



Pteranodon



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Pteranodon



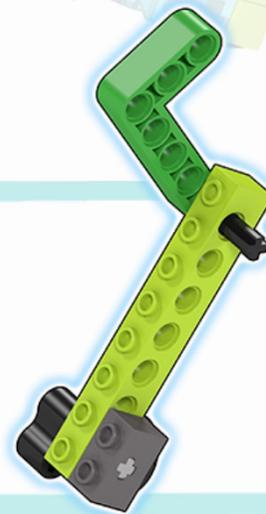
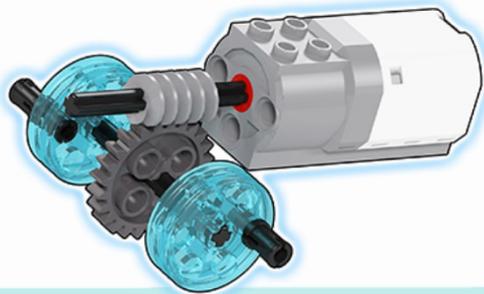
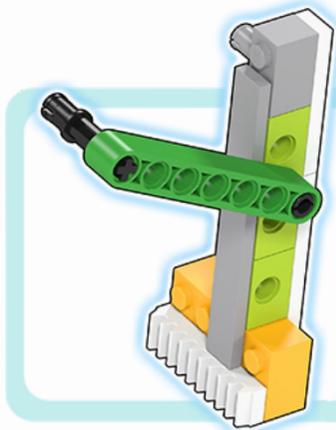


Let`s remind! Stegosaurus



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Place parts of the robot on the right places



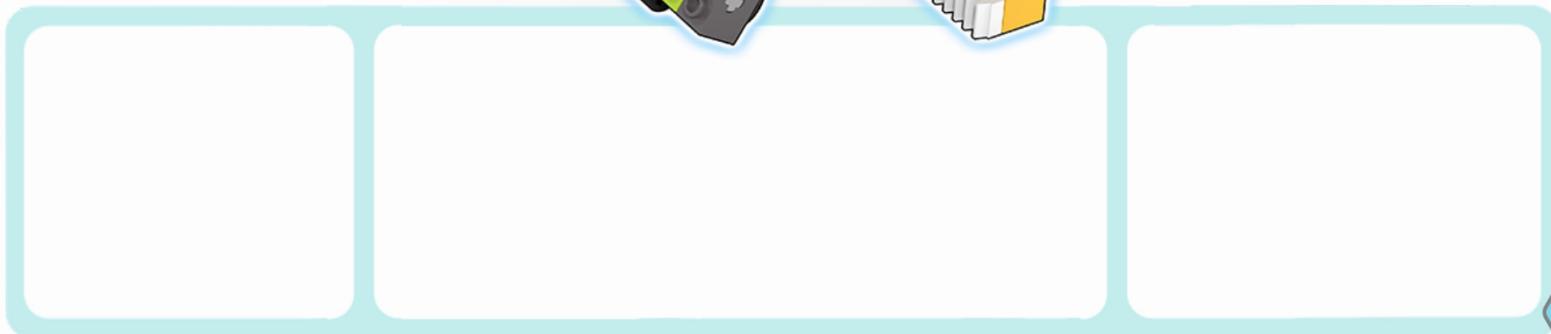


Let`s remind! Stegosaurus



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Place parts of the robot on the right places





Let`s remind! Stegosaurus



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How could Stegosaurus use their spikes?



For hunting for
prey

To protect against
predators

For digging the
soil



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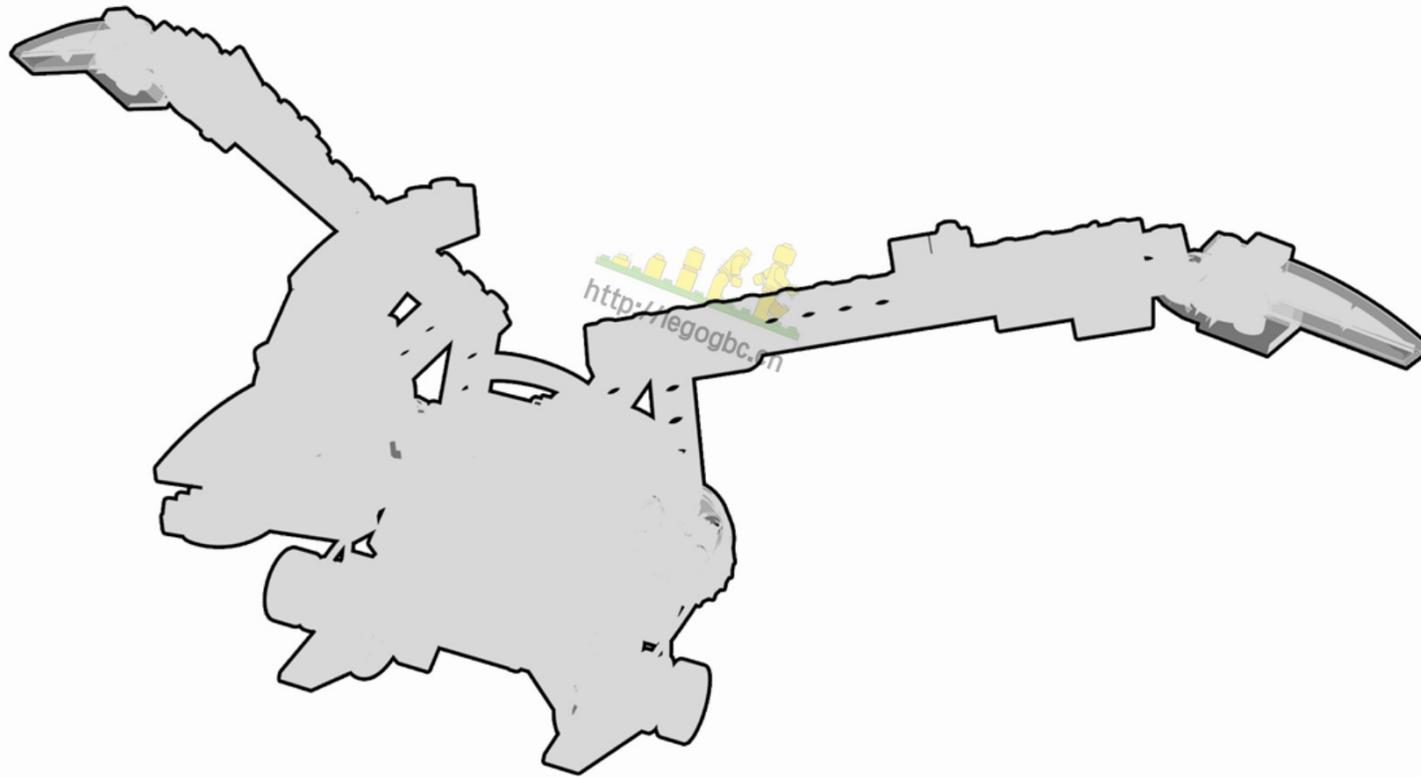


Dino Park



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Today we continue to create a modern Dino Park. We must develop a robot for the exposition of the flying reptiles of the Cretaceous period by the Mesozoic.



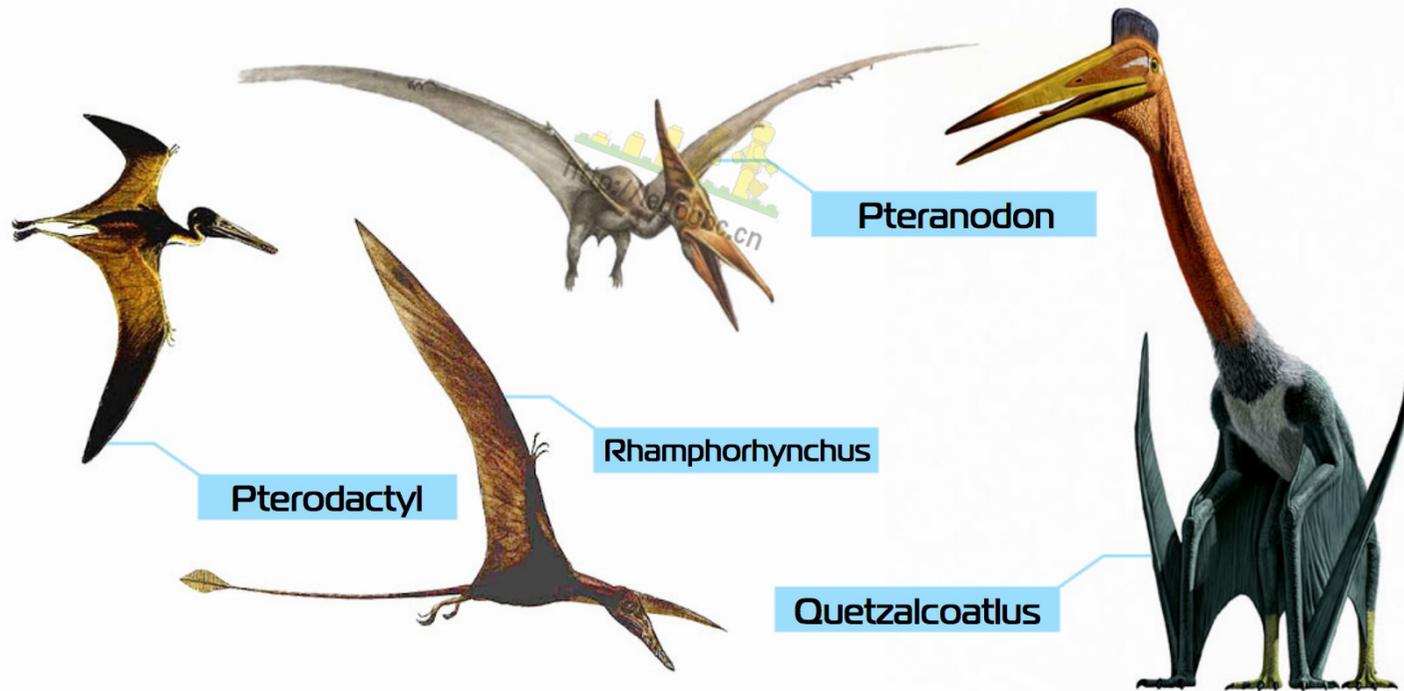


Pterosaurs



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Flying reptiles had leather wings stretched between a very long finger and leg. Their jaws were elongated, and on the heads of some were crests.



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Birds



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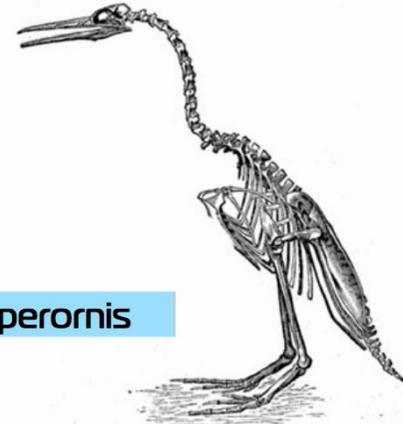
It is interesting that simultaneously with Pterosaurs in the air of the Cretaceous period actively hunted the first birds. They developed in parallel. Scientists have not yet reached a consensus on why birds have survived to this day, and Pterosaurs are not.



Avisaurus gloriae



Hesperornis



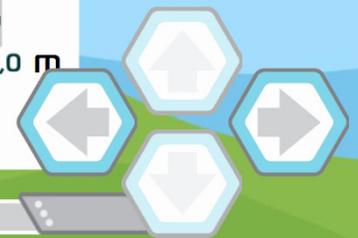
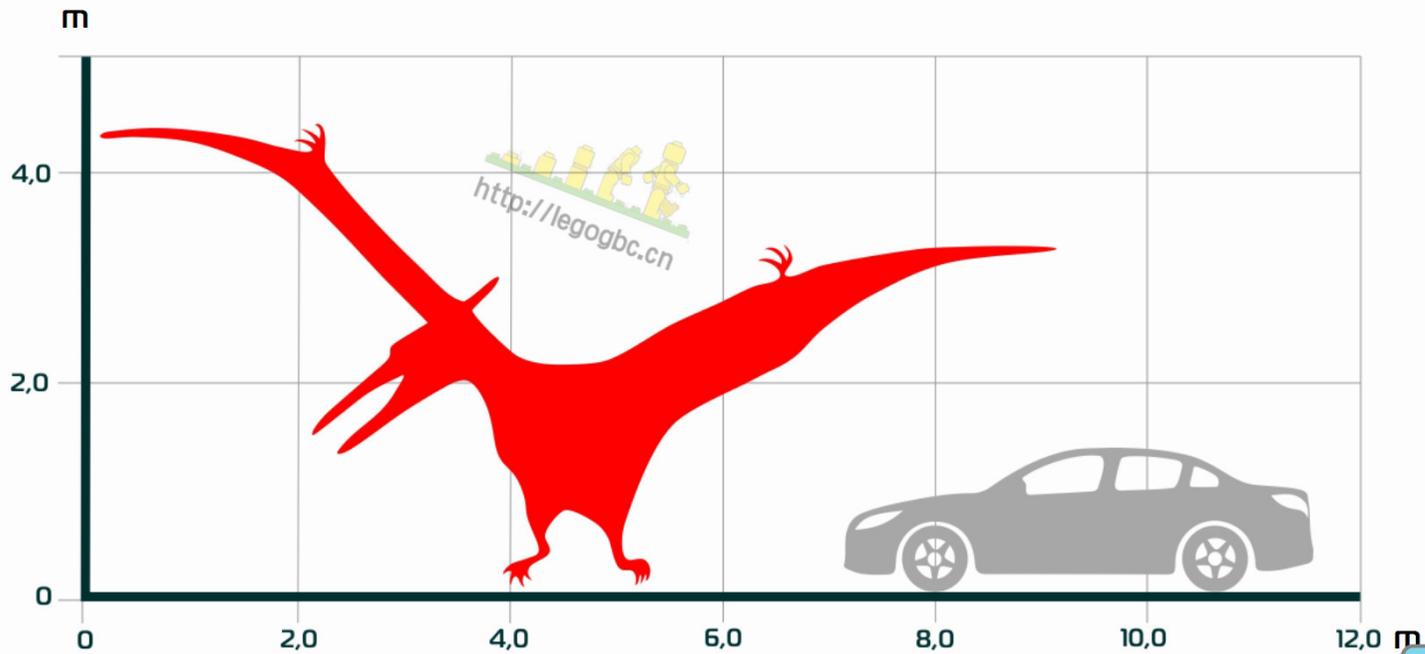


Pteranodon



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The wingspan of these flying lizards was 9 meters, and they were significantly higher than an adult and weighted to 40 kg.



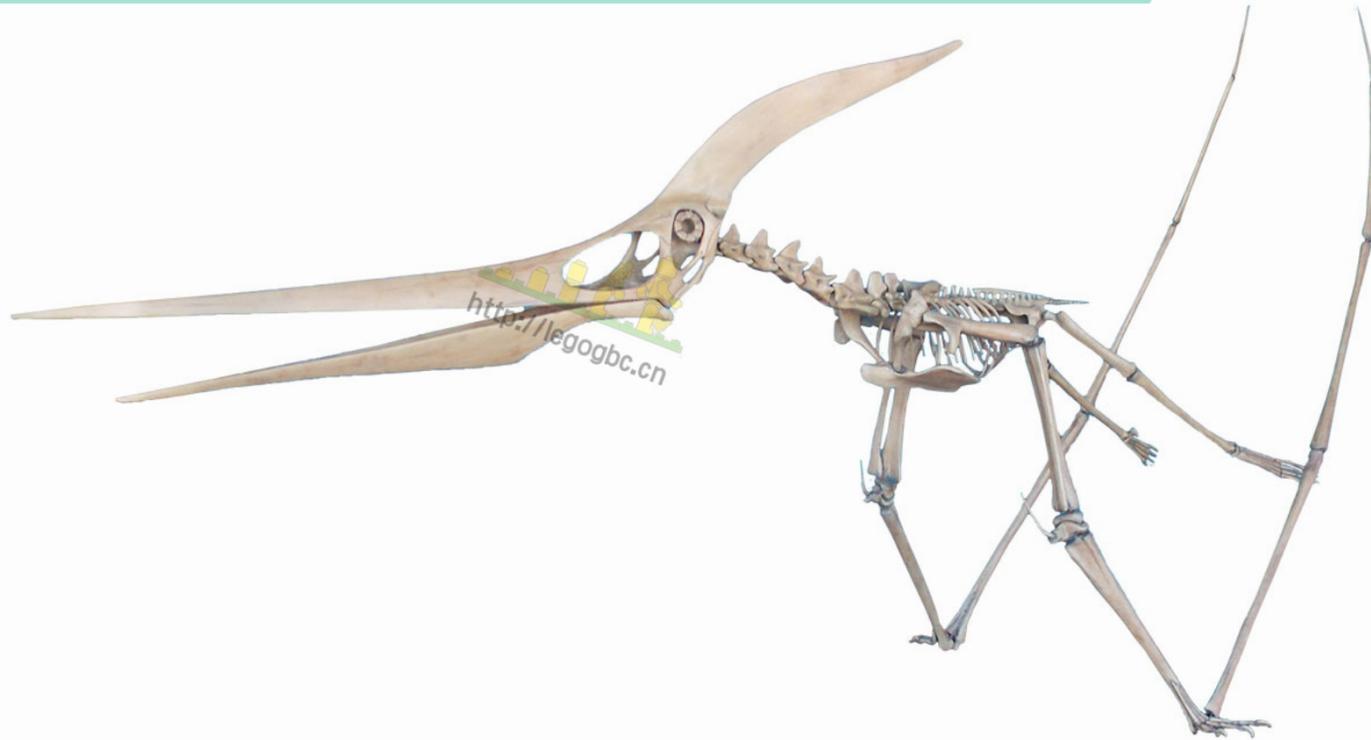


Pteranodon



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These flying reptiles had a very light and durable skeleton. One of the fingers was very elongated. A leather wing was stretched between it and the rear leg.



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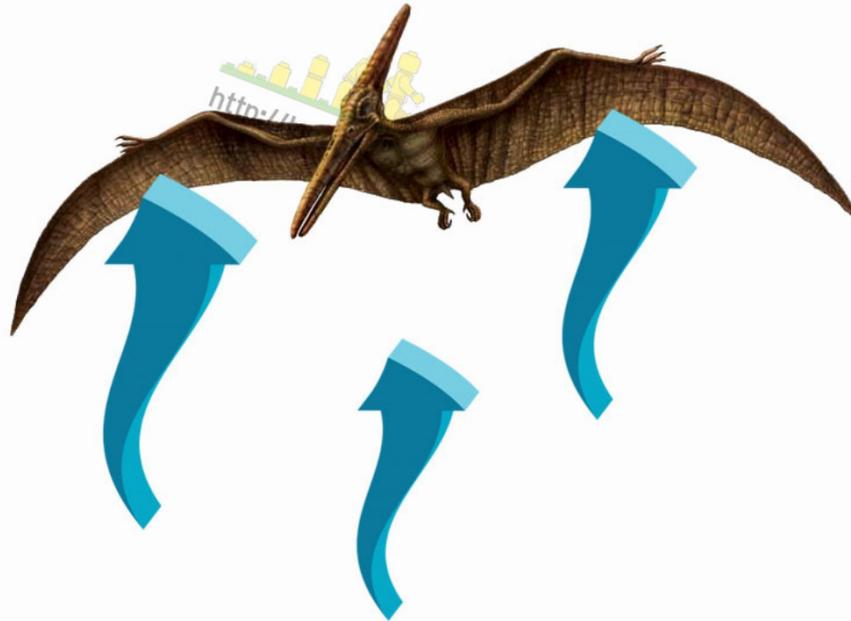


Pteranodon



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Most likely, Pterarodons could use upward airflows for the flight, as the modern Albatrosses do. This allows to spend less effort.



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Pteranodon



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Pteranodon ate fish. Flying over the ocean, it could see it through the thickness of the water due to big eyes. Interestingly, it was toothless reptile, teeth interfere with swallowing fish.



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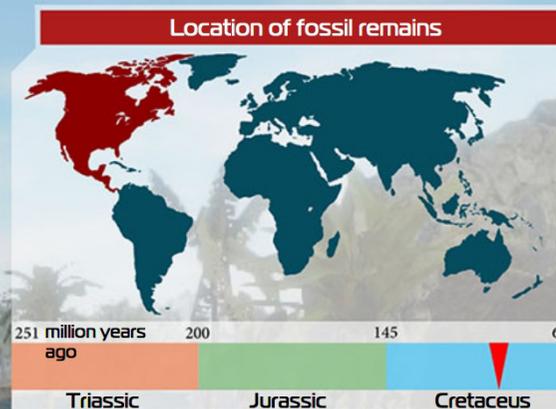


Pteranodon



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The fossilized remains of Pteranodons are found throughout North America. These flying reptiles hunted fish, which were abundant in the reservoirs of the Cretaceous period



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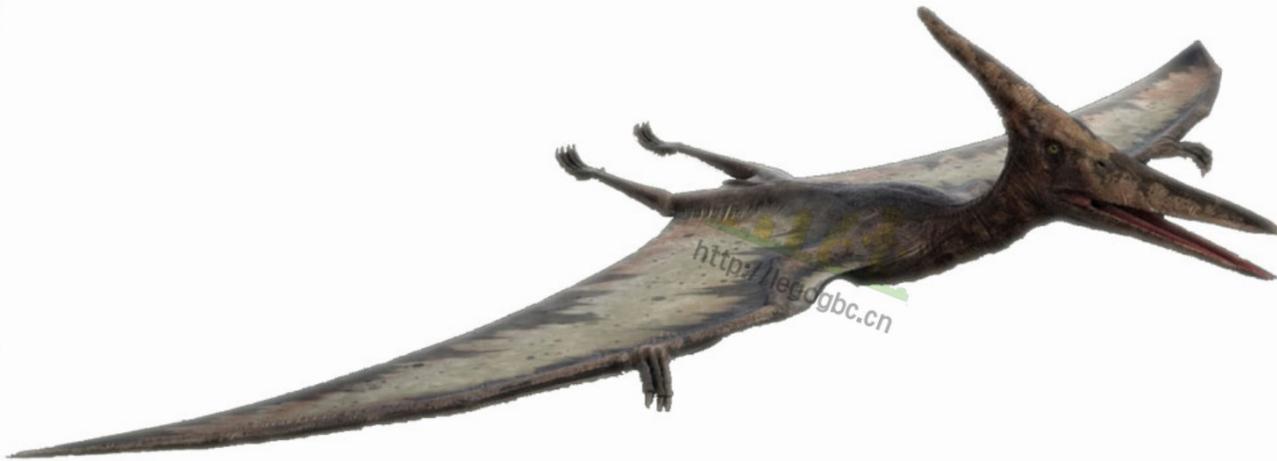


Dino Park



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While on the planet's surface dinosaurs dominated, winged reptiles were the main in the sky. In our park will be presented to Pteranodon, one of the most famous of the flying reptiles.



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TASK



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Task

- create a robot for the exposition of flying reptiles of the Cretaceous period

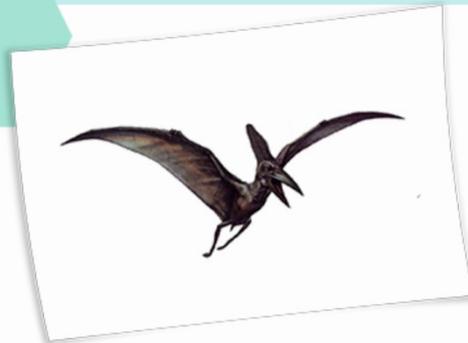


Requirements

- should remind Pterarodon - have the wings and the characteristic shape of the head
- must move on land and react to food



Pteranodon's appearance



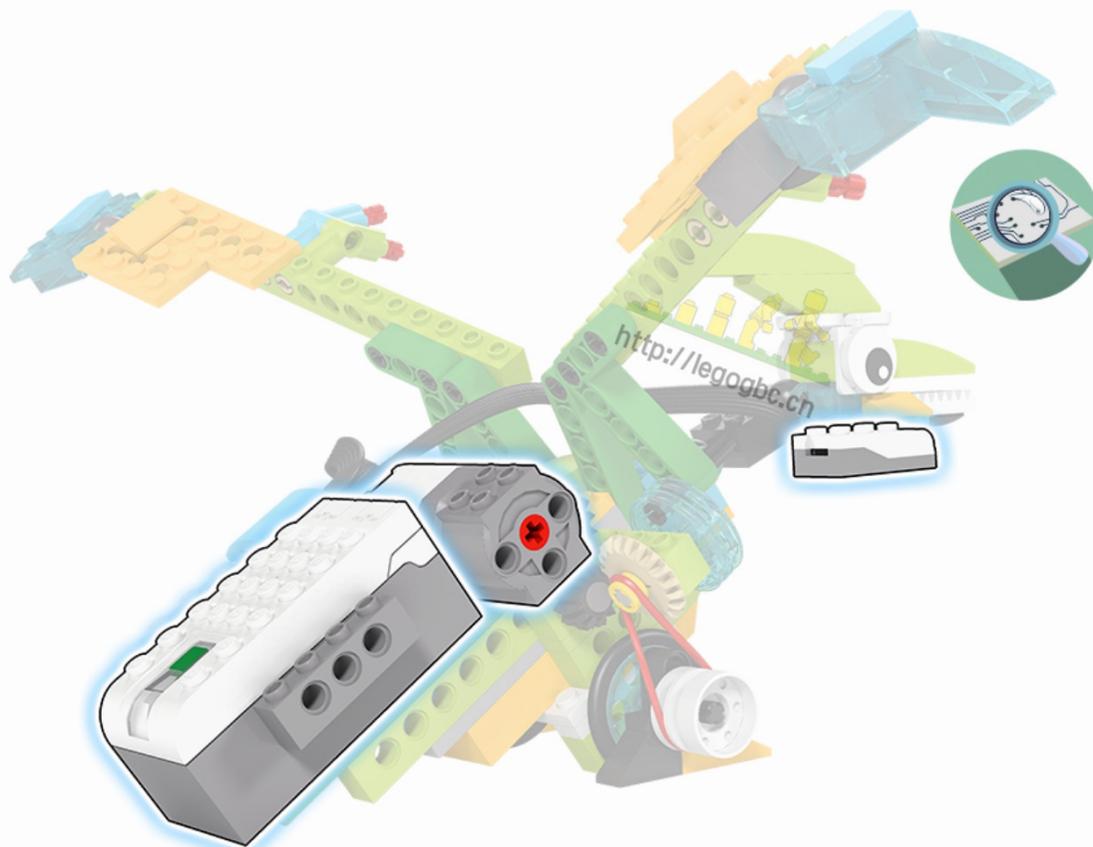


Design features



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Pteranodon's motor drives the wings and wheels for moving the robot on the surface. The motion sensor is placed on the head.



Find:

-  smarthub
-  motor
-  motion sensor



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Design features



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The robot has a moving head and wings ends.



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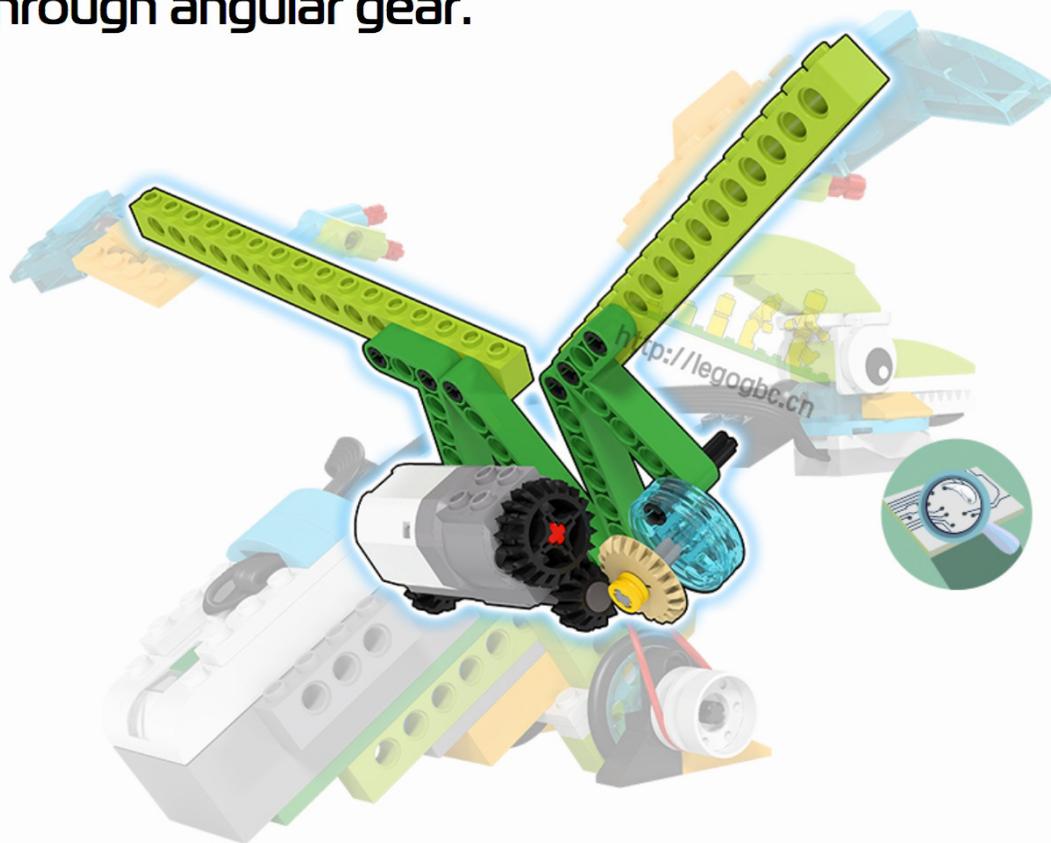


Design features



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From the motor the rotation is transmitted to the intermediate axle, where 12-tooth gears are fixed. From them, cranks are driven through angular gear.



Find:

- motor
- angular gear
- cranks and wings



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Design features



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The rotation from the motor is transmitted first through direct and then - through the angular gear.



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Design features



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The rotation from the motor is transmitted first through direct and then - through the angular gear.



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Design features



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Depending on the direction of the motor rotation, the movement of the wings may either be suitable for the flight or not. When programming, choose the right direction!



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4



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Design features



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Depending on the direction of the motor rotation, the movement of the wings may either be suitable for the flight or not. When programming, choose the right direction!



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4



24





Design features



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On one axle with cranks, pulleys belt gear are fixed. It transmits rotation to the wheels of the robot. Pay attention! The movement is not transmitted directly, but at an angle of 90 degrees.



Find:

- ▶ wheels
- ▶ angular gears
- ▶ belt drives



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Build the robot!



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Pteranodon



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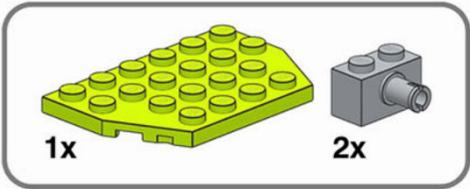


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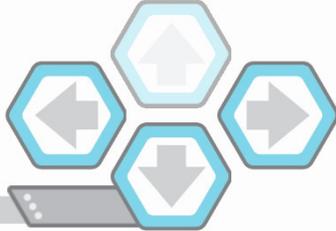
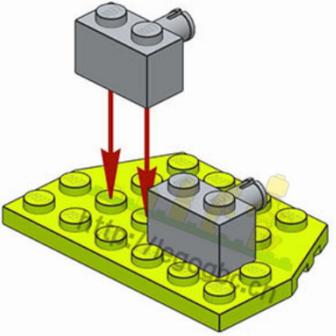




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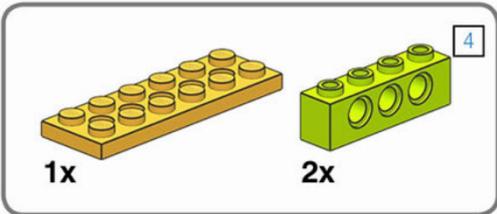


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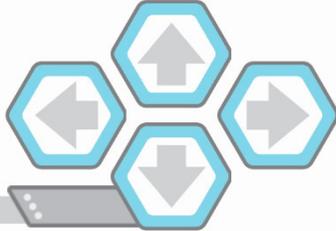
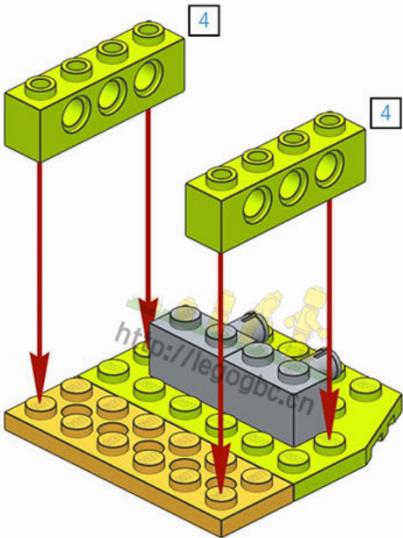




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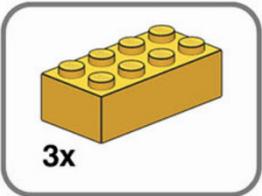


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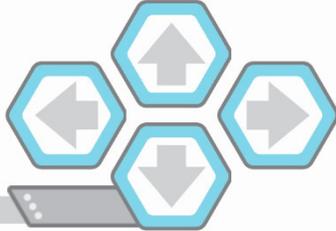
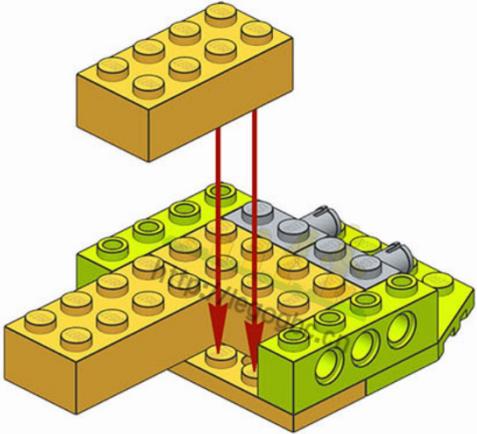




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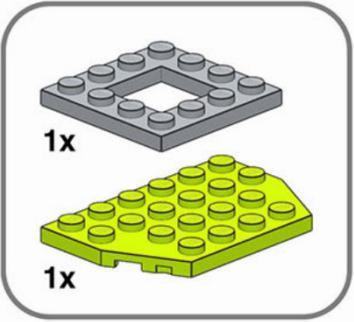


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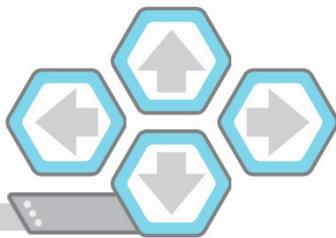
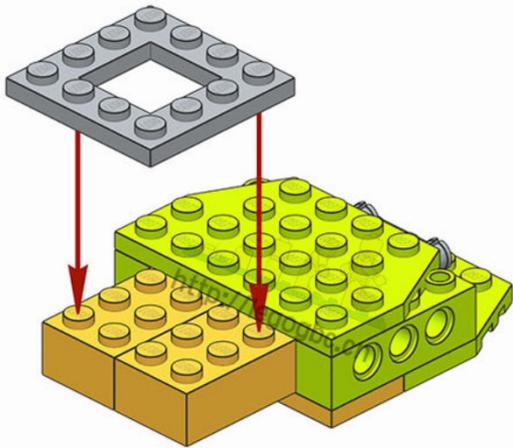




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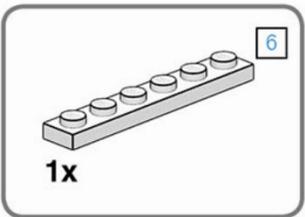


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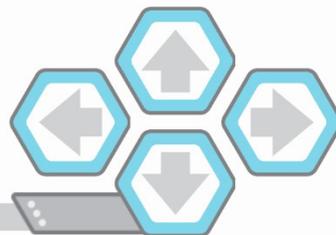
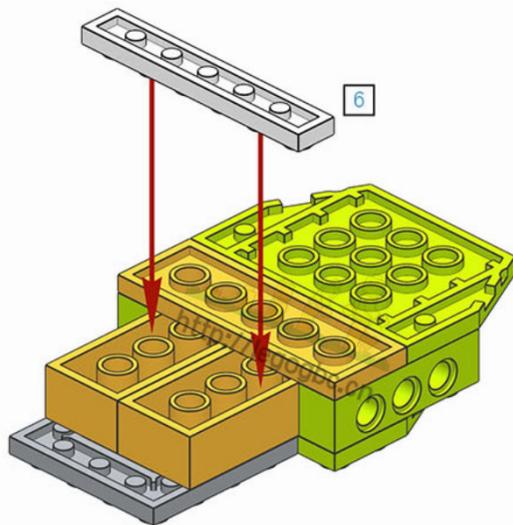




