



# Parasaurolophus



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Parasaurolophus



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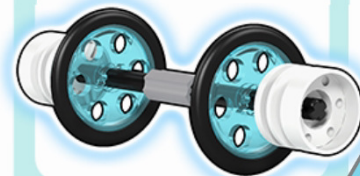
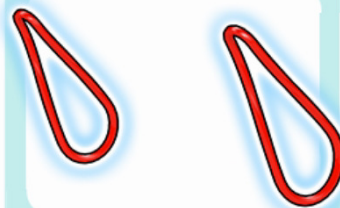
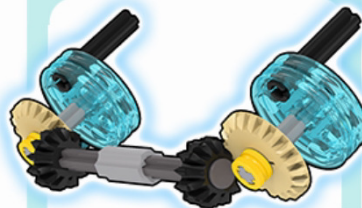
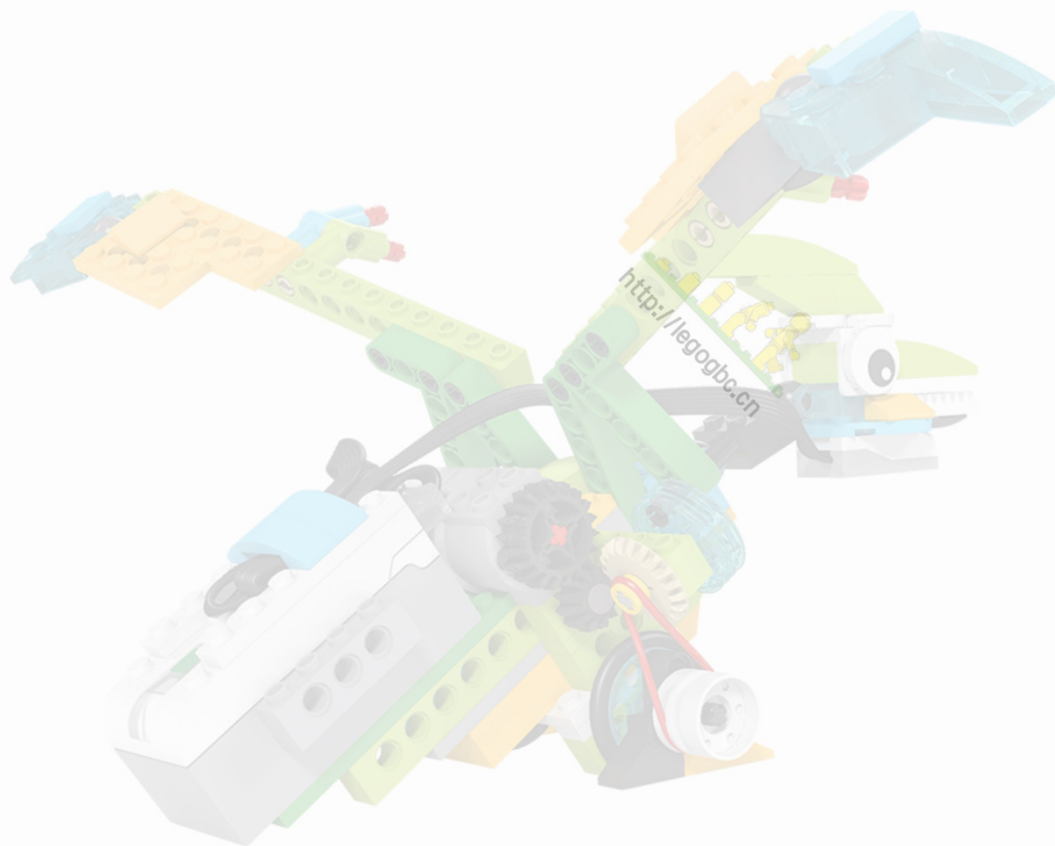


# Let`s remind. Pteranodon



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Place parts of the robot on the right places



0



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# Let`s remind. Pteranodon



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Place parts of the robot on the right places








# Let`s remind. Pteranodon



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Who became the descendant of Pterosaurs?



Birds

Insects

None of the  
modern creatures



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# Dino Park



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Today we continue to create a modern Dino Park. We must develop a robot for the expositions of the Mesozoic era Cretaceous period.



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# Dino Park



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In the Mesozoic Cretaceous period were flowering plants and insects that pollinated them. Plants with more succulent leaves gave the opportunity to develop large groups of herbivorous dinosaurs and predators that hunted them.





# Let`s remind



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<http://teggobc.cn>

**Which five groups do dinosaurs divide into the structure of the skeleton?**



5

8





# The structure of the dinosaur skeleton



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Scientists have come to the conclusion that most of the found skeletons of the dinosaurs by structure can be attributed to one of

Dinosaur from which group have you already built?



THEROPODS



SAUROPODS

DINOSAURS

STEGOSAURUS



ORNITHOPODS



CERATOPS



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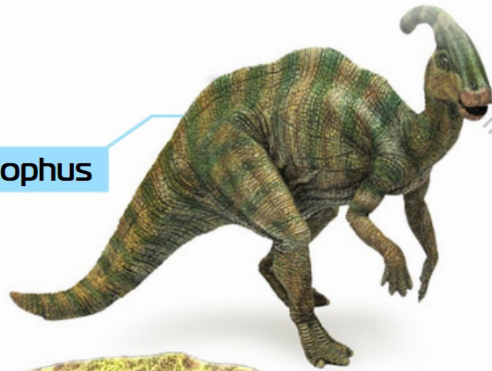
# Parasaurolophus



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Parasaurolophus belongs to the Hadrosaurus, or duck-like dinosaurs. These are representatives of the Ornithopods, one of the main consumers of vegetable food. Recent findings in the nests of these dinosaurs say that they not only lived in large colonies, but also worried about offspring.

Parasaurolophus



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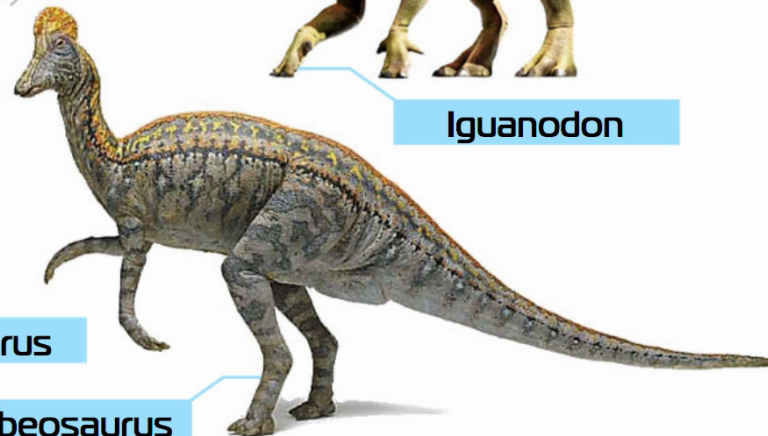
Iguanodon



Hadrosaurus



Lambeosaurus



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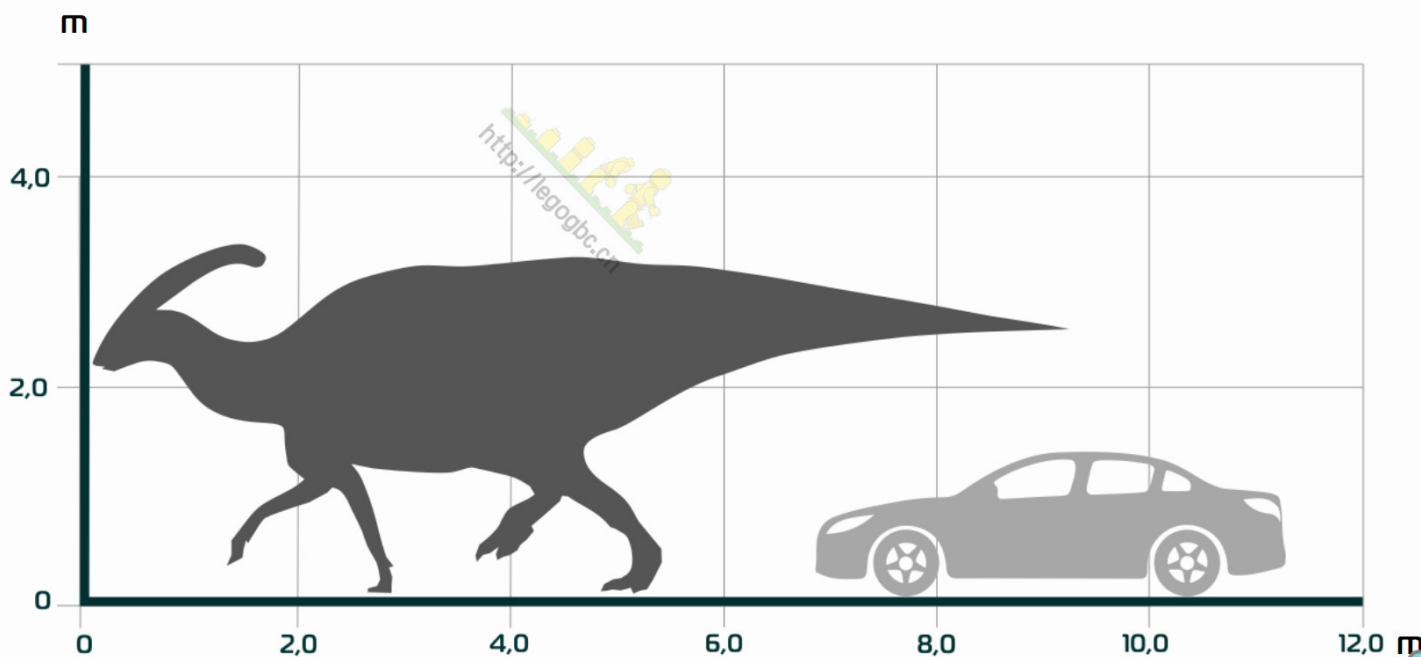


# Parasaurolophus



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These were massive animals up to 9 meters long. Most likely, they moved on four legs, but could stand only on the rear legs.



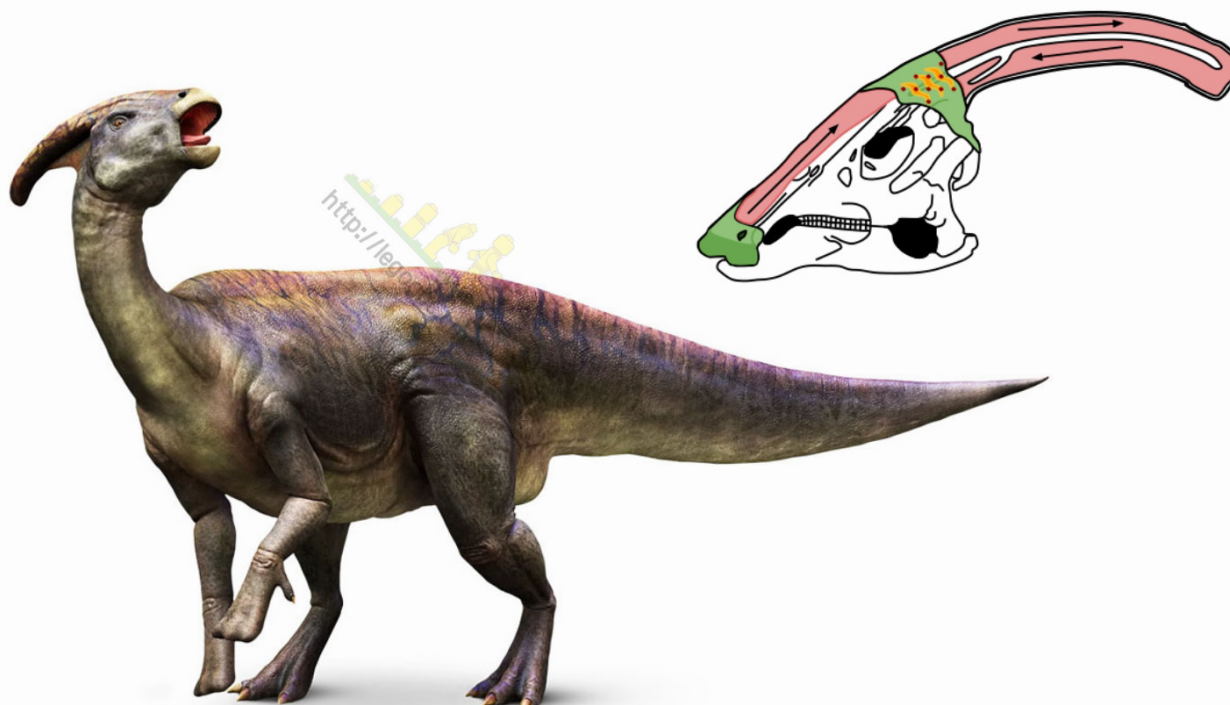


# Parasaurolophus



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This representative of the Ornithopods had a long crest on its head. It is believed that with its help, the dinosaur could create vowels to communicate with other dinosaurs.



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# Parasaurolophus



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Carnivorous Parasaurolophus had to take care that both they and their youth would not become predators' food. The life in large colonies helped them to survive and care about dinosaur that had just hatched.



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# Parasaurolophus



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For chewing the plant food, these duck-like dinosaurs had in the back of the jaw many teeth. And in order to look for food was more convenient, the rear legs were twice longer than the front ones.



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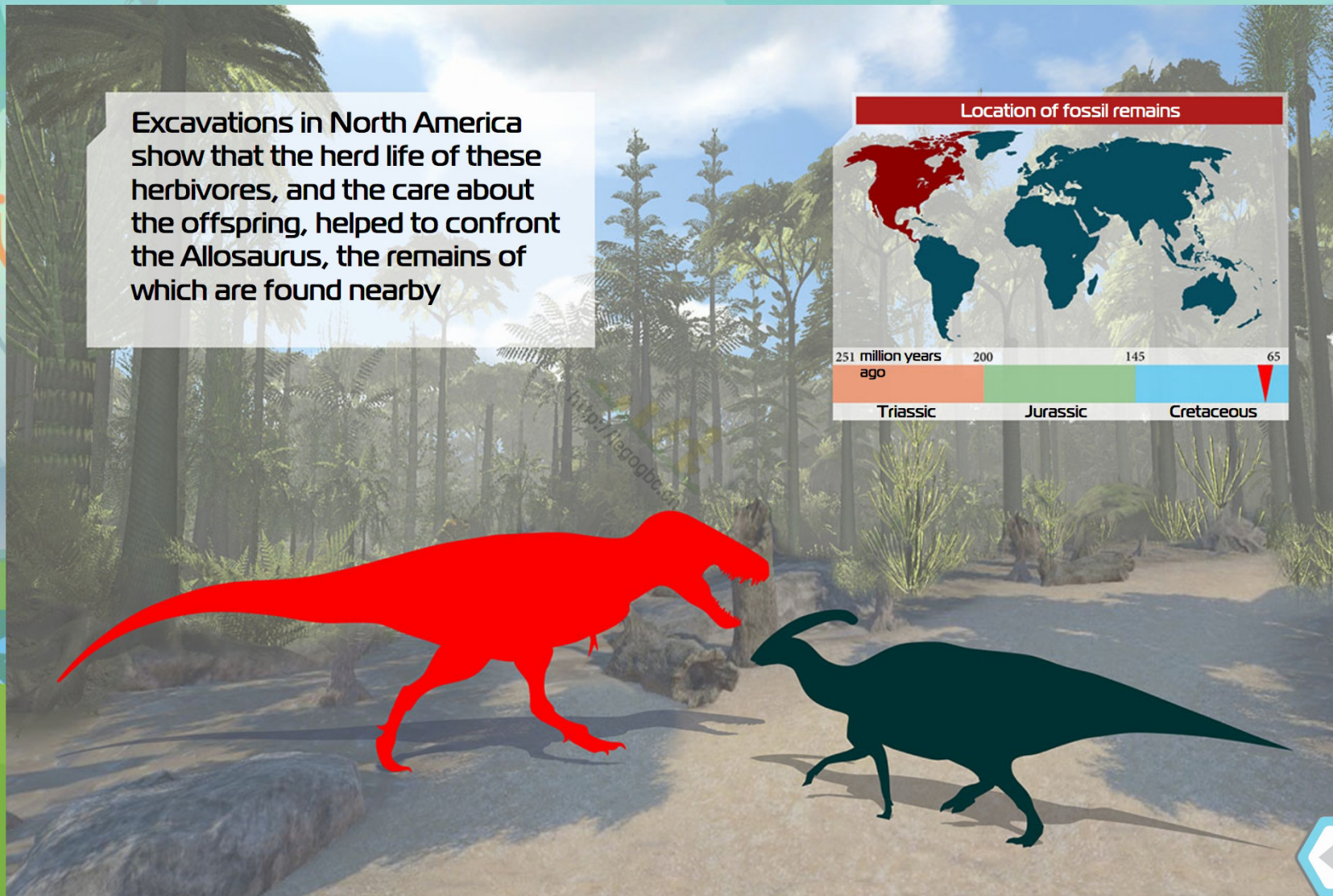
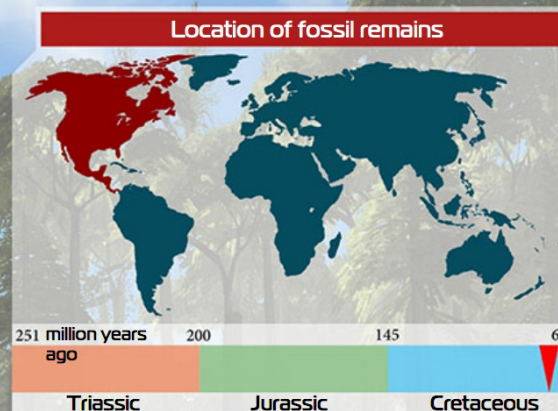


# Parasaurolophus



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Excavations in North America show that the herd life of these herbivores, and the care about the offspring, helped to confront the Allosaurus, the remains of which are found nearby



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# Dino Park



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Next, who we will create for Dinopark, will be *Parasaurolophus*. Scientists believe that the crest on its head was the first trombone in history.



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# TASK



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## Task

- create a robot for the exposition of the Cretaceous period by the Mesozoic



## Requirements

- should be Parasaurolophus, walk on four legs and have a characteristic shape of the head
- must present the Ornithopods



## Parasaurolophus appearance



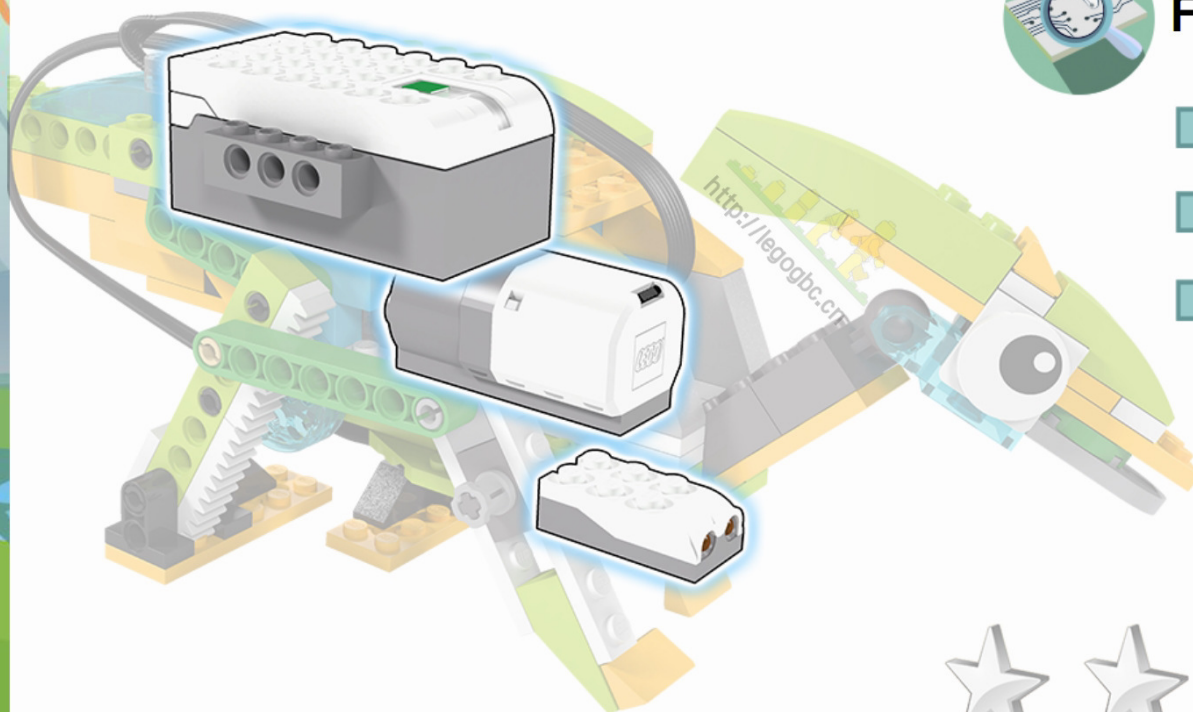


# Design features



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Parasaurolophus feature that movement from the motor transmit to the rear leg of the robot, and than from them - on the front. The motion sensor is motionless placed to the robot trunk.



Find:

- smarthub
- motor
- motion sensor



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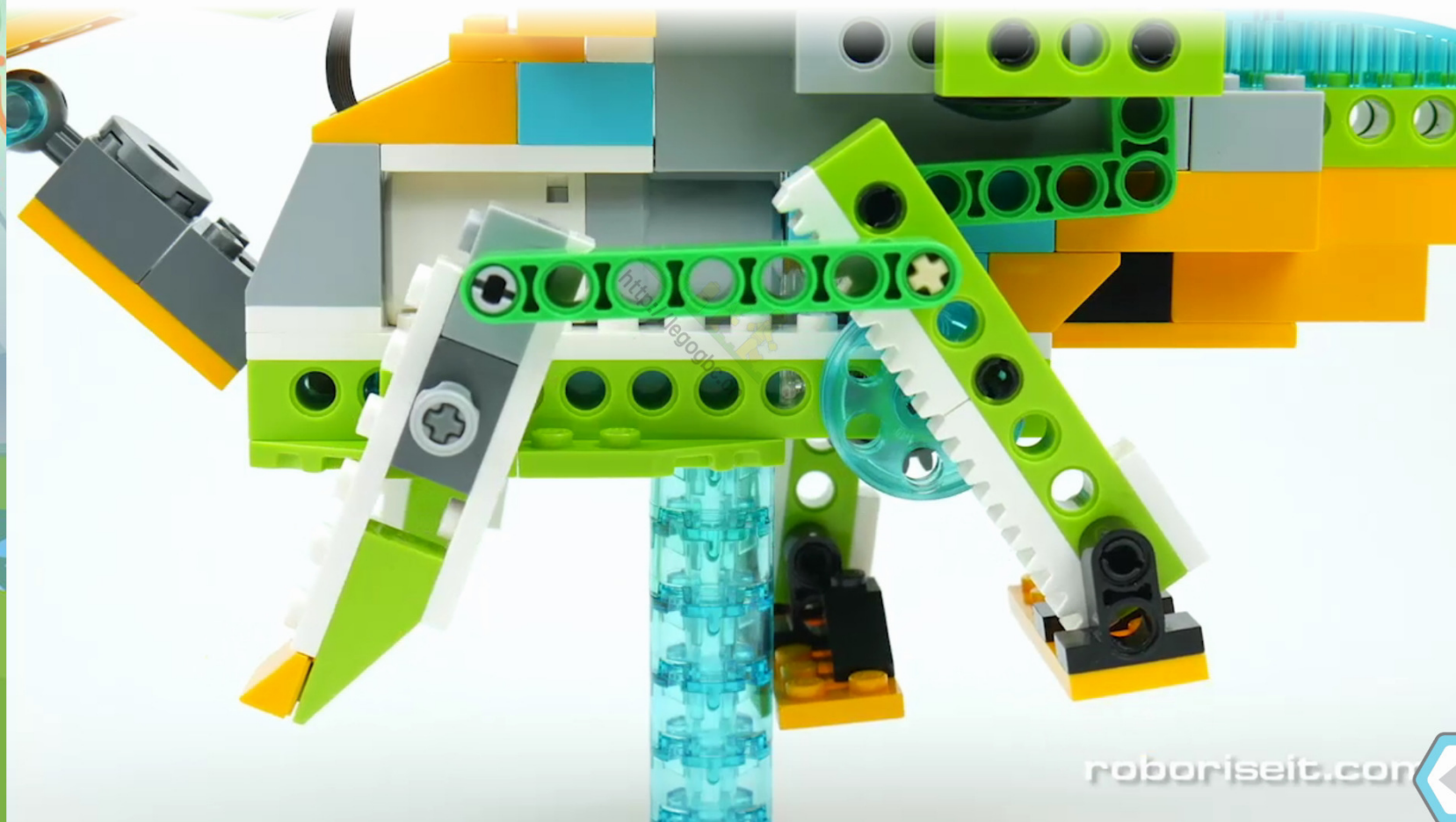


# Design features



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Like the real dinosaurs of this species, the rear legs of the robot play a major role in stepping. Compare the movement of the front and rear legs of the robot.



robotiseit.com





# Design features



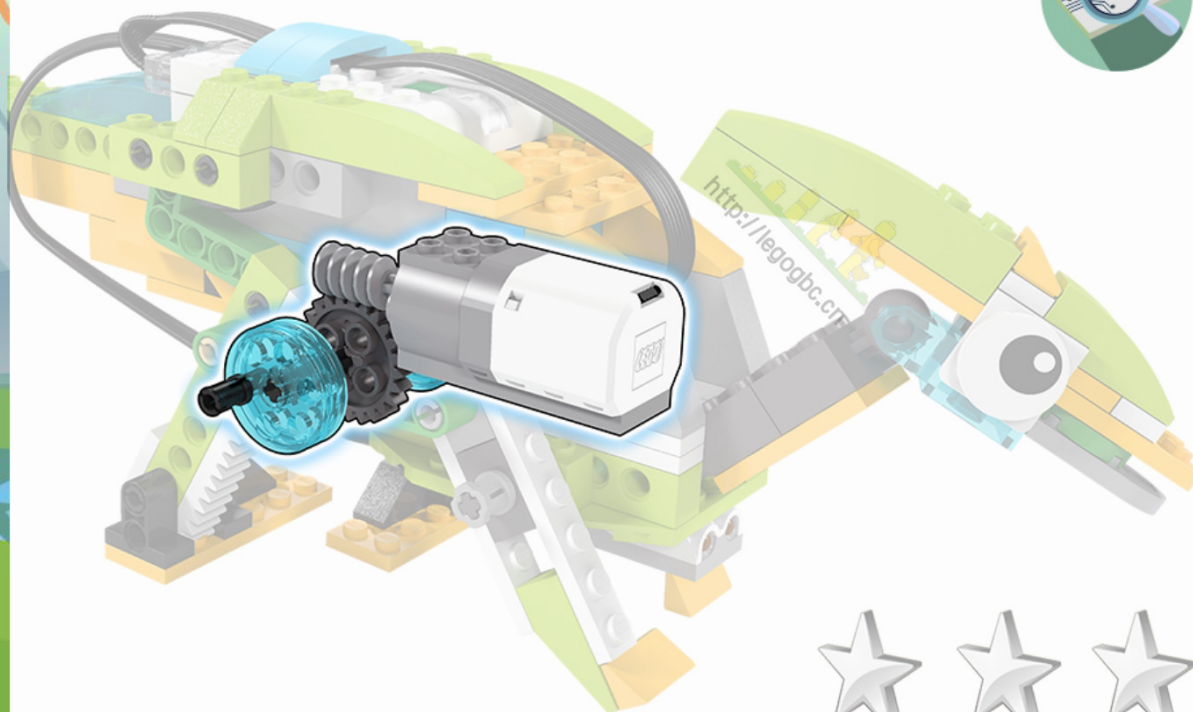
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The rotation from the motor to the cranks is transmitted through a worm gear, so keep your robot very carefully!



Find:

- motor
- worm gear
- cranks



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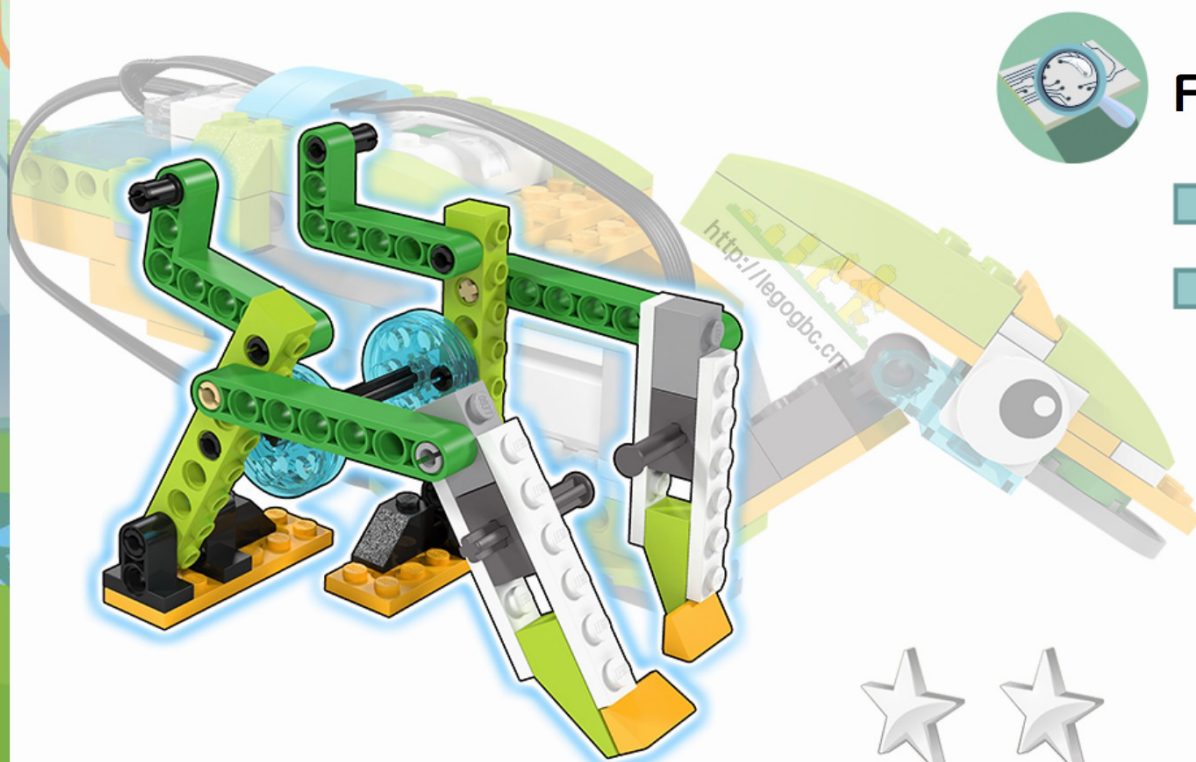


# Design features



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The rear legs of the robot have very wide feet. Due to this, the robot can stand on its rear legs and even begin to move from this position.



Find:

rear leg

front leg



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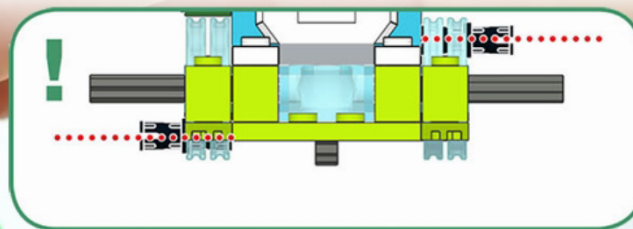
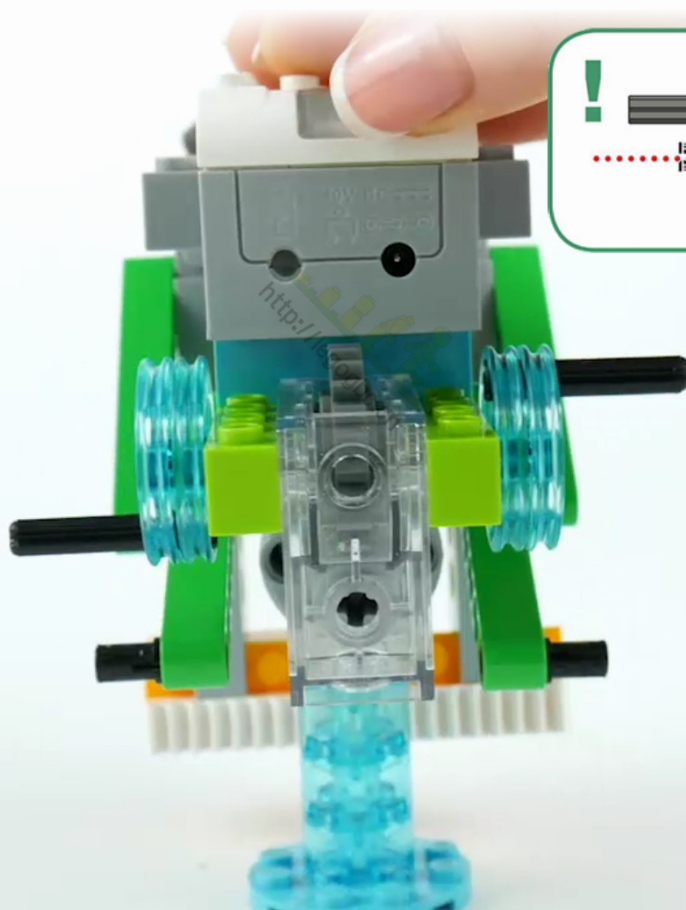


# Pay attention!



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When building the robot correctly fix the crank mechanism. If on the left it is at the top point, on the right it should be in the bottom, and vice versa:



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# Build the robot!



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## Parasaurolophus



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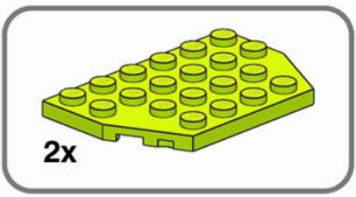


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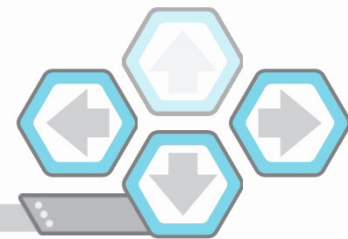
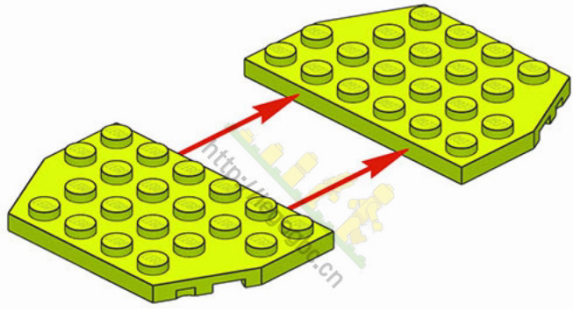




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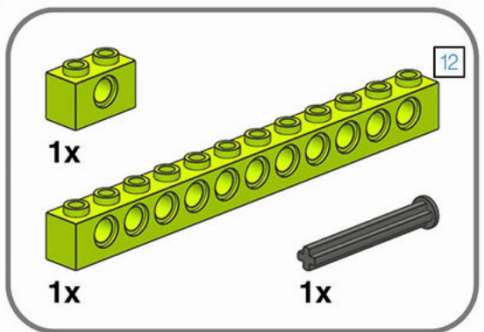


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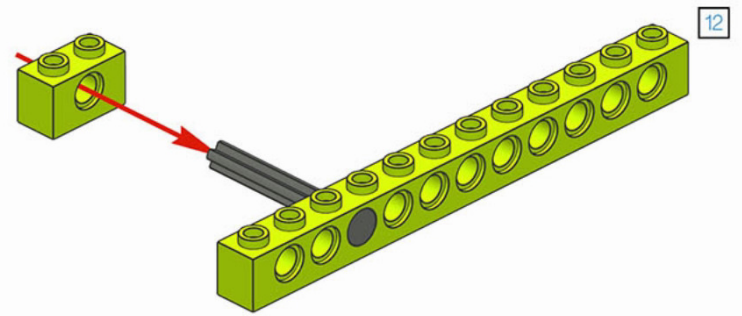




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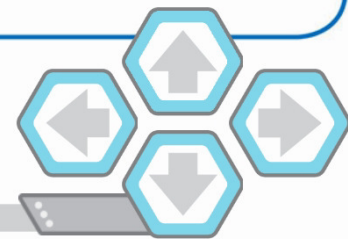
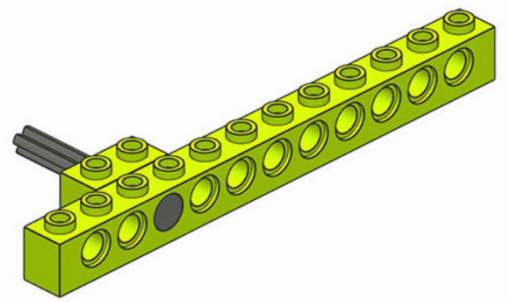


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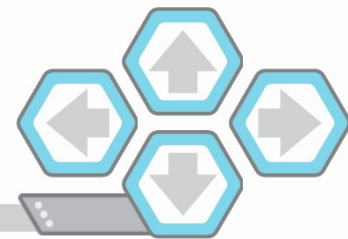
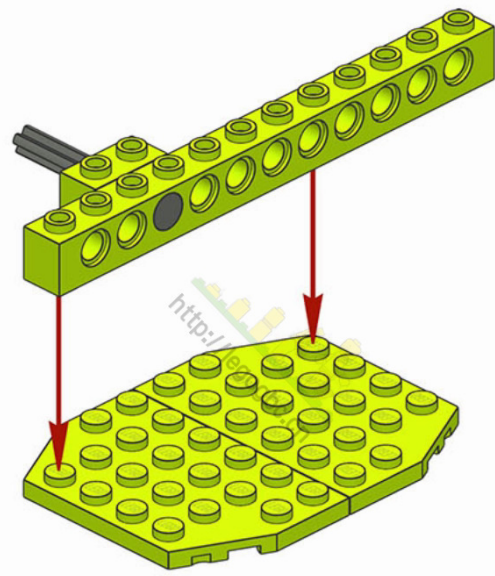
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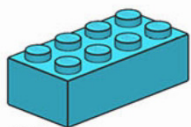
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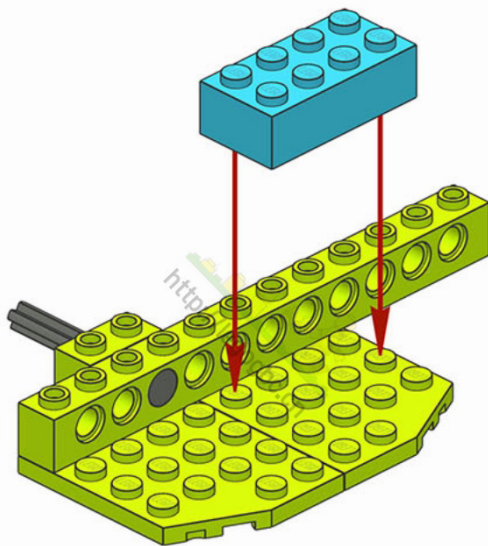


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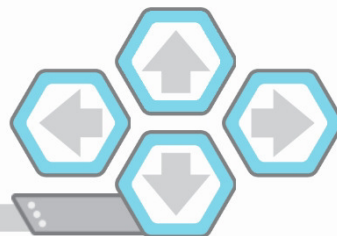
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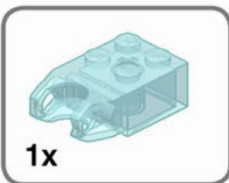
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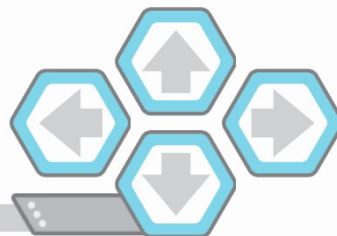
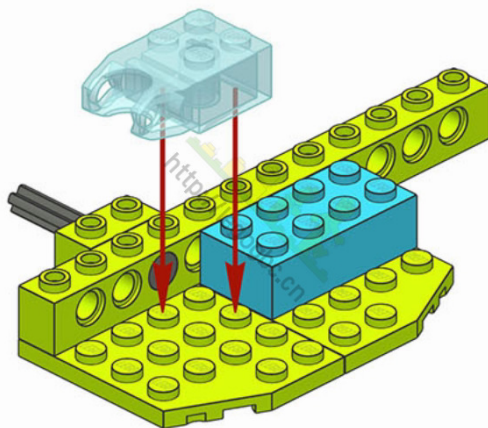




