

Ignite children's technological  
dreams with AI

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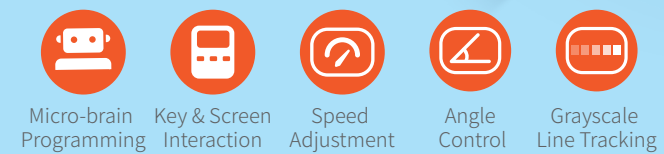
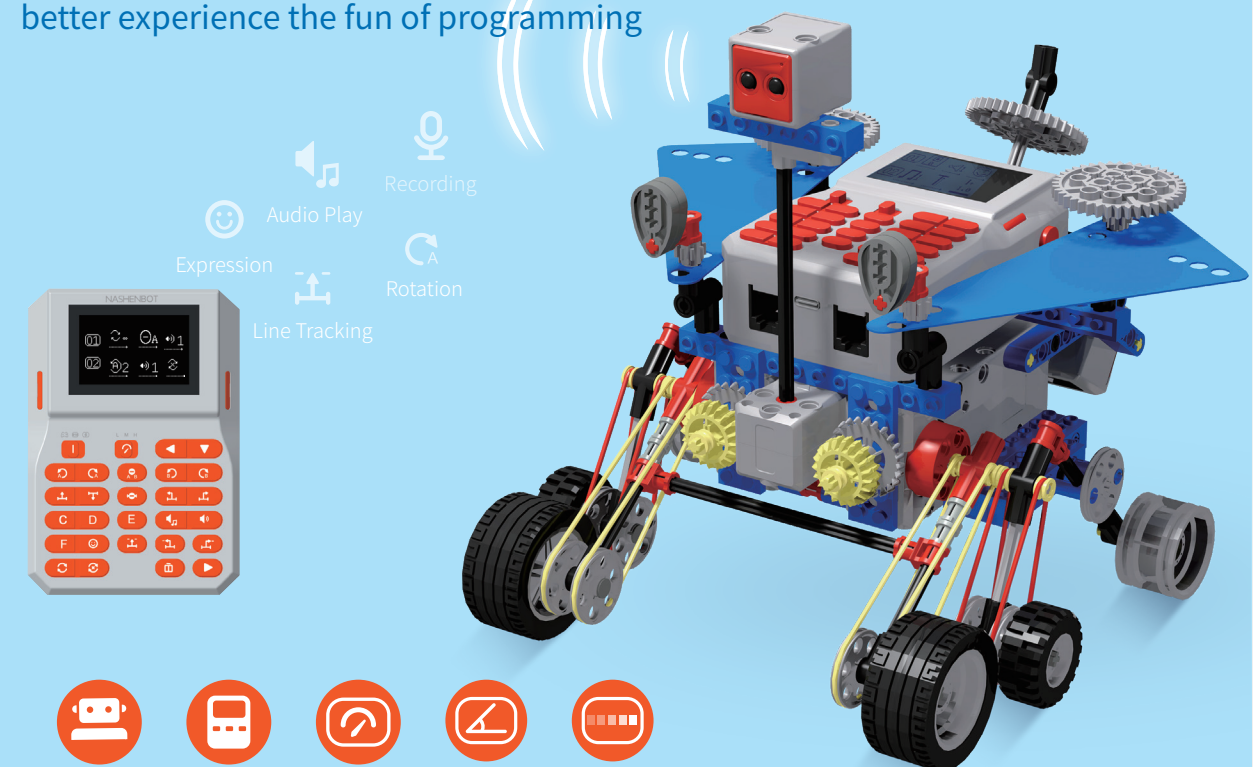
S1 Building Manual

## MPBOT Micro-brain Programming Robot

AI programming advanced set

# MPBOT S1

Rich programming control keys and sensors let you  
better experience the fun of programming

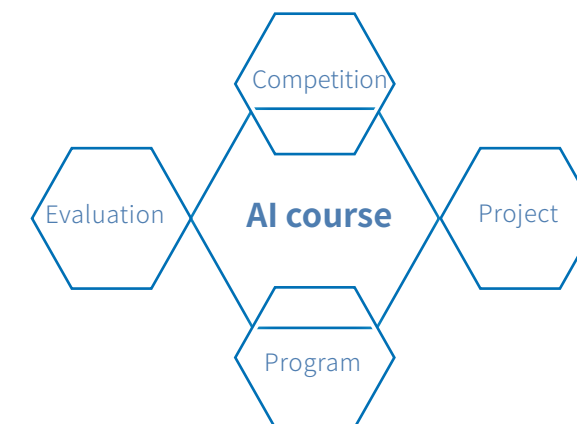


## Educational robots for children aged 3-18

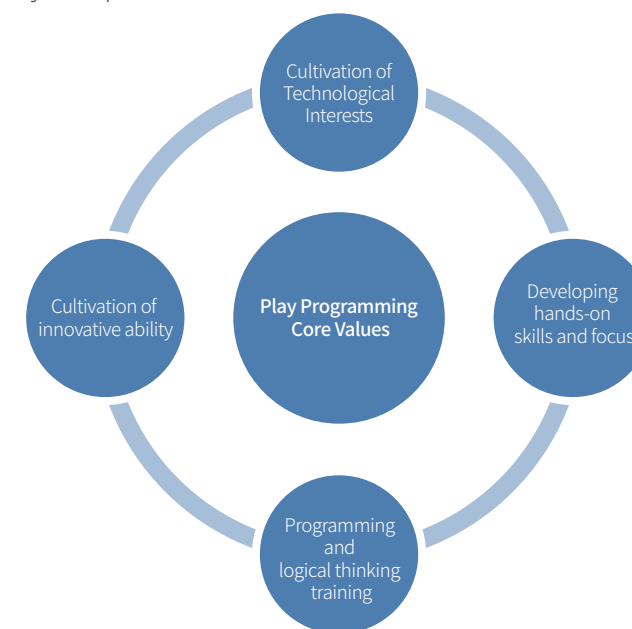


## Multi-disciplinary integration of Nashenbot AI course

The course is jointly developed by the Nashenbot Artificial Intelligence Education Research Institute and well-known STEM related research institutions. The course covers interdisciplinary, competition, project, programming, evaluation and other multi-level artificial intelligence innovation curriculum system.



By playing a series of programming courses, children's interest in science and technology can be found in project exploration, practical ability and concentration can be cultivated in project construction, programming and logical thinking can be trained in programming games, and innovative practical ability can be cultivated in project optimization.





## Is it helpful for children to learn subjects?

The core of the course is AI programming. The project-based teaching method can cultivate children's ability to apply what they have learned. For example, the interesting theme of DIY smart toys can cultivate children's active learning quality and academic interest. The process of structural construction and optimization can cultivate children's concentration and comprehensively enhance children's learning ability.



### How to learn?

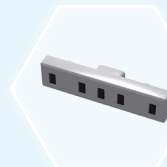
The course adopts PBL project-based teaching, that is, you can go to the offline store to buy a lesson package for the teacher to play with, or you can register and log in to the account of the course platform. Parents can play with it several times according to the course materials, and the children can complete it independently.



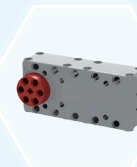
## Understanding programming robots



MPC Controller x1



Integrated 5-Grayscale Sensor x1



Motor x2



Open-loop Motor x1



Infrared Sensor x1



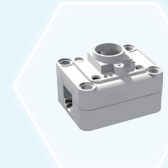
Sound Sensor x1



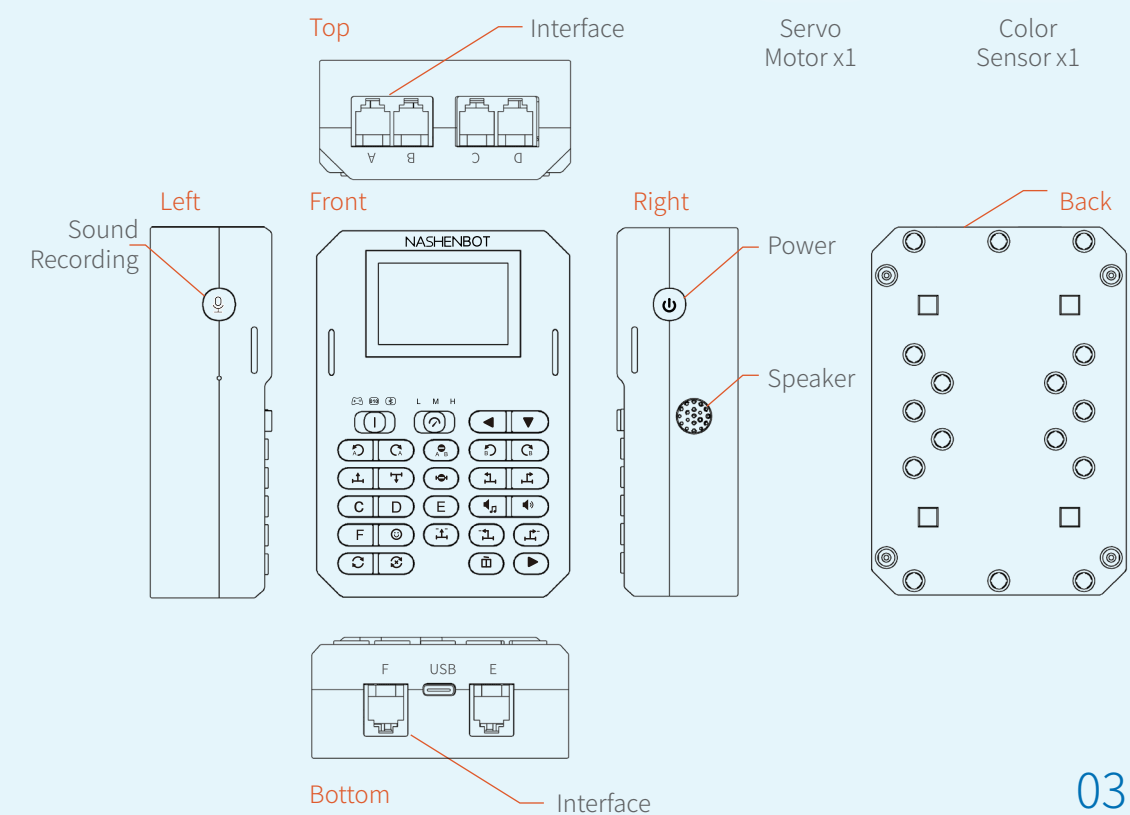
Full Color Light x2



Servo Motor x1



Color Sensor x1





### Mode switch

Three modes are supported

- Real-time control
- Key-screen programming
- Advanced Function



### Speed switch

Support three kinds of power

- H** High speed
- M** Medium speed
- L** Low speed



### Insert a program / Return

- Support inserting program module in key screen programming mode
- Support return in advanced function mode