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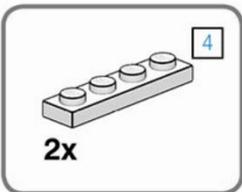


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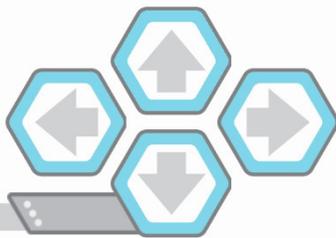
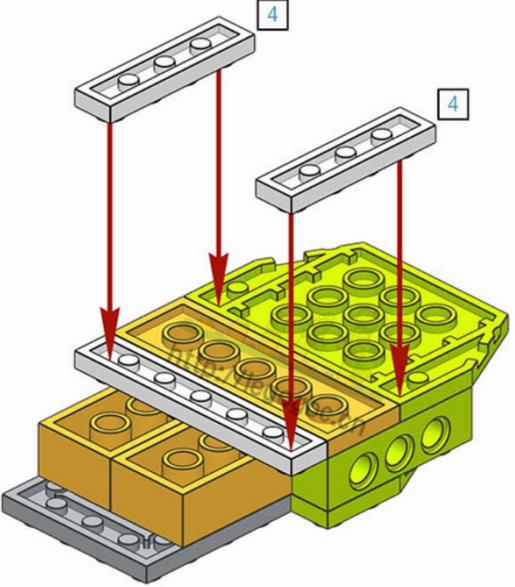




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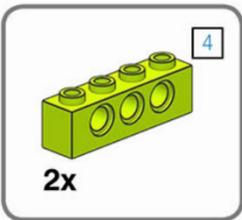


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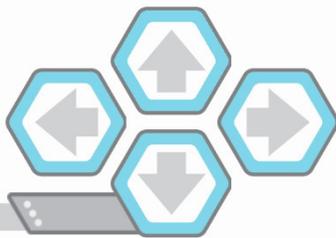
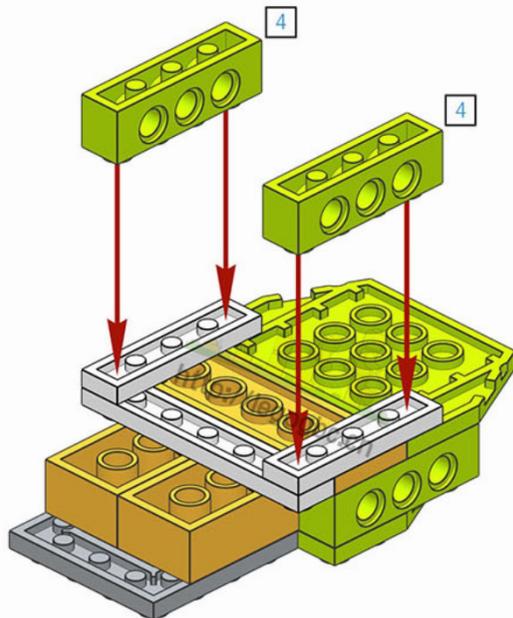




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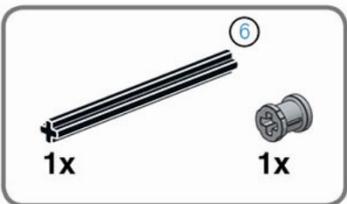


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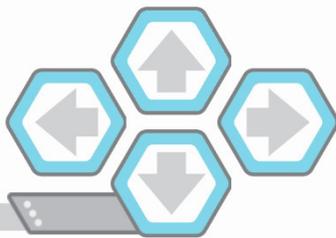
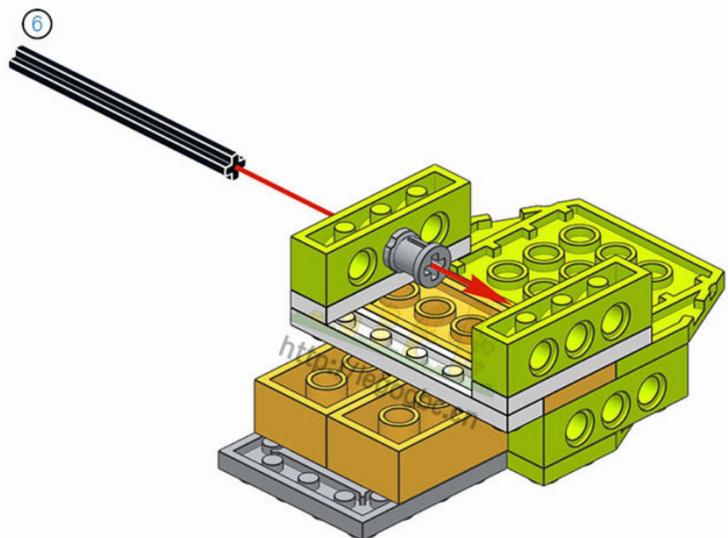




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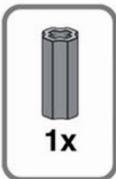


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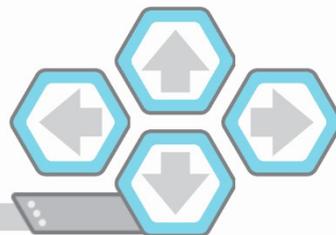
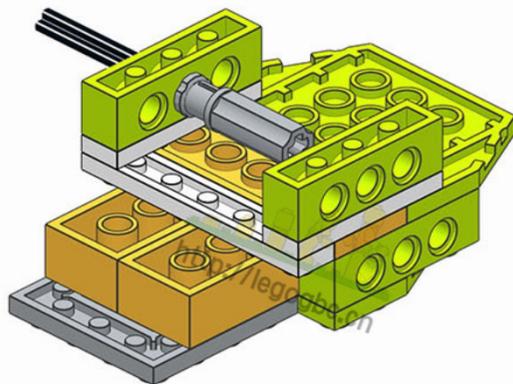




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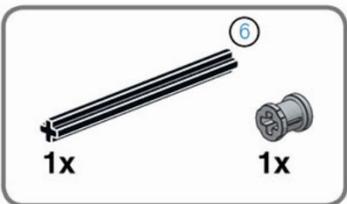


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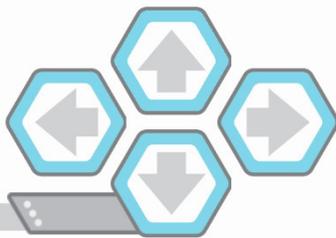
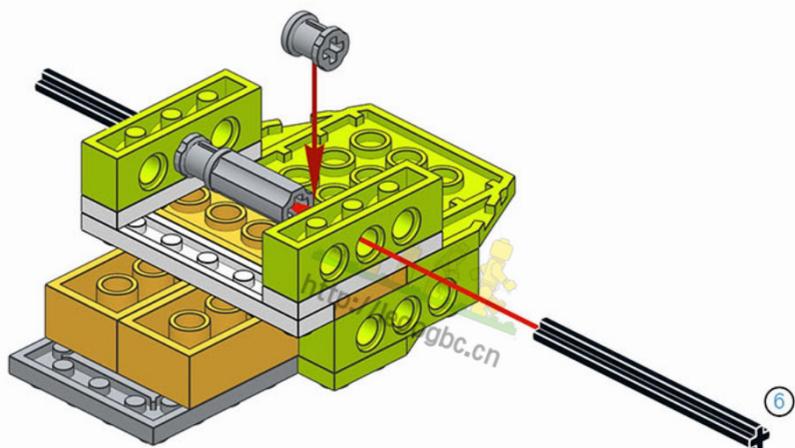




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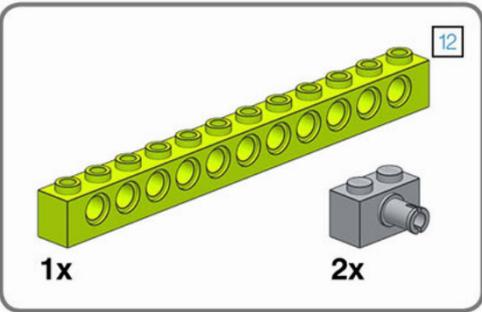
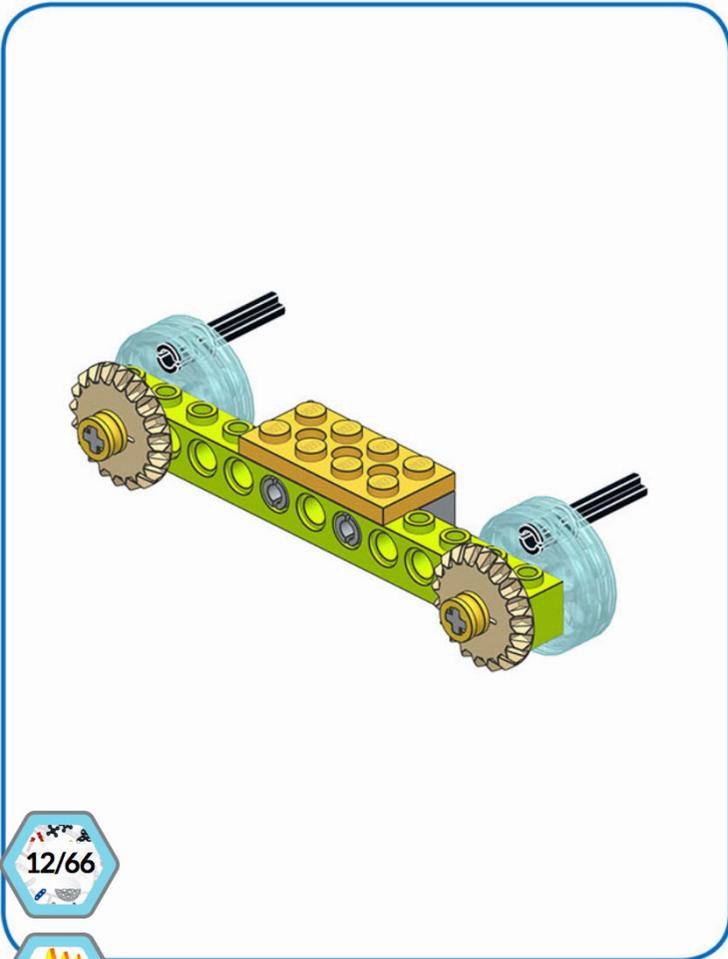


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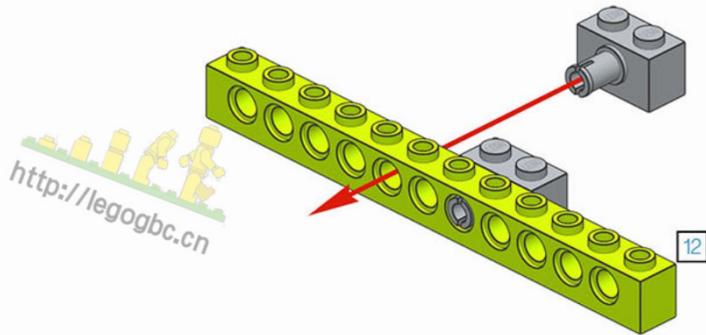




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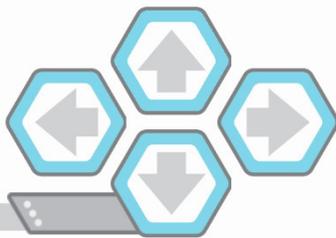
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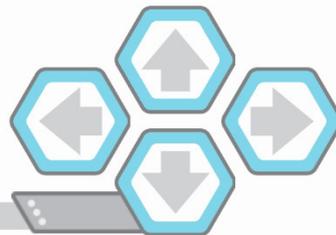
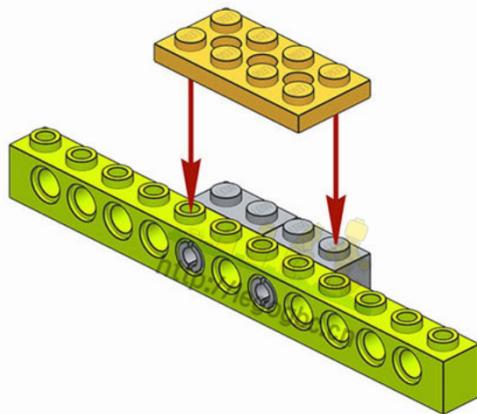


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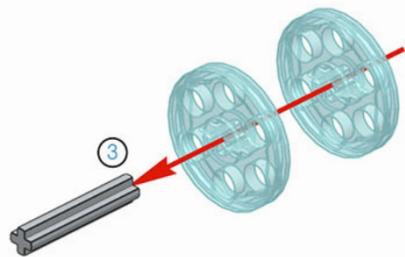
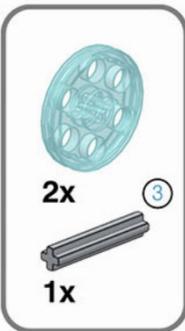
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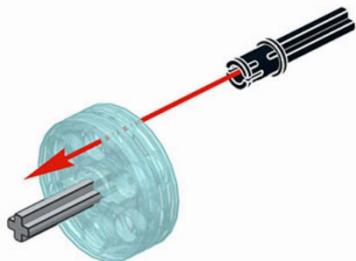
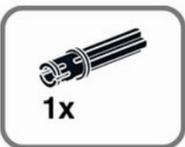




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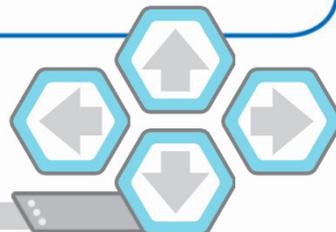
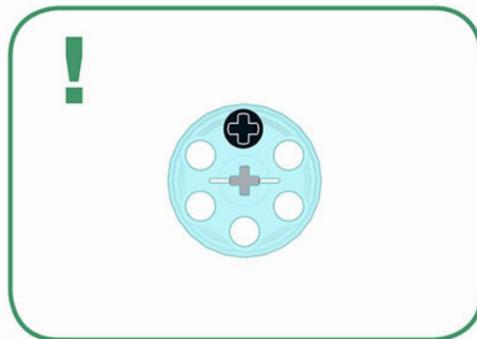


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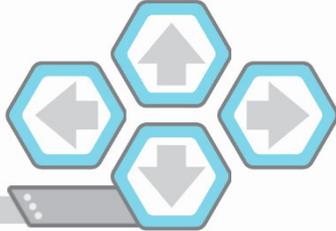
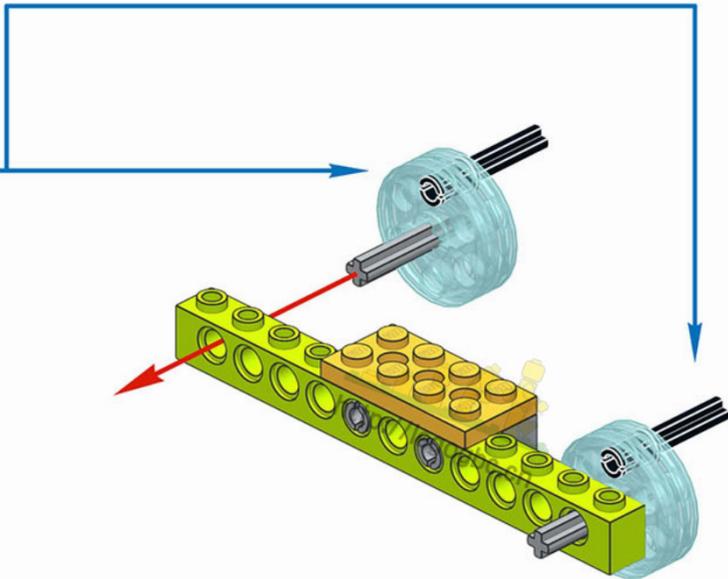


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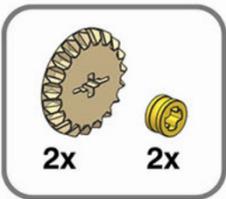
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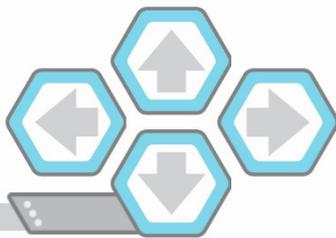
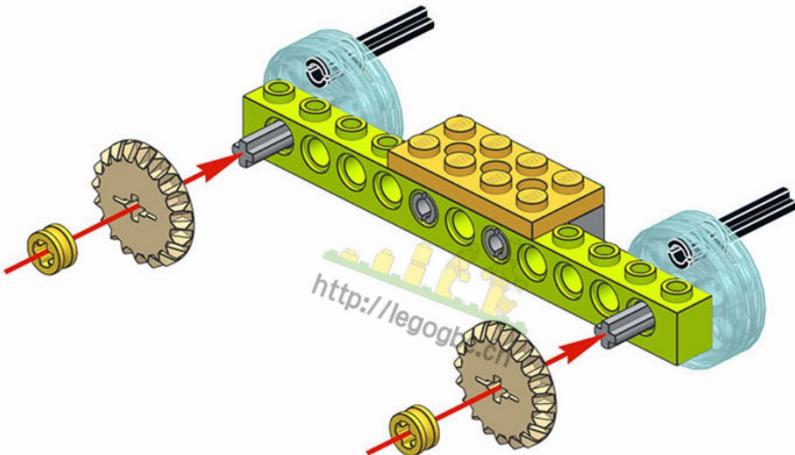




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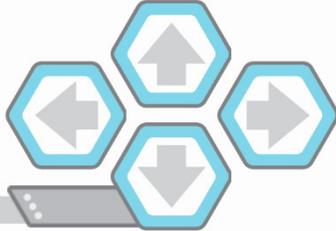
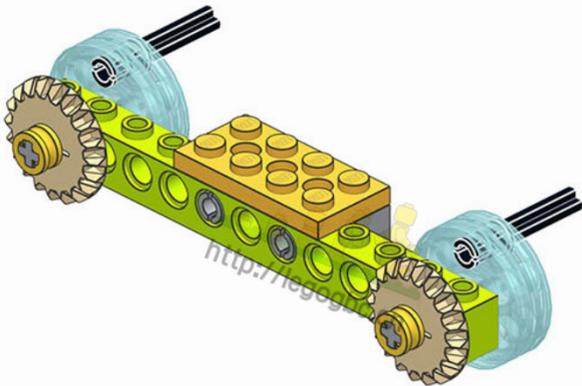
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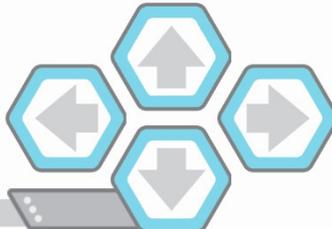
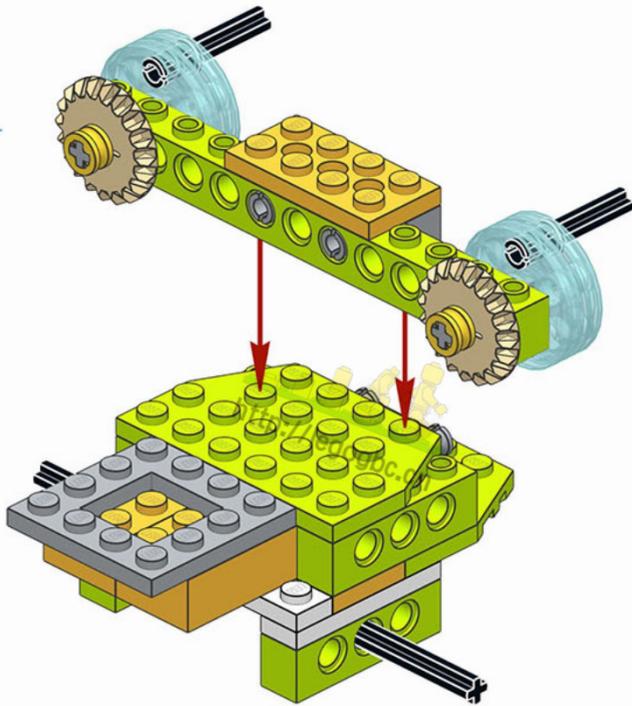
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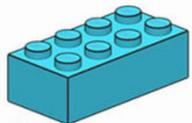
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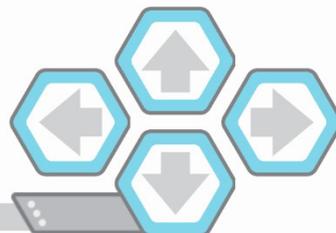
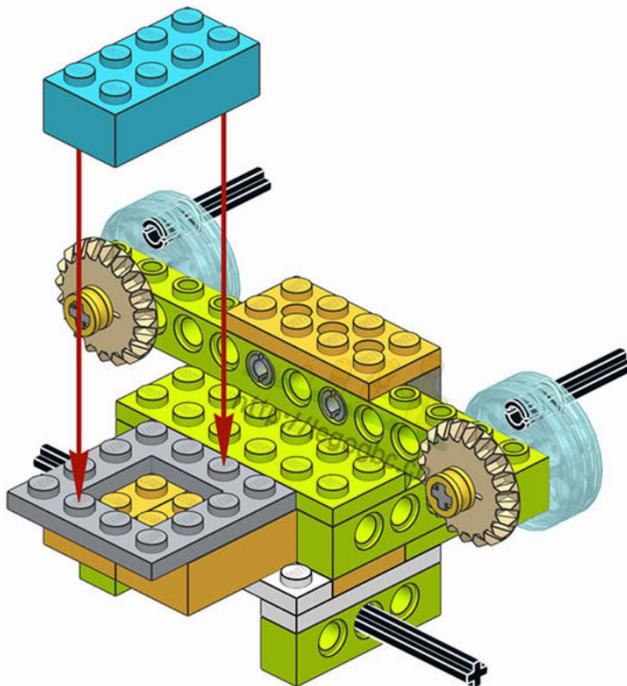


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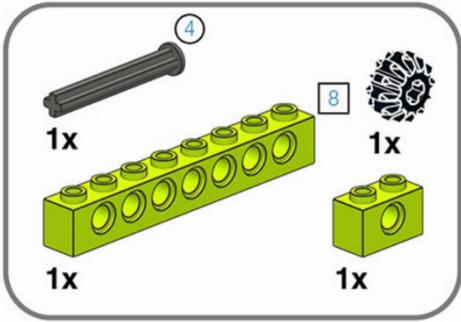
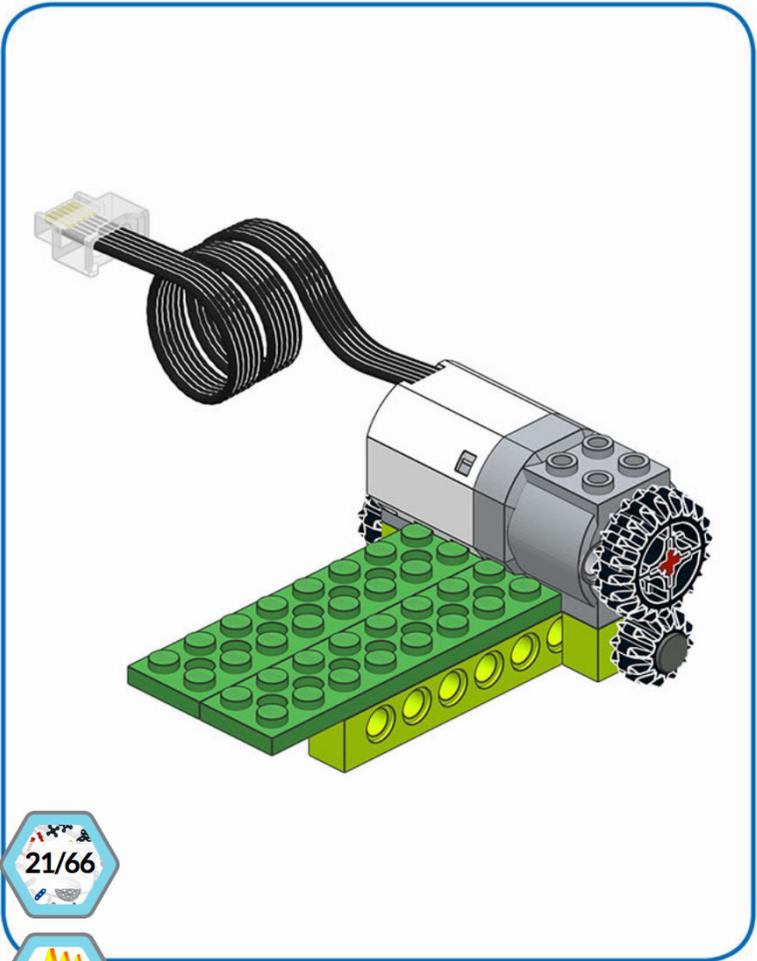
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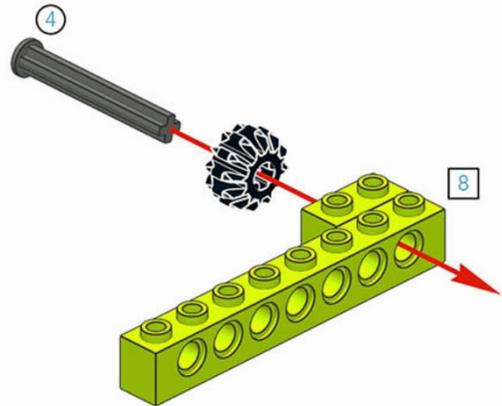


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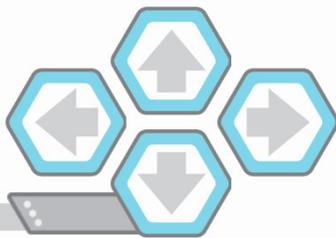
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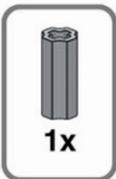
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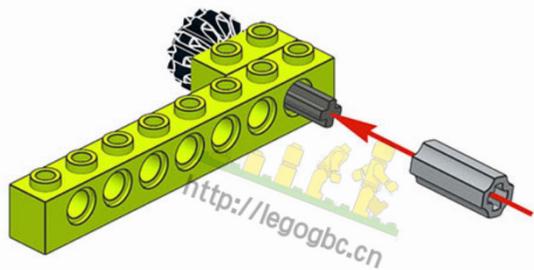


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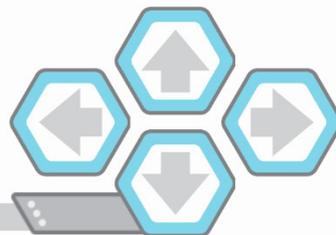
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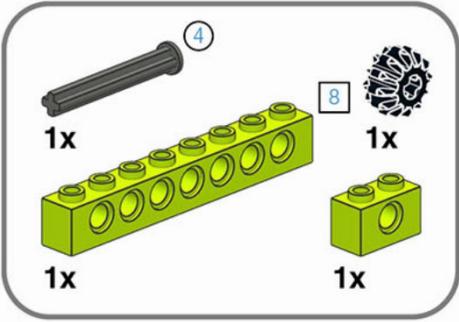


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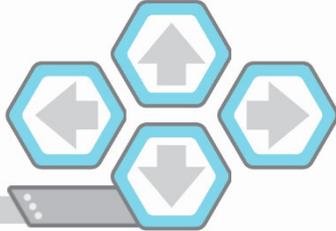
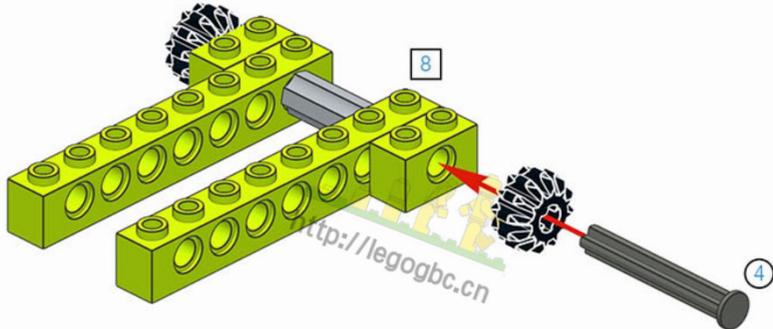




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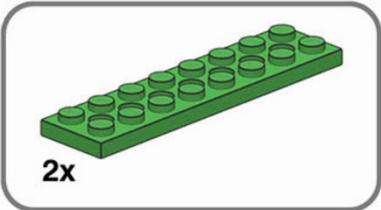


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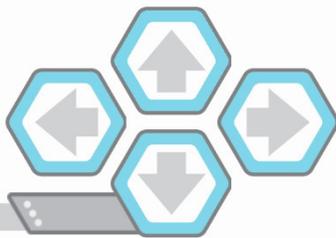
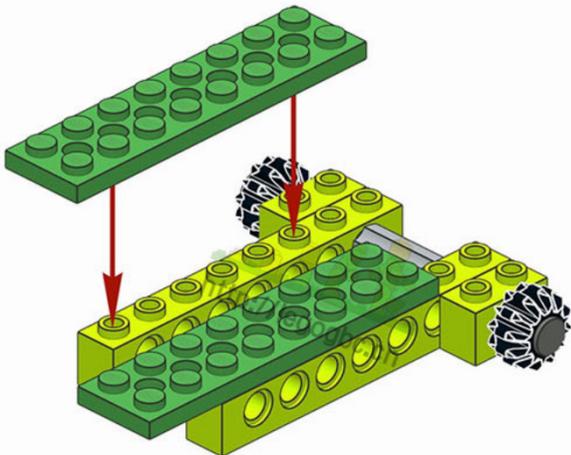




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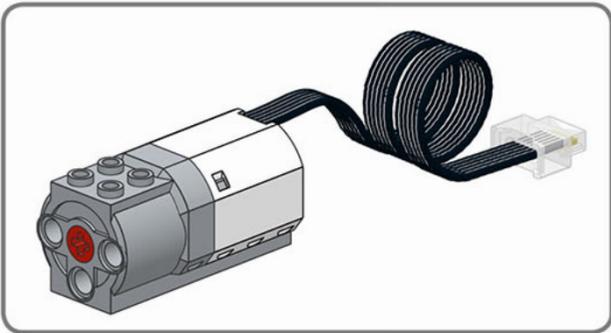


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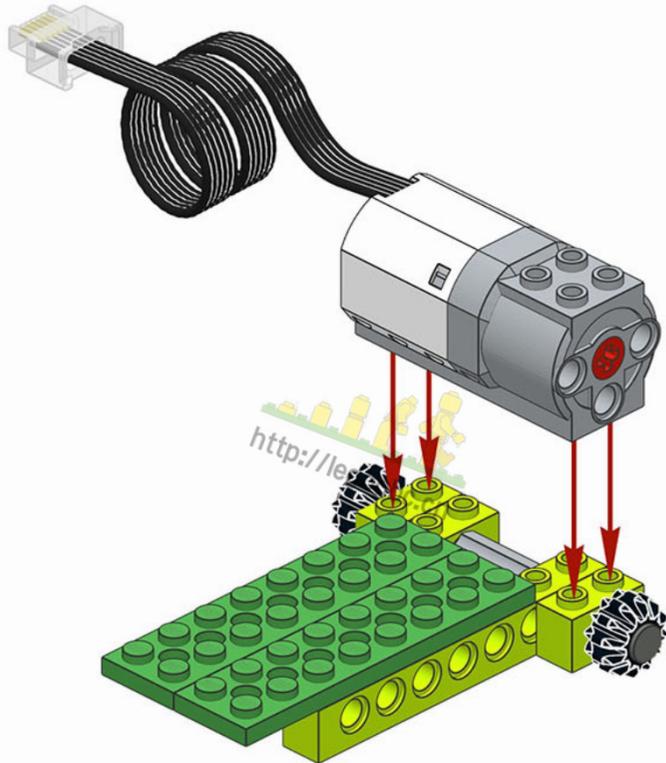




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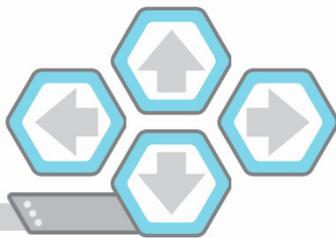
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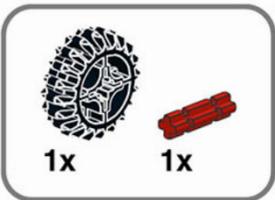
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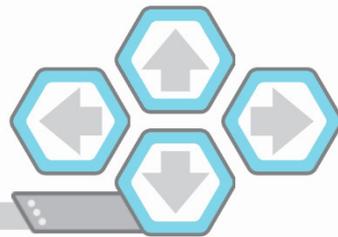
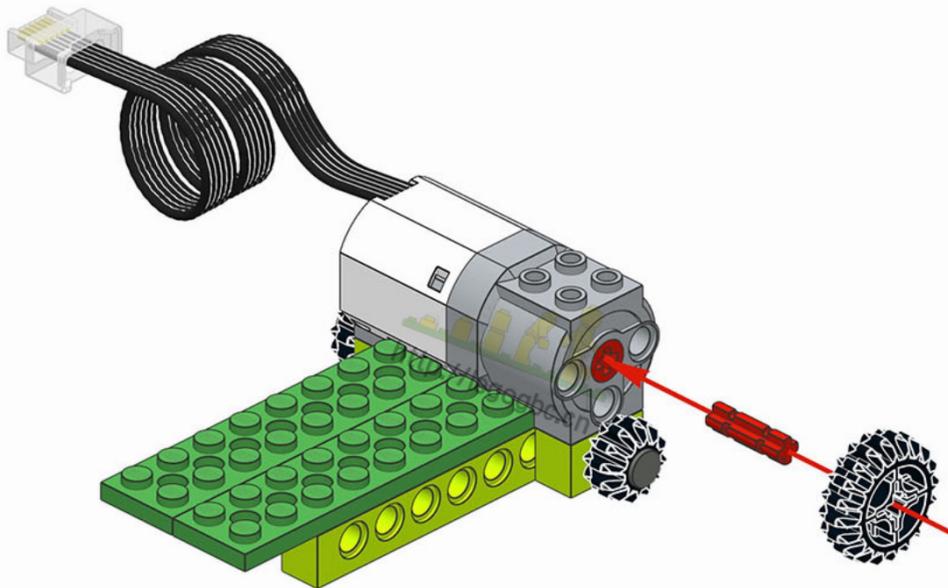




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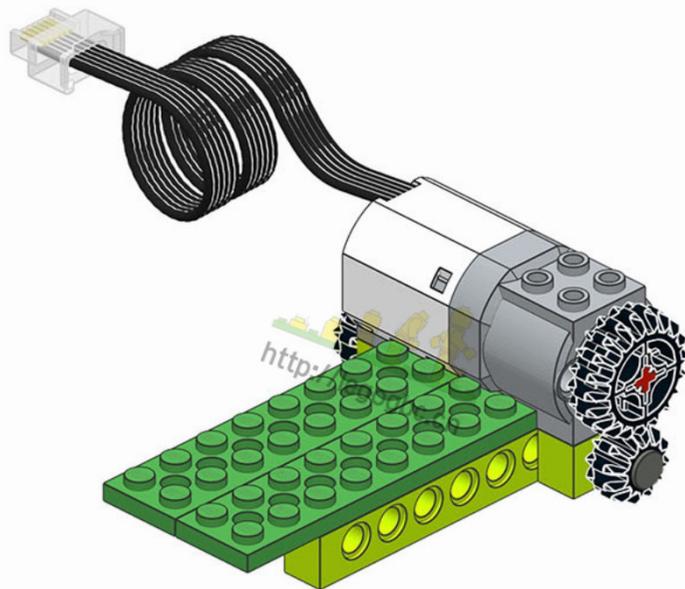
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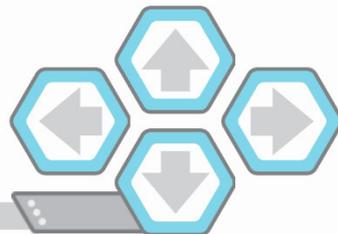