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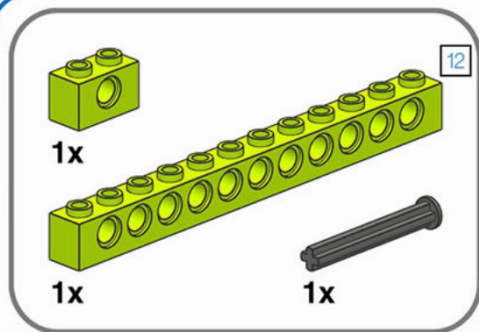


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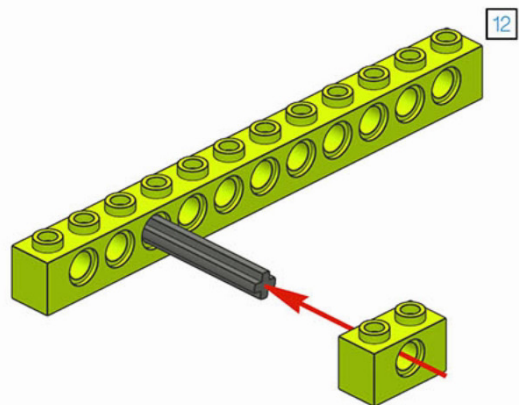




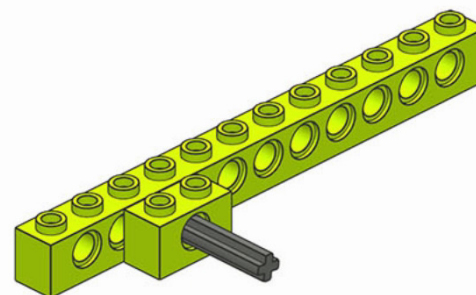
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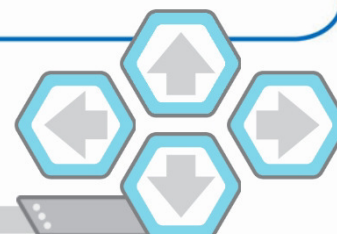
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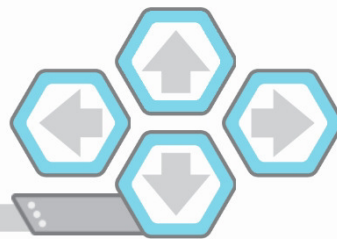
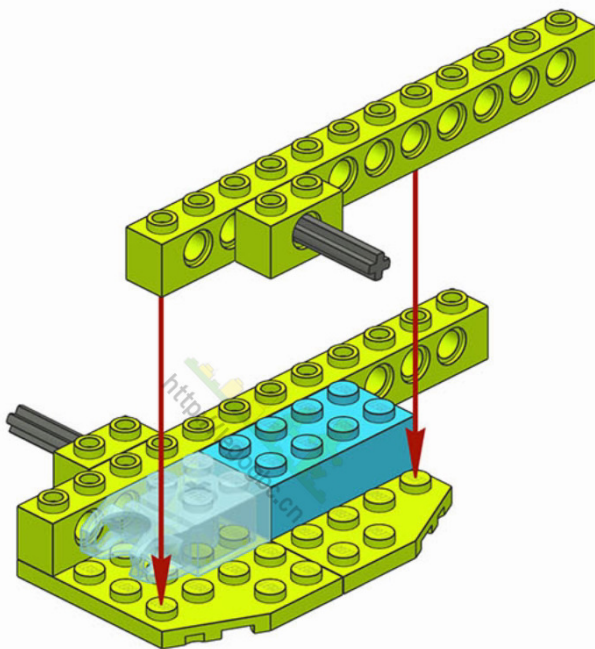
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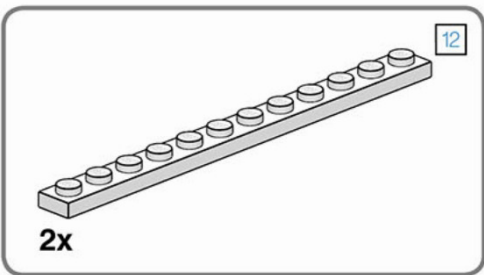
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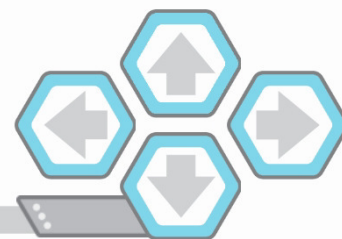
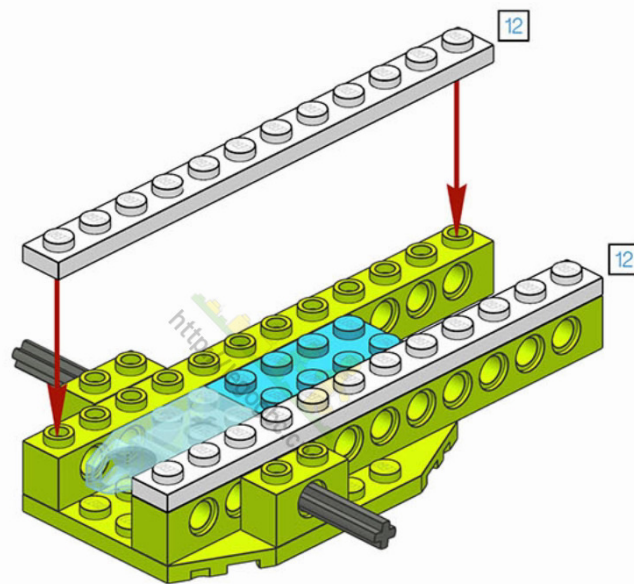




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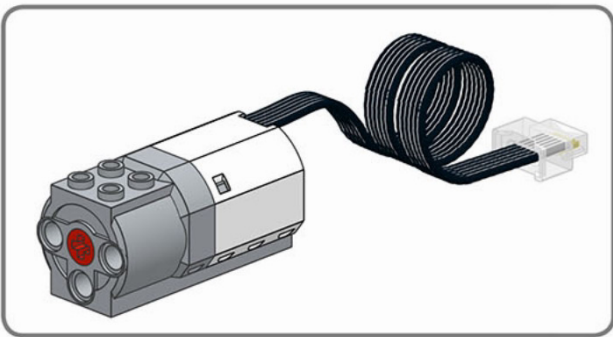


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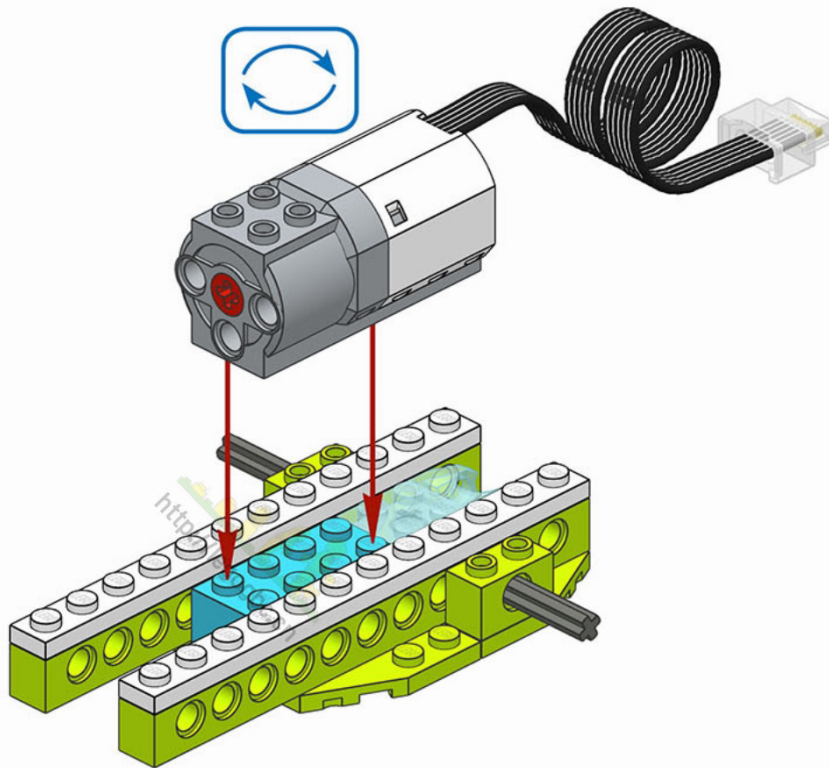




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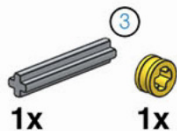


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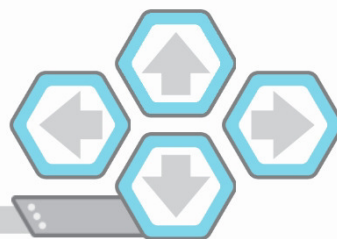
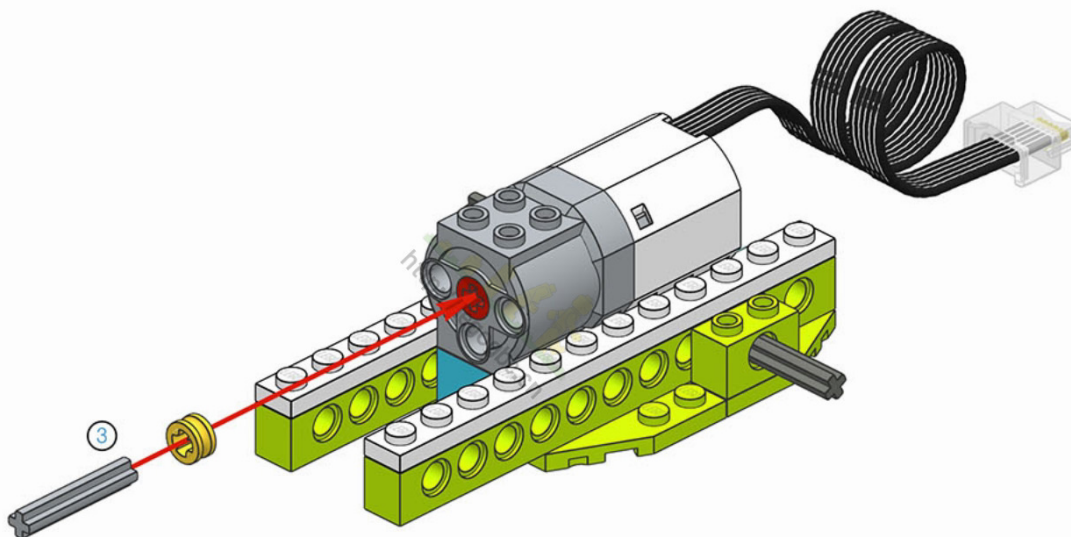




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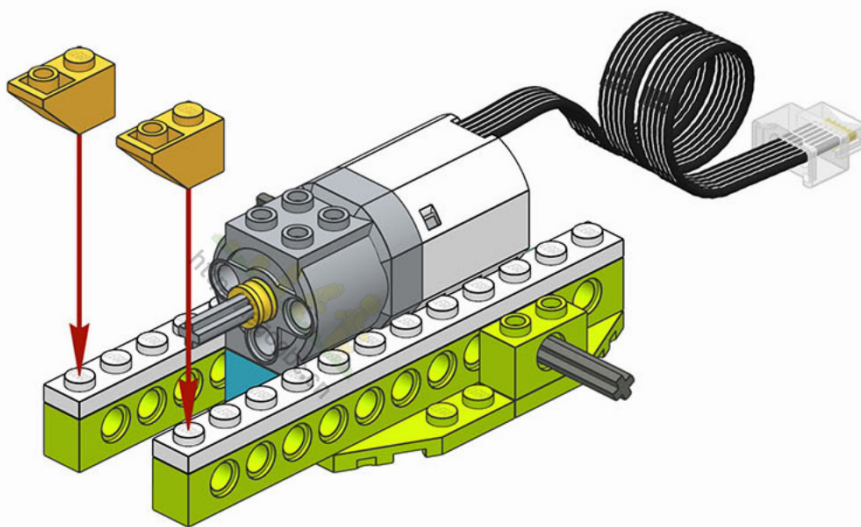


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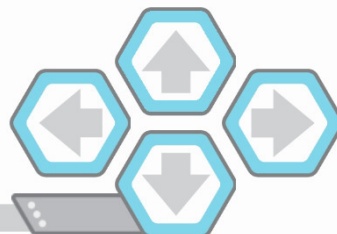


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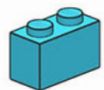
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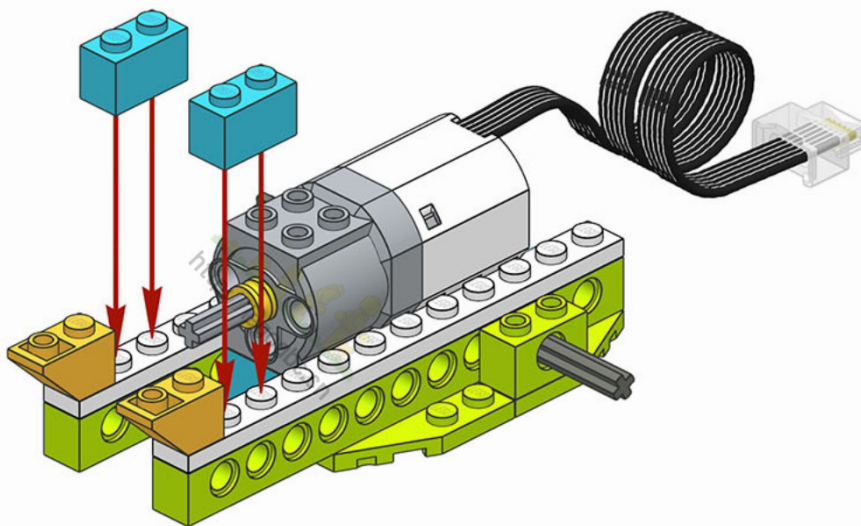


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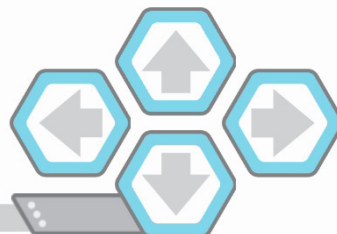


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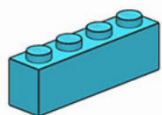
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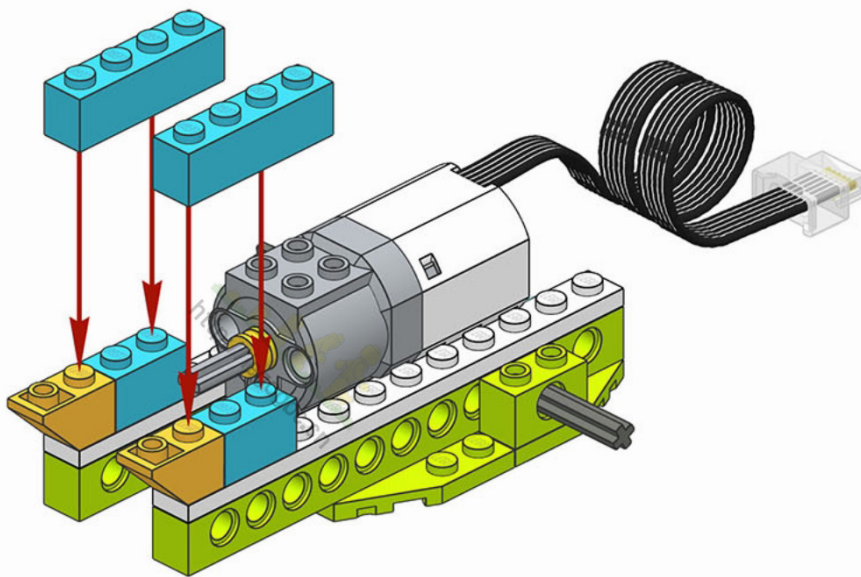


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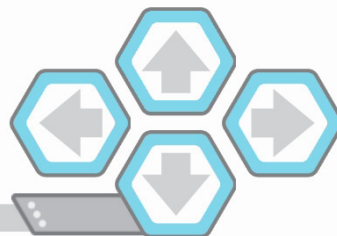


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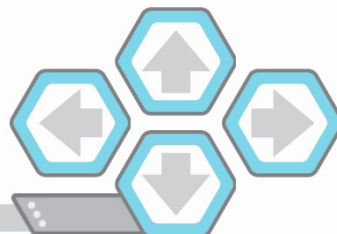
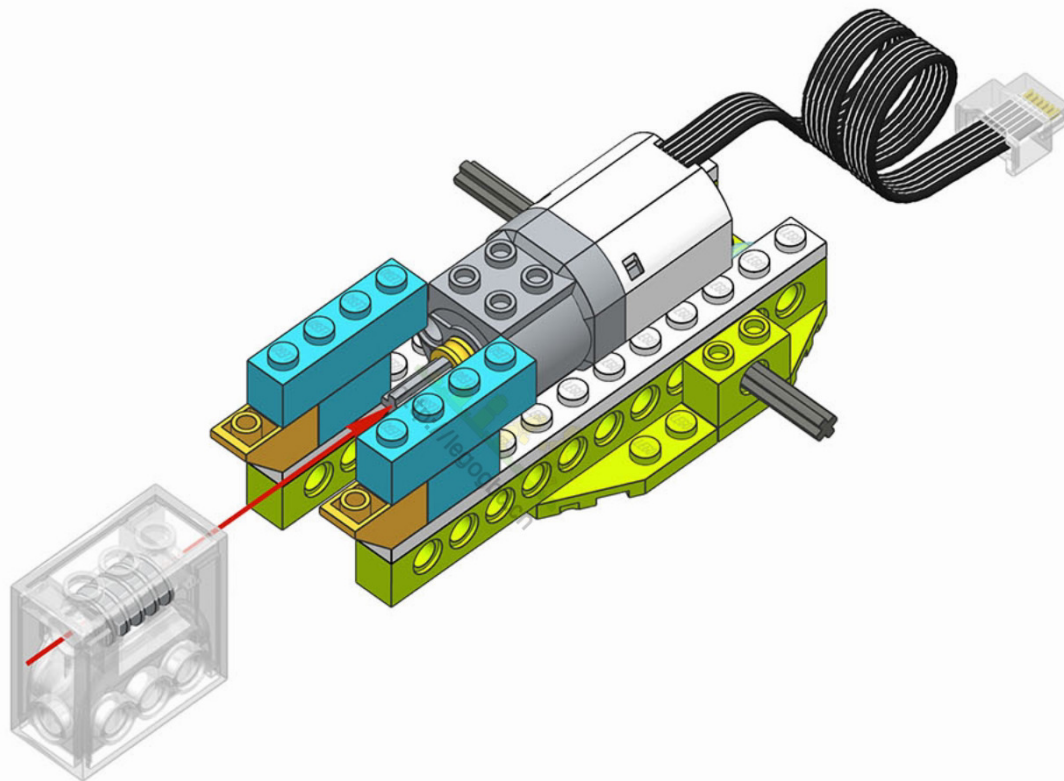


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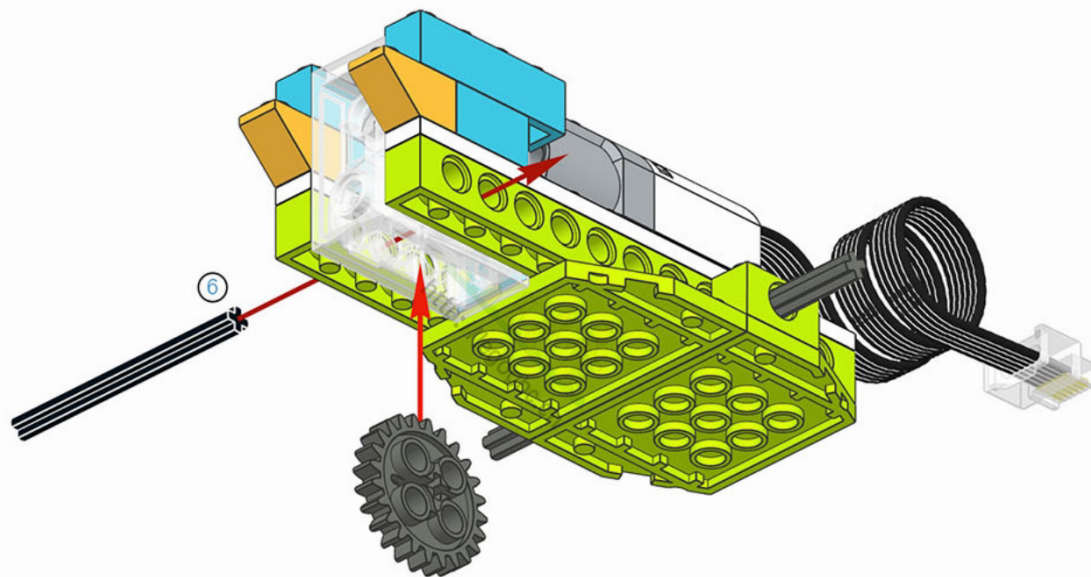
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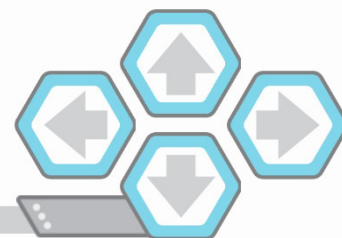
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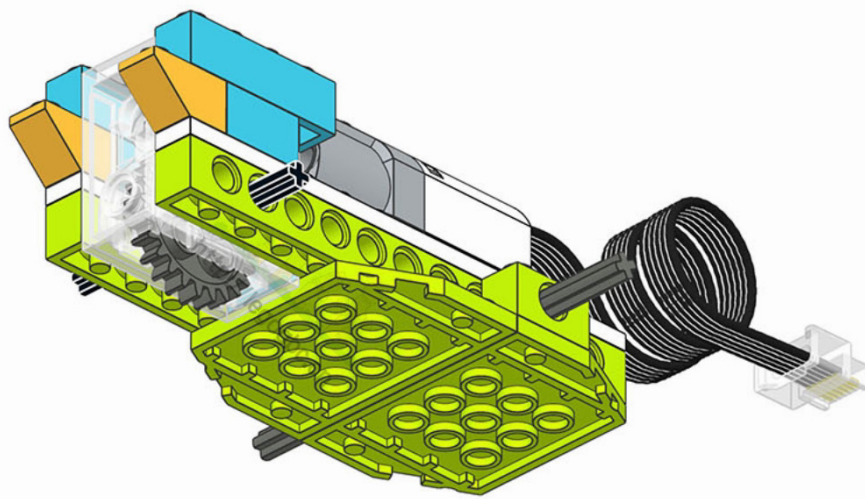
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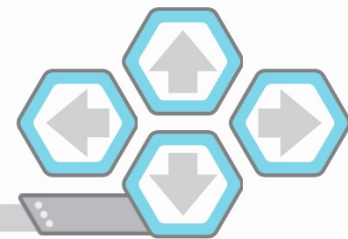
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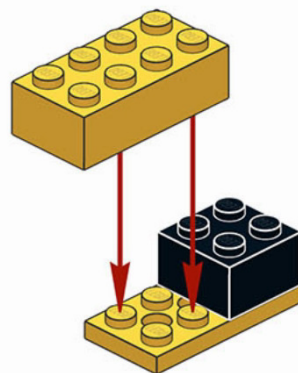


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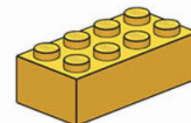
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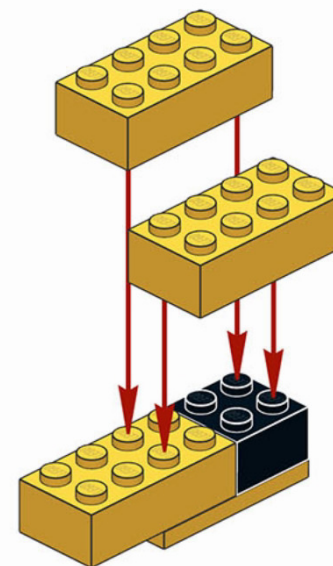


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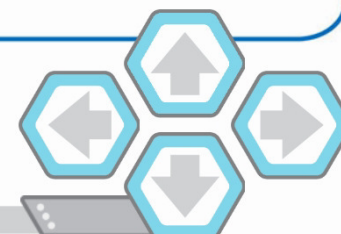
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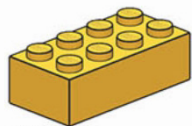
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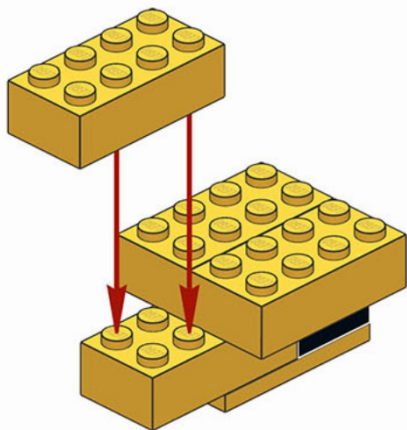


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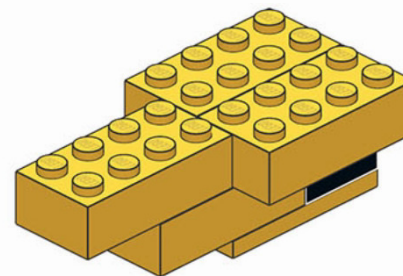


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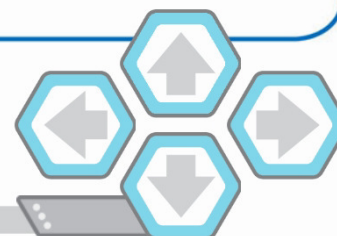
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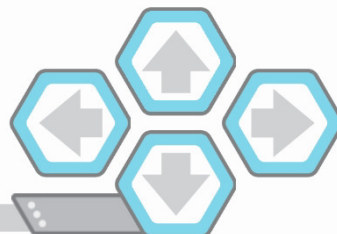
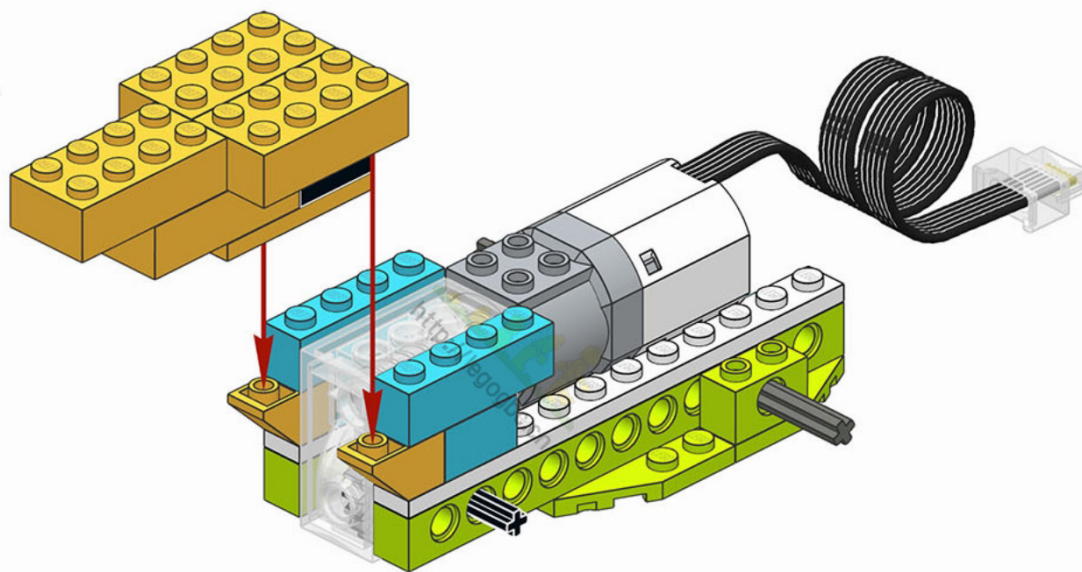
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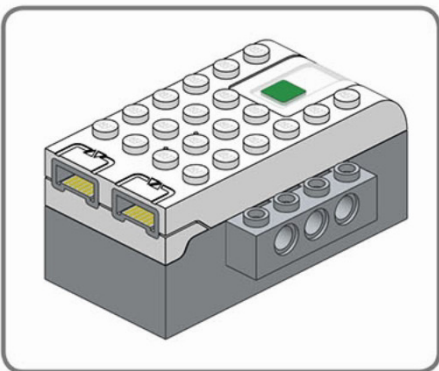
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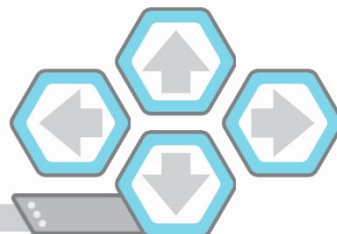
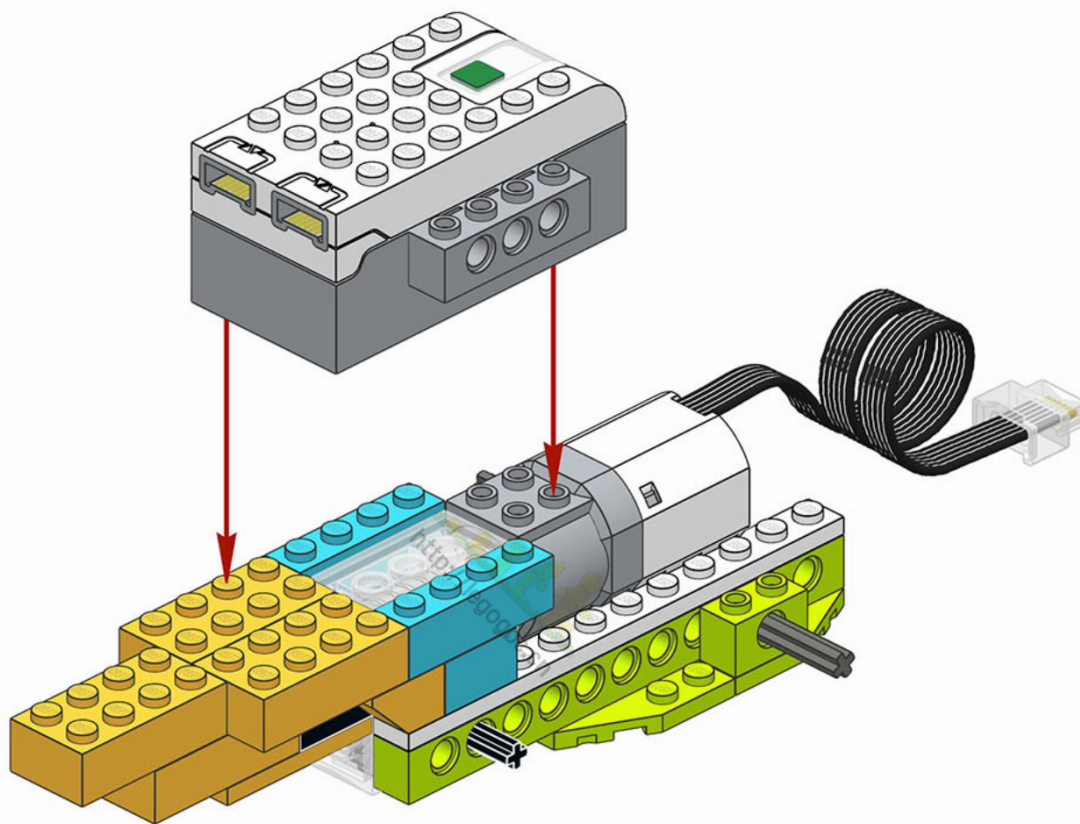




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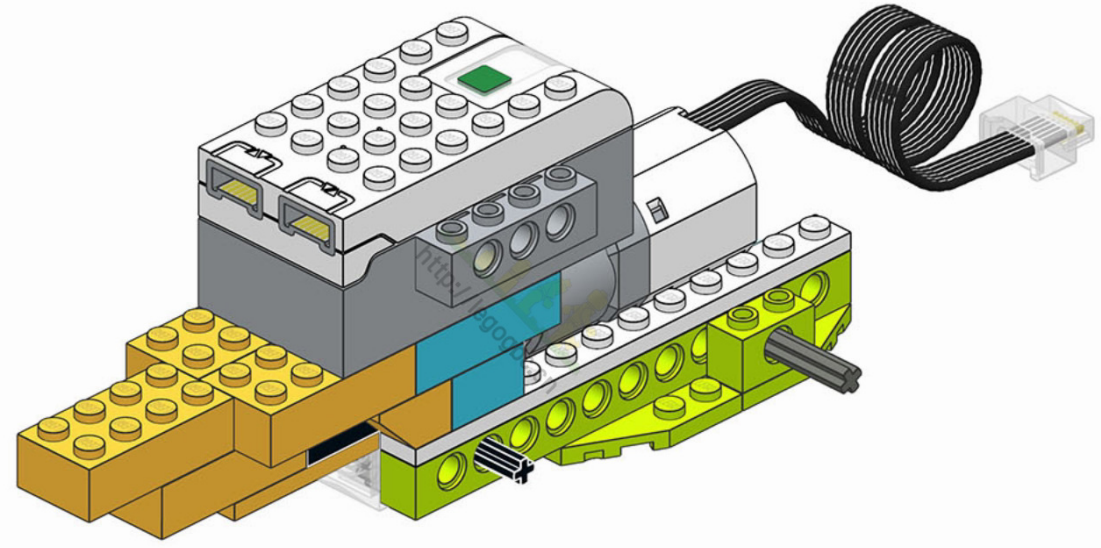
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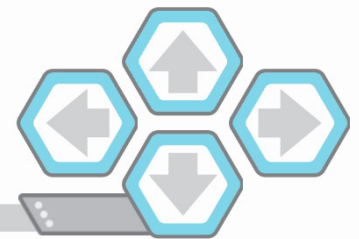
21



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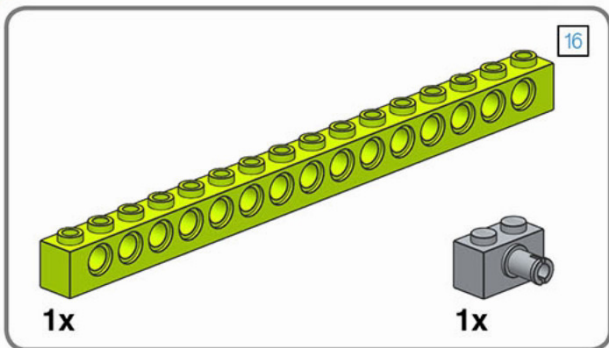
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46

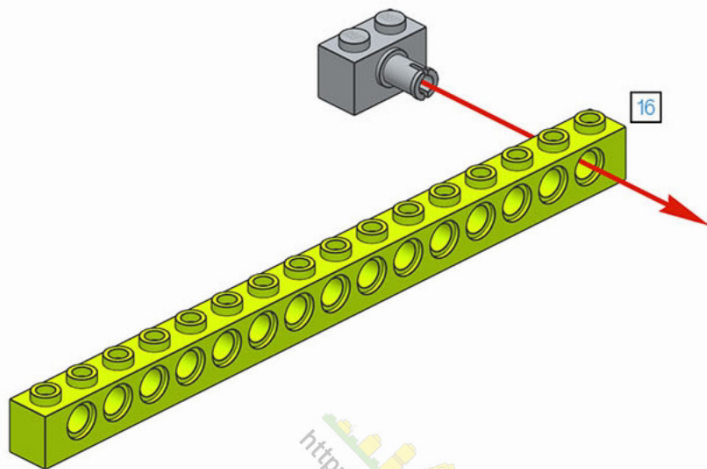




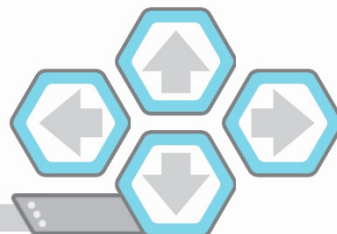
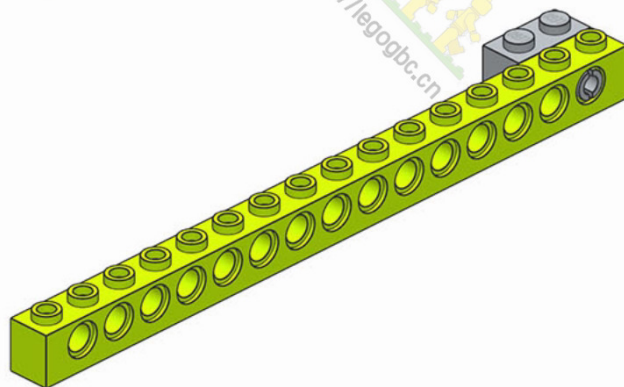
关注公众号获取更多



1



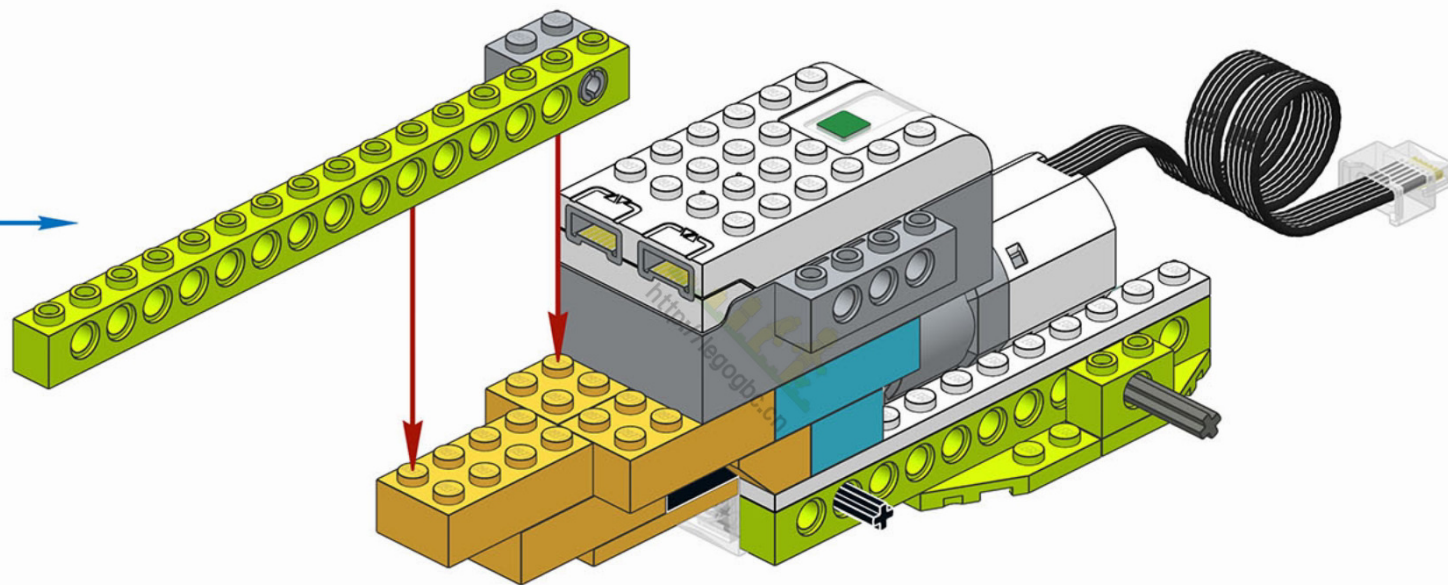
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关注公众号获取更多

