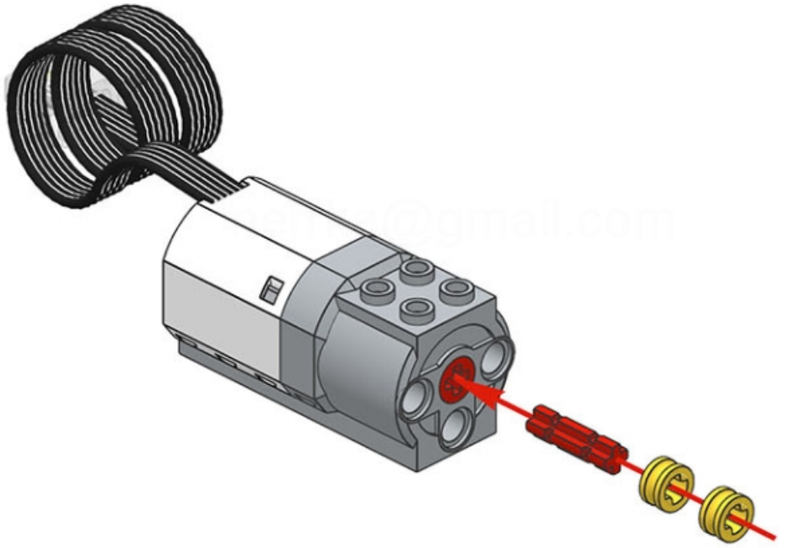

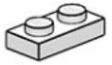

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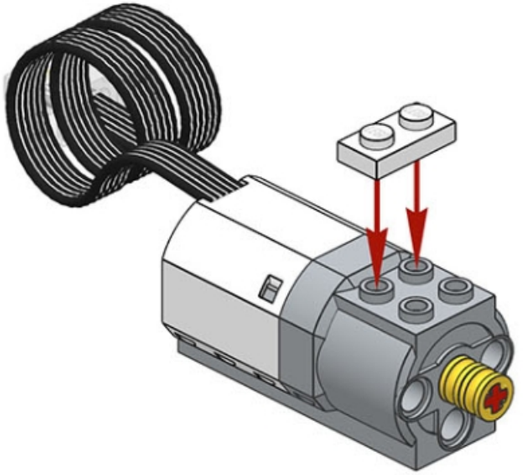

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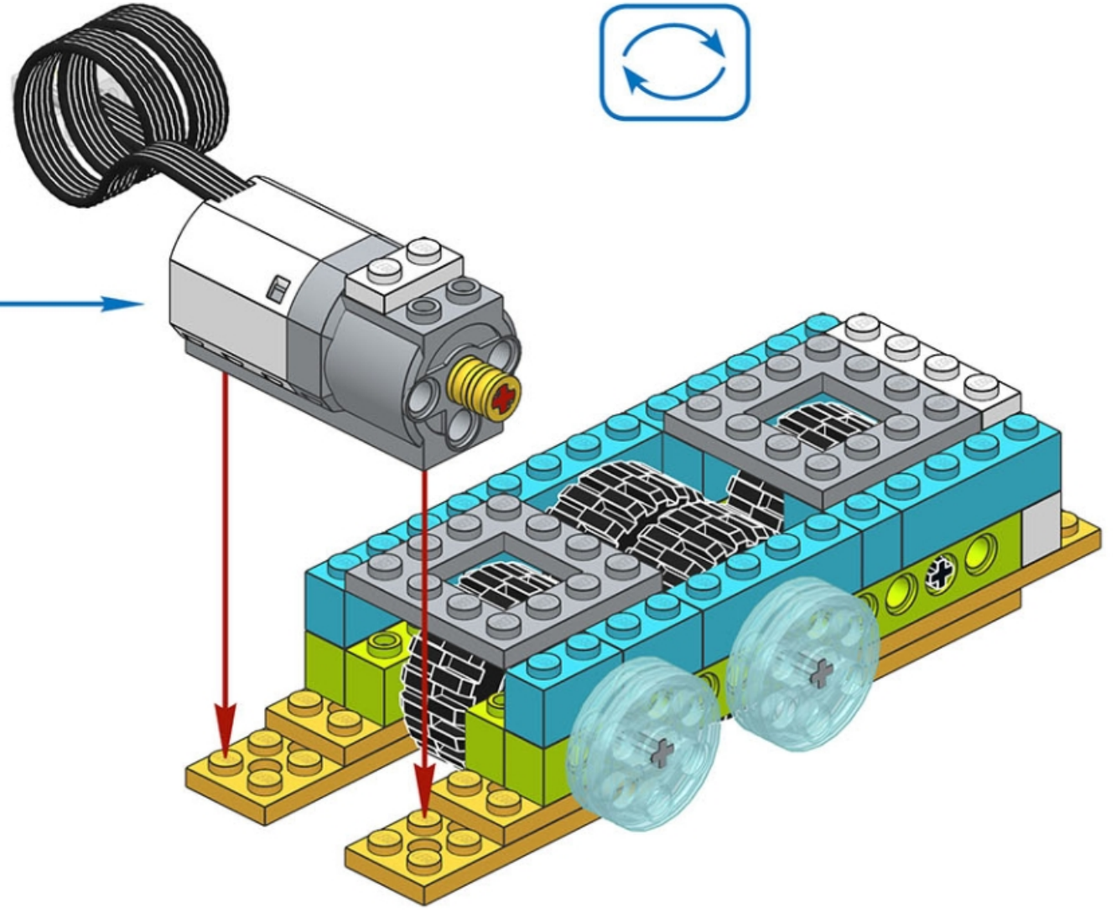

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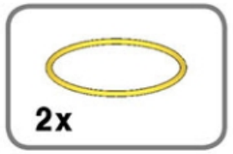

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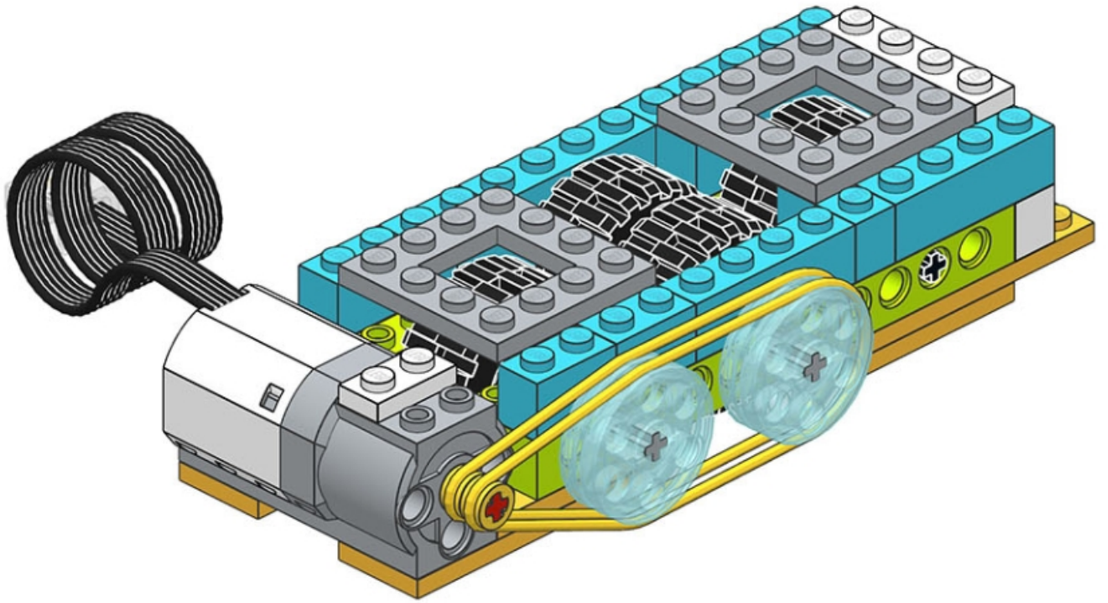

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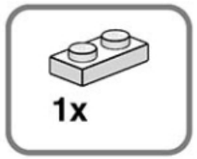

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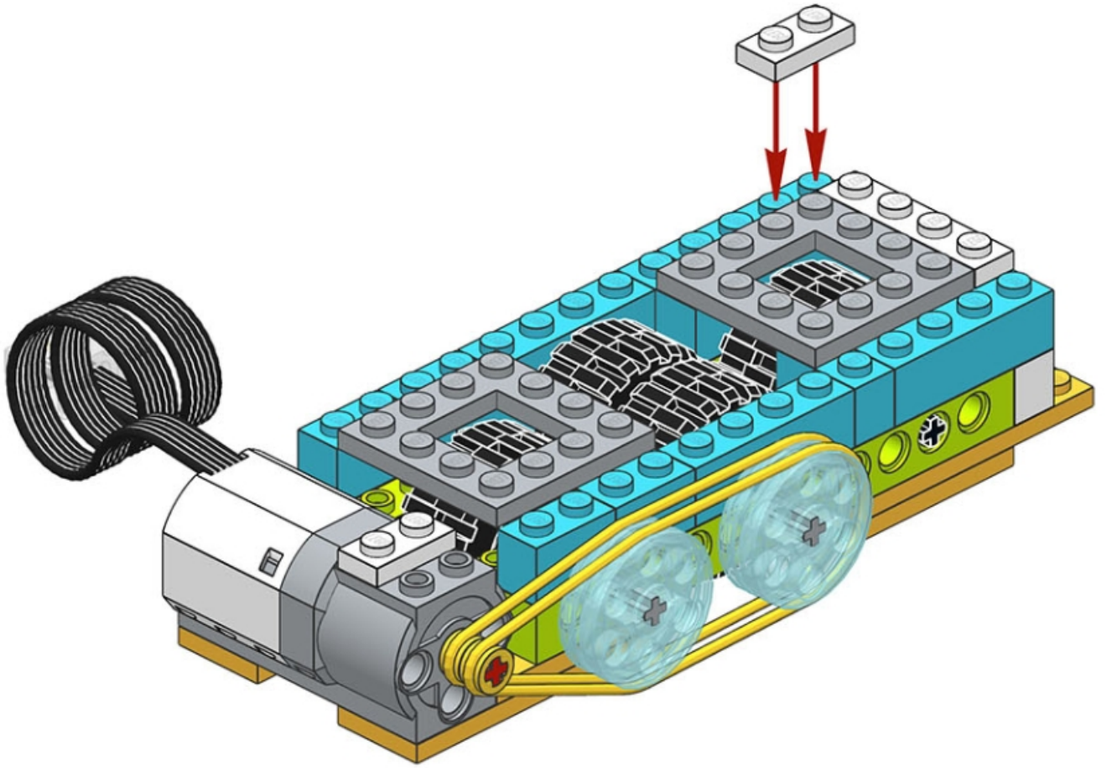

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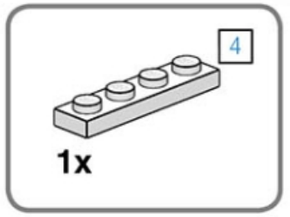

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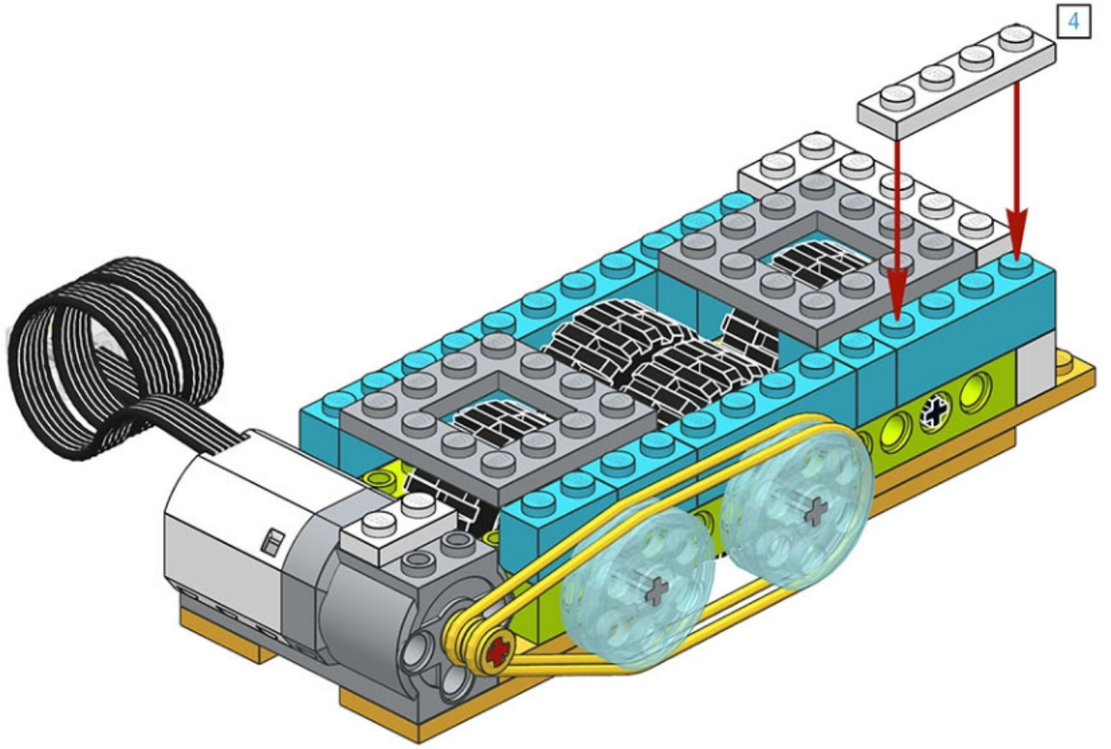

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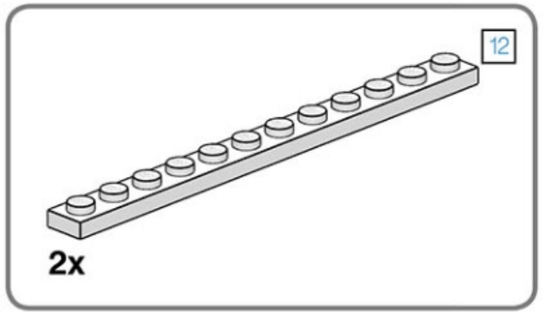

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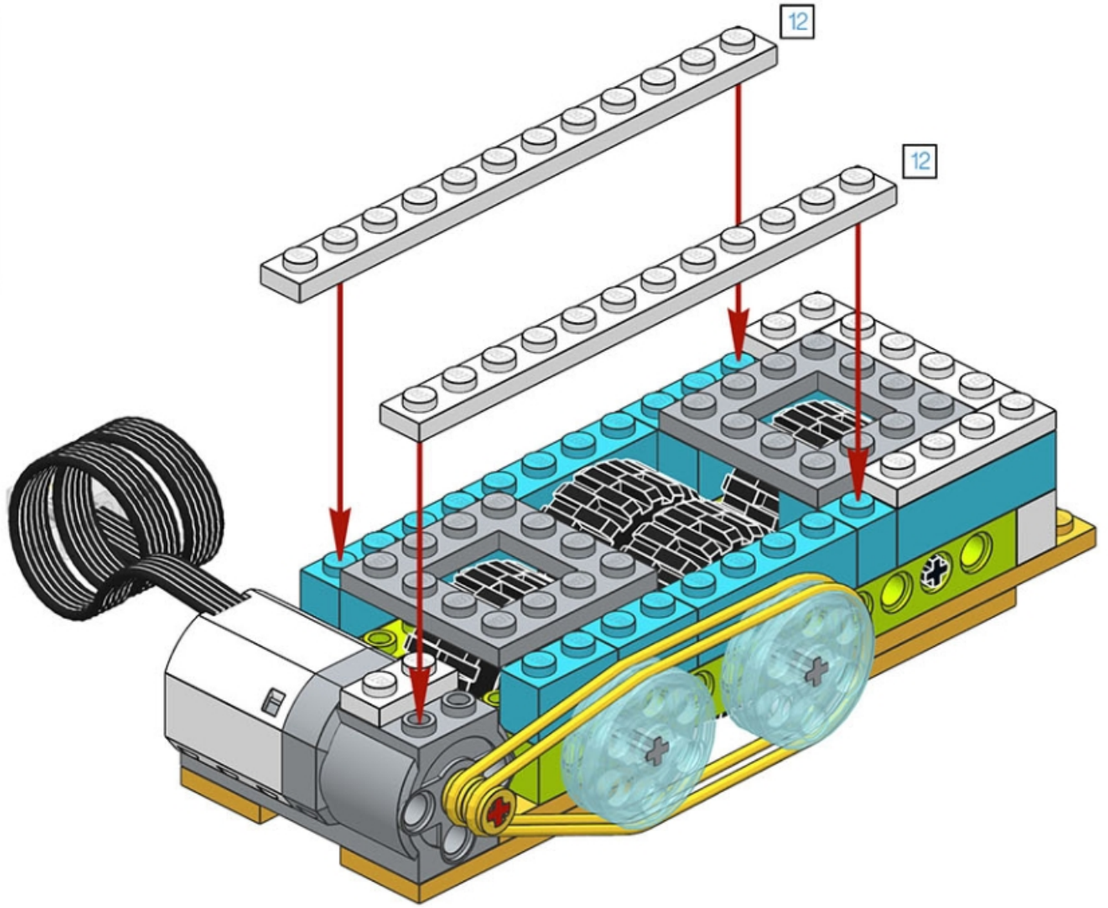

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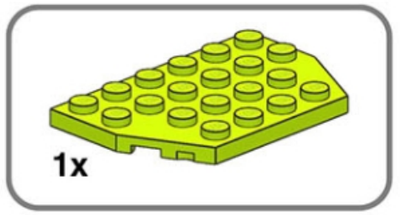

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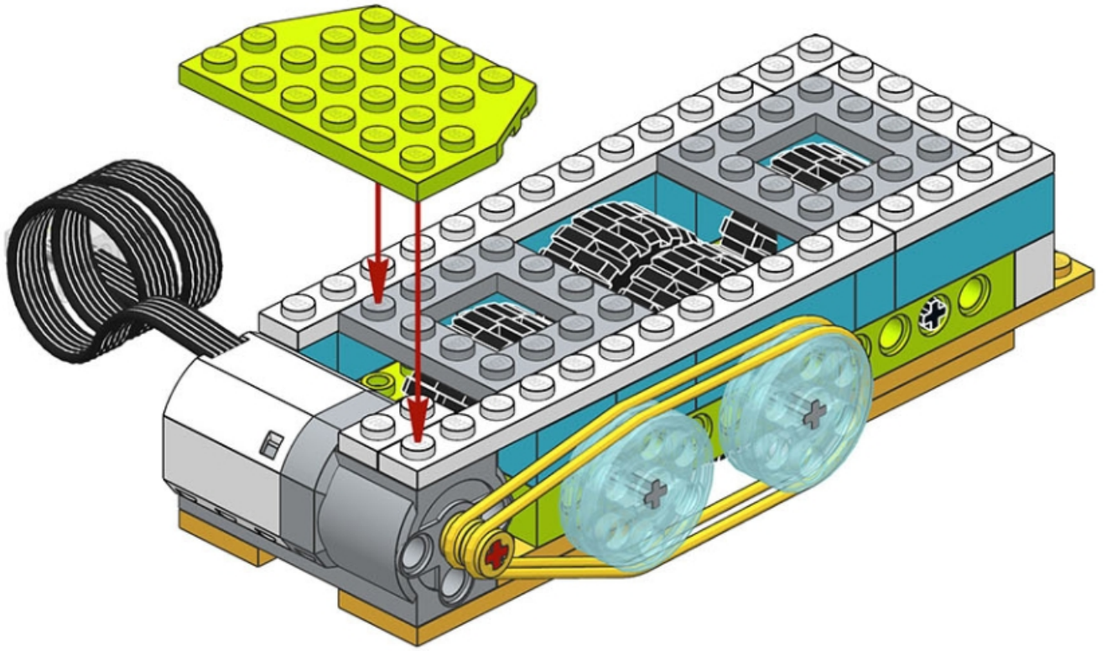

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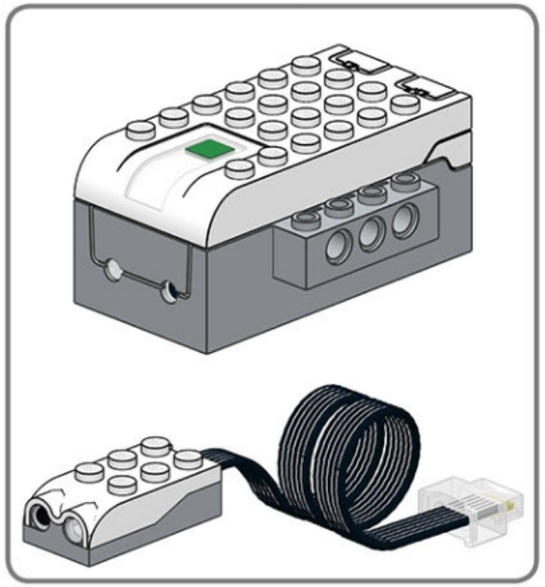