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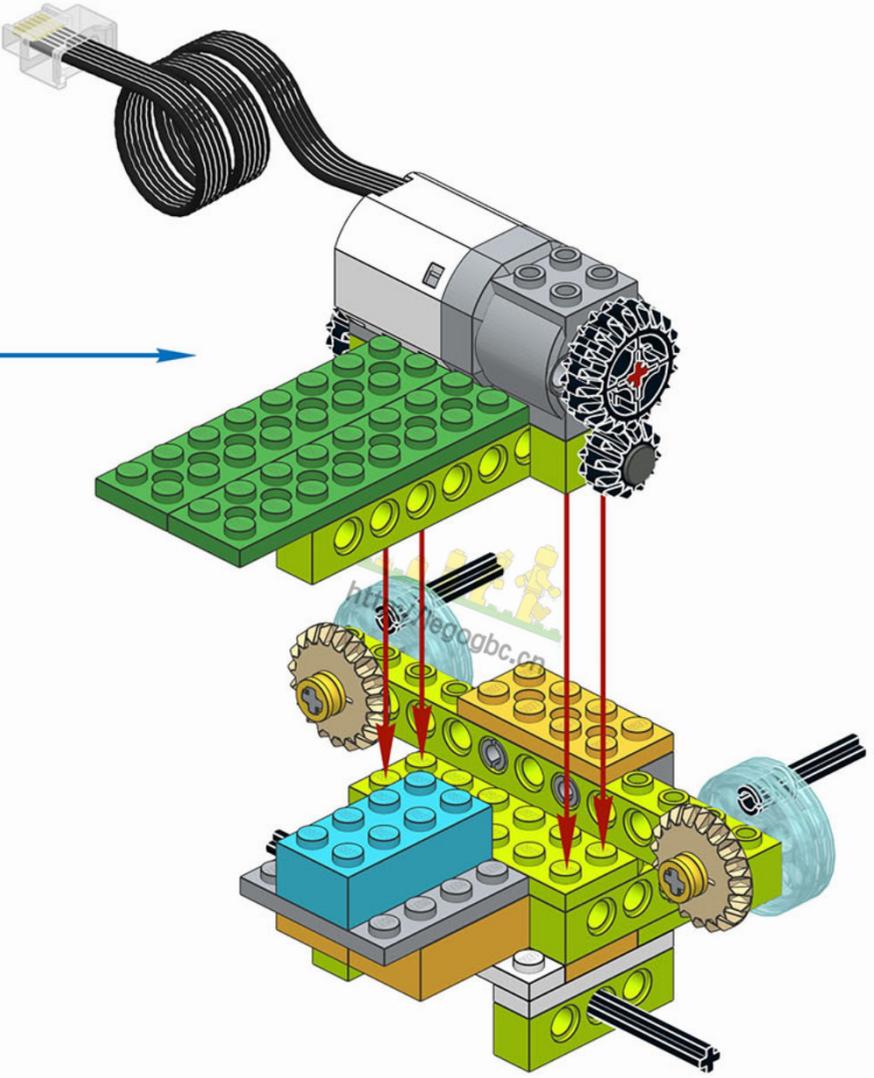
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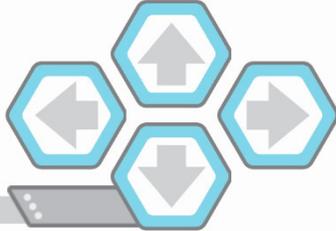
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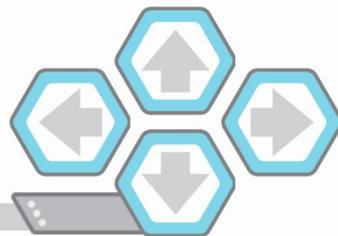
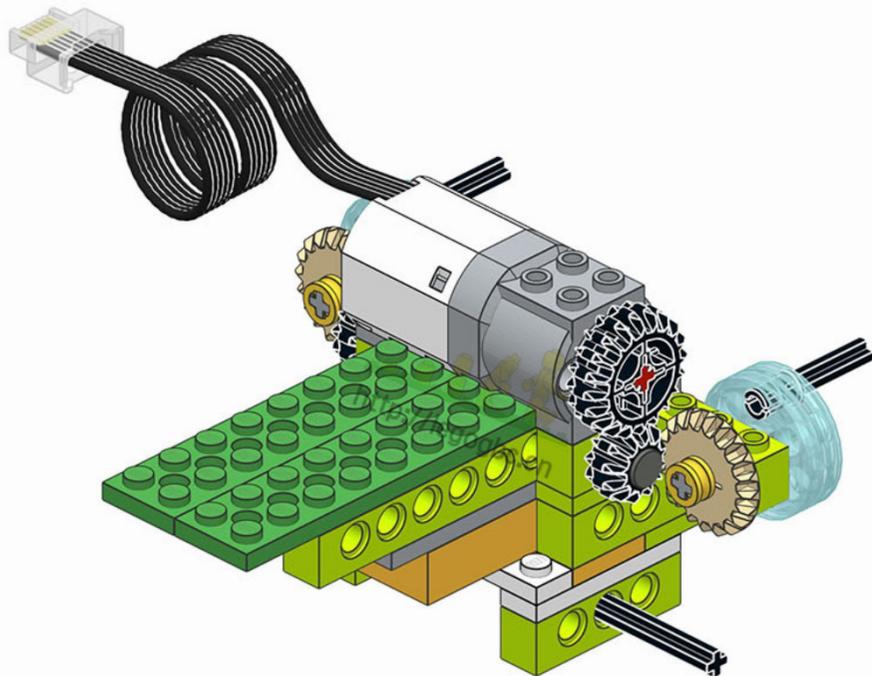
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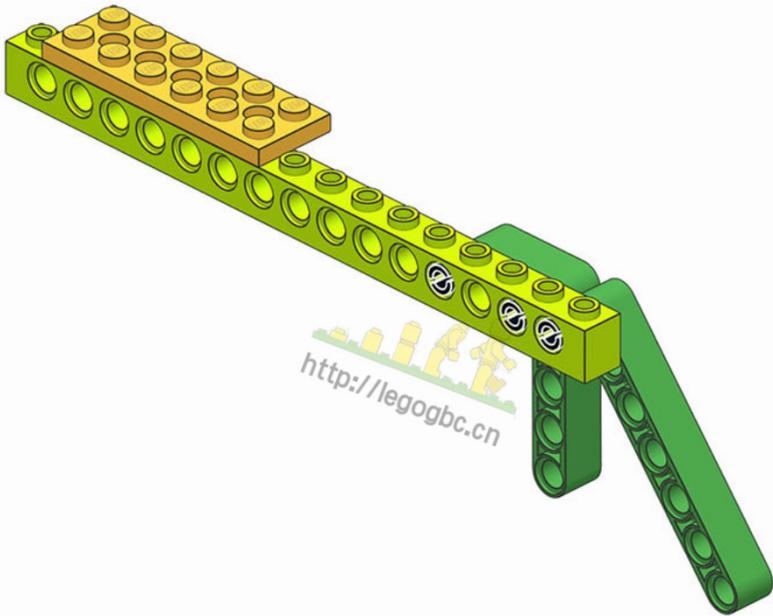
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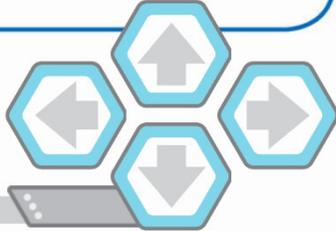
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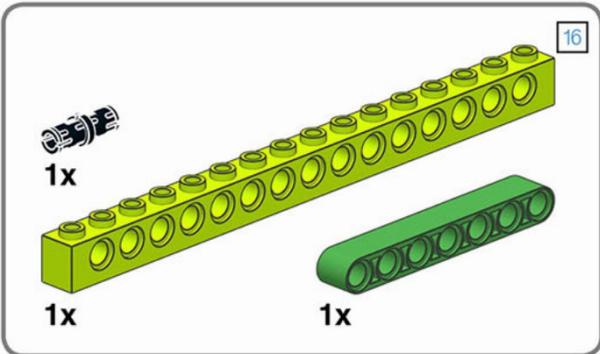
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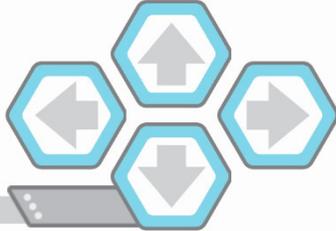
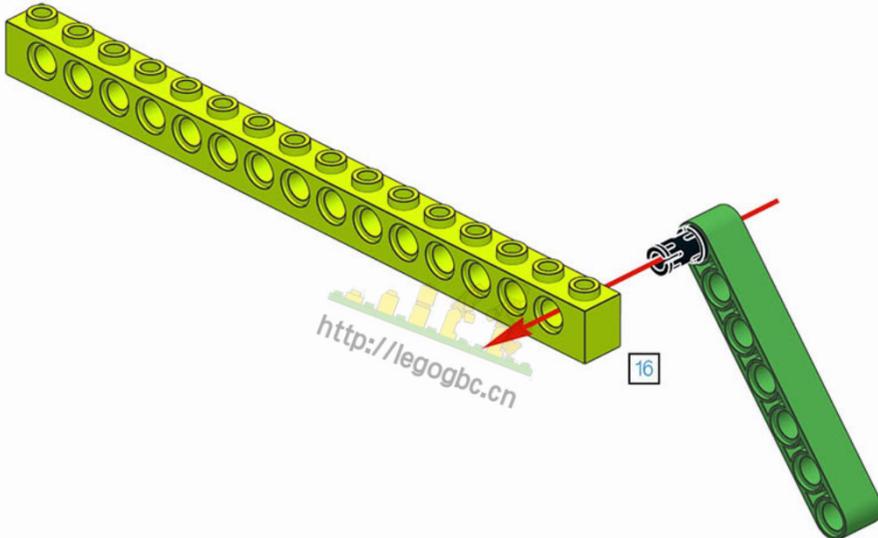




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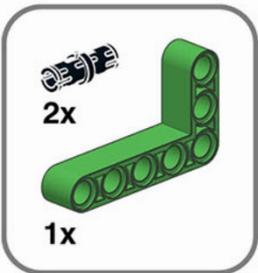


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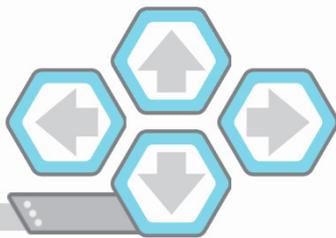
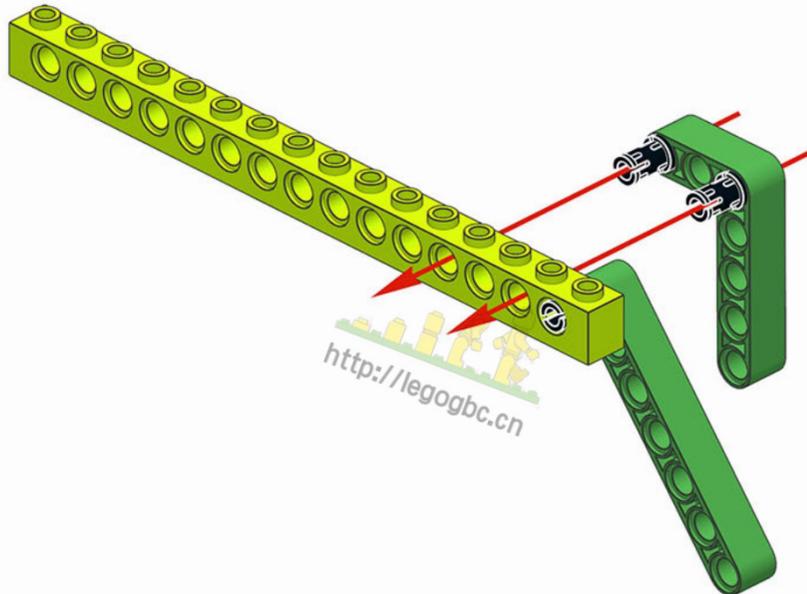




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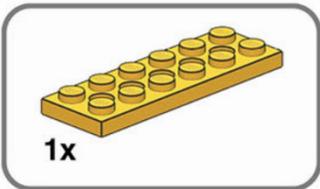


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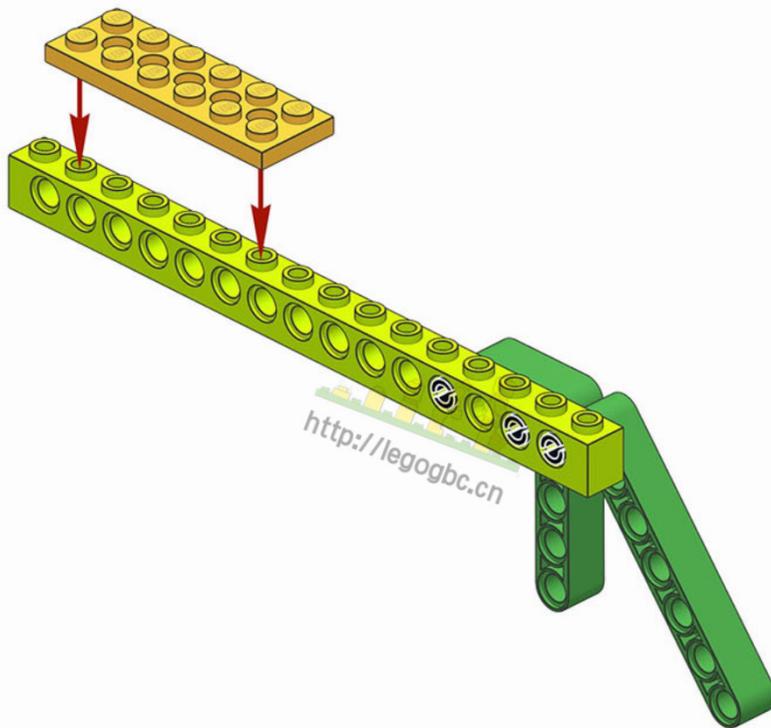


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1x

33



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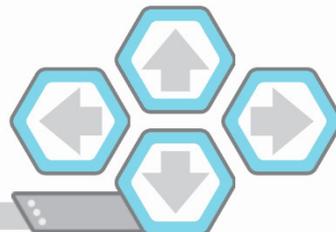
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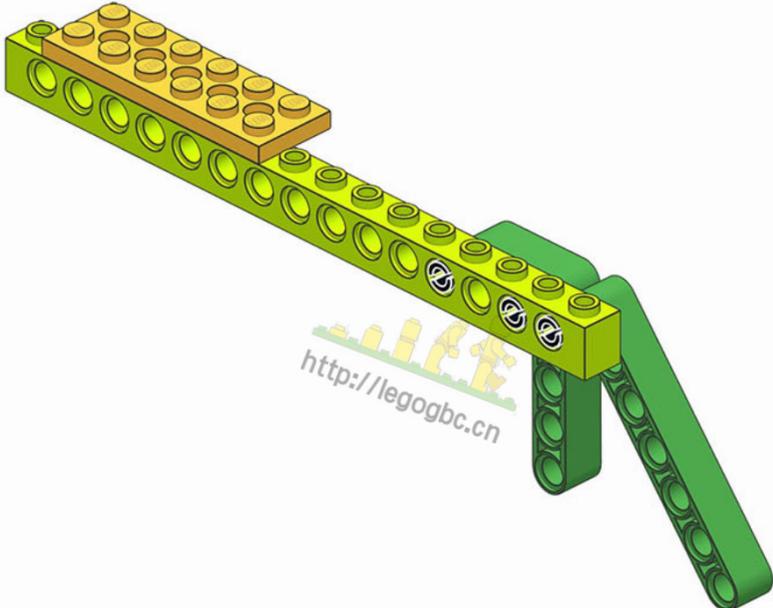
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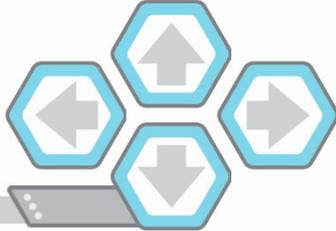


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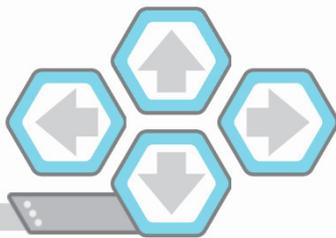
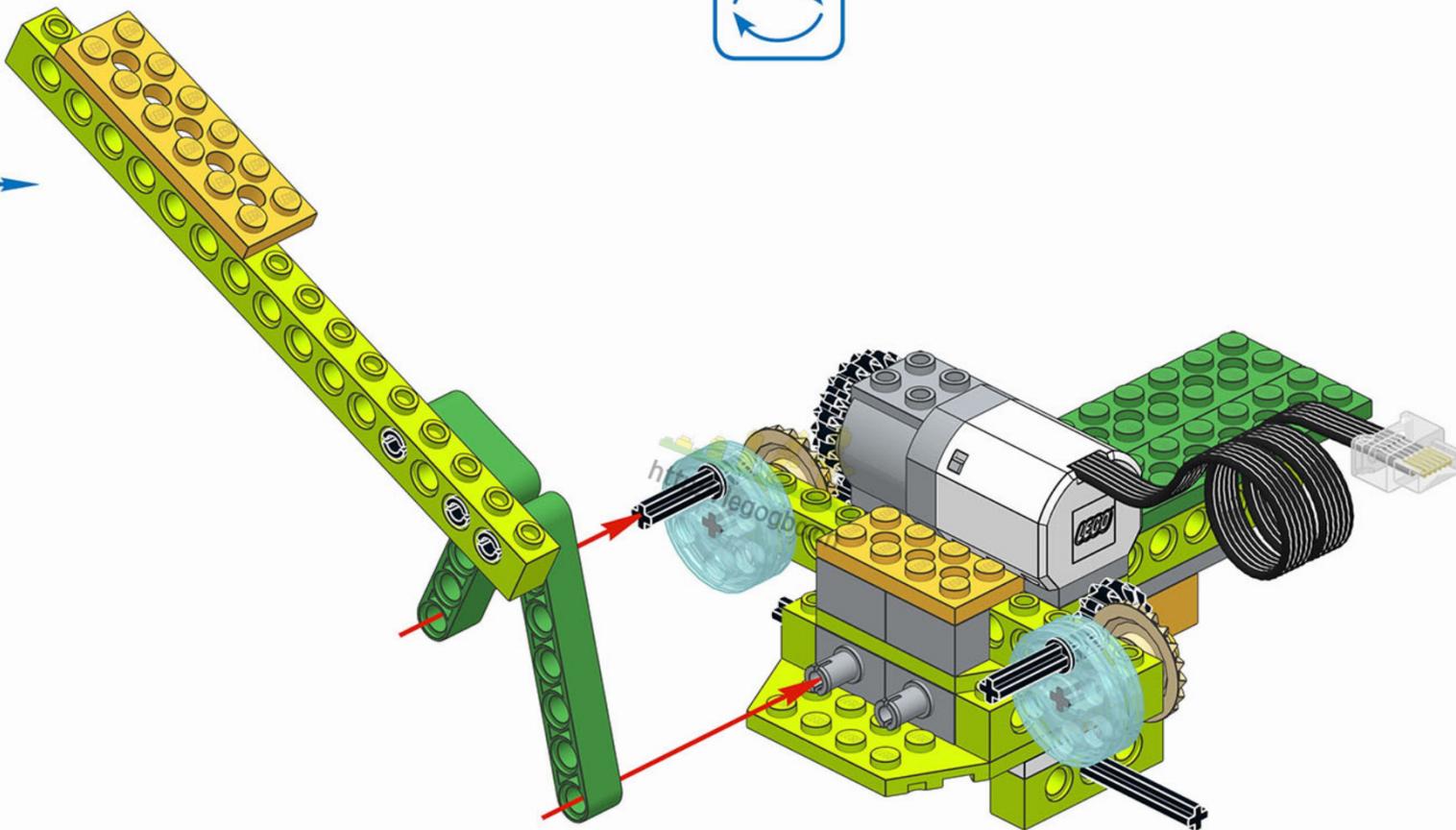




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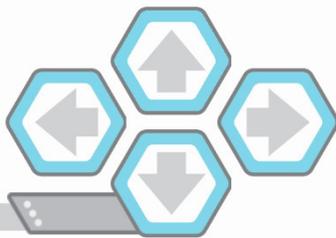
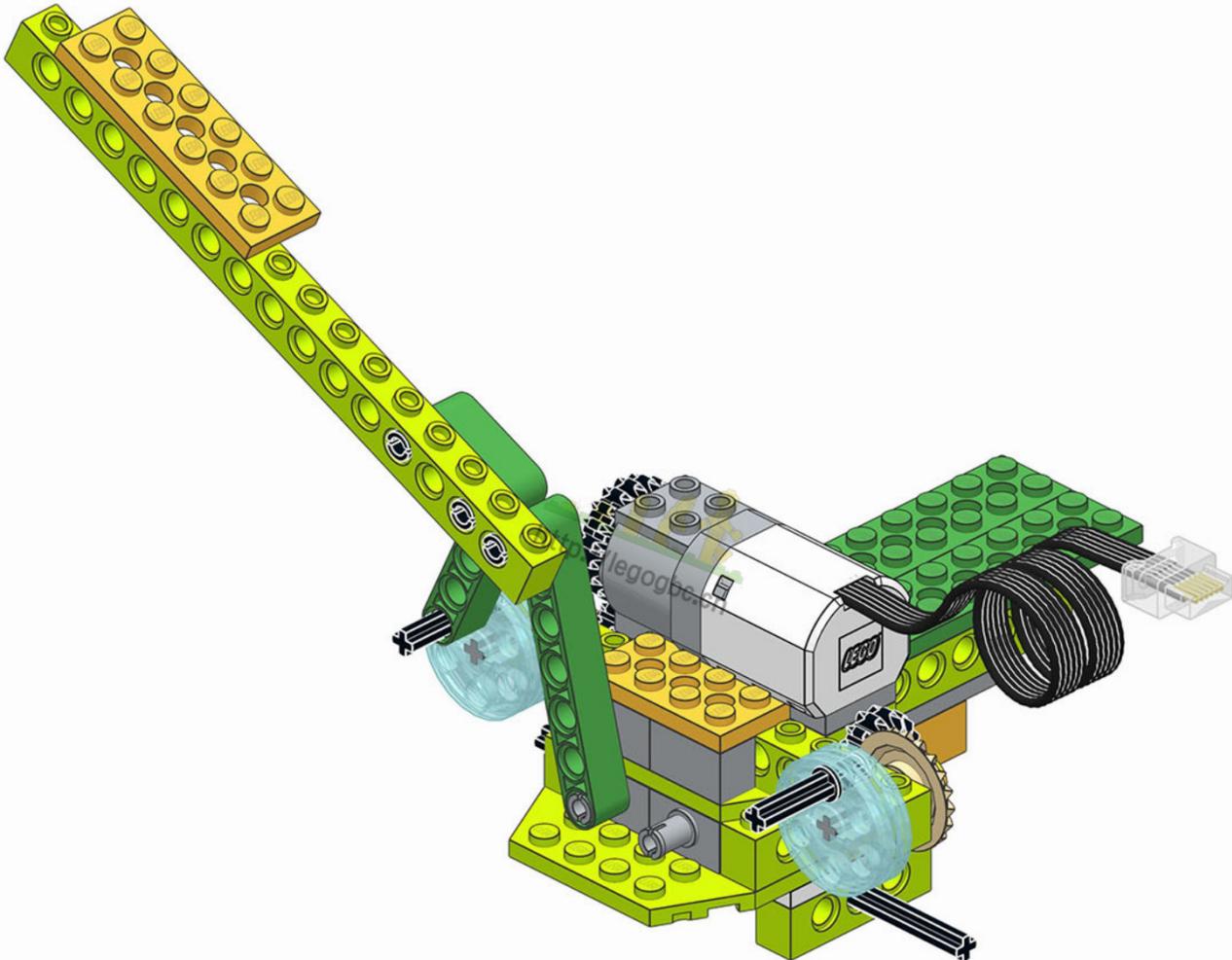
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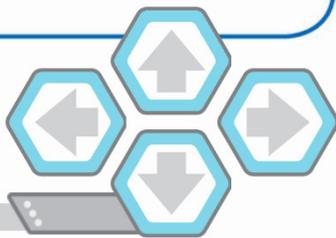
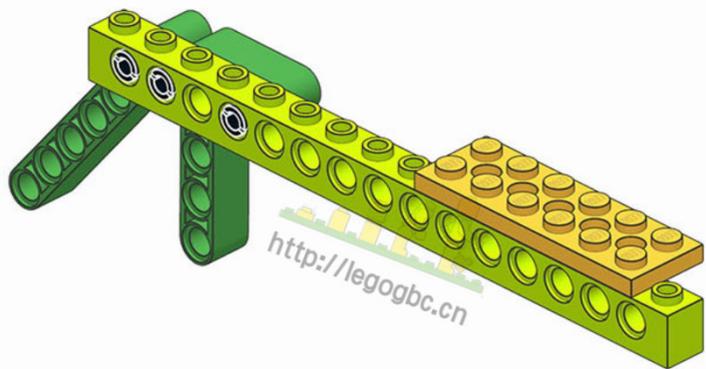
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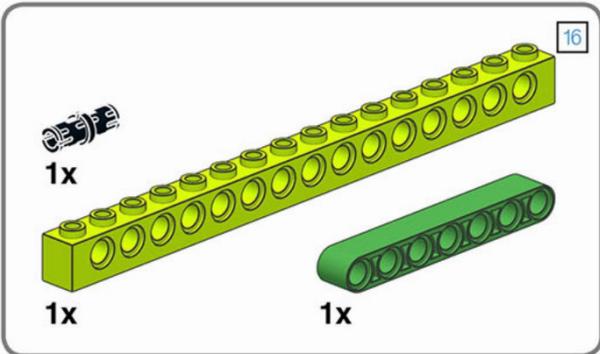


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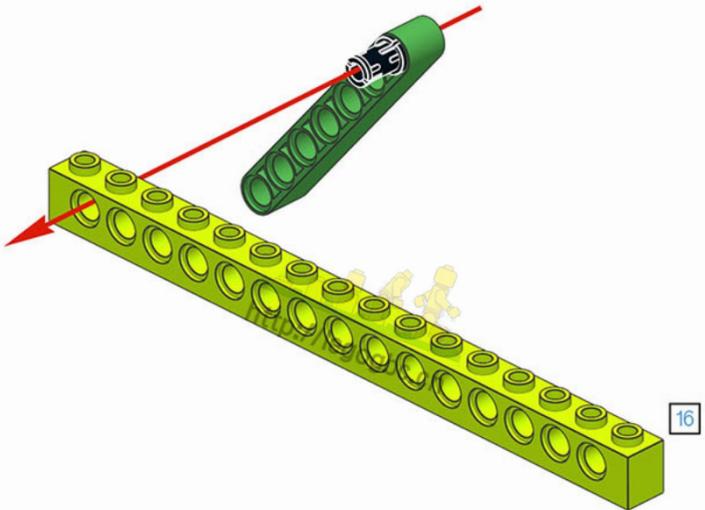




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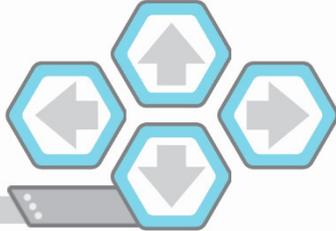
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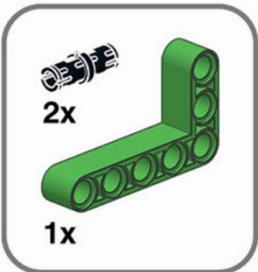
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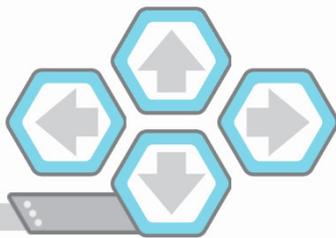
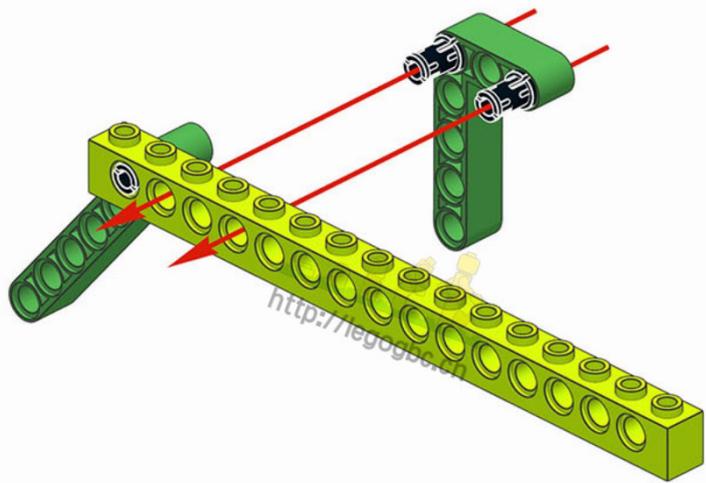




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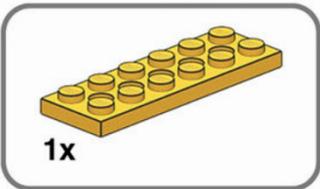


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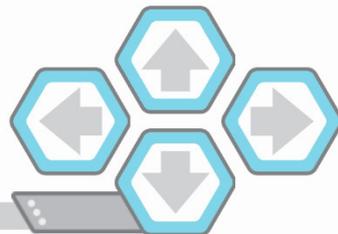
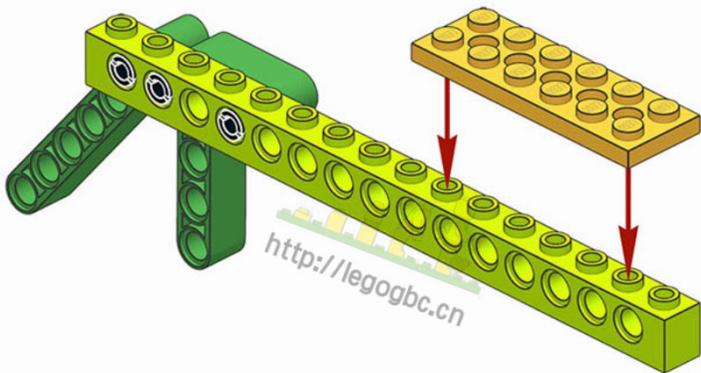


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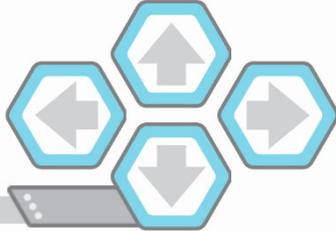
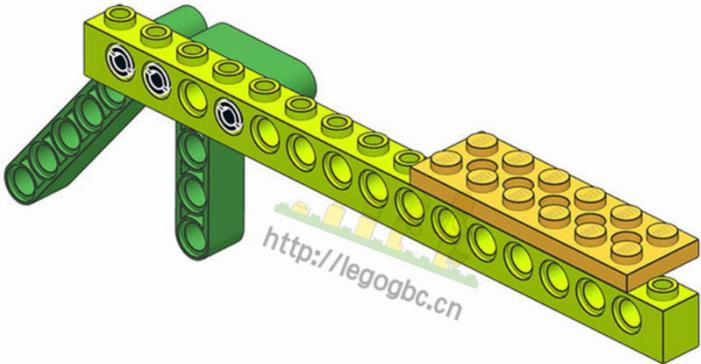
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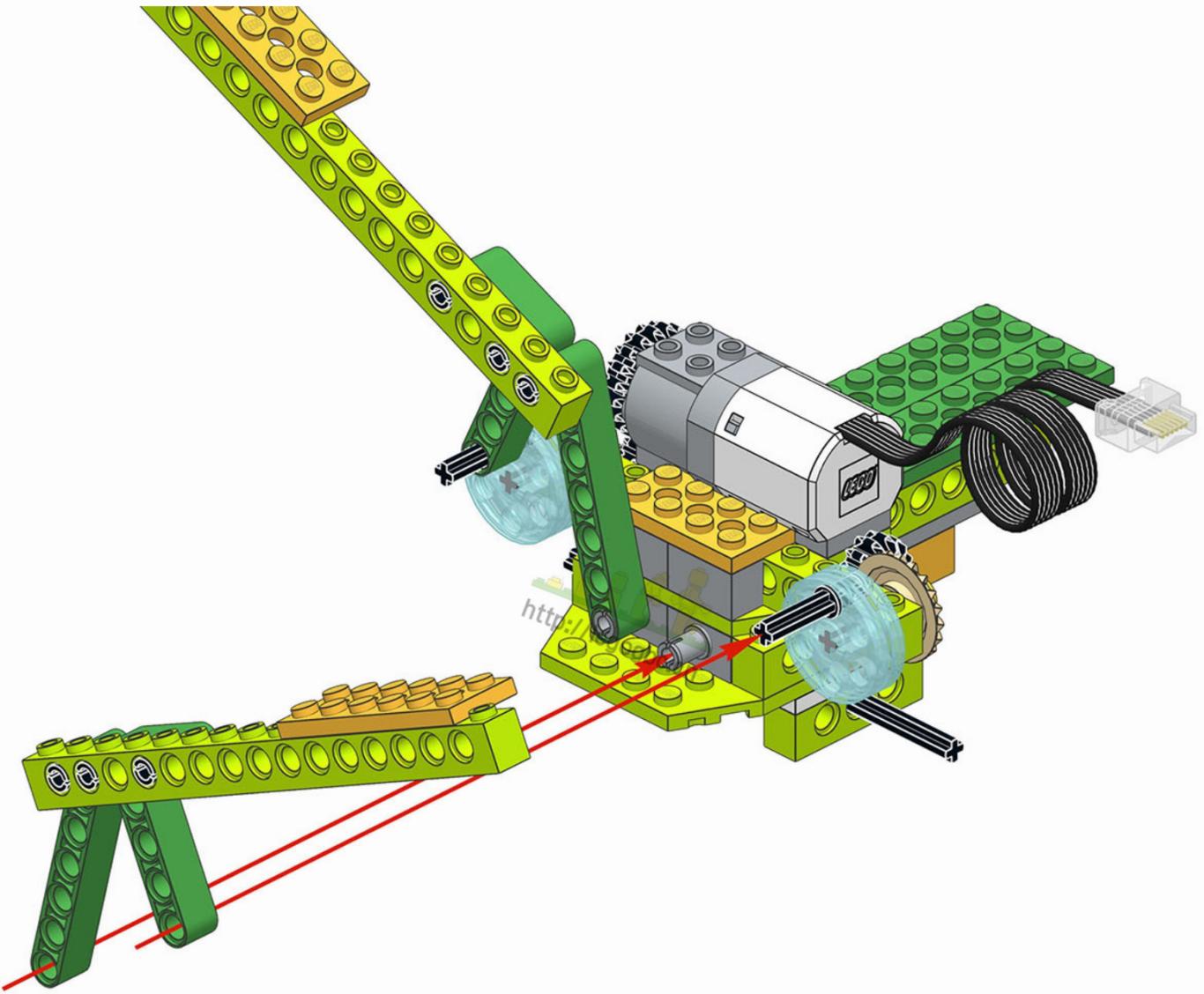
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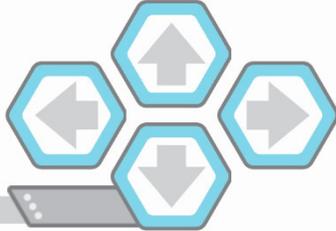
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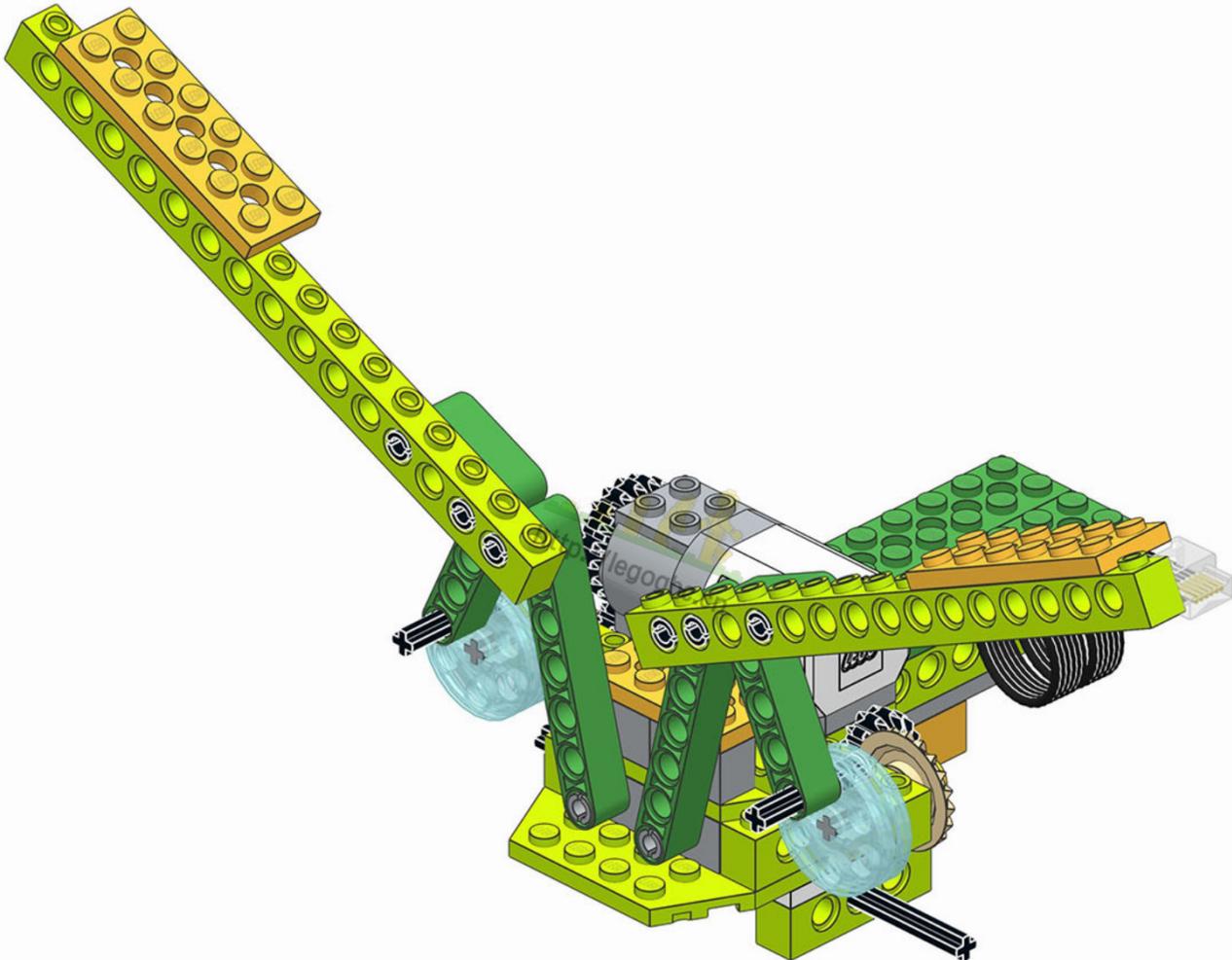
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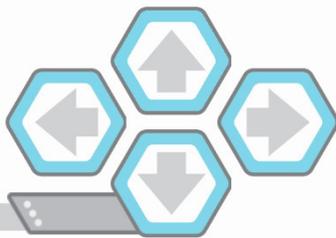
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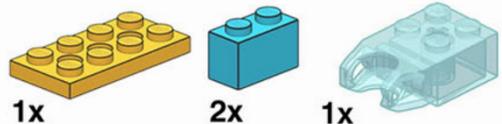
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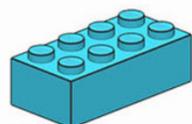
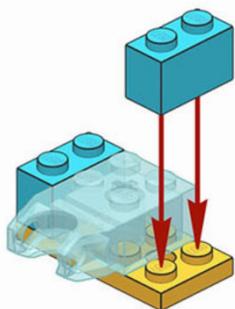