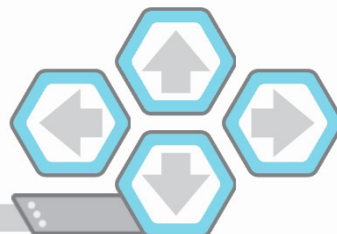
23



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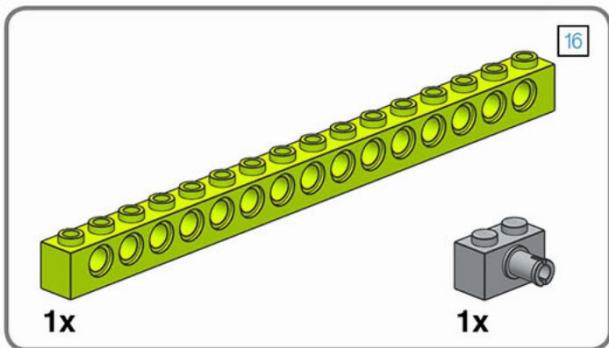
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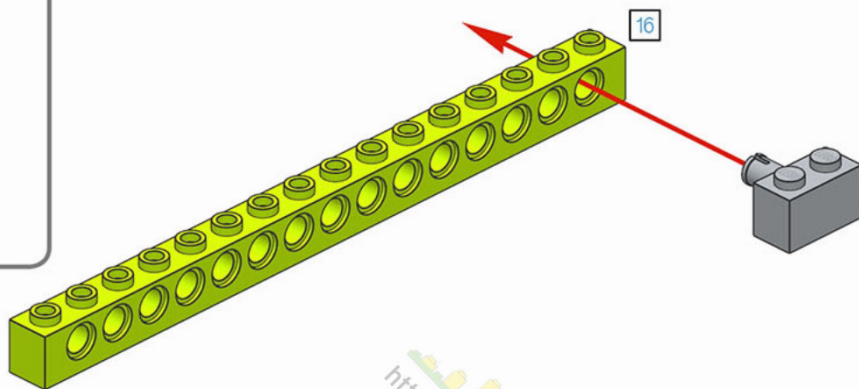




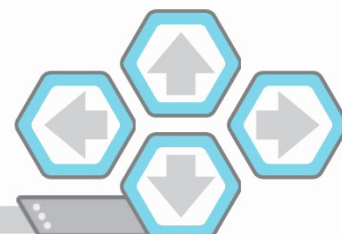
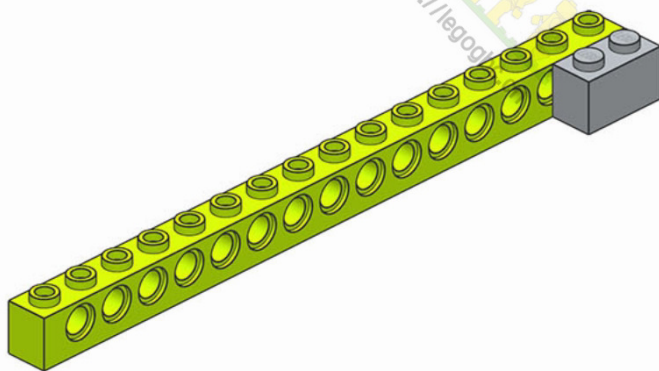
关注公众号获取更多



1



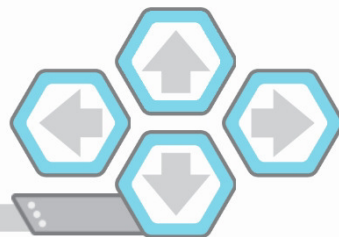
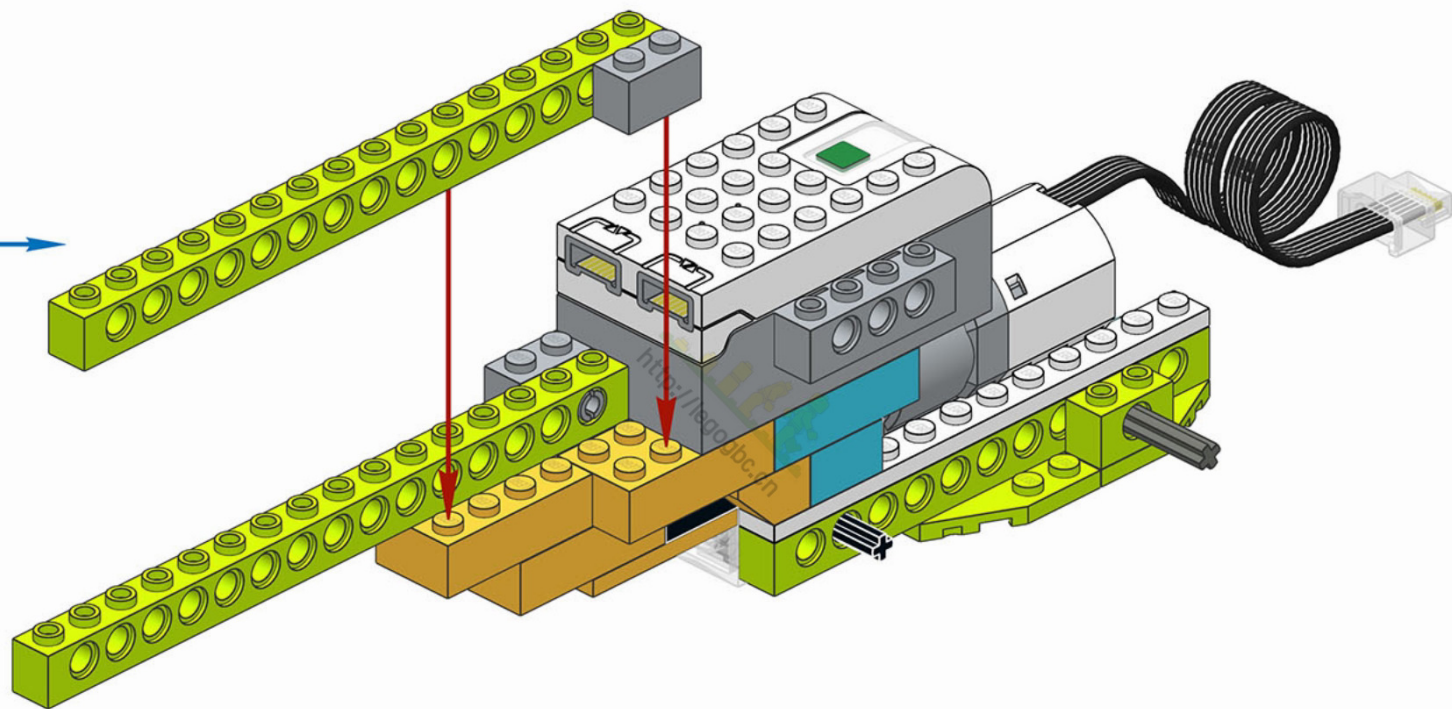
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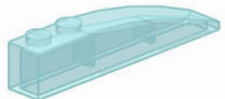
关注公众号获取更多

25



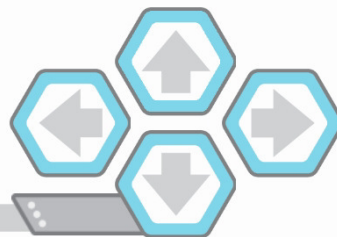
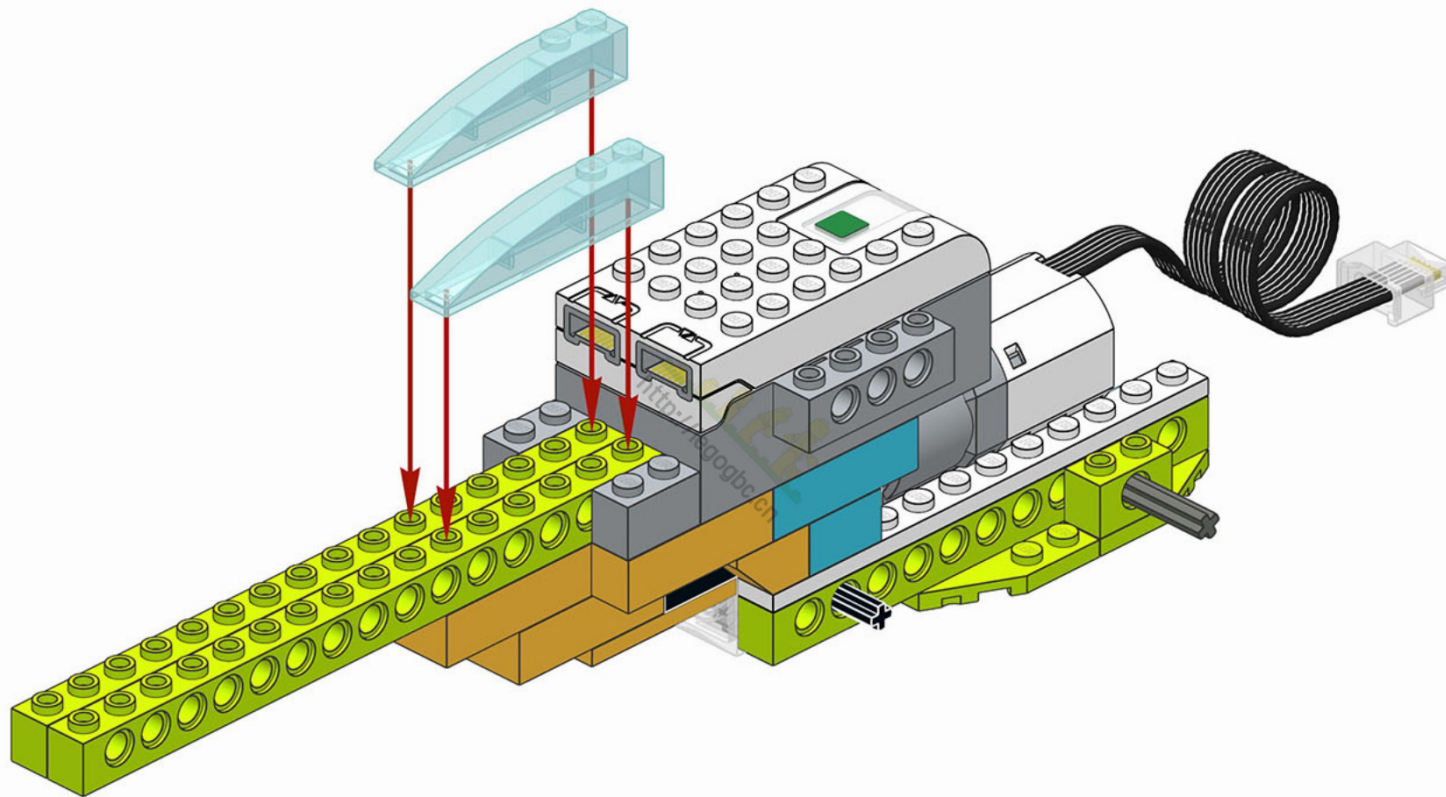


关注公众号获取更多



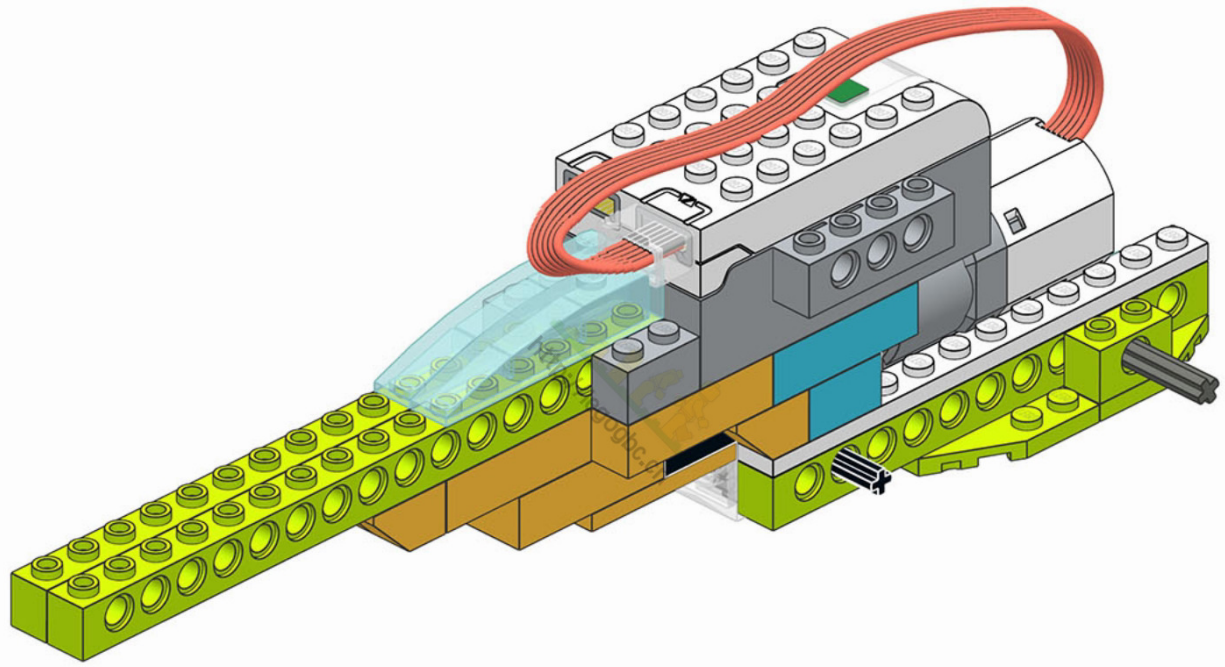
2x

26

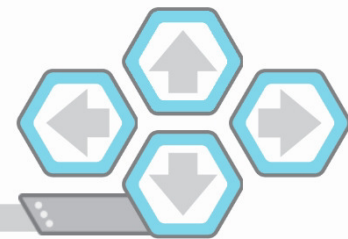




关注公众号获取更多



27



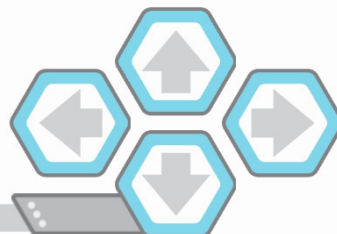
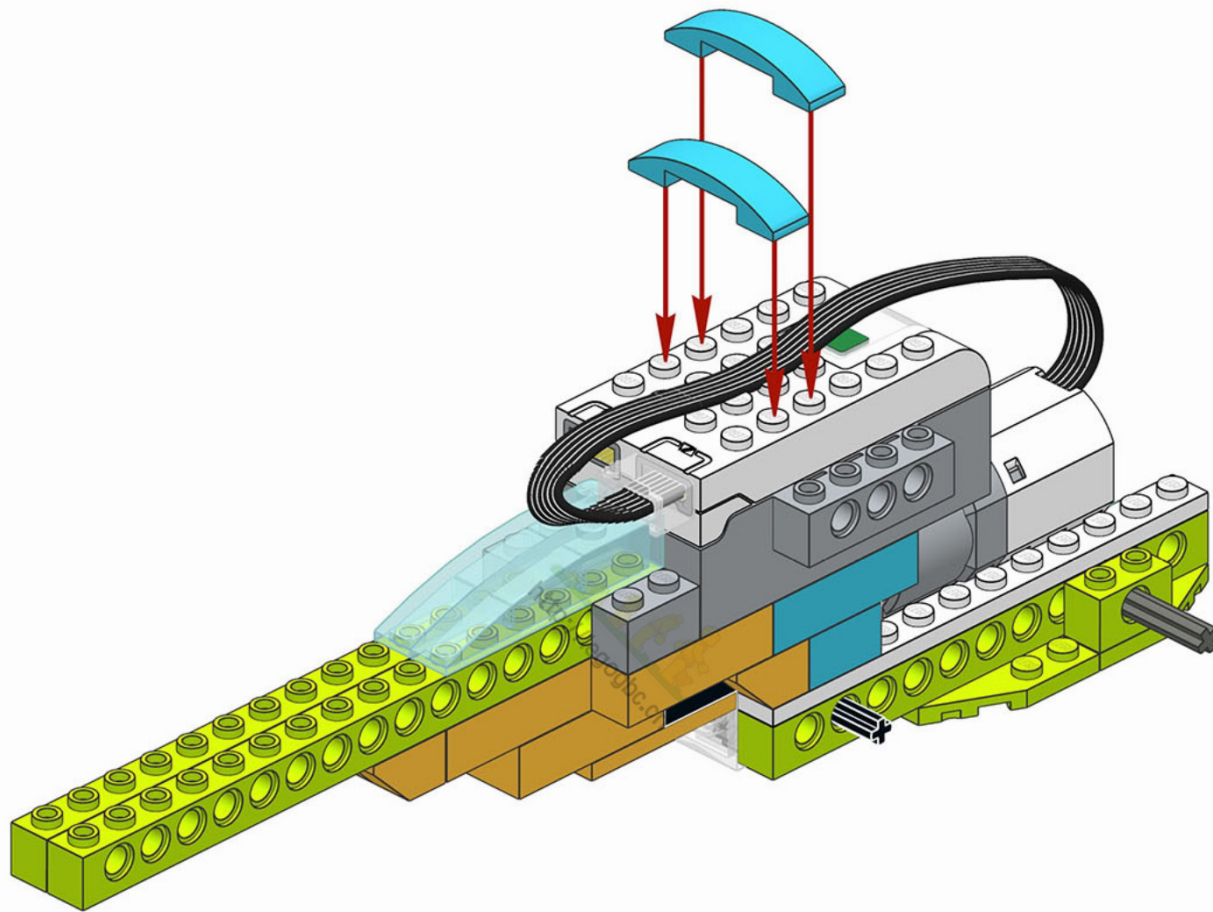


关注公众号获取更多



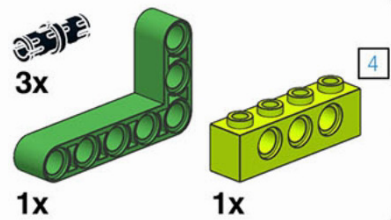
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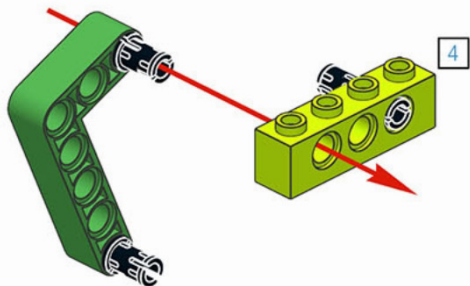




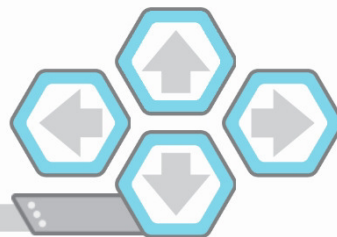
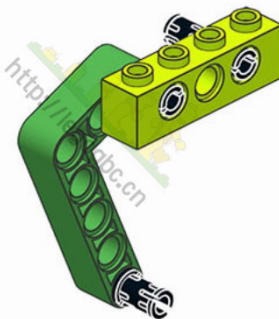
关注公众号获取更多



1



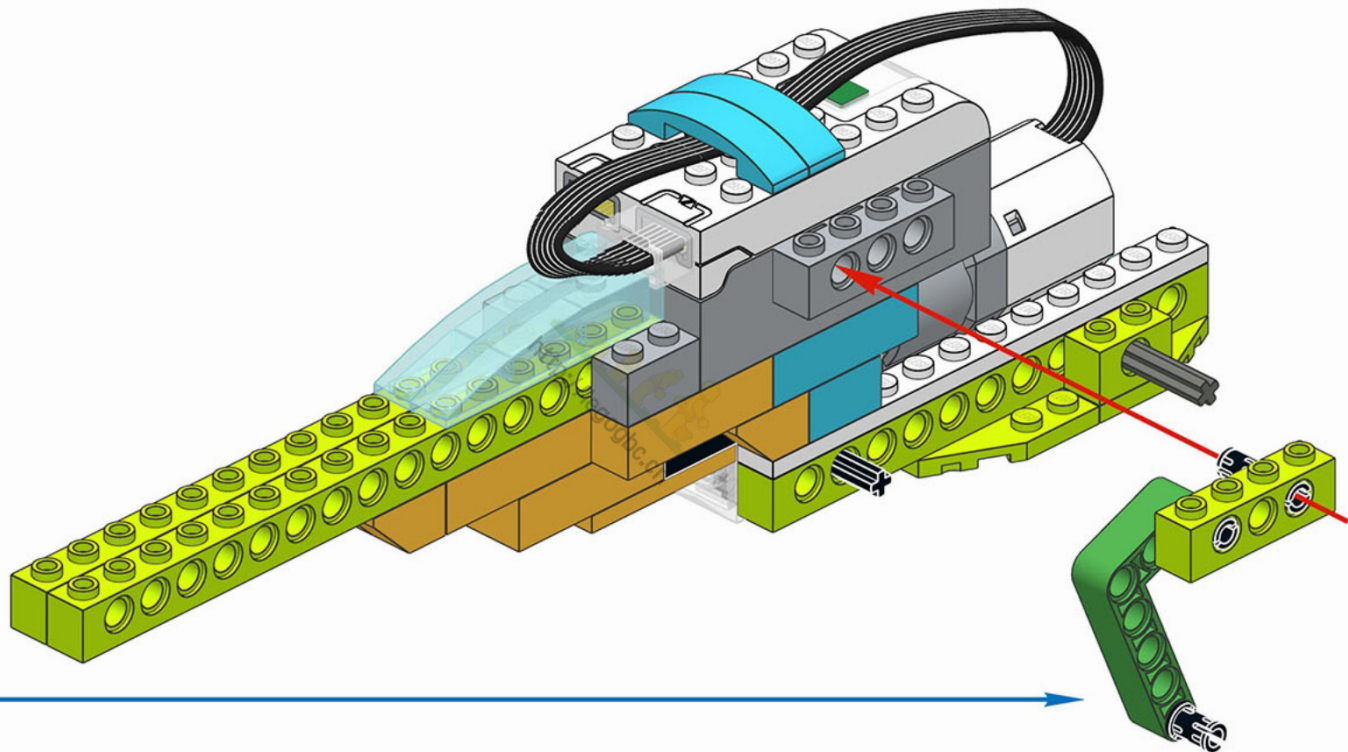
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关注公众号获取更多

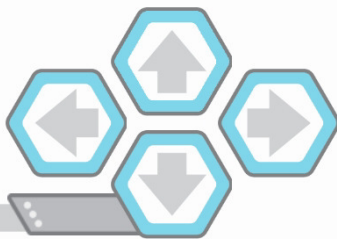
30



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5

55



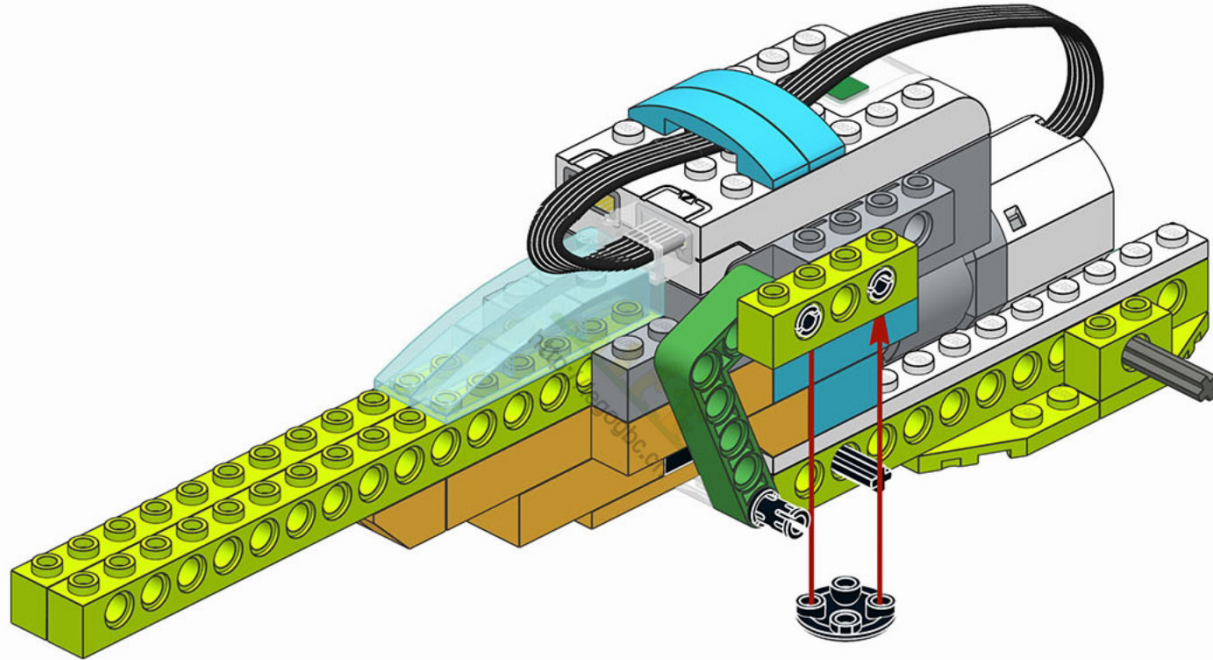


关注公众号获取更多



1x

31



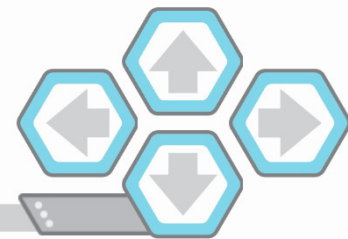
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5



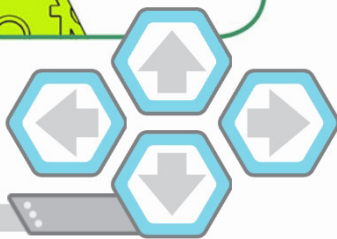
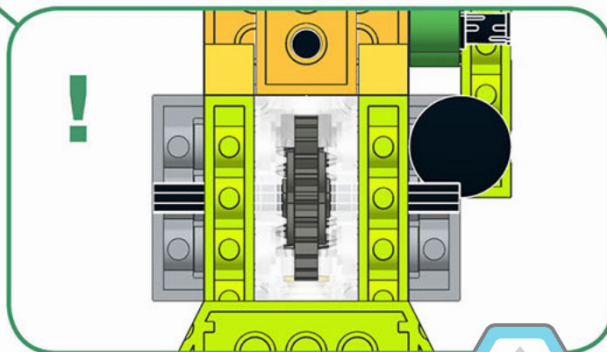
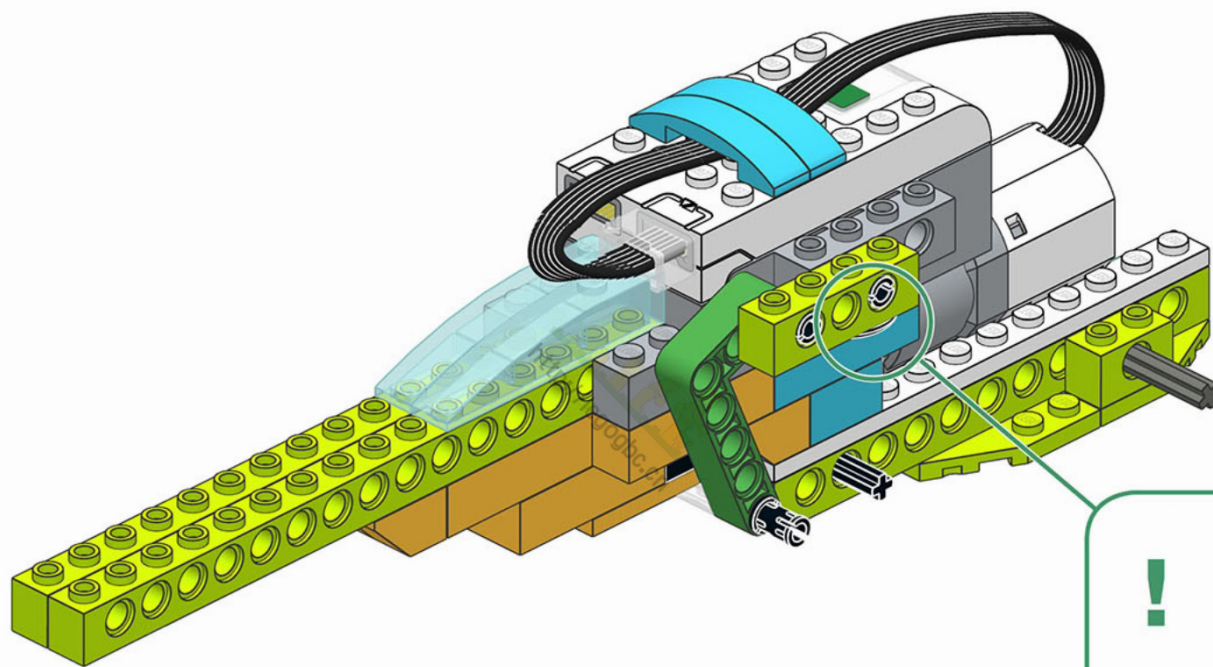
56





关注公众号获取更多

32

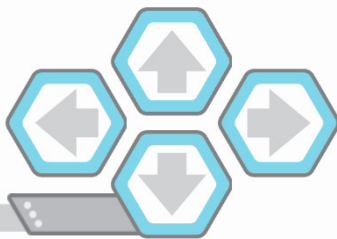
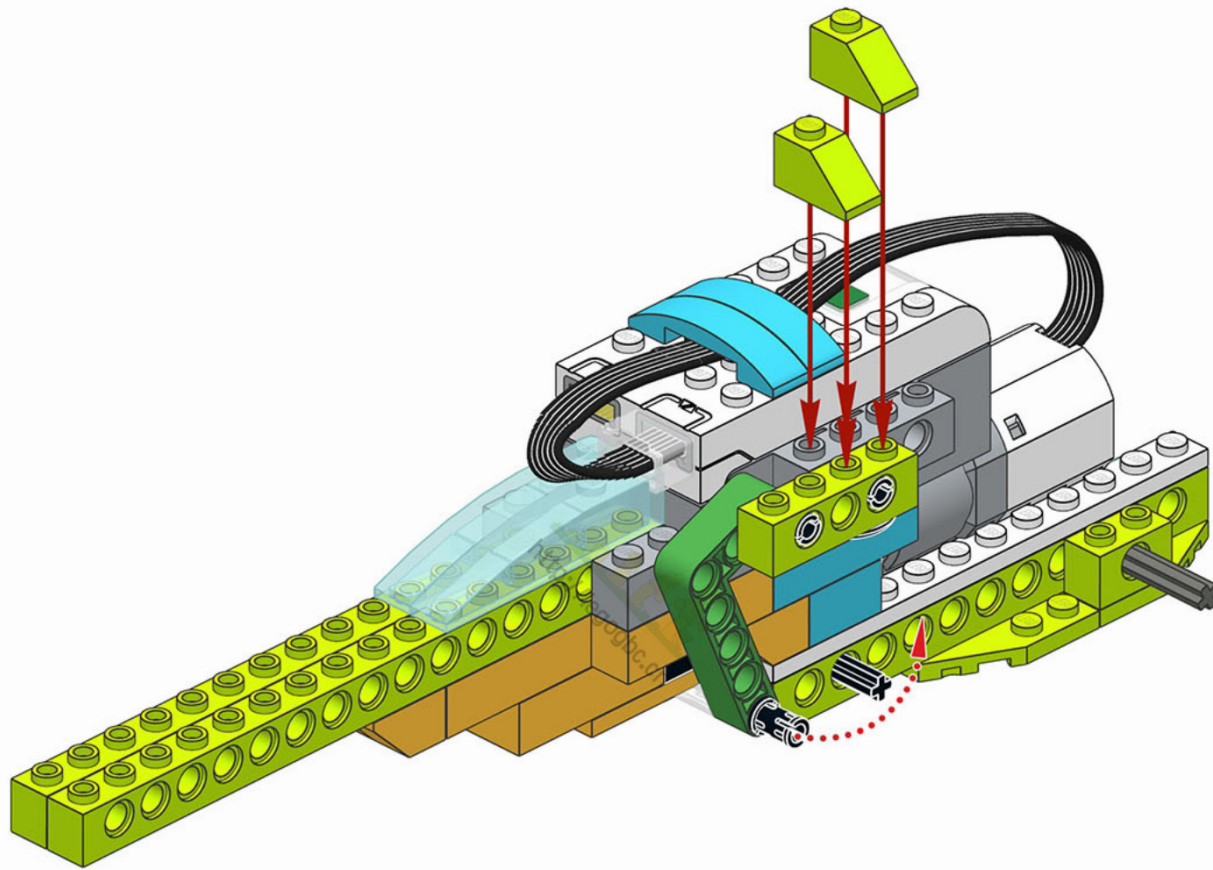




关注公众号获取更多

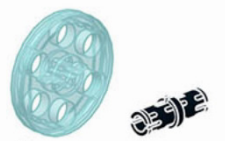


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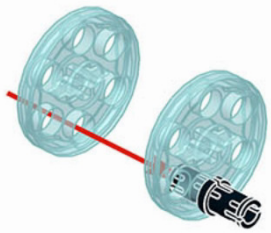


关注公众号获取更多

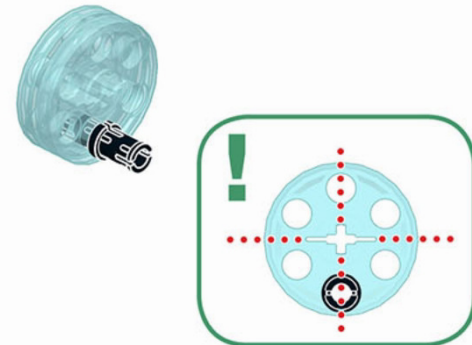


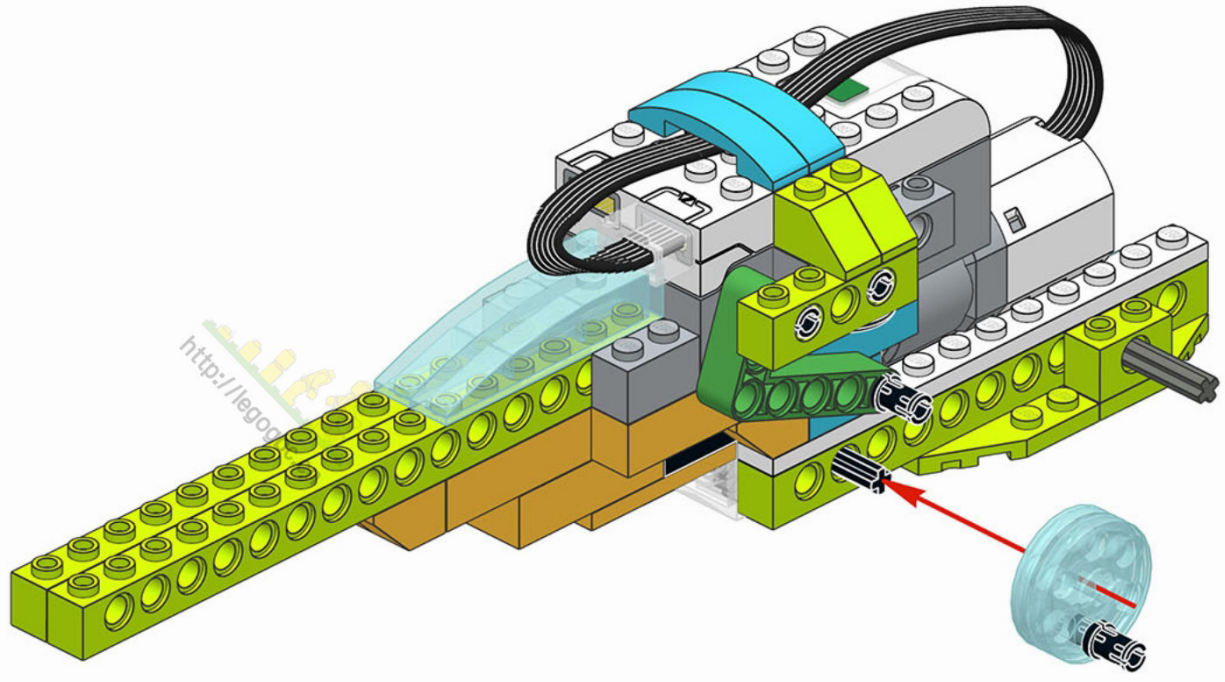
2x 1x

1



2

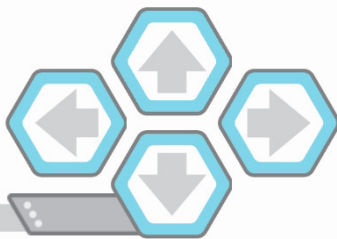




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5

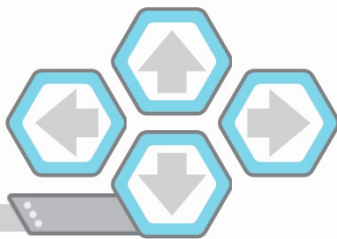
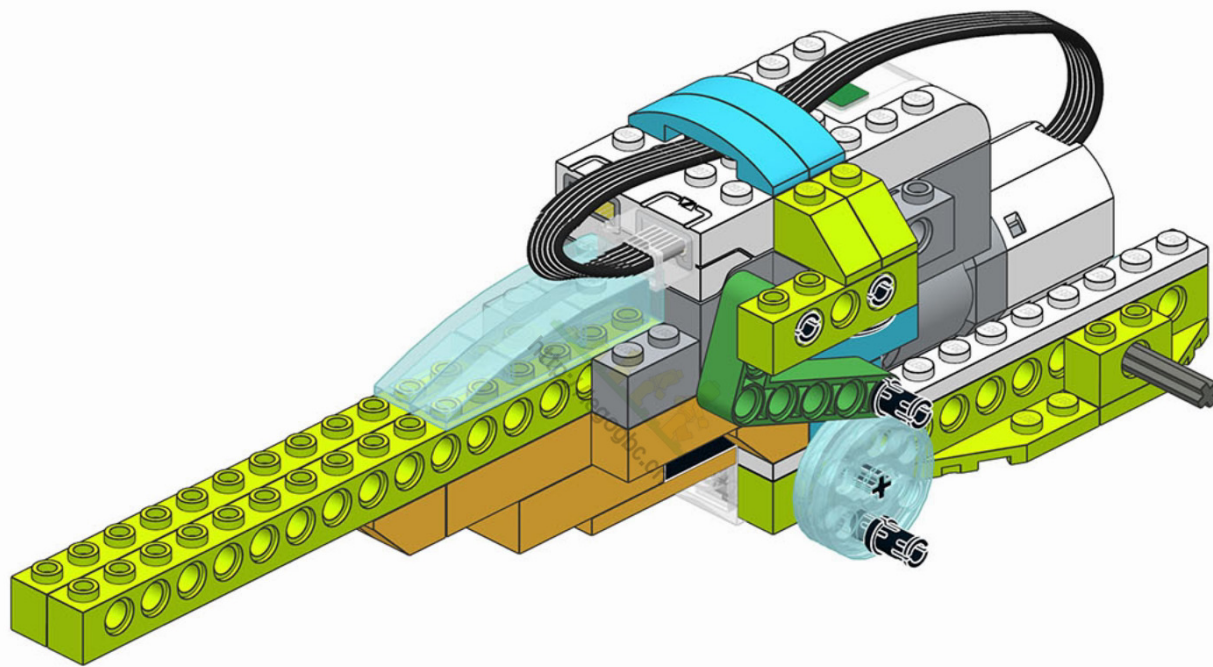
59





关注公众号获取更多

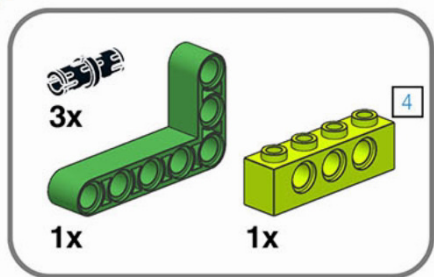
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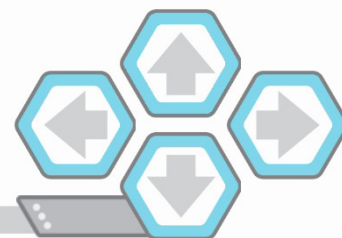
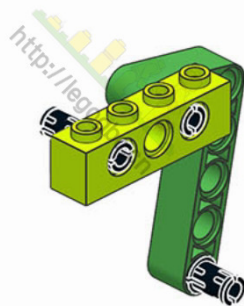
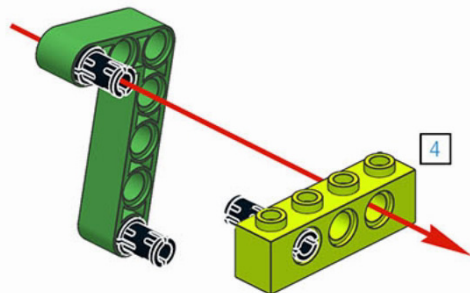