### Page turning / Move

- Support page down in key-screen programming mode
- Mobile support in advanced function mode



### A Motor reverse / forward rotation

- In normal mode of key-screen programming, short press can set 1~9 seconds and unlimited time, and long press can set 0.1~9.9 seconds in advanced mode
- In real-time control mode, long press will continue to execute



### B Motor reverse / forward rotation

- In normal mode of key-screen programming, short press can set 1~9 seconds and unlimited time, and long press can set 0.1~9.9 seconds in advanced mode
- In real-time control mode, long press will continue to execute



### A or B motor stop

- Key-screen programming Normal mode short press to switch A or B motor, advanced mode long press to set the stop time



### Robot stop

- Key-screen programming Normal mode short press to switch A or B motor, advanced mode long press to set the stop time



### Forward / Backward

- When moving forward, motor A reverses and motor B rotates forward
- When moving backward, motor A rotates forward and motor B reverses
- In normal mode of key-screen programming, short press can set 1~9 seconds and unlimited time, and long press can set 0.1~9.9 seconds in advanced mode
- In real-time control mode, long press will continue to execute



### Turn left / Turn right

- At the same time, control the forward or reverse rotation of A and B motors
- In normal mode of key-screen programming, short press can set 1~9 seconds and unlimited time, and long press can set 0.1~9.9 seconds in advanced mode
- In real-time control mode, long press will continue to execute



### Sensor interface

Automatically identify 9 sensors such as infrared obstacle avoidance or sound intensity detection for logic judgment



- Only valid in key-screen programming mode



### Sensor interface

Automatically identify 9 sensors such as infrared obstacle avoidance or sound intensity detection for logic judgment



- Only valid in key-screen programming mode



### Play Sound

- In normal mode of key-screen programming: short press can play 8 audio and 1 recording; in advanced mode, long press can play 19 audio and 9 recording



### Turn on the buzzer

- In key-screen programming mode: press briefly to set 1~7 syllables
- In real-time control mode, press once to play sound



### Line tracking

- In normal mode of key screen programming: short press to select intersection line patrol and time line patrol; in advanced mode, long press to set the time of line patrol for 0.1~9.9 seconds



### Expression

- When programming the normal mode of the key screen: short press can switch 5 expressions, while long press can set the switch of 5 expressions and set the display time of the expressions for 0.1~9.9 seconds



### Start loop / End loop

Short press to set infinite and 2~9 cycles



- Only valid in key-screen programming mode



### Turn at intersection

Turn left/right at the intersection in a short time



- Only valid in key-screen programming mode



### Run program / Define

- Short press to run or stop the program in the key-screen programming mode
- In advanced function mode, the function is determined



### Remove program

Short press to delete the currently selected program

- Only valid in key-screen programming mode



### Sound recording

Short press to start recording,

- Only valid in real-time control mode



### Power switch

Long press for 1 second to turn on or off



## What will the children gain?

Build and program, let children learn structural principles, electronic knowledge and programming knowledge from cases.

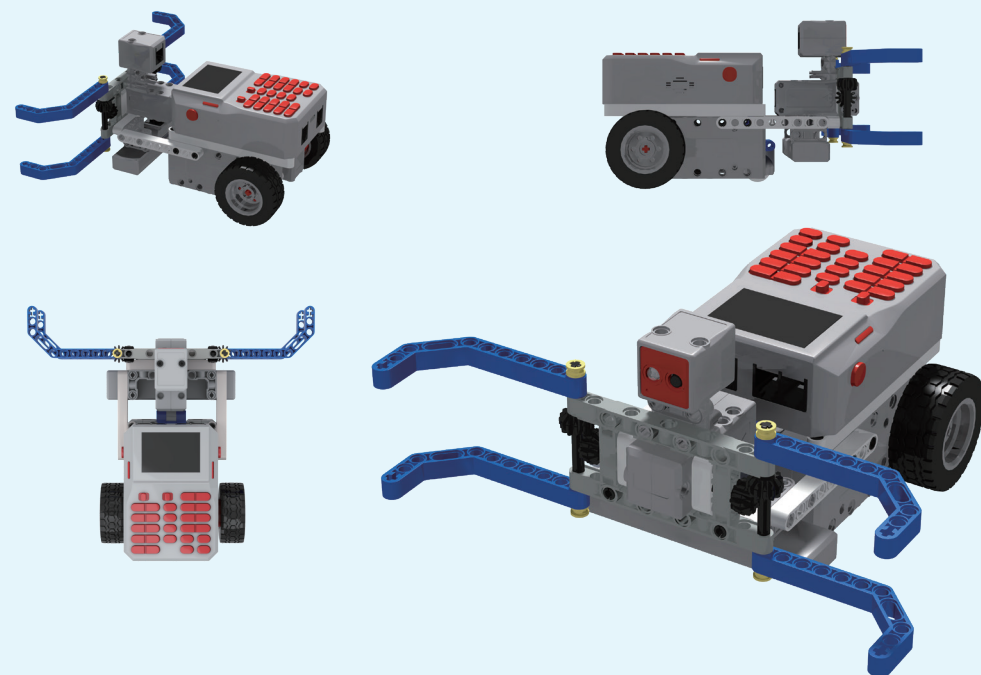
## Multi-functional robot

Construction difficulty: ★★★

Programming difficulty: ★★★

### 1 Course introduction

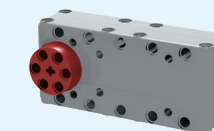
We have seen many robots with a single function. Some of them can patrol the line and some can avoid obstacles. Today we will build a multi-functional robot that integrates line patrol, movement, obstacle avoidance and grasping functions.



### 2 Parts list



MPC Controller x1



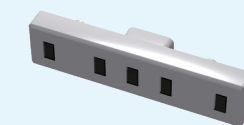
Motor x1



Servo Motor x1



Infrared Sensor x1



Integrated 5-Grayscales Sensor x1

2# 1:1

4# 1:1

8# 1:1



4



26



1



4



6



4



2



1



4



2



5



2



2 ③



4 ⑤



3 ⑨



2 ⑮



1



1



2 4#



2 8#

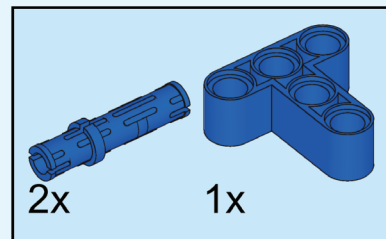


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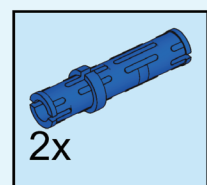
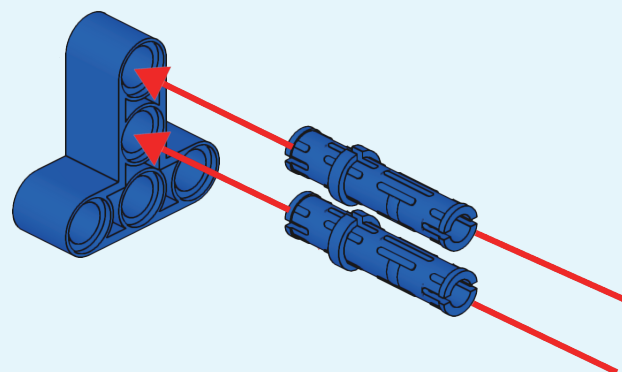


Building steps: items with this icon need to be turned over. Accessories include decorative pieces, which can be decorated by yourself.

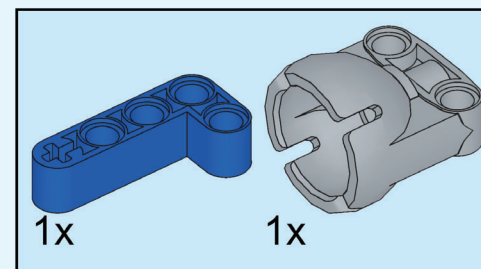
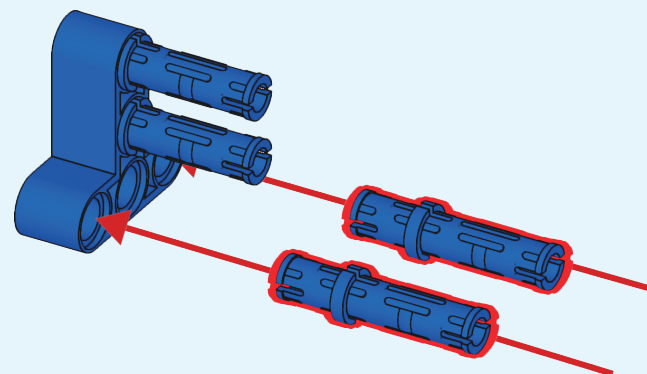
3 Let's start building