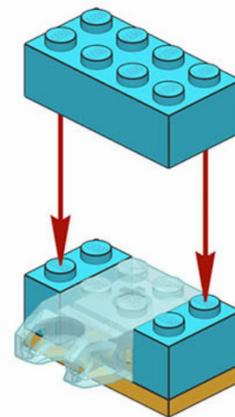
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1



2

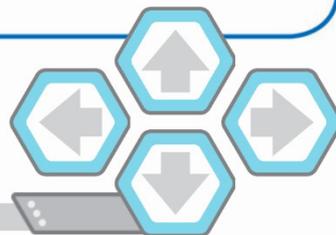


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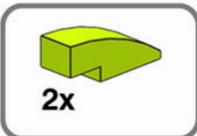
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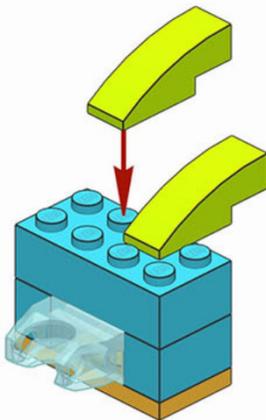




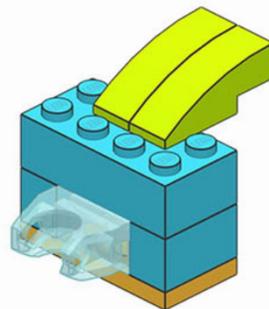
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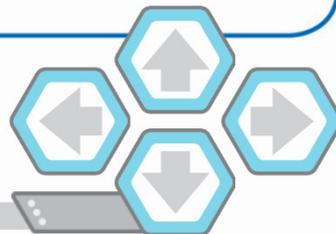
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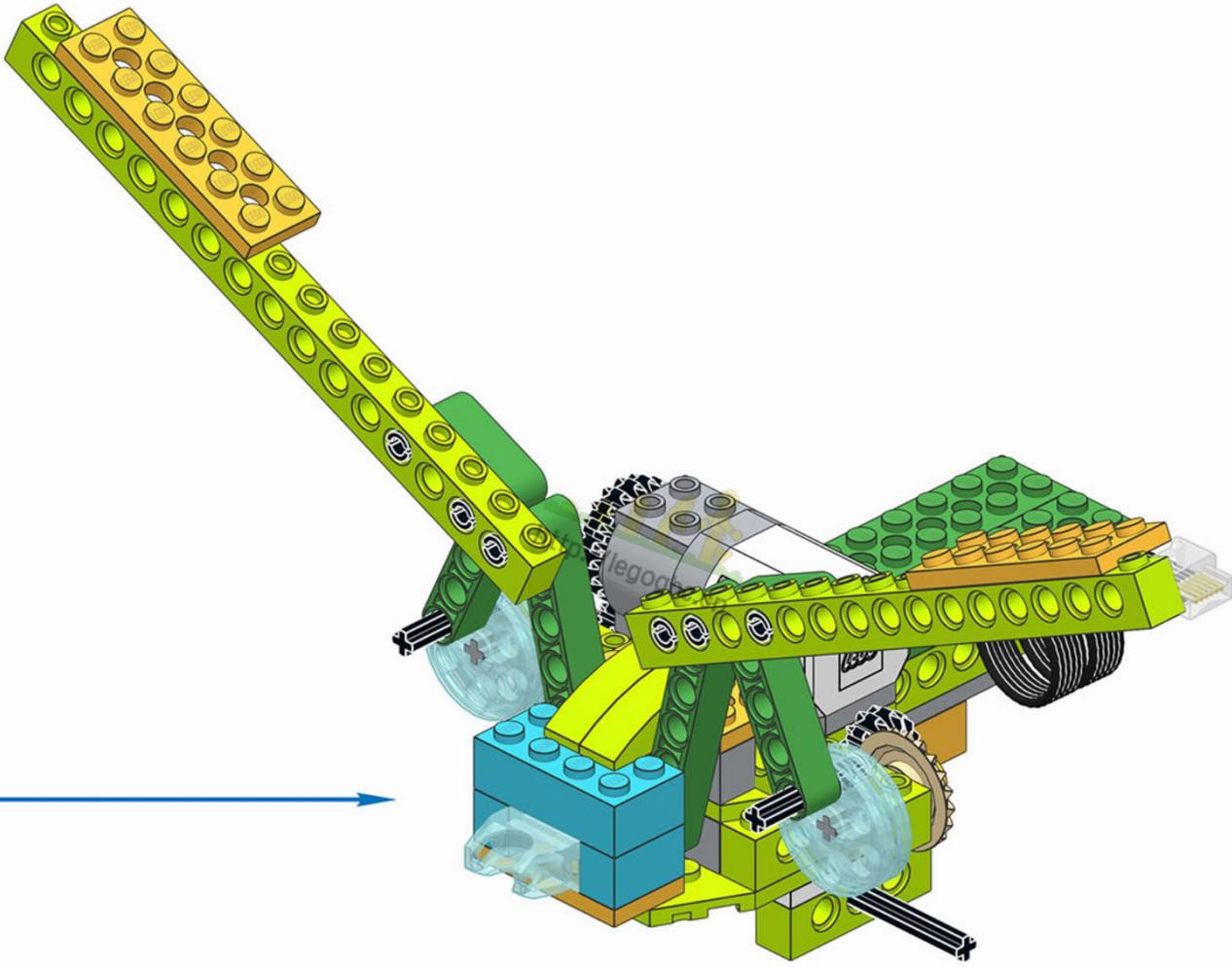
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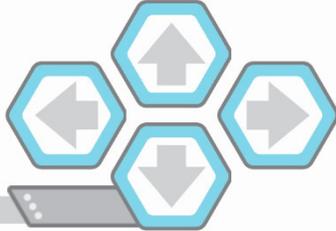
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1x



1x

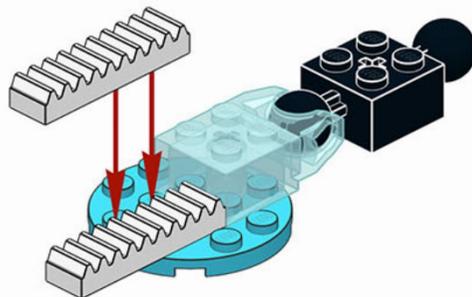
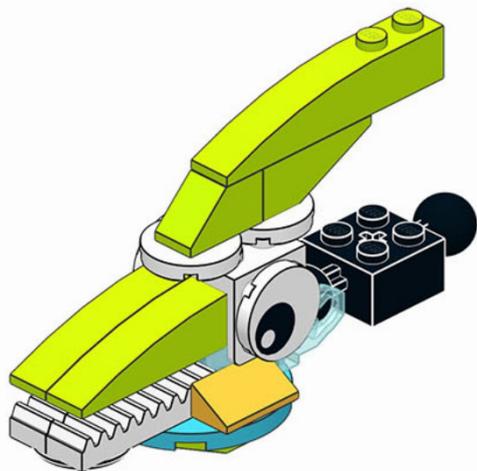


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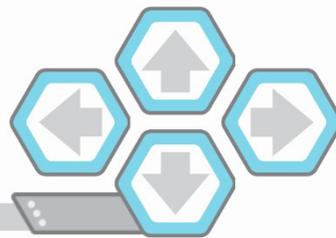


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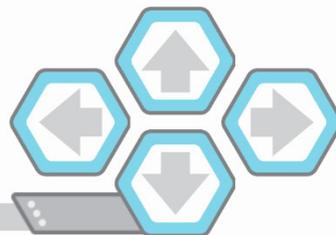
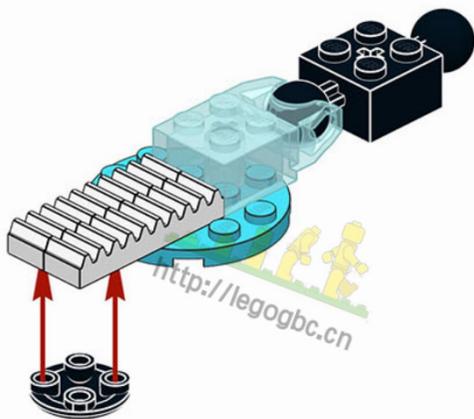


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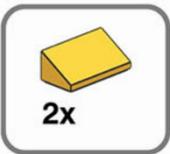
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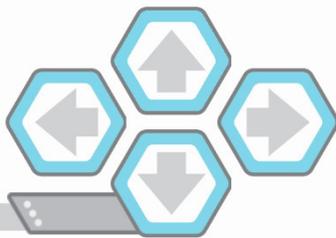
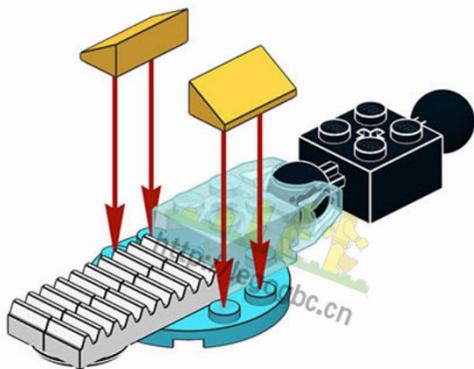




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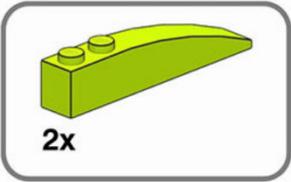


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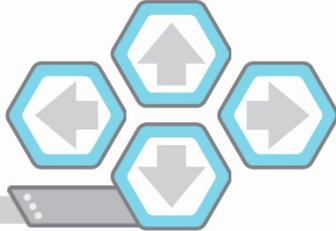
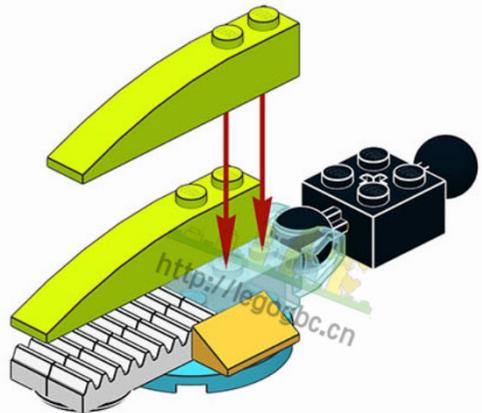


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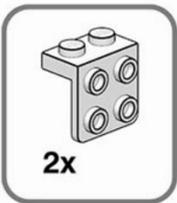
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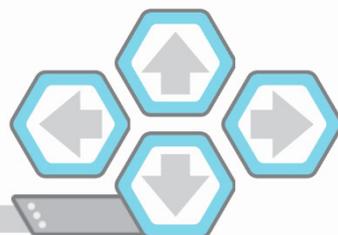
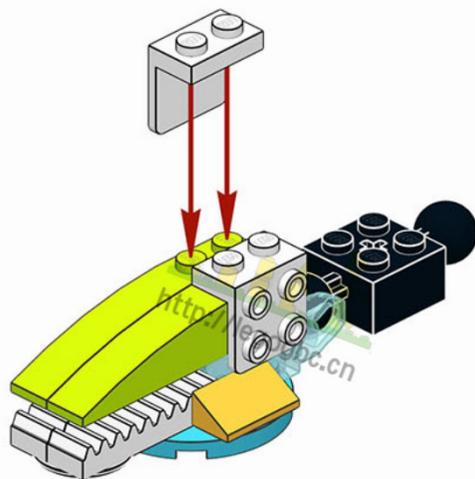


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2x

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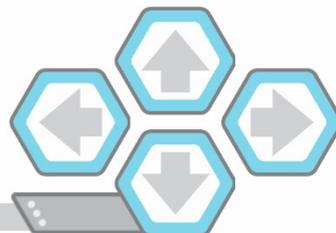
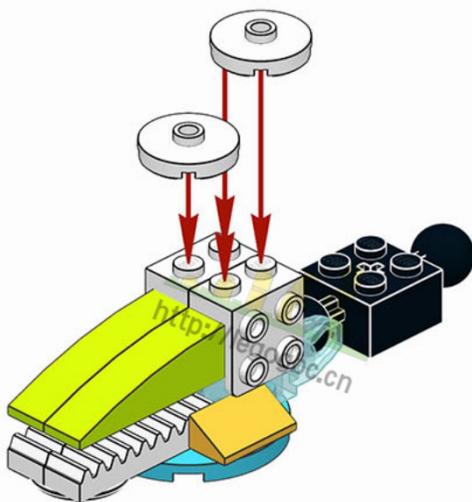


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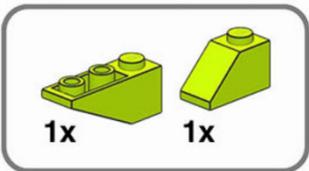
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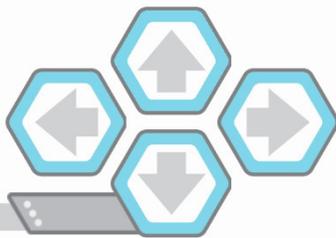
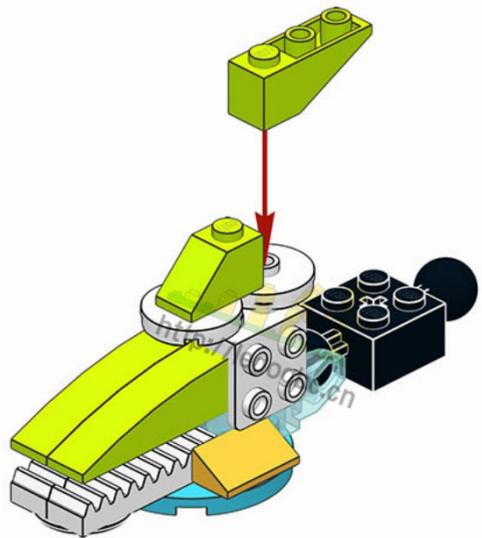
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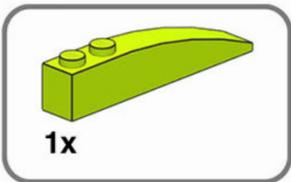
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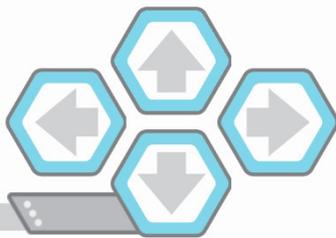
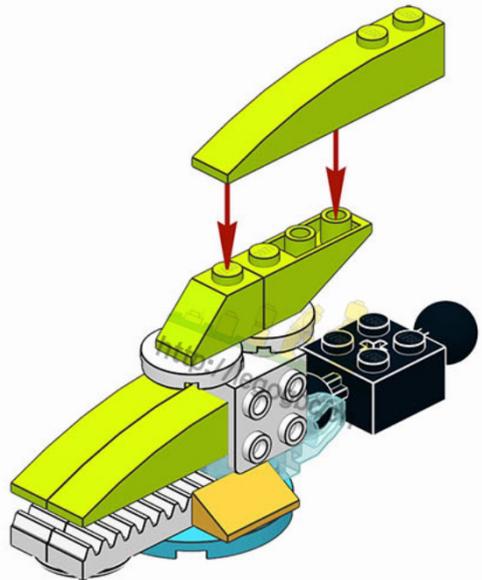




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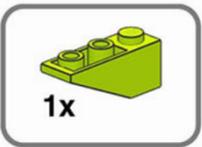


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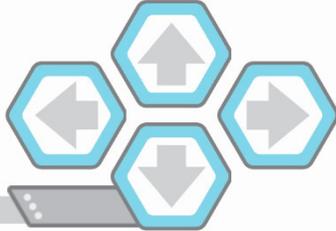
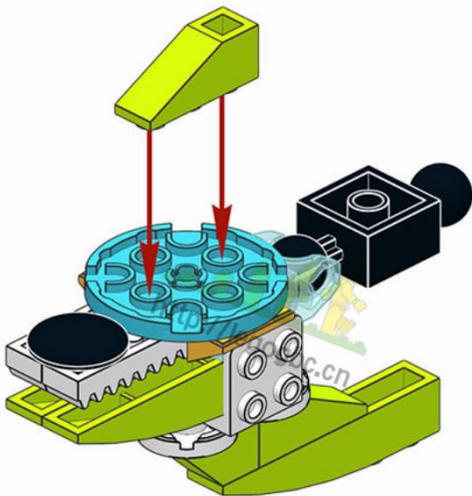




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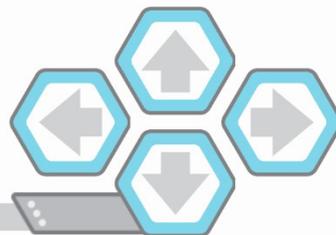
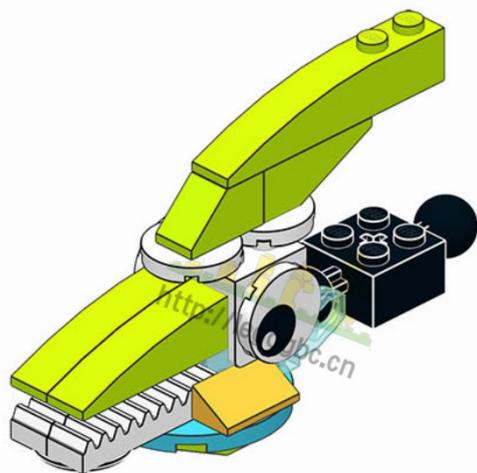




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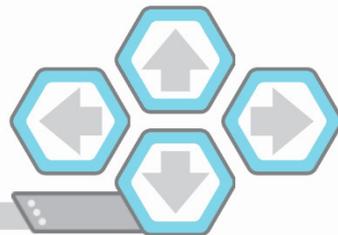
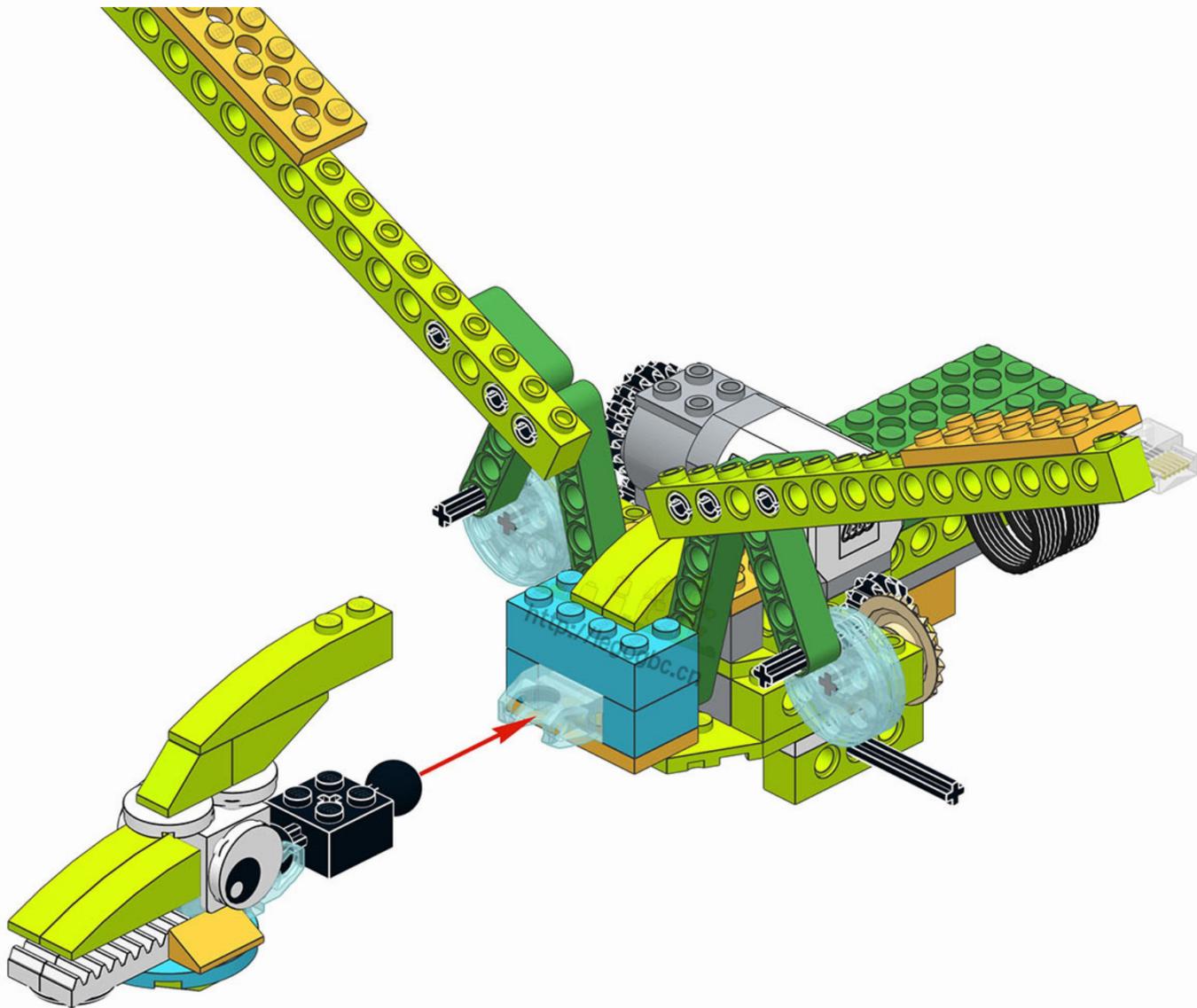
56





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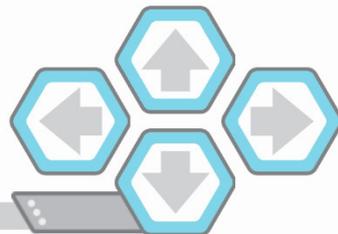
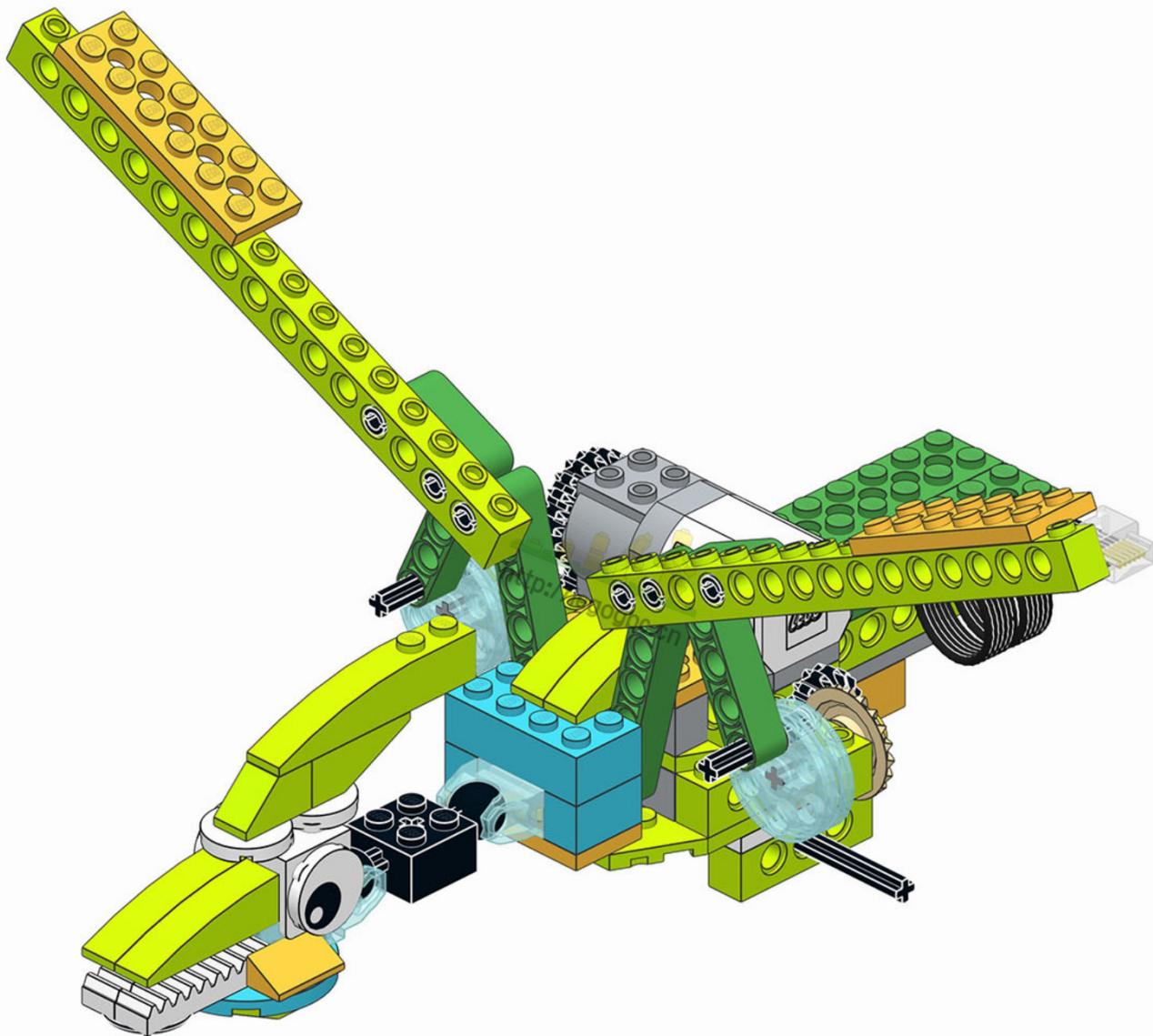
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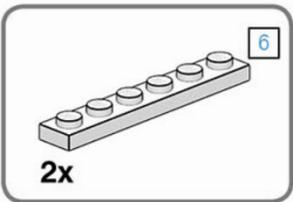
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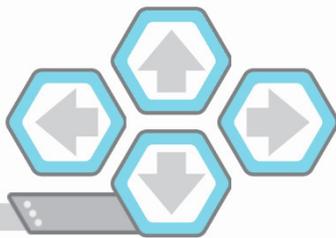
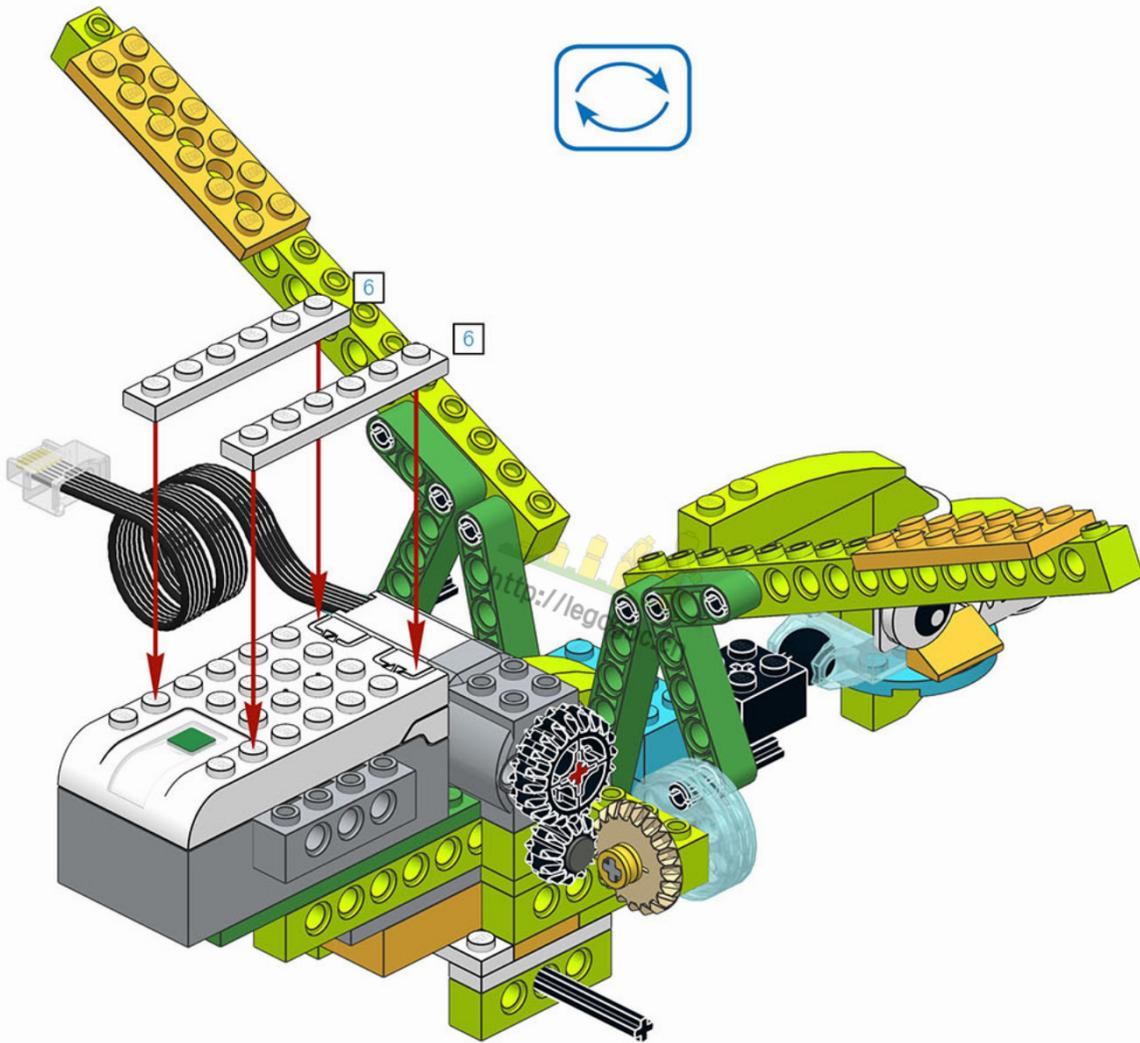




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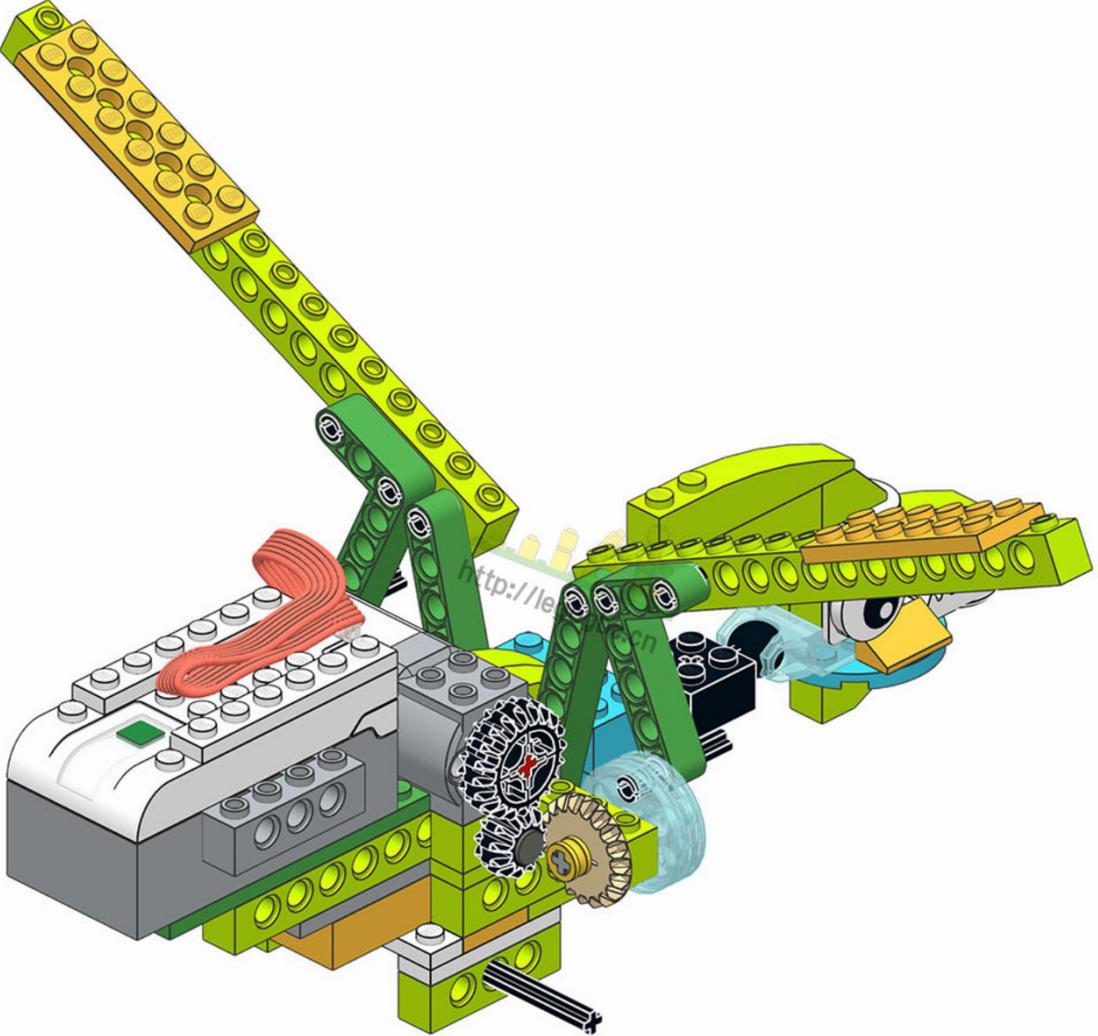
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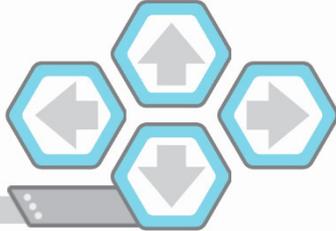
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60/66

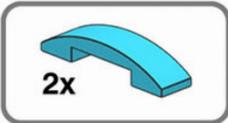
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87