关注公众号获取更多

2

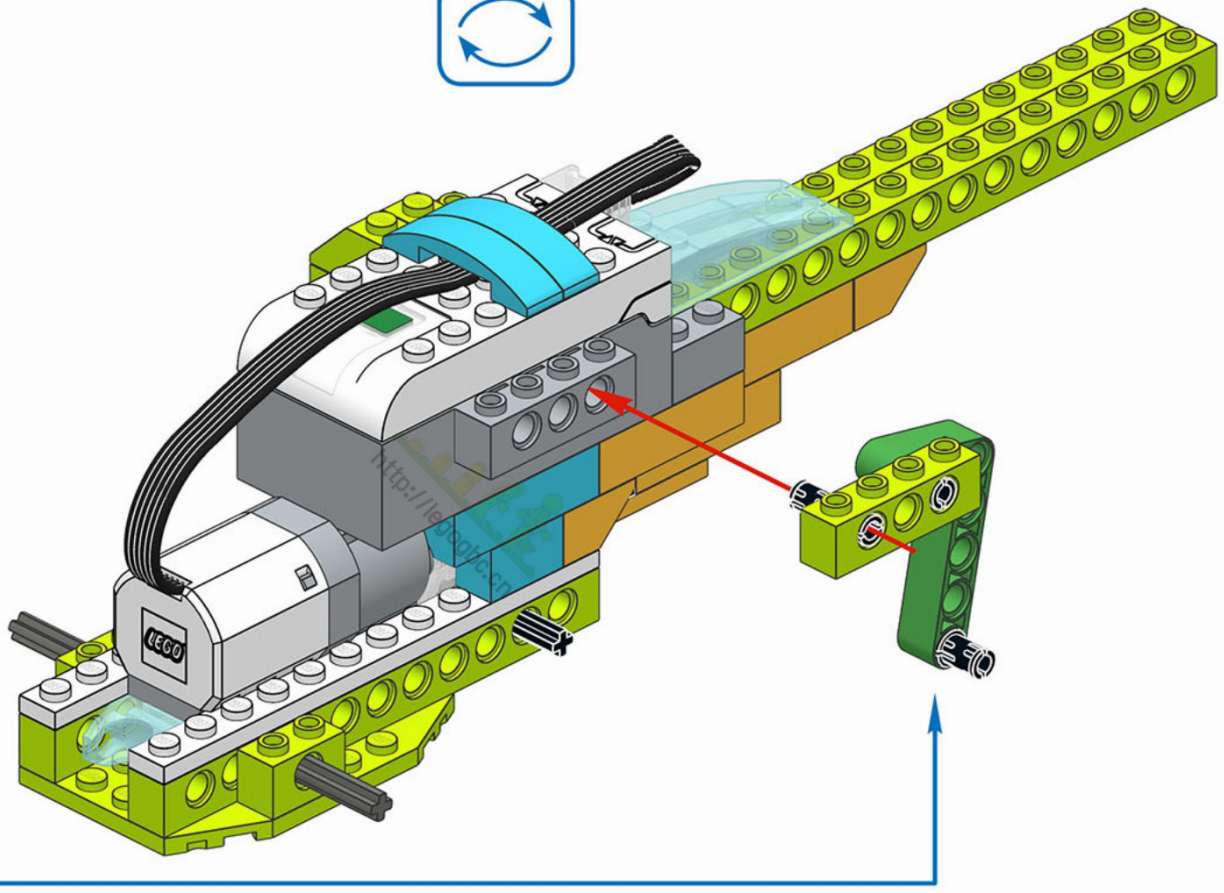


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关注公众号获取更多

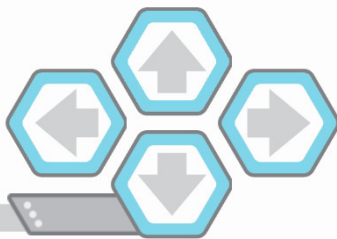


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5

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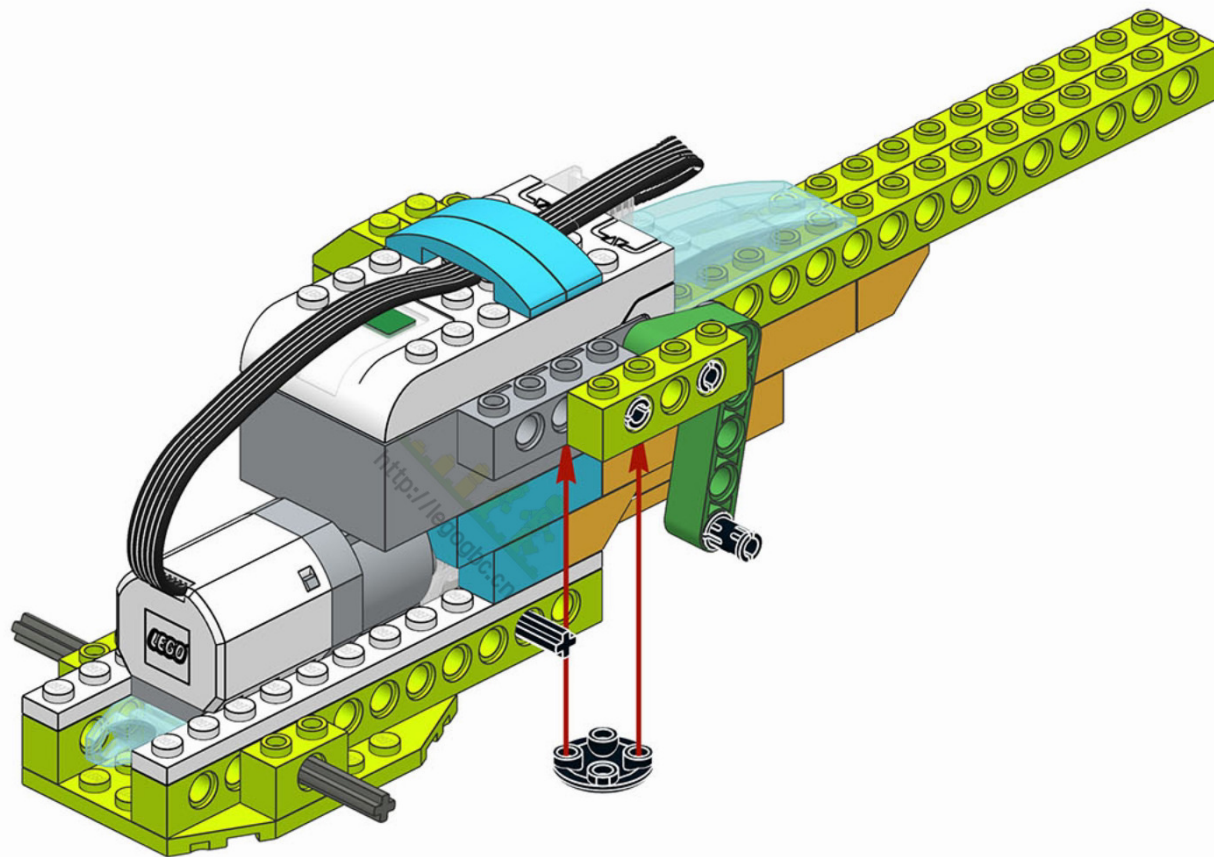


关注公众号获取更多



1x

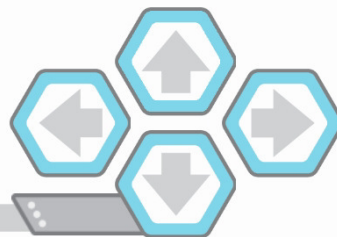
38



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5

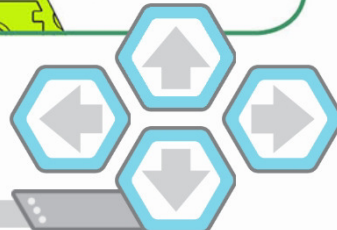
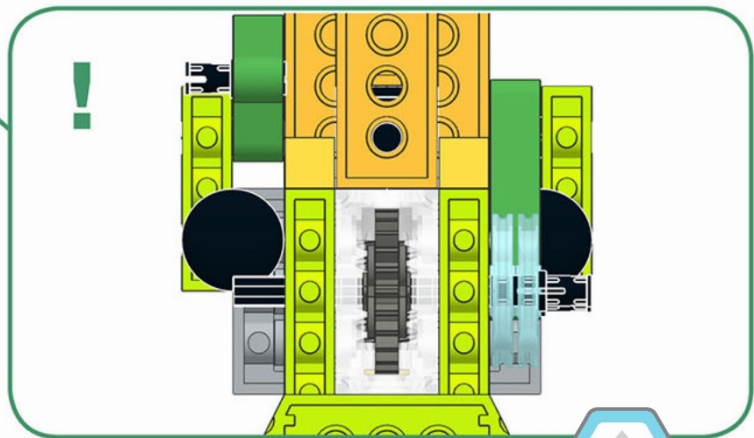
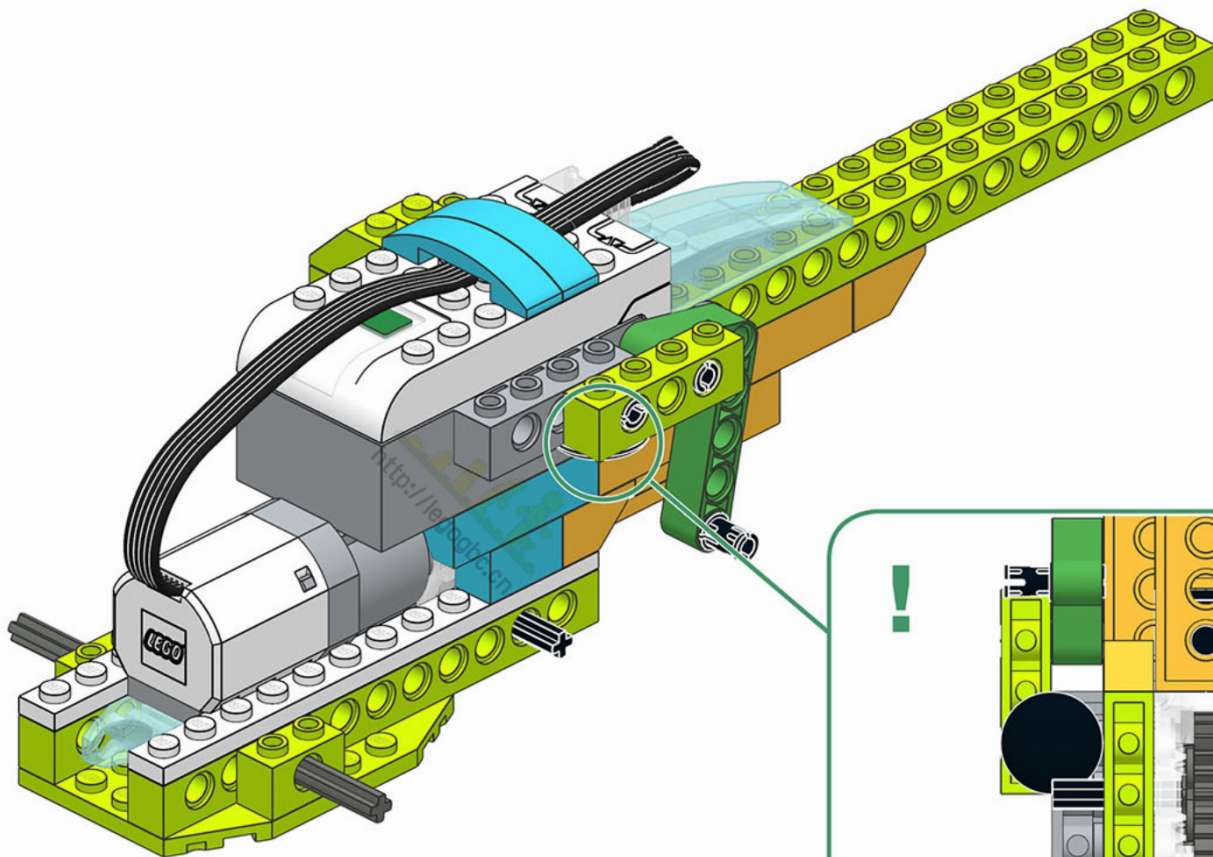
63





关注公众号获取更多

39



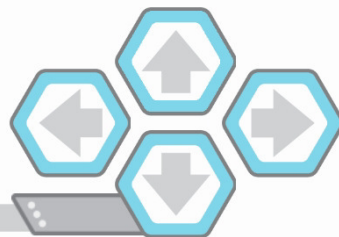
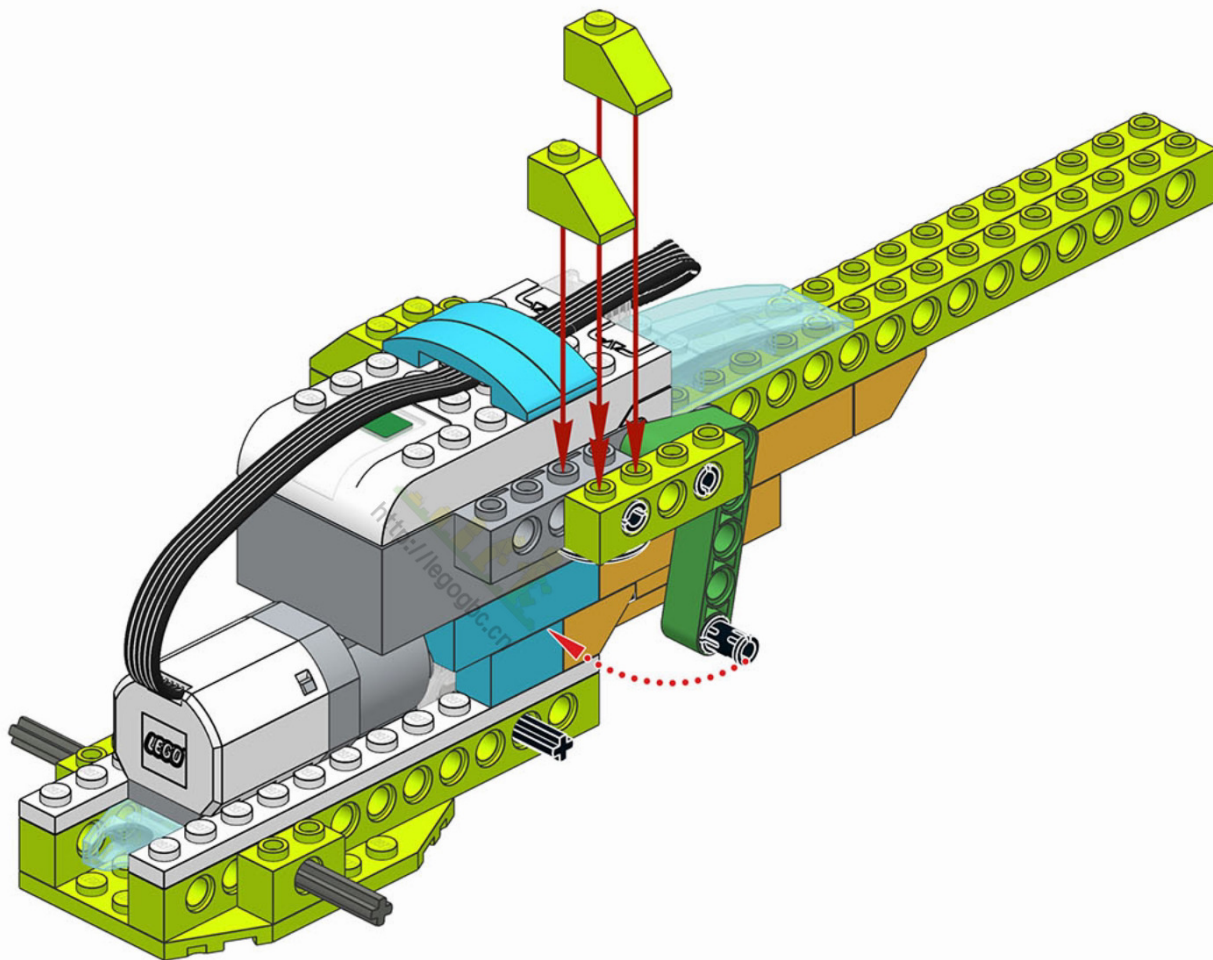


关注公众号获取更多



2x

40



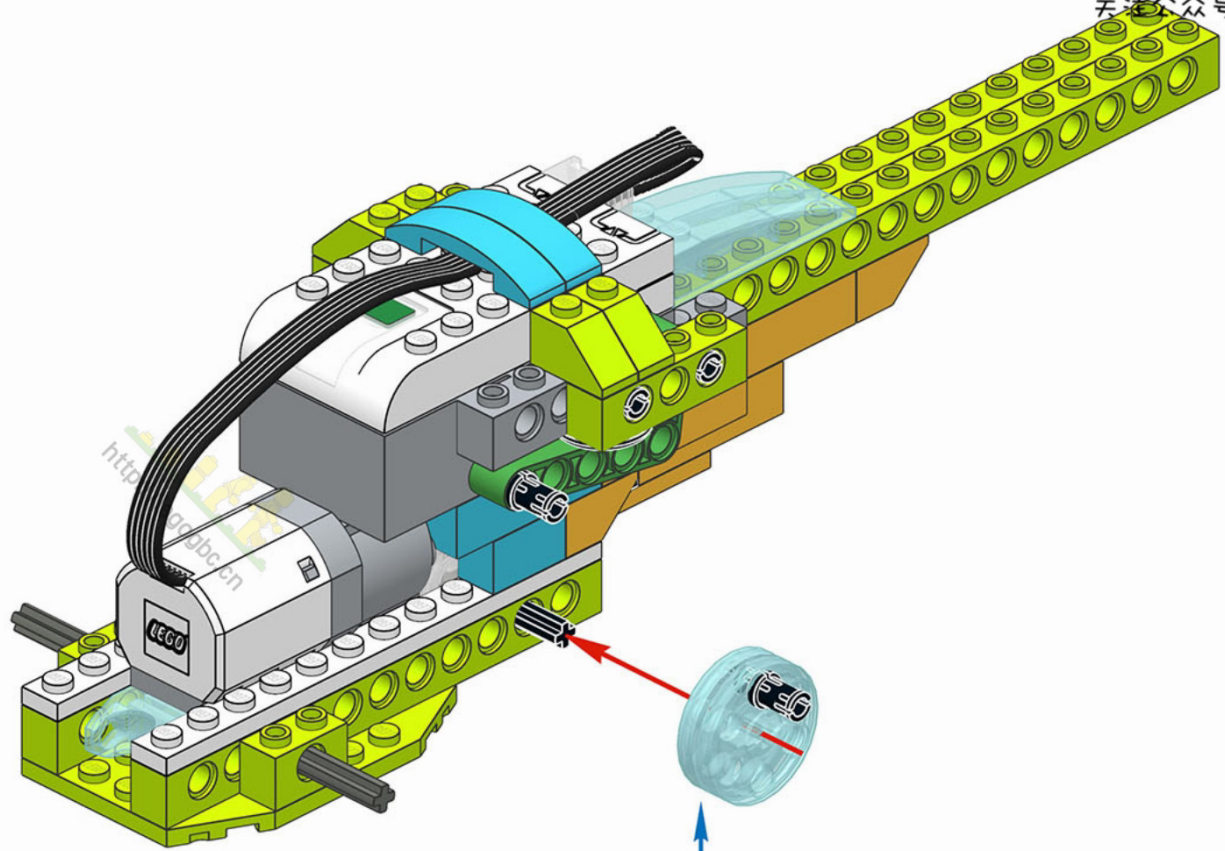


关注公众号获取更多

2x 1x

1

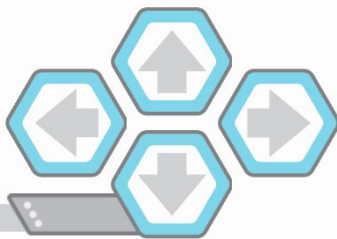
2



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5

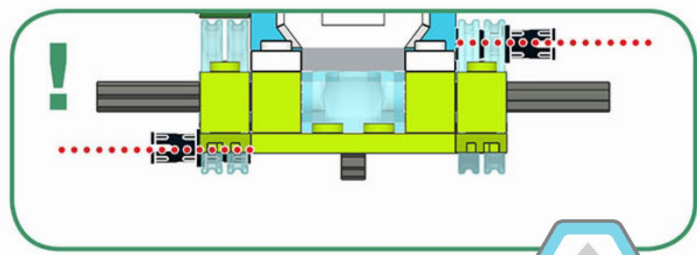
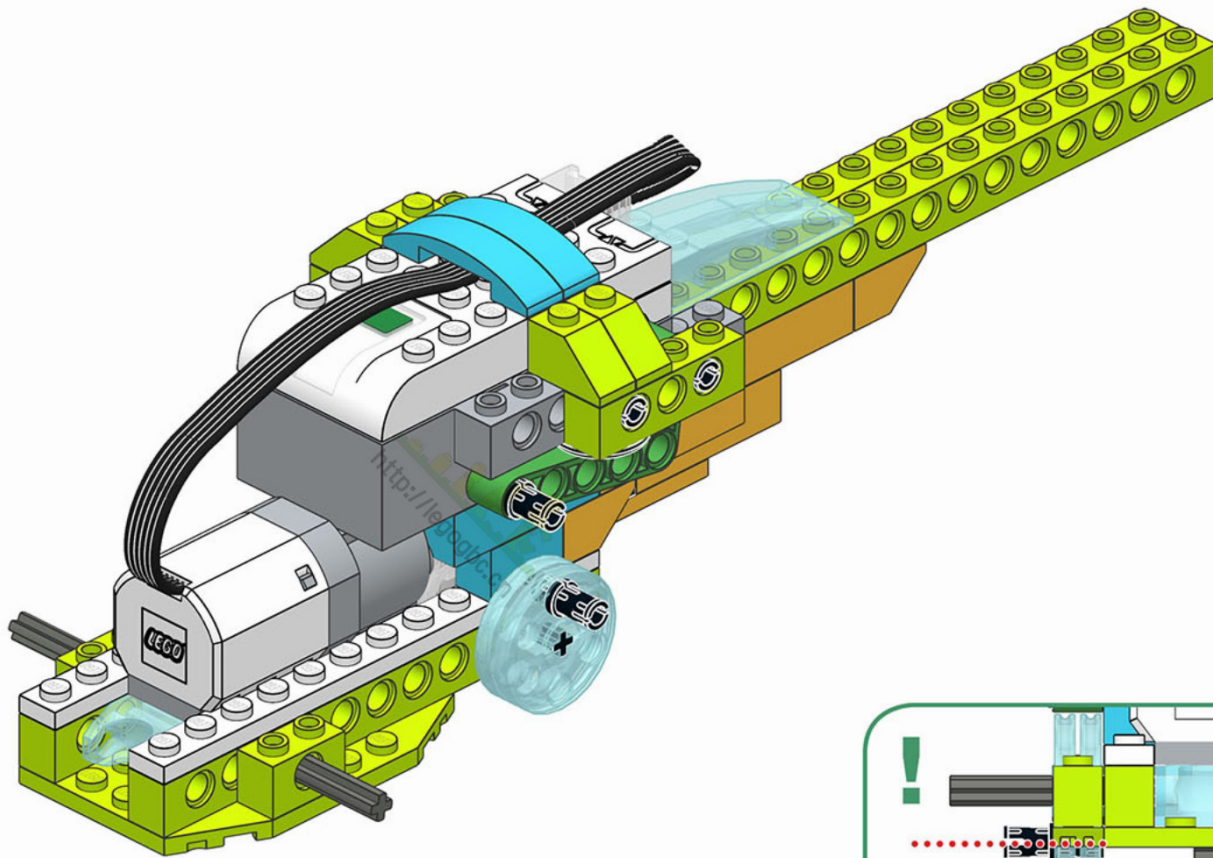
66





关注公众号获取更多

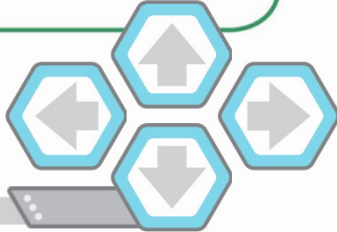
42



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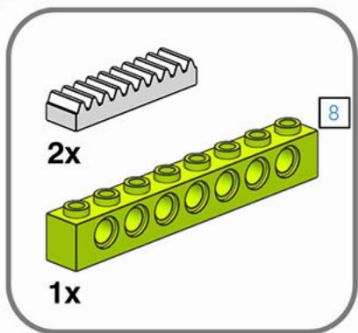
5

67

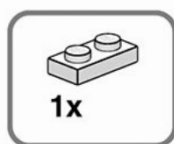
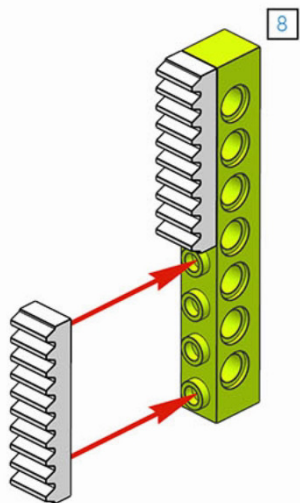




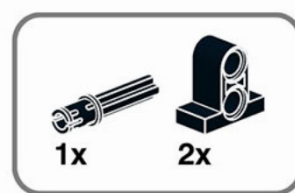
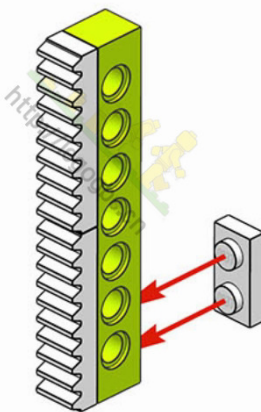
关注公众号获取更多



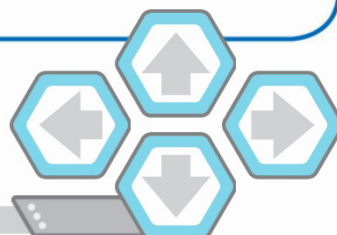
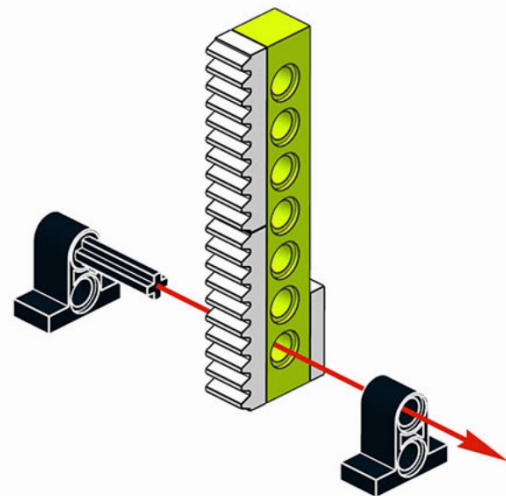
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2

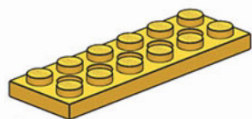


3





关注公众号获取更多

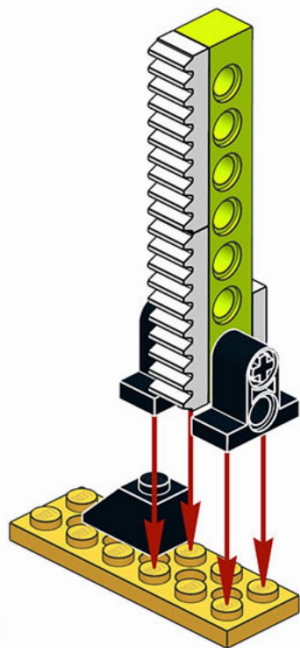


1x



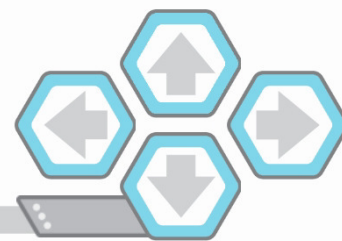
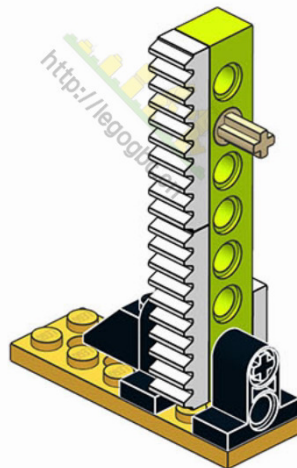
1x

4



1x

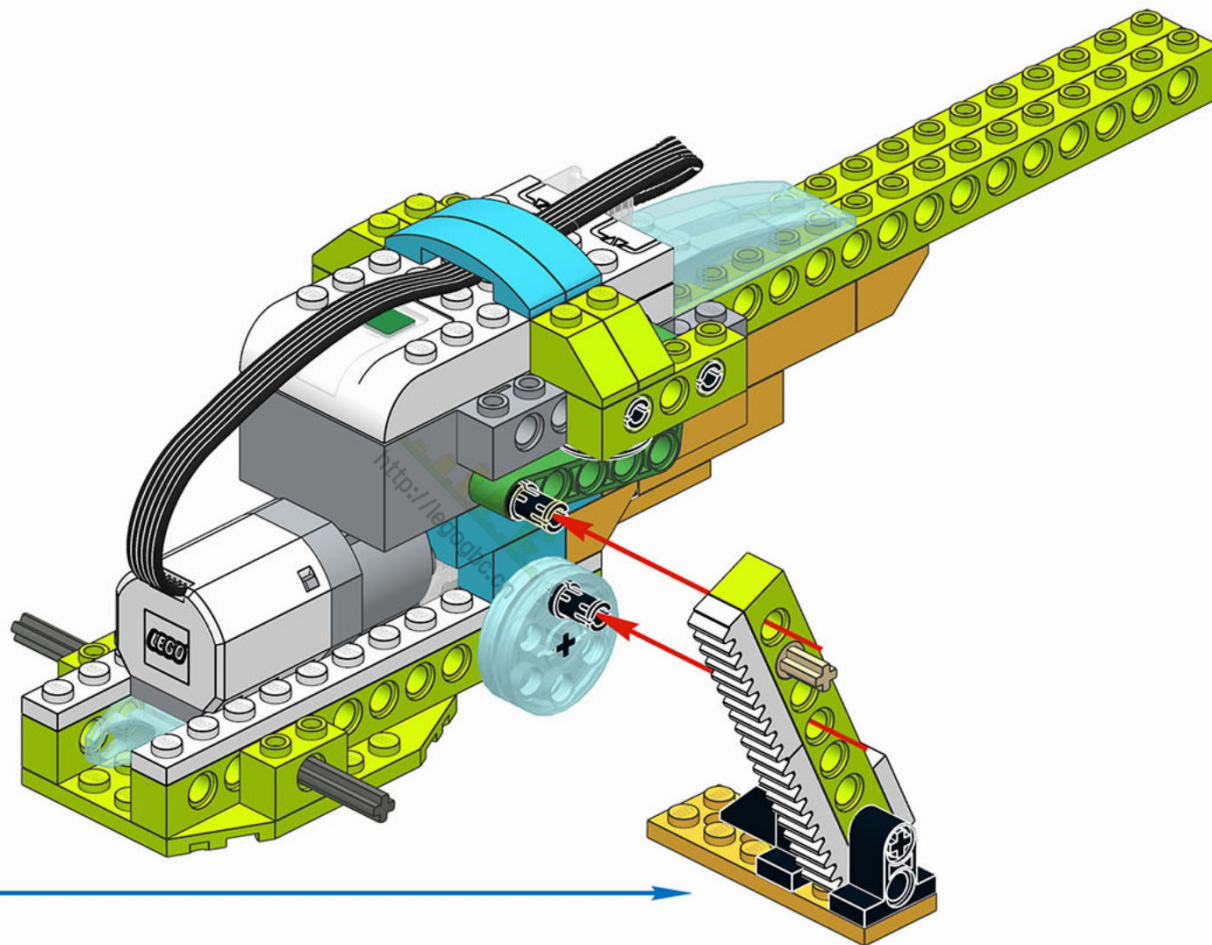
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关注公众号获取更多

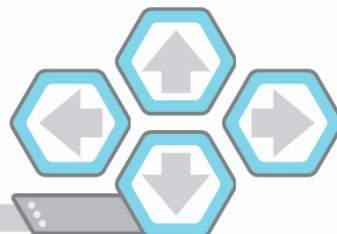
45



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5

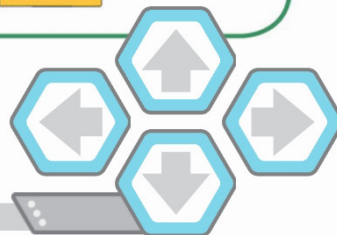
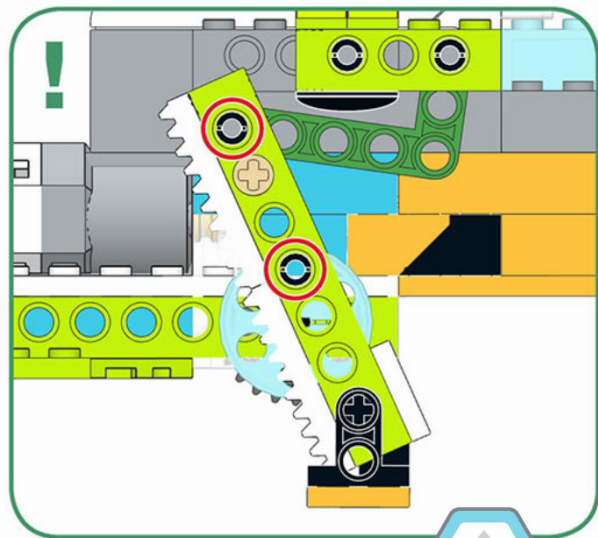
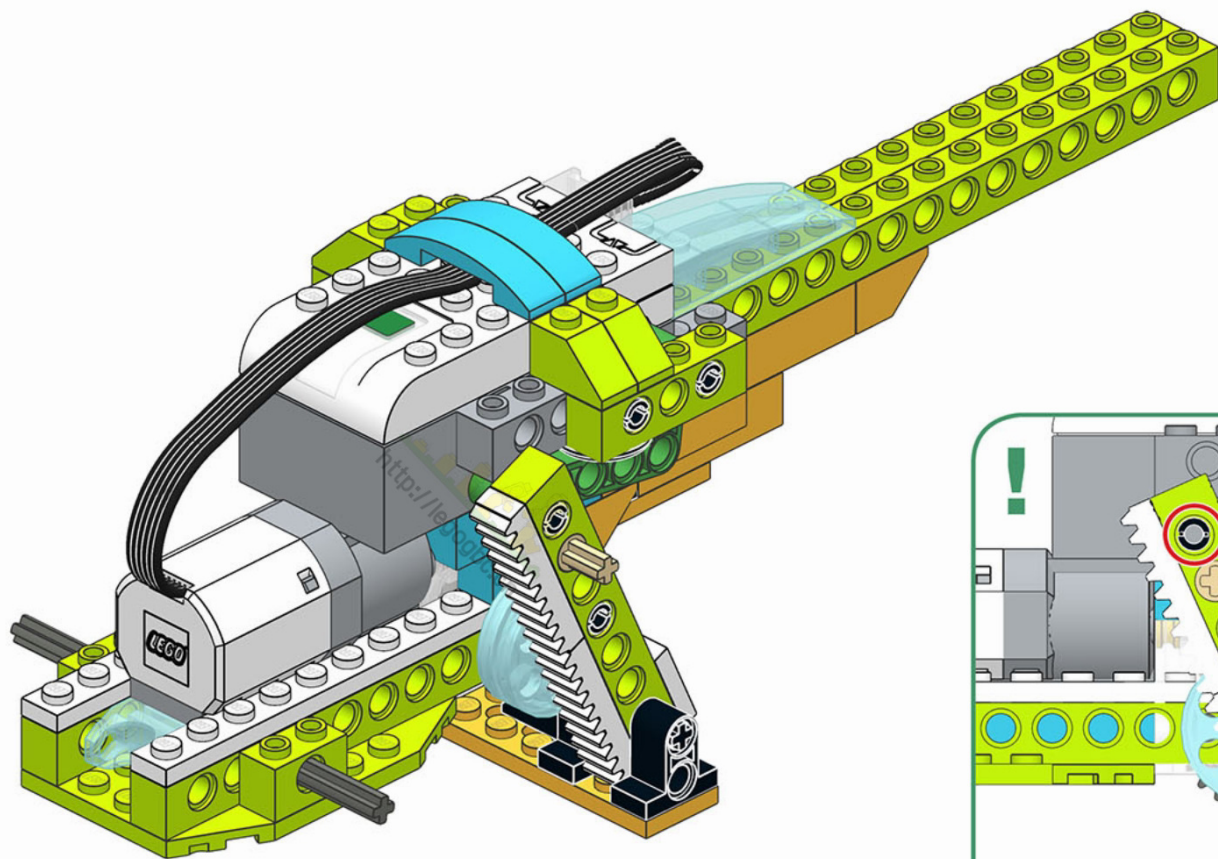
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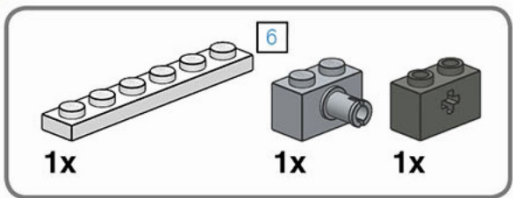
关注公众号获取更多

46

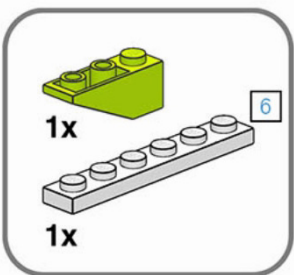
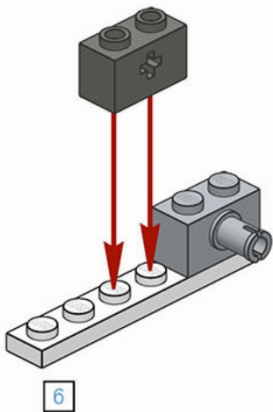




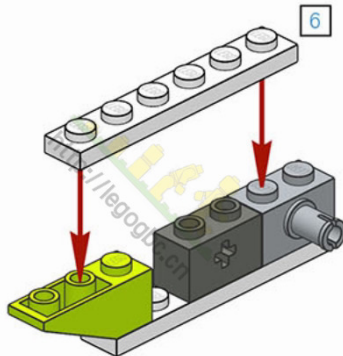
关注公众号获取更多



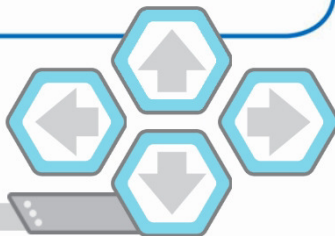
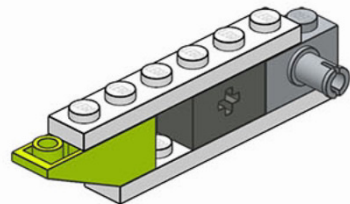
1