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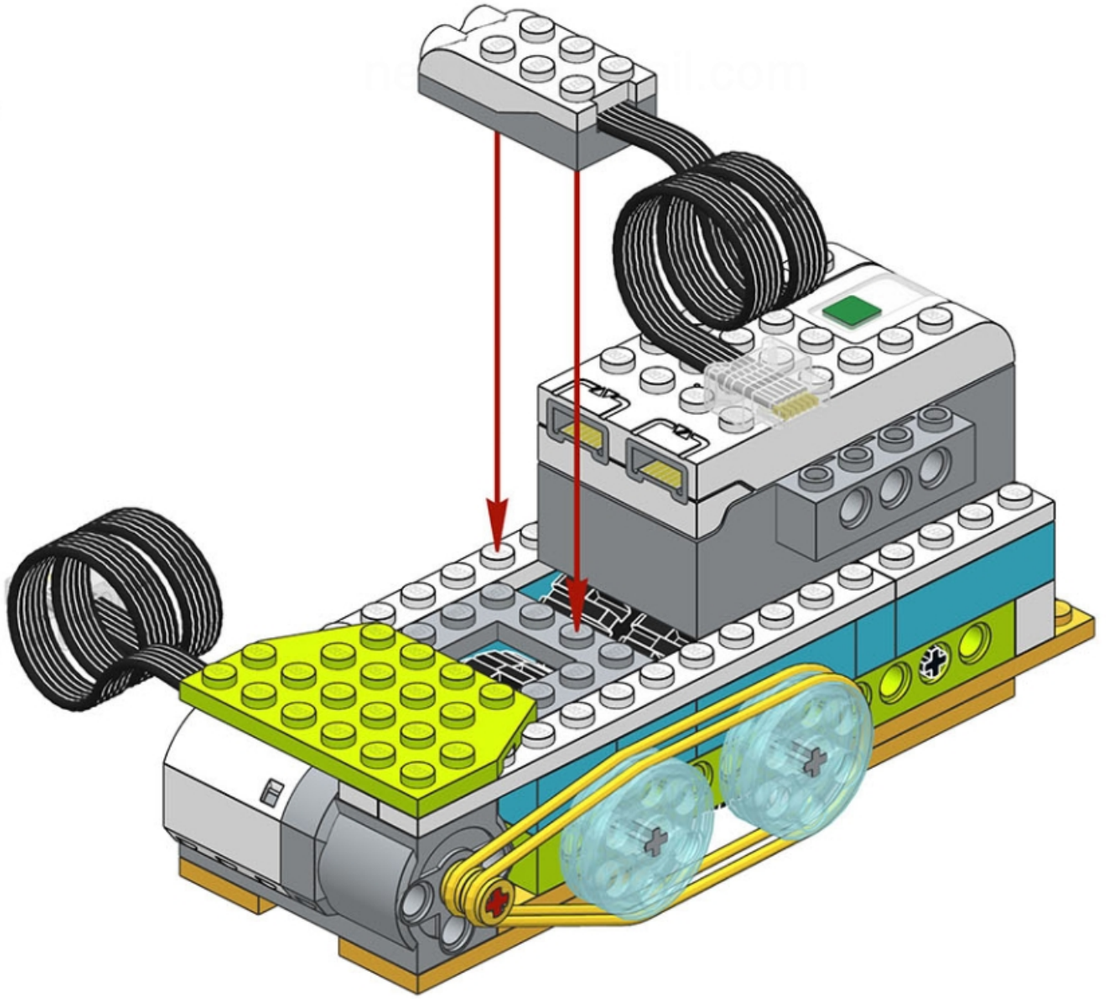

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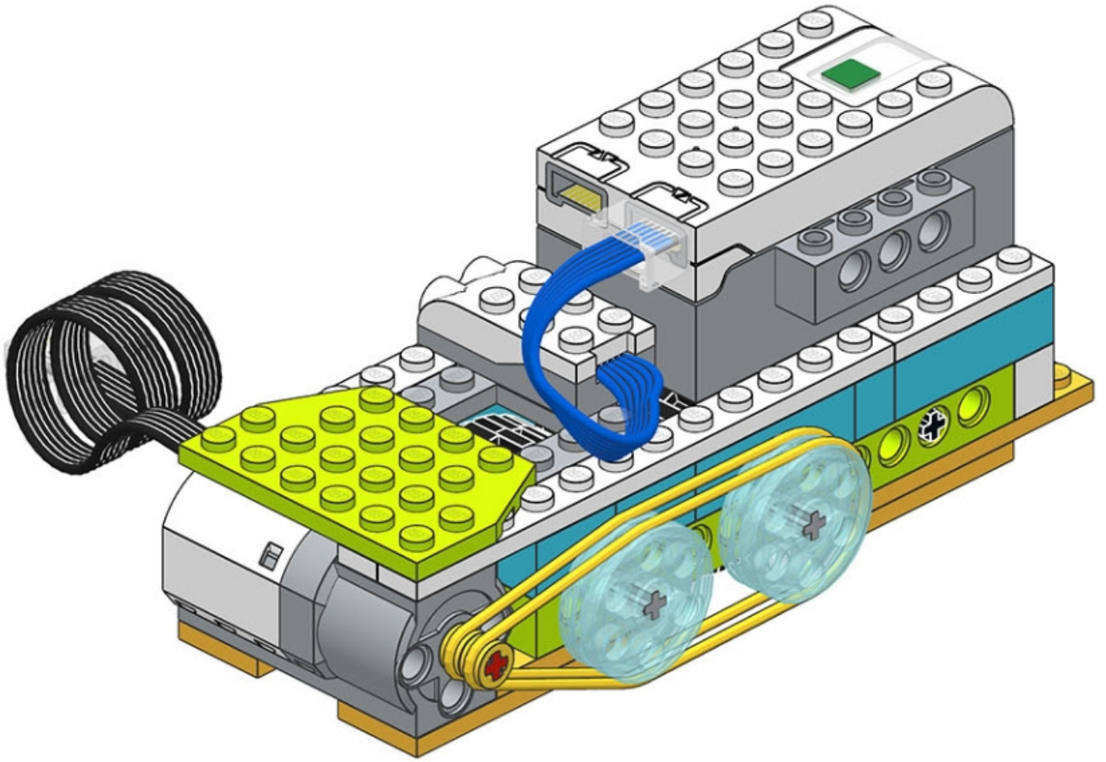

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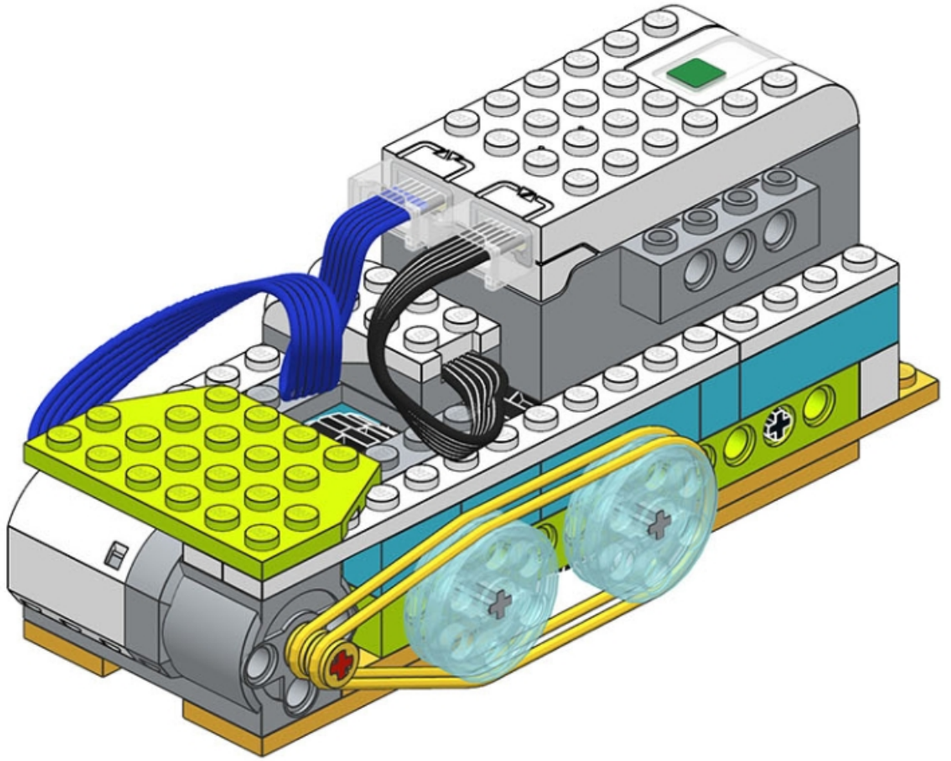

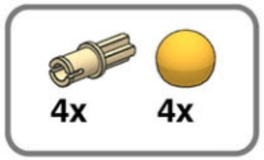

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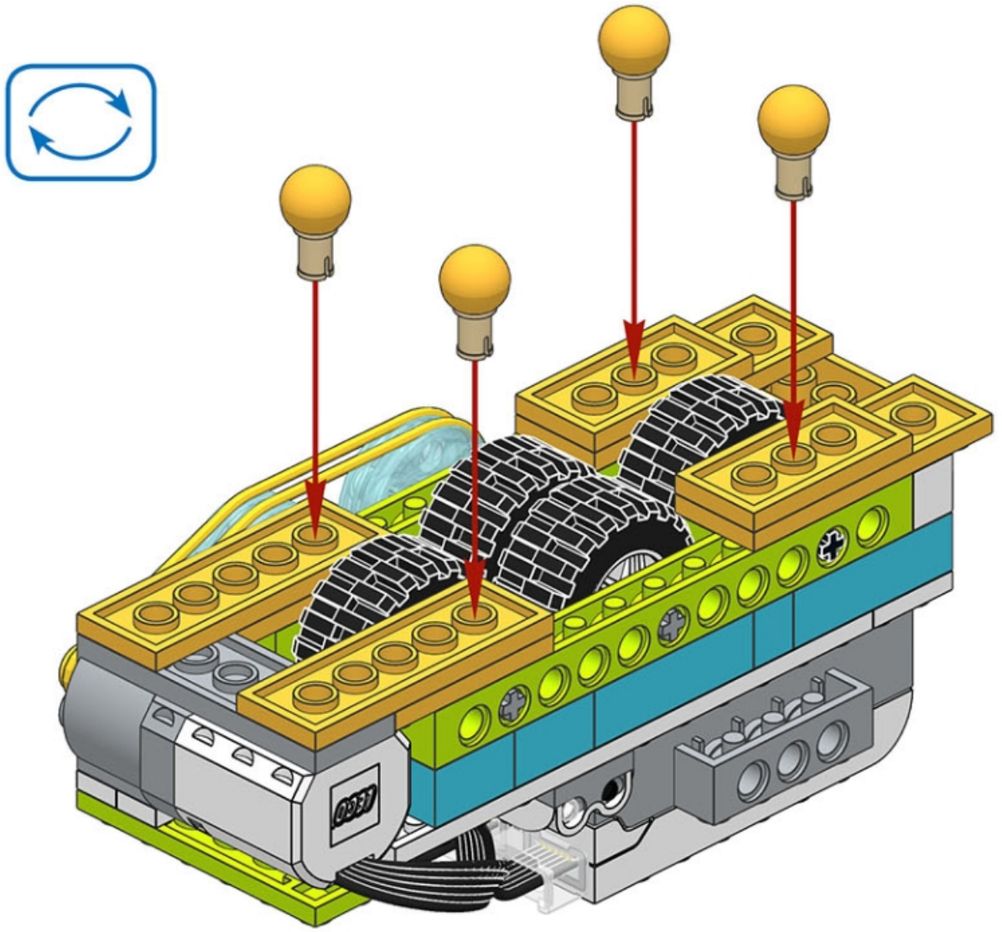

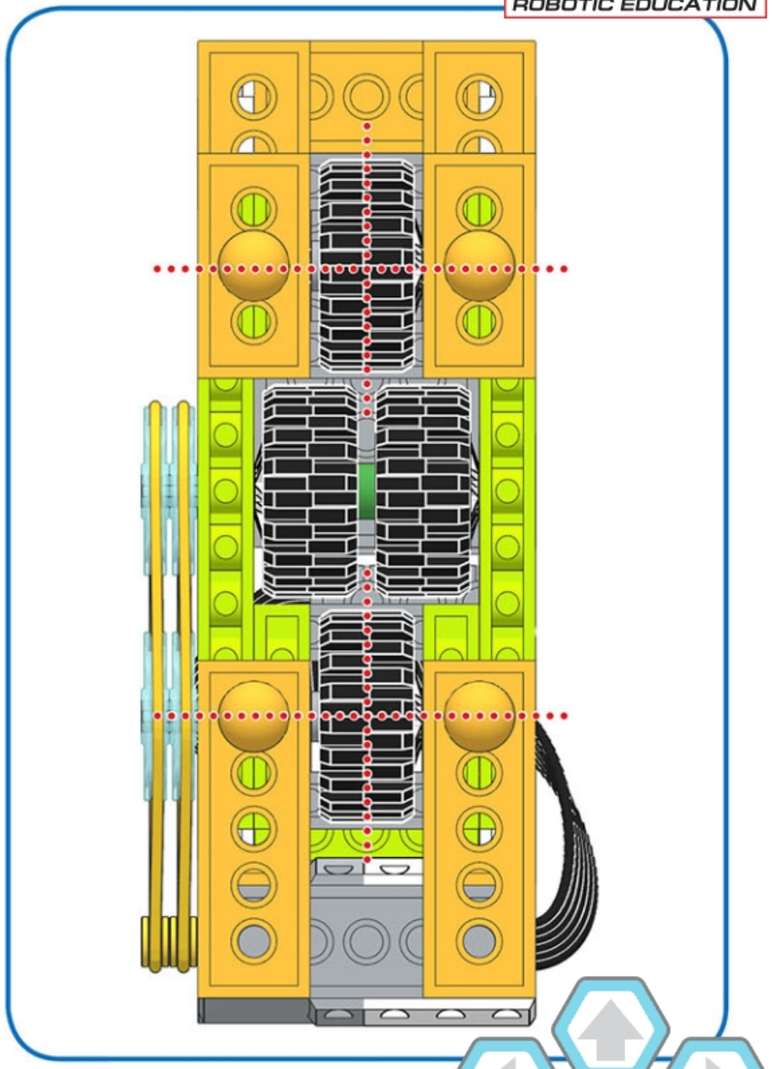

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38/56

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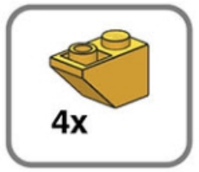

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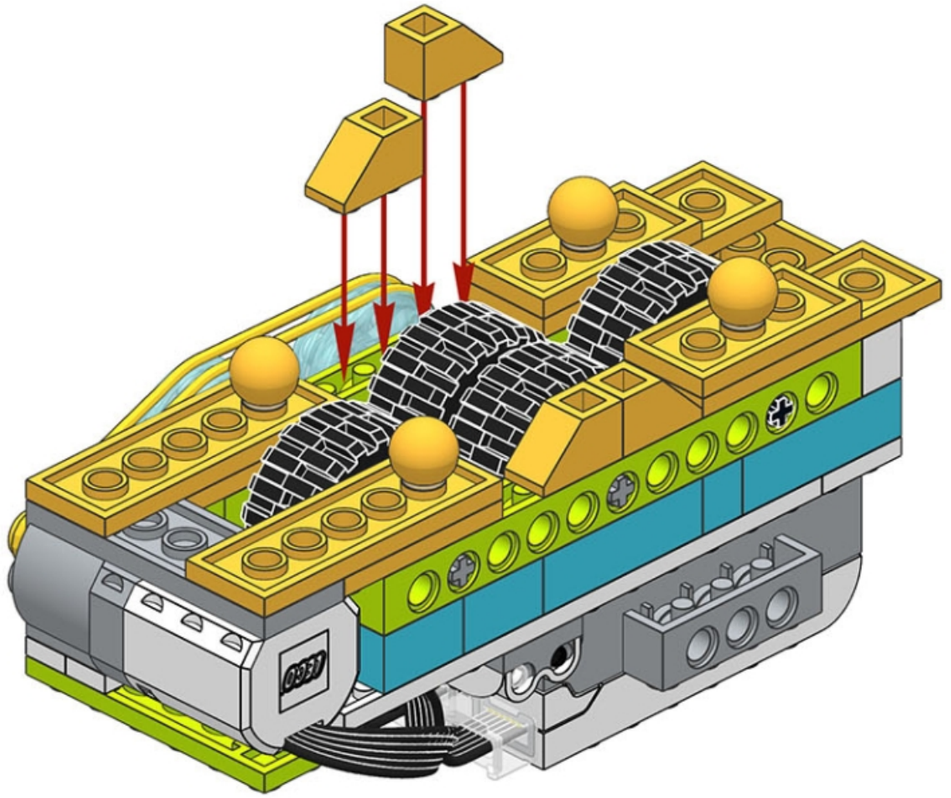

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39/56

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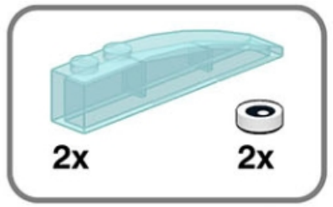

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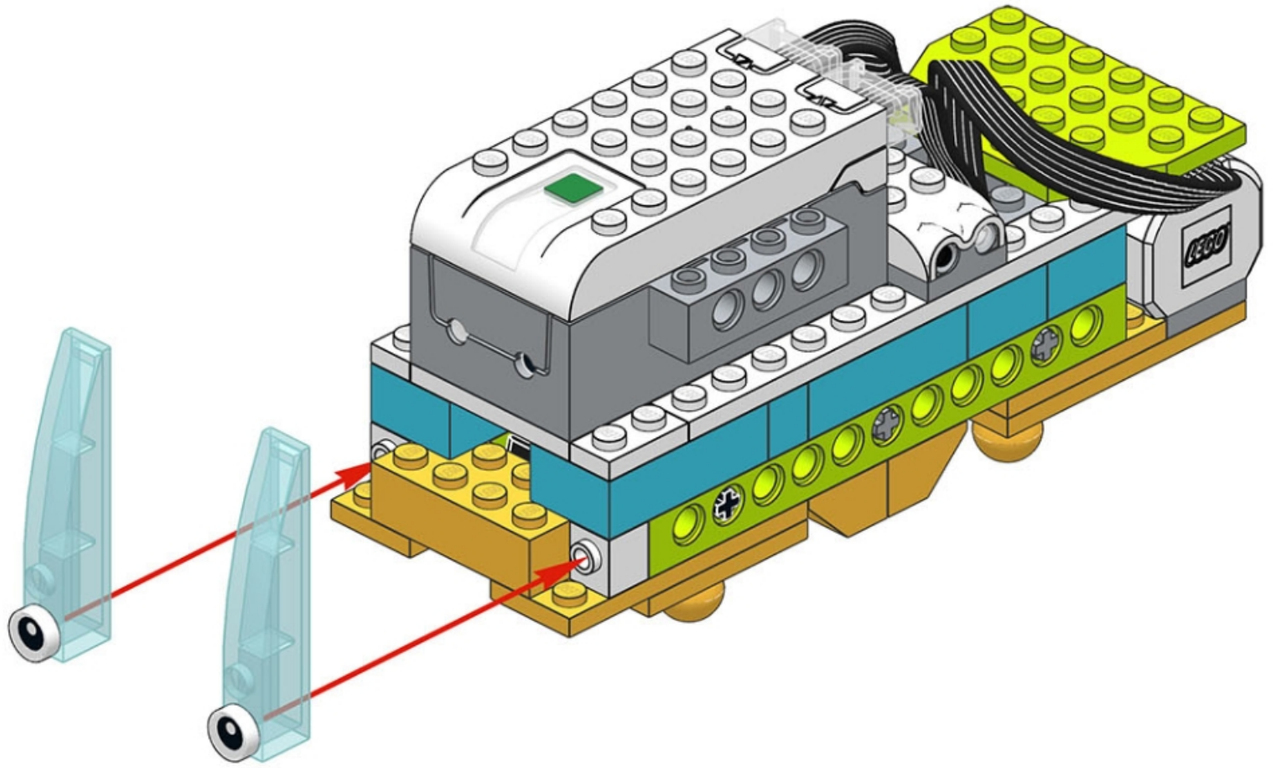