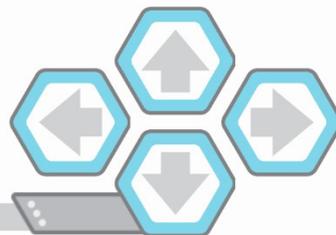
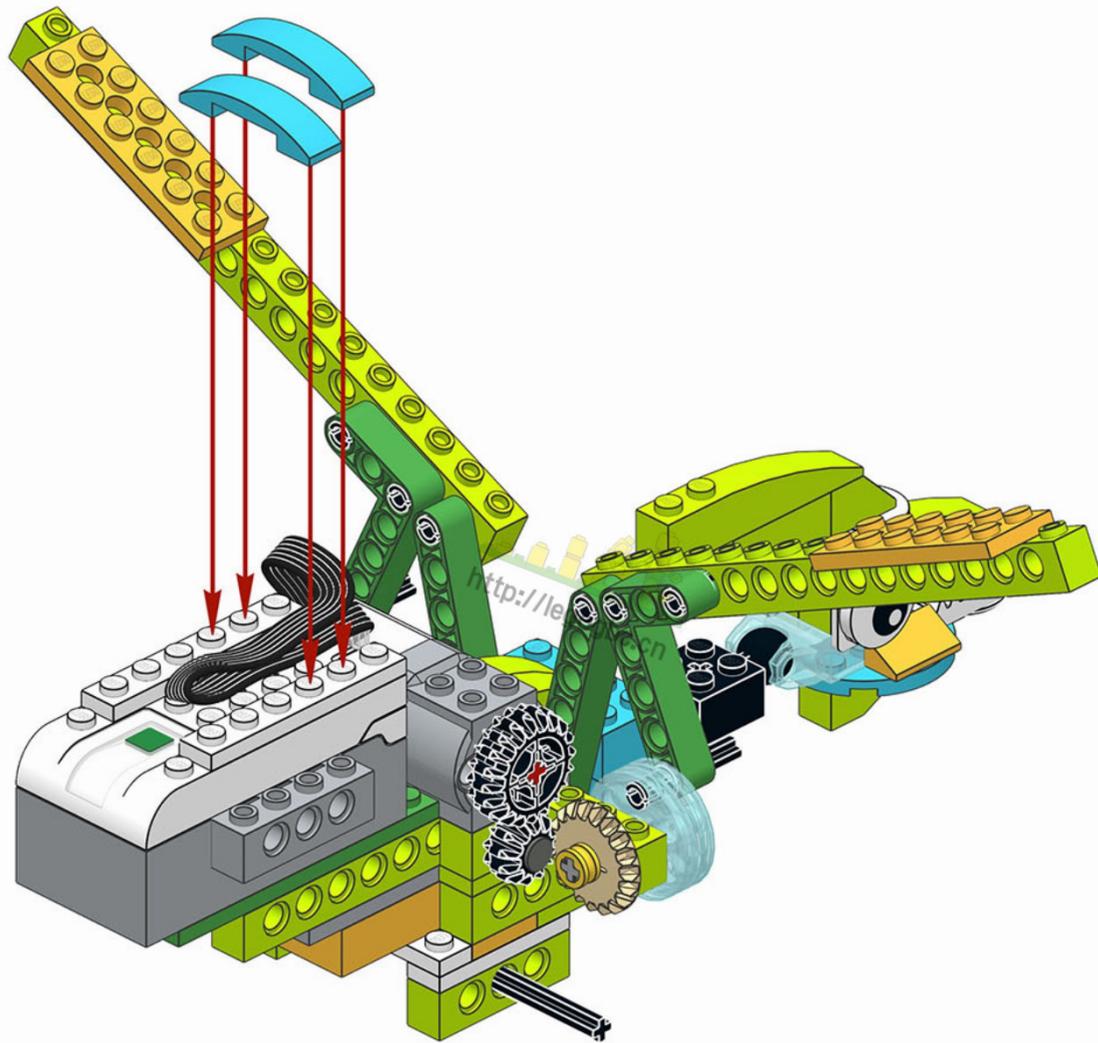




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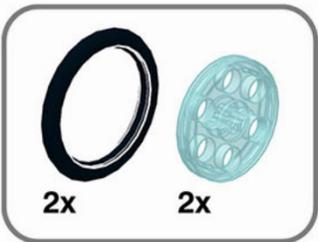


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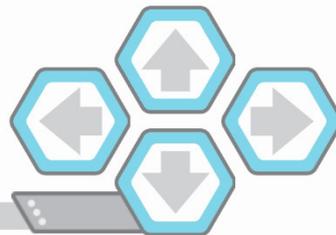
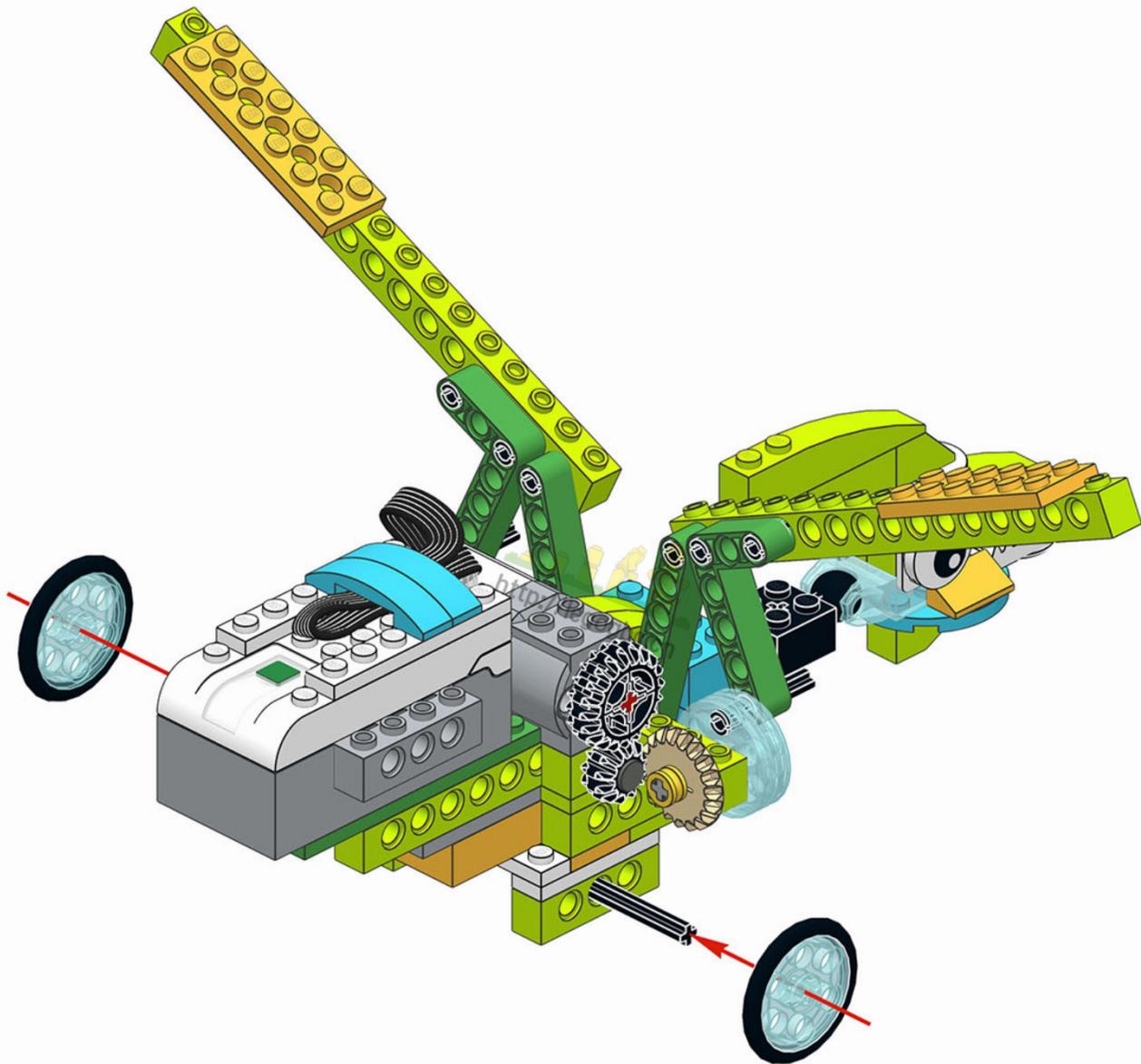




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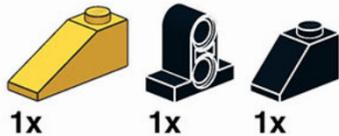


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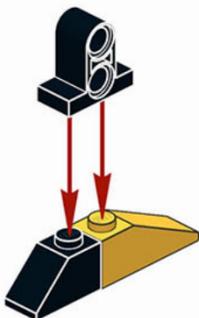


1x

1x

1x

1



2



2x



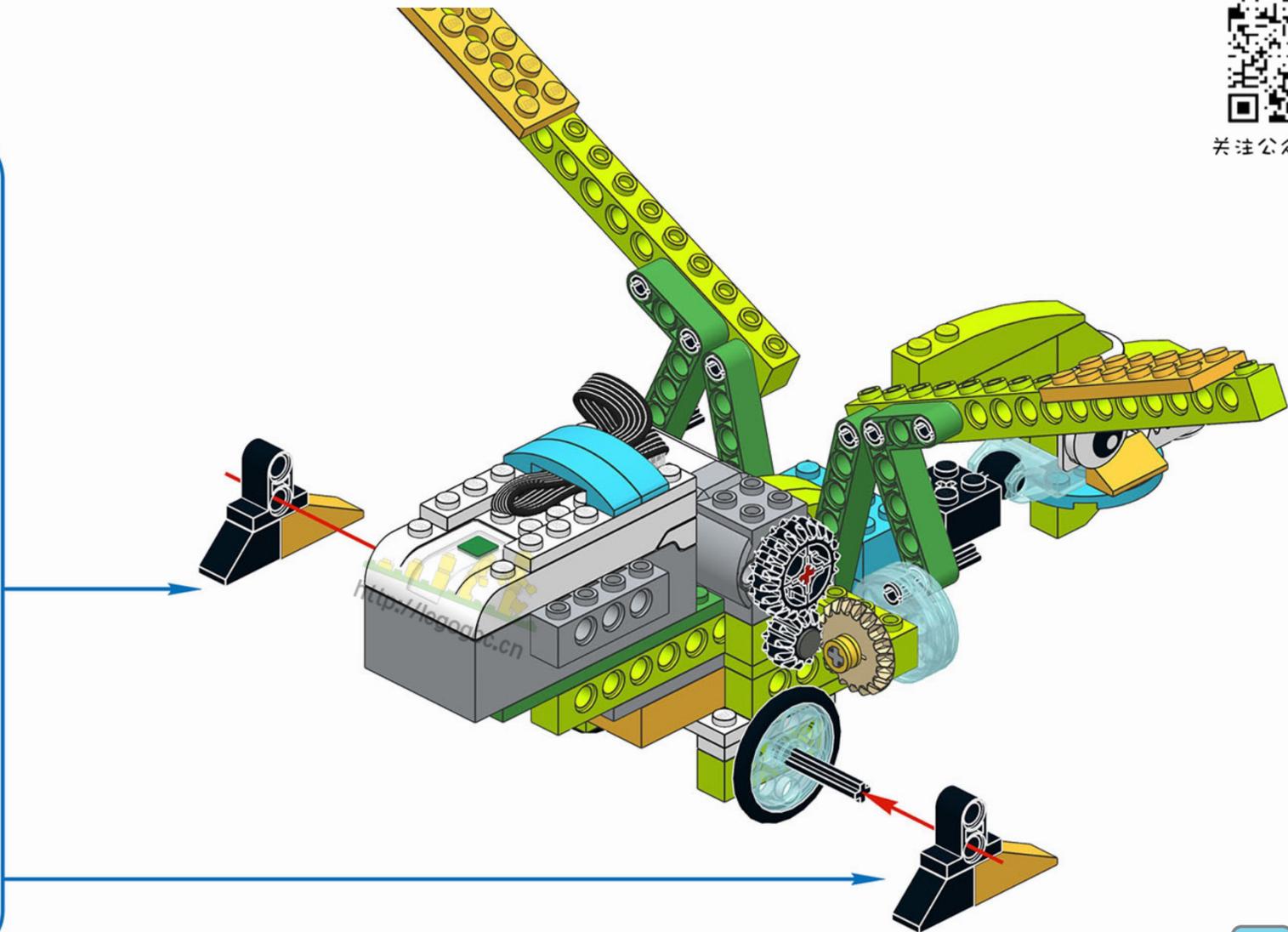
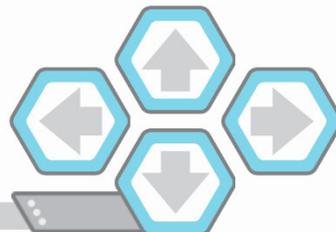
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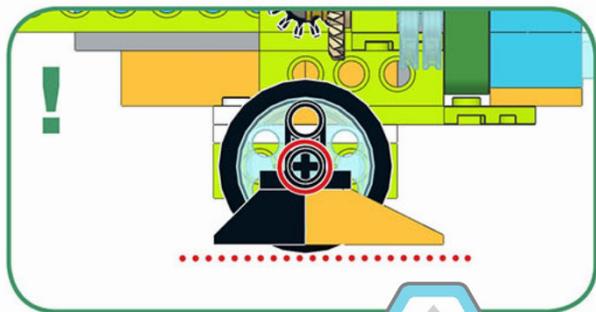
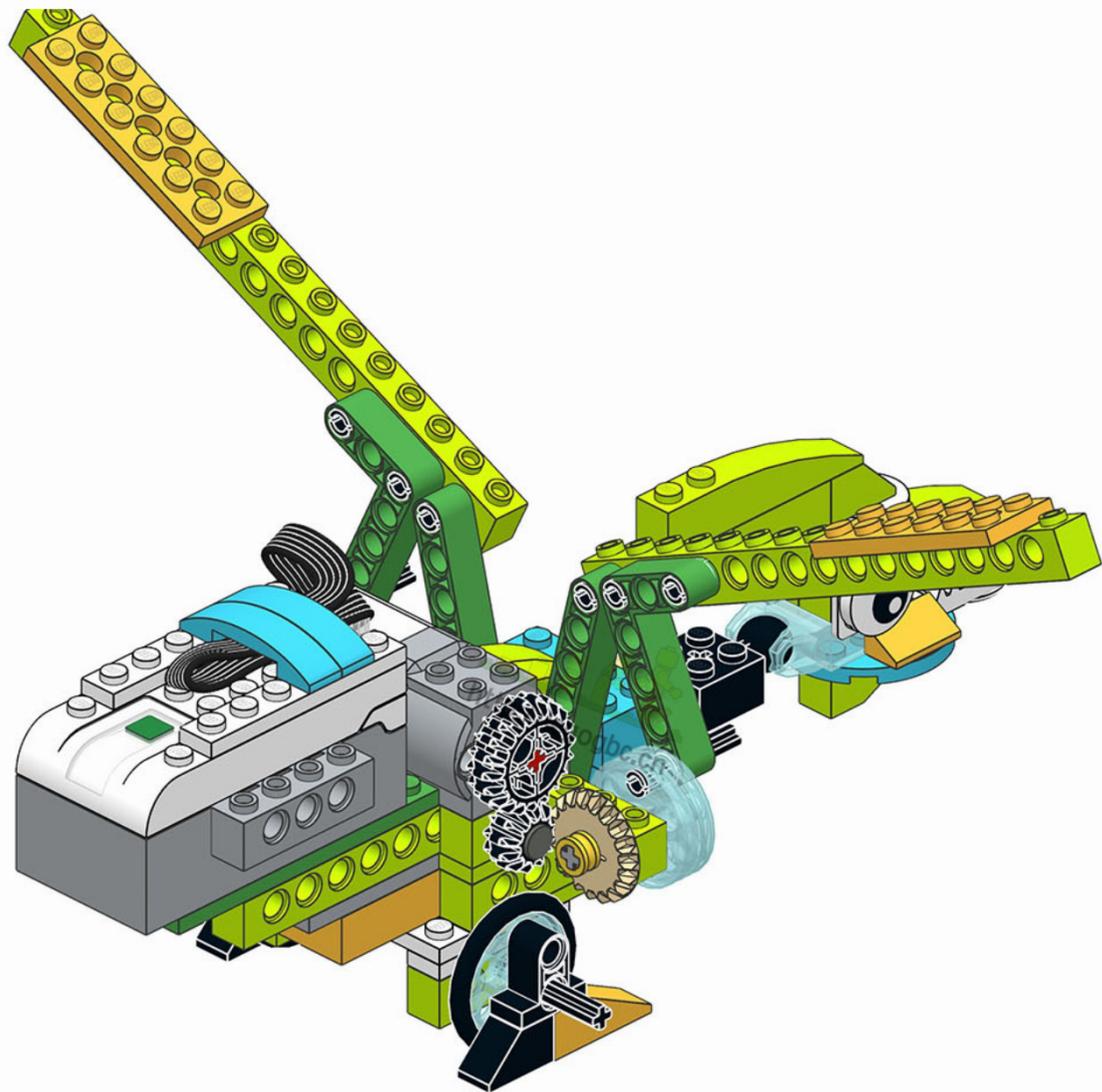
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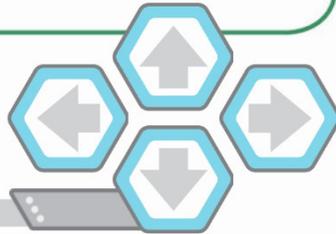
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64/66

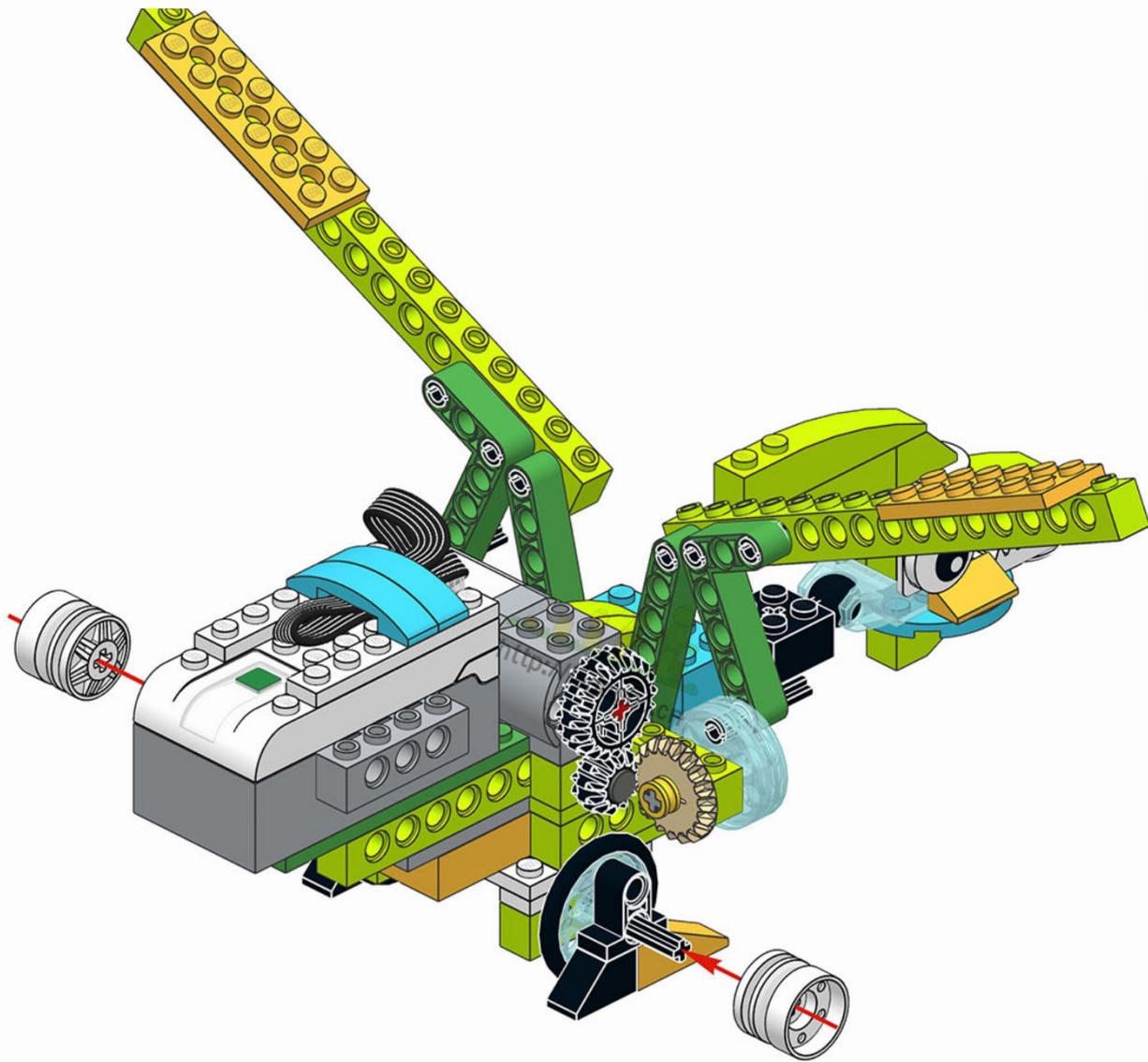
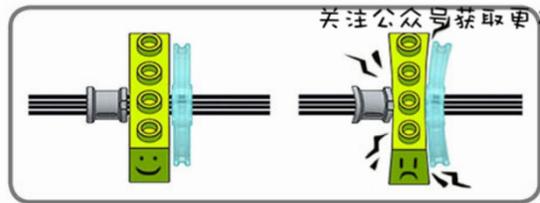
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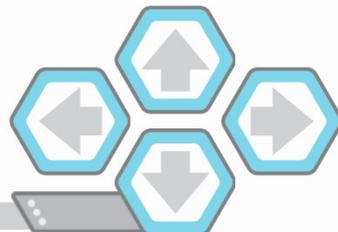


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2x

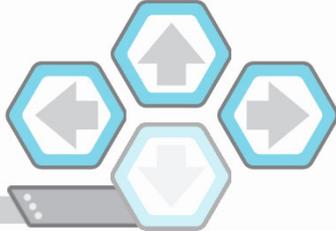
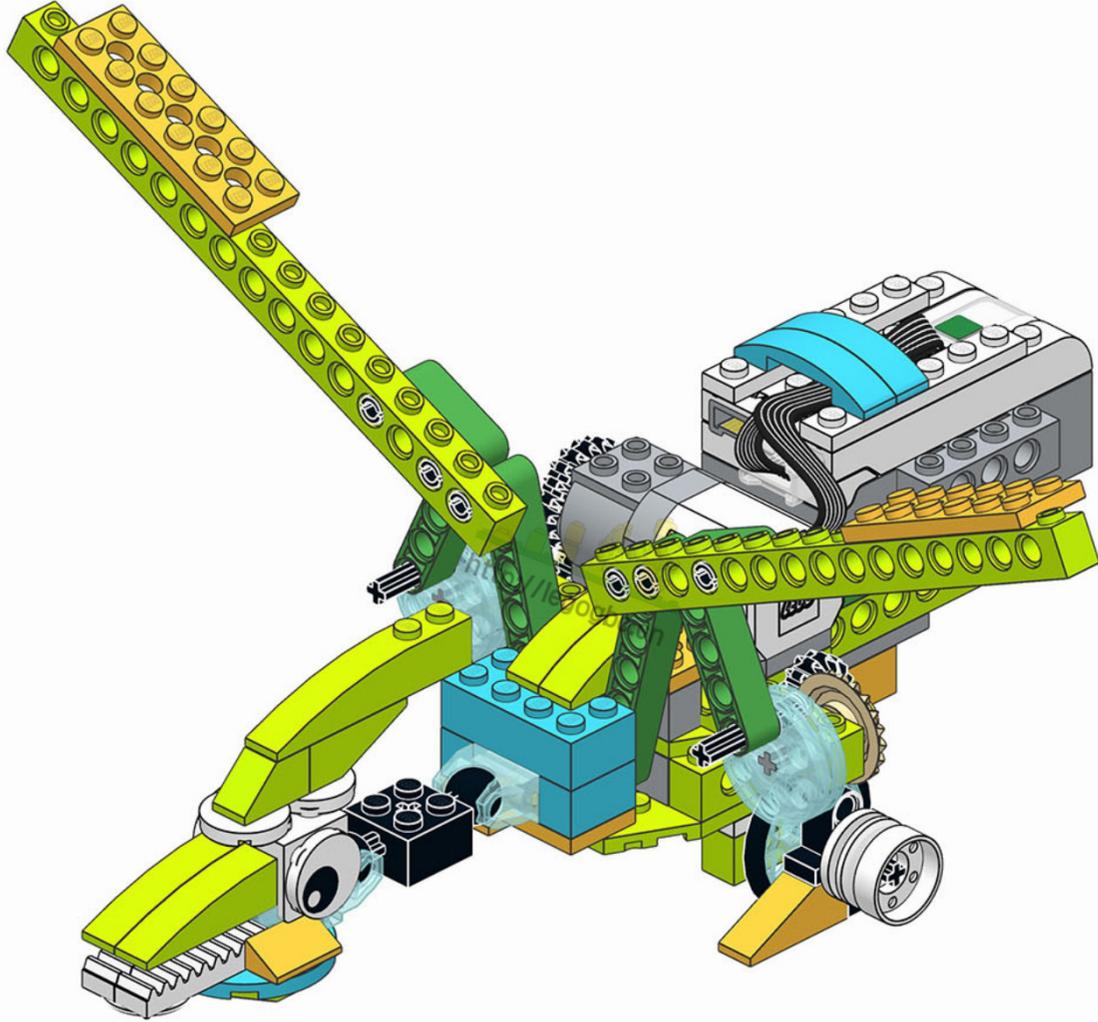
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66



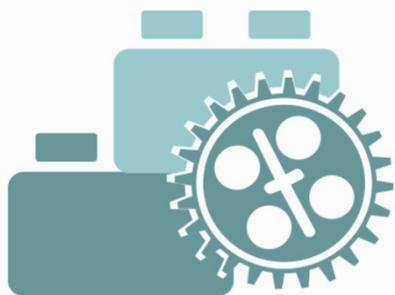
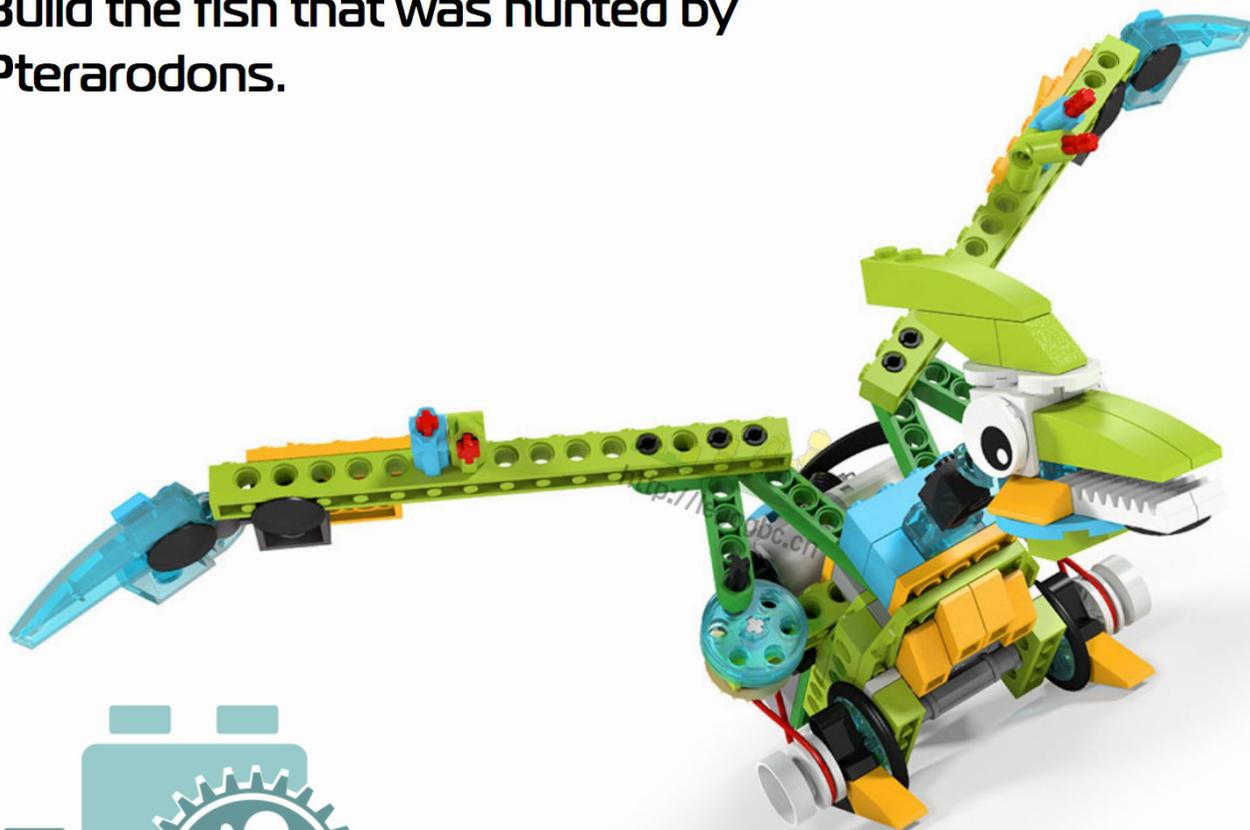


Prehistoric fish



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Build the fish that was hunted by Pterarodons.

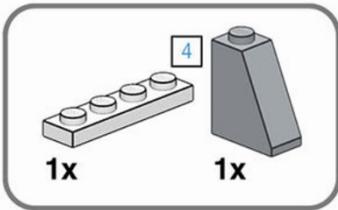


Pteranodon

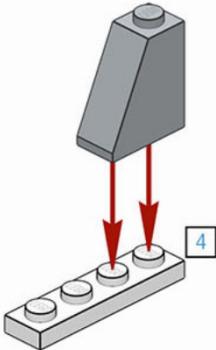




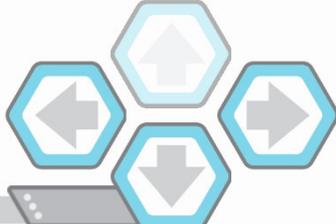
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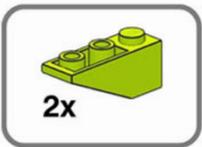


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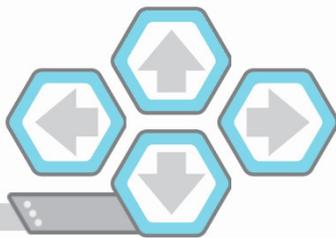




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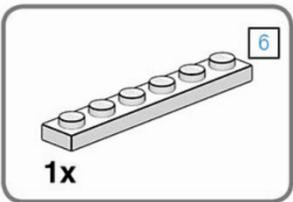


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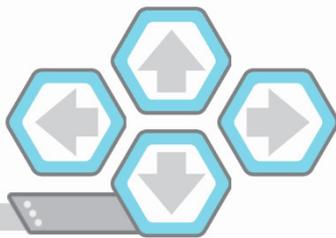
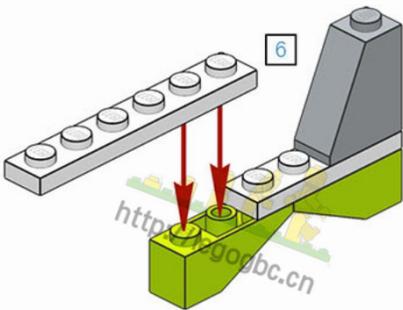




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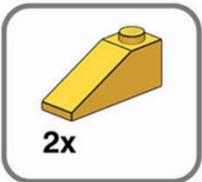


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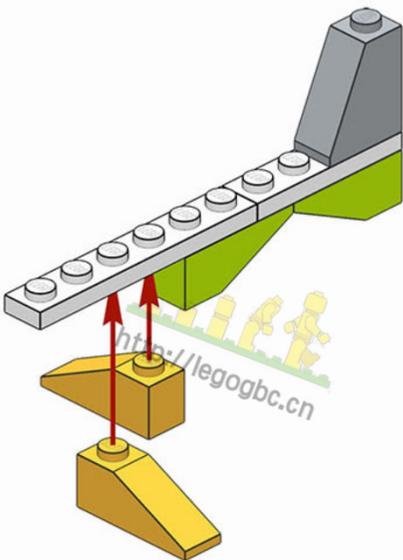


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2x

89



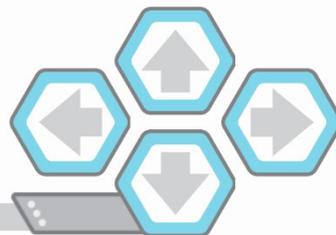
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4

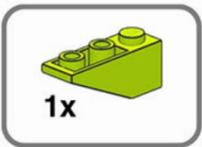


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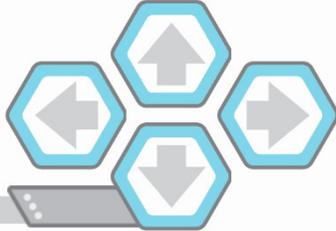
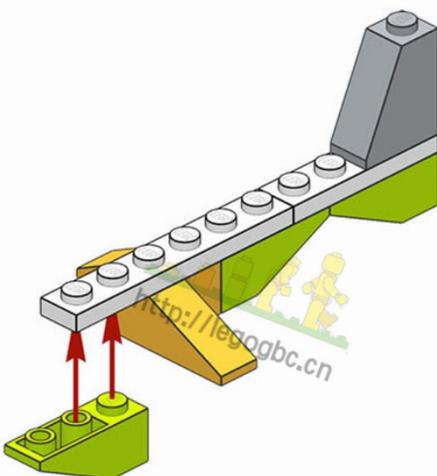




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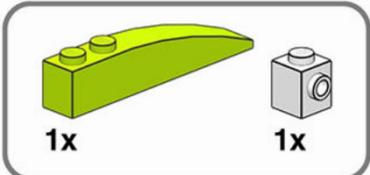


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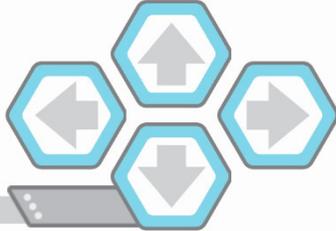
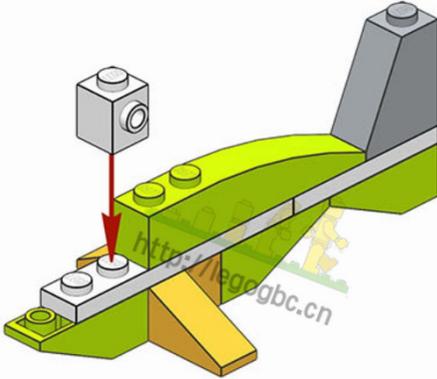




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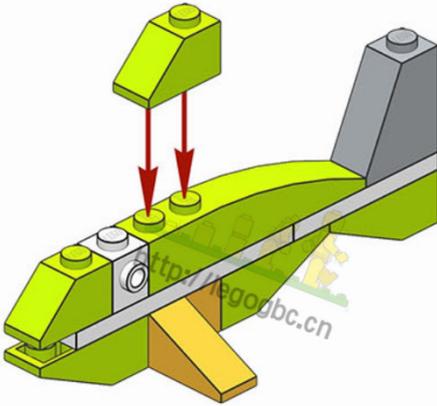


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2x

92



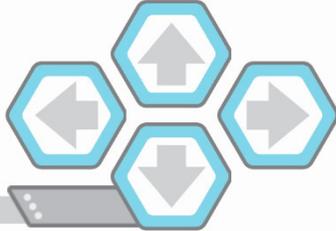
7/9



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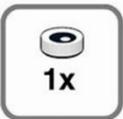


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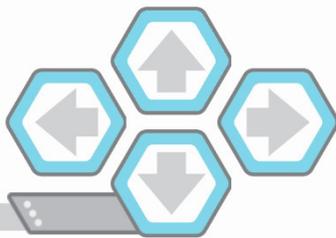
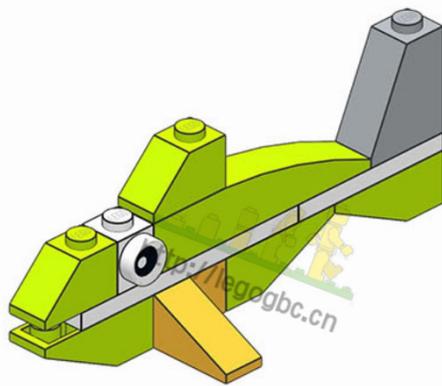




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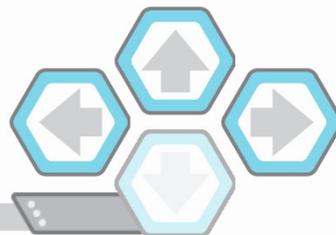
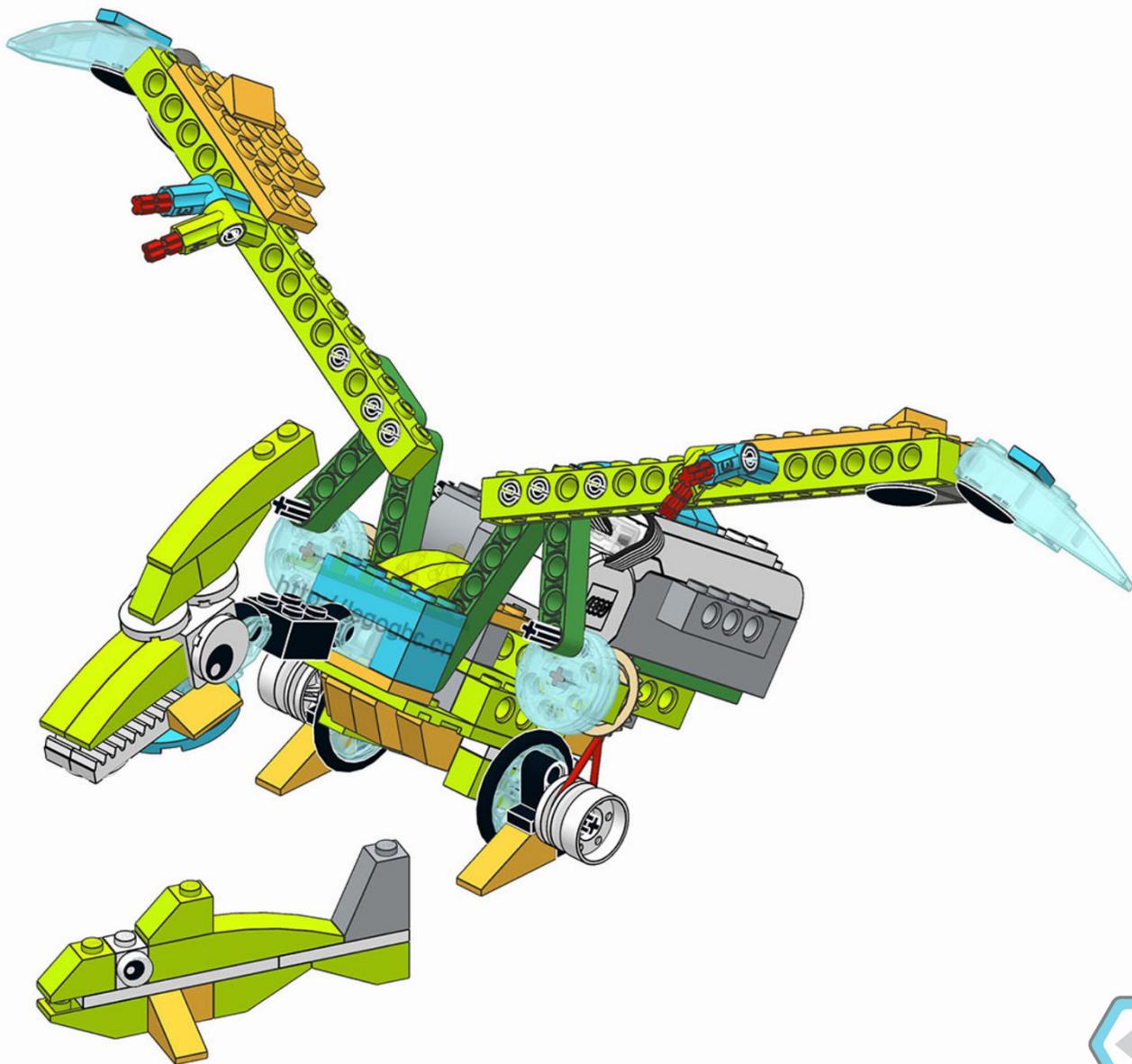
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Check it out!