2



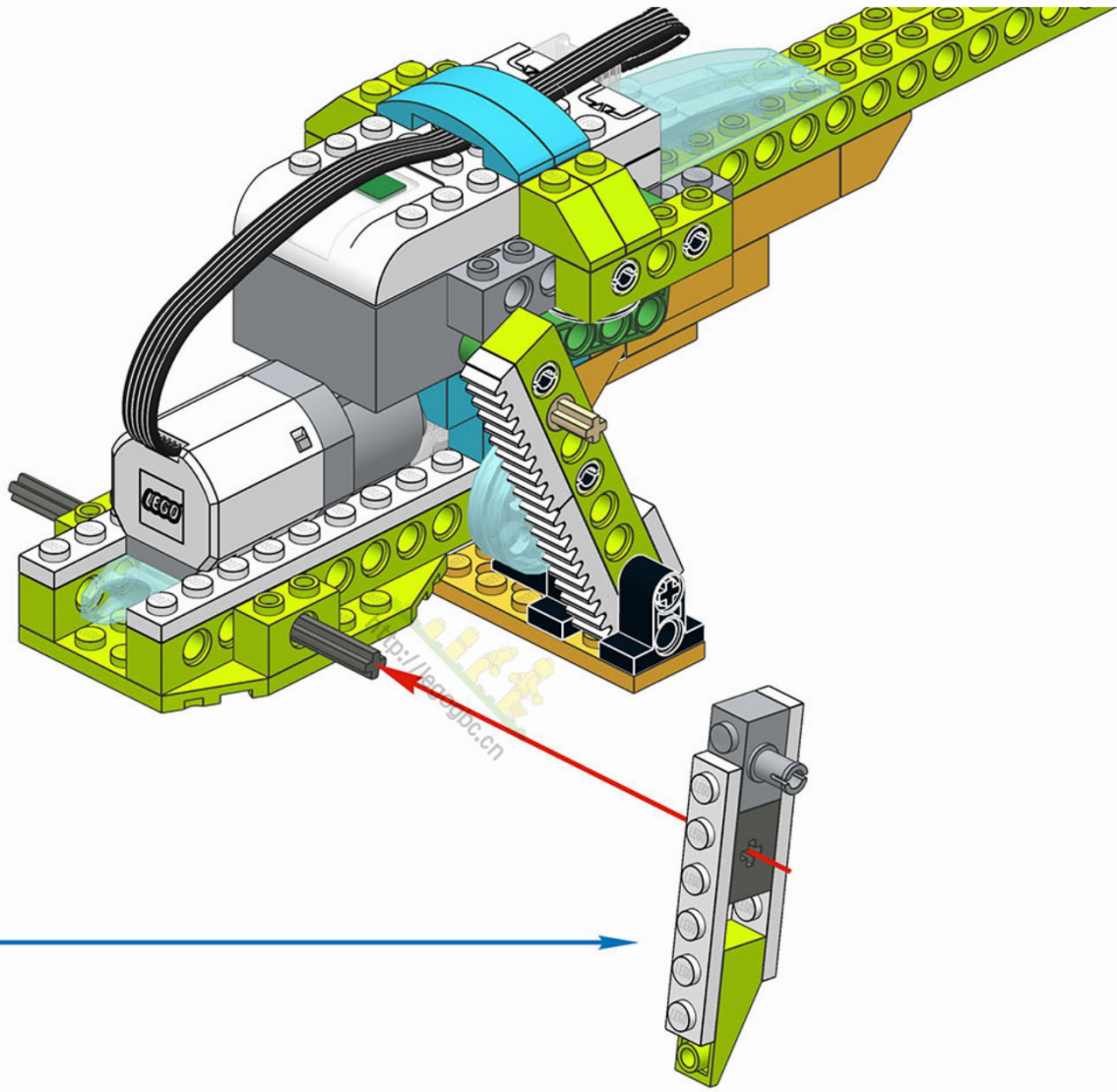
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关注公众号获取更多

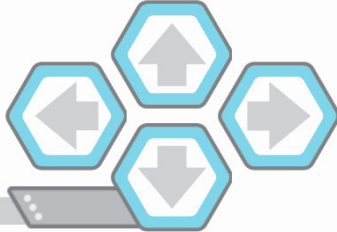
48



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5

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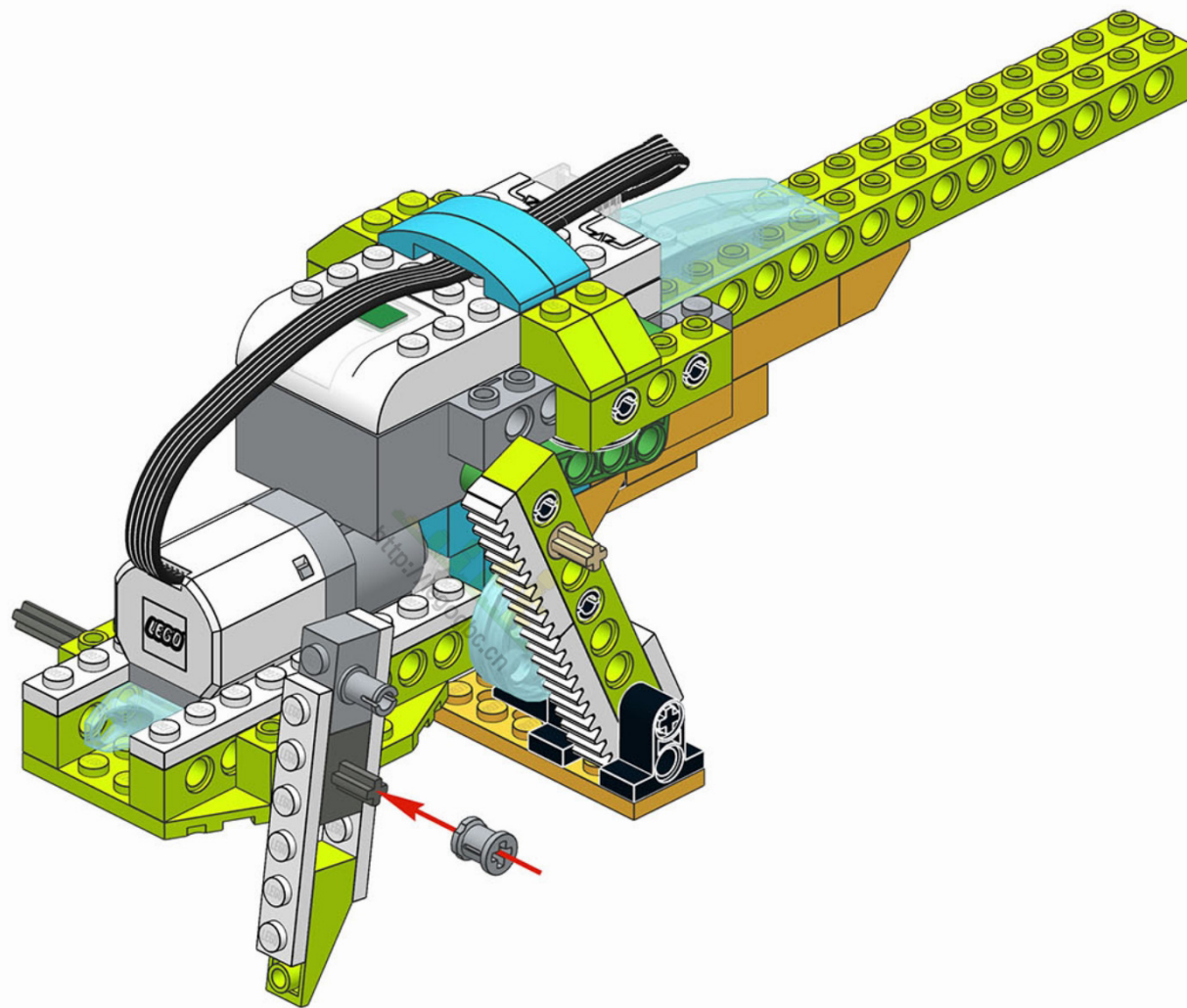


关注公众号获取更多



1x

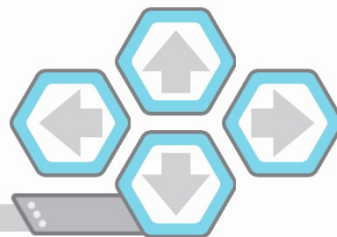
49



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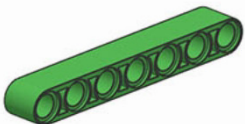
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74



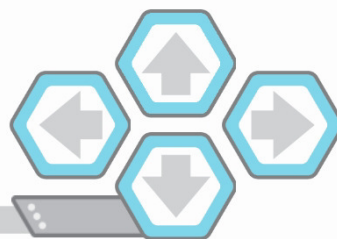
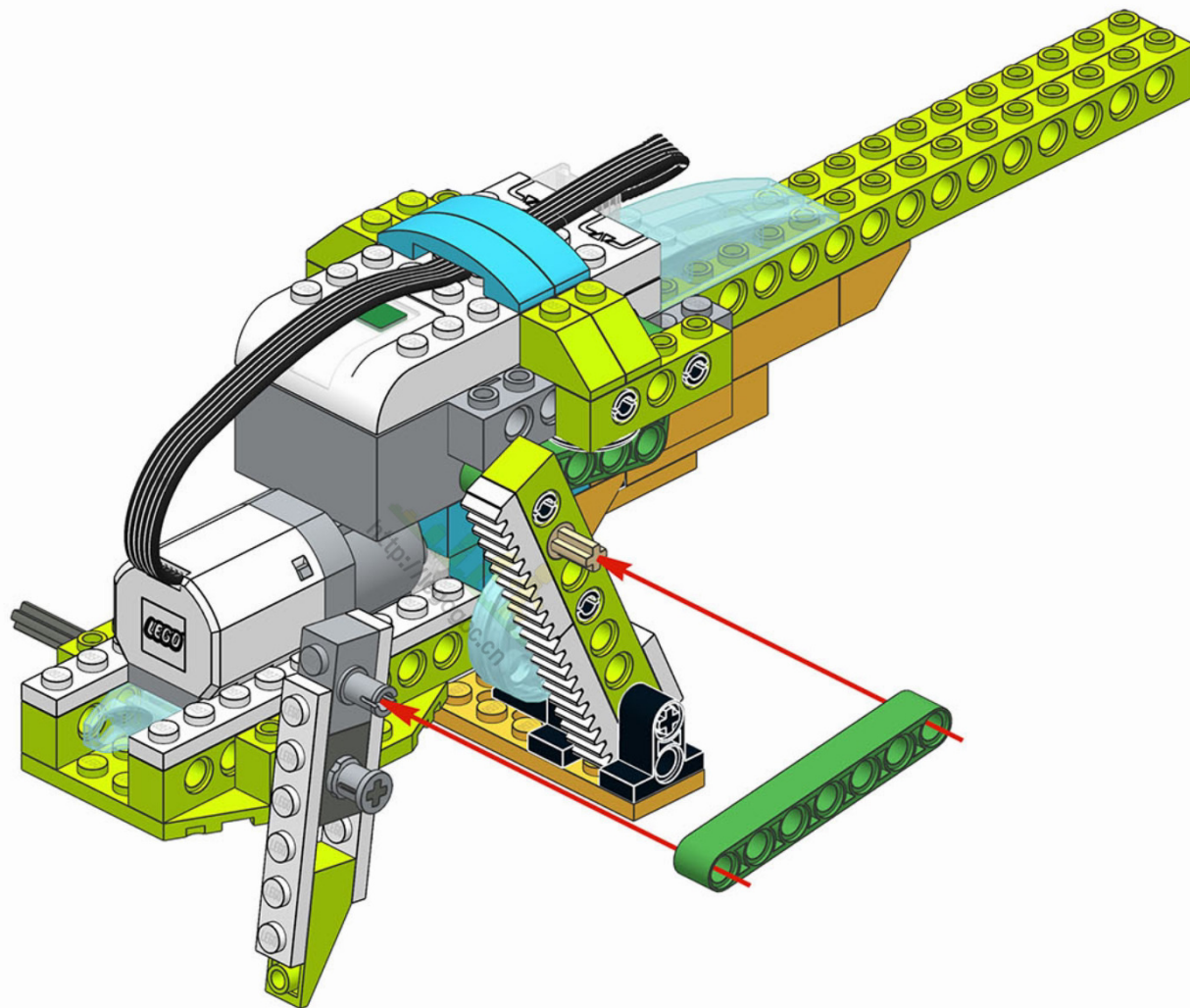


关注公众号获取更多



1x

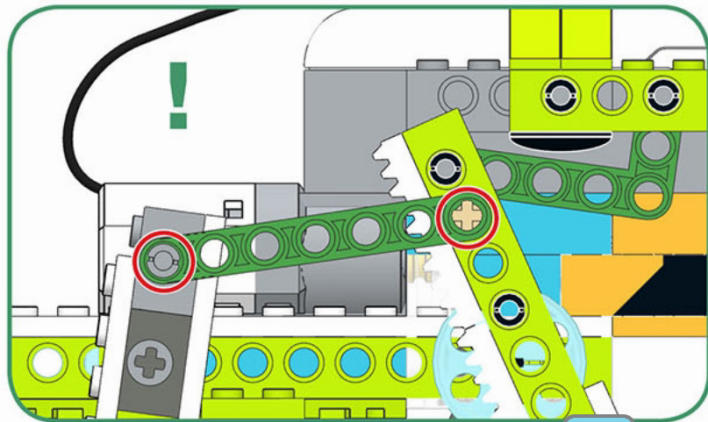
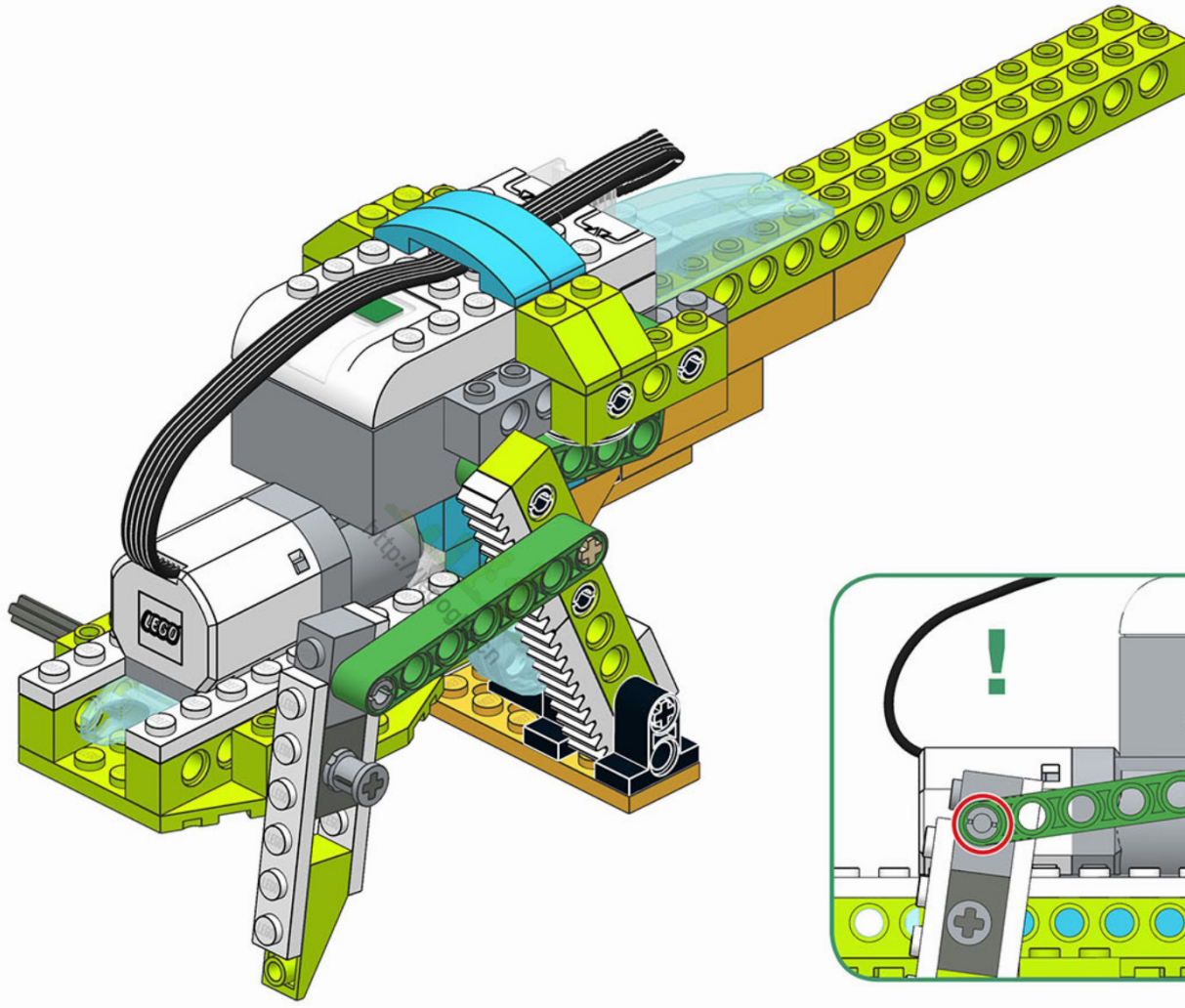
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关注公众号获取更多

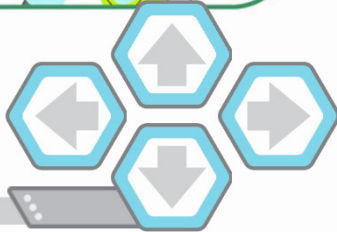
51



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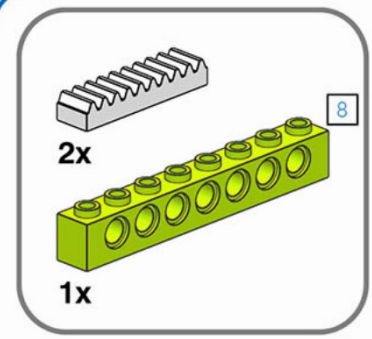
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76

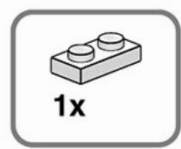
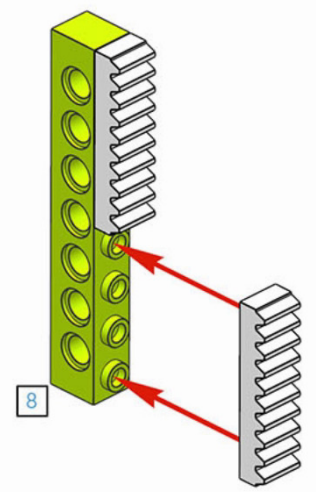




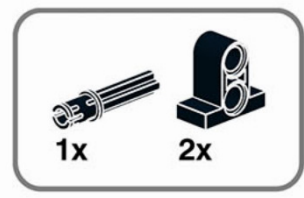
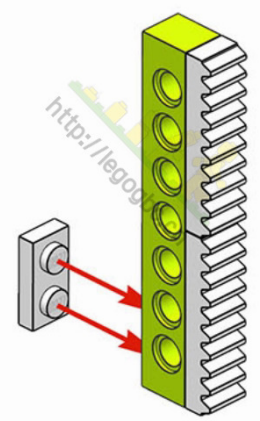
关注公众号获取更多



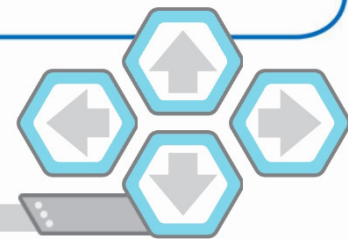
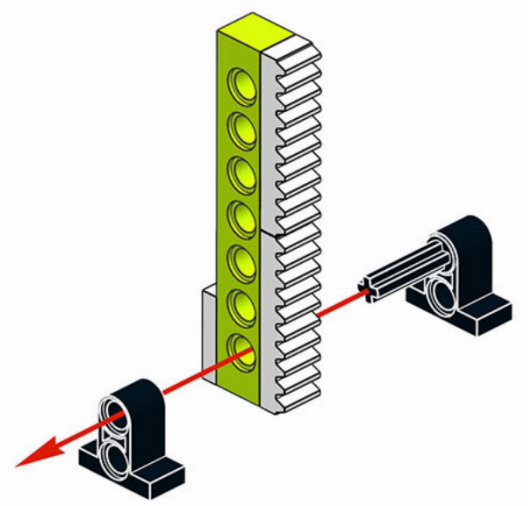
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2

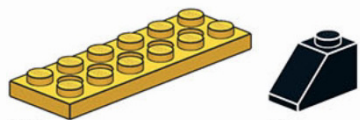


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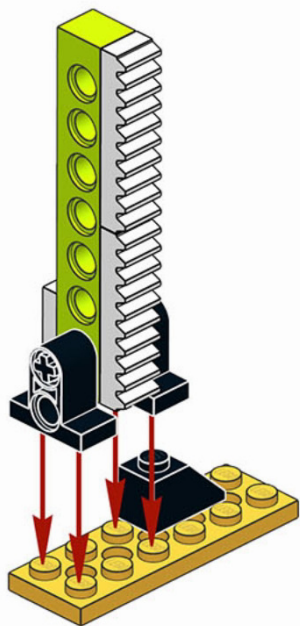
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1x

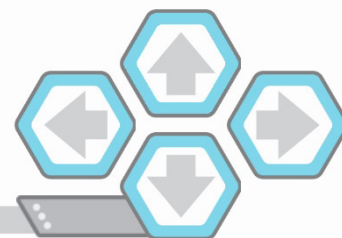
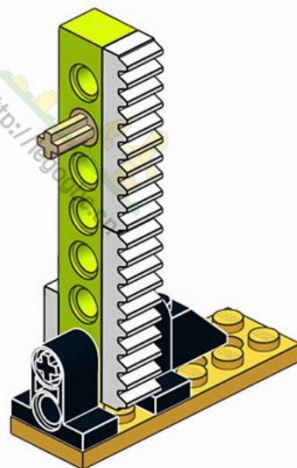
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4



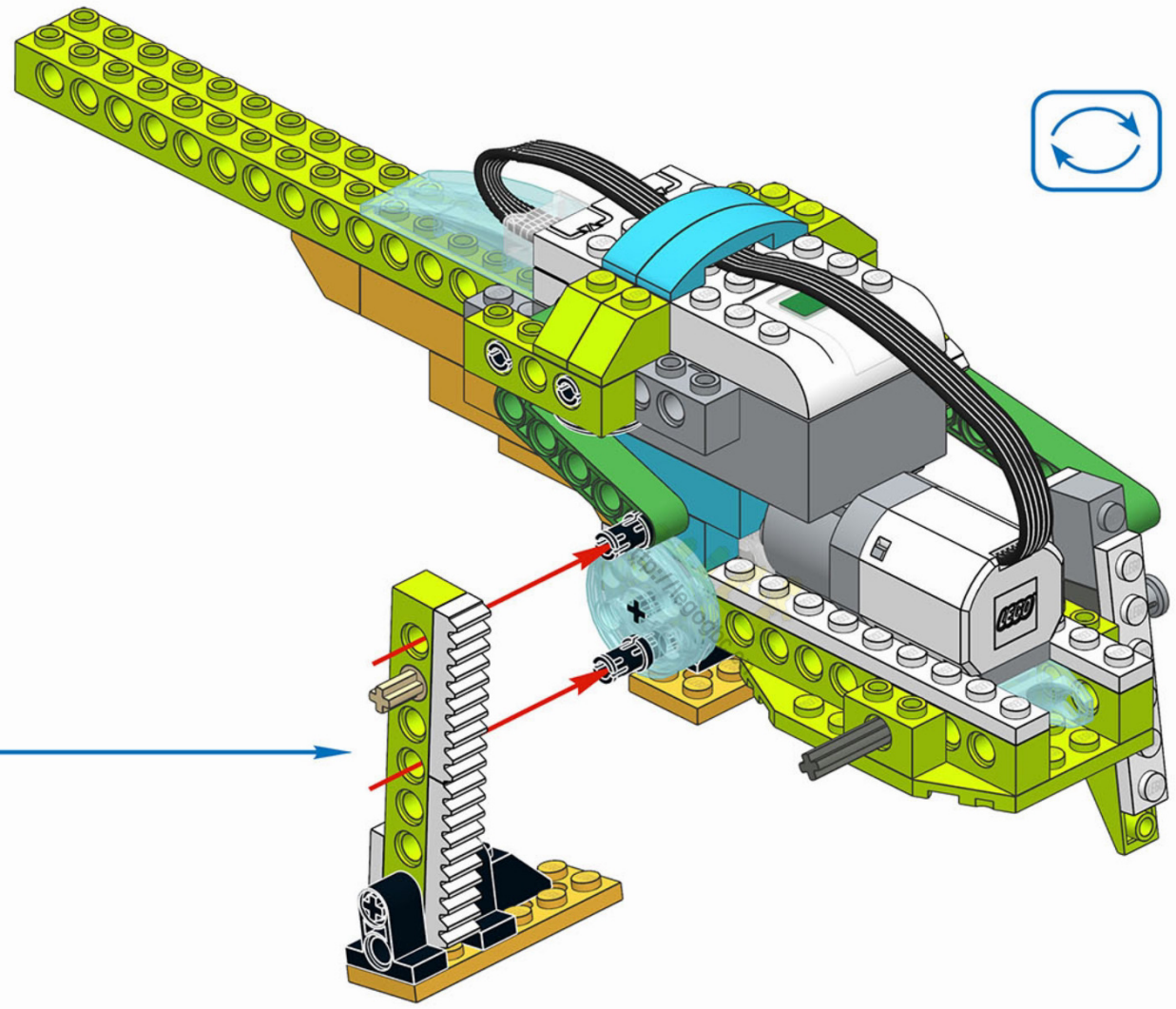
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关注公众号获取更多

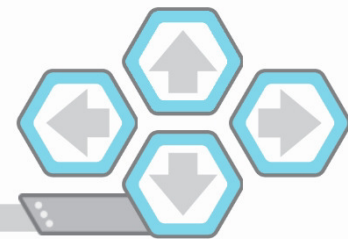


54

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5

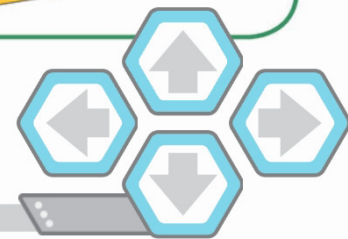
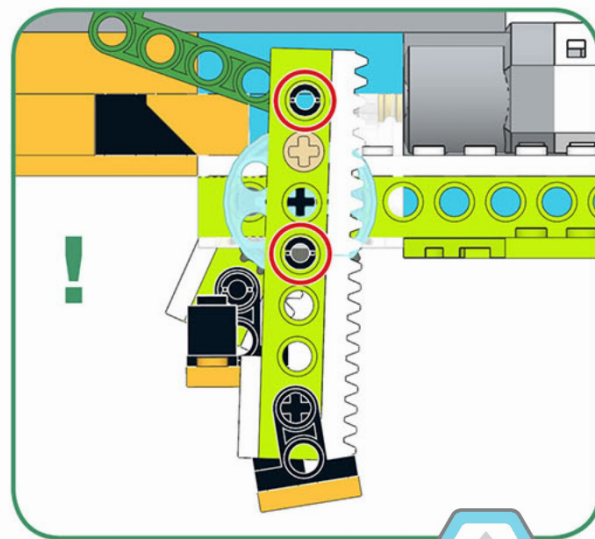
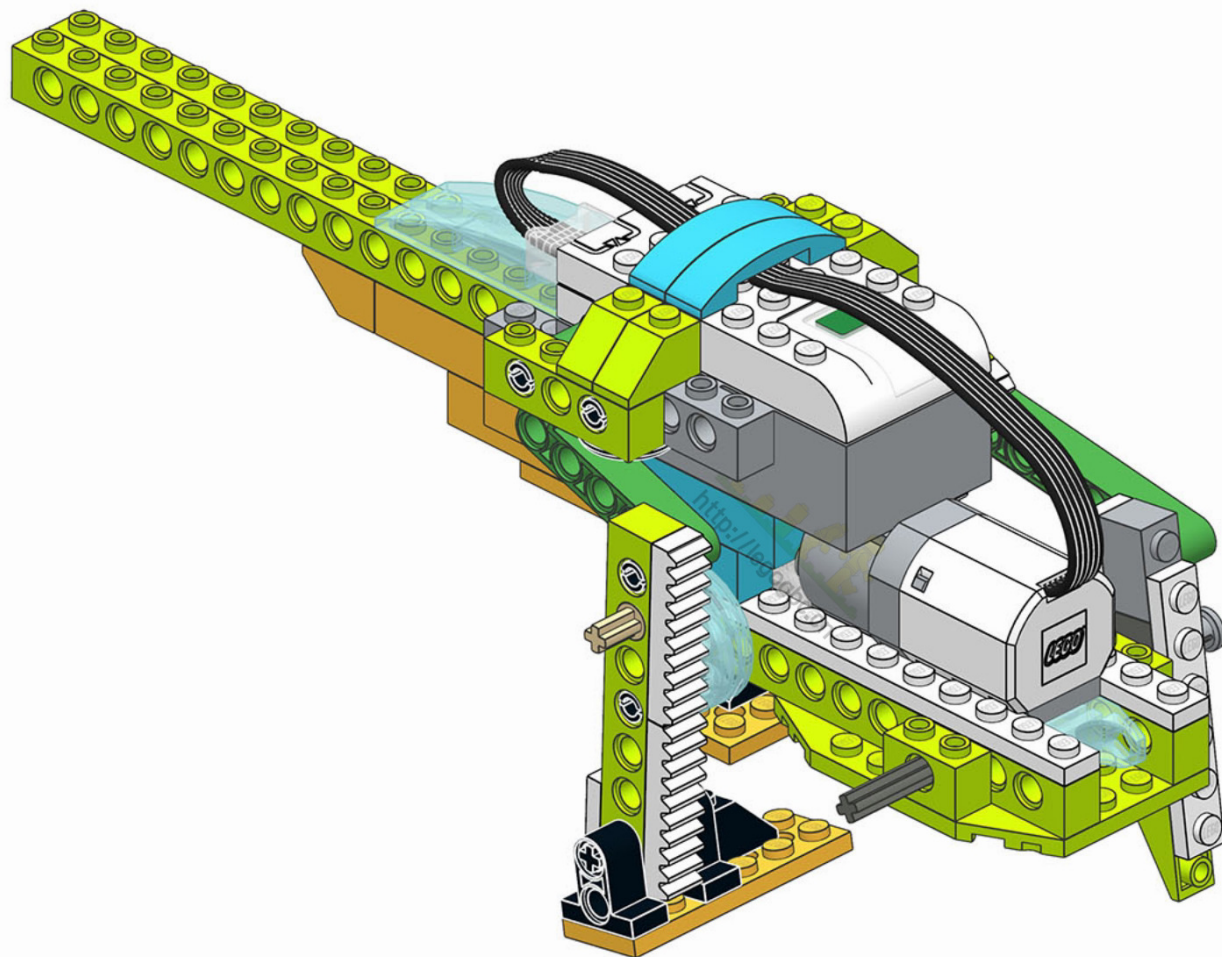
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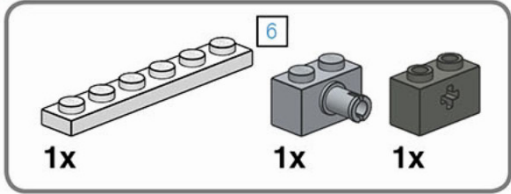
关注公众号获取更多

55

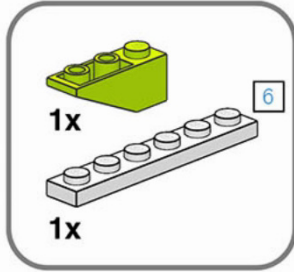
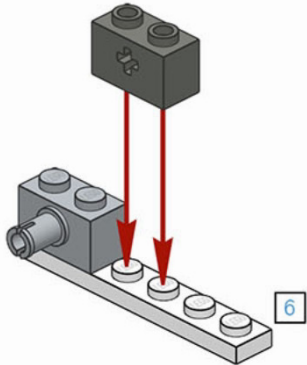




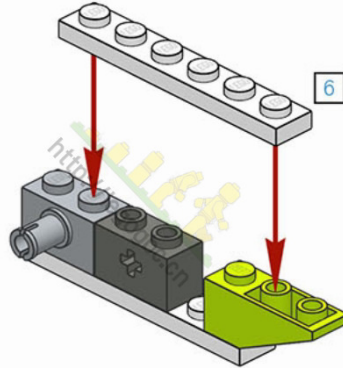
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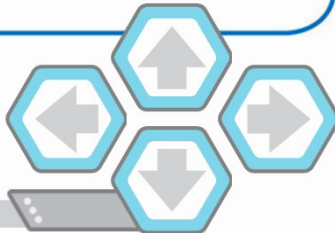
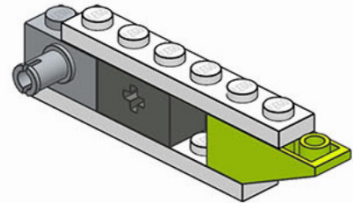
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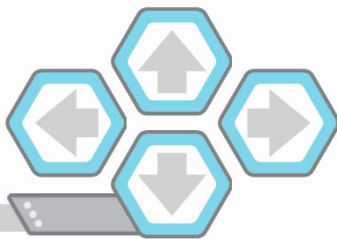
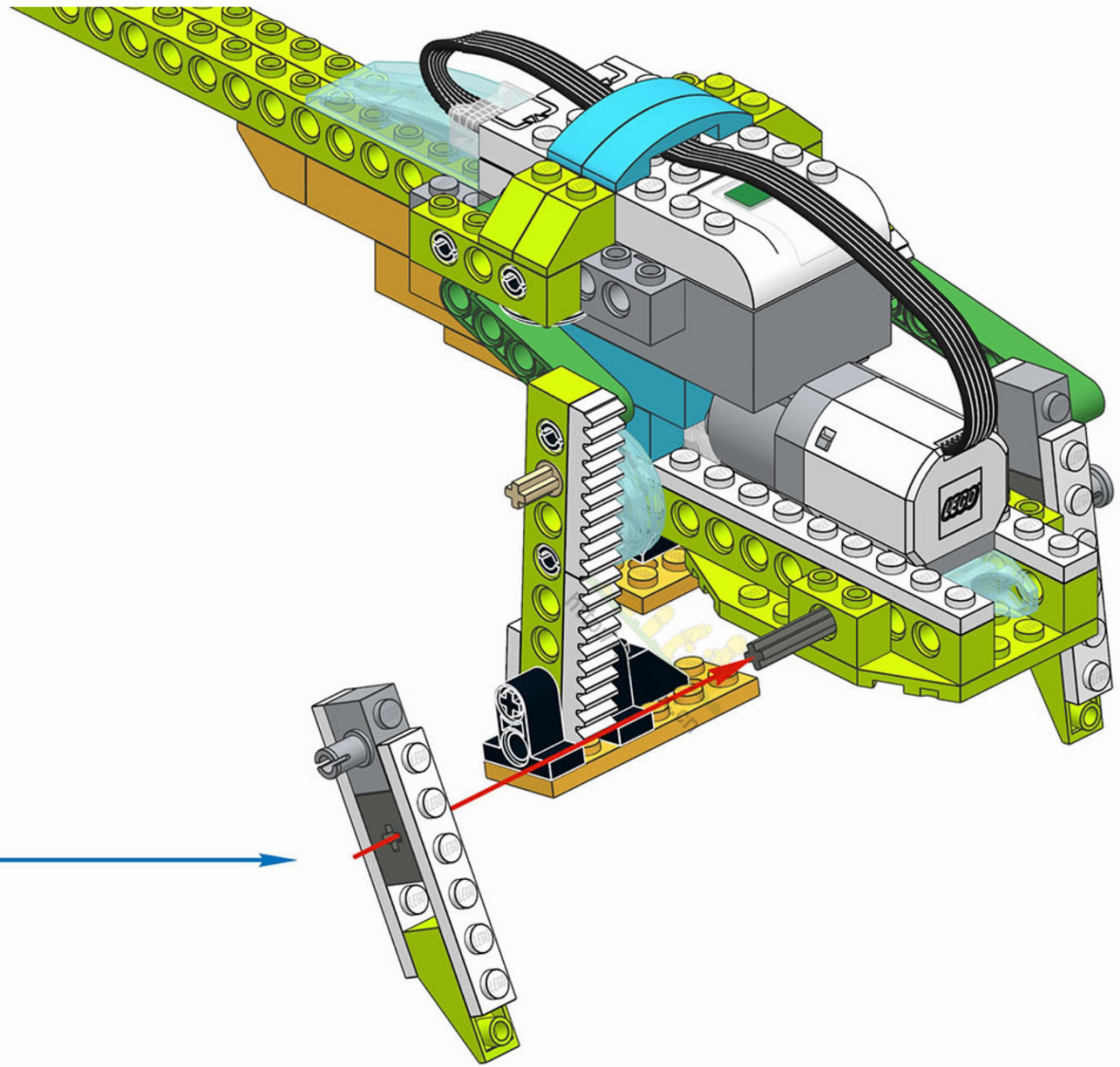
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关注公众号获取更多

57



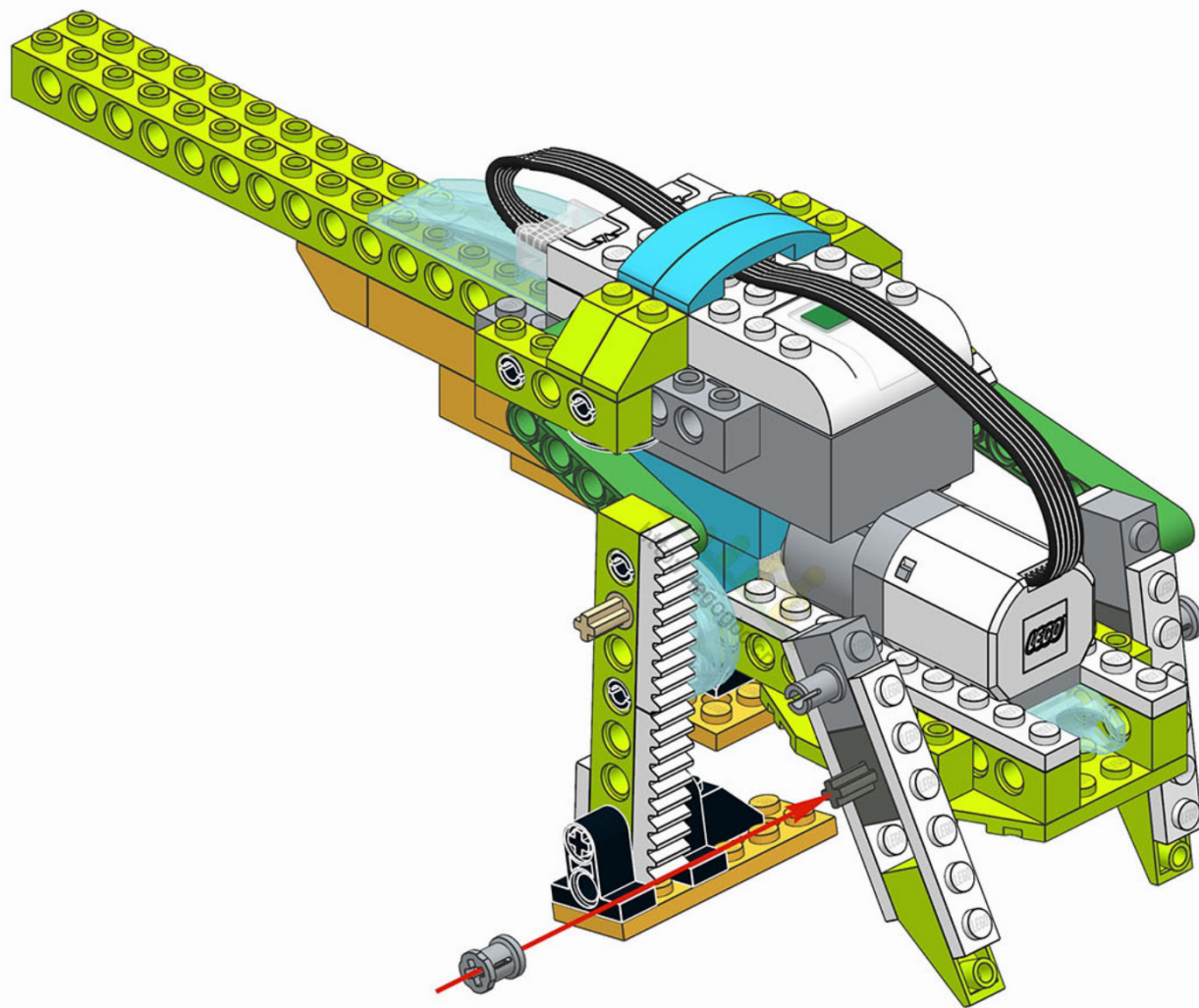


关注公众号获取更多



1x

58

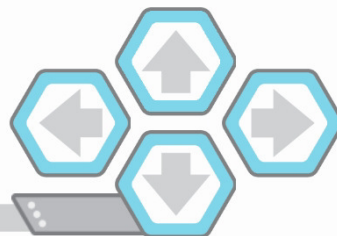


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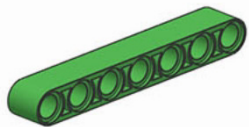
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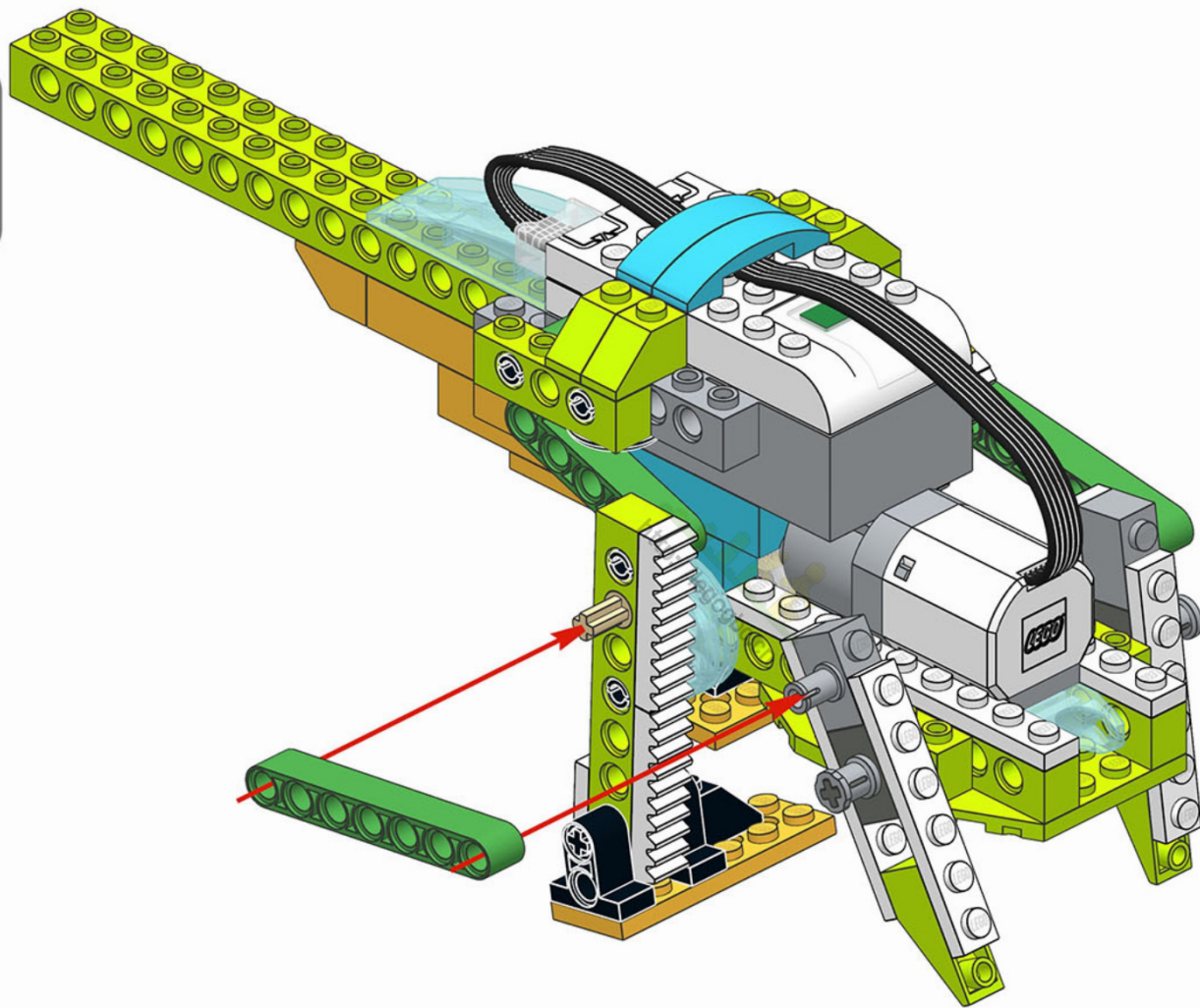