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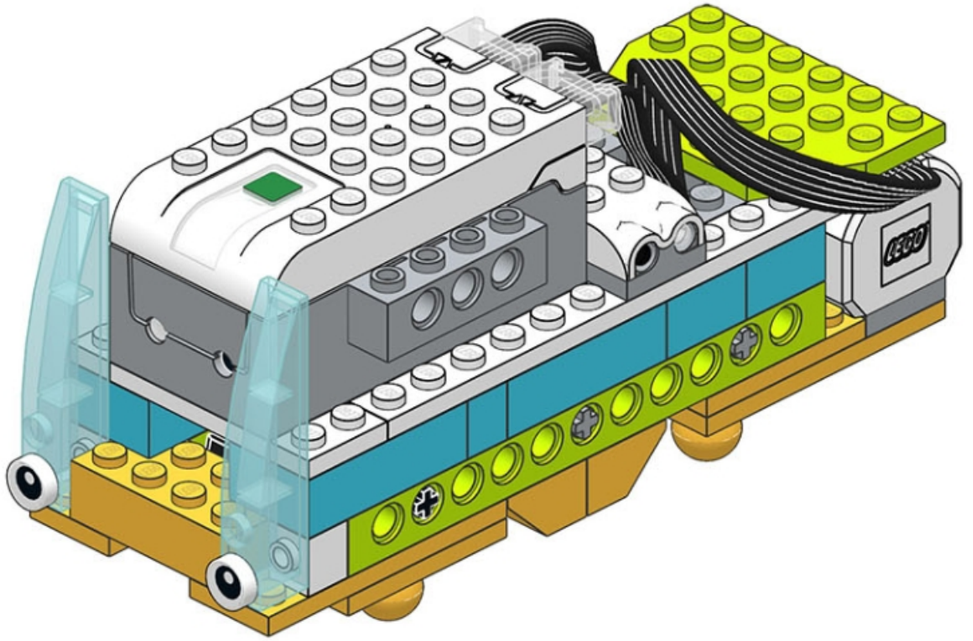

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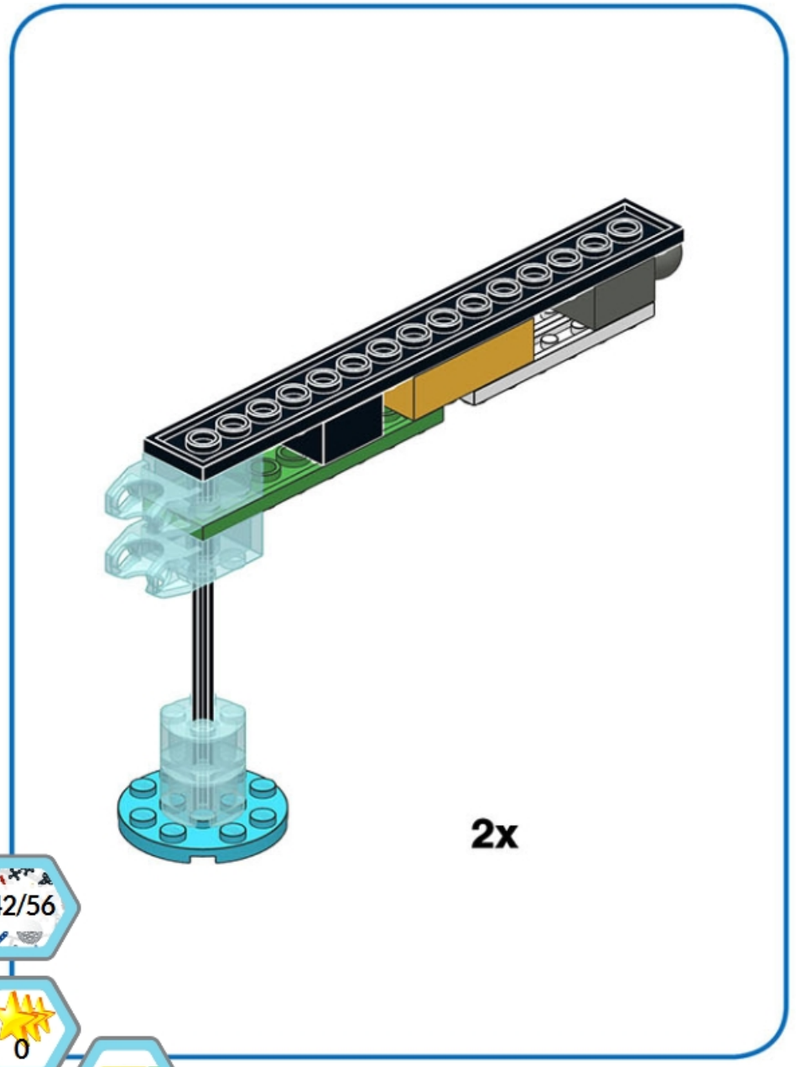

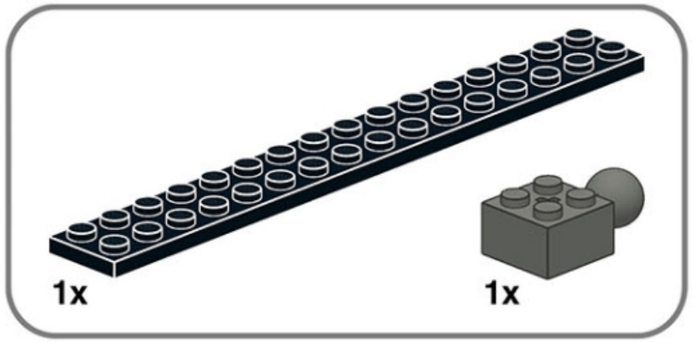

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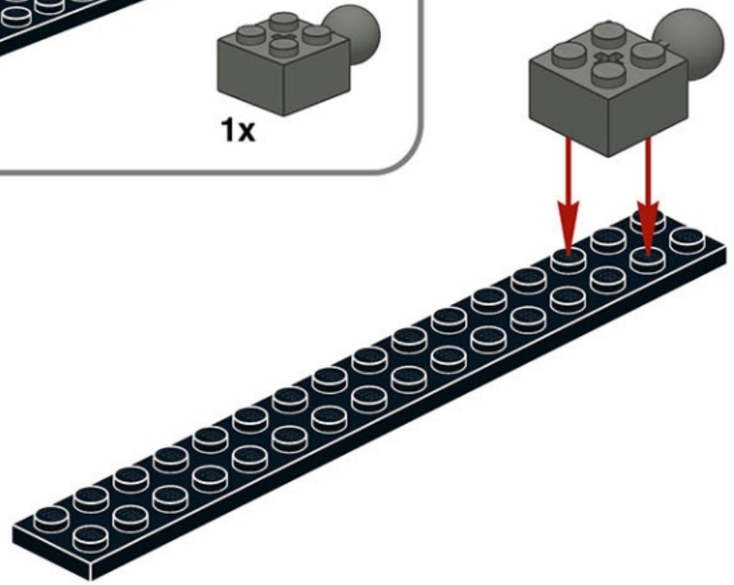

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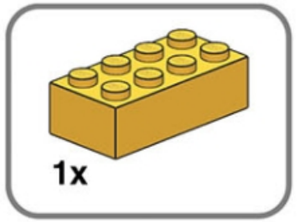

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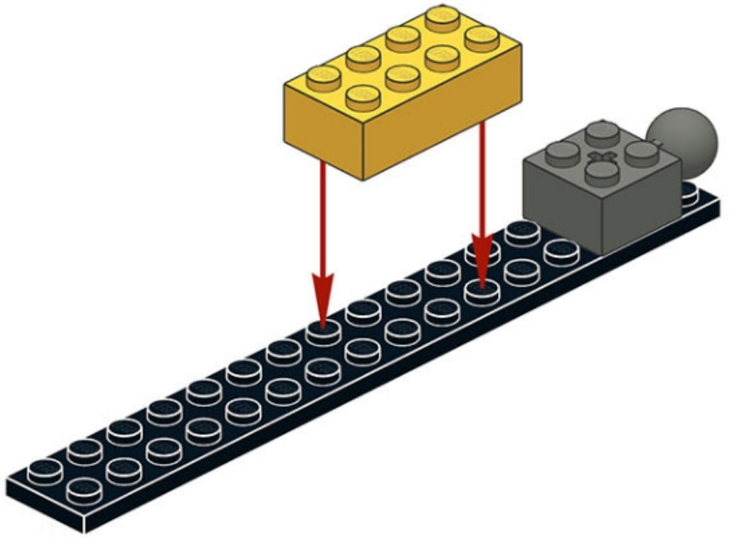

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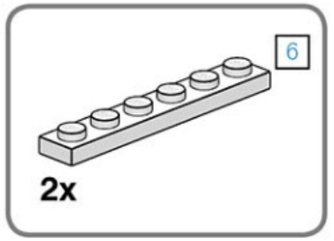

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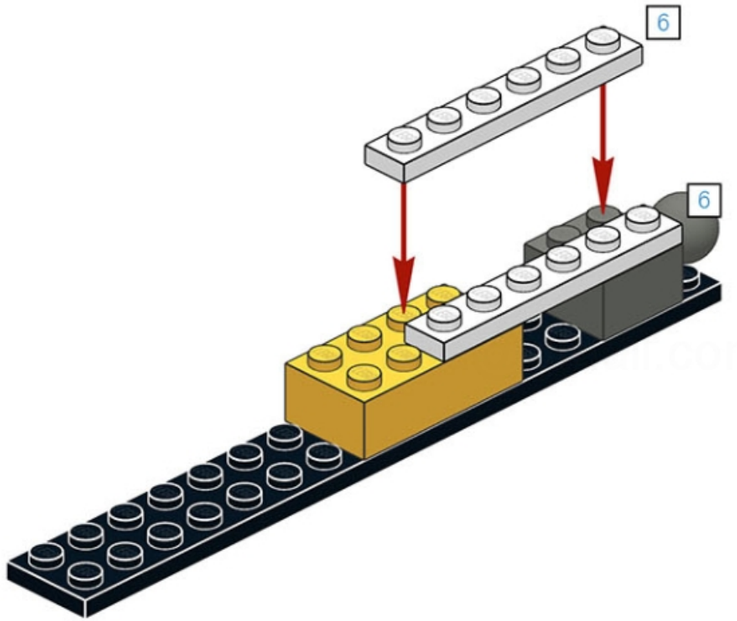

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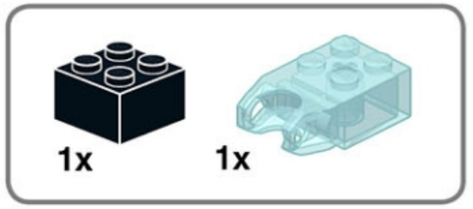

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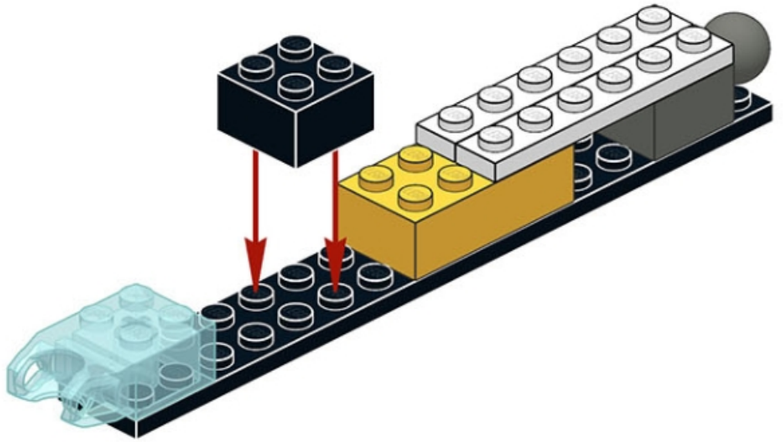

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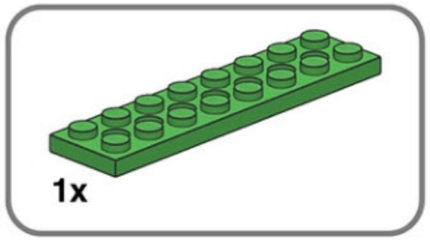

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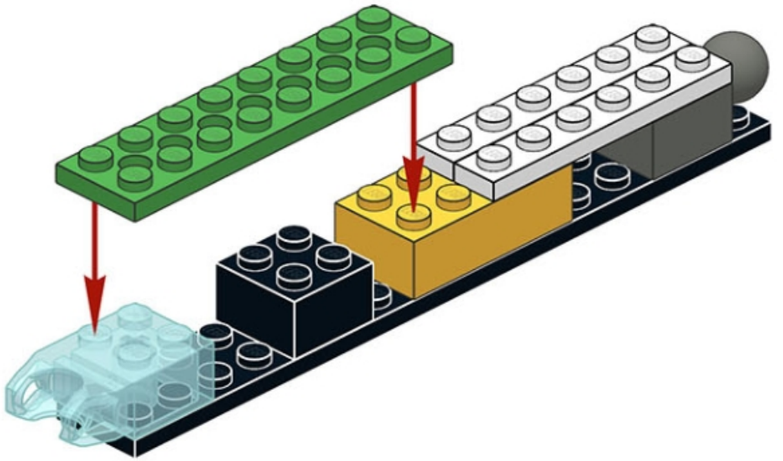

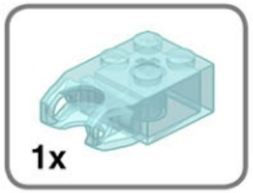

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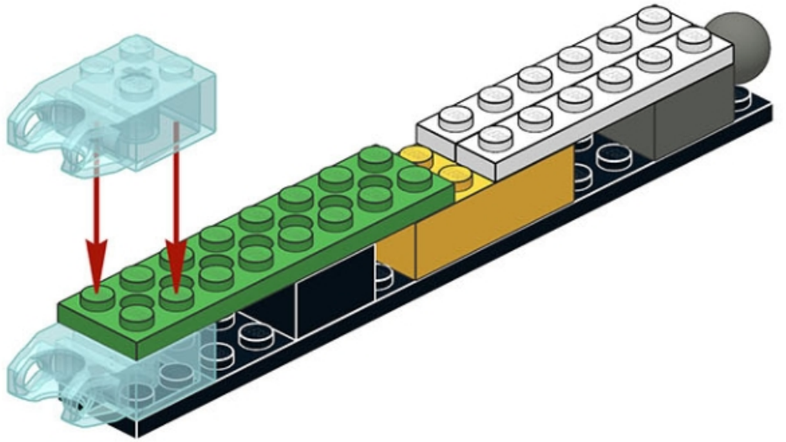

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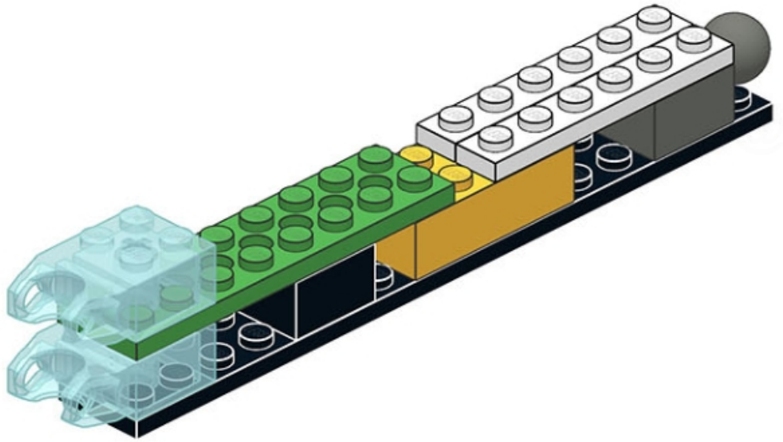

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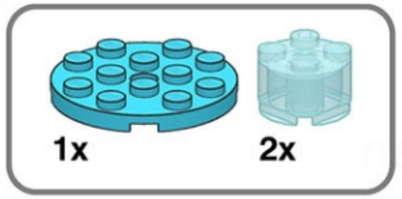

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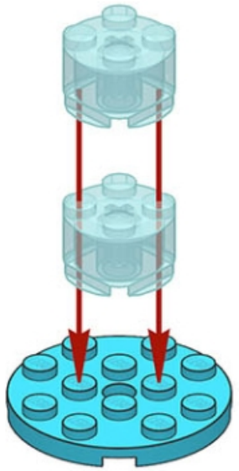

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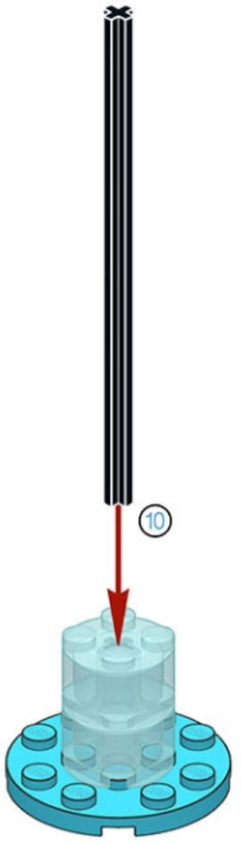

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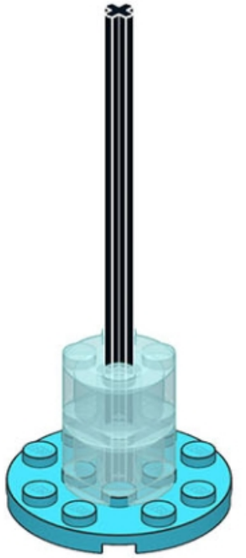

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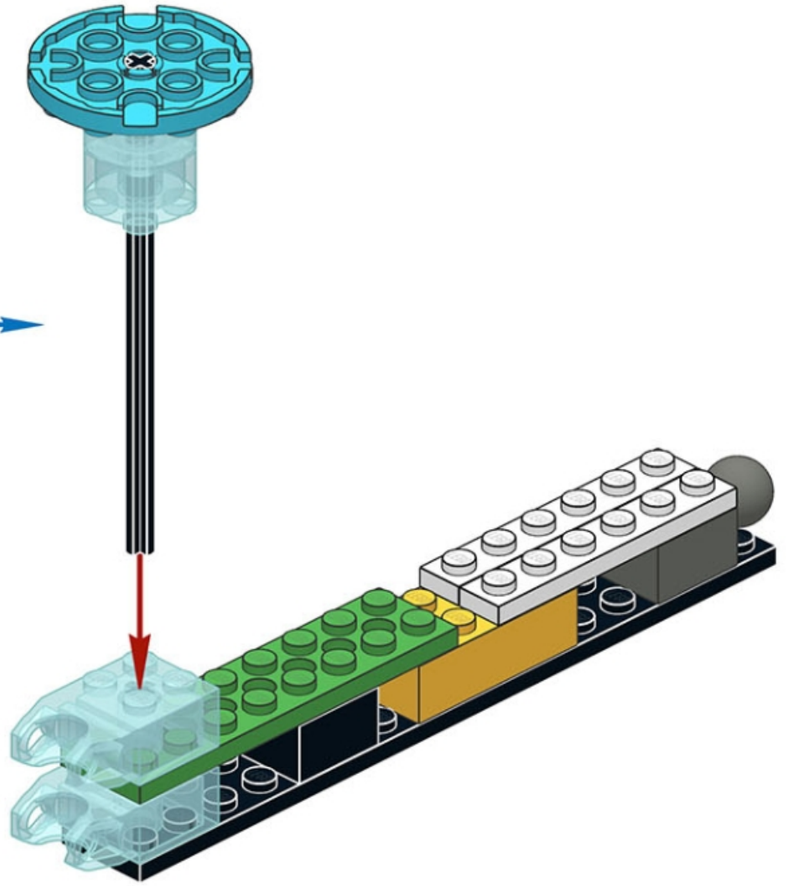

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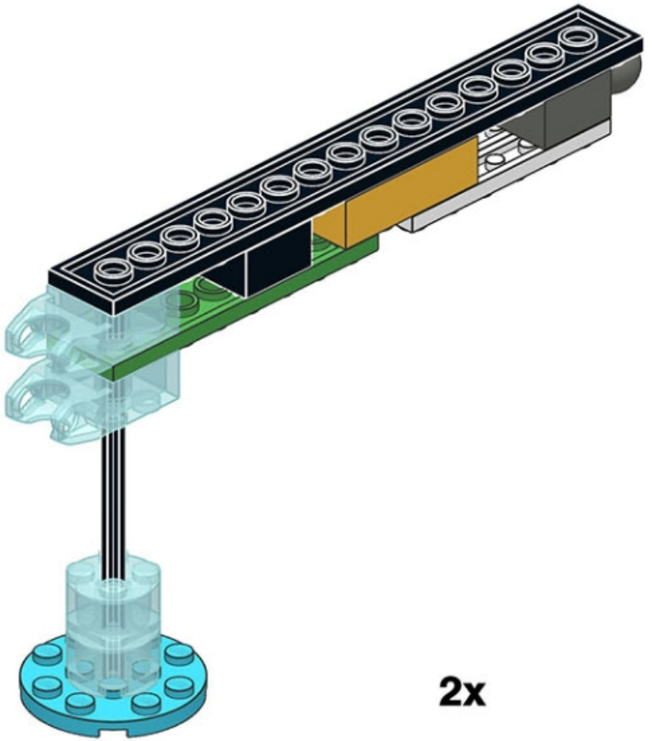