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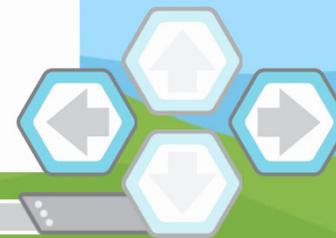
Avoid any friction
between the cables
while robot is moving.



4



104



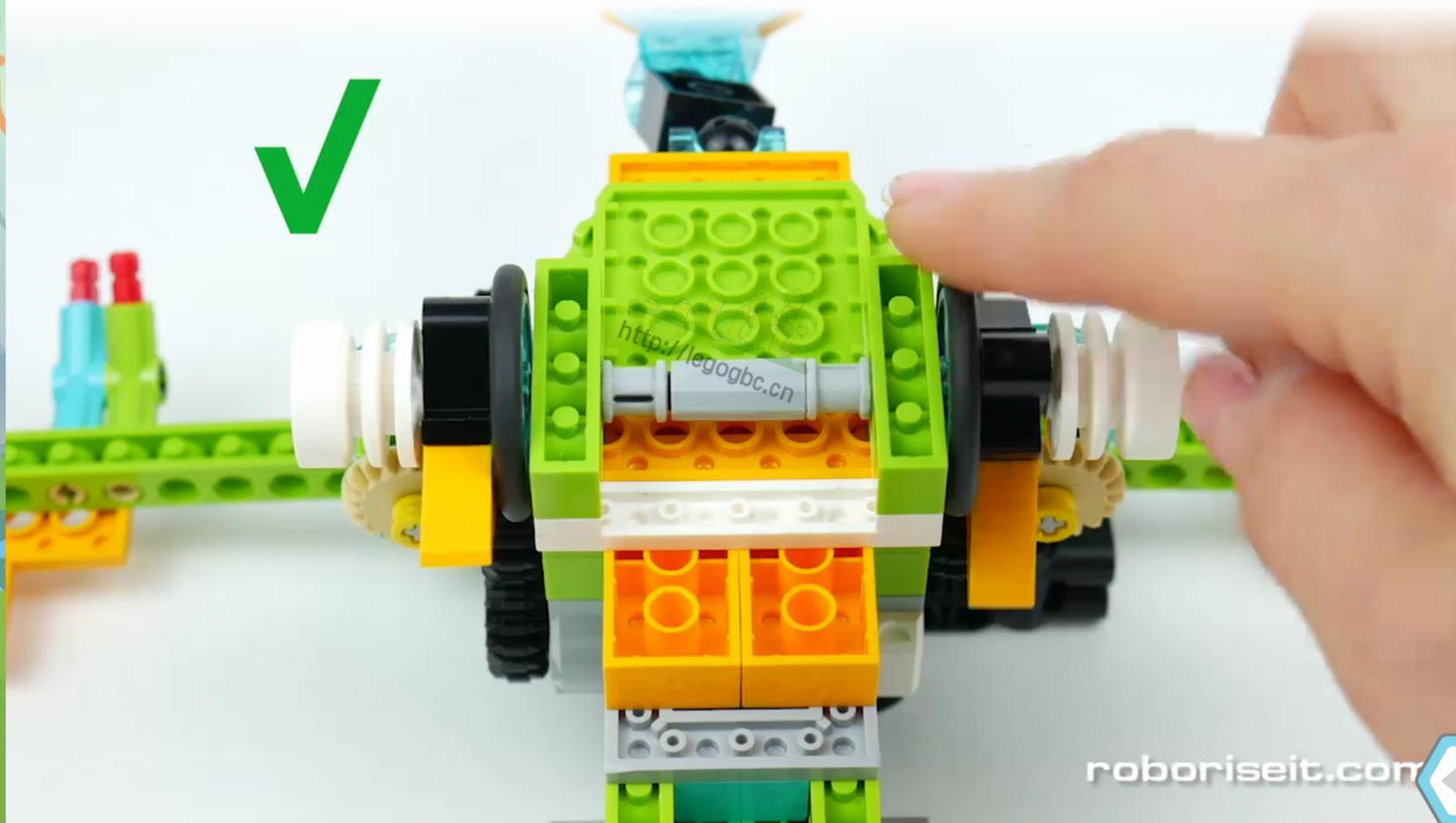


Check it out!



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Do not pinch robot wheels too hard. The axis has to rotate freely. White discs should not pinch the robot "feet".



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4



105



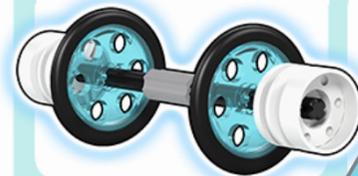
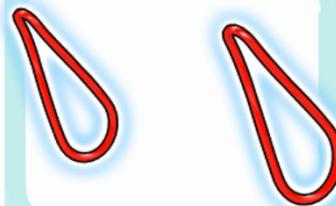
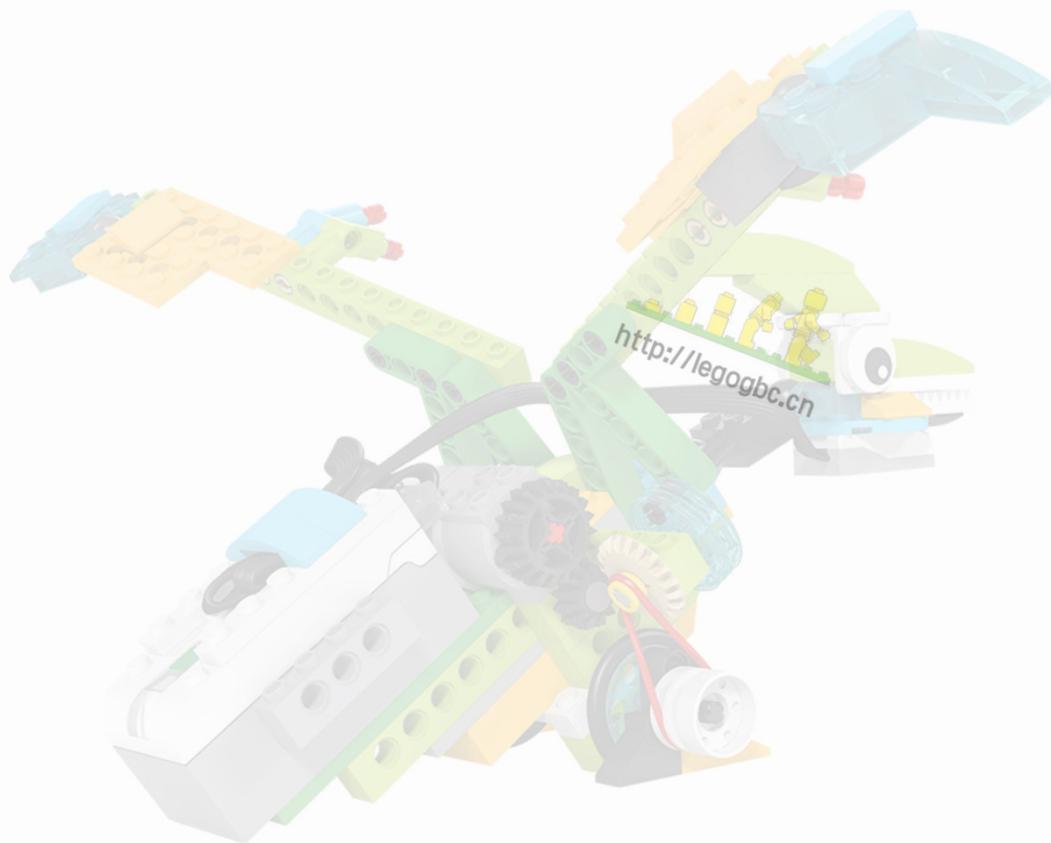


Task



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Place parts of the robot on the right places



4



106



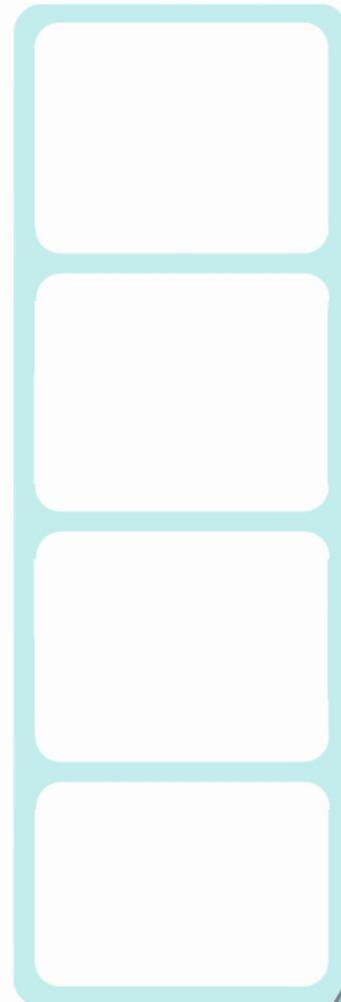


Task



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Place parts of the robot on the right places



8



106





Task 1



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Program the motor rotation for 5 seconds. Test the work of the mechanism. In which direction of rotation the wings are moving correctly?



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8



107





Task 2

Abc



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In order for the robot can move on the surface, a belt drive must be made. Wear rubbers. Pay attention to the positions of rubber in the pulleys! Only in one of the four possible positions the robot will move forward!



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8



108



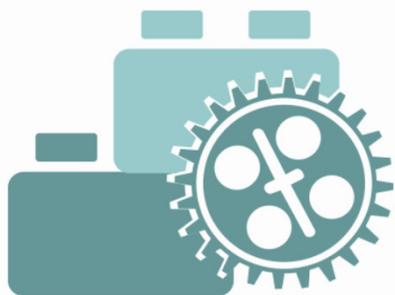
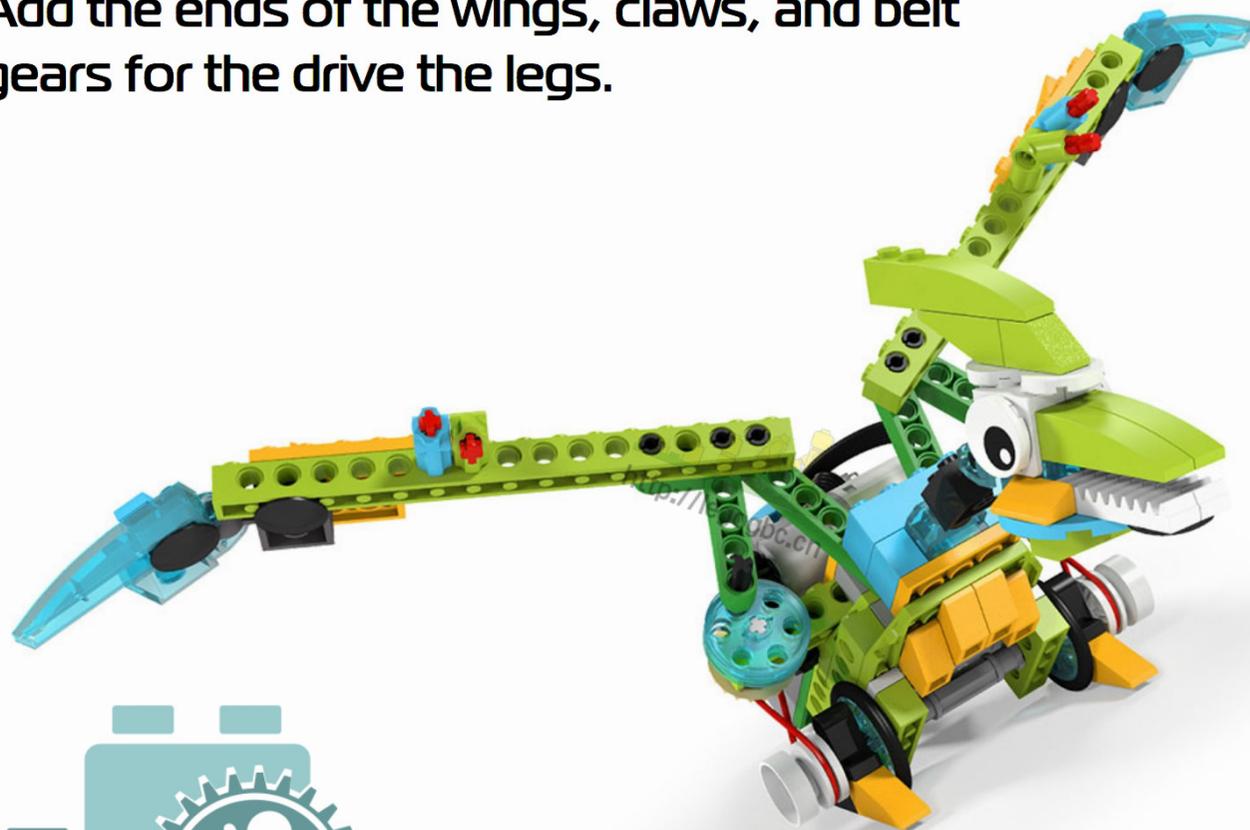


Enhanced version



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Add the ends of the wings, claws, and belt gears for the drive the legs.



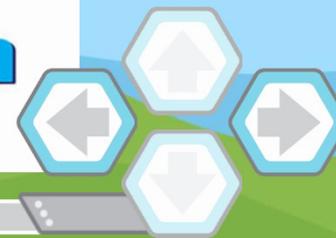
Pteranodon



8

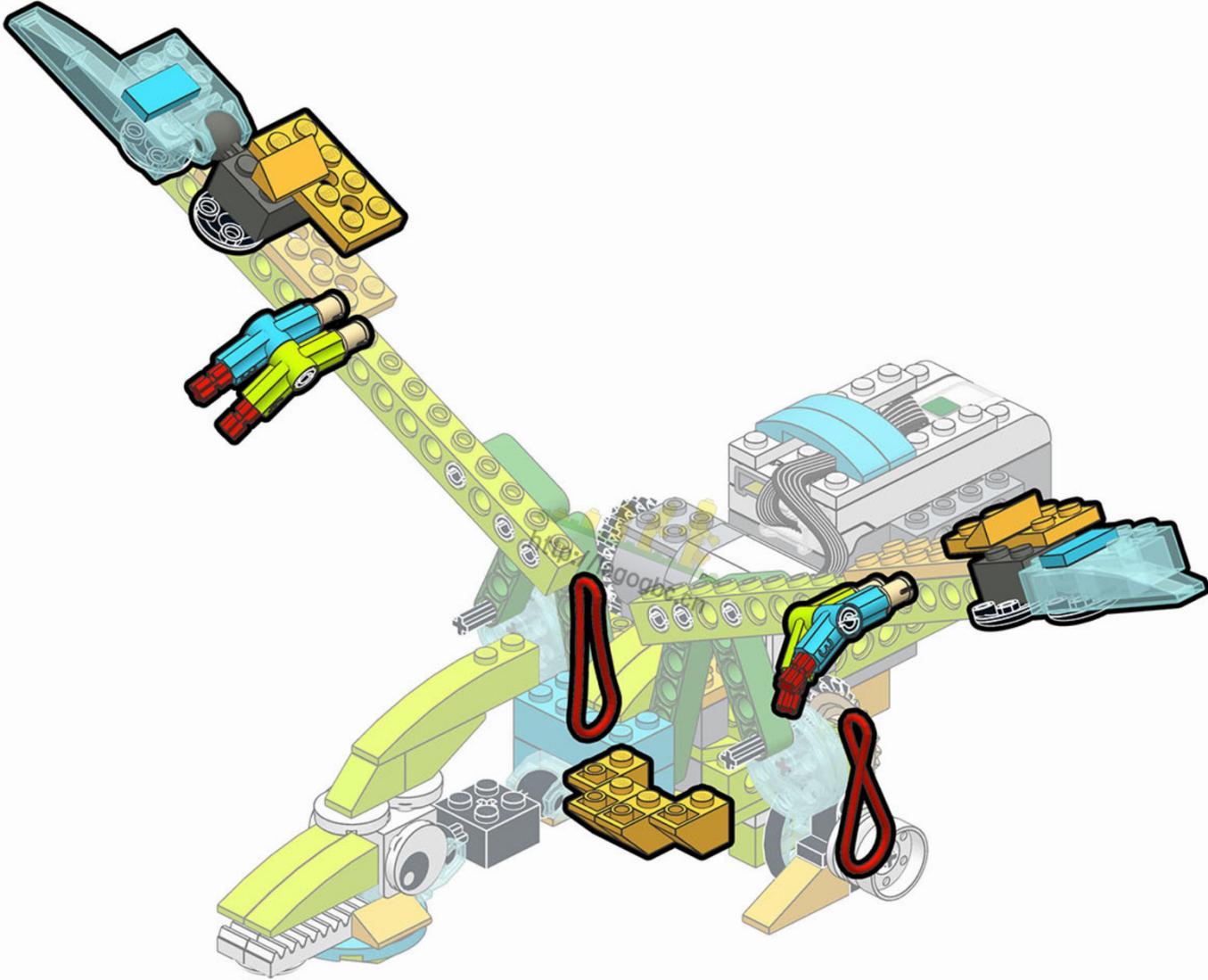


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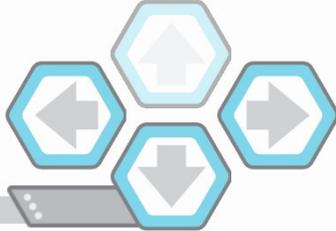
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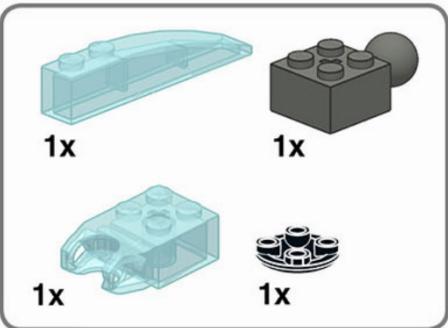
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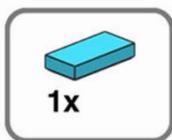
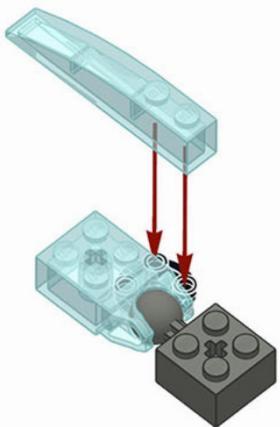




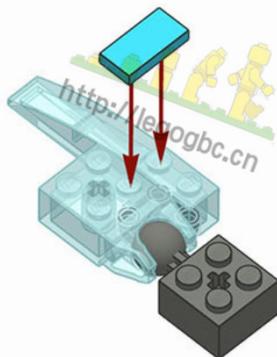
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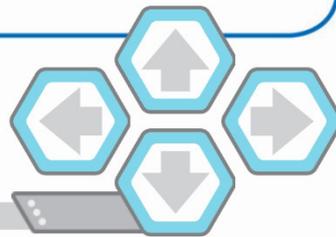
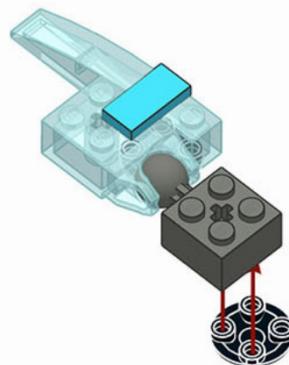
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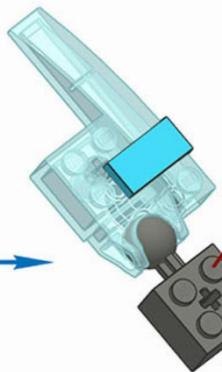
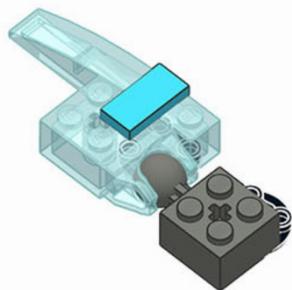
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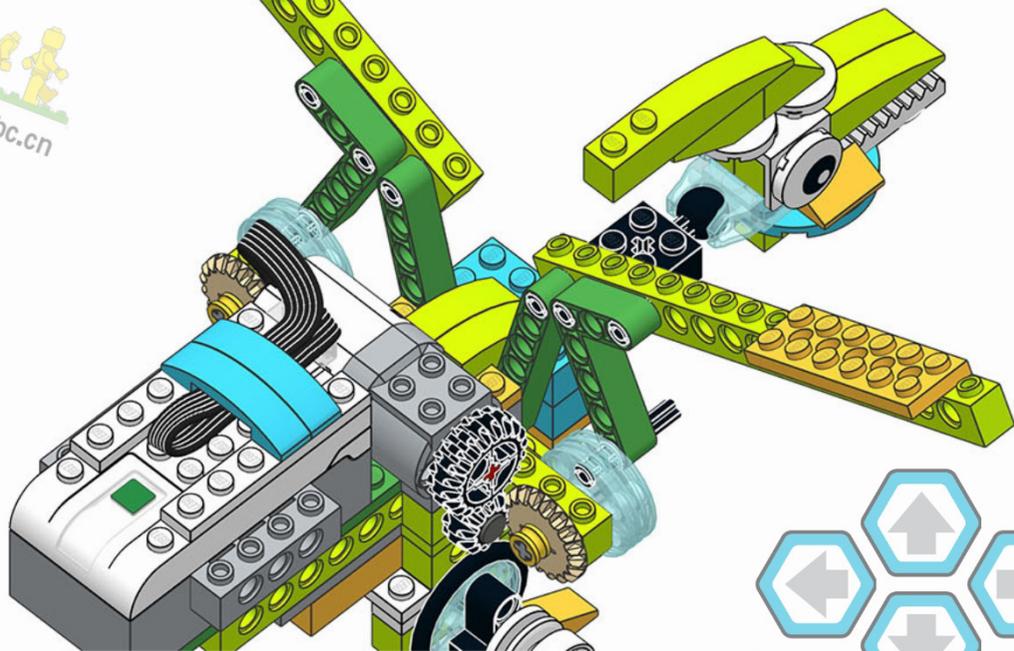


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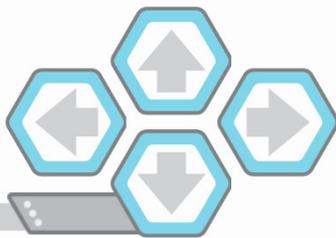
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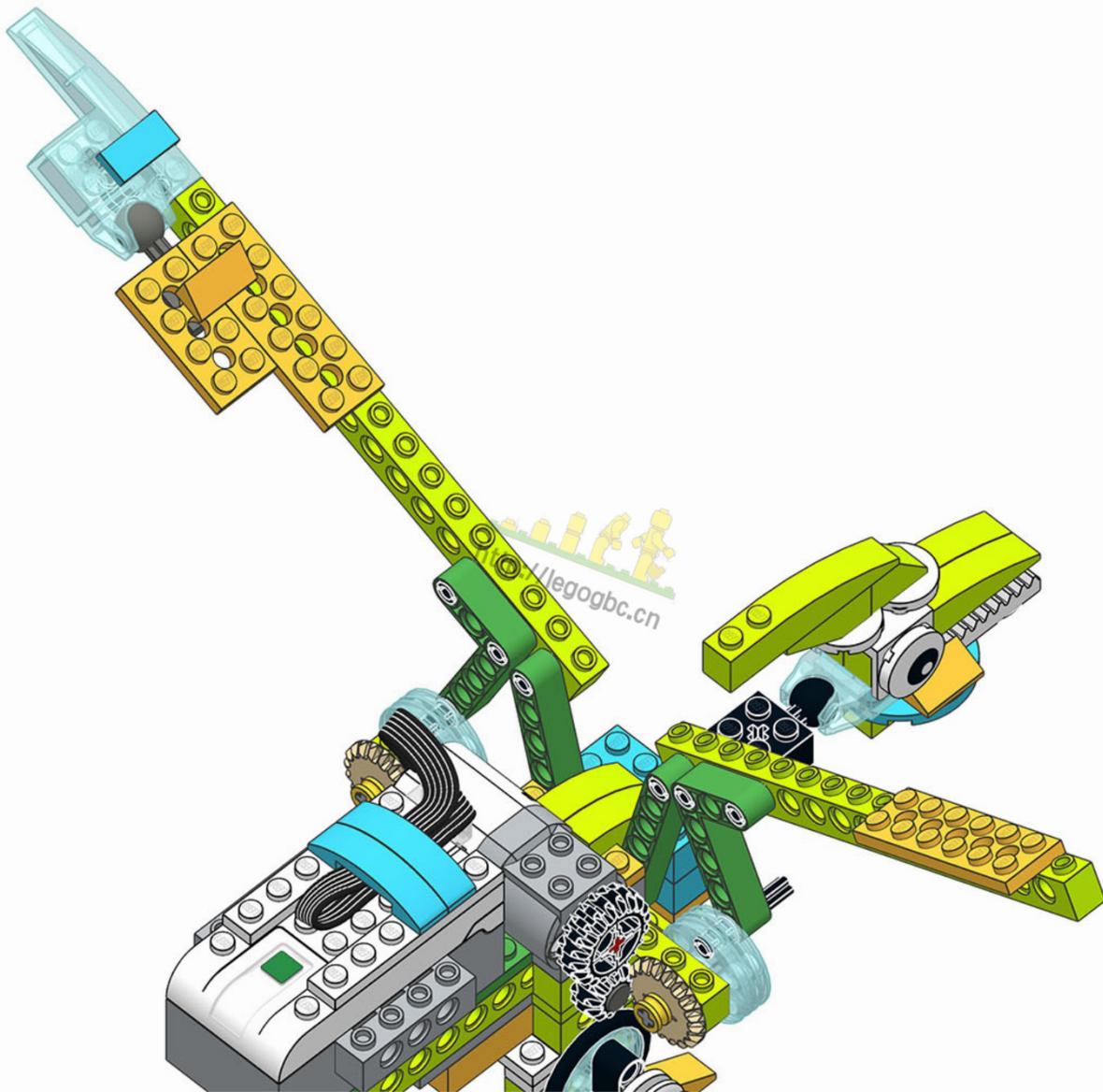
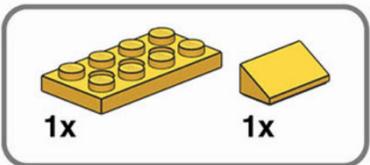
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112





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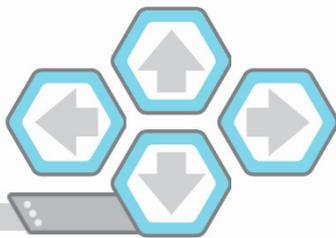
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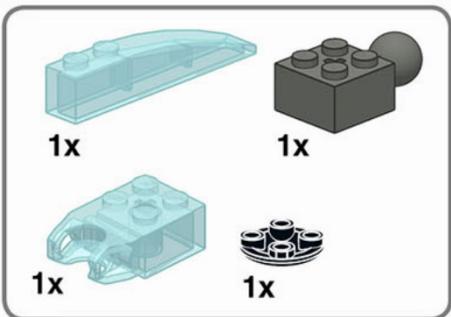
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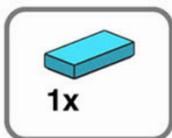
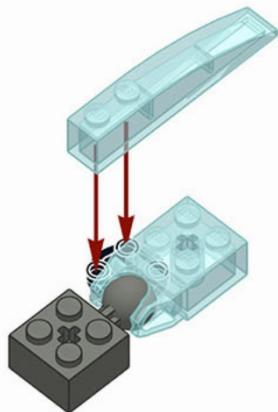




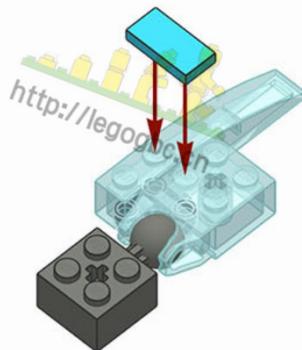
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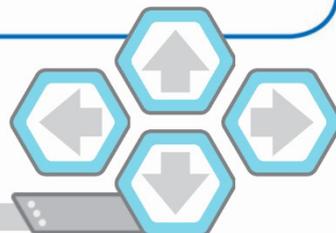
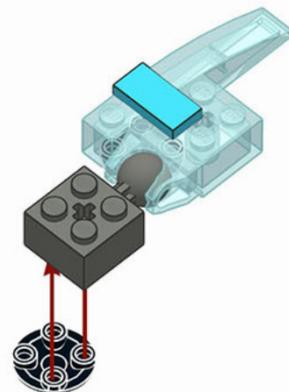
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2



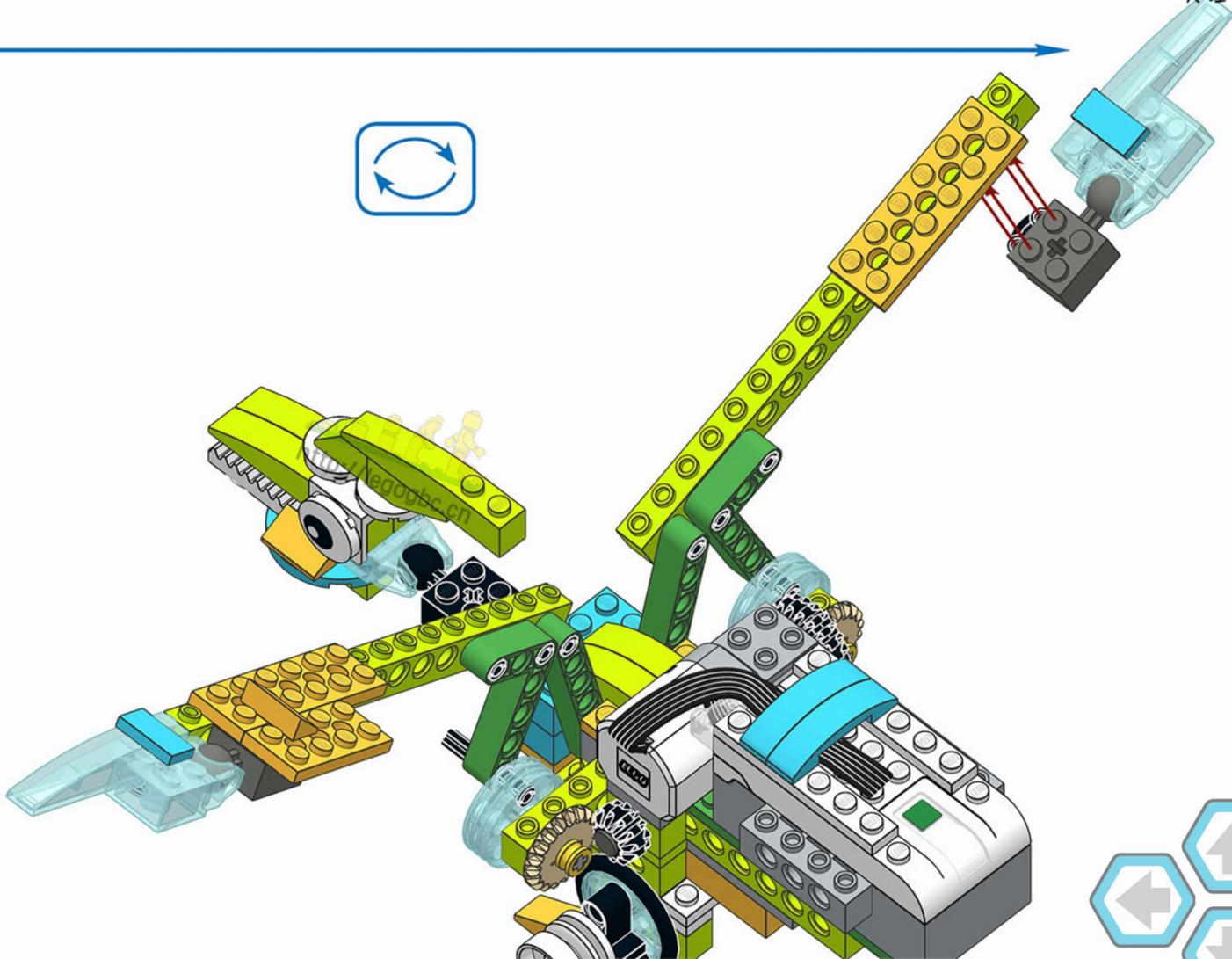
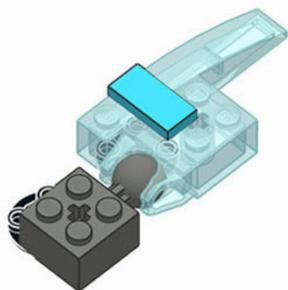
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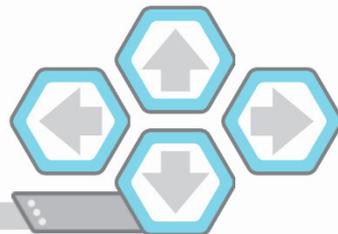
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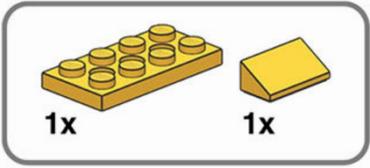
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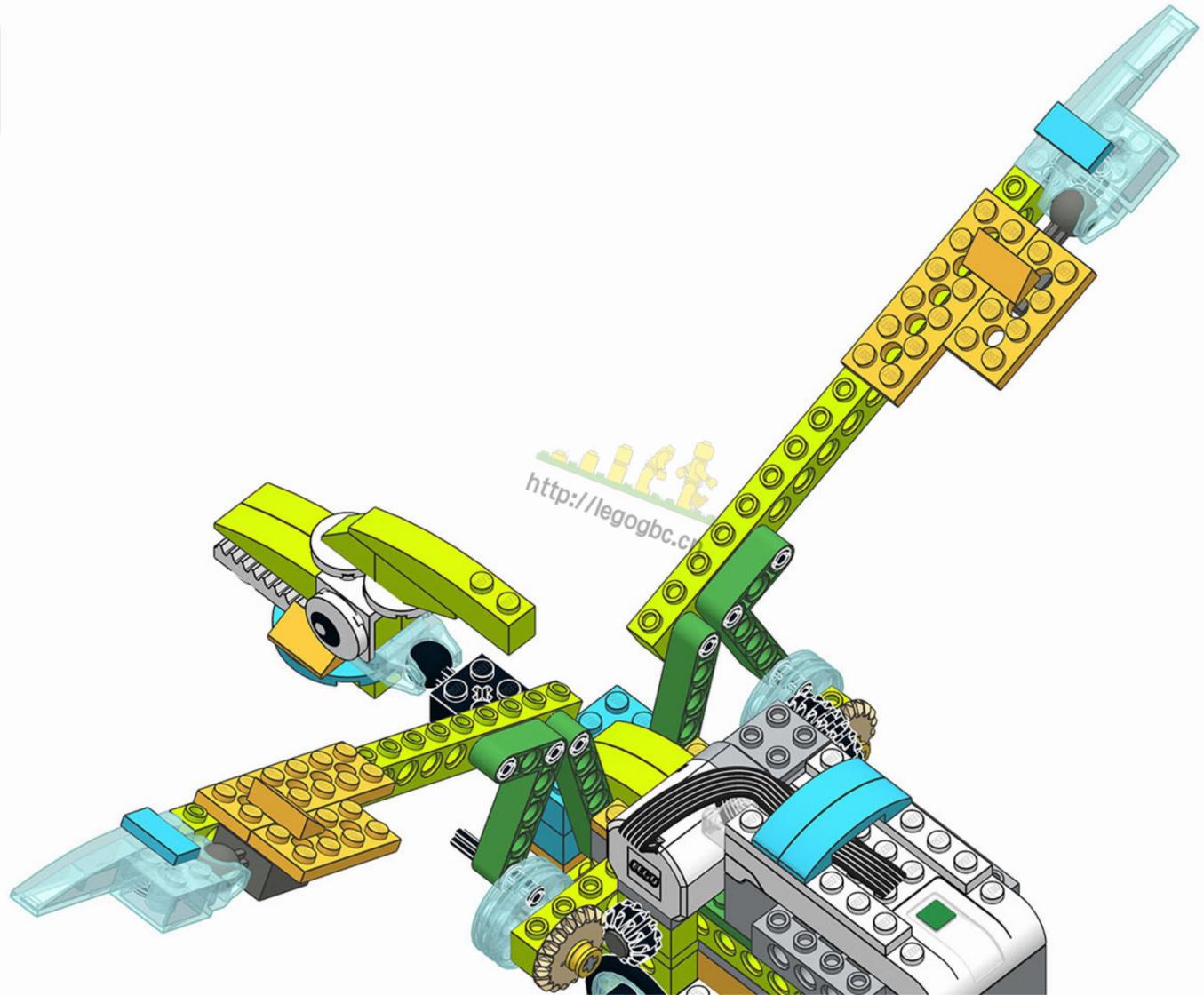