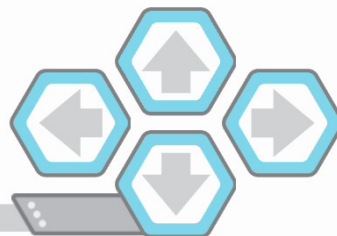
关注公众号获取更多



1x



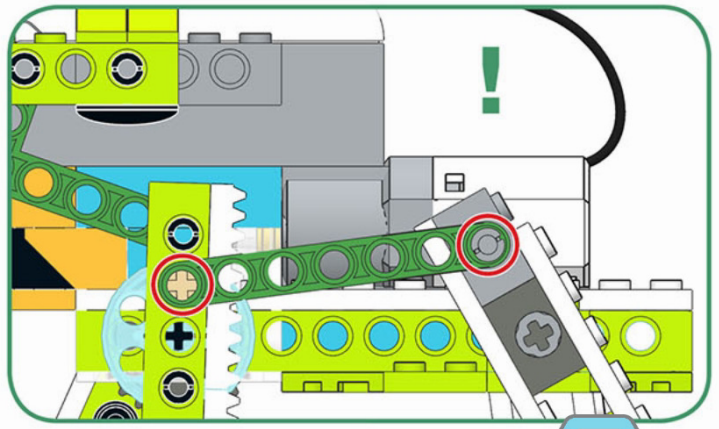
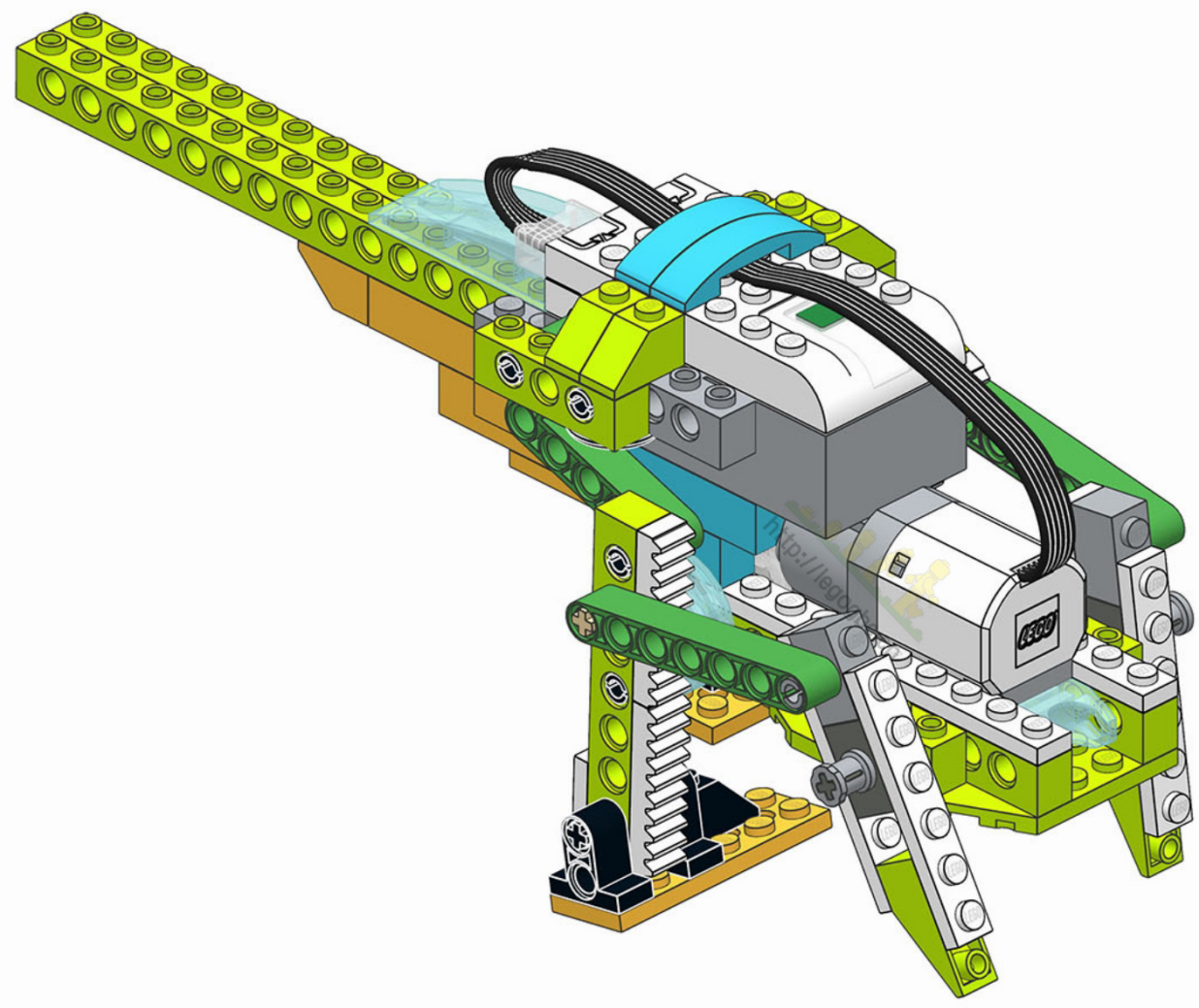
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关注公众号获取更多

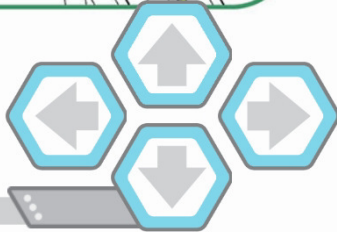
60



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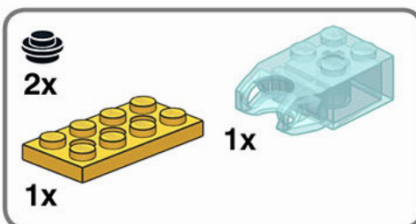
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85



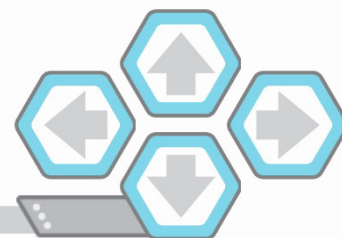
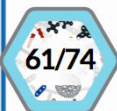
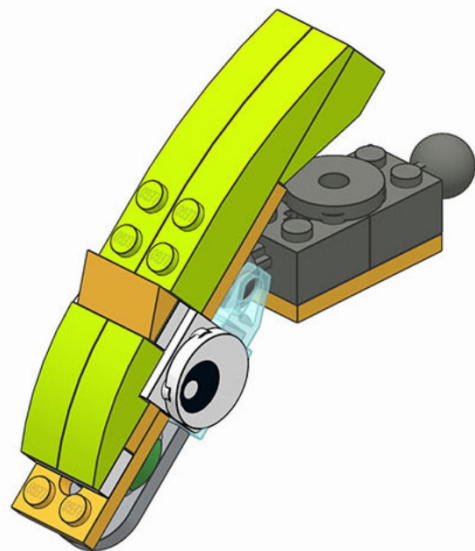
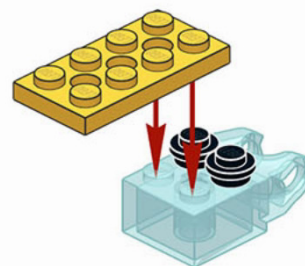


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<http://legogbc.cn>

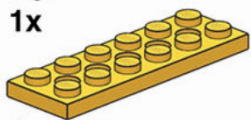




关注公众号获取更多

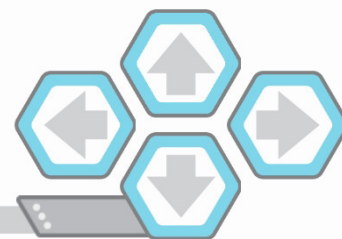
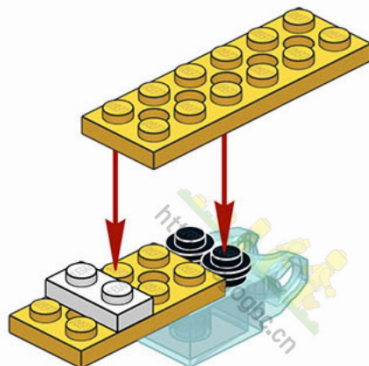


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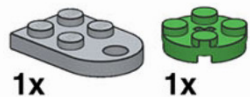
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62





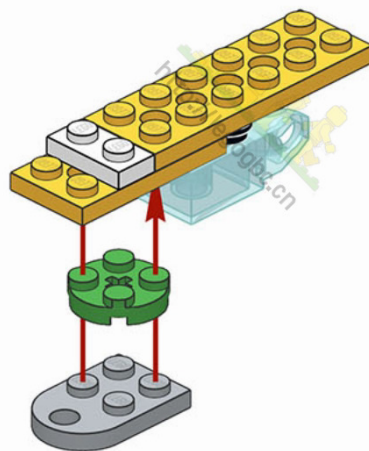
关注公众号获取更多



1x

1x

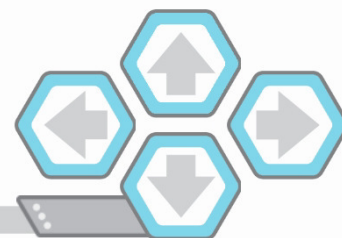
63



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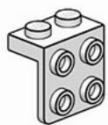
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88



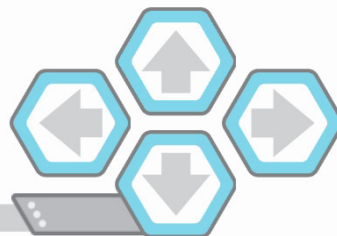
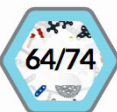
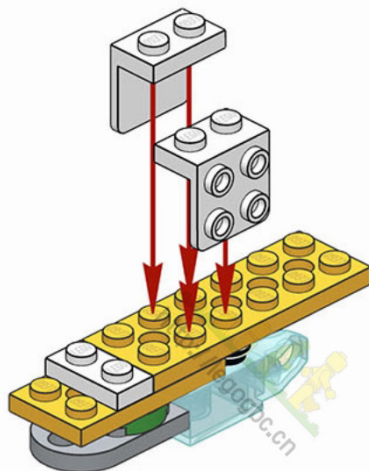


关注公众号获取更多



2x

64



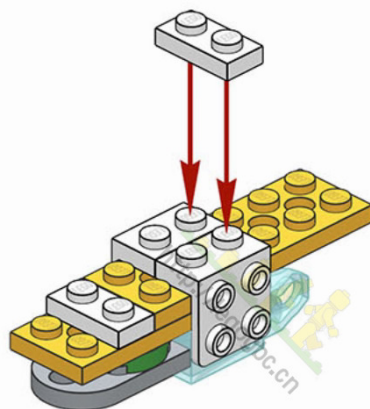


关注公众号获取更多



1x

65



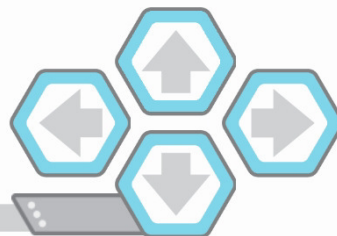
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5



90





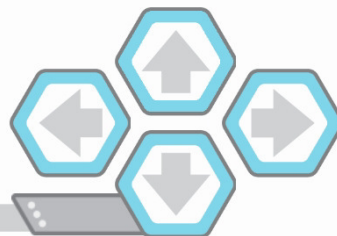
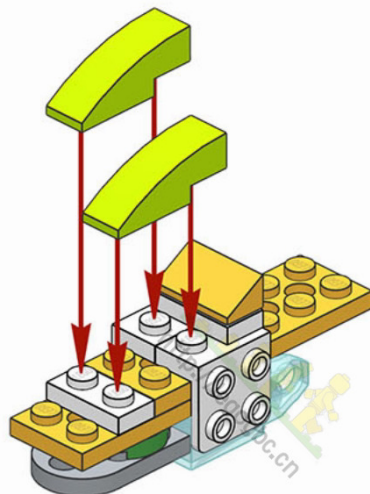
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2x

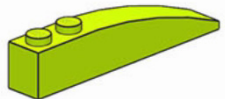
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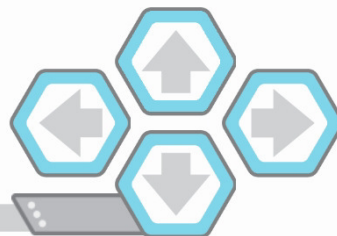
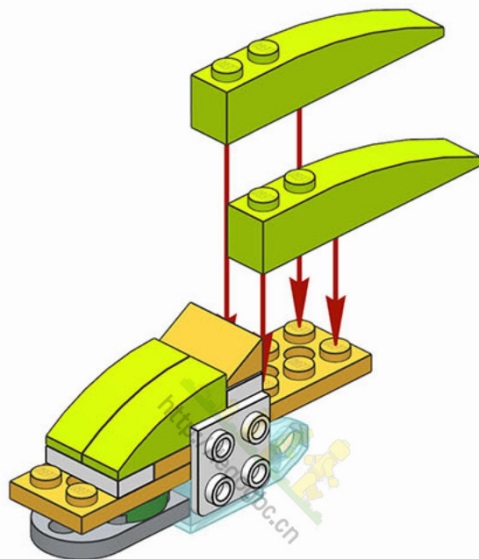




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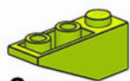


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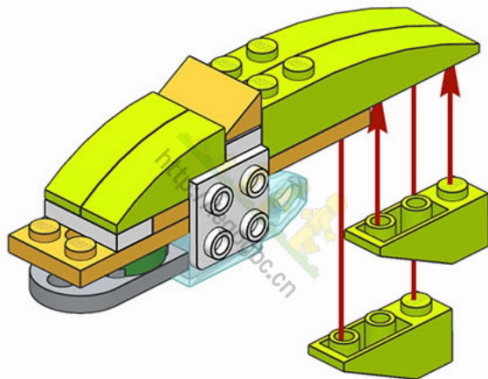


关注公众号获取更多



2x

68



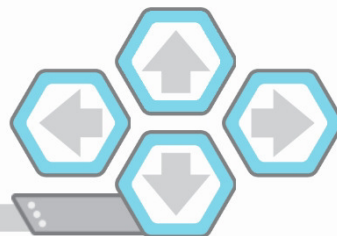
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5



93



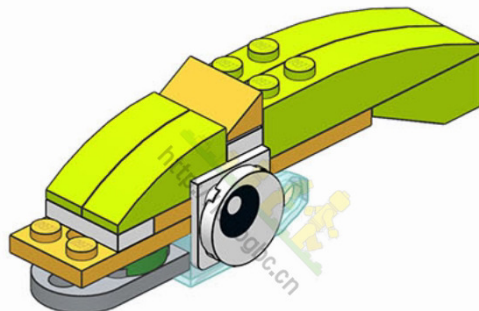


关注公众号获取更多



2x

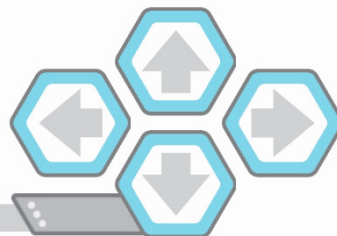
69



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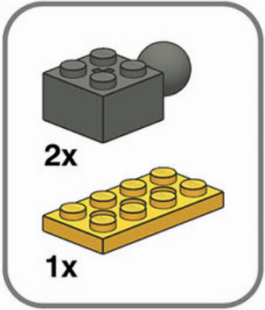
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94

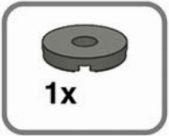
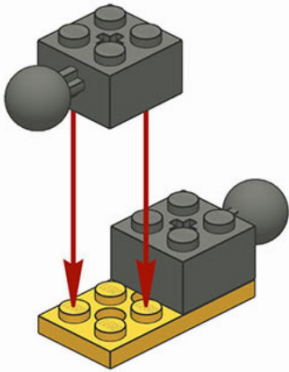




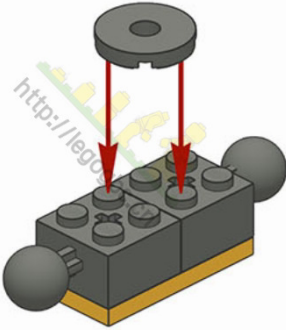
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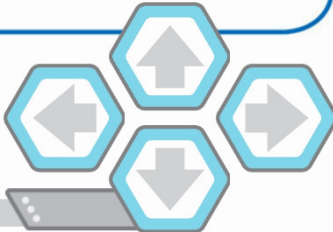
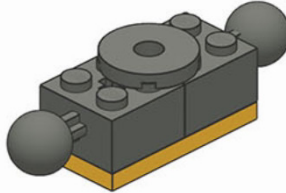
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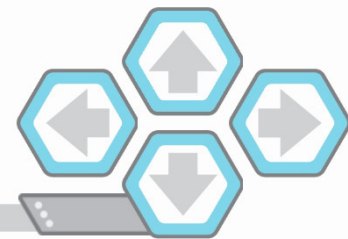
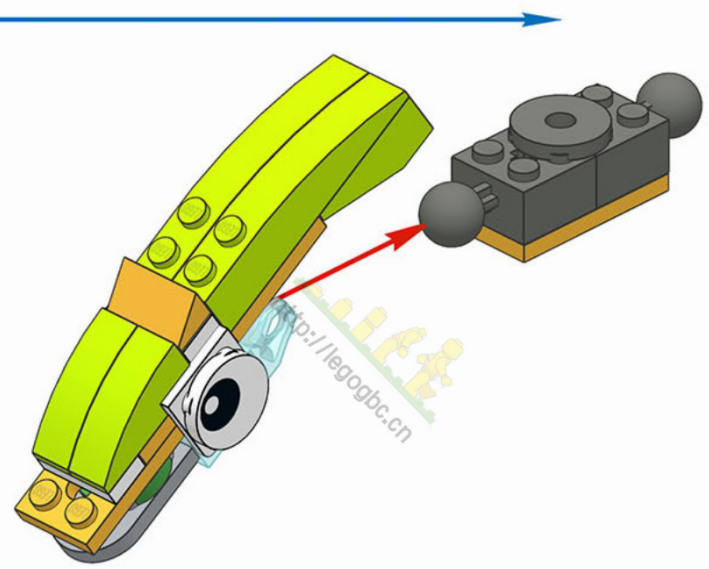
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关注公众号获取更多

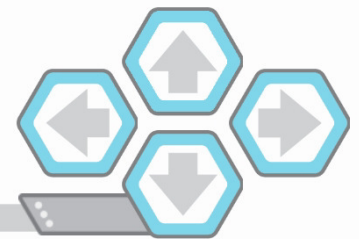
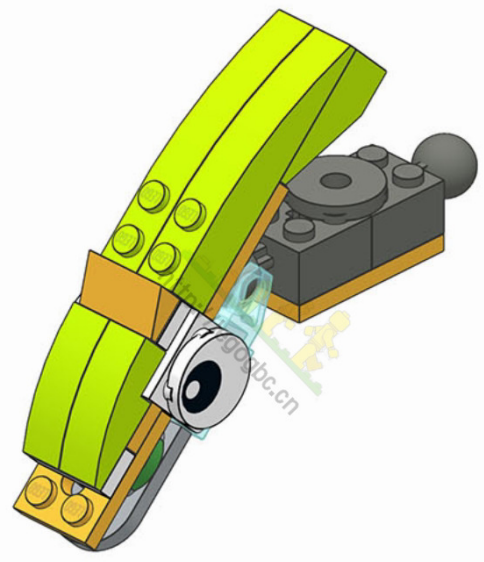
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关注公众号获取更多

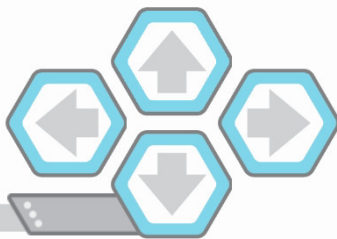
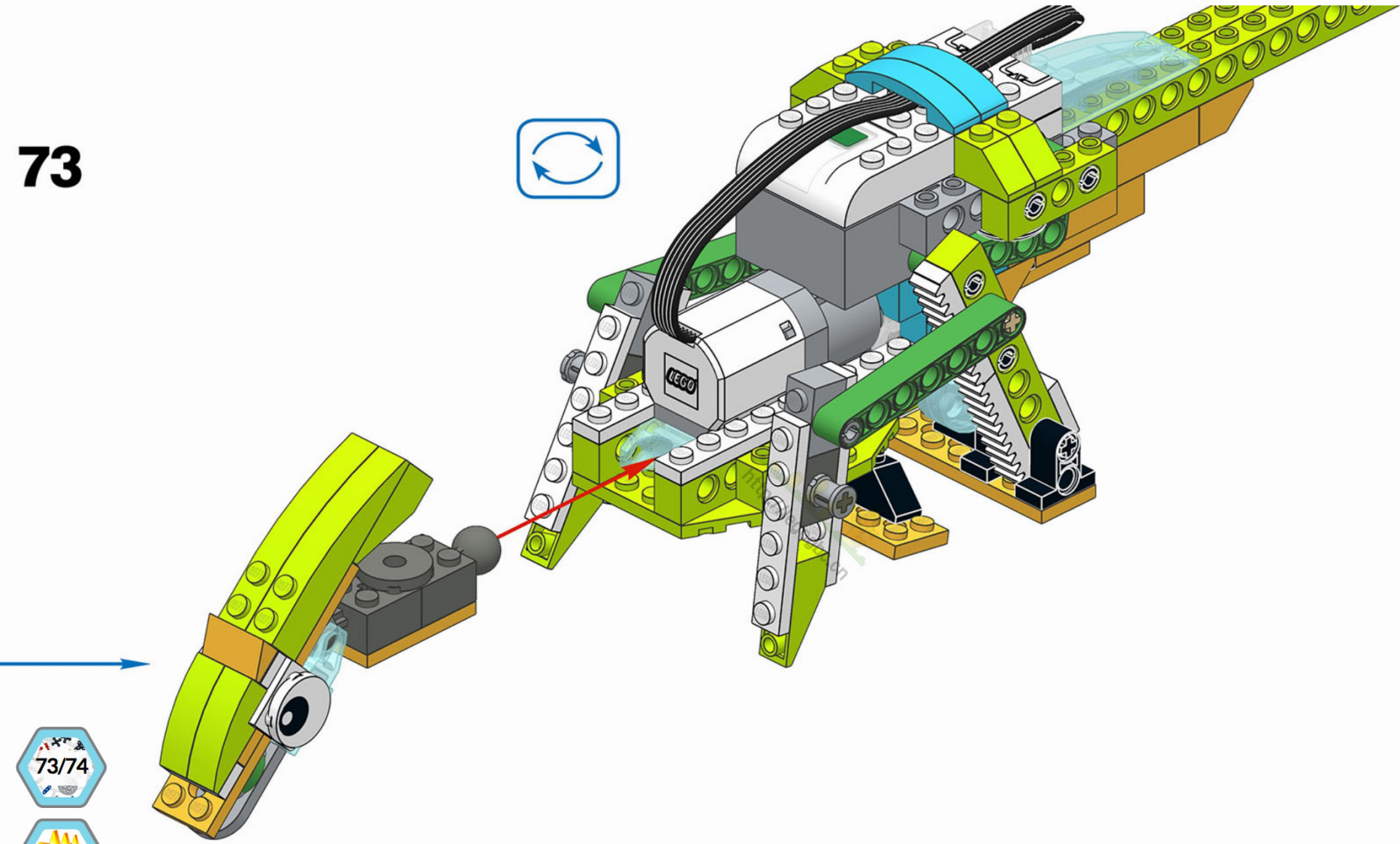
72





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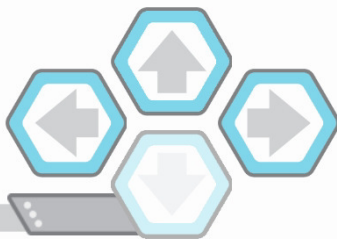
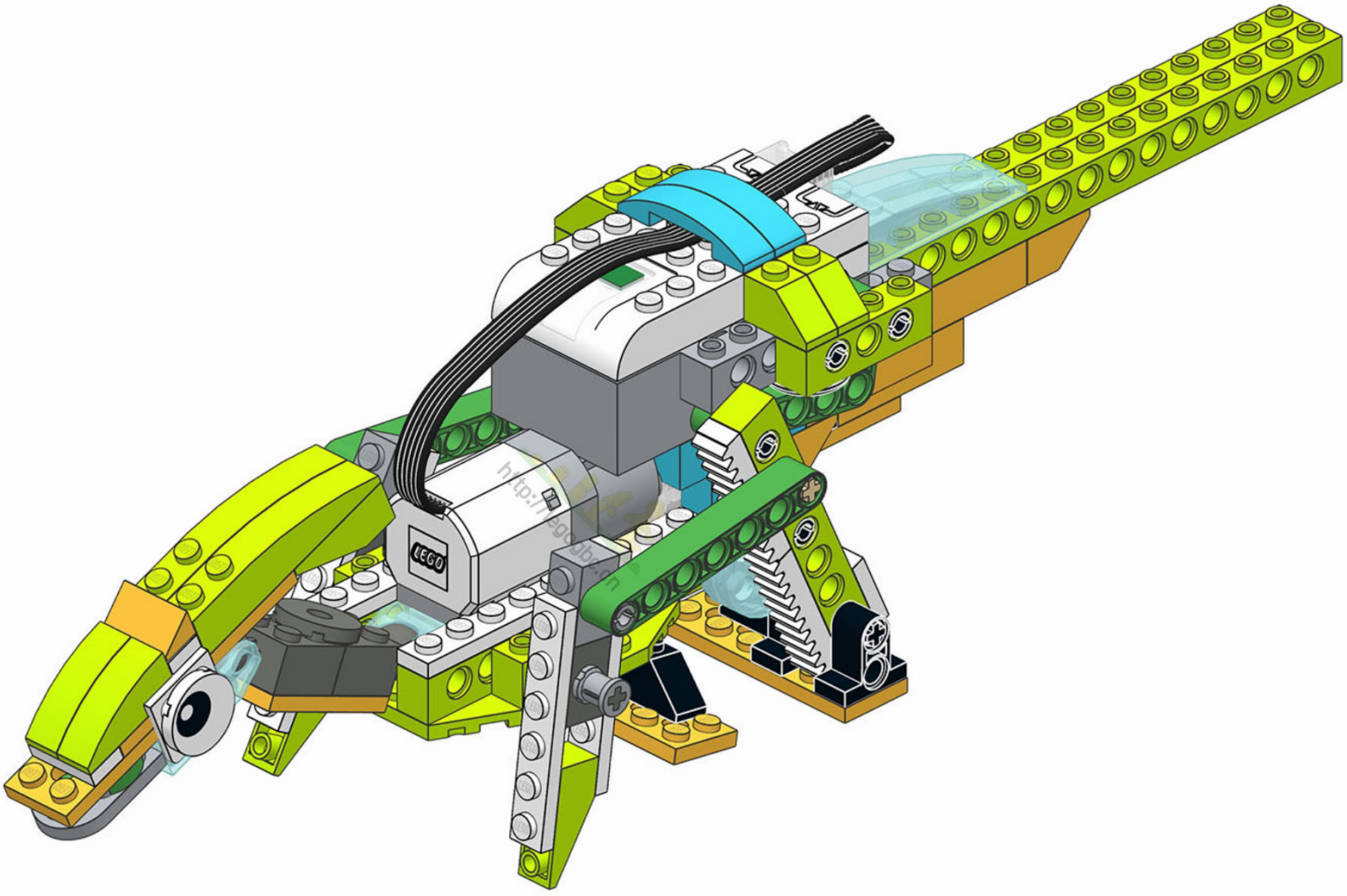
73





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74



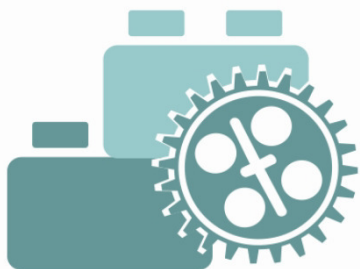


## Enhanced version



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Add the decorative elements of the trunk and tail of the robot.



**Parasaurolophus**



5

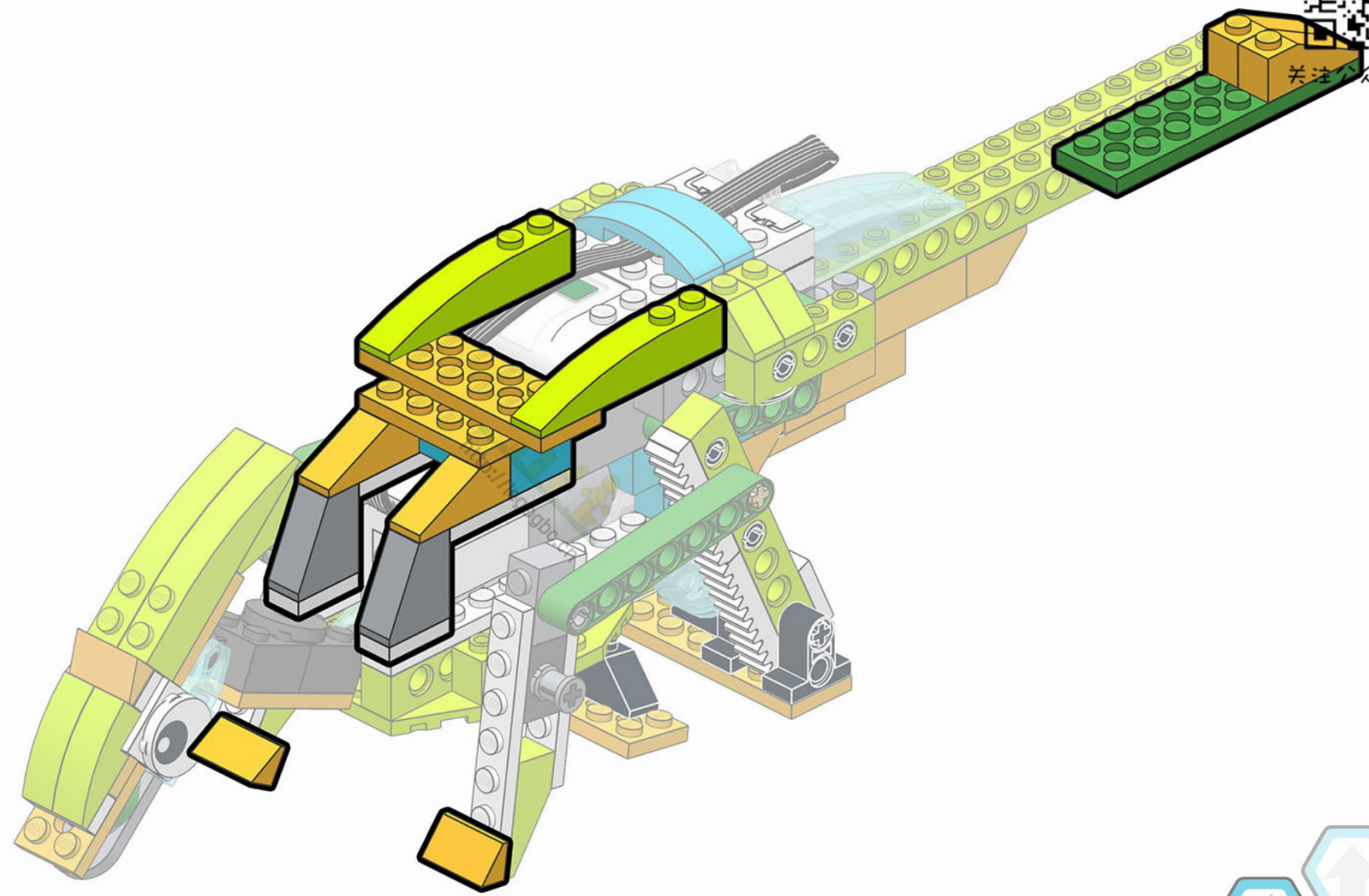


100





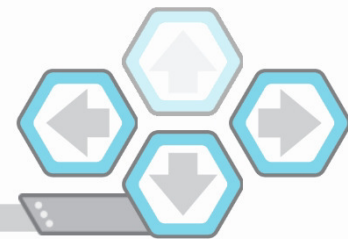
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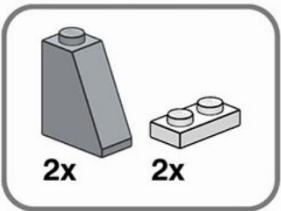
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101

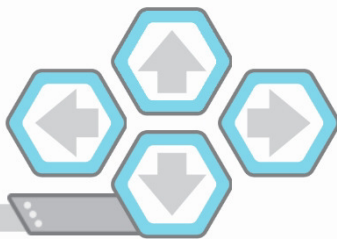
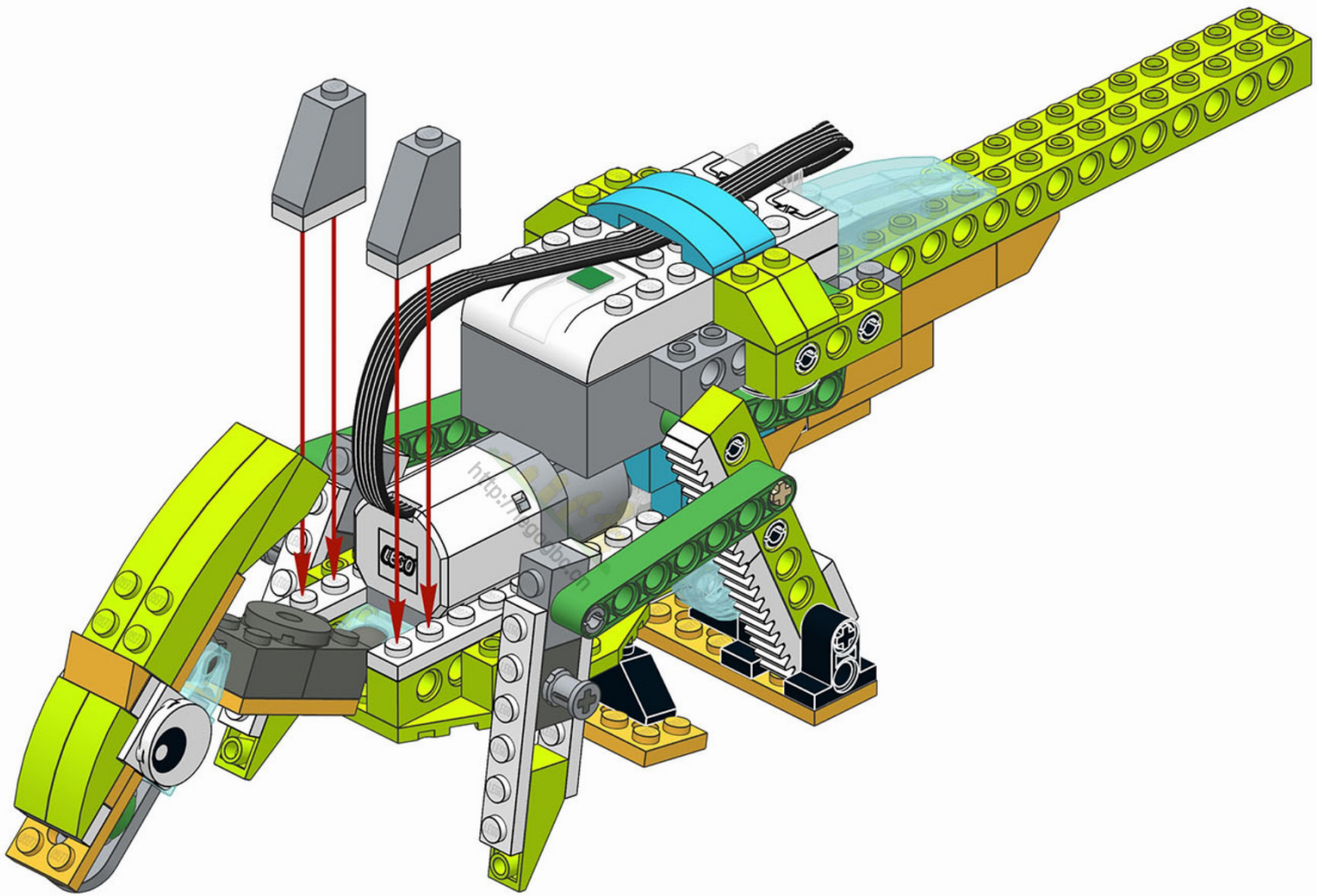