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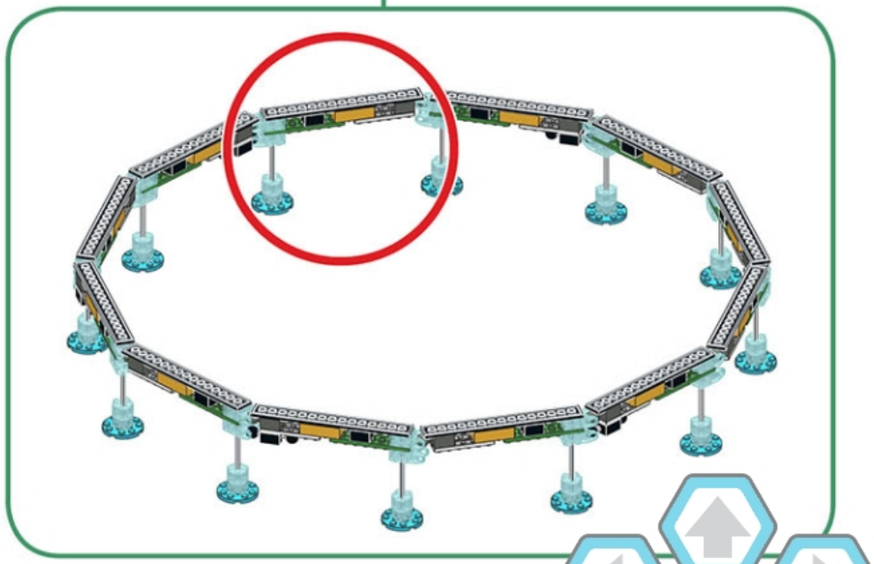

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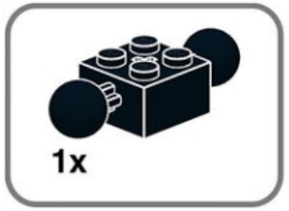

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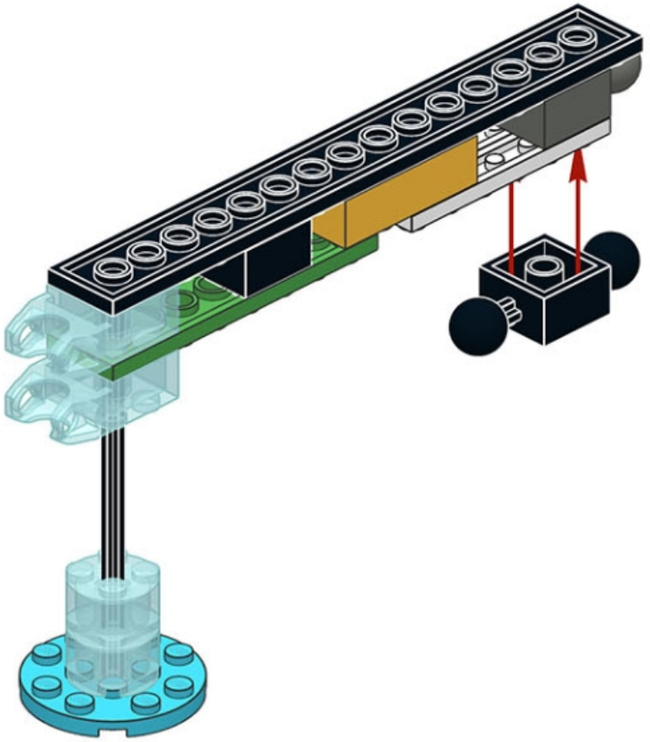

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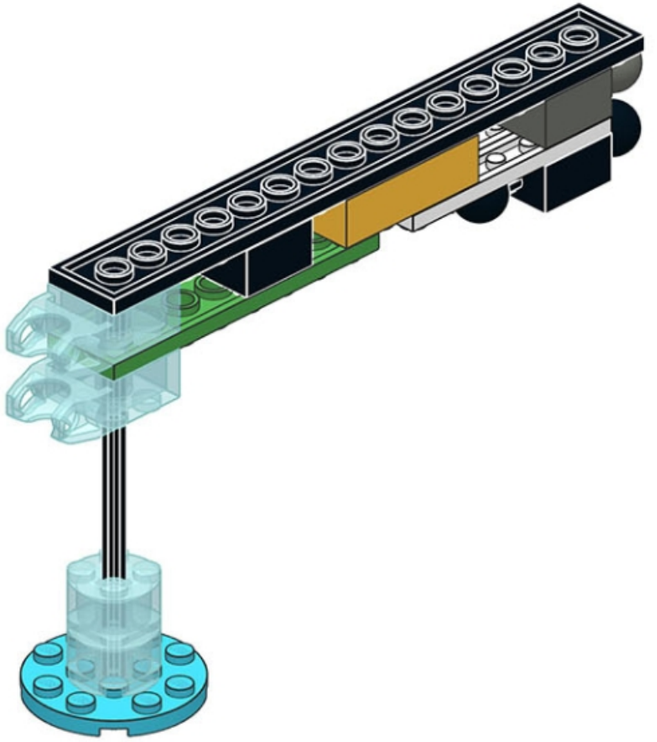

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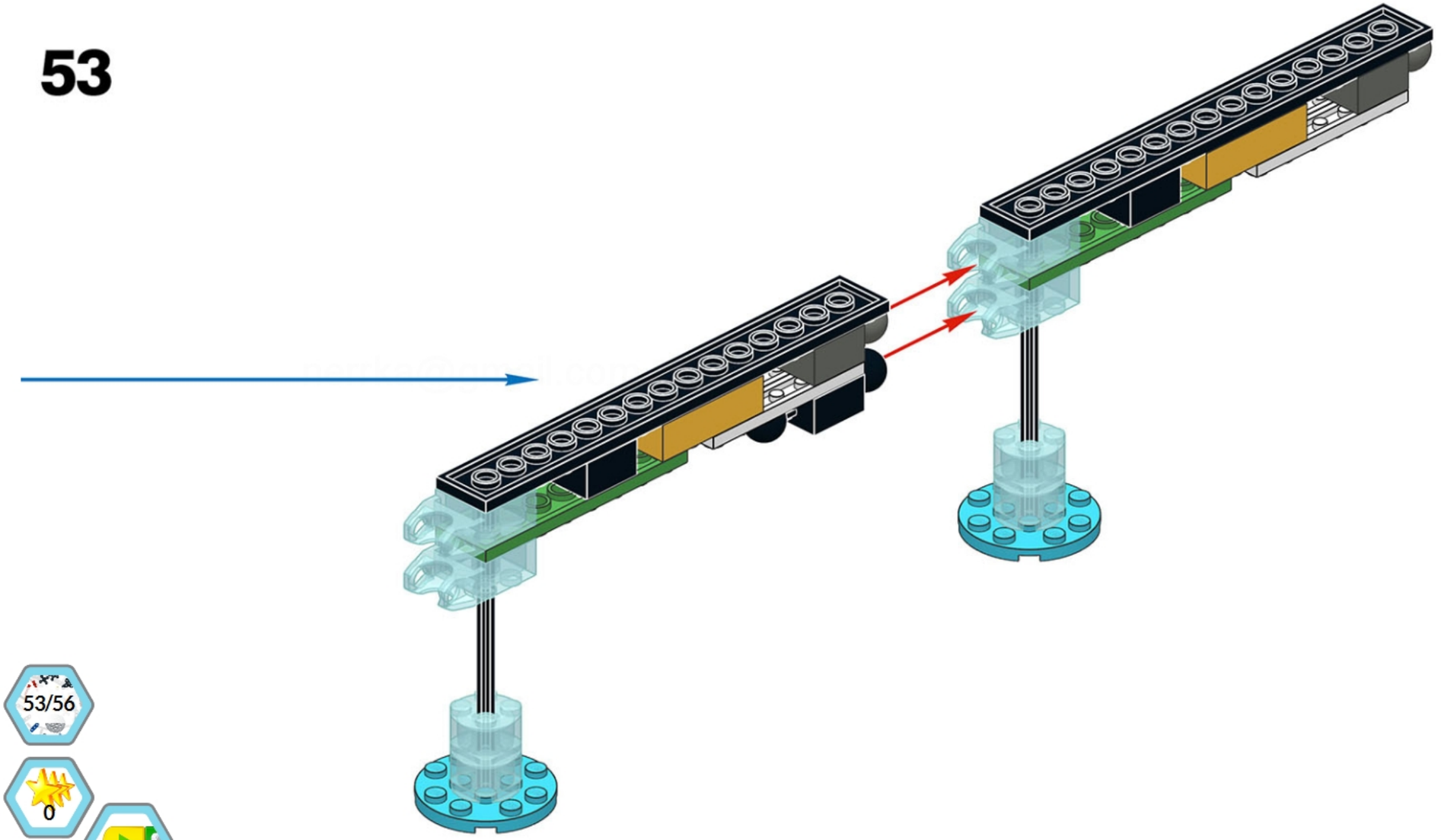

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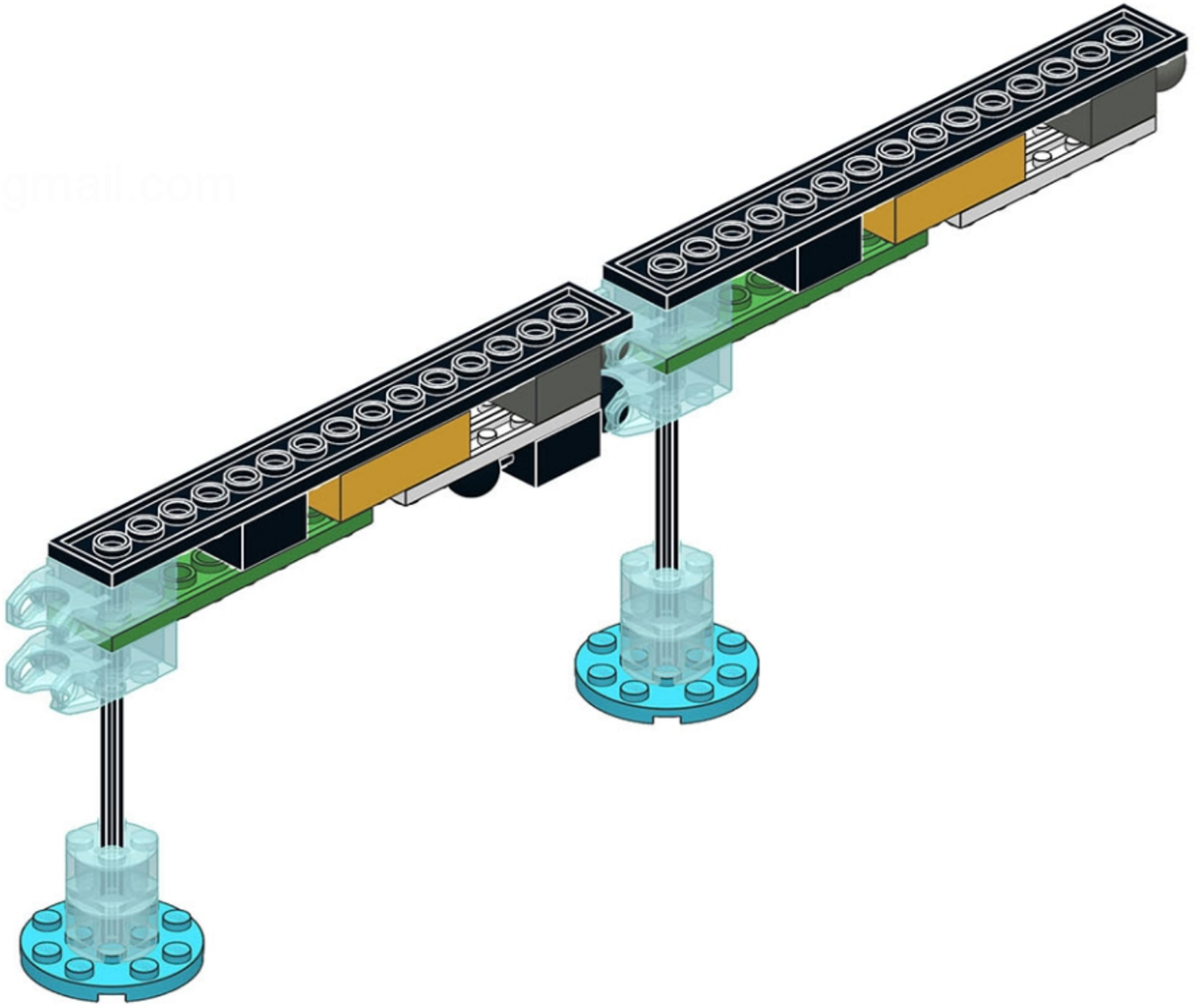

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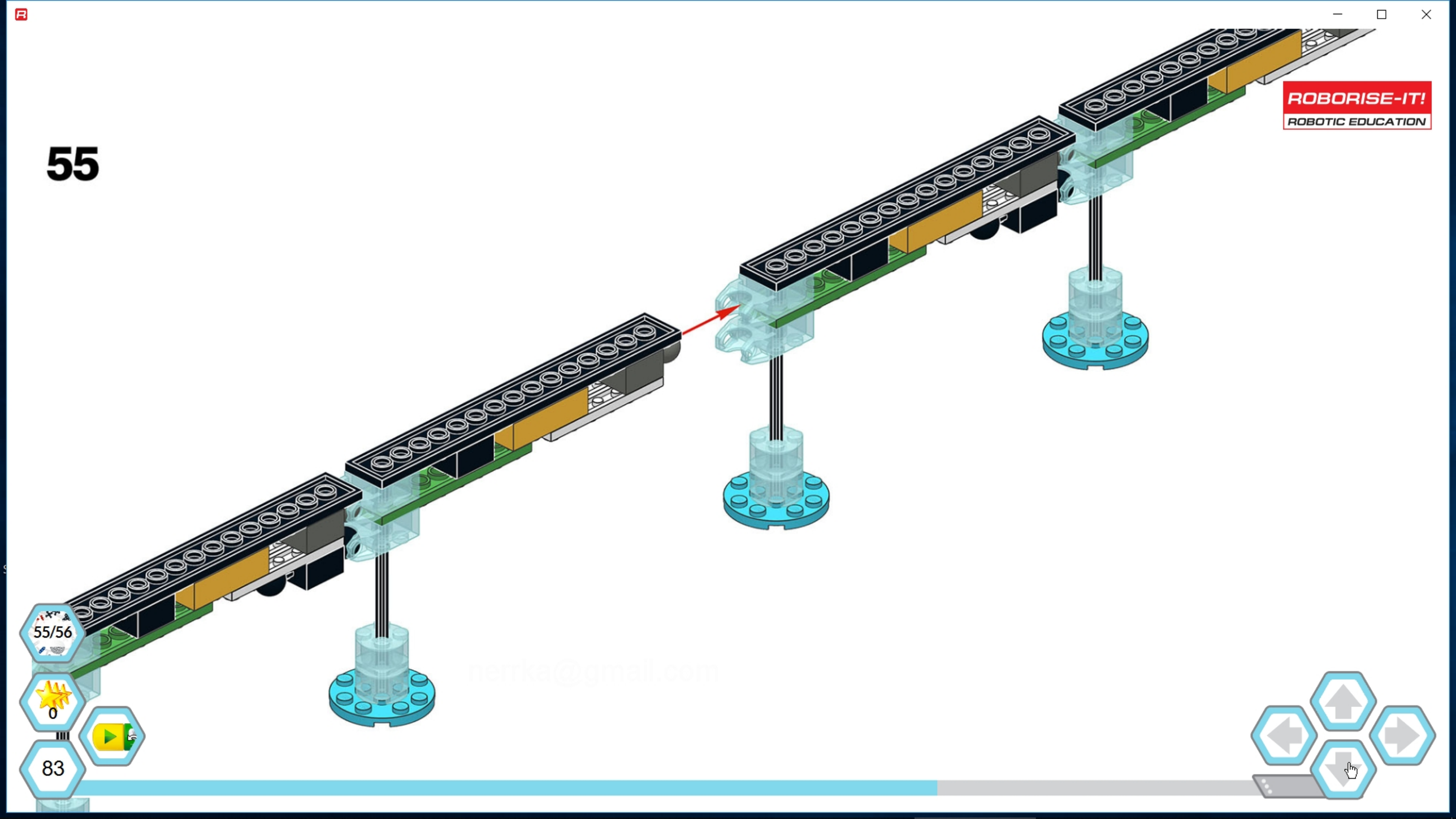
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Enhanced version

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Build more comfortable
train saloon.

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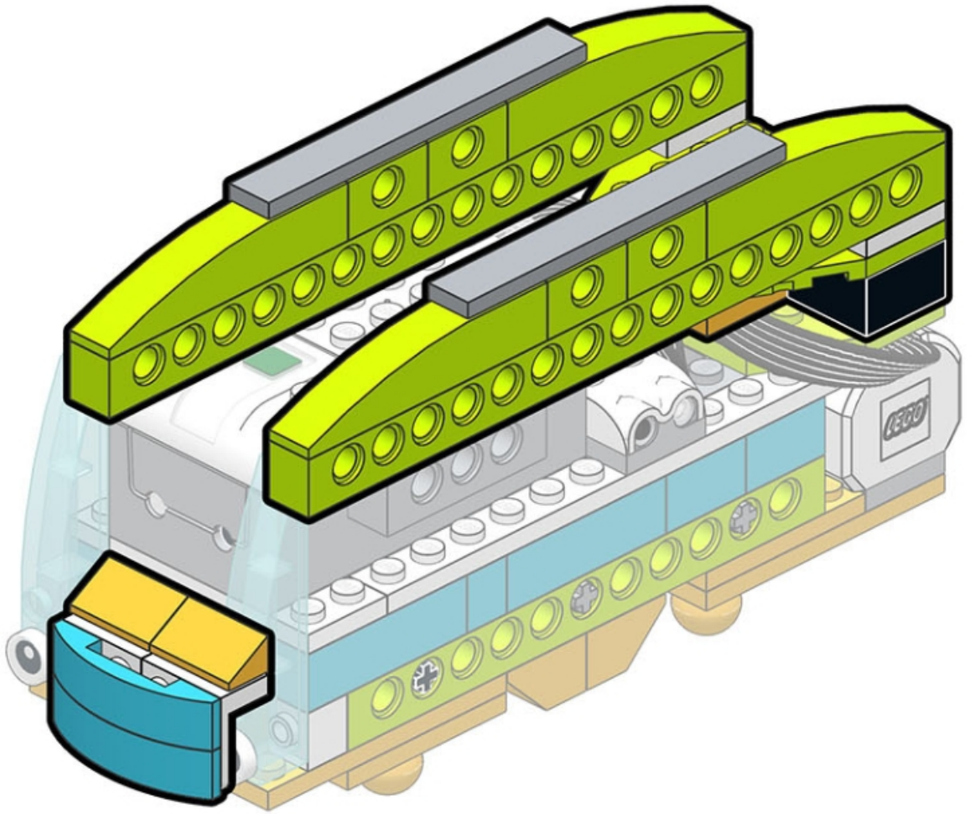

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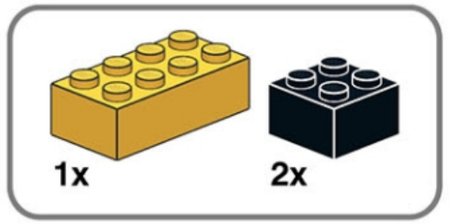