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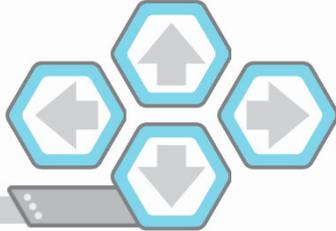


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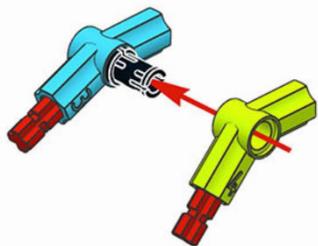
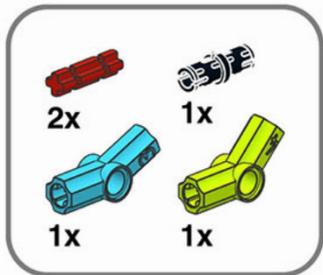
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116

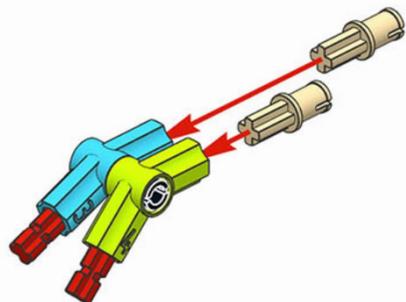




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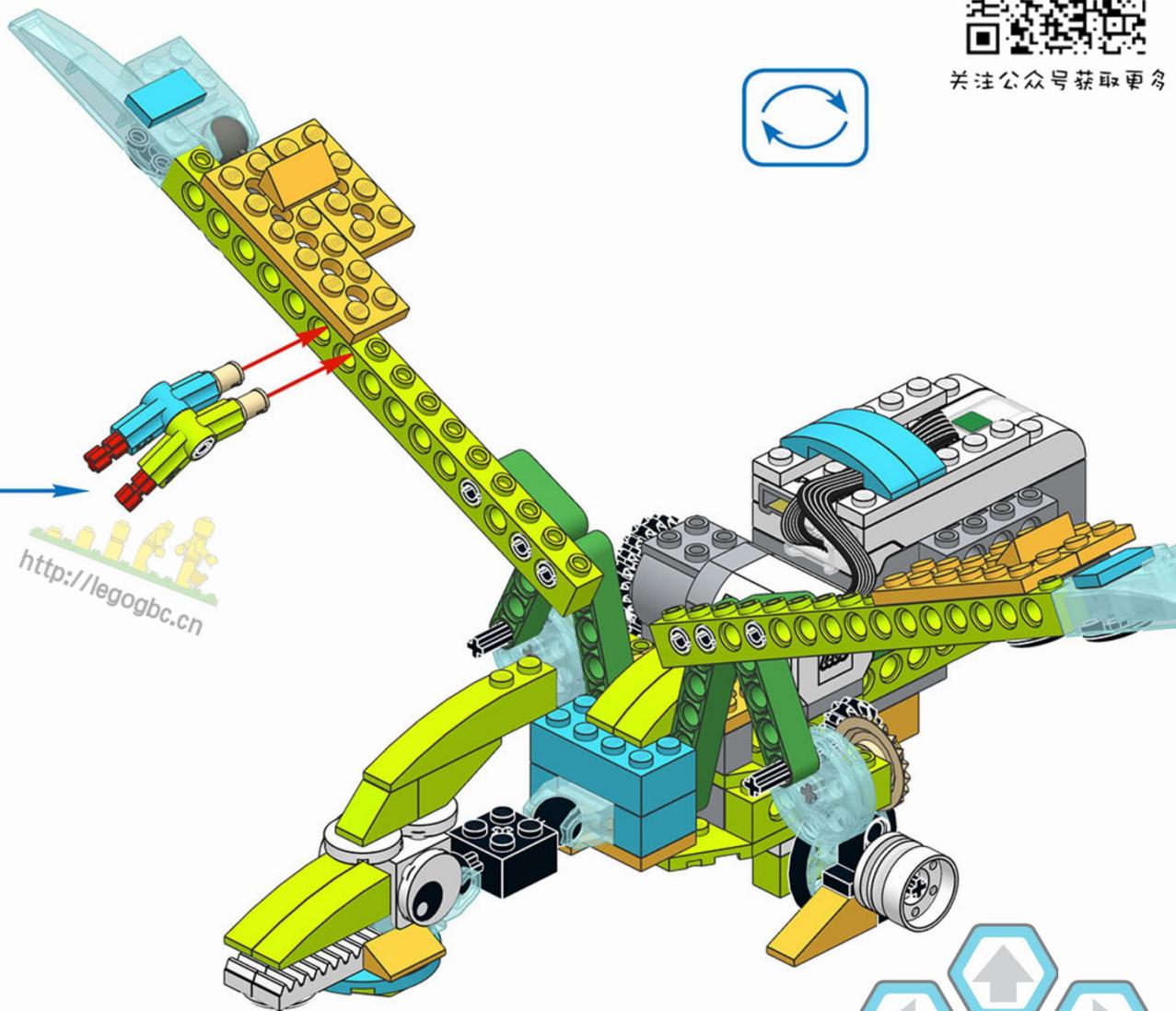
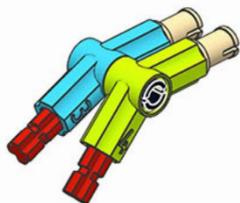


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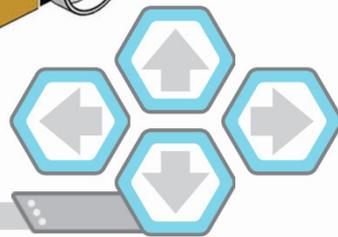


2

3

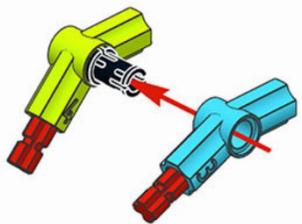
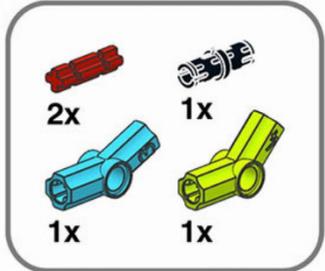


<http://legogbc.cn>

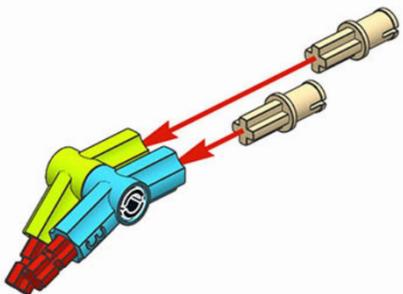




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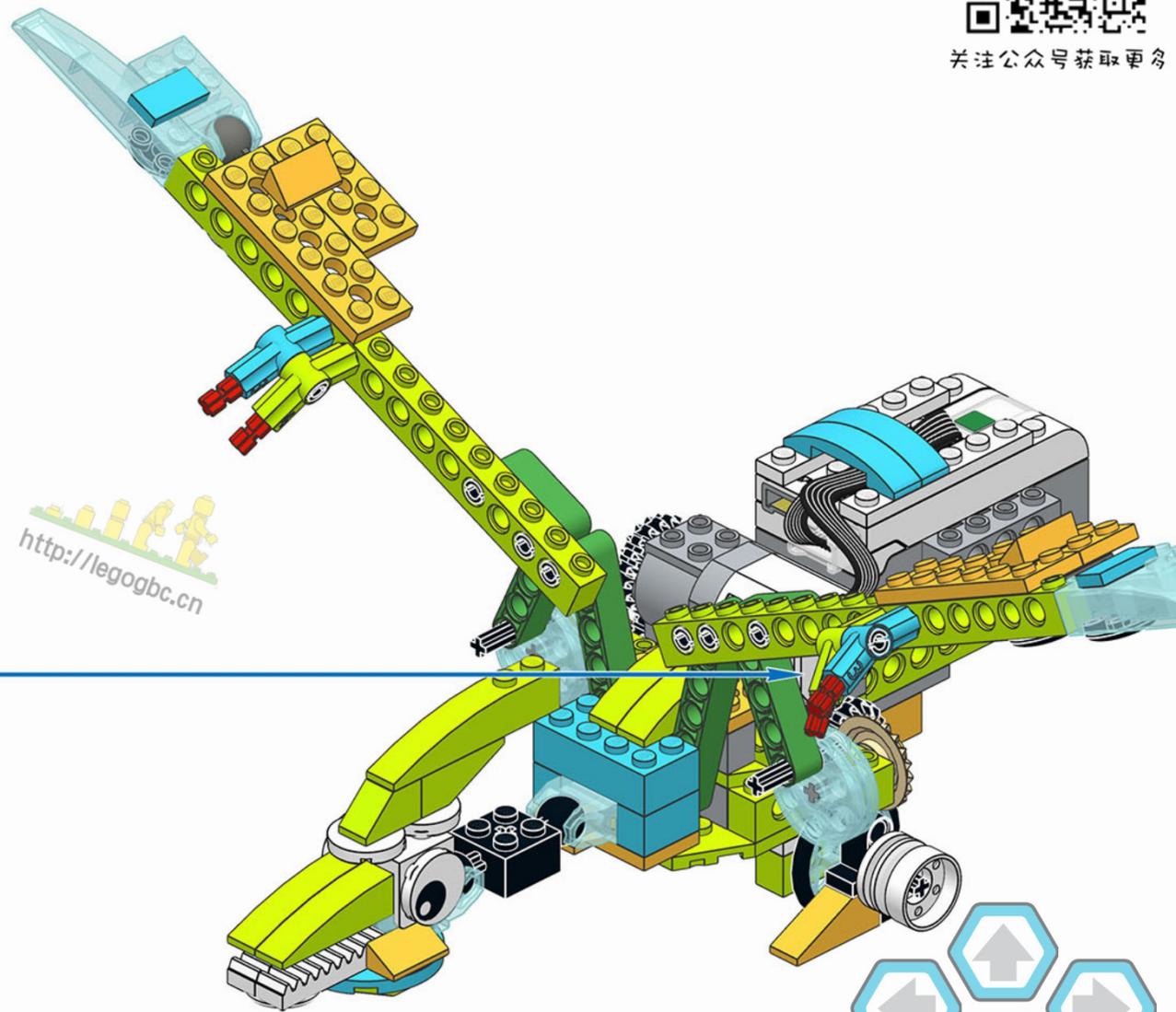


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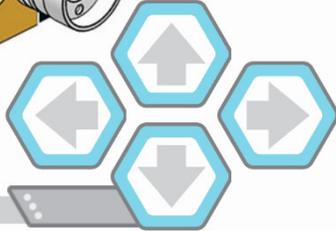


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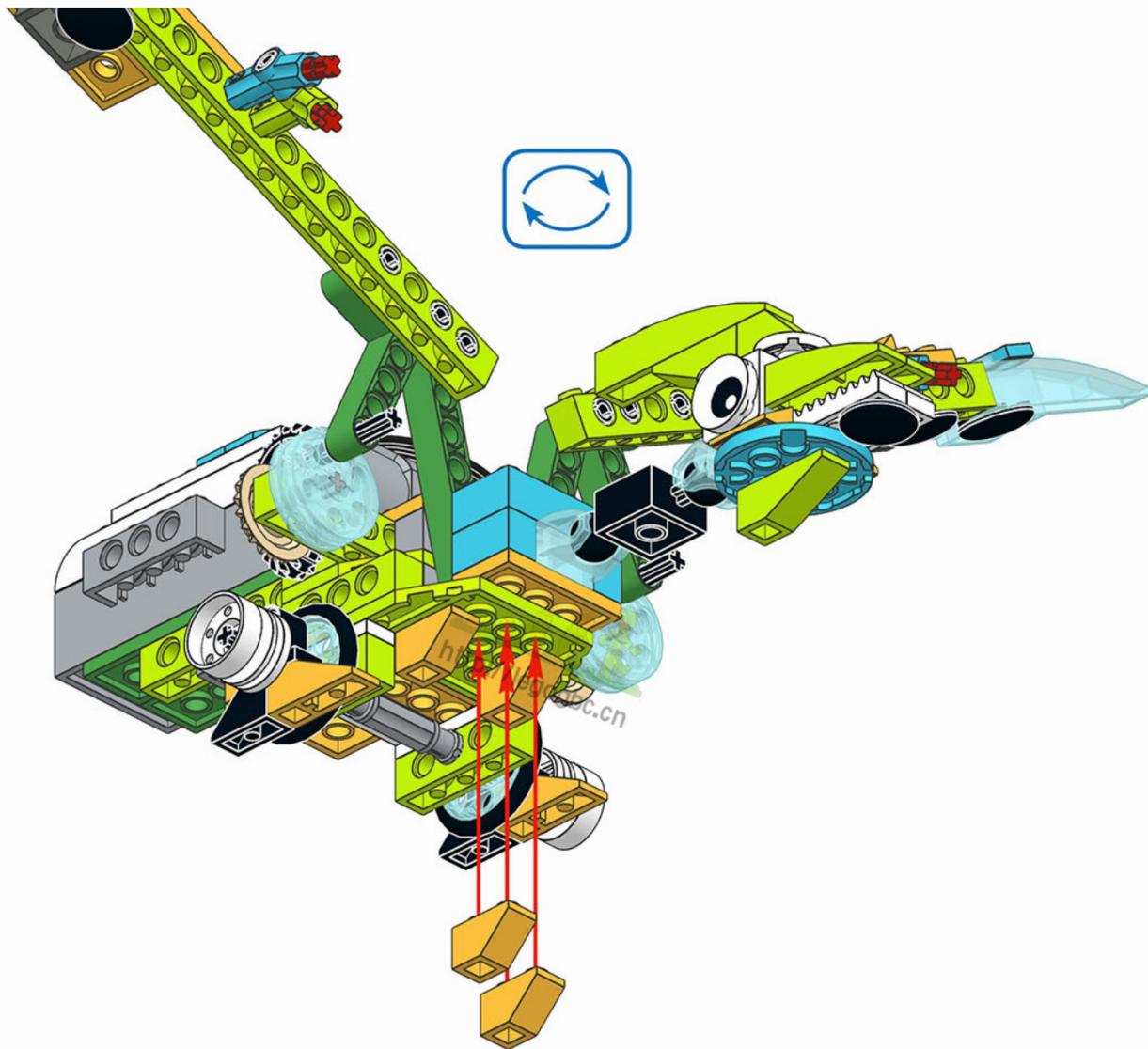


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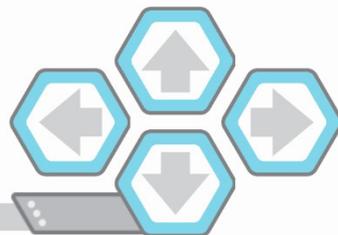


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4x

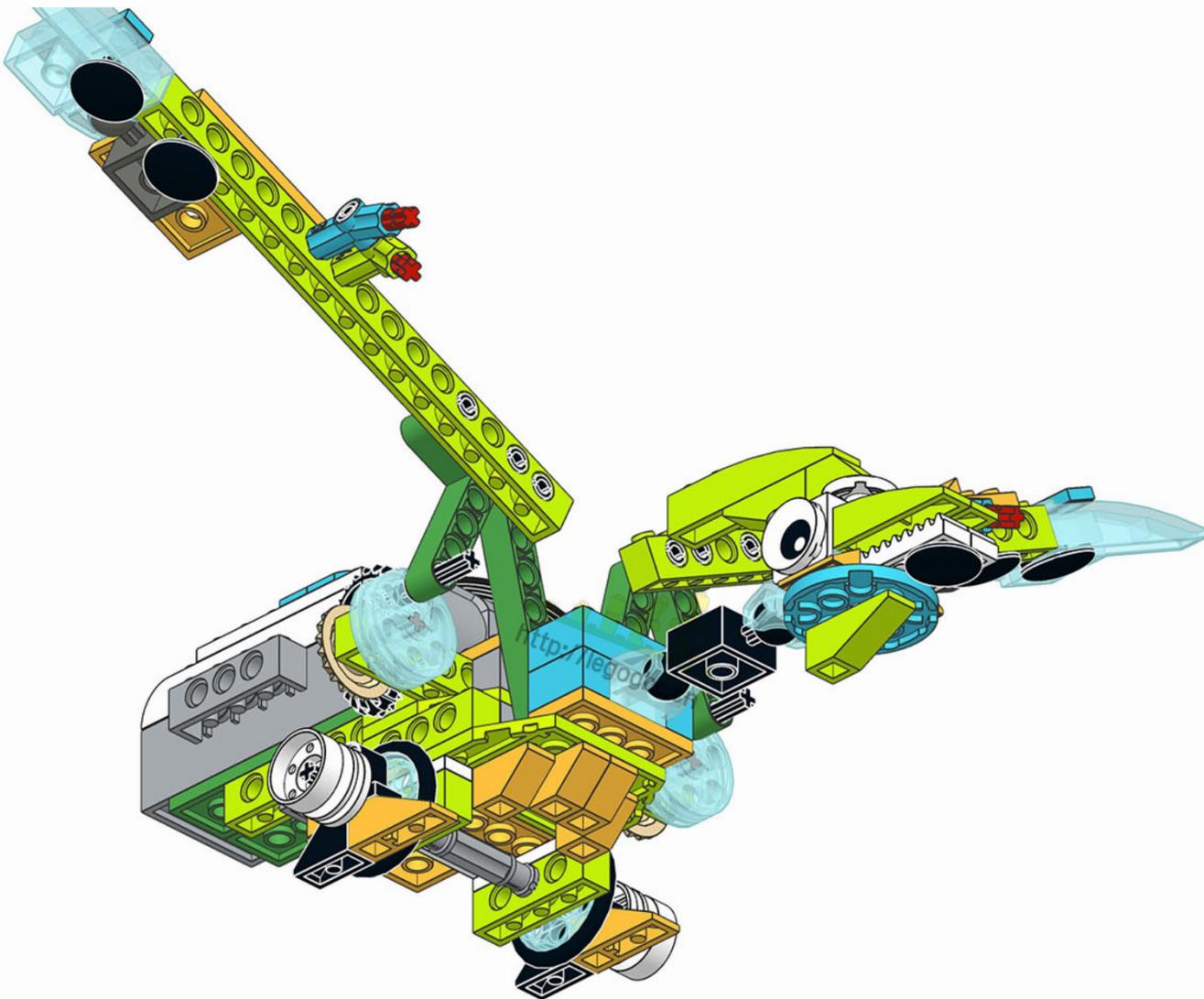
75





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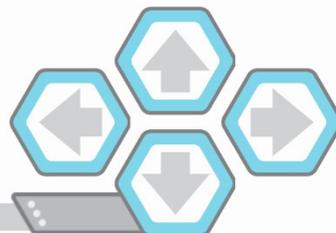
76



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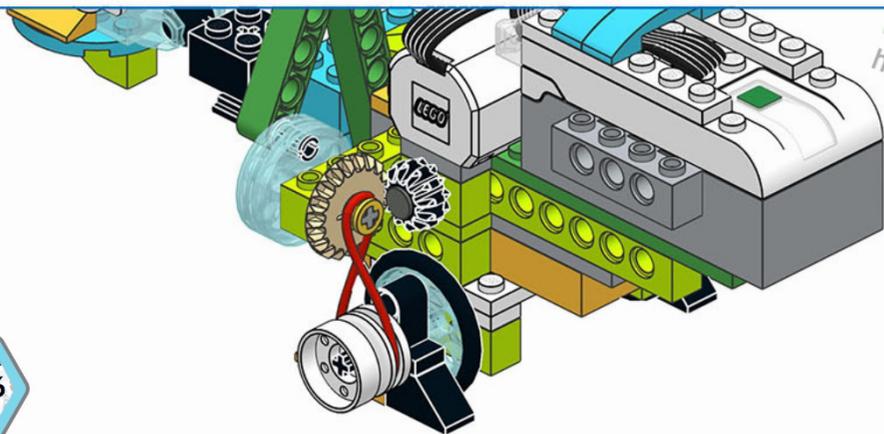
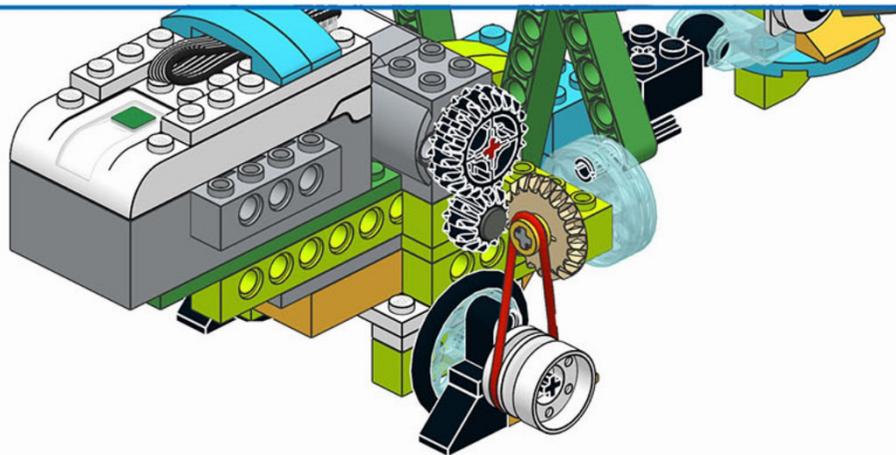
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120

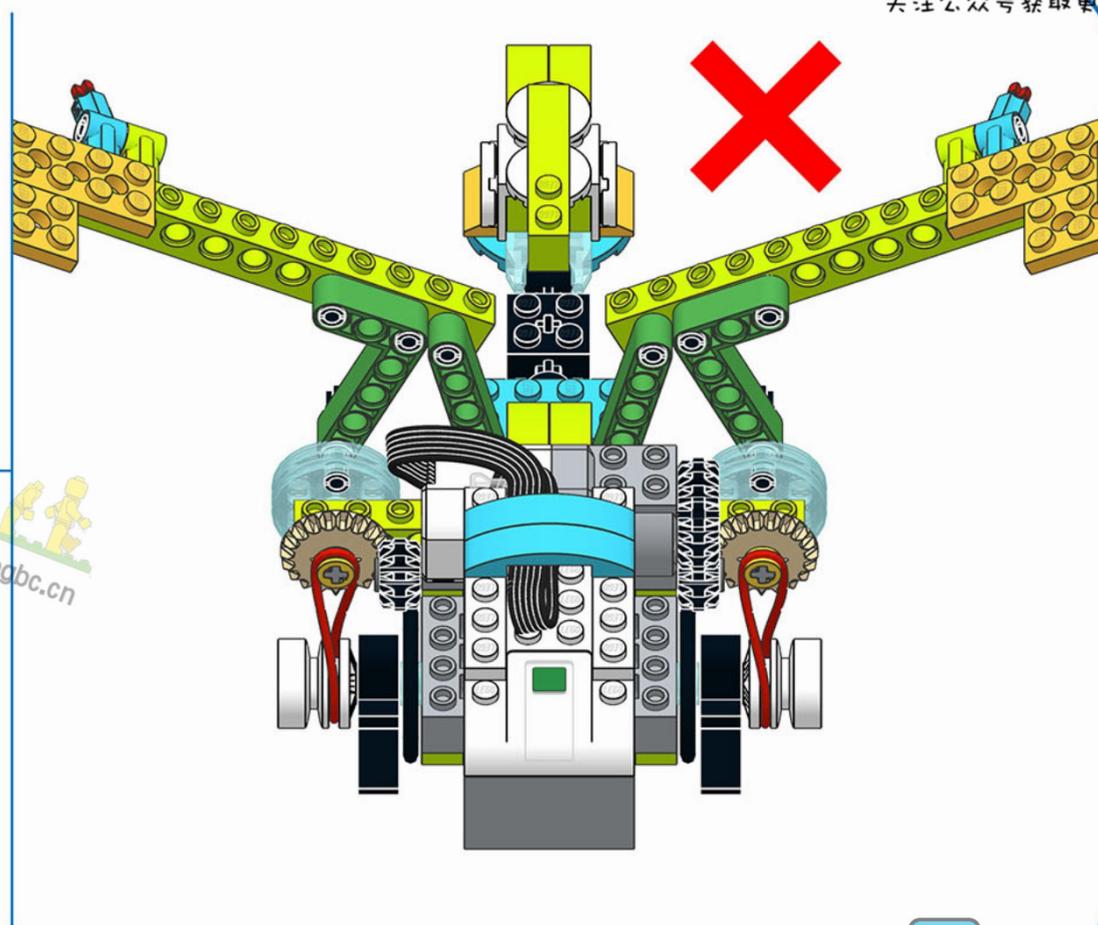




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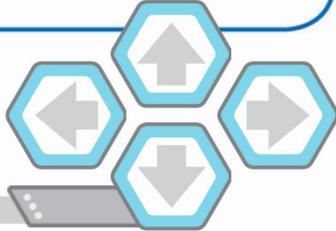
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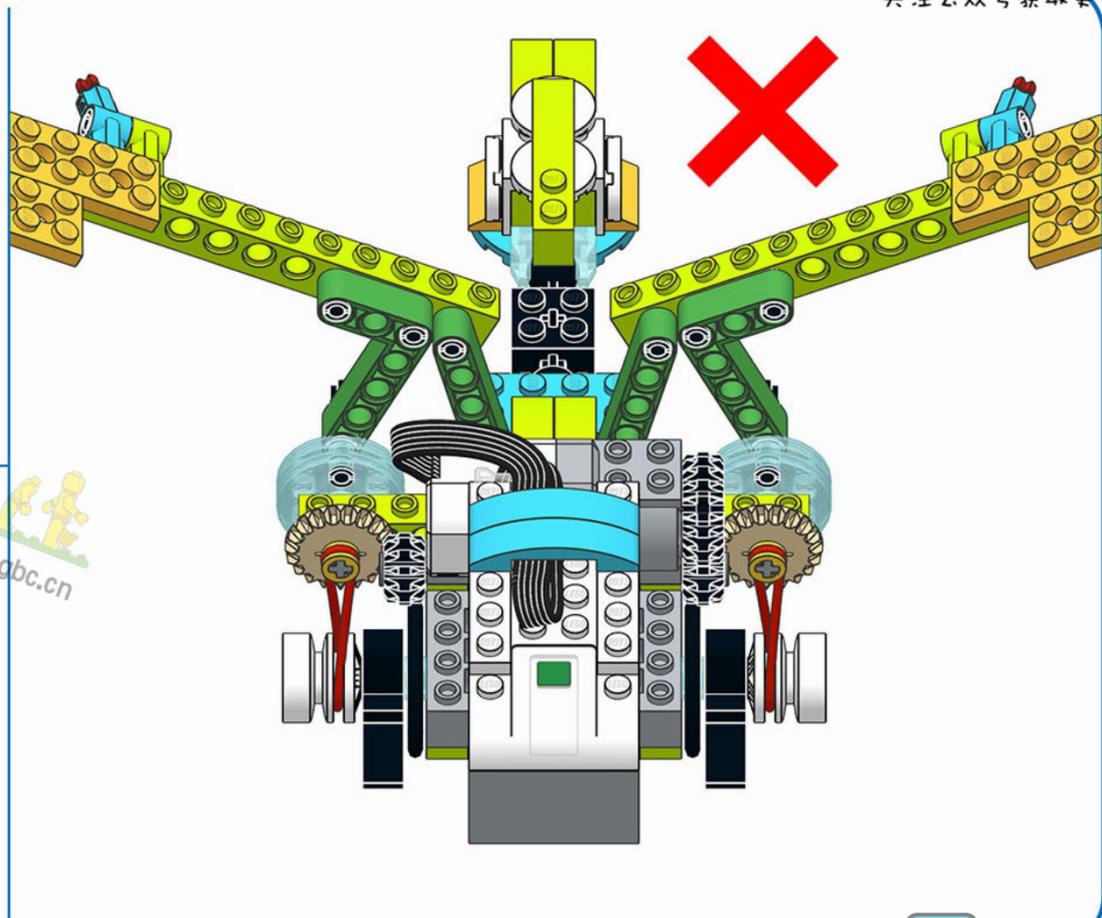
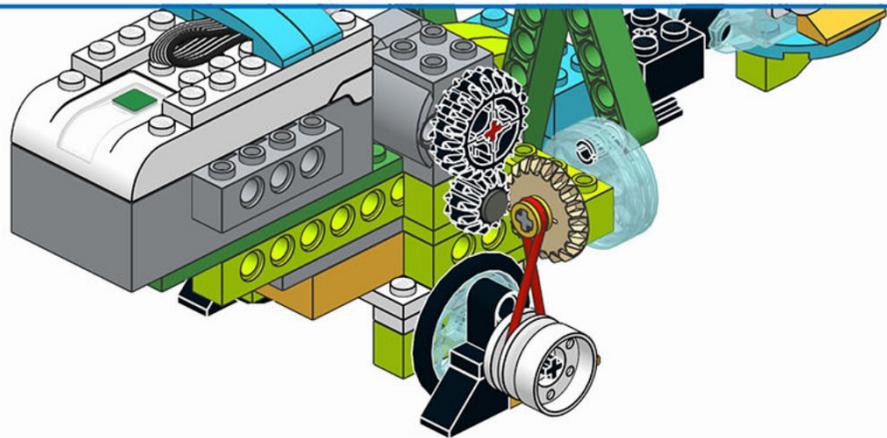
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121





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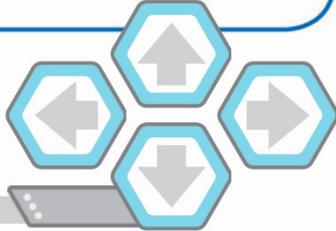


<http://legoabc.cn>

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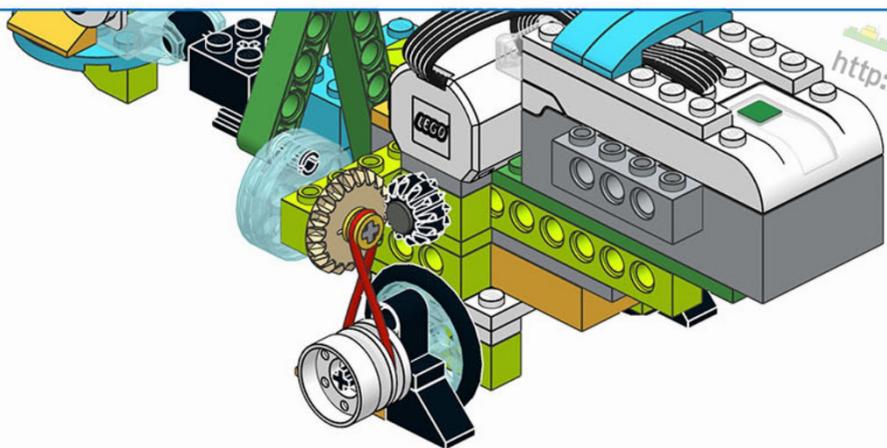
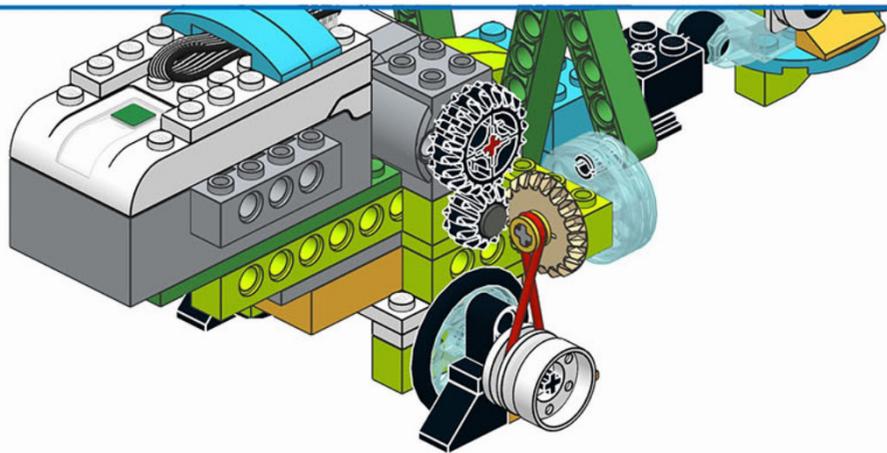
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122