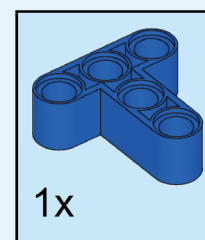
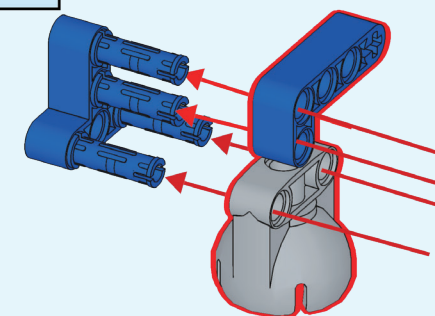
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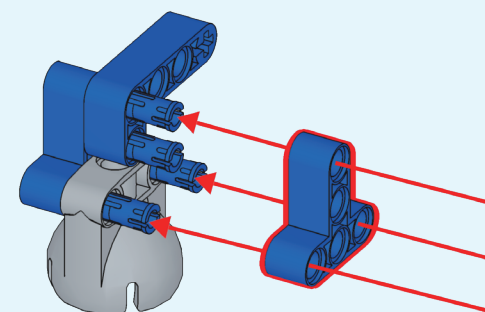
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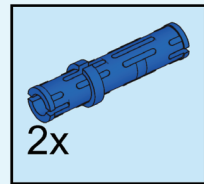
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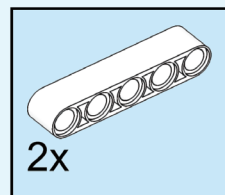
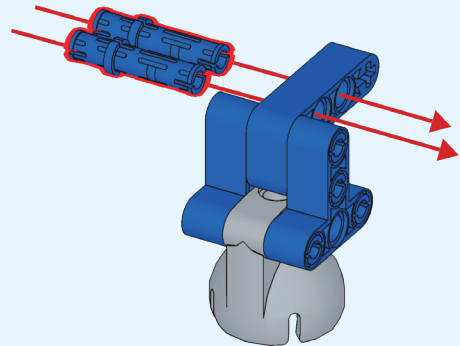
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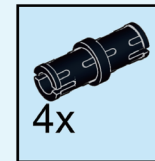
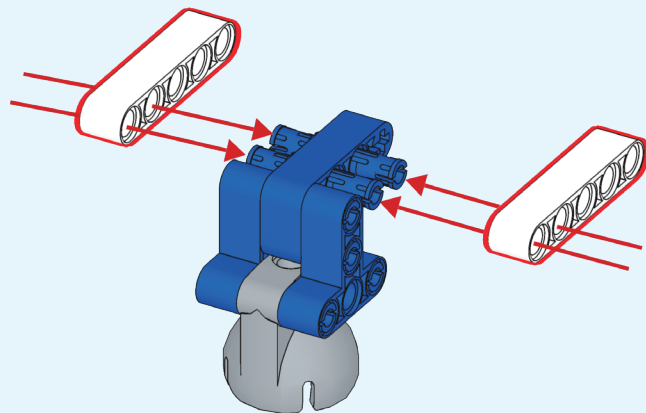




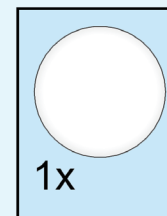
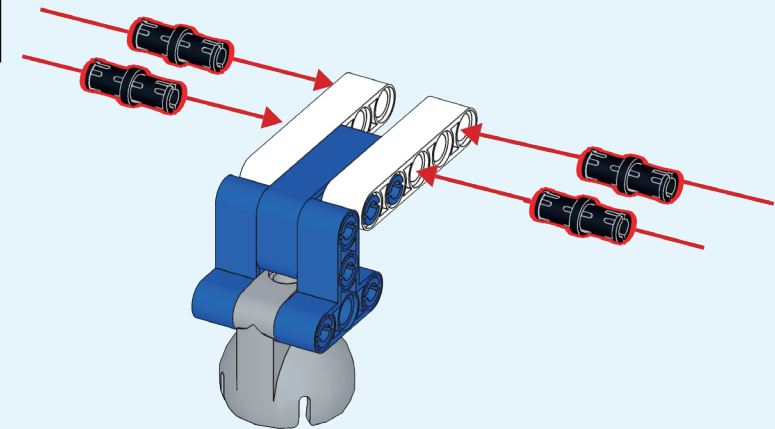
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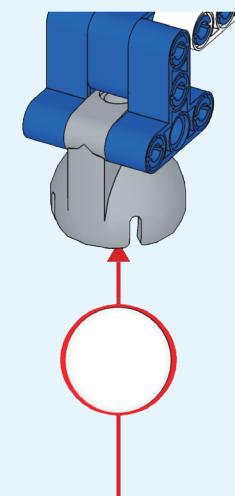
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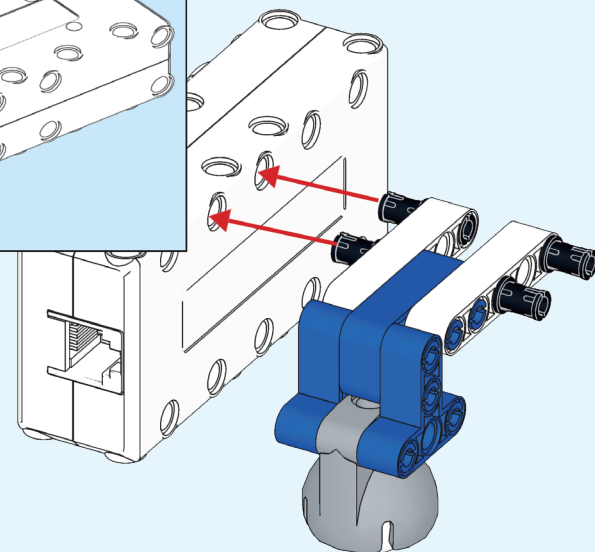
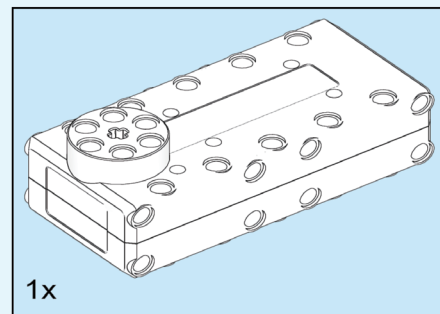


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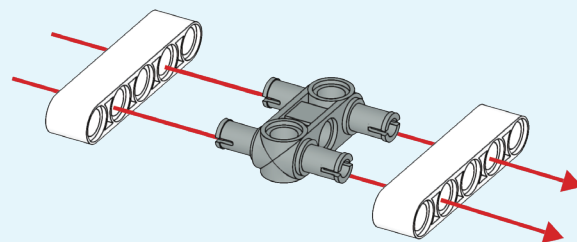
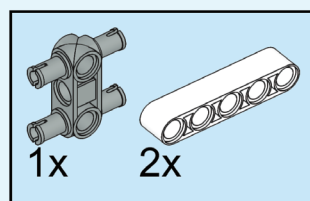


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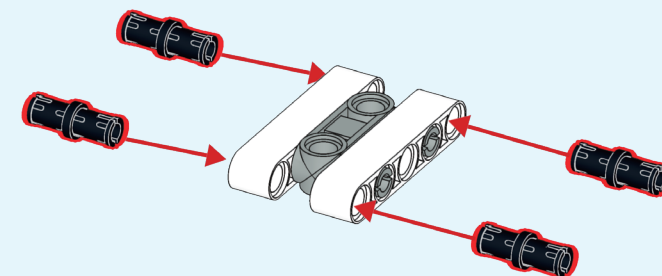
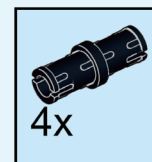




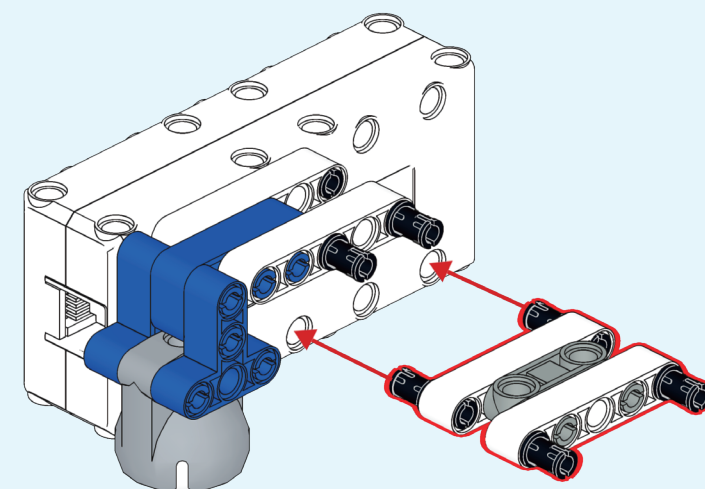
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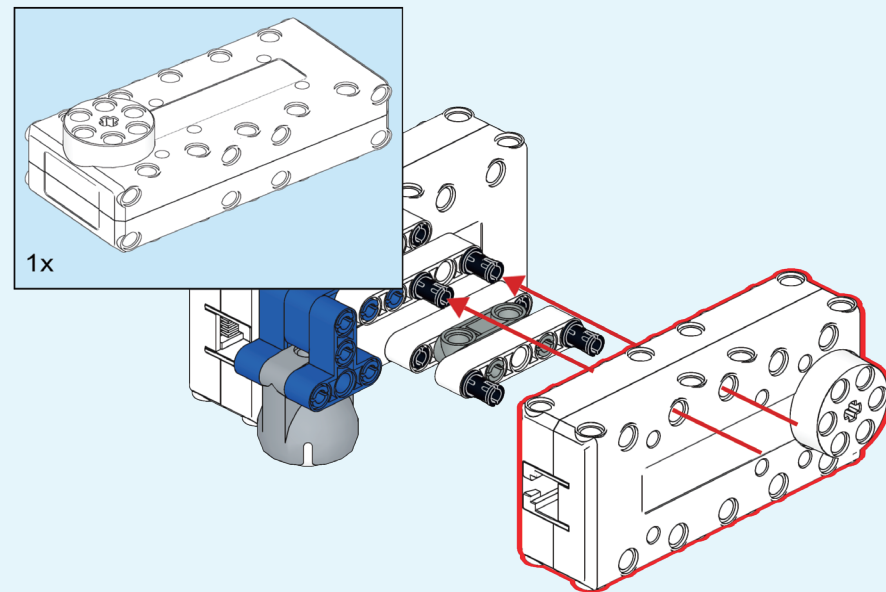
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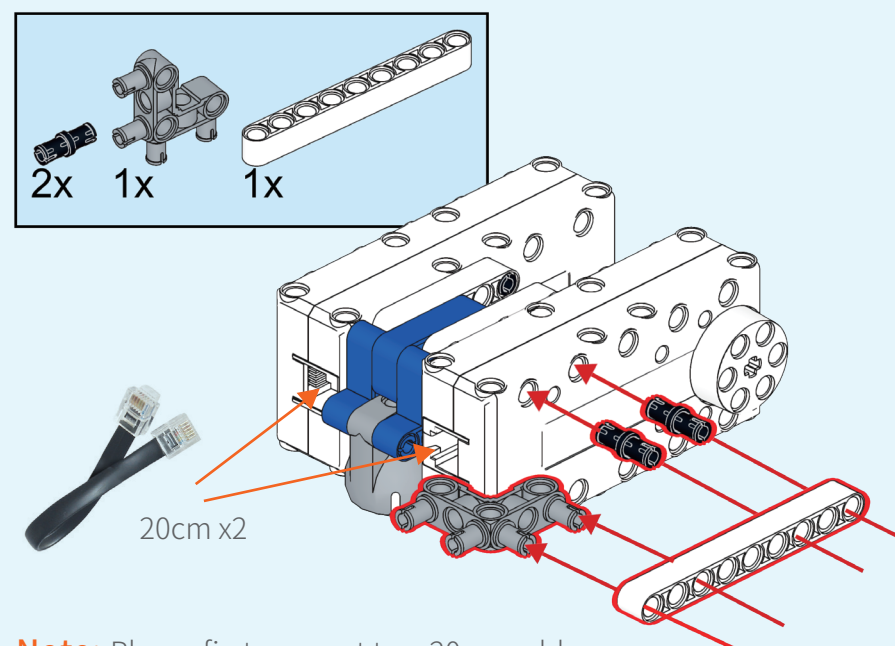
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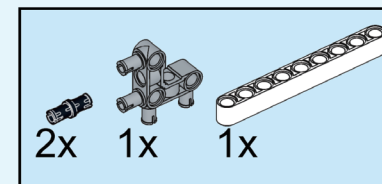
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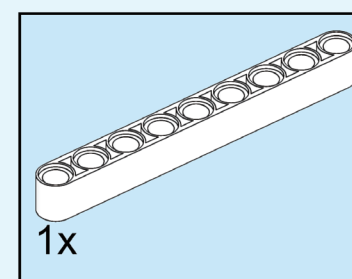
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**Note:** Please first connect two 20cm cables.