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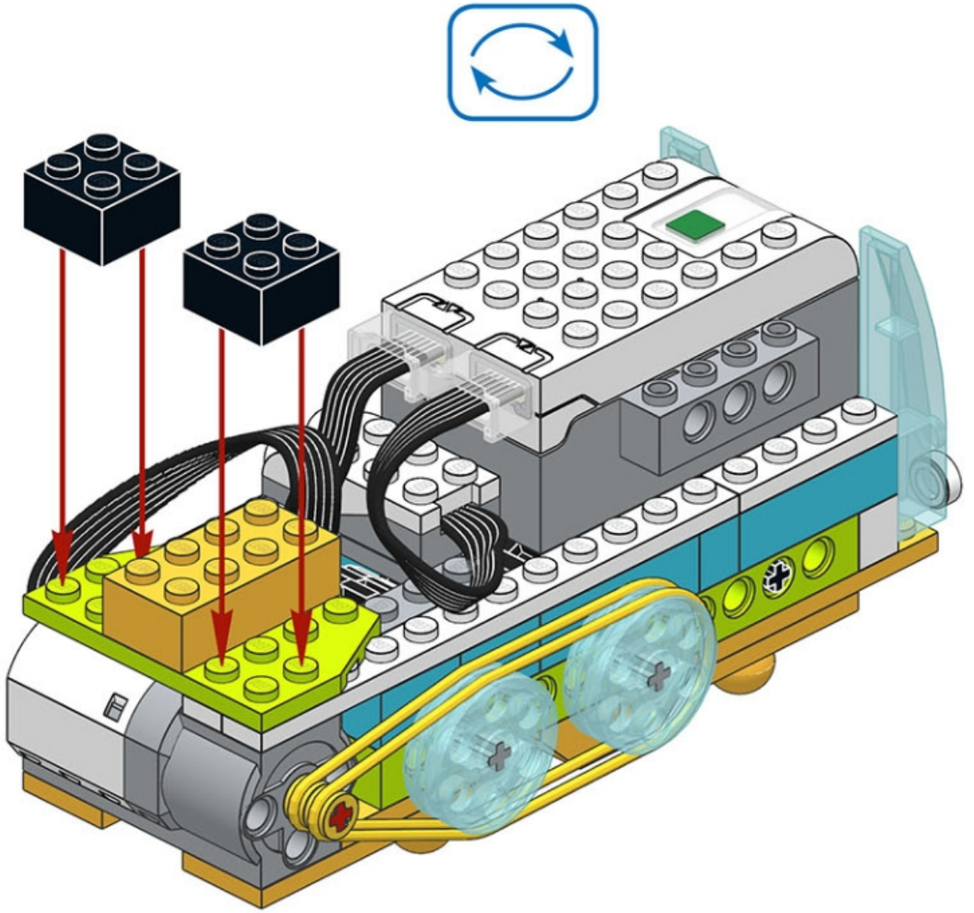

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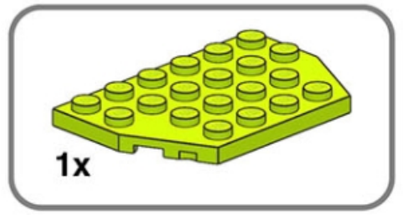

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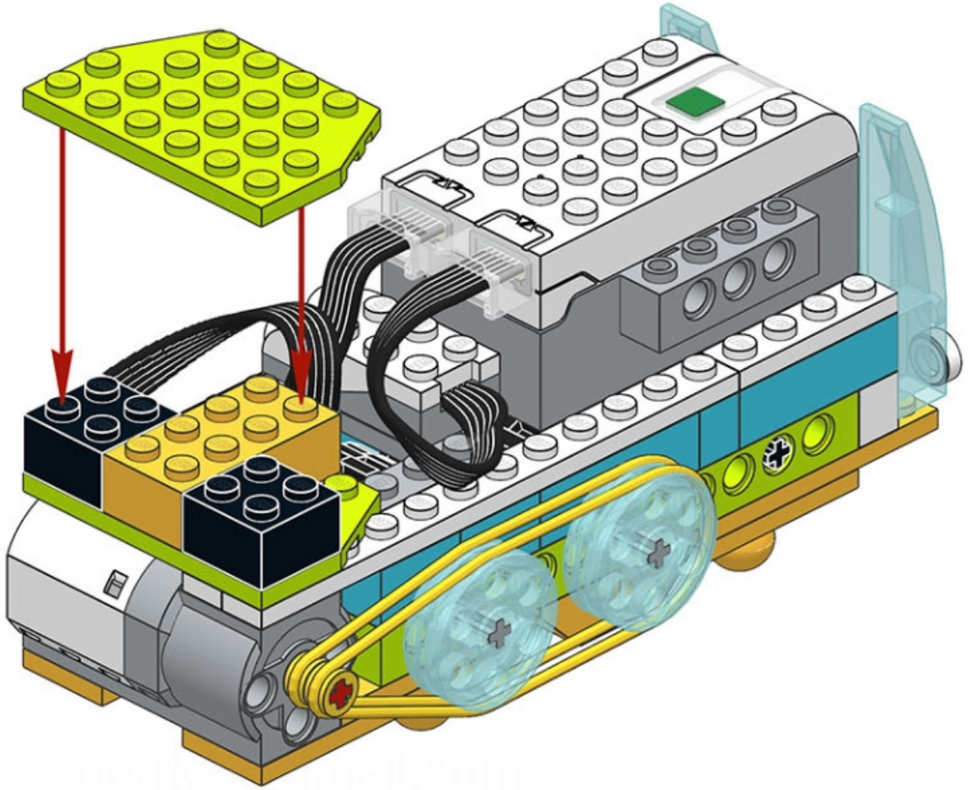

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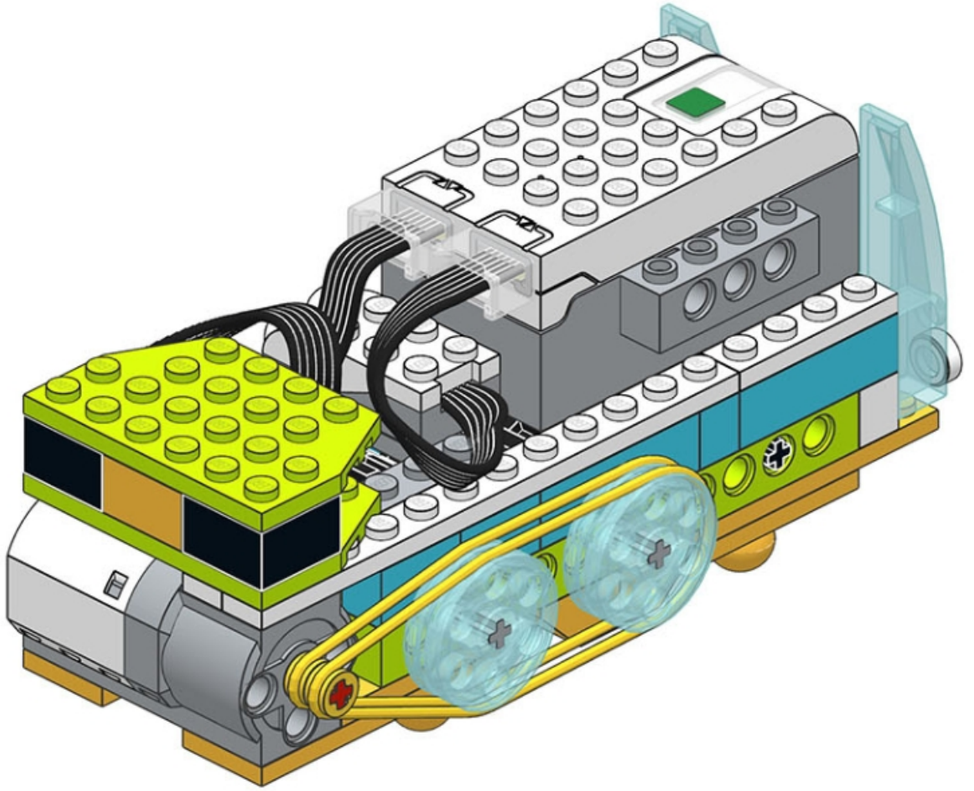

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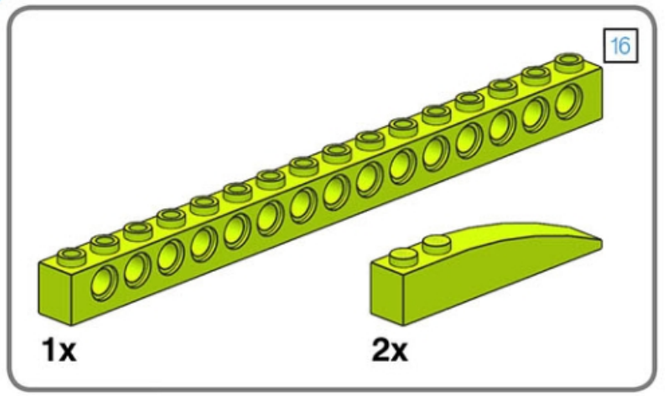

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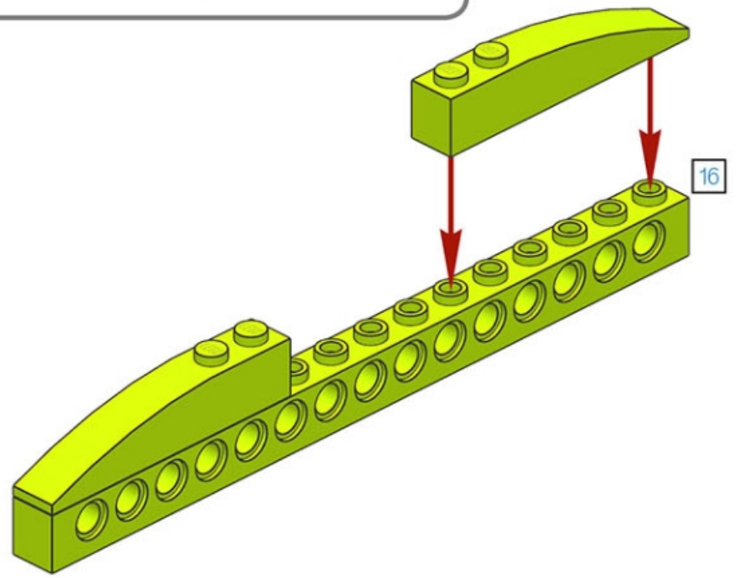

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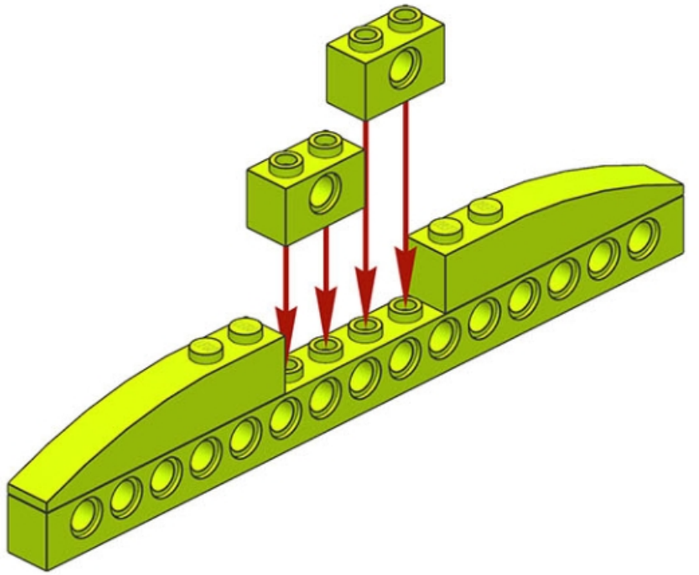

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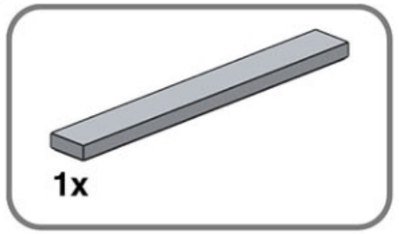

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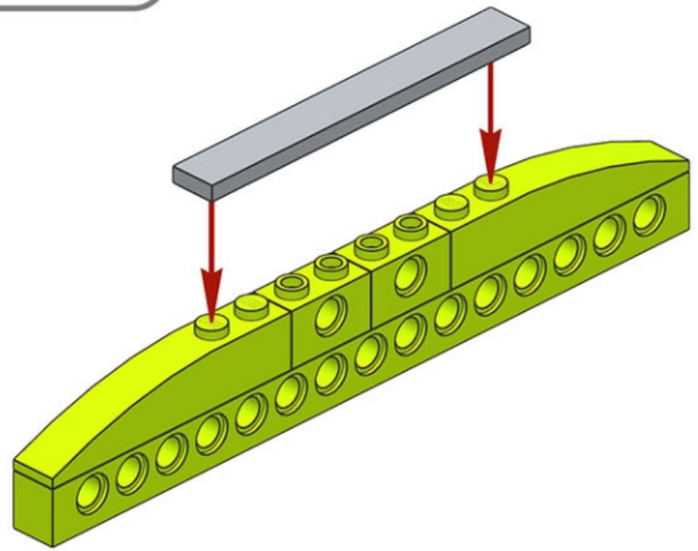

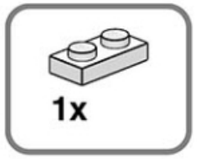

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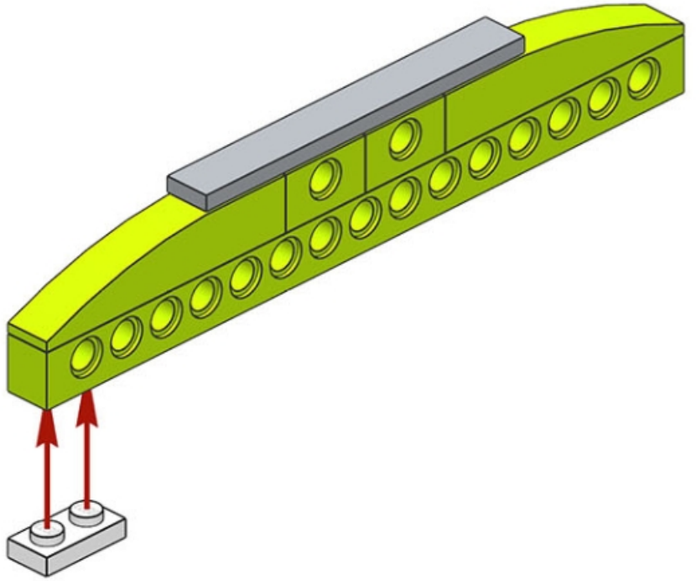

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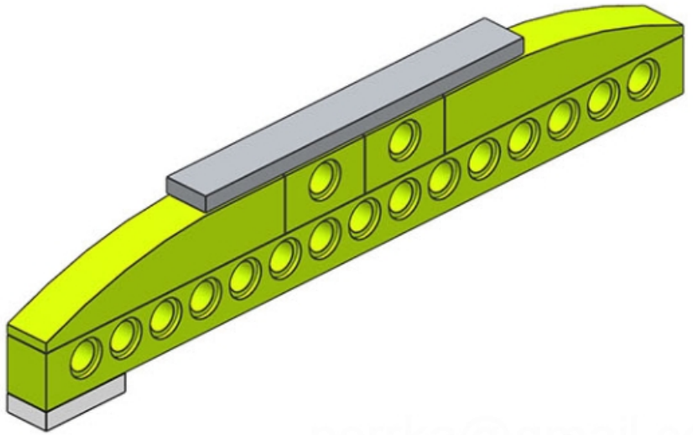

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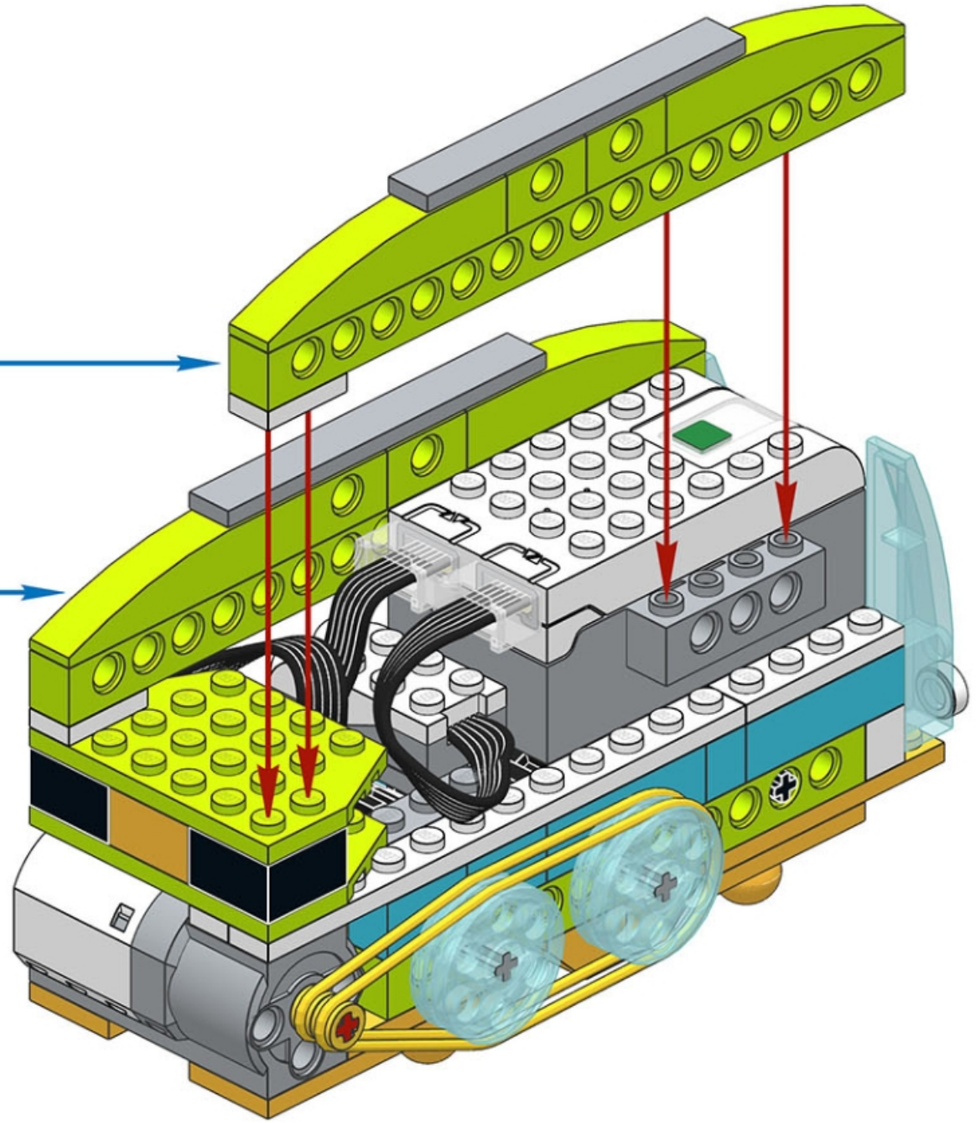

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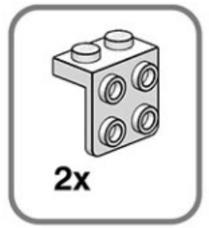

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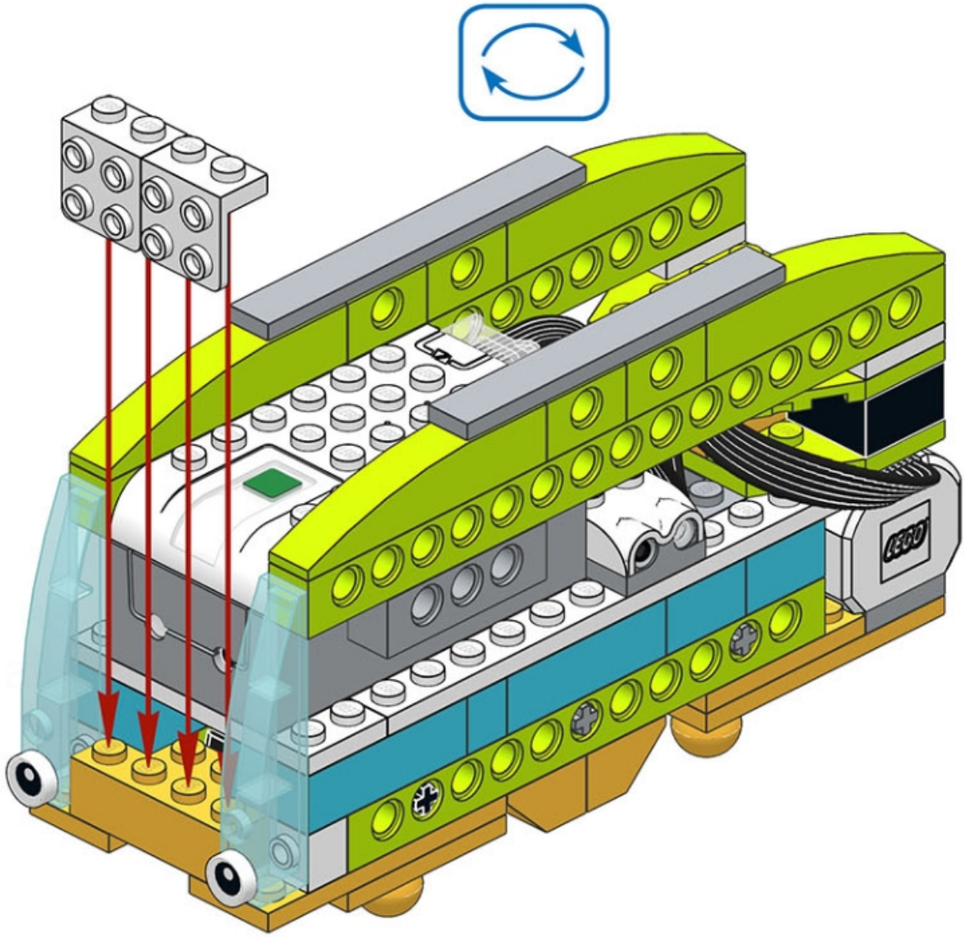