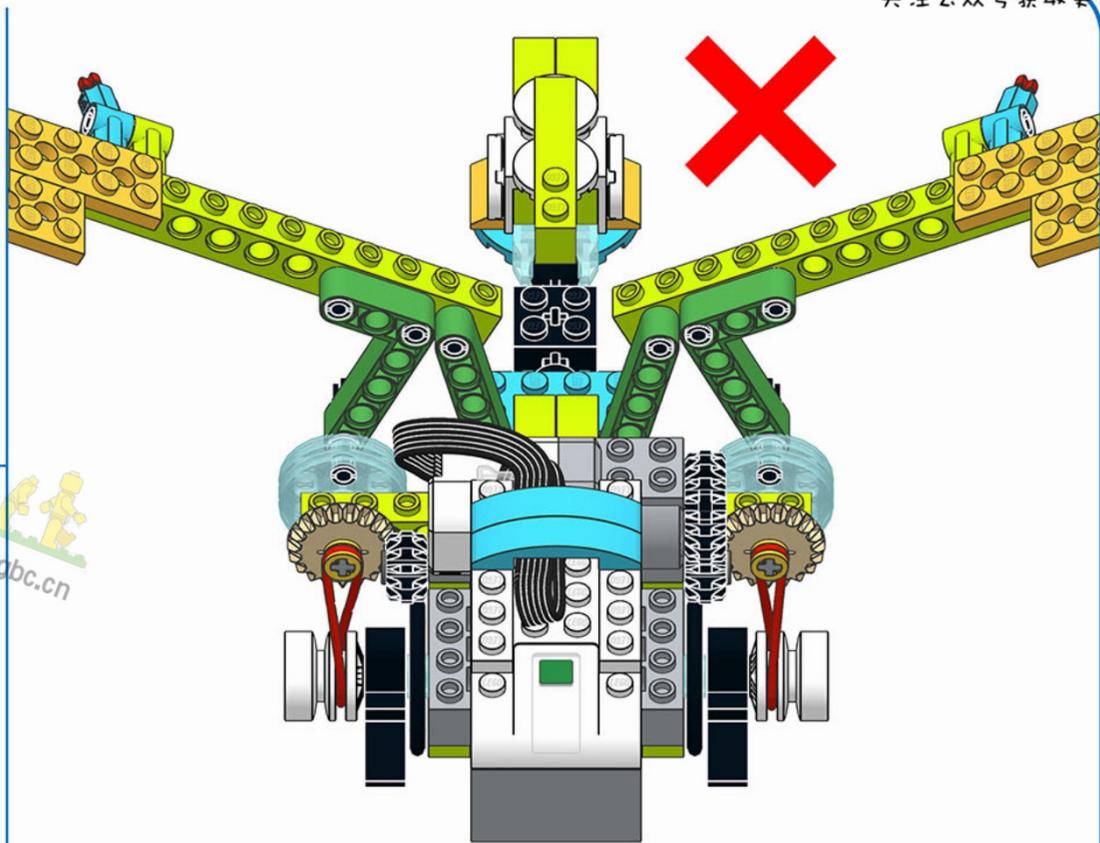




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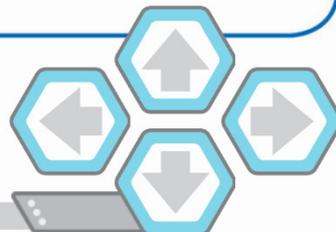
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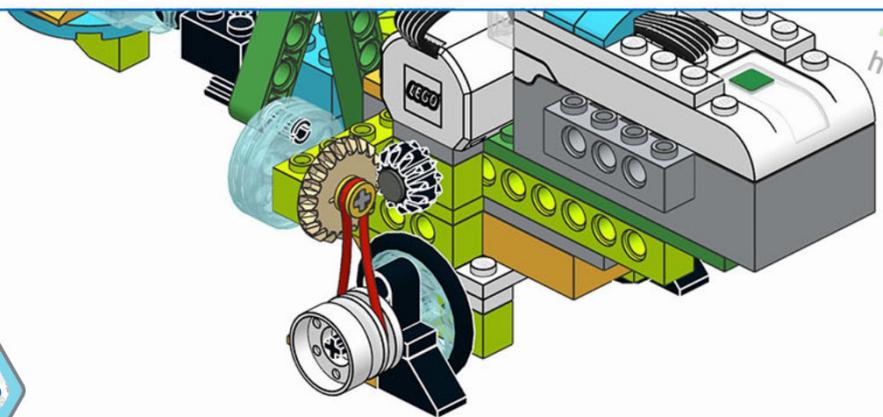
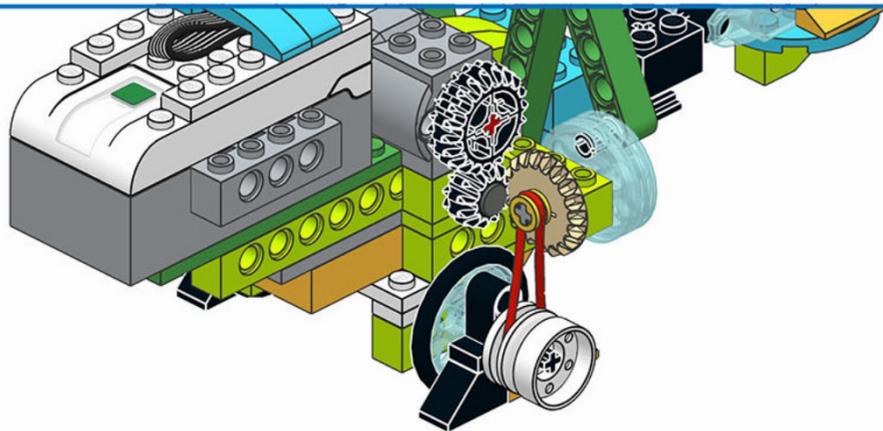
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123

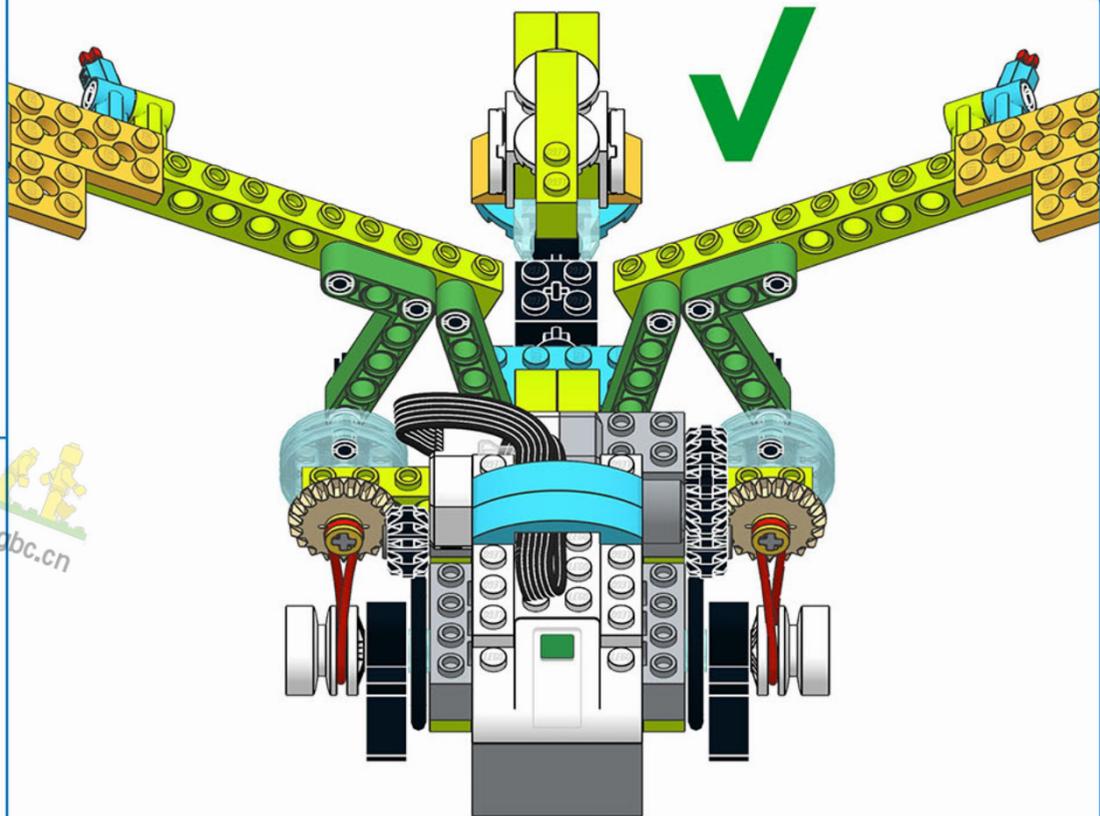




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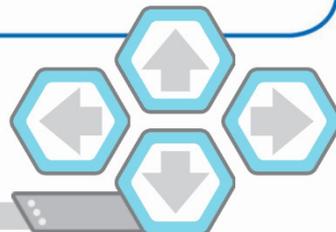
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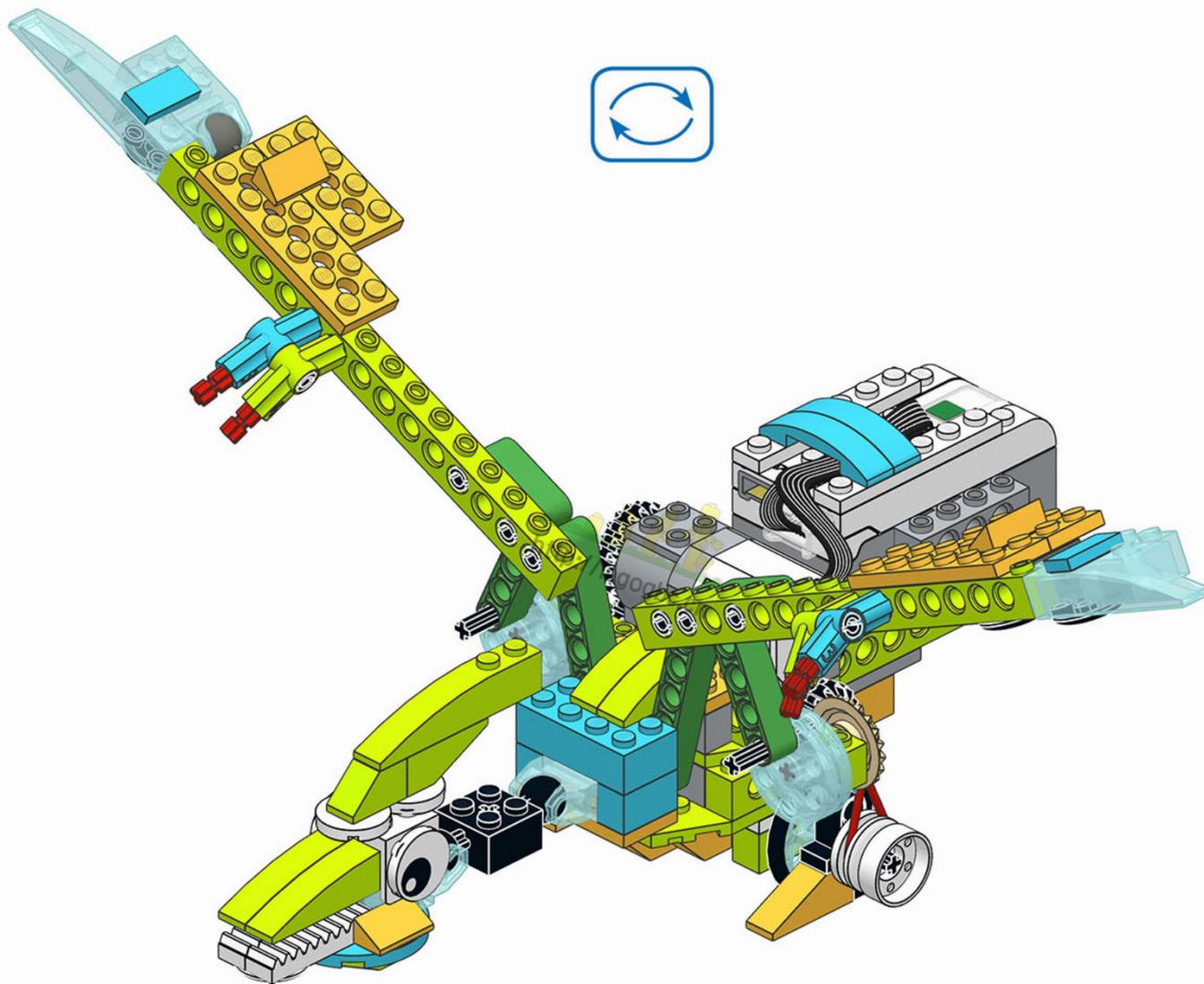
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124





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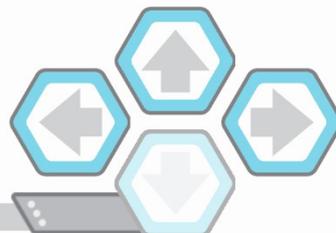


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8

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Task 3



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Program the robot's reaction to the loud sounds. So you can call the robot and it will come to you.



robotiseit.com



8



126



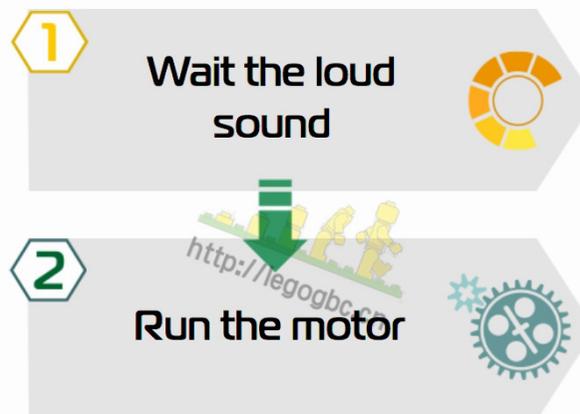


Task 3. Algorithm



关注公众号获取更多

The program is run by the following algorithm:



8



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Task 3. Program



关注公众号获取更多

1

Wait the loud
sound



Step:





Task 3. Program



关注公众号获取更多

1

Wait the
sour

2

Run the motor



Step:



8



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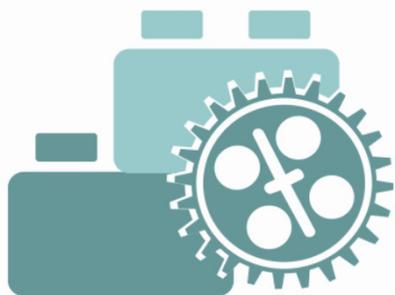


Additional sensor



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Add a motion sensor to detect objects in front of the robot.



Pteranodon



8

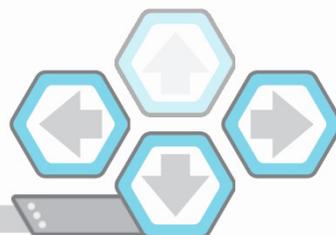
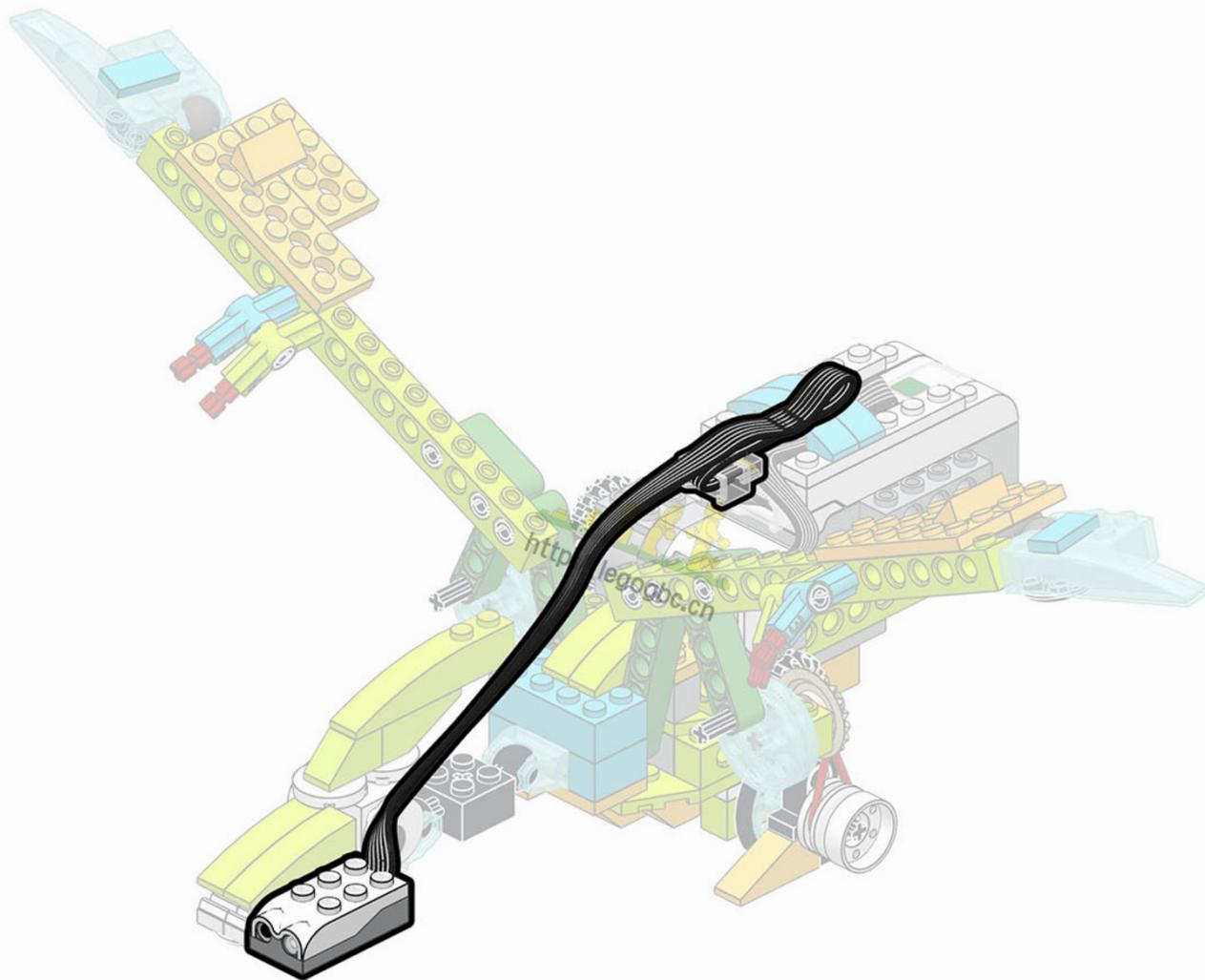


129



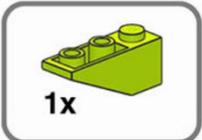
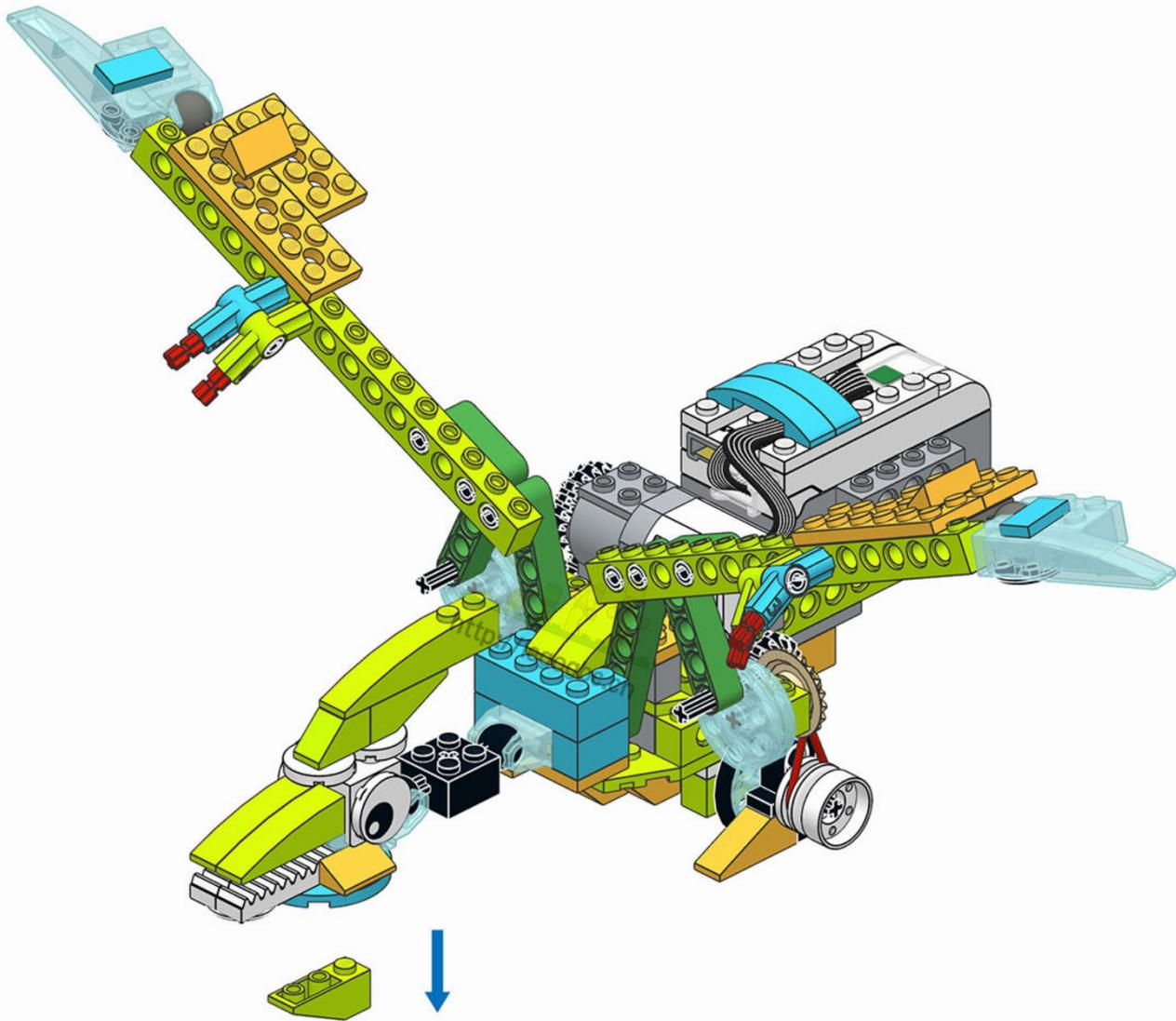


关注公众号获取更多

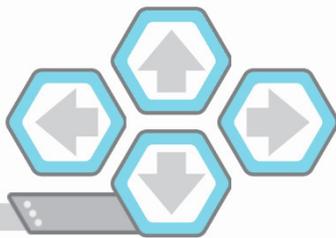




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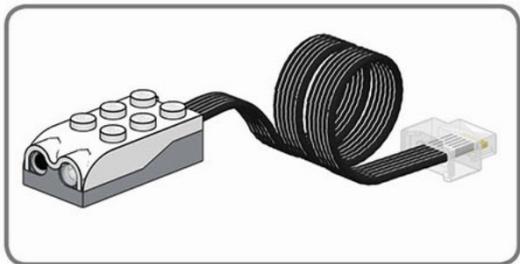


82

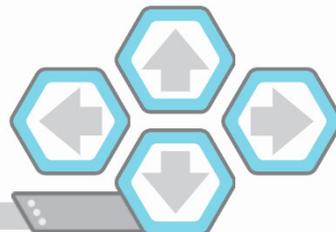




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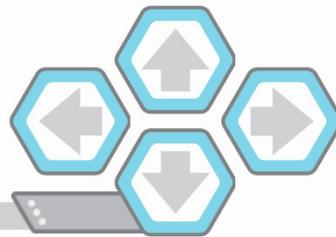
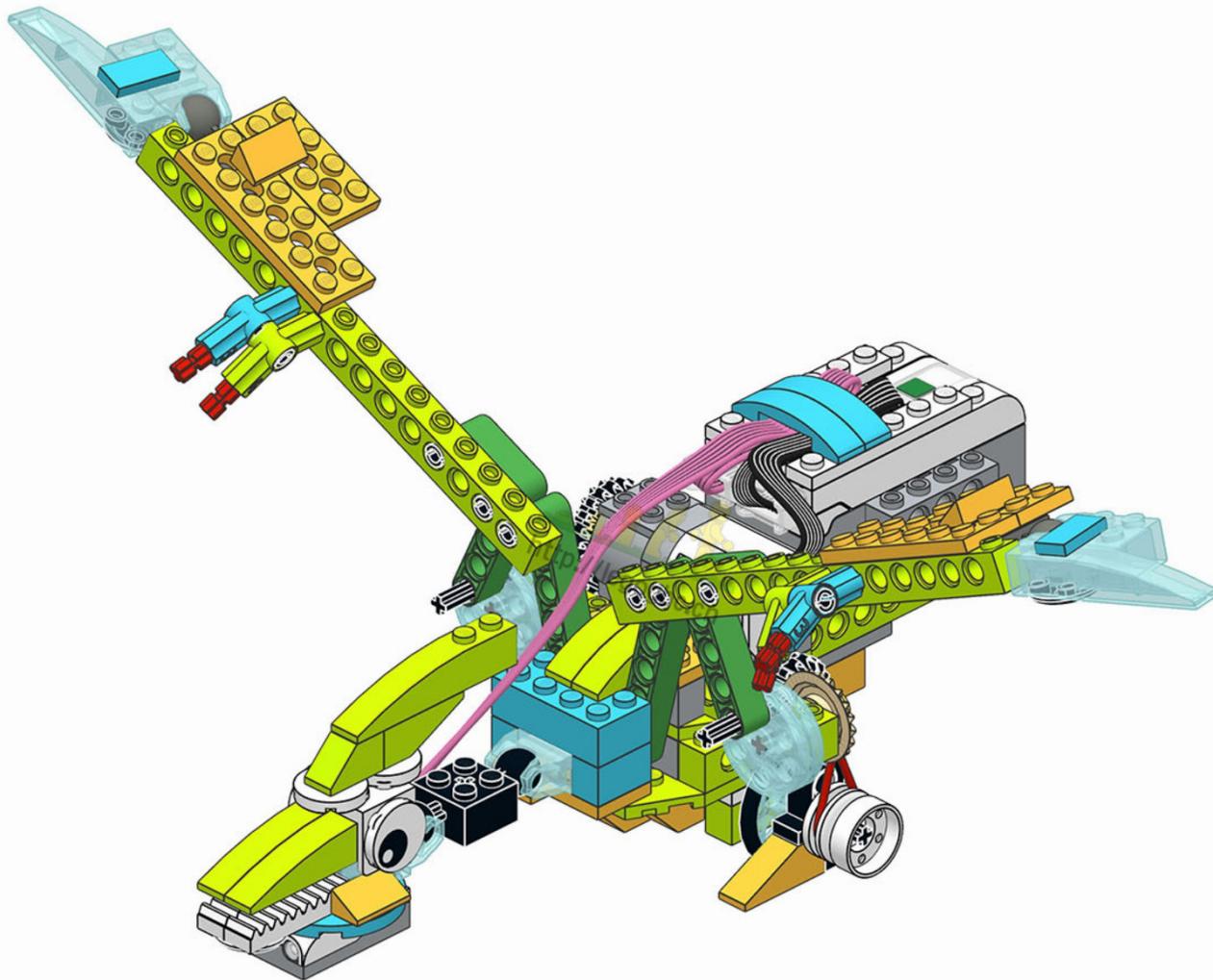
83





关注公众号获取更多

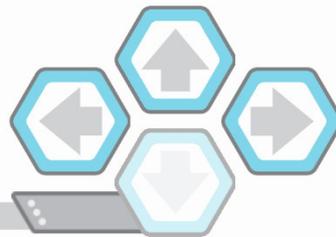
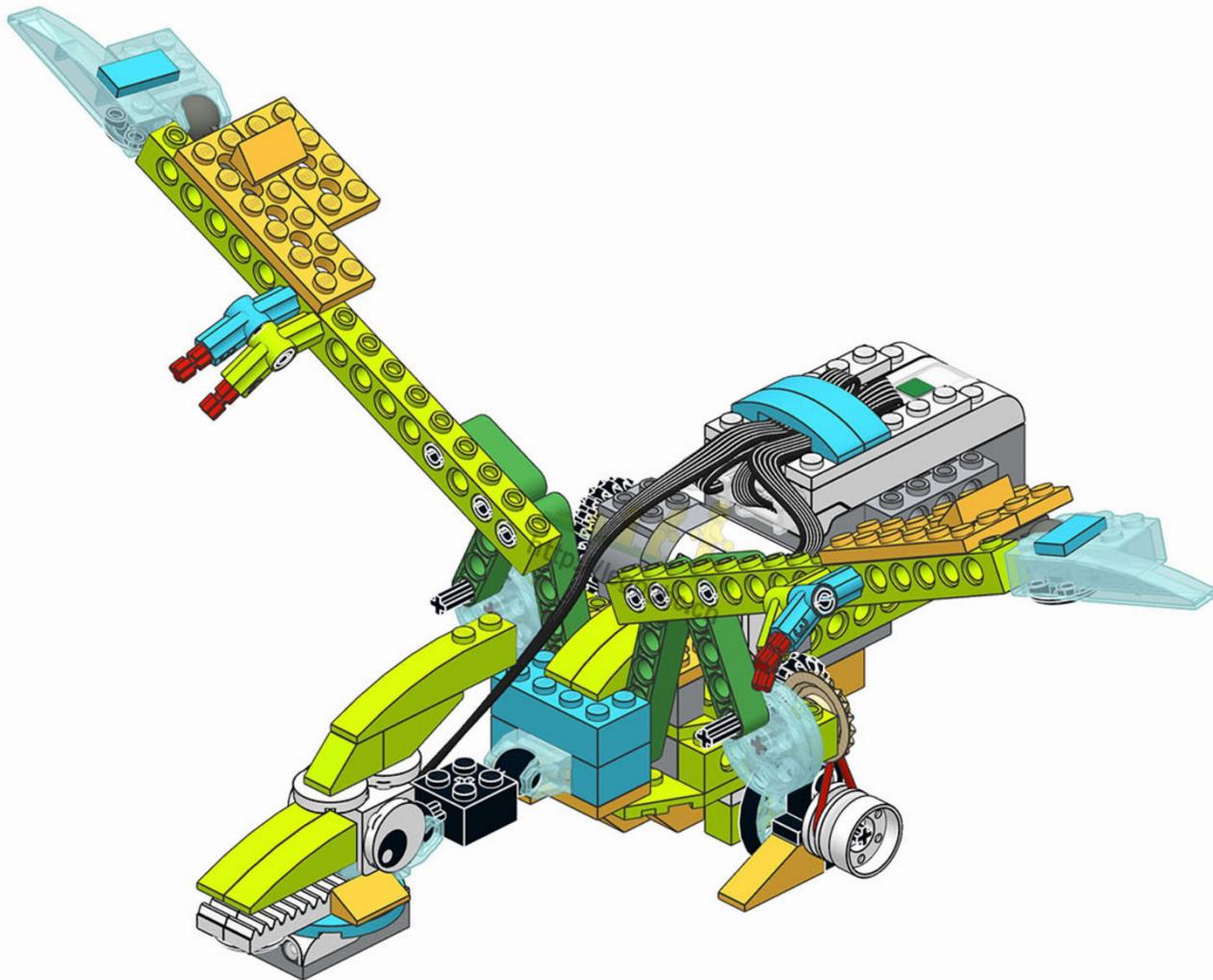
84





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Task 4



关注公众号获取更多

Program the robot fishing. When the fish is near, it has to catch and eat it.



robotiseit.com



8



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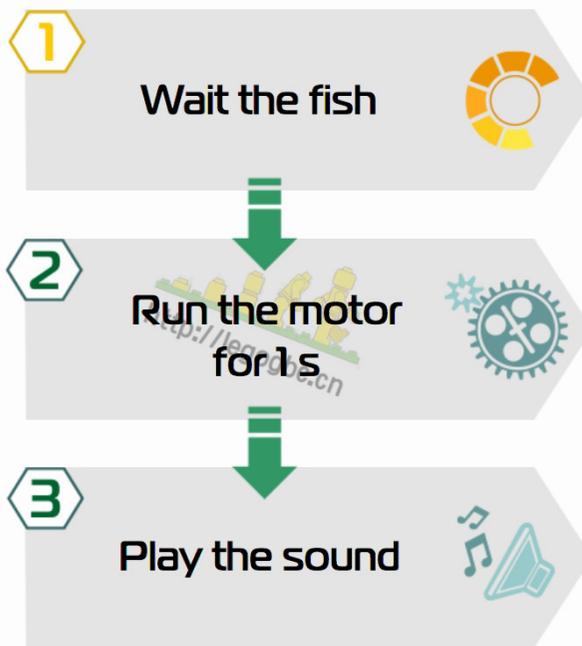


Task 4. Algorithm



关注公众号获取更多

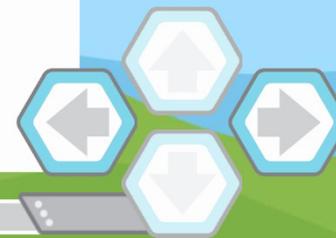
The program is run by the following algorithm:



8



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Task 4. Program



关注公众号获取更多

1

Wait the fish



Step:



8



137





Task 4. Program



关注公众号获取更多

1 Wait th 2 Run the motor for 1 s 



http://legoabc.cn

Step:



8



137





Task 4. Program



关注公众号获取更多



Step:



8



137



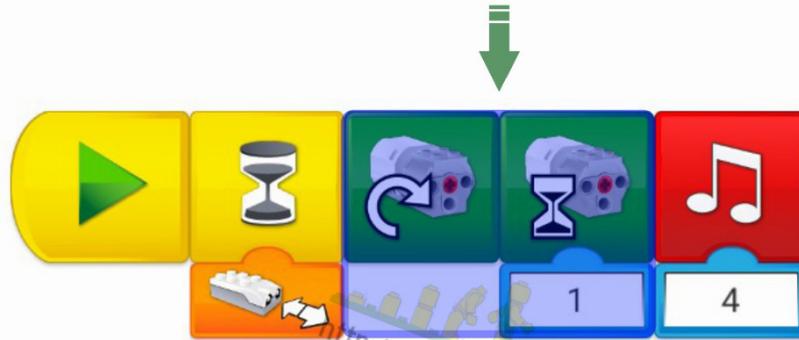


Task 4. Question



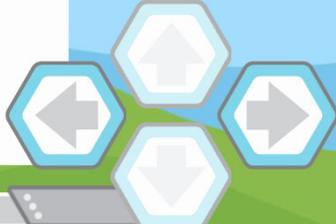
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What program blocks are used to set the motor?



9

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Question



关注公众号获取更多

Who became the descendant of Pterosaurs?



Birds

Insects

None of the modern creatures

10

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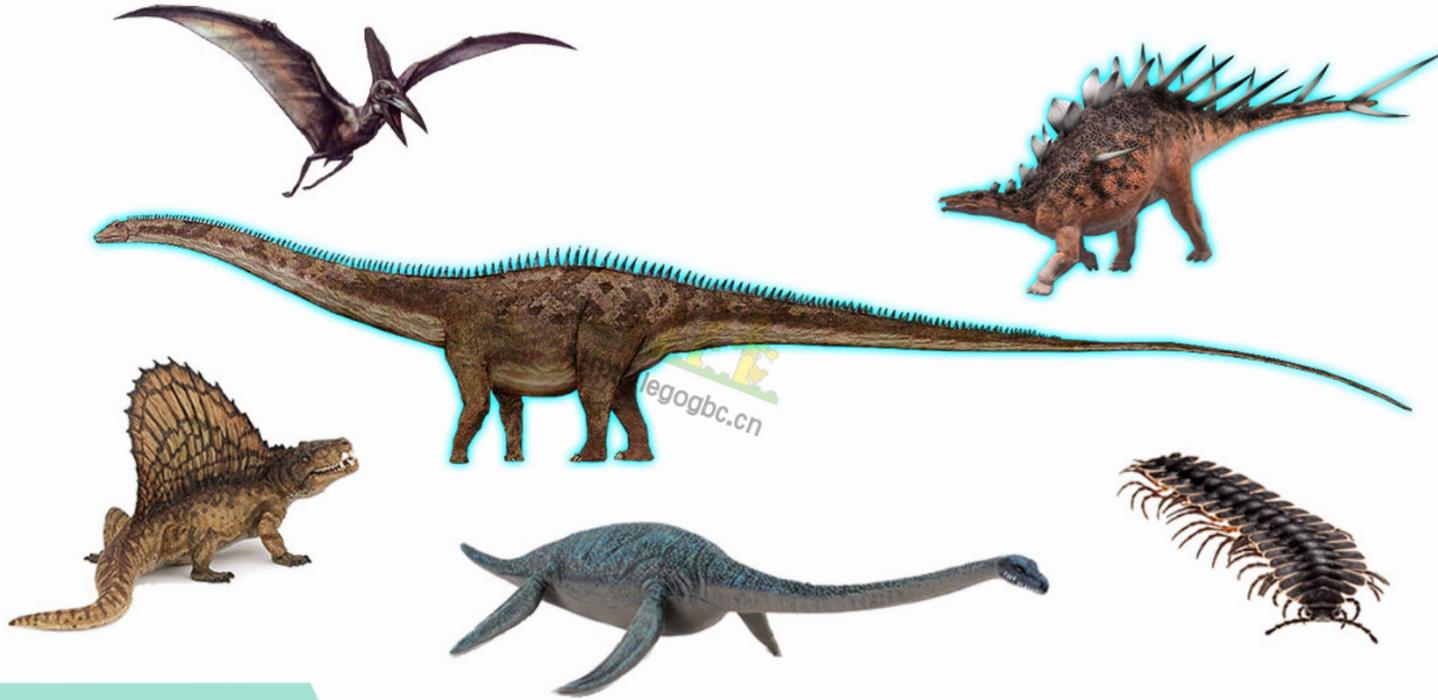


Question



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Which of the following creatures were dinosaurs?
Click on them.



Kentrosaurus



12



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Discuss!



关注公众号获取更多

- ▶ How were the wings of Pterosaurs arranged?
- ▶ What features of the skeleton helped them fly?
- ▶ What did Pteranodons eat?



12



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