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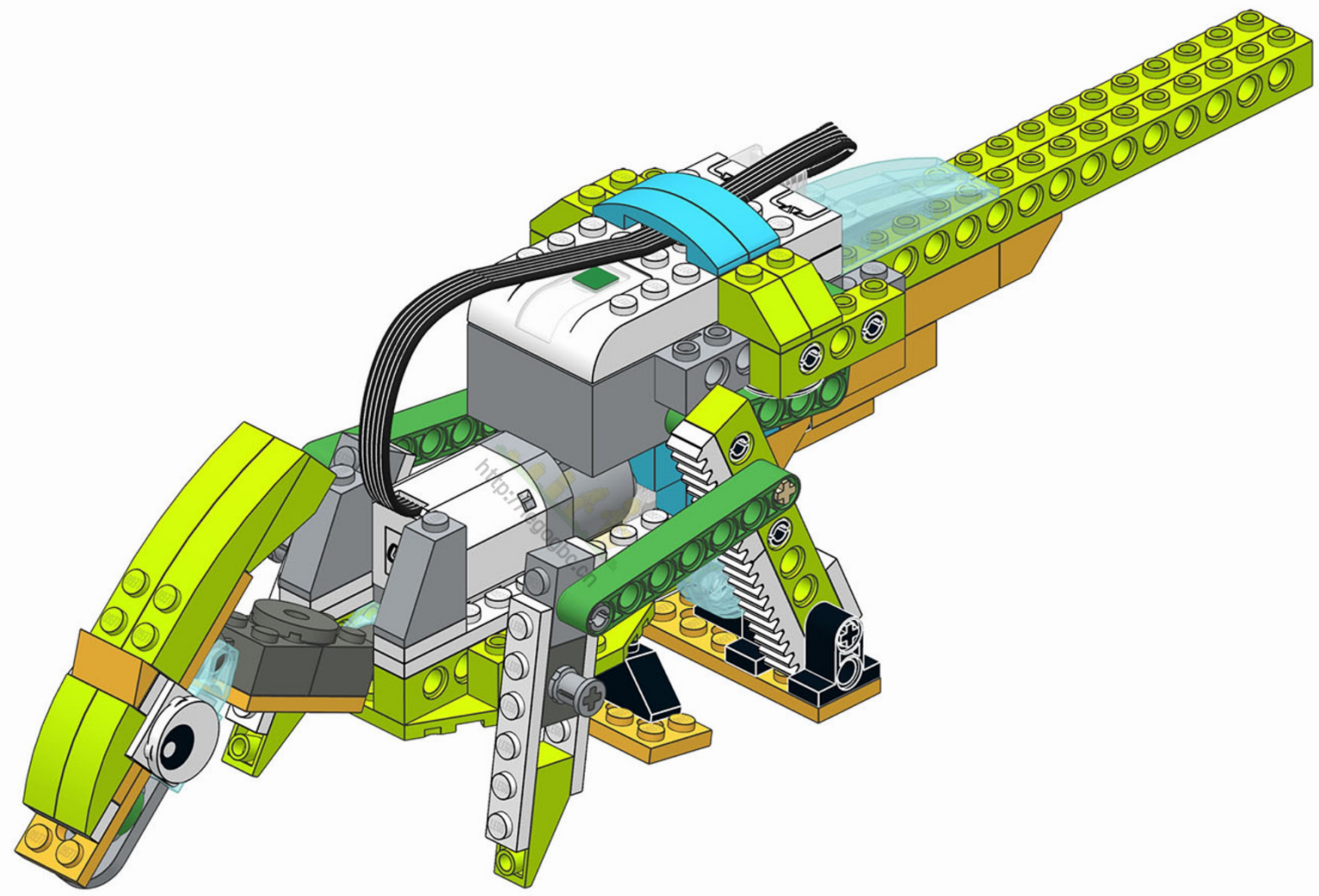
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关注公众号获取更多

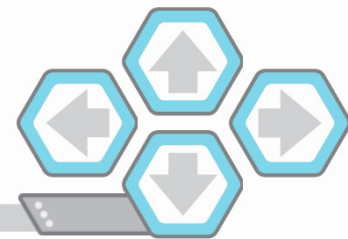
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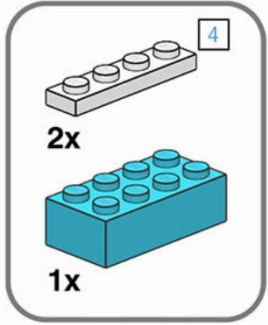
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103

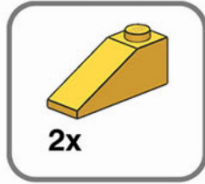
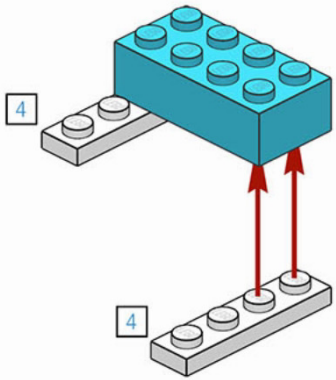




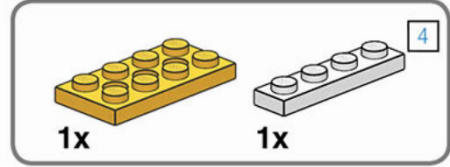
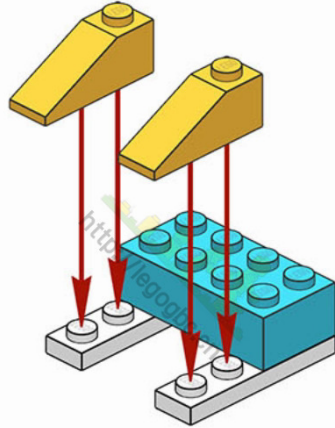
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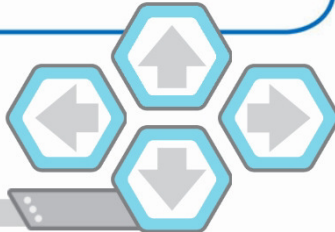
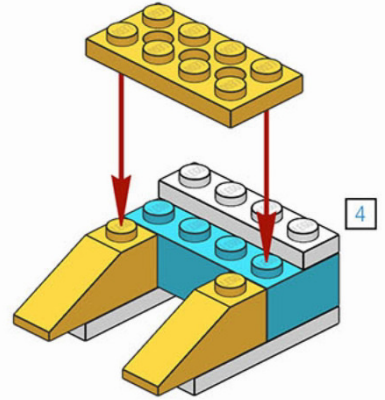
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2

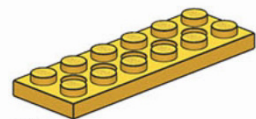


3



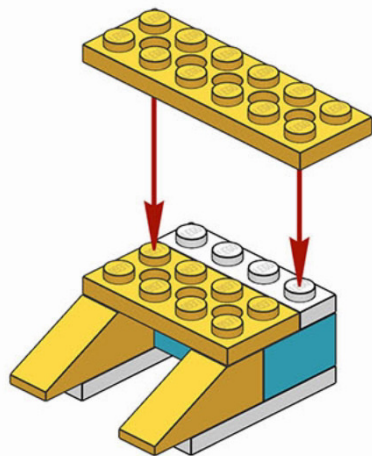


关注公众号获取更多

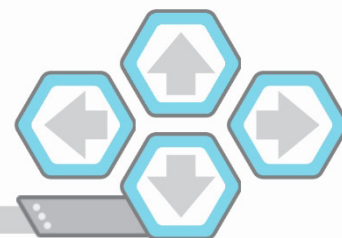
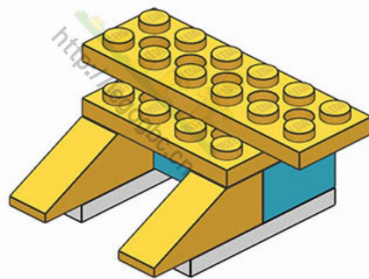


1x

4



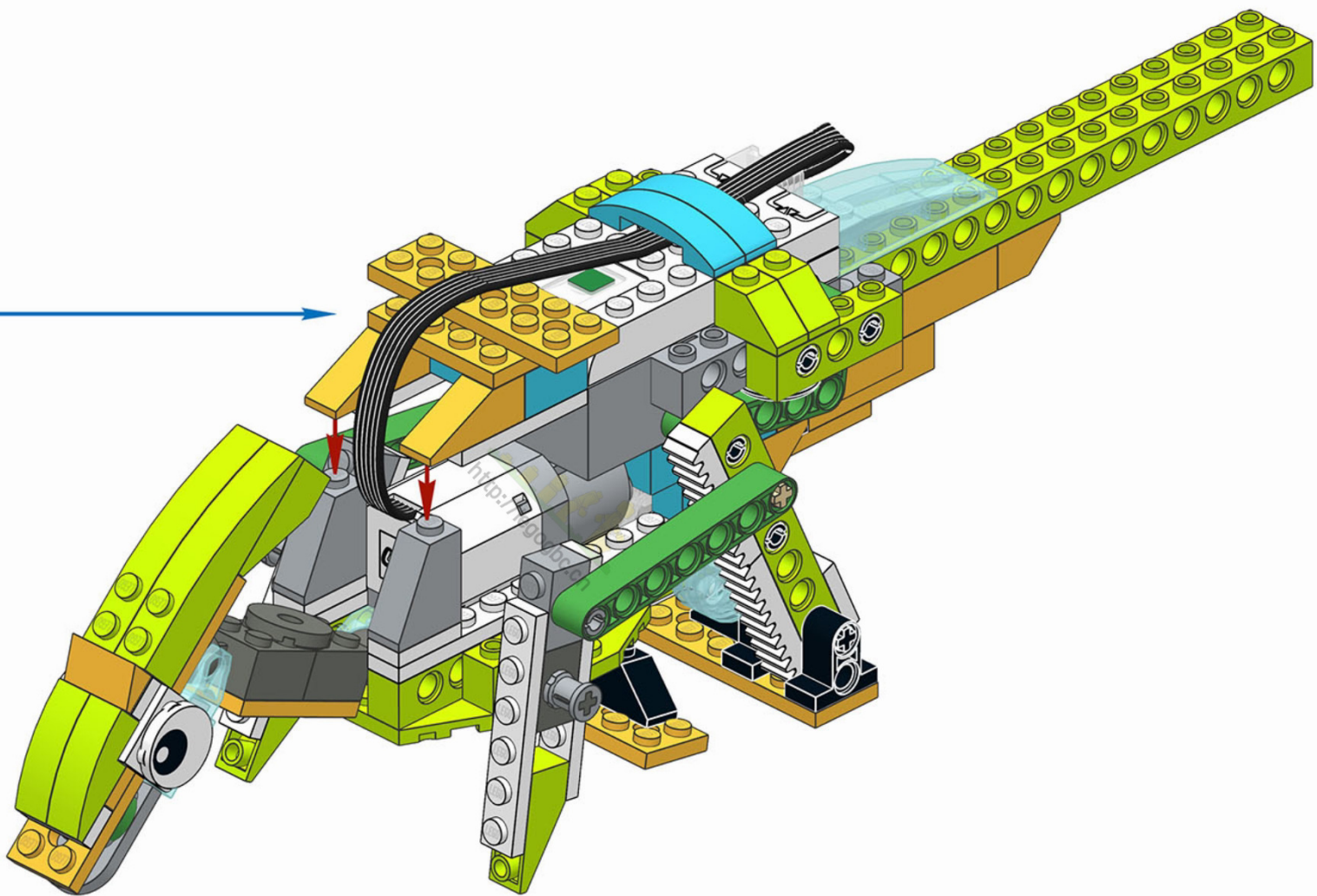
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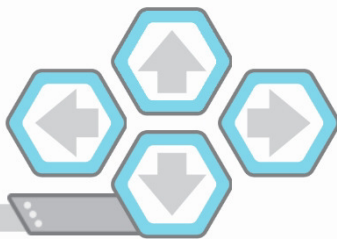
79



6/10

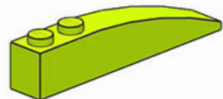
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106



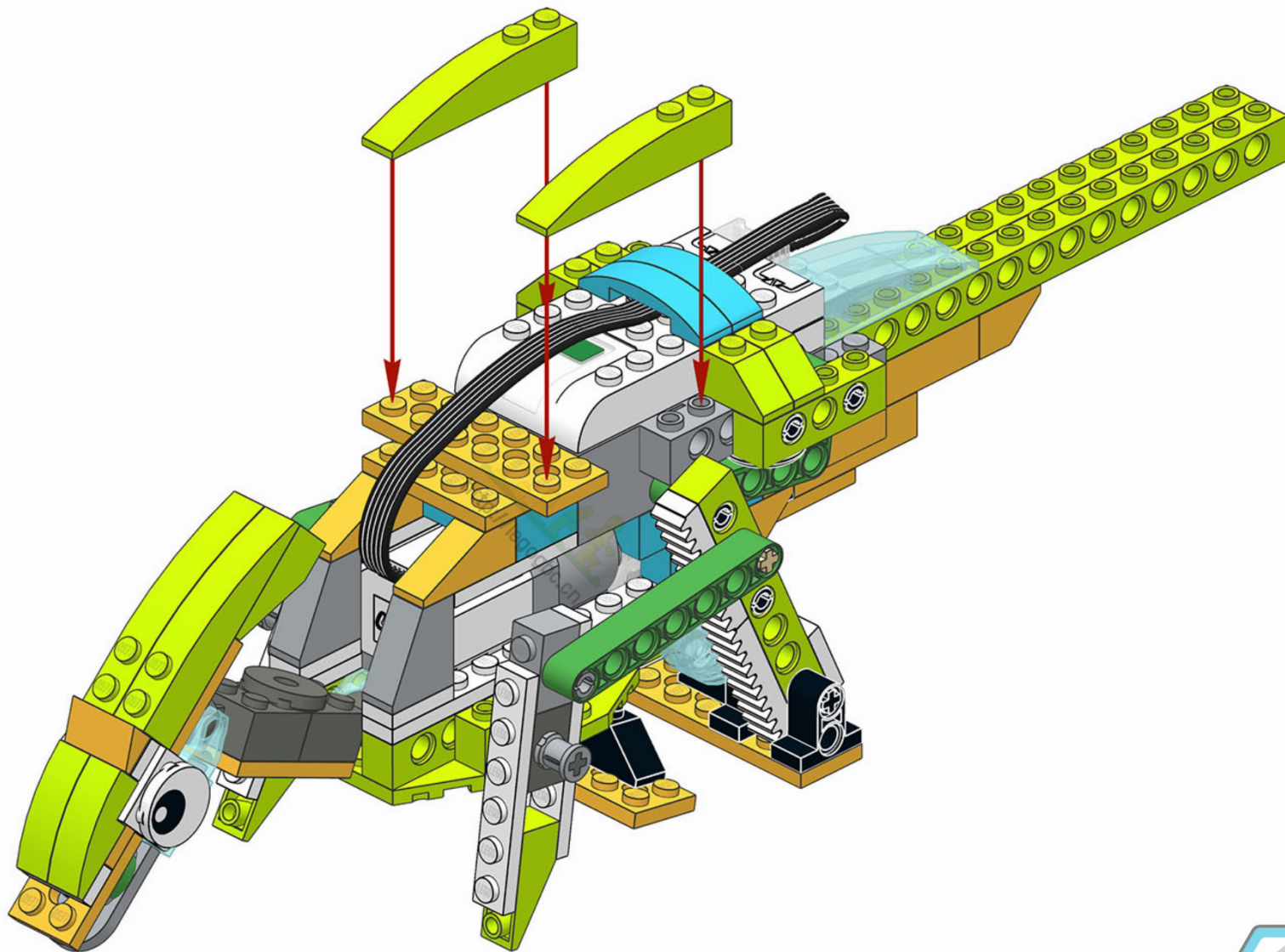


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2x

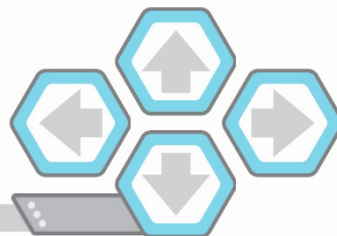
80



7/10

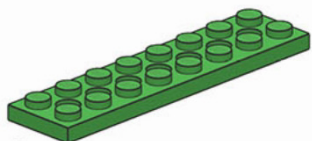
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107





关注公众号获取更多

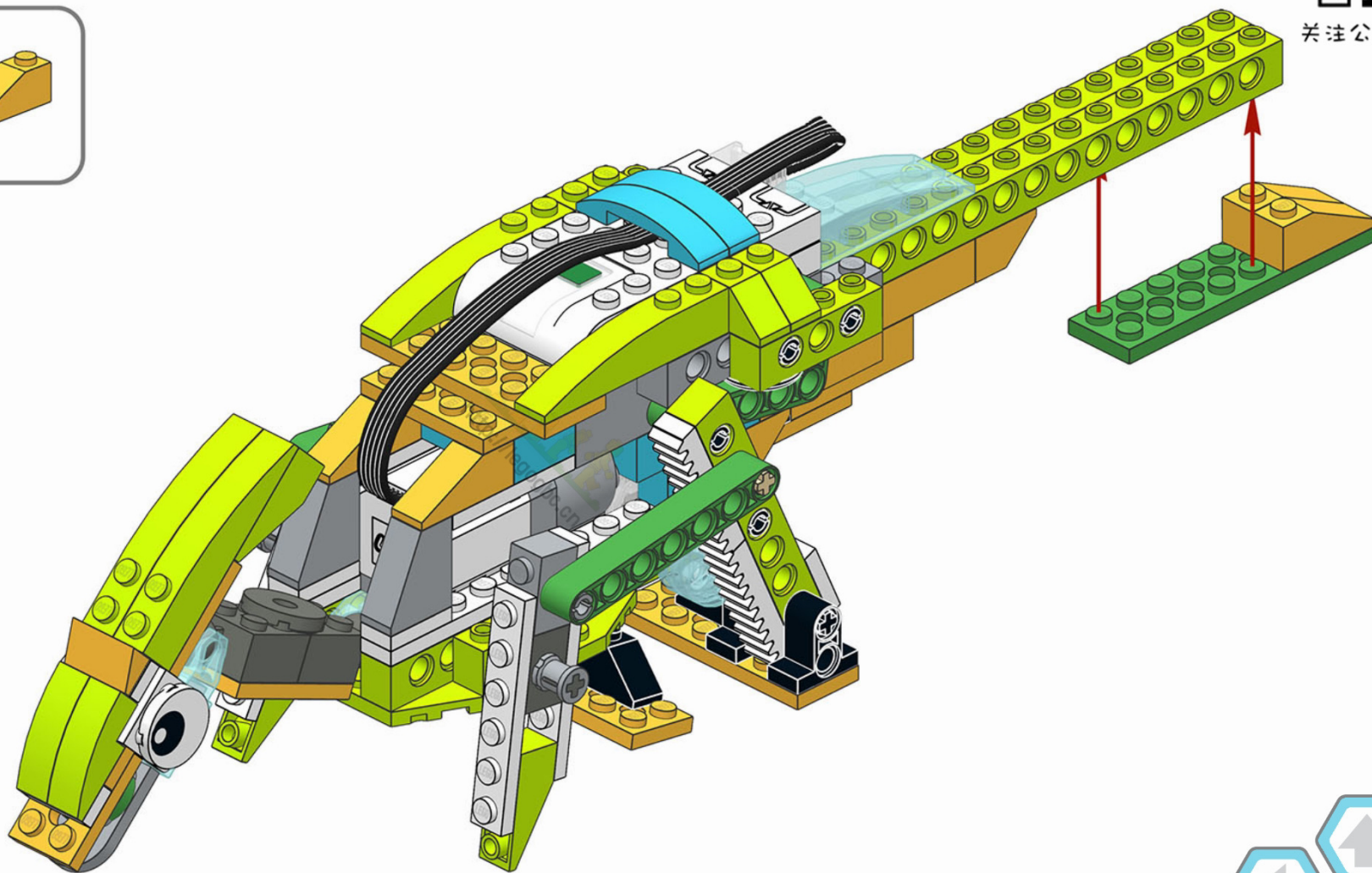


1x



2x

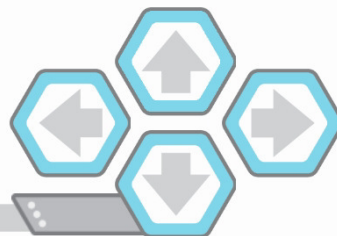
81



8/10

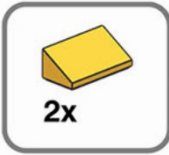
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108

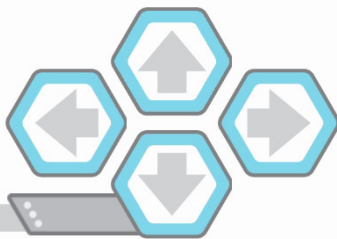
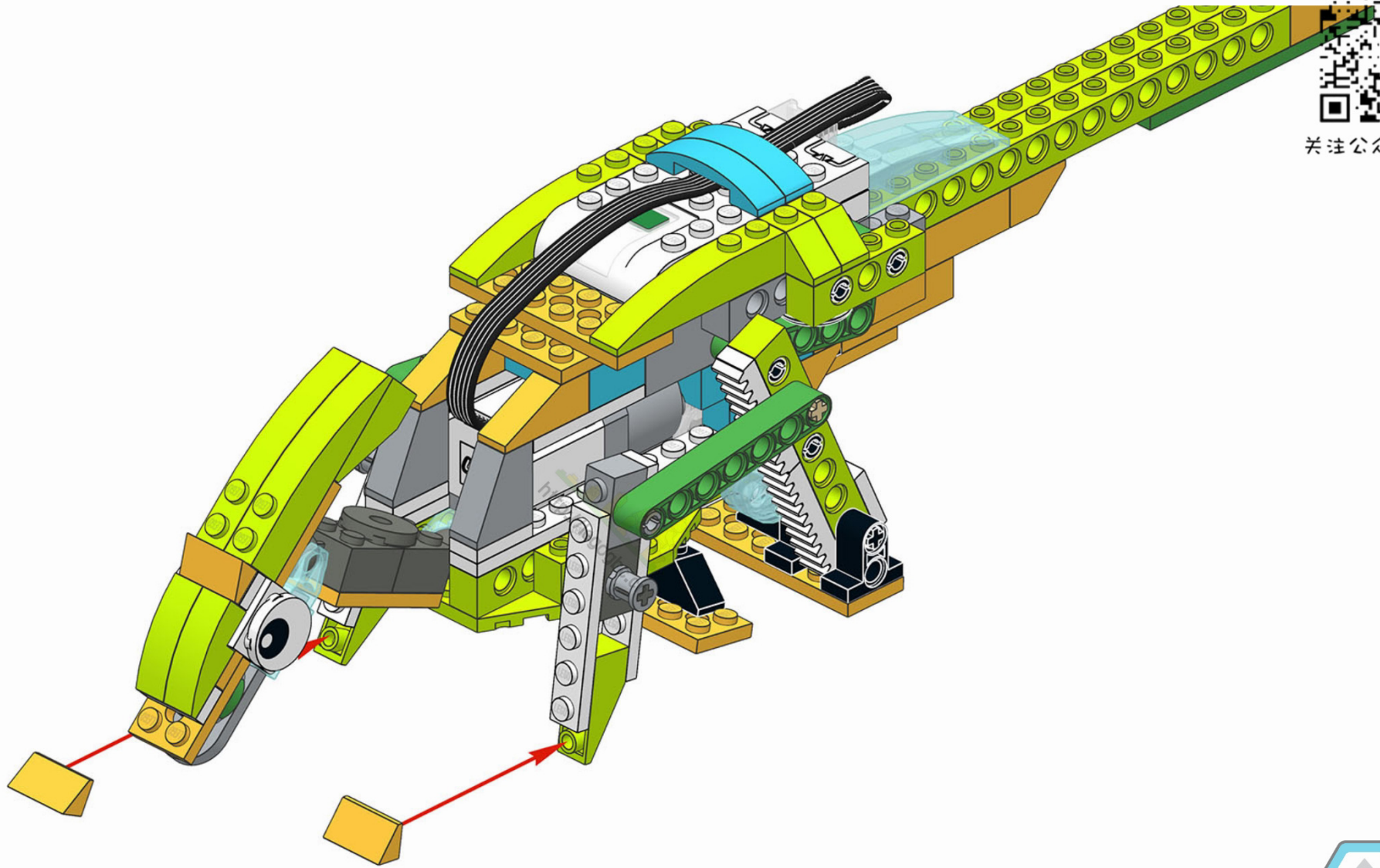




关注公众号获取更多



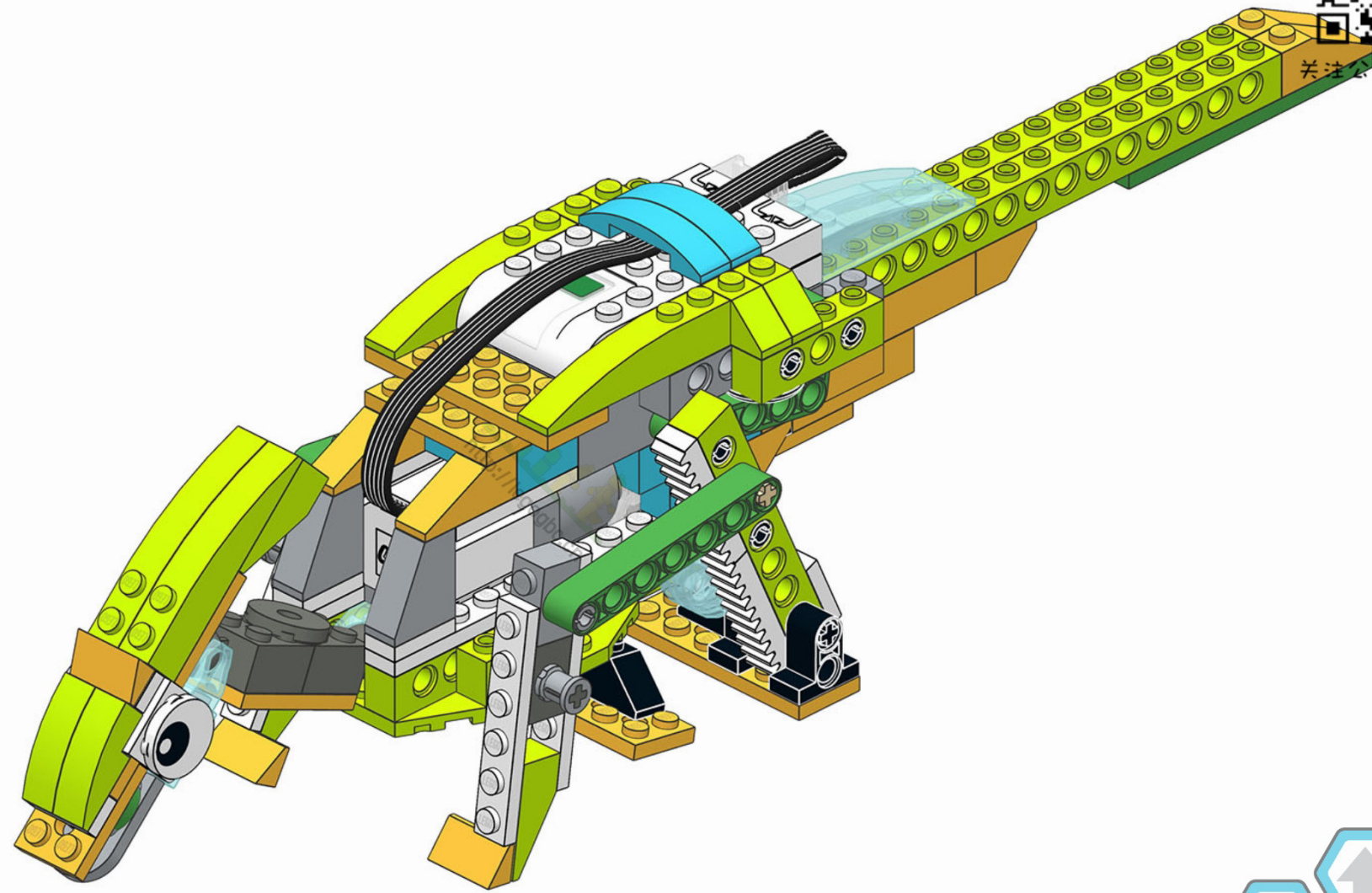
82





关注公众号获取更多

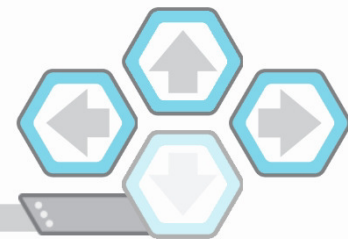
83



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5

110



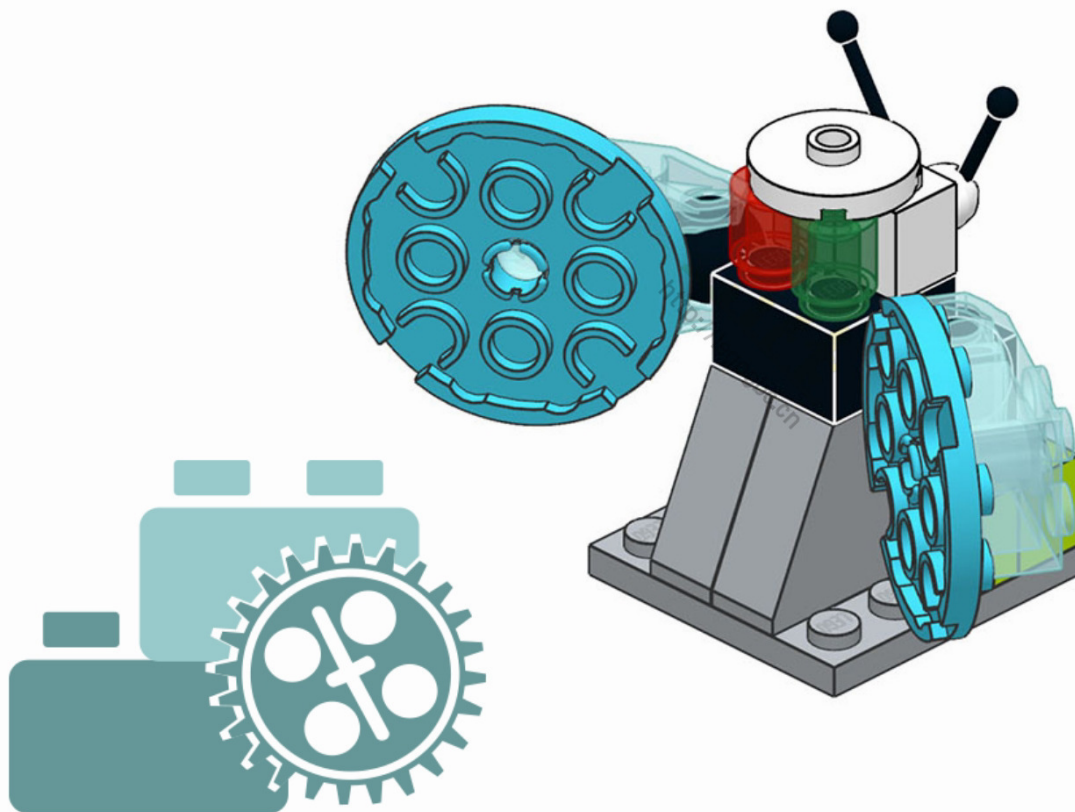


# Charging station



关注公众号获取更多

Build the charging station for the robot.

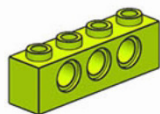
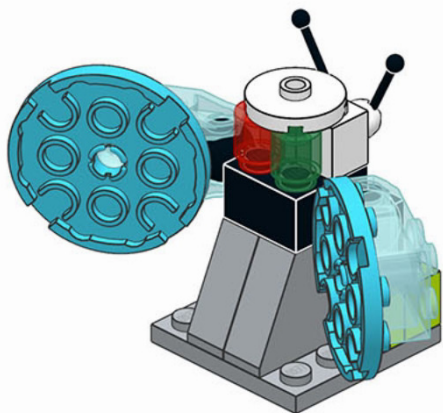


111

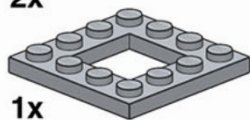




关注公众号获取更多



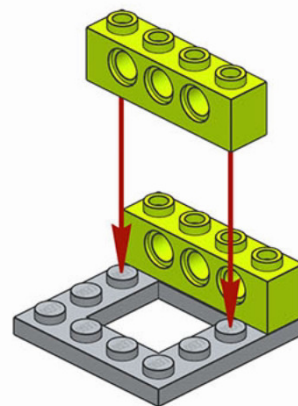
2x



1x

1

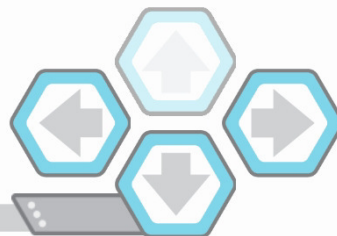
<http://legogbc.cn>



1/9

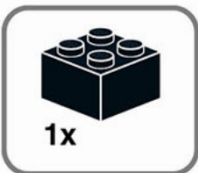
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112

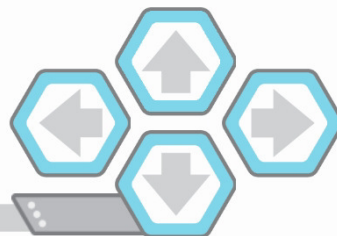
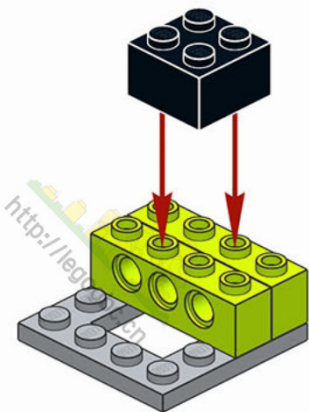




关注公众号获取更多



2



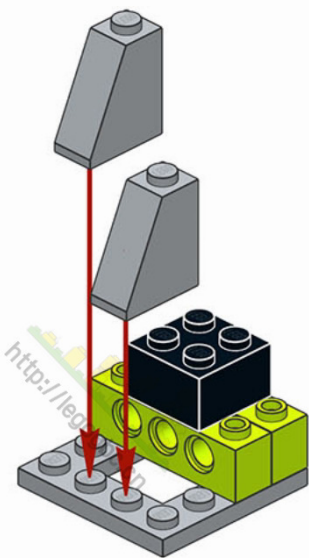


关注公众号获取更多



2x

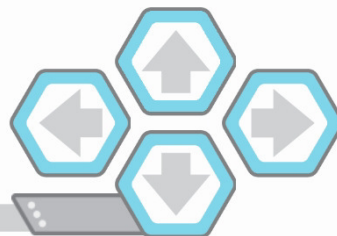
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3/9

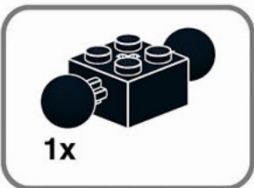
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114

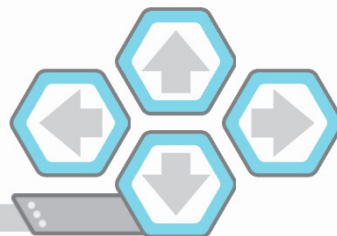
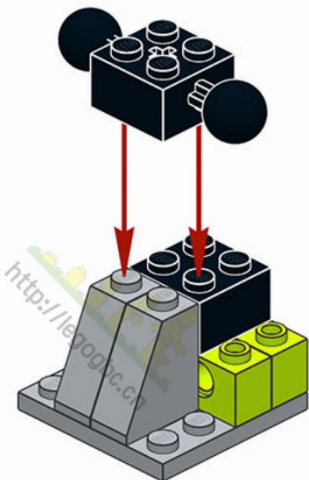




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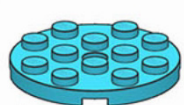


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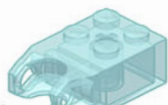




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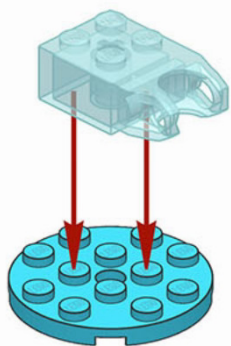


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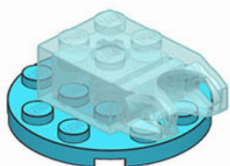


1x

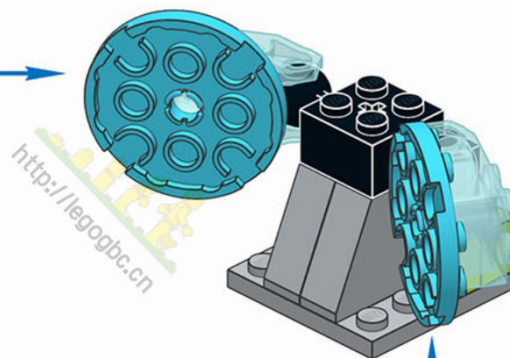
1



2



2x



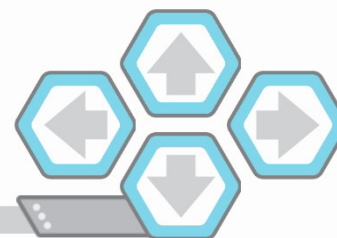
5/9



5



116



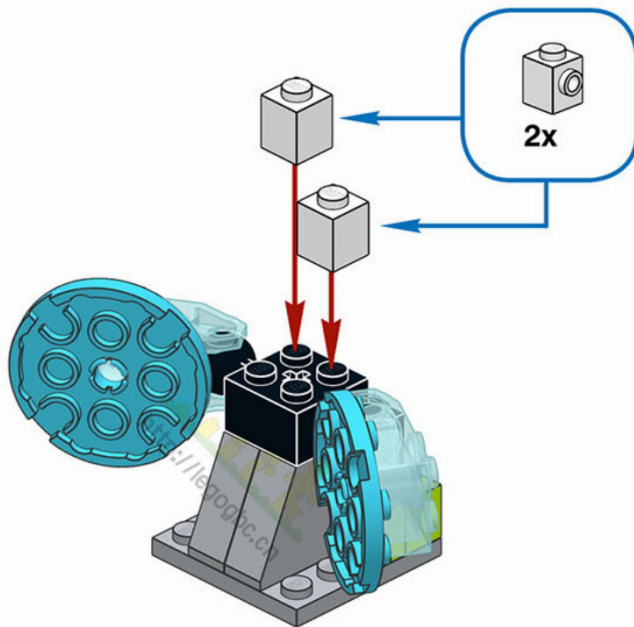


关注公众号获取更多



2x

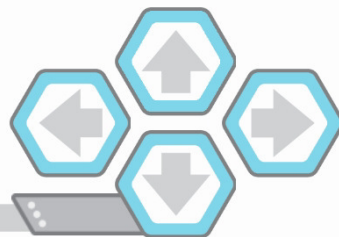
6



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5

117

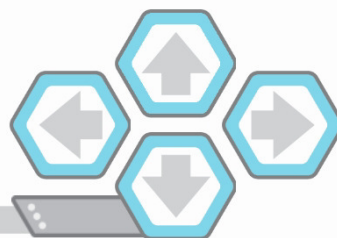
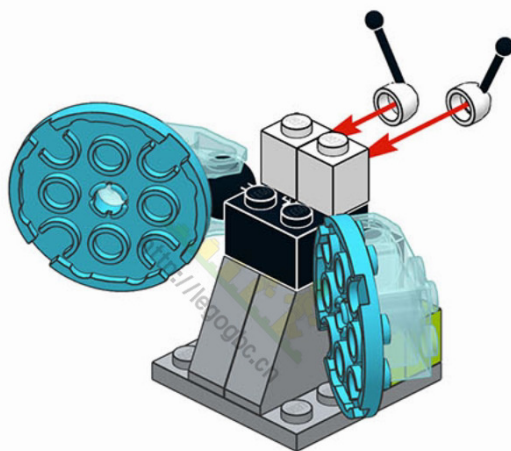




关注公众号获取更多



7

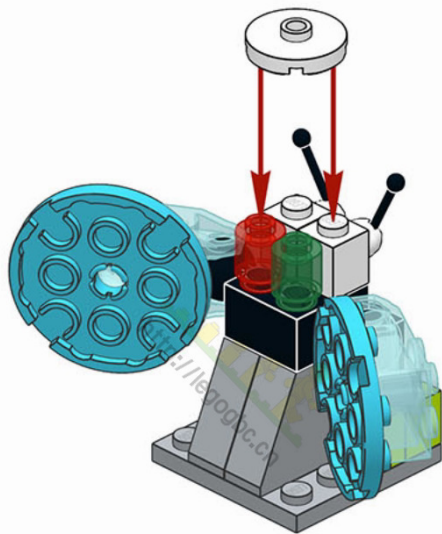




关注公众号获取更多

1x 1x 1x

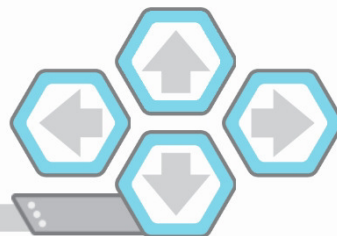
8



8/9

5

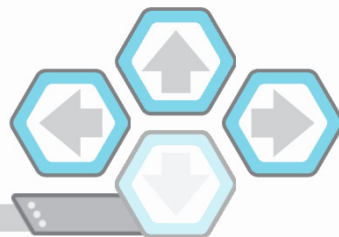
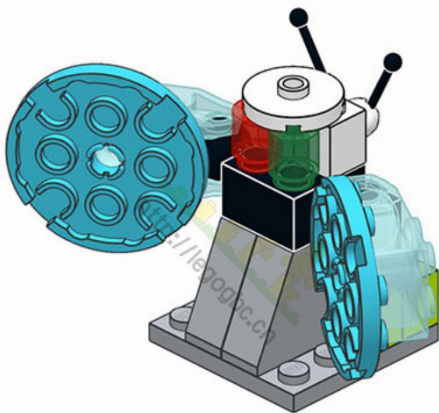
119





关注公众号获取更多

9





# Check it out!



关注公众号获取更多

Avoid any friction  
between the cables  
while robot is moving.