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ROBOTIC EDUCATION

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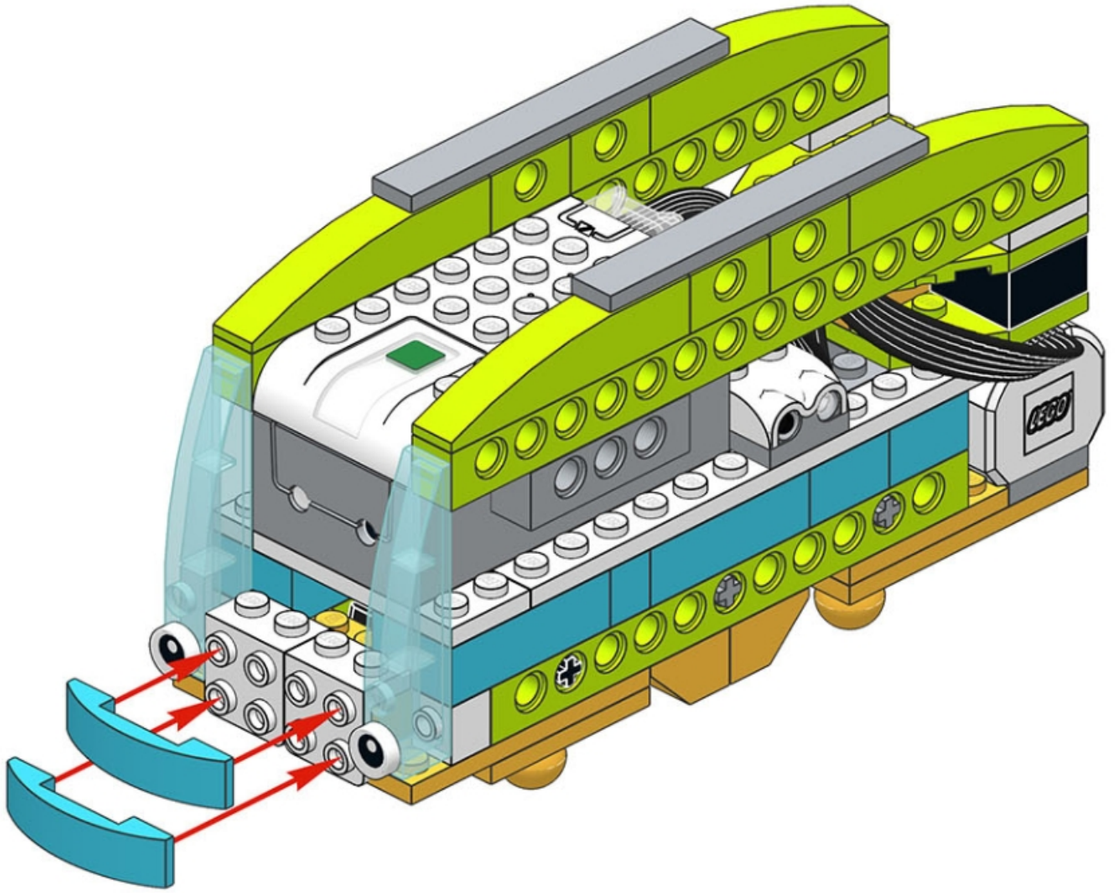

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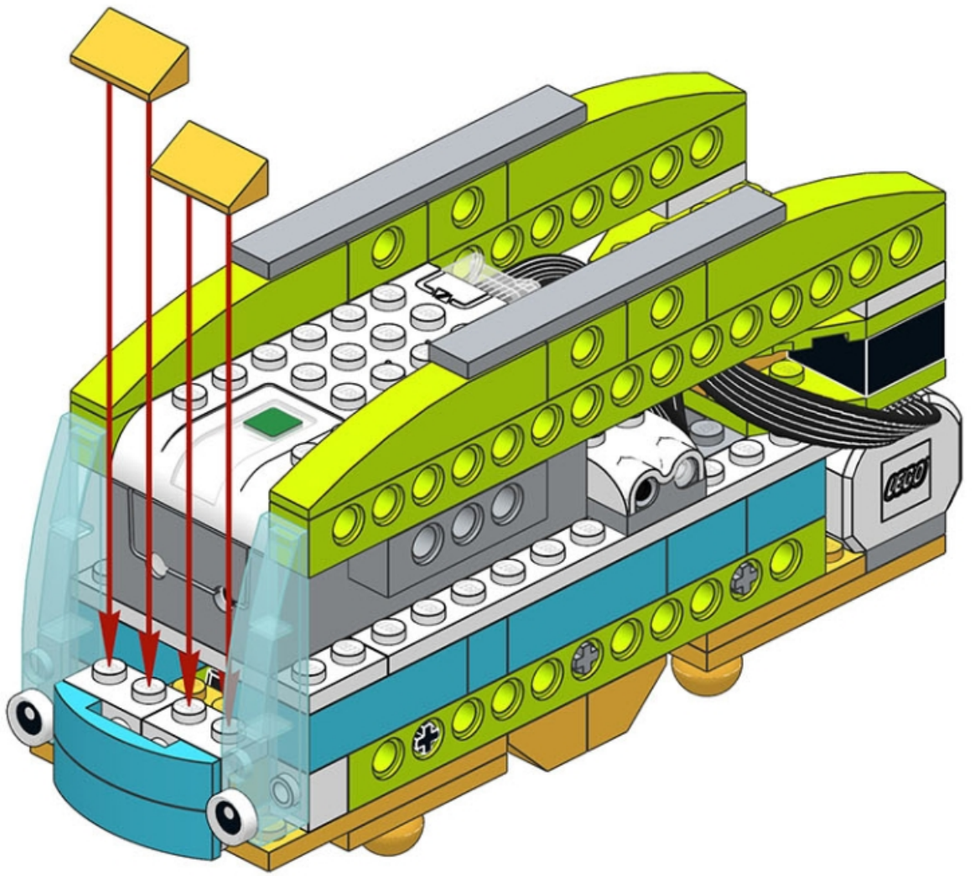

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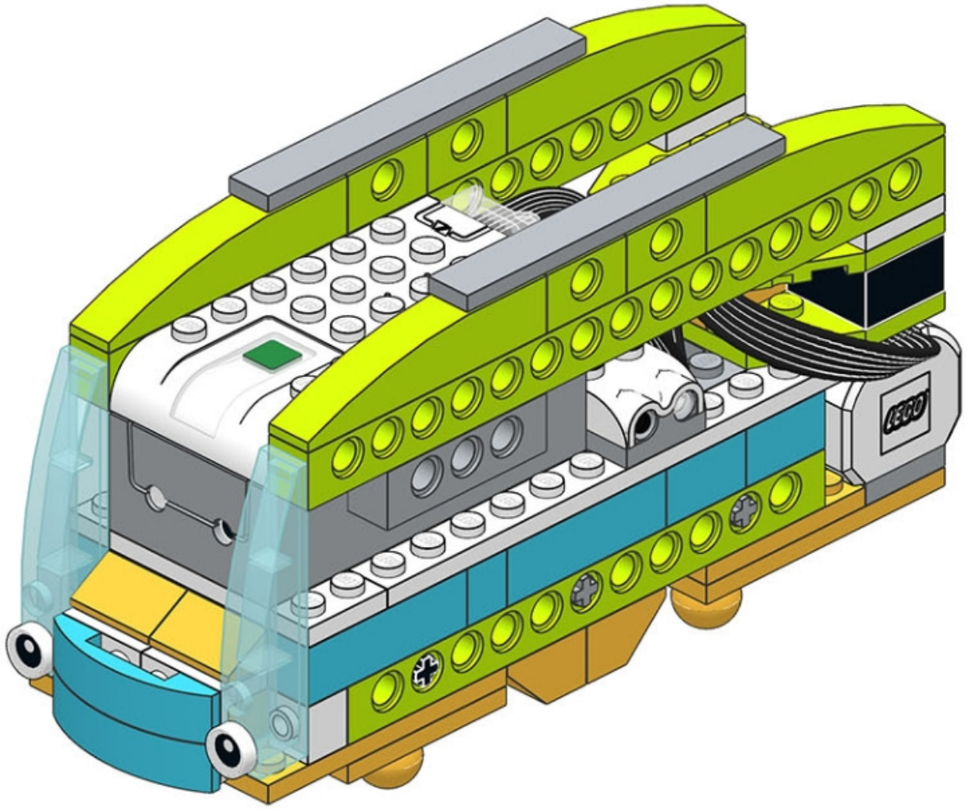

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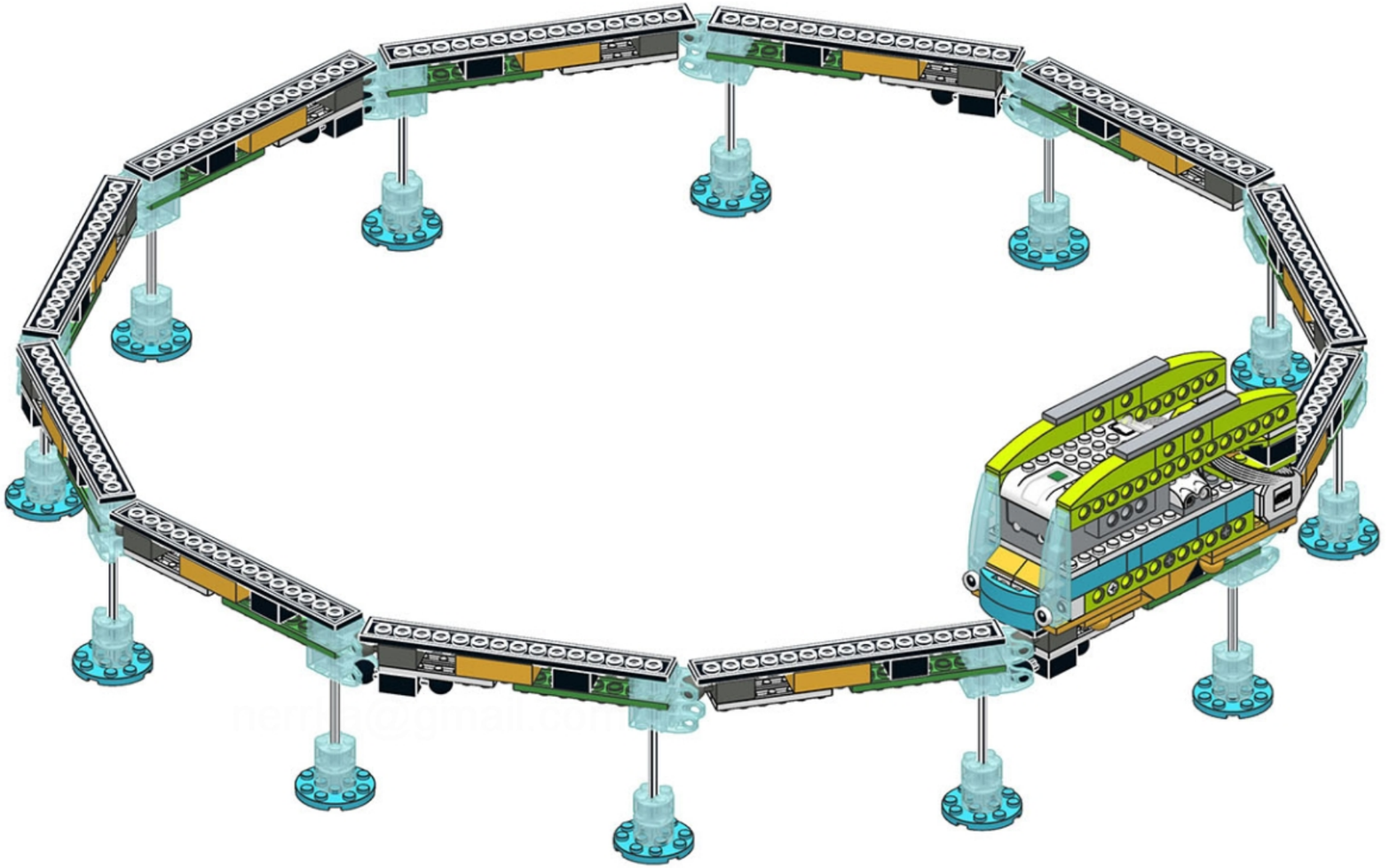
67



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97

MonoRail

ROBORISE-IT!
ROBOTIC EDUCATION

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1

New day at the robots` factory

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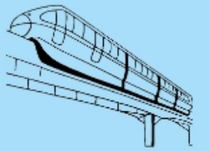
Hello!
Our next task is to solve the problems of public transport system. A large number of tourists are expected. The city must be ready to provide the free movement of people.



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TASK

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TASK

- to find the solution of the public transport system problems

Steps

- to know more about the types of public transport
- to define the main advantages and disadvantages of the each transport
- to make the choice of the transport to build

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Discussion of the task

What do you know about the public transport? What types of it do you know?

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Public transport

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Public transport helps to make the free movement of people between city districts. Usually the working and living places are separated, do people need to travel to the job.

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Public transport

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The good functioning of the public transport system decrease the number of the cars on the roads and allows to travel faster.

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Public transport types

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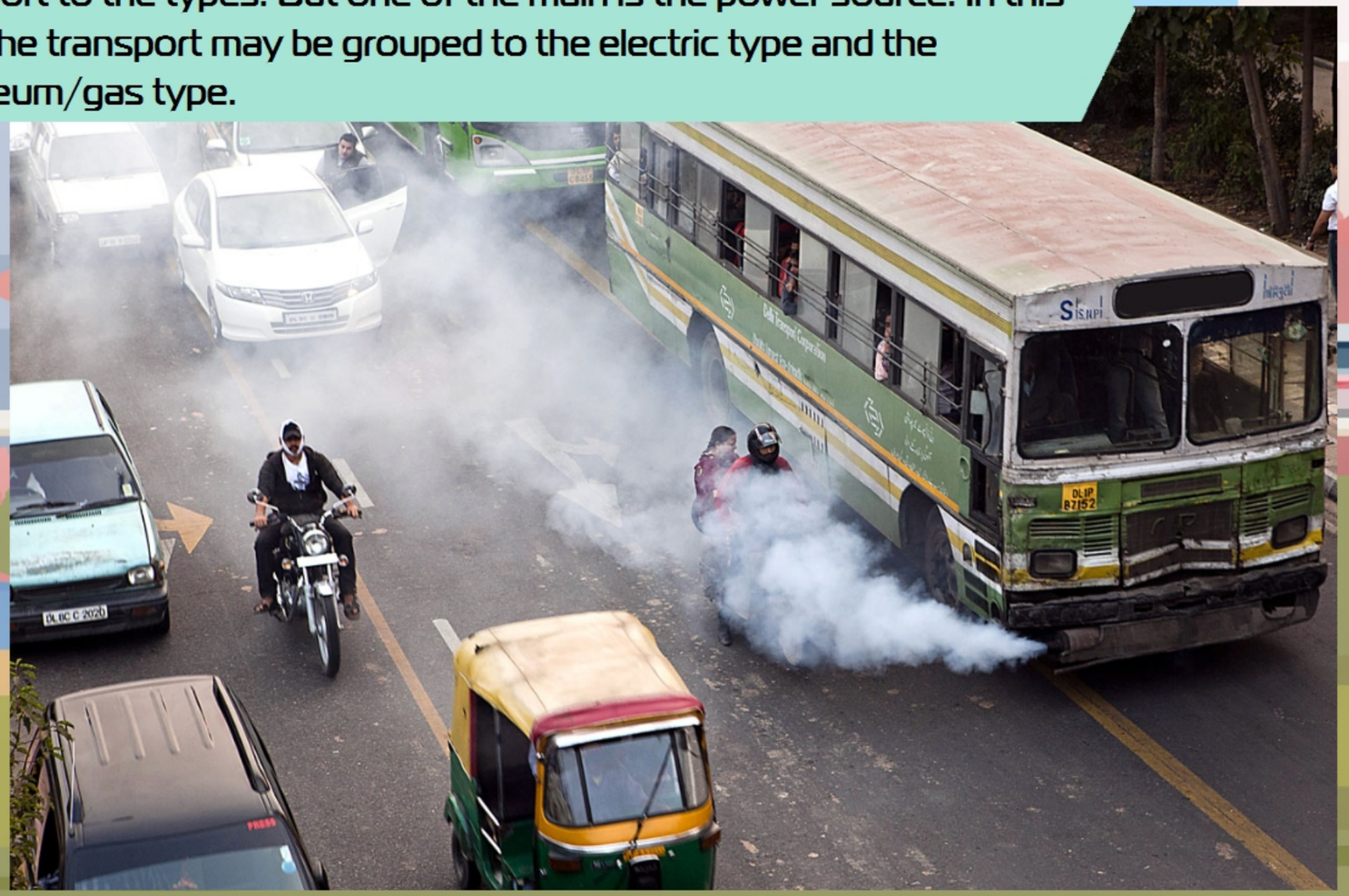
There are a lot of the factors that may be used for the grouping the transport to the types. But one of the main is the power source. In this layer the transport may be grouped to the electric type and the petroleum/gas type.



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Discuss!

How do you think, what advantages of the electric public transport has?

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Electric public transport

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The following machines is electric: trolleybus, tram, metro, monorail. Also the electric-powered buses appears on the roads of many countries.

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Electric transport advantages

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Electric public transport decreases the air pollution emissions in cities. Also it produse minimal noise pollution and may be use in the enclosed space (in tunnels or underground).

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11

Trolleybus

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This is an electric bus that draws power from overhead wires. The disadvantages is: aesthetic (wires is unsightly in city), dewirements (sometimes it come off of the wire), difficulties when re-routing.

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12

Tram

This is a rail vehicle which runs on tramway tracks along public urban streets. Usually tramways powered by electricity. They produce a high sound pollution, but very effective. Also often the trams must to stop at the Traffic lights as usual cars.

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13

Metro

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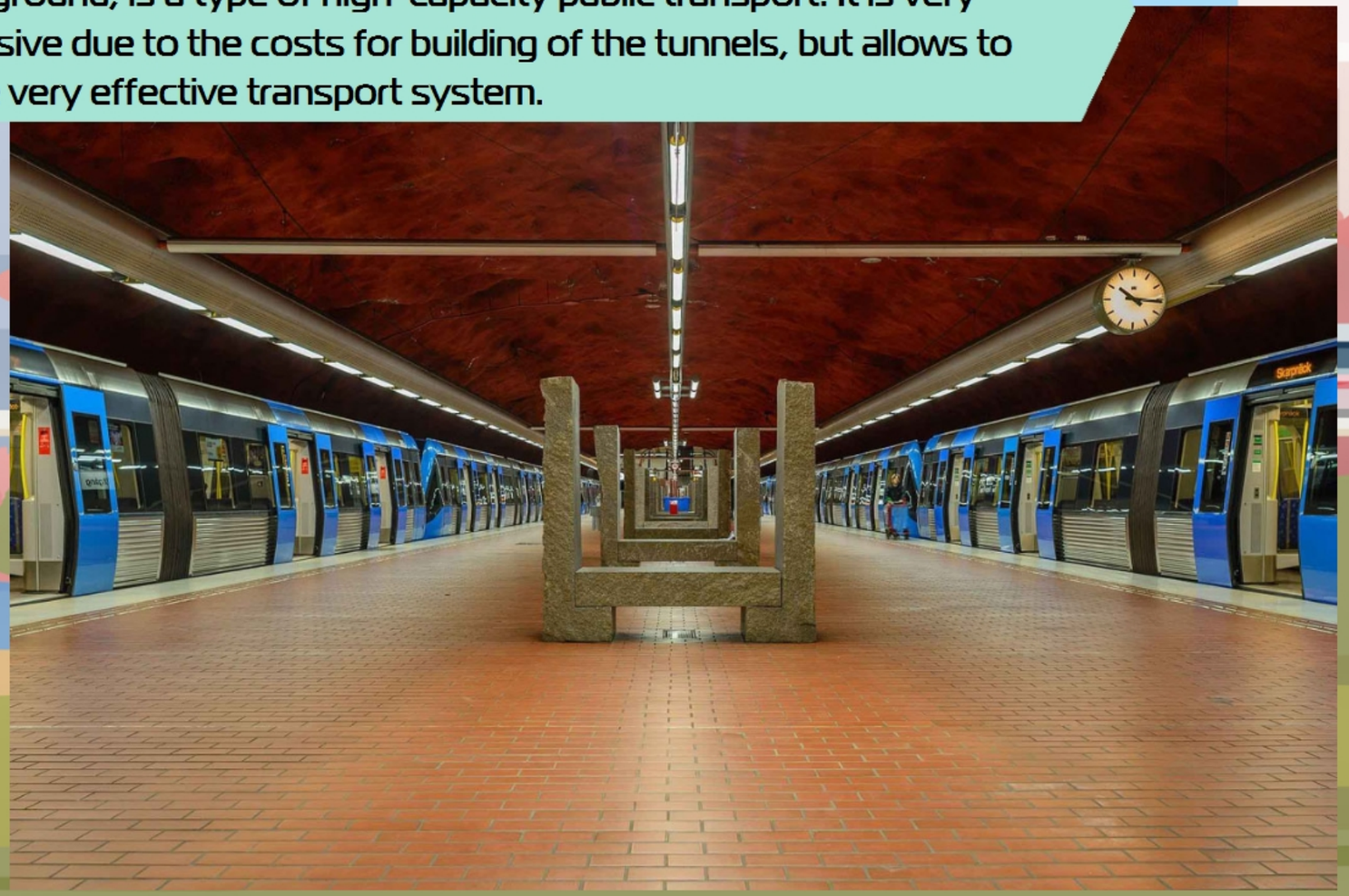
Also known as heavy rail, subway, MRT, tube, U-Bahn or underground, is a type of high-capacity public transport. It is very expensive due to the costs for building of the tunnels, but allows to create very effective transport system.