14

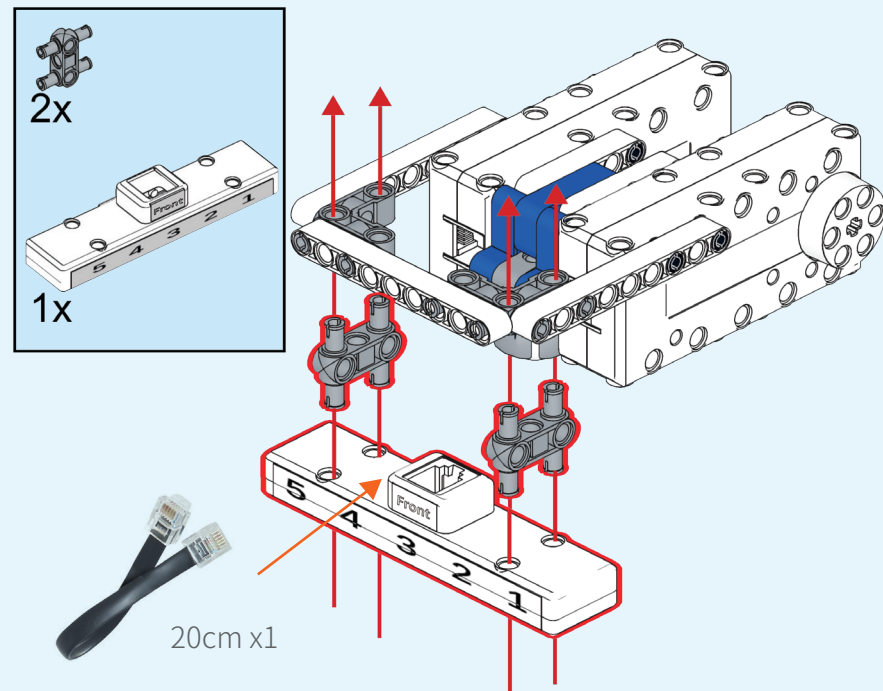


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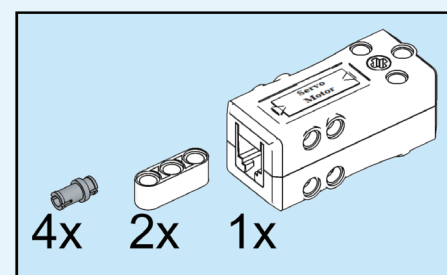
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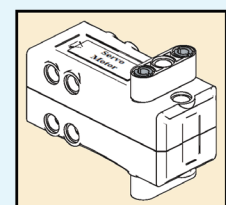


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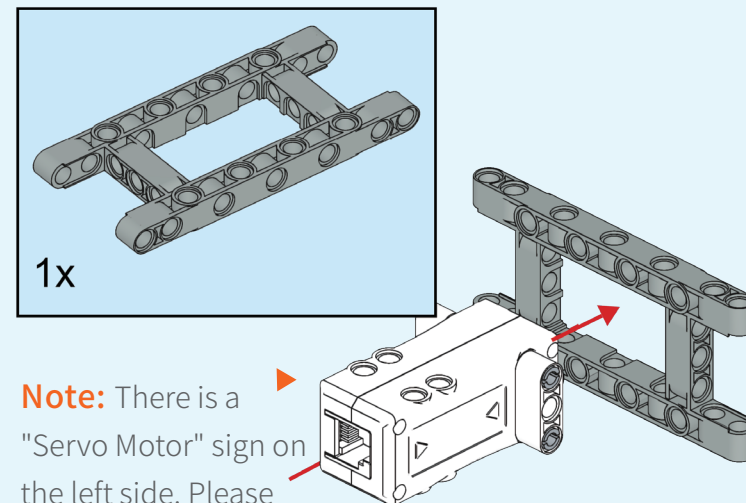
**Note:** Please connect the cable before installation.  
Please pay attention to the installation direction.



18

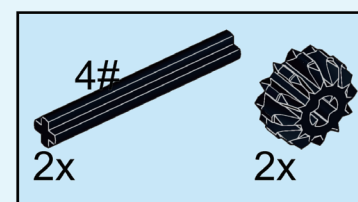


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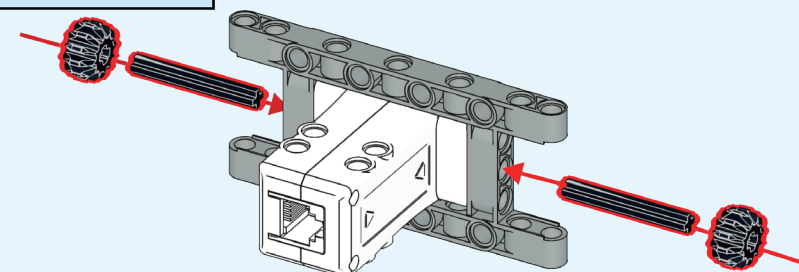


19

**Note:** There is a "Servo Motor" sign on the left side. Please pay attention to the installation direction.

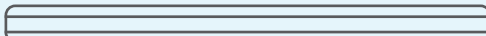


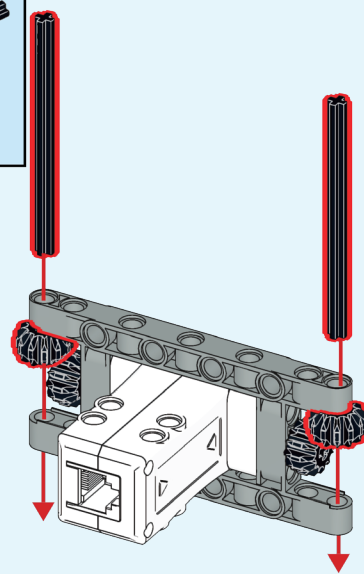
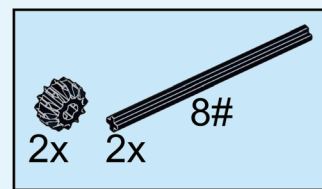
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4# 1:1