5



121



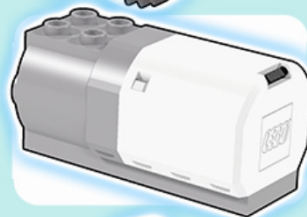
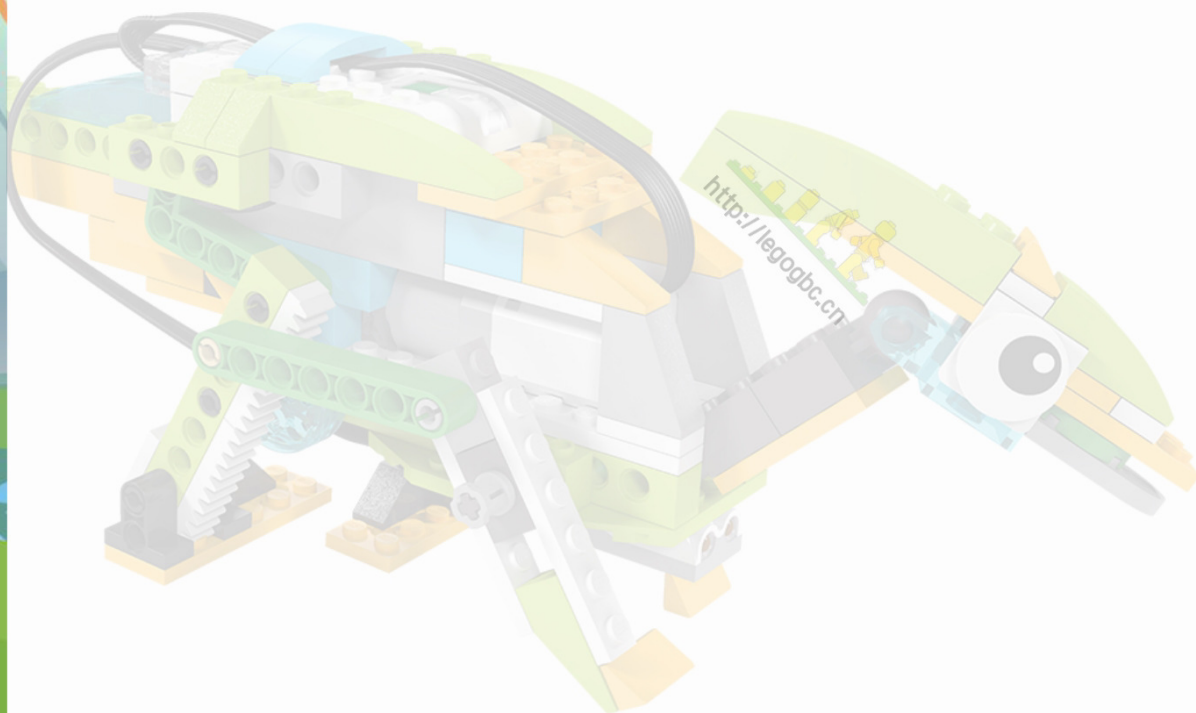


# Task



关注公众号获取更多

Place parts of the robot on the right places



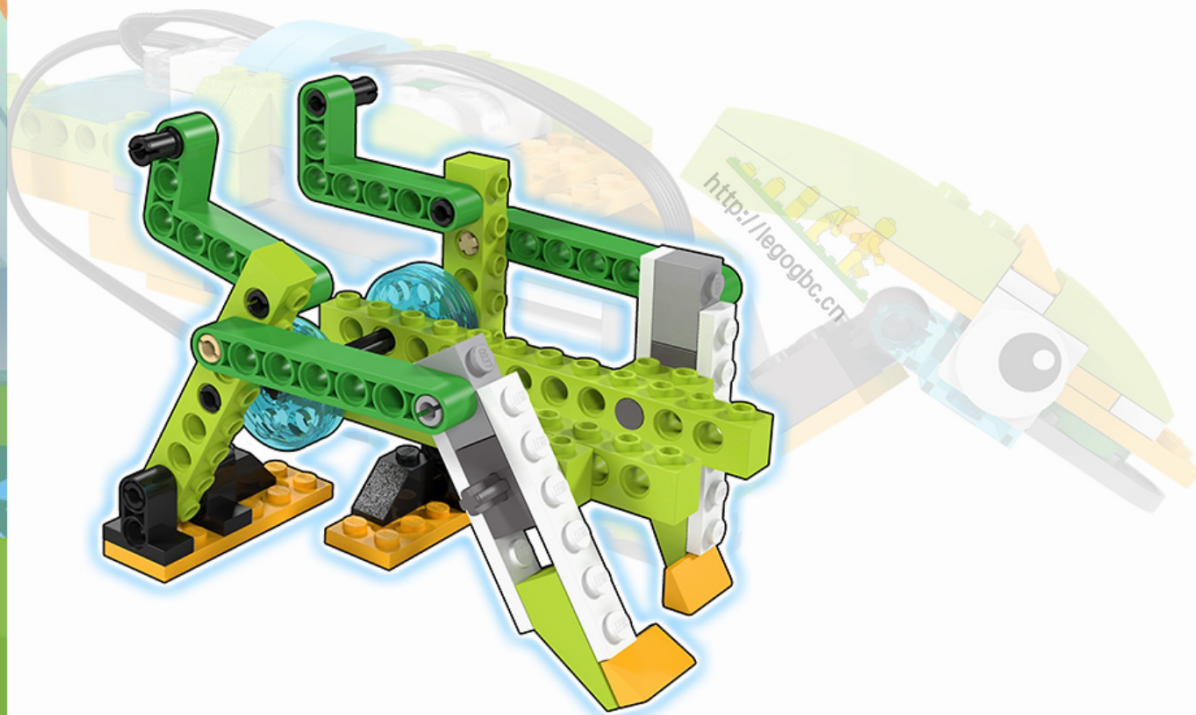


# Task



关注公众号获取更多

Place parts of the robot on the right places






9



122





# Task 1



关注公众号获取更多

Check the work of the mechanism. Program the robot moving forward for 10 seconds. Experiment with the position of the robot at the beginning of the movement.



robotiseit.com



123



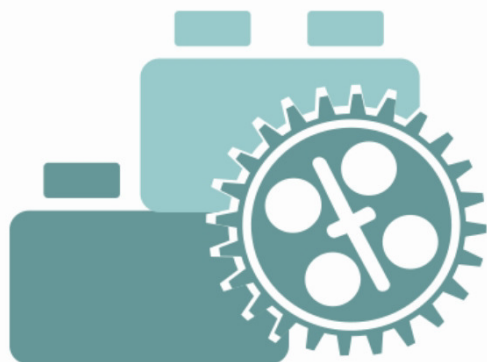


# Additional sensors



关注公众号获取更多

Fix the motion sensor at the robot



9

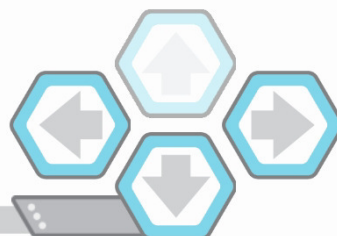
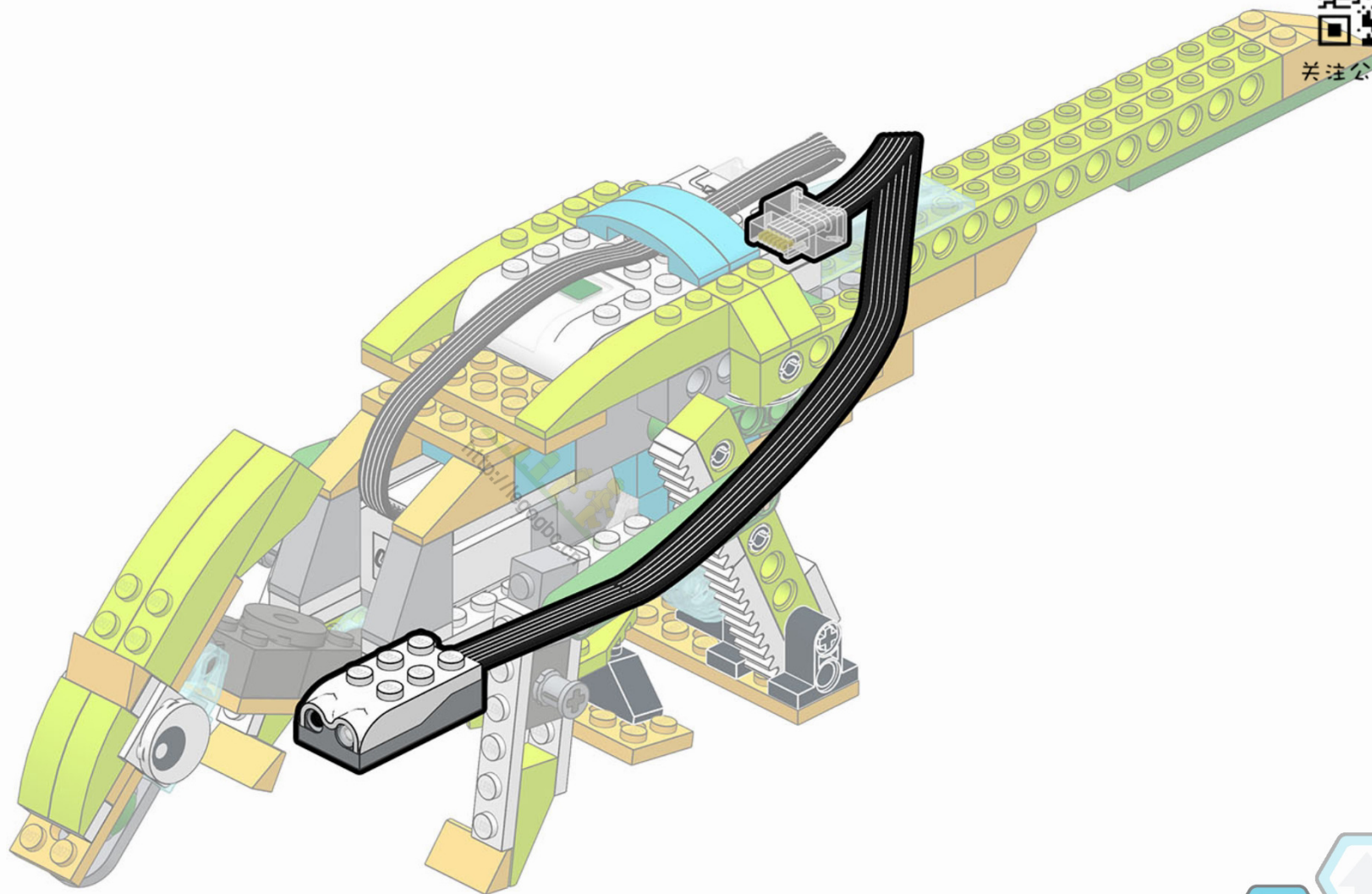


124



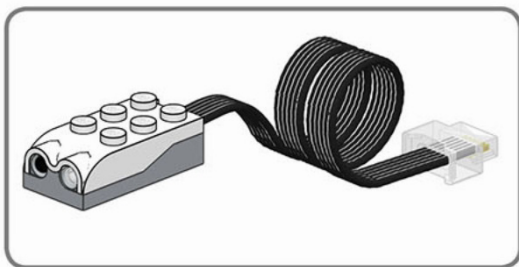


关注公众号获取更多

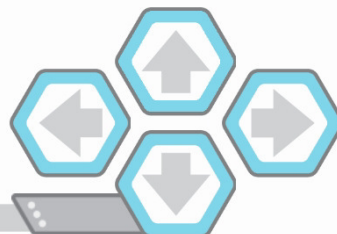
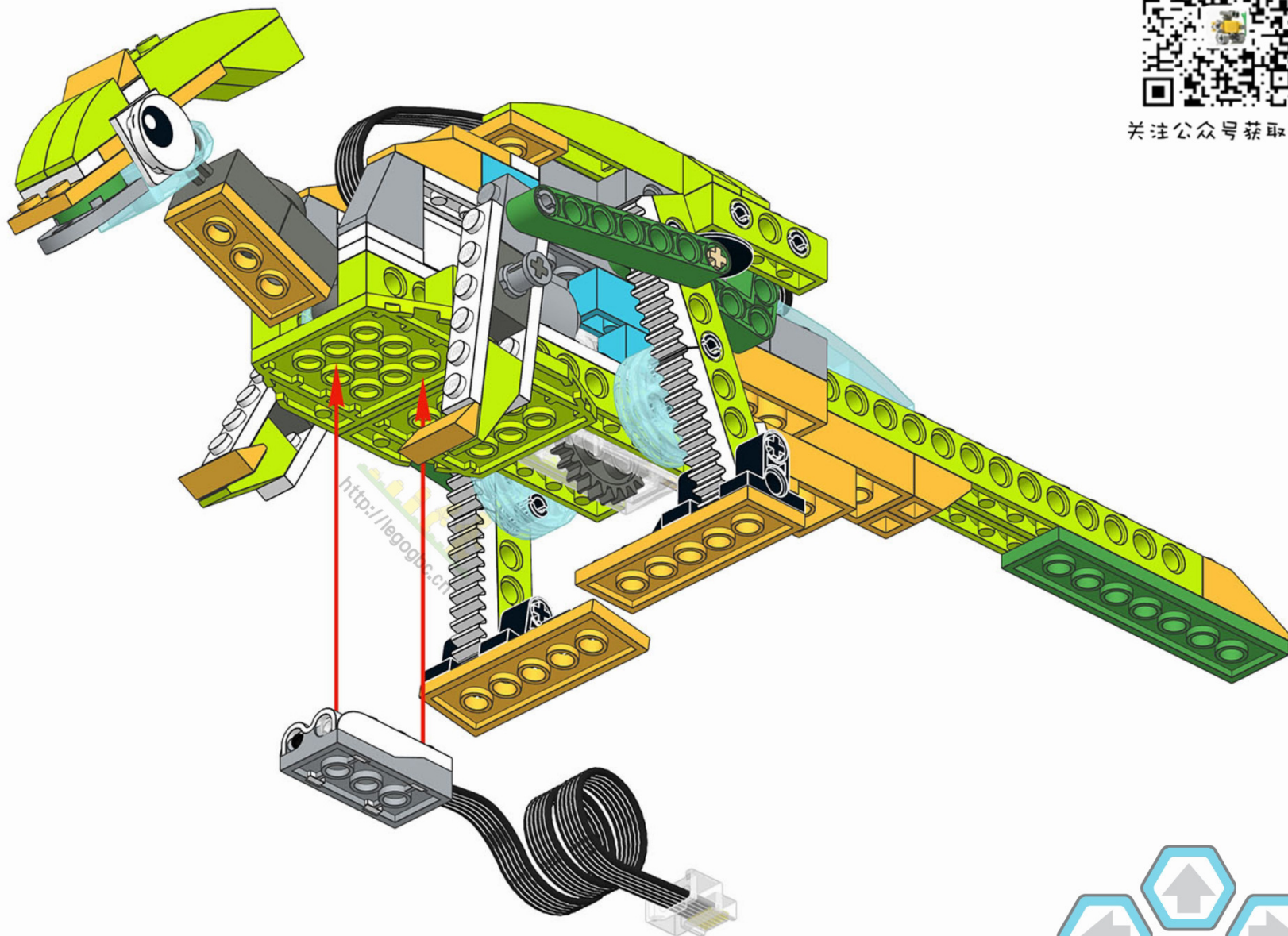




关注公众号获取更多



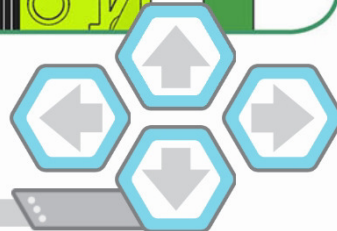
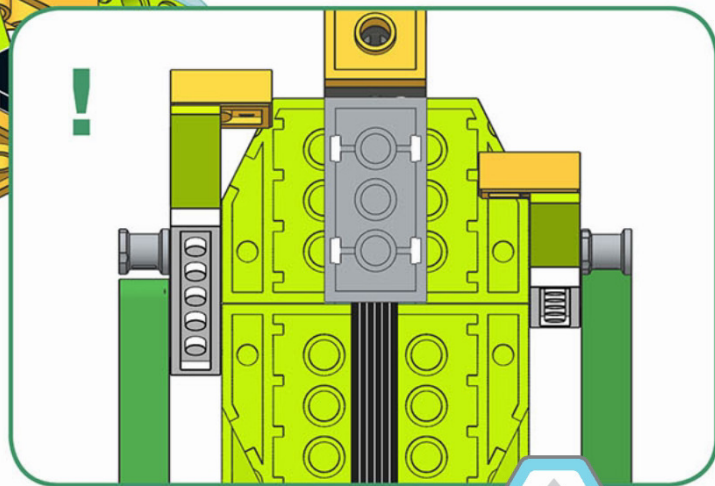
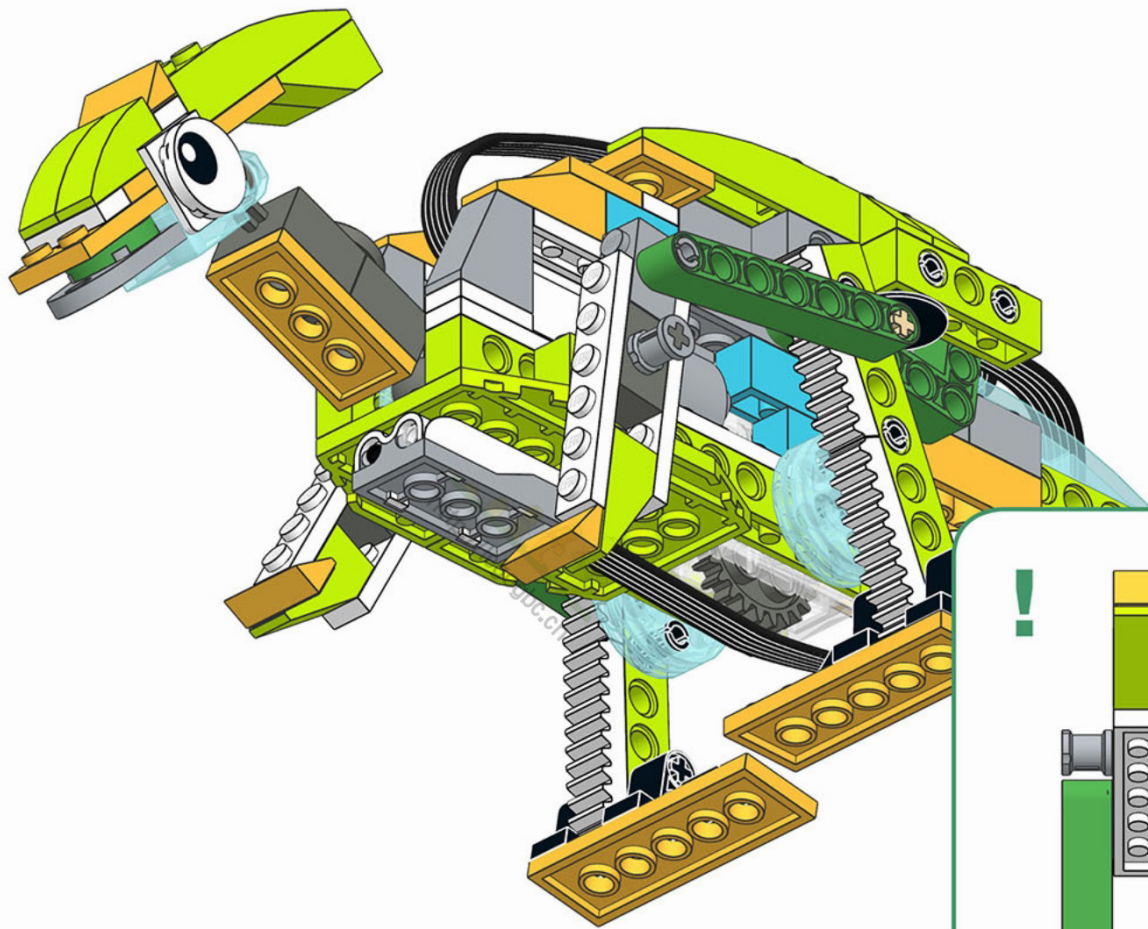
84





关注公众号获取更多

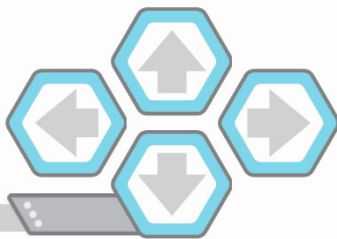
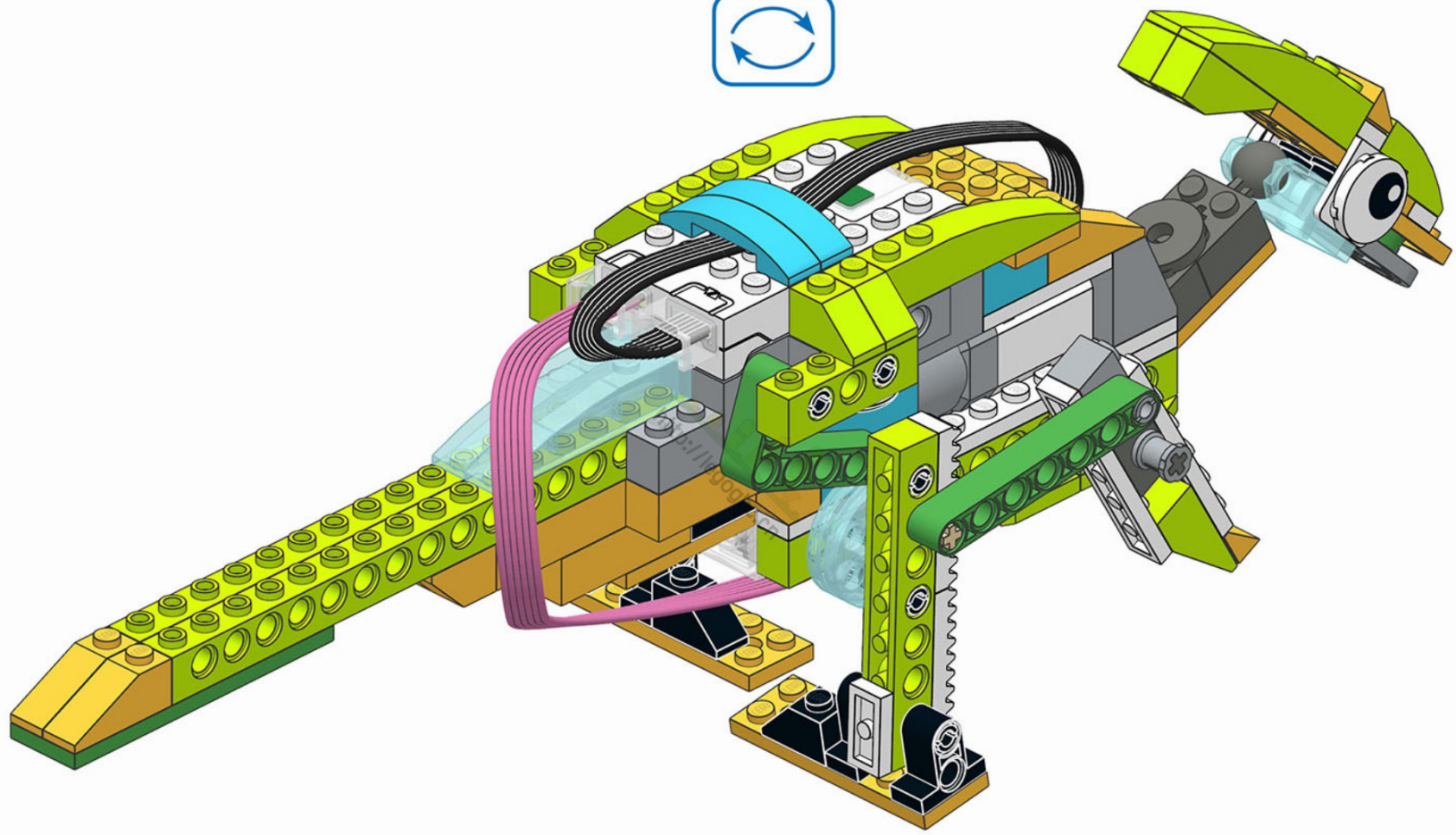
85





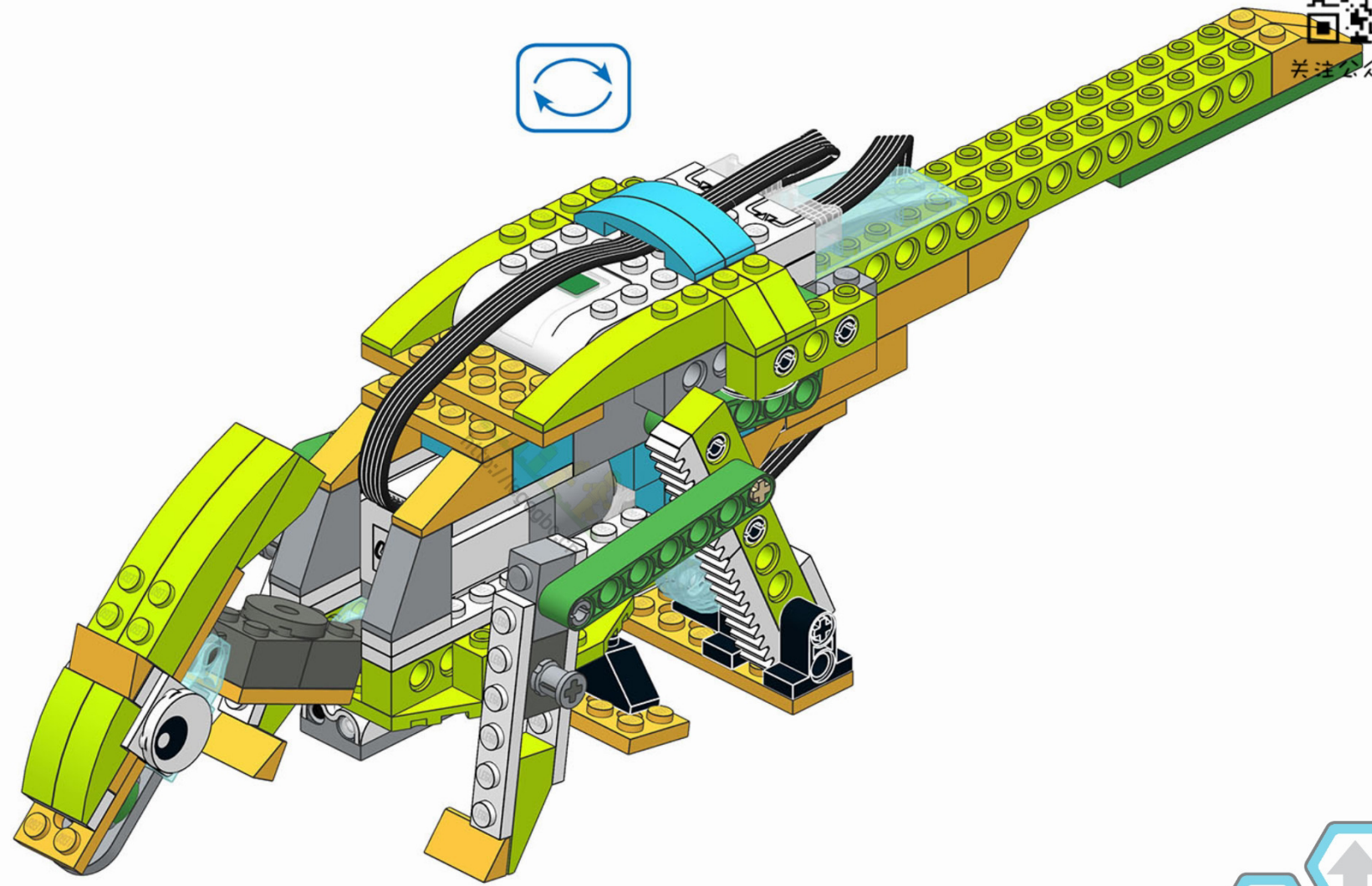
关注公众号获取更多

86

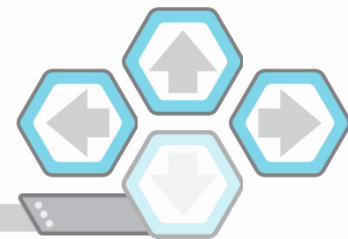




关注公众号获取更多



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## Task 2



关注公众号获取更多

Robots of the dinopark should react to visitors. Program the robot movement forward after greeting. The motion sensor will detect a consistent approach and distance of the object in front of it:



robotiseit.com



9



130



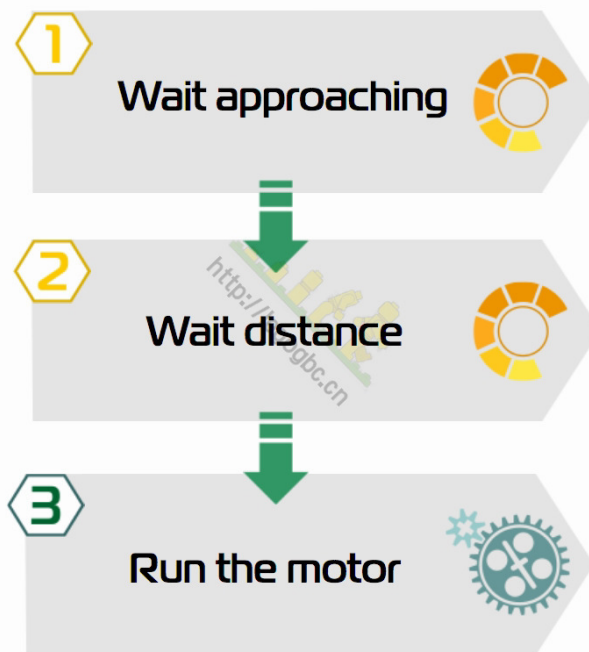


## Task 2. Algorithm



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The program is run by the following algorithm:



131





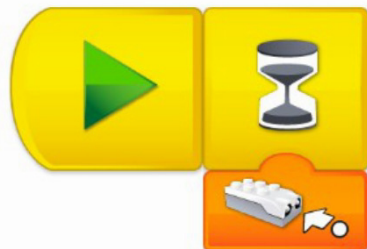
## Task 2. Program



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1

Wait approaching



<http://legogbc.cn>

Step:

1

2

3



9



132





## Task 2. Program



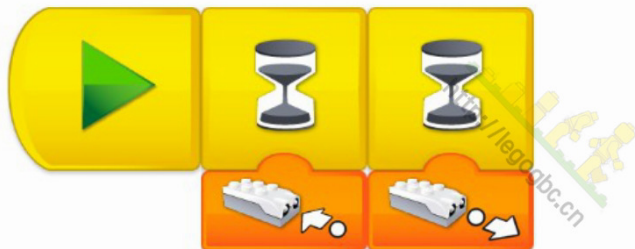
关注公众号获取更多

1

Wait appr

2

Wait distance



Step:



132





## Task 2. Program



关注公众号获取更多



Step:



9

132



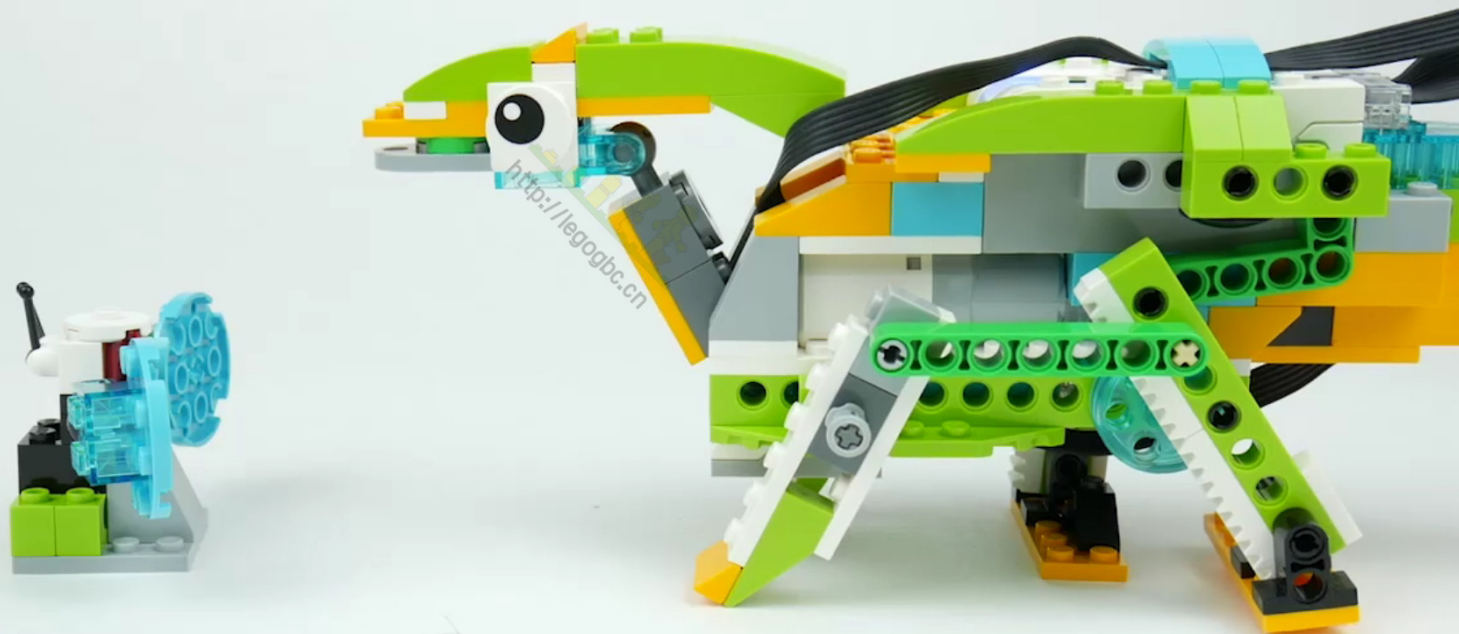


## Task 3



关注公众号获取更多

In the evening, after closing the park for visitors, robot must recharge their batteries, as they do, for example, robot-vacuum cleaners. Each robot has its own charge station. Program the robot stop at the station:



robotiseit.com



9



133



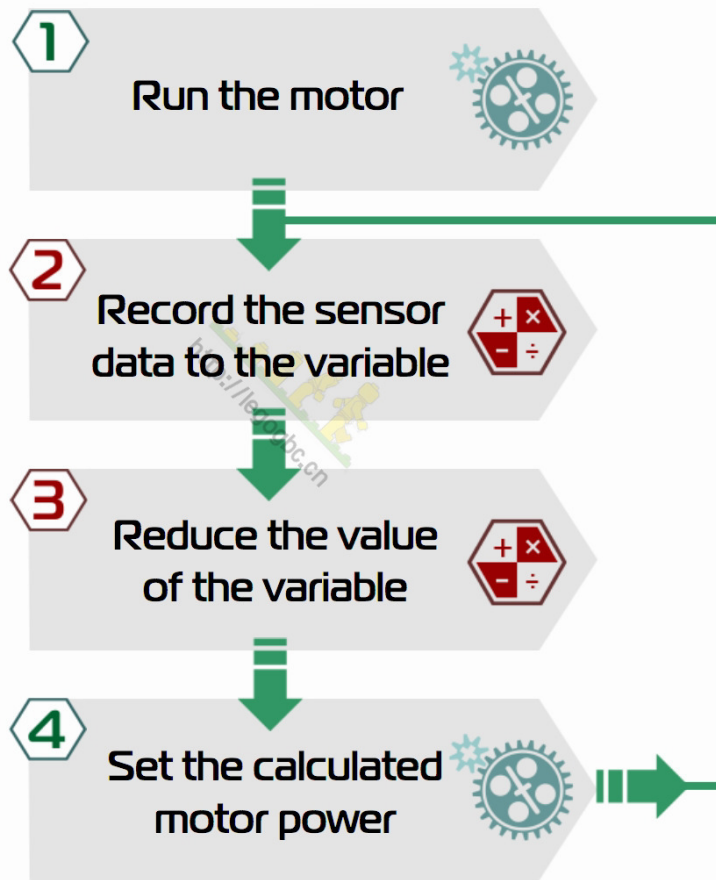


# Task 3. Algorithm



关注公众号获取更多

The program is run by the following algorithm:





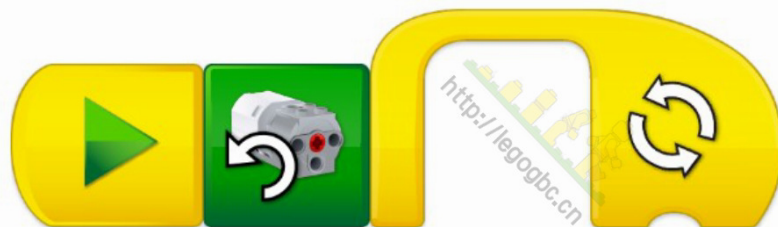
# Task 3. Program



关注公众号获取更多

1

Run the motor



Step:



135





# Task 3. Program



关注公众号获取更多

- 1 Run the
- 2 Record the sensor data to the variable



Step:



9



135





# Task 3. Program



关注公众号获取更多

- 1 Run the
- 2 Record the data to the
- 3 Reduce the value of the variable



Step:



135





# Task 3. Program



关注公众号获取更多

- 1 Run the
- 2 Record the data to the
- 3 Reduce the of the v
- 4 Set the calculated motor power



Step:



9



135





## Task 3. Questions



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What program blocks are used to work with a variable?



136





# Question



关注公众号获取更多

How could *Parasaurolophus* use its bone crest on the head?



To get food

To protect against  
predators

To create loud  
sound



9

137





# Question



关注公众号获取更多

Were Parasaurolophus predators or herbivorous dinosaurs?



Herbivorous

Predators

They were  
omnivorous



138





# Discuss!



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- ▶ How the caring for the offspring help the species to thrive?
- ▶ Why is it important for animals living in large groups to communicate?
- ▶ What are the advantages of the wide feet of the robot rear legs?



10



139