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Monorail

This is a railway in which the track consists of a single rail. In most cases rail is elevated, but monorails can also run at ground, below ground or in subway tunnels.

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Monorail

Unlike some trams and light rail systems, modern monorails are always separated from other traffic and pedestrians. It allows to make the very fast and safely transport system.

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16

Monorail

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Often monorails is only one available transport that may be added to the existing city infrastructure. Other transport has a lower capacity (as trams) or is very expensive (as metro) or is influented by other traffic (as trolleybuses).

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Let's summaries

We must to create the public transport system that:

- Has a great capacity.
- Has zero emission of air pollution.
- May be integrated into the existing city infrastructure.
- Not very expensive.

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18

Discussion of the task

What do you think, which type of the electric public transport is better for our needs?

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Meet MonoRail!

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This is a robotised autonomous monorail.

MonoRail

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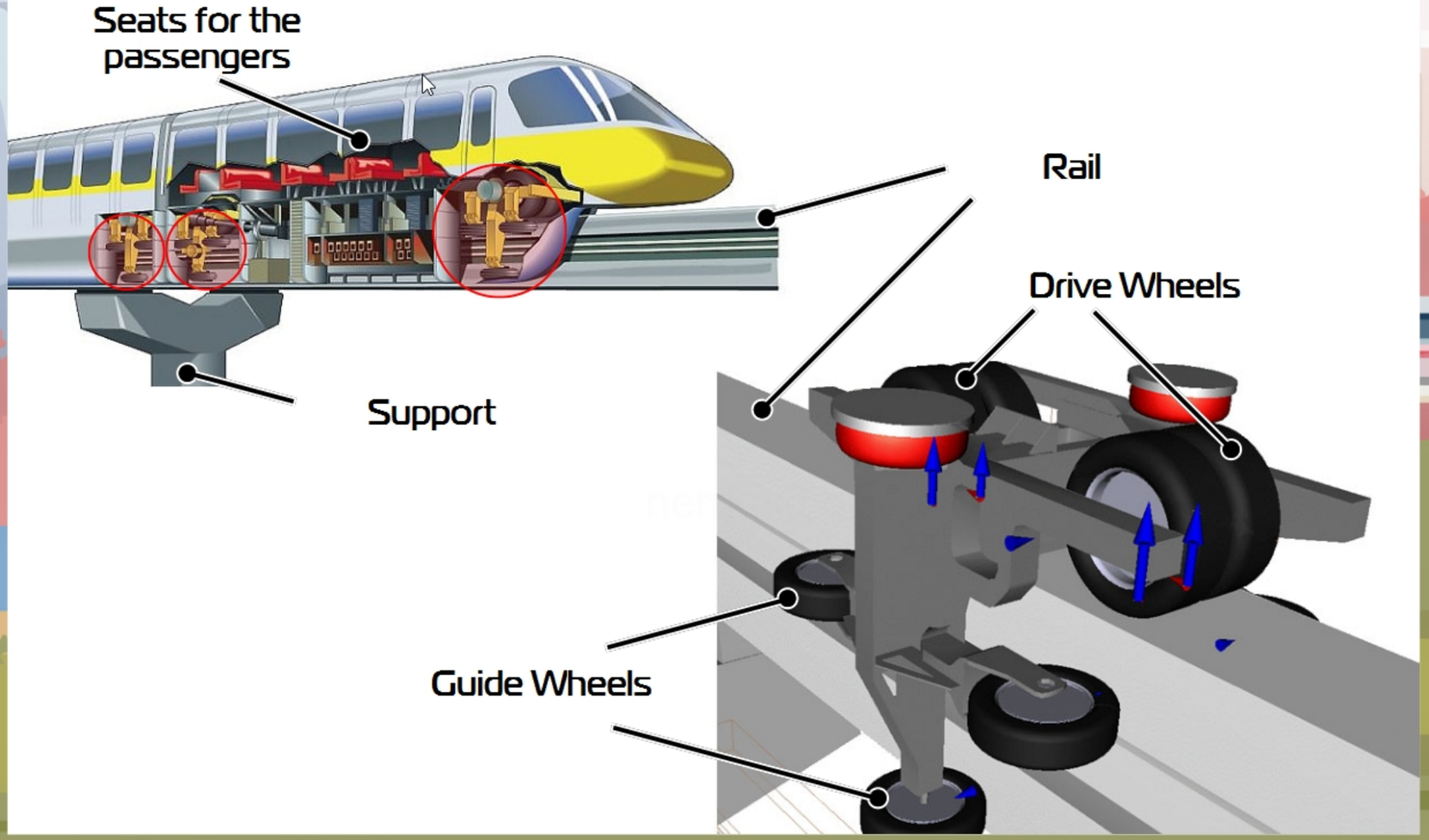
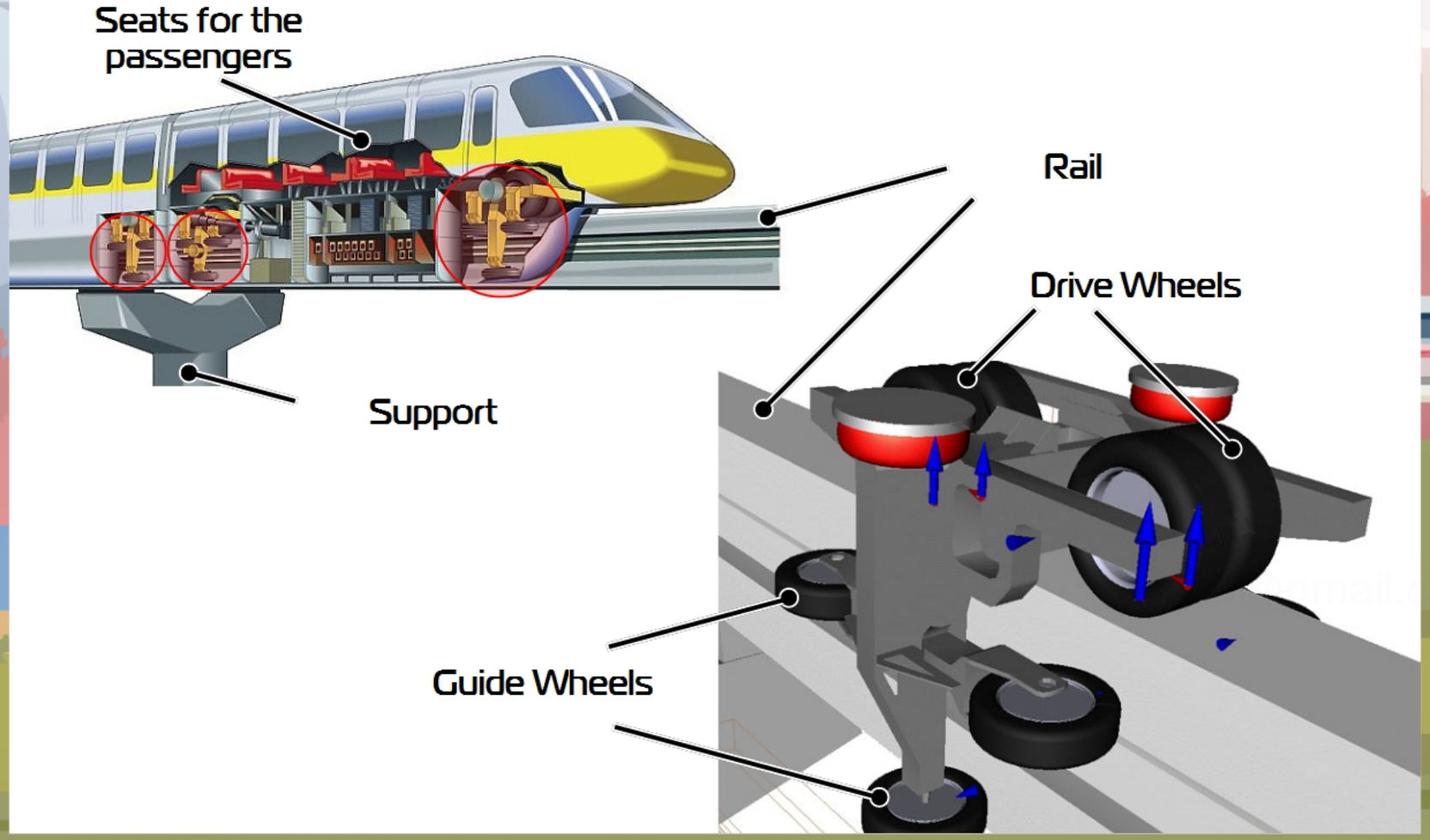
Monorail's elements



Monorail's elements



Features

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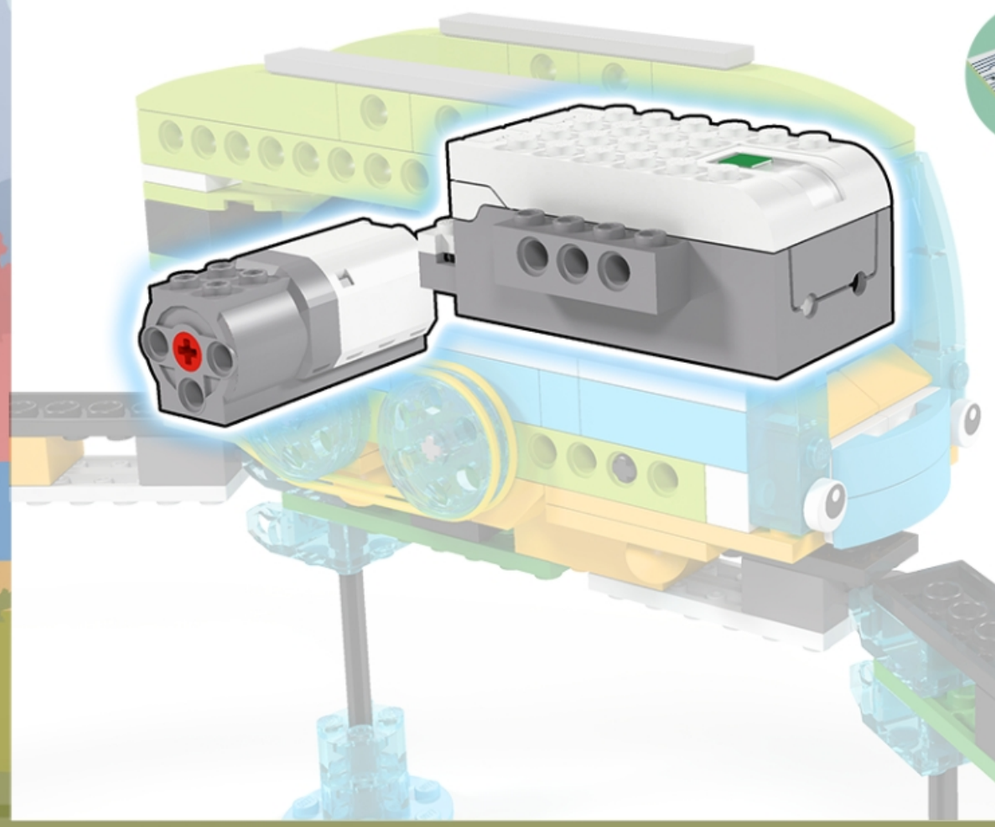
The motor is used for movement of the MonoRail. The motion sensor can be used to station detection.



Find:

- smarthub
- motor
- sensor

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Features

The separate parts of the rails can be connected together to achieve a Circular route.

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23

Features

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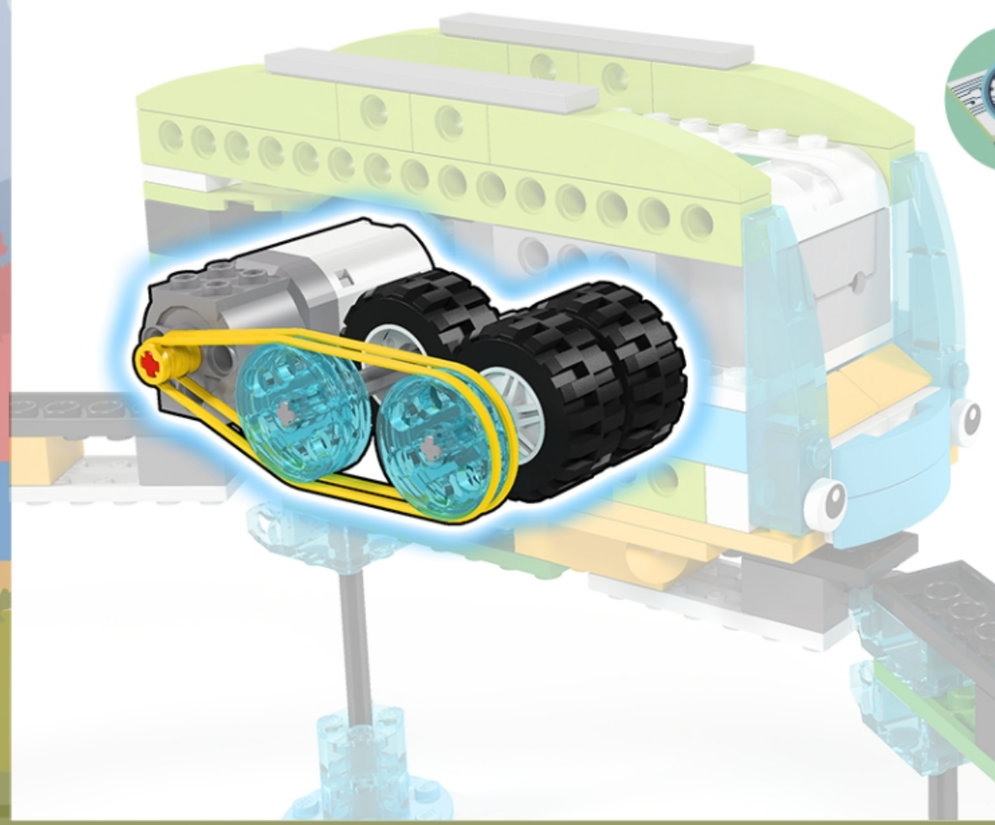
The rotation is transmitted from the motor to the Drive wheels due to the Belt drive. Compare the size of the contact of the belt with first and second pulley. How do you think, what will this lead to?



Find:

- Motor
- Belt drive
- Drive Wheels

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Features

How do you think, why robot needs two Drive axles?

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Features

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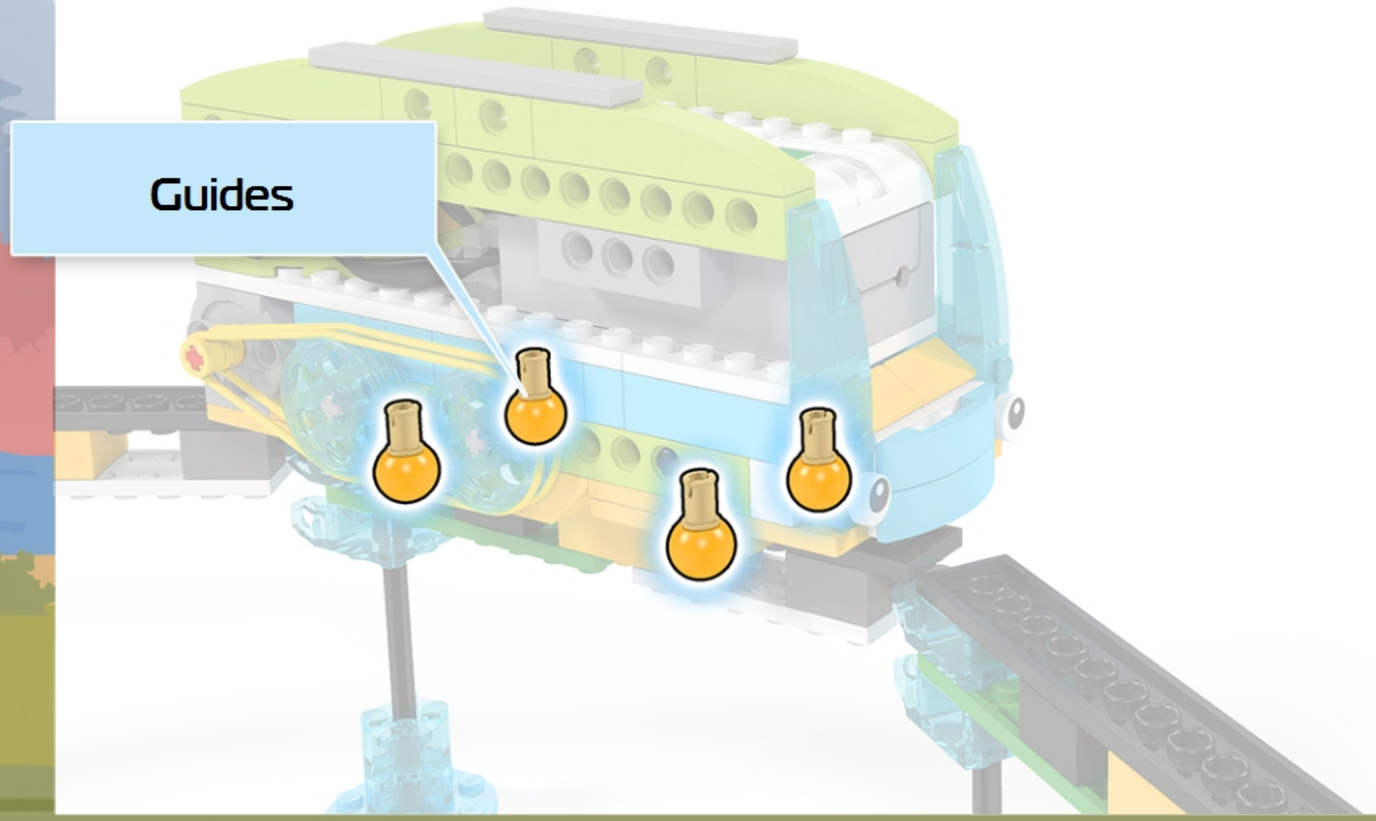
MonoRail has the guides for run through the curves of the rail.
They fix the robot on the rail.



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Features

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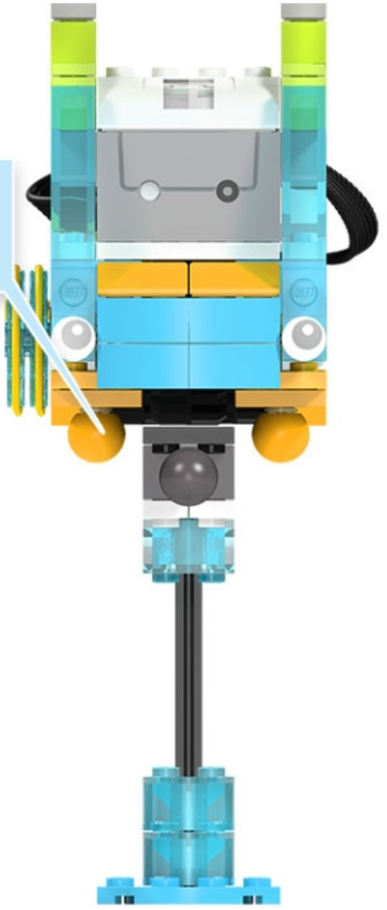
Guides



Note, that Guides not touches the rail on the straight sections. But they works on the curves.