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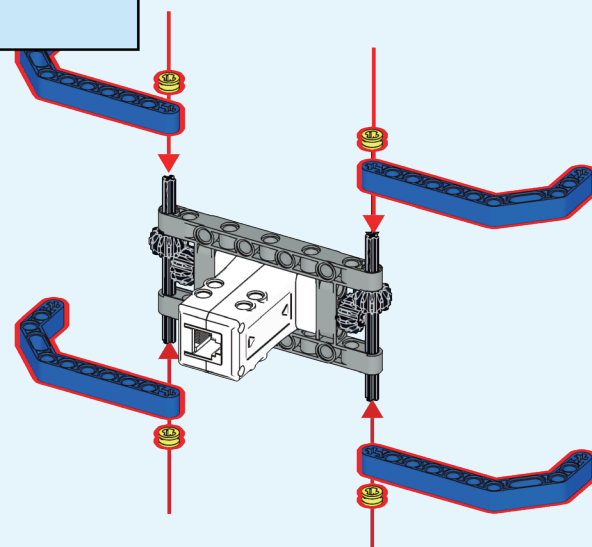
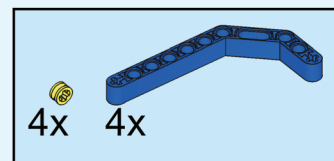
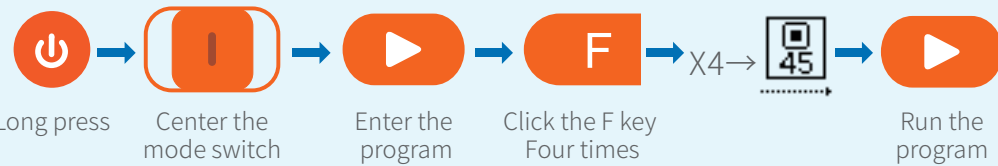
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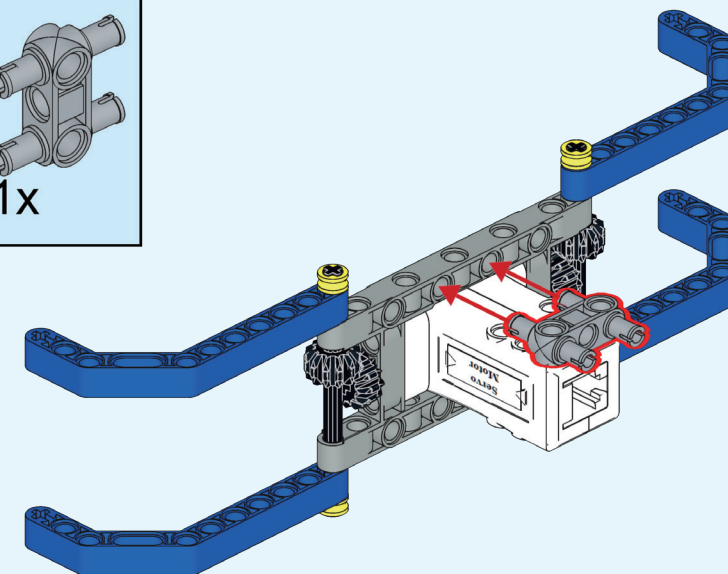
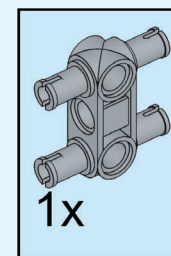
**Note:**

Before installing the servo motor structure, connect the servo motor to the controller F port, turn on the machine, select the middle mode, and set the servo motor angle to 45°.

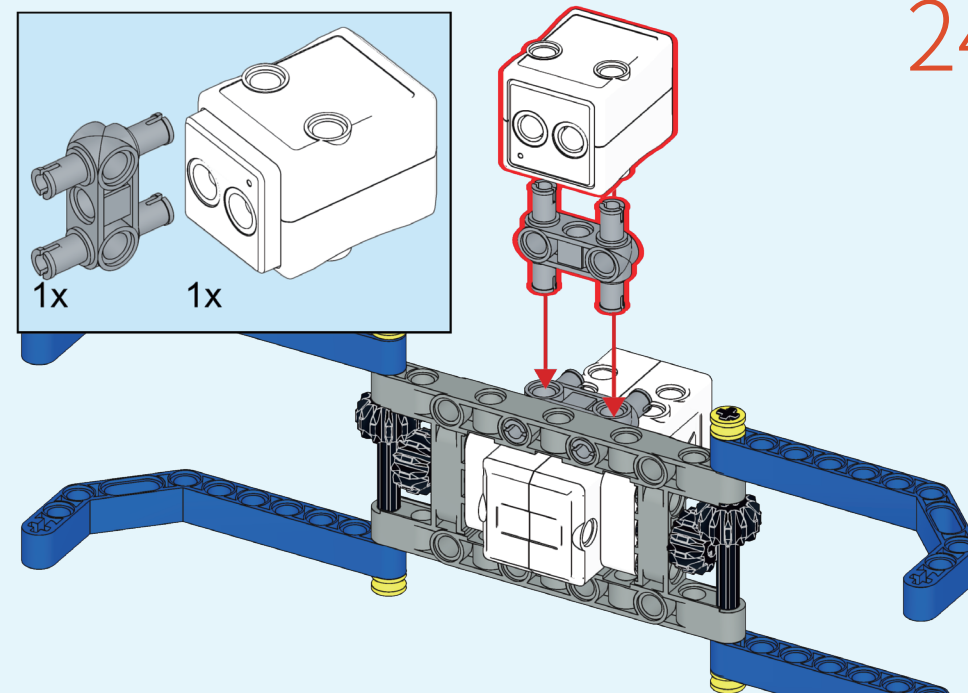
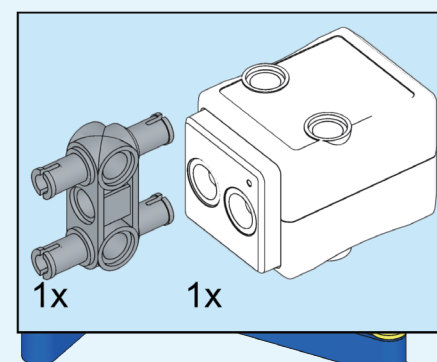