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27

Build the robot!

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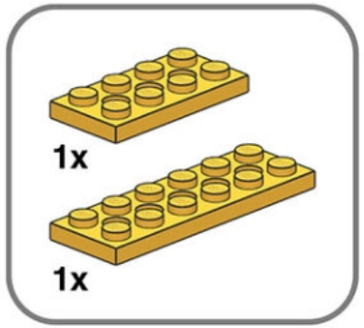

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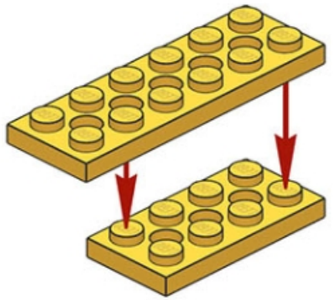

Enhanced version

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Build more comfortable
train saloon.

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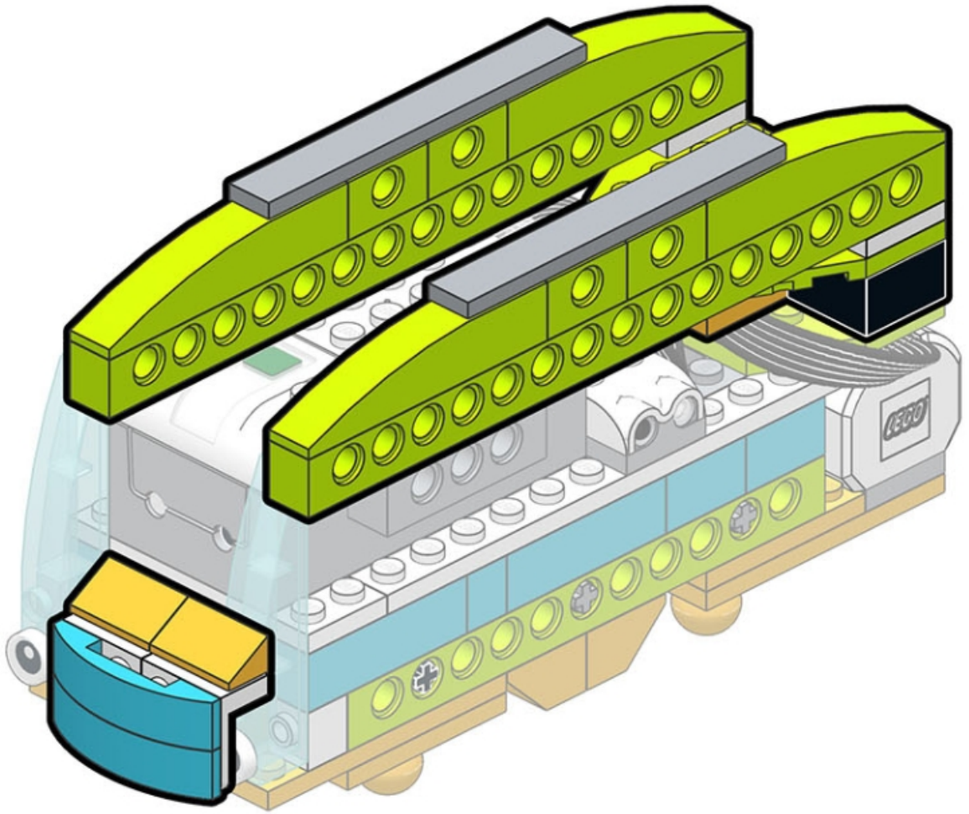

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86

Check it out!

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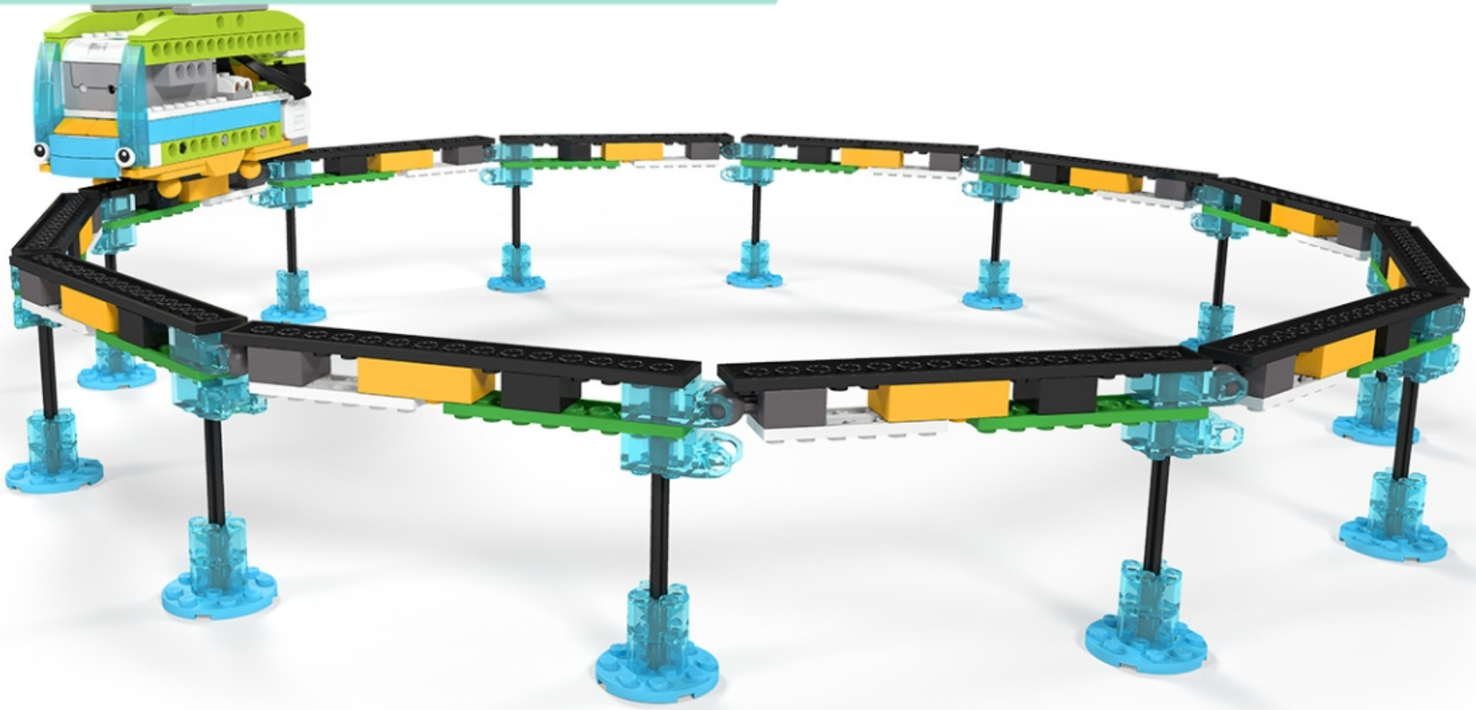
Avoid any friction between the cables while robot is moving.



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98

TASK

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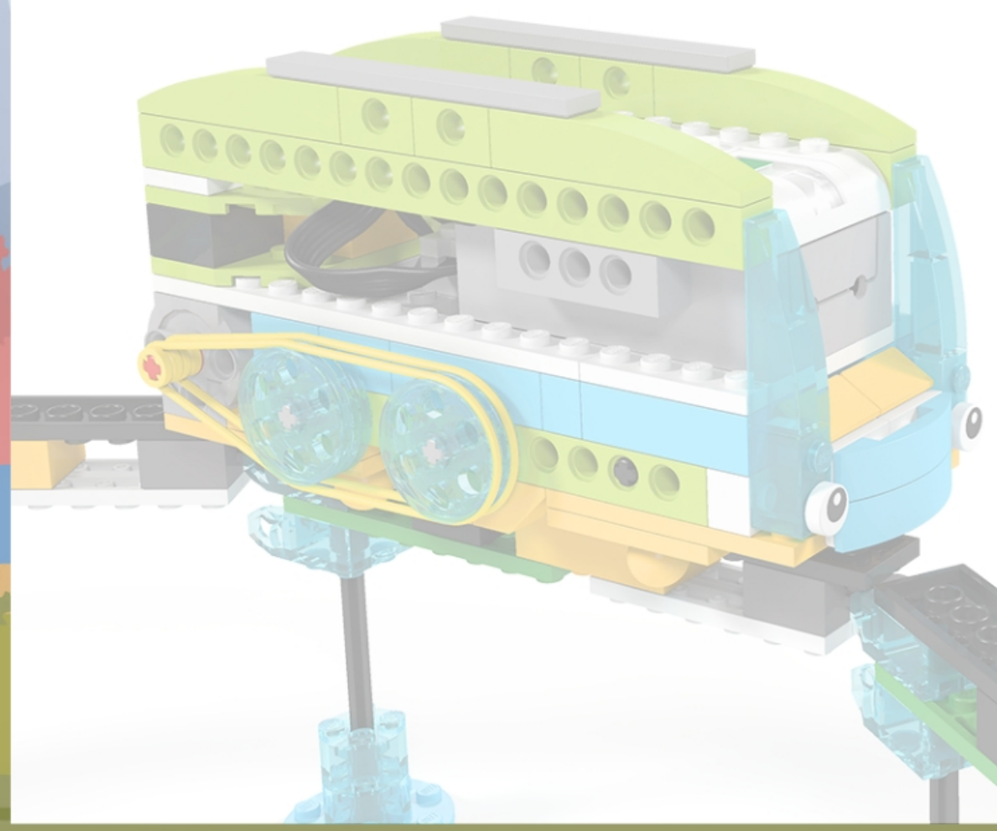
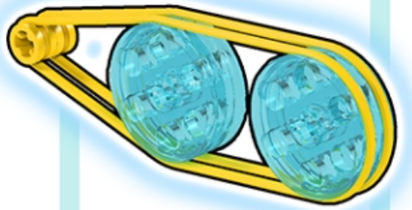
Place parts of the robot in the right places.





0

99

Task 1

ROBORISE-IT!
ROBOTIC EDUCATION

Check the mechanism. The MonoRail must smoothly run via each joint of the road.

0

100

Task 2

ROBORISE-IT!
ROBOTIC EDUCATION

Program the stop of the monorail near the station. Note, that robot must to stop at the center of the station.

0

101

Task 2. Algorithm

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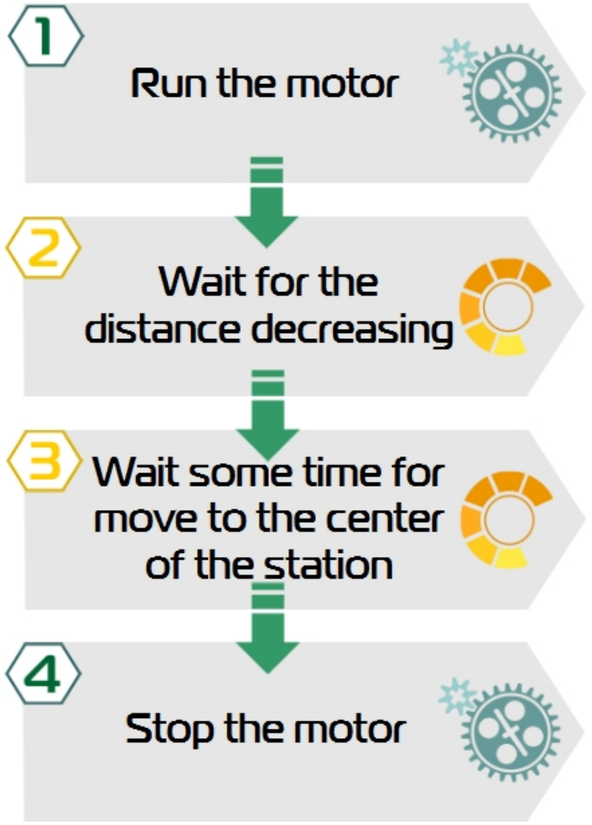
ROBOTIC EDUCATION

The program should run by the following algorithm:



0

102

Task 3. Program

ROBORISE-IT!
ROBOTIC EDUCATION

1 Run the motor

Step: 1 2 3 4

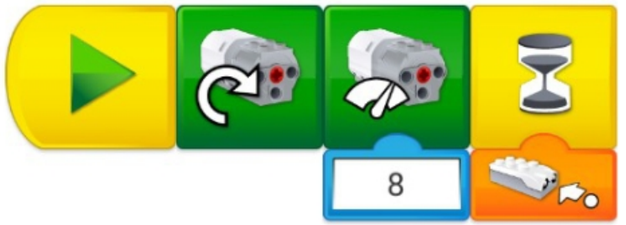
0

103

Task 3. Program

ROBORISE-IT!
ROBOTIC EDUCATION

1 Run the 2 Wait for the distance decreasing



Step: 1 2 3 4

0

103

nerka@gmail.com

Task 3. Program

ROBORISE-IT!
ROBOTIC EDUCATION

1 Run the

2 Wait fo
distance de

3 Wait some time for
move to the center
of the station

Adjust the duration
of the waiting

Step: 1 2 3 4

0

103

Task 3. Program

ROBORISE-IT!
ROBOTIC EDUCATION

1 Run the
2 Wait f
distance d
3 Wait som
move to th
of the s
4 Stop the motor

Adjust the duration
of the waiting

Step: 1 2 3 4

0
103

Task 3

ROBORISE-IT!
ROBOTIC EDUCATION

Program the continuous transfers between the stations.

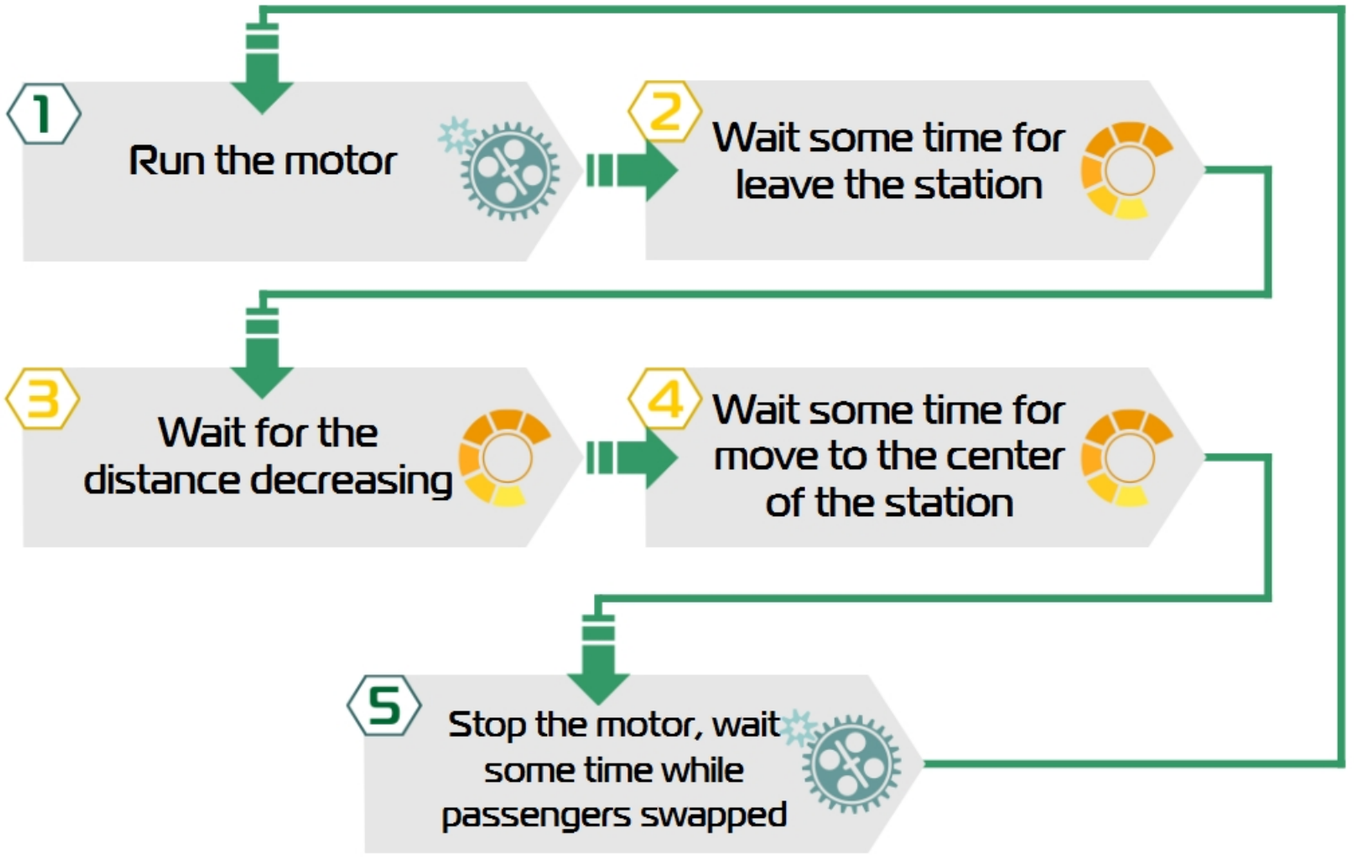
0

104

Task 3. Algorithm

ROBORISE-IT!
ROBOTIC EDUCATION

The program should run by the following algorithm:



0

105

Task 4

Build and place near the rail few stations and display on the screen the number of the stops on the stations.

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ROBOTIC EDUCATION

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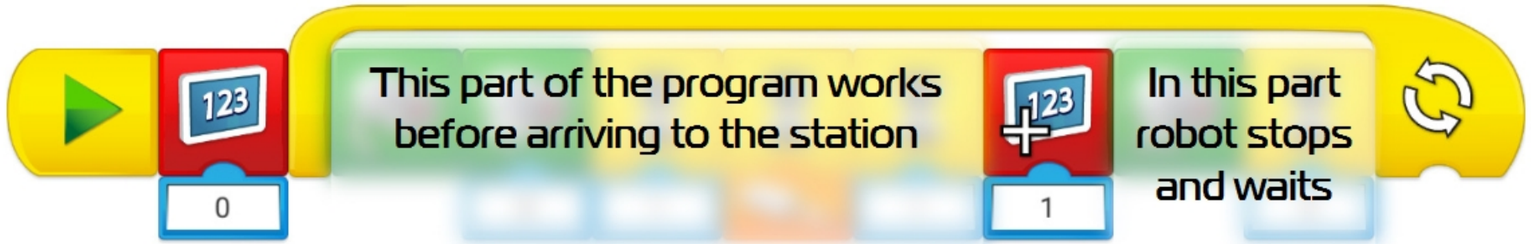
106

Task 4. Program

For modify your program you need only a few blocks. First of all at the program begin you must to set the number of the passed stations to the "0". Then at the each loop iteration the value of the variable must be increased on the "1".



Note! Your program may be differ. The above screenshot is for reference only.

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ROBOTIC EDUCATION

Task 5*

Let's calculate how many full circles will finish the robot in a two minutes. To do this you may divide the number of passed station on the number of station on the route. The number of the full circles is the integer part of the result.

$$N = \frac{\text{\# passed station}}{\text{\# station on the route}}$$

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ROBOTIC EDUCATION

0

108

Task 6

ROBORISE-IT!
ROBOTIC EDUCATION

Re-built the rails to make the straight section and place two stations on the ends.

0

109

Task 7

Program the work of the robot on such route. Note, that for stop at the center of the stations robot will need different Wait block settings.

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ROBOTIC EDUCATION

0

110

TASK

ROBORISE-IT!
ROBOTIC EDUCATION

Sort the transport by the cost of the construction. Drag and drop corresponding icons.

111

Discuss!

- What advantages the monorail has?
- Why the electric public transport is better for using in a large cities?
- What types of public transport presented in our city?

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0

112

Your achievements

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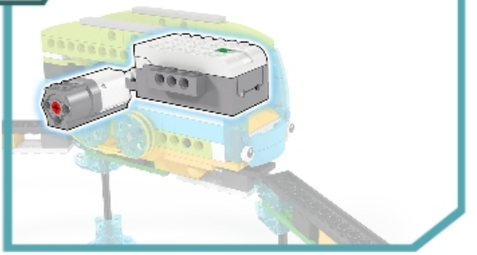
ROBOTIC EDUCATION

Total count: 0

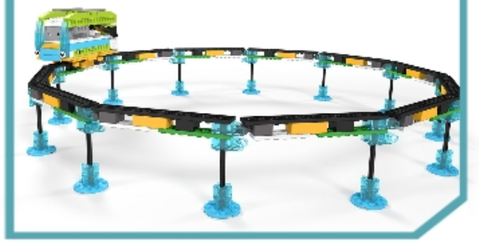
1

2



3

4



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113

Mission complete!

ROBORISE-IT!
ROBOTIC EDUCATION

0

114