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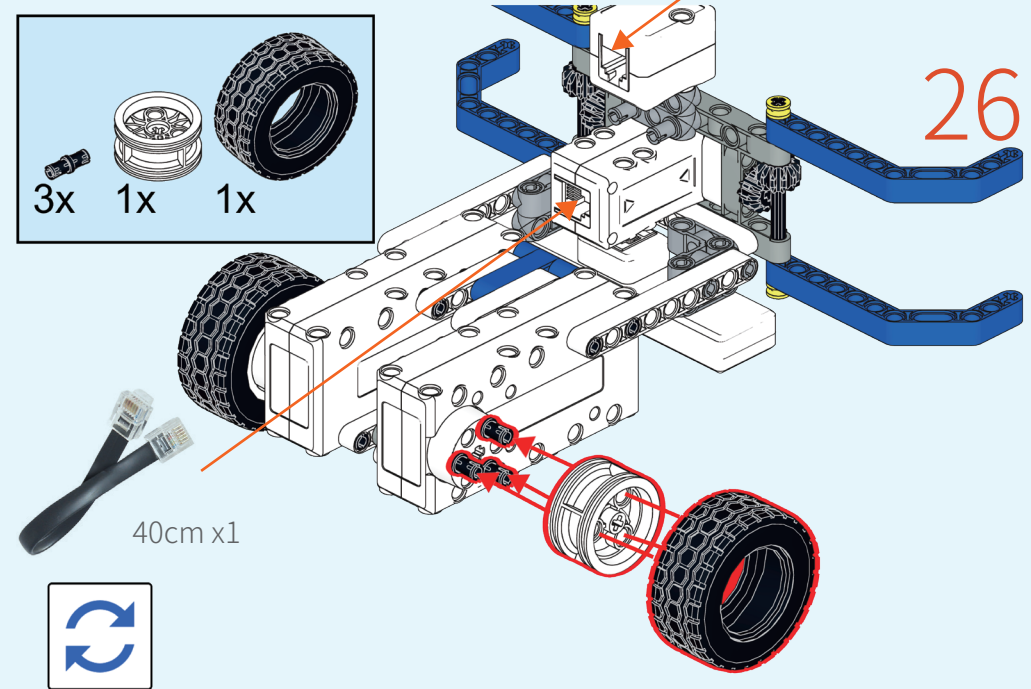
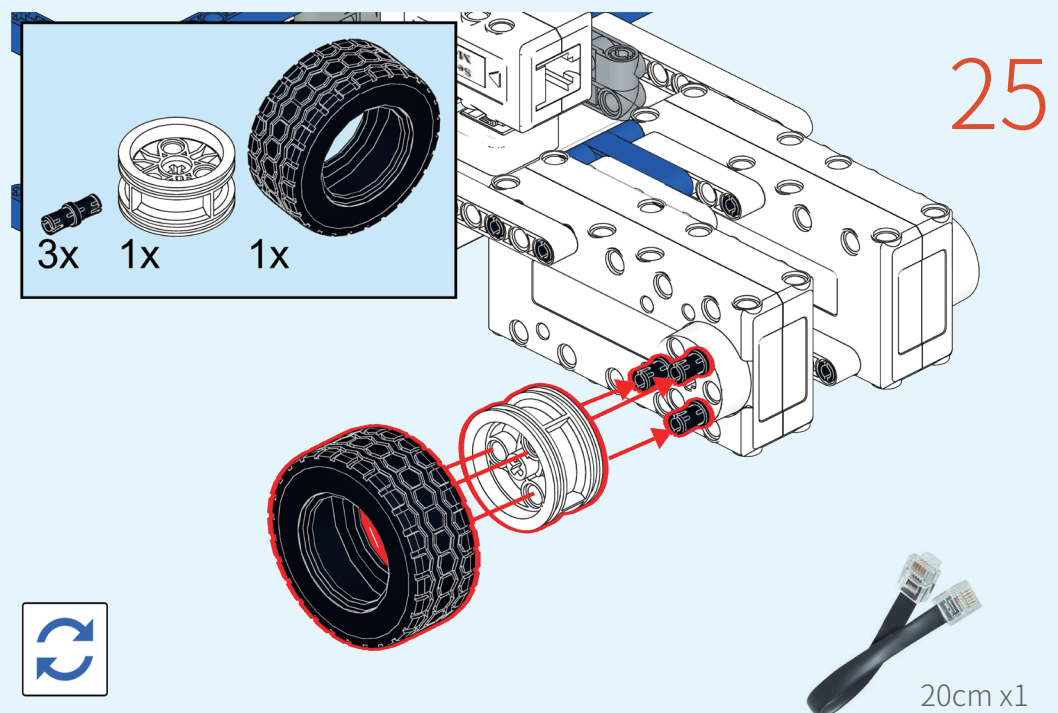
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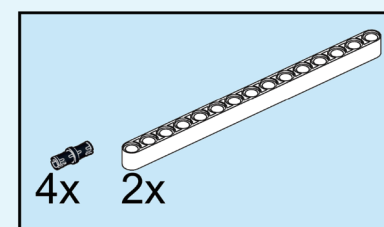
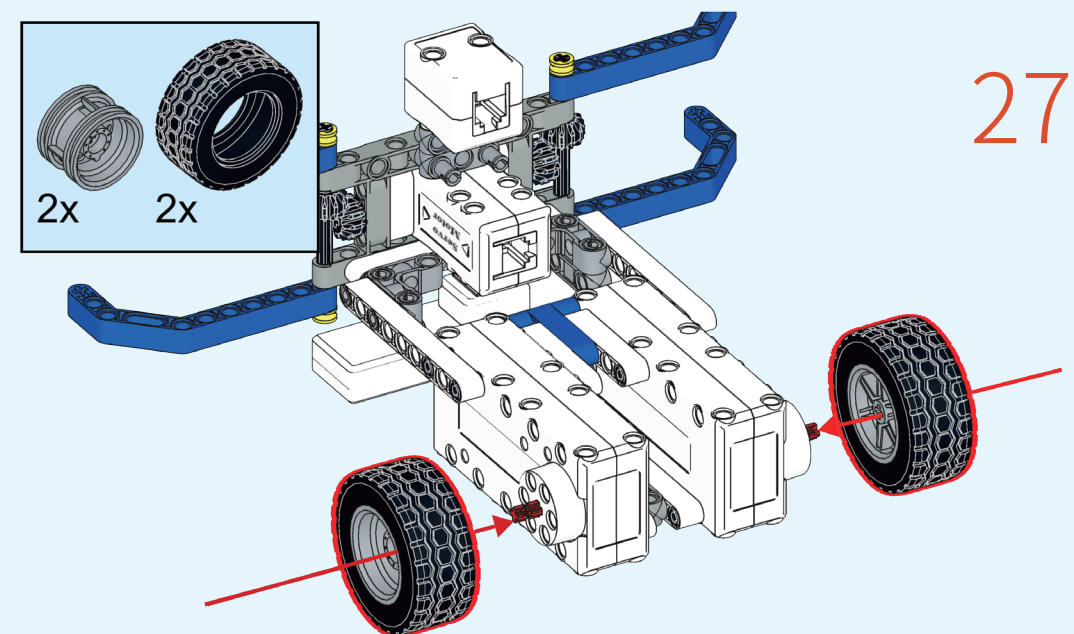
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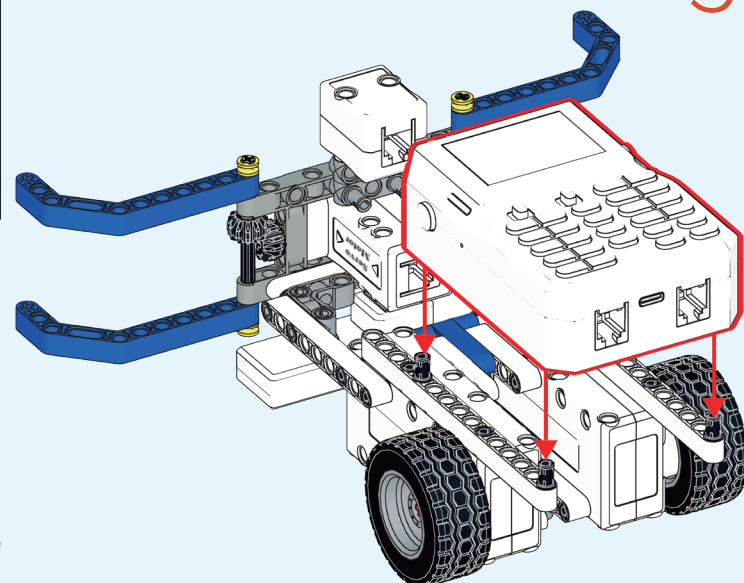
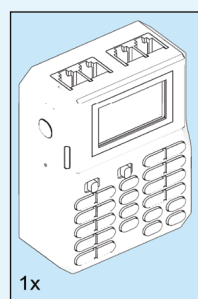
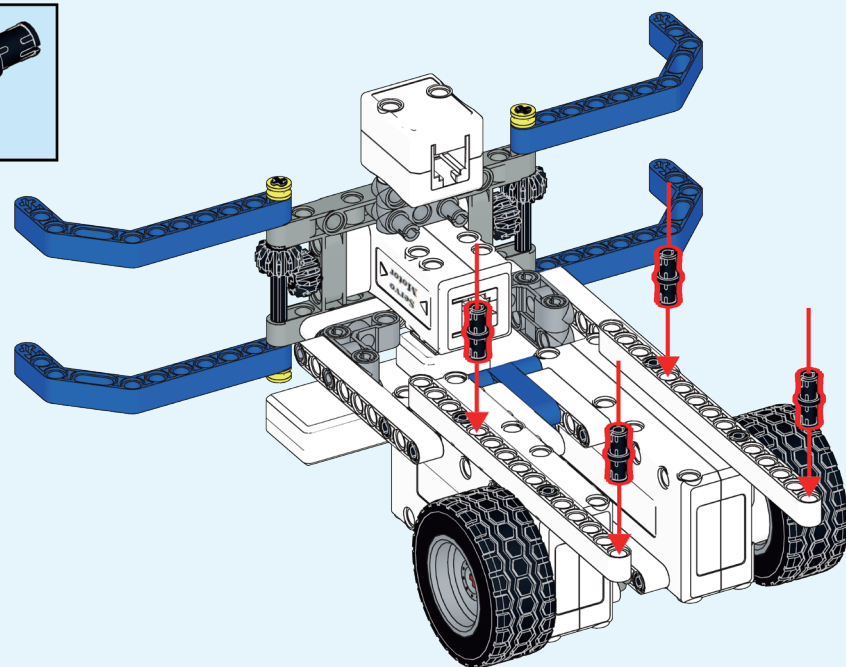
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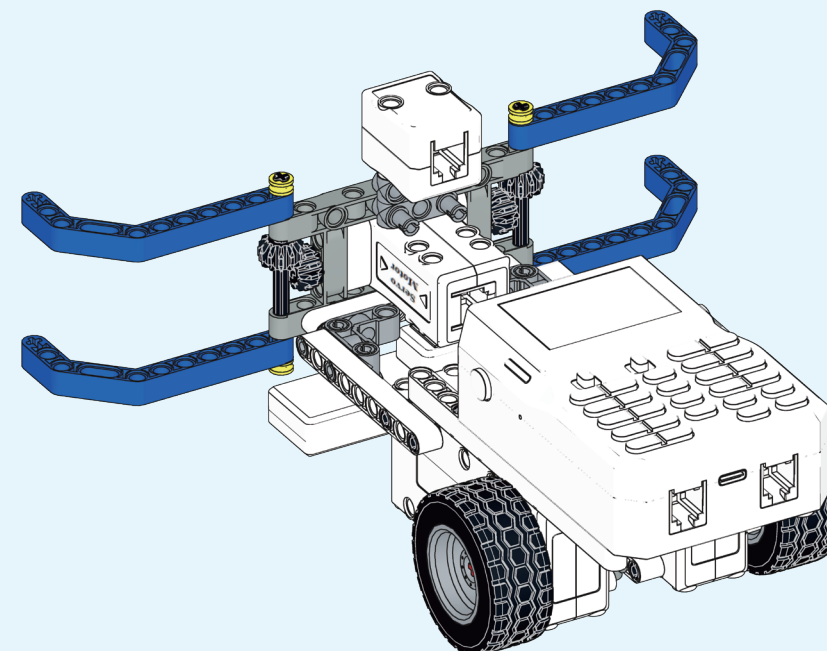


2# 1:1





**Note:** Please connect before installing the controller.



### 1 Interface selection:

The left motor is connected to port A, the right motor is connected to port B, the integrated 5-grayscale sensor is connected to port C, the infrared sensor is connected to port D, and the servo motor is connected to port F.

### 2 Mode selection:



### 3 Start programming:

The programming of multi-functional robots can be debugged in combination with specific scenarios. The following are several basic actions. You can try to program them separately to get familiar with them.

## Motion

1.  X 4 →  X 1
2.  X 1

① 

### Tips

 Press the key once to run the program, and the dotted line is below the programming icon, for example: 

Click again to enter the programming modification status. The solid line is below the programming icon, for example: 

### Obstacle avoidance:

Programming analysis:  
keep going → infrared obstacle avoidance detection → stop

1.  X 10 →  X 1
2.  X 1 → 

3.  X 1 → 
4.  X 1

①   

## Grab

Programming analysis:  
open the claw in place → forward → close the claw to grasp

1.  X 4 → 
2.  X 1 → 

3.  X 1 → 
4.  X 1

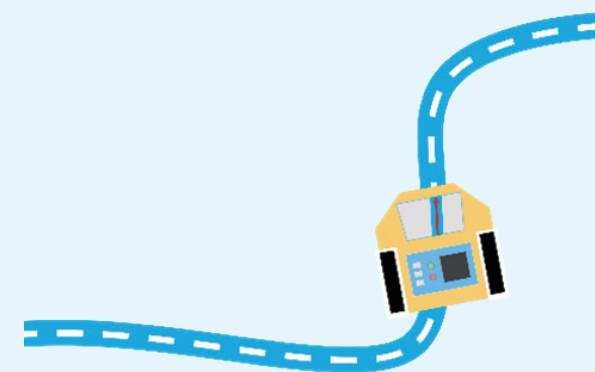
①   

## Maze Battle

Programming difficulty: ★★★★★

### 1 Course introduction

In life, cars can only run on the road, while trains run on the rail. Although planes fly in the sky, they also have their own routes. Can our car also drive along the prescribed route?





## Principle analysis

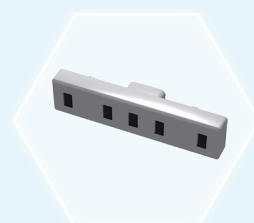
- 1 Let's use the "straight command" to let the car walk along the black line and stop at the intersection.



- 2 If the car is offset, please consider why the car is slightly offset? If we go further, will the error be greater? The car forward is the result of the motor driving the tire to rotate. Whether the map is smooth or not and whether the ground is uneven or not will affect the car forward. The use of integrated 5-grayscales sensor can help reduce the offset.

### Introduction to core modules

Integrated 5- Grayscales Sensor: Grayscale line patrol can automatically correct the direction of the car when it deviates along the black line.



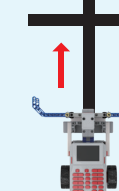
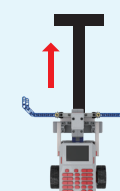
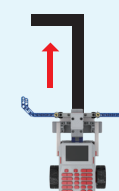
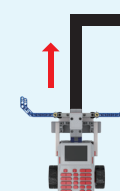
## Tips



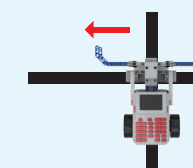
**Line tracking module:** short press to select the line patrol and time at the intersection.

The line patrol at the intersection will proceed along the line to the next intersection and stop, whether it is a left intersection, a right intersection, a T-shaped intersection, or an intersection.

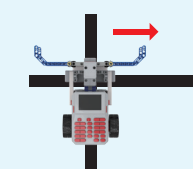
The time line patrol can be conducted within the specified time, and it will be stopped after the time.



**Turn left at the intersection:** turn left at the intersection in a short time, and turn left until you find the next line.



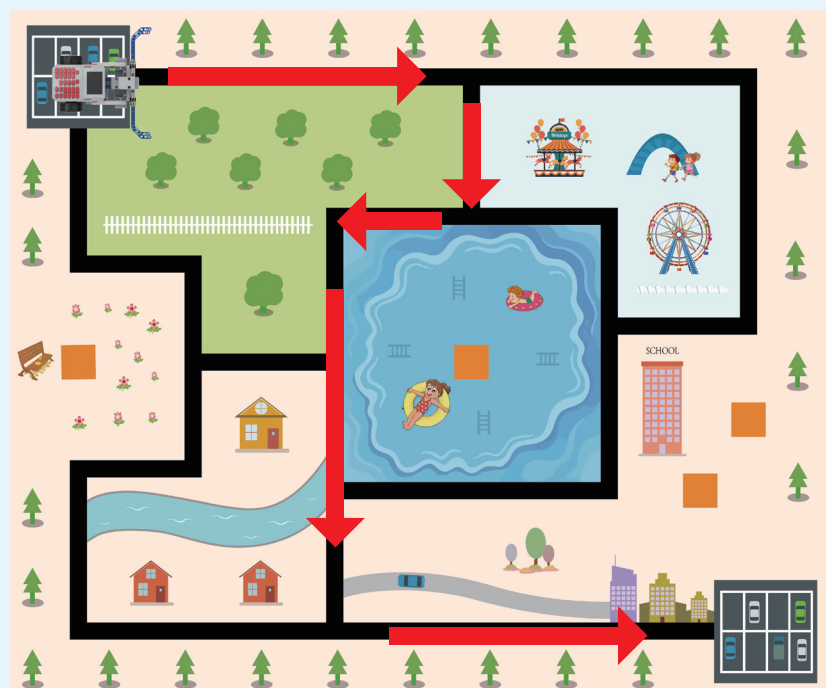
**Turn right at the intersection:** turn right at the intersection in a short time, and turn right until you find the next line.





## Actual combat training

Please use the line patrol command to program the car to drive from one base to another along the black line. The red arrow route is an example route.



### Reference route programming:

place the car horizontally → move forward and leave the base → patrol line at the intersection to move forward, stop at the right intersection → turn right → patrol line at the intersection to move forward, stop at the right intersection → turn right → patrol line at the intersection to move forward, stop at the left intersection → turn left → patrol line at the intersection to move forward, stop at the right intersection → move forward → patrol line at the intersection to move forward, stop at the left intersection → move forward → patrol line at the intersection to move forward, Stop at T junction again → turn left → time patrol for 1 second, repeat for 5 times → advance for 2 seconds

L M H



Push the power switch to the right and select high speed.

- |                                                                                                                                                                                      |                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  X 1 →      | 10.  X 1 →      |
| 2.  X 1 →      | 11.  X 1 →      |
| 3.  X 1 →      | 12.  X 1 →      |
| 4.  X 1 →  | 13.  X 1 →  |
| 5.  X 1 →  | 14.  X 5 →  |
| 6.  X 1 →  | 15.  X 2 →  |
| 7.  X 1 →  | 16.  X 1 →  |
| 8.  X 1 →  | 17.  X 2 →  |
| 9.  X 1 →  | 18.  X 1                                                                                         |



## Achievement display



## Gameplay upgrade

There are many crossed black lines on the map, which can form many routes. Please write a line patrol program and design and verify a new route to lead the car from the first base to the second base!

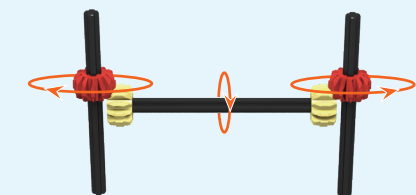
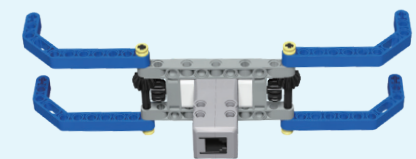


## Little porter

Programming difficulty: ★★★★★

### 1 Course introduction

Have you ever played with the doll grabbing machine? Throw a coin and control a mechanical claw to grab the doll. Mechanical claw is widely used in life. There is also a simple mechanical claw on our car. Today, let's learn about the control of mechanical claw.



The two yellow gears rotate in the same direction, and the two red gears rotate in the opposite direction, realizing the opening and closing of the mechanical claw.

### Introduction to core modules

**Servo Motor:** It can accurately control and maintain the rotation angle, and the control range is  $-90^{\circ} \sim 90^{\circ}$ . The servo motor will not turn by itself, but will turn from the previous angle to the next angle, such as 0 to 90 degrees.



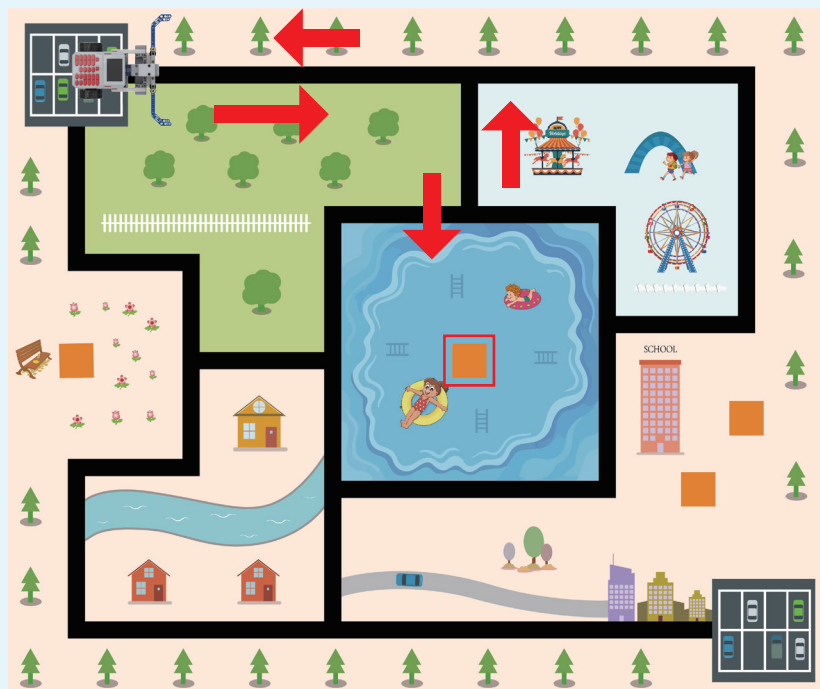
## Tips

**Servo motor angle control:** in the key screen programming mode, click 1-5 to correspond to the servo motor angle of -90, -45, 0, 45, and 90 degrees respectively. If you want to make the servo motor rotate, you can set two different angles successively, for example, 0 first, and then 90. It takes two seconds to continuously write the servo motor angle.

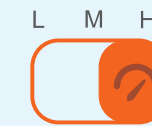
1.  X 3 → 
2.  X 1

## Actual combat training

The car starts from the base, drives along the black line to the swimming pool as shown in the figure, and brings the modules in the swimming pool back to the base. The red arrow route is an example route.



## Reference programming



Push the power switch to the right and select high speed.

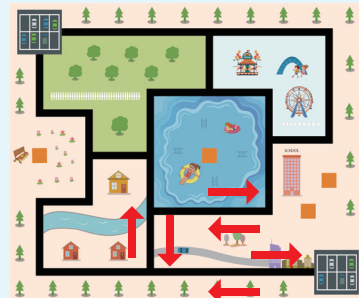
1.  X 4 → 
2.  X 1 → 
3.  X 1 → 
4.  X 1 → 
5.  X 1 → 
6.  X 2 → 
7.  X 1 → 
8.  X 1 → 
9.  X 4 → 
10.  X 1 → 
11.  X 5 → 
12.  X 2 → 
13.  X 1 → 
14.  X 4 → 
15.  X 1

## Achievement display

- ①   
- ②   
- ③   
- ④   
- ⑤  

## Play upgrade

If this module is in the position shown in the figure below, how can we design a route to carry it?



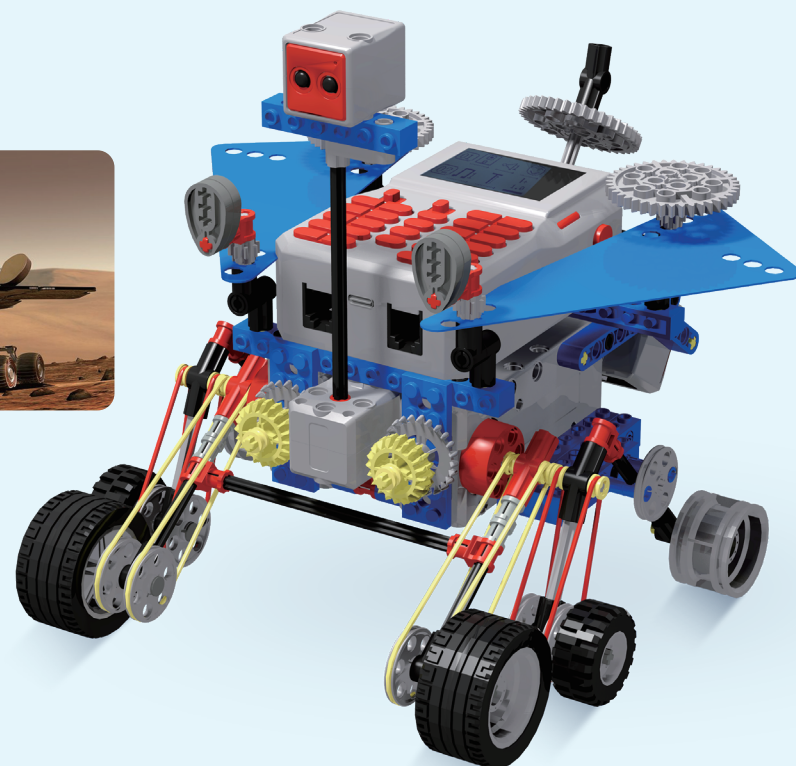
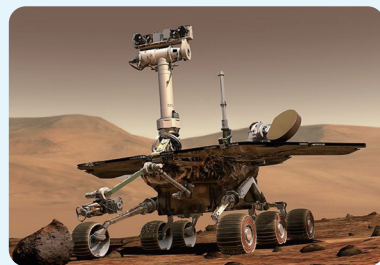
# Mars rover

Construction difficulty:★★★★★

Programming difficulty:★★★★★

## 1 Course introduction

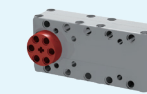
Some believe that there may be a small number of low life on Mars that cannot be found by fixed rovers, at the same time, humans also want to further understand the situation of more areas on Mars, so the Mars rover came into being.



## 2 Parts list



MPC Controller x1



Motor x1



Servo Motor x1

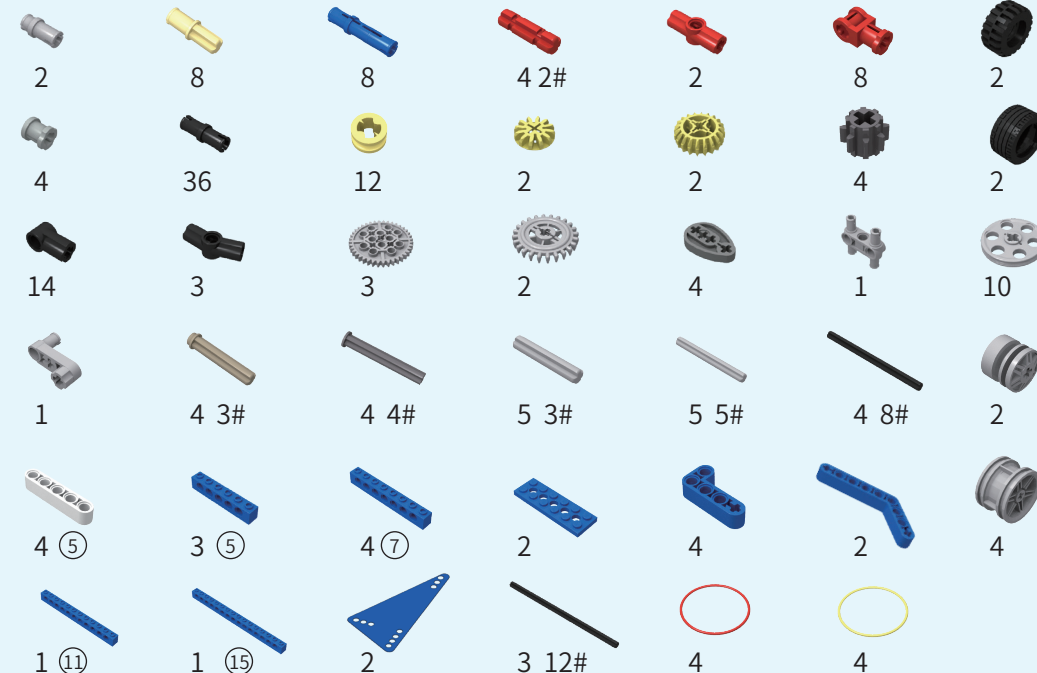


Infrared Sensor x1



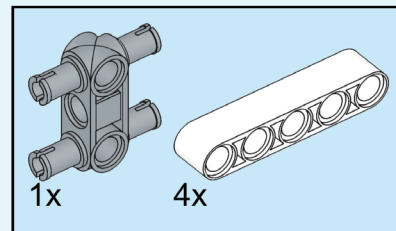
Full Color Light x1

2# 1:1  3# 1:1  4# 1:1   
 5# 1:1  8# 1:1   
 12# 1:1

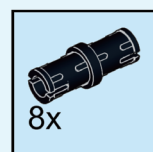
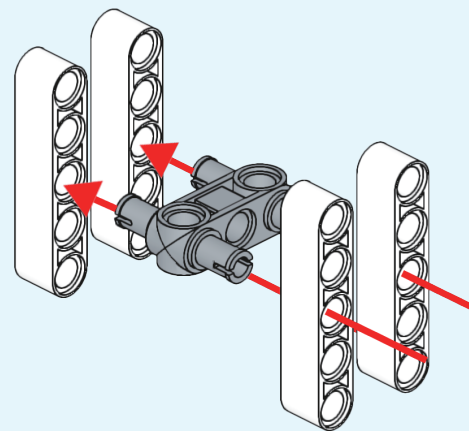


Building steps: items with this icon need to be turned over. Accessories include decorative pieces, which can be decorated by yourself.

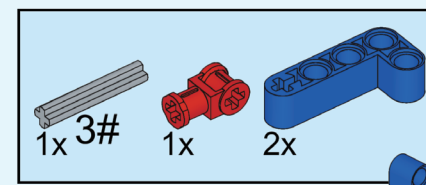
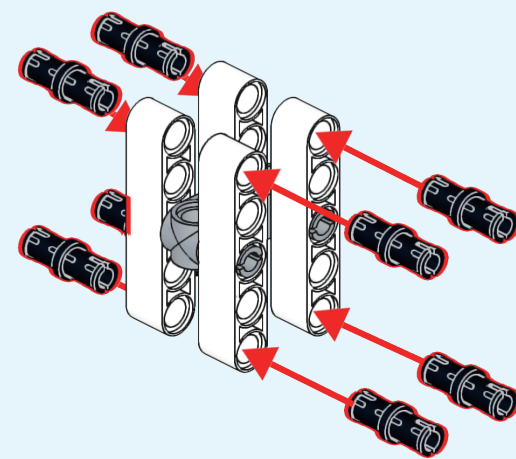
### 3 Let's start building



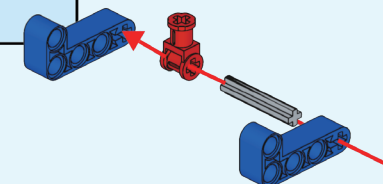
1



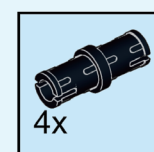
2



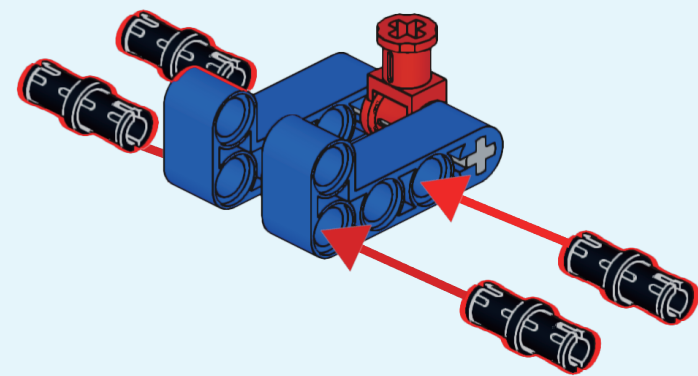
3

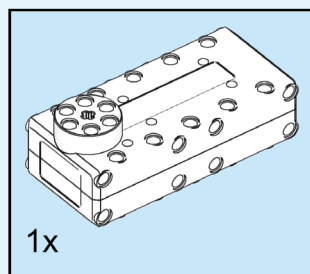


3# 1:1

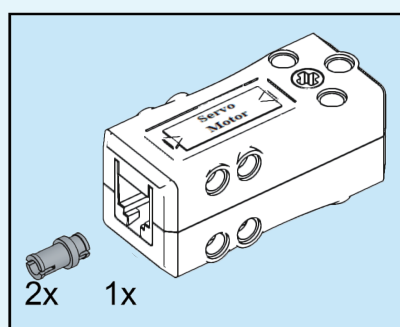
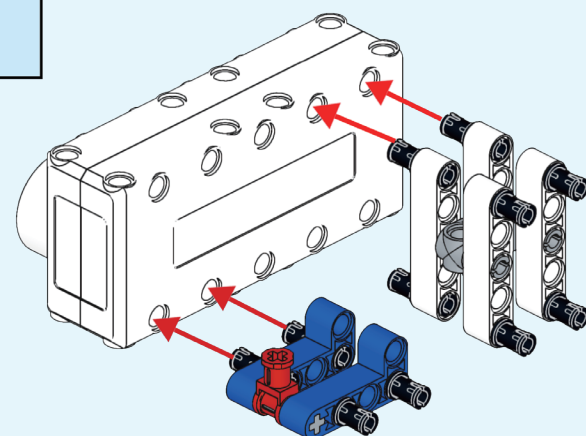


4

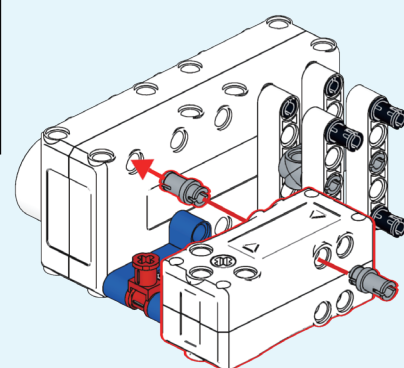




5



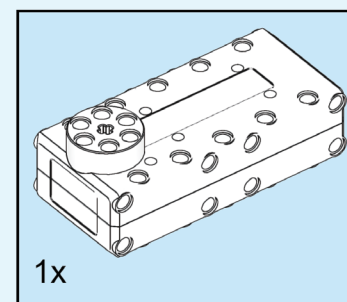
6



**Note:** Please first connect the cable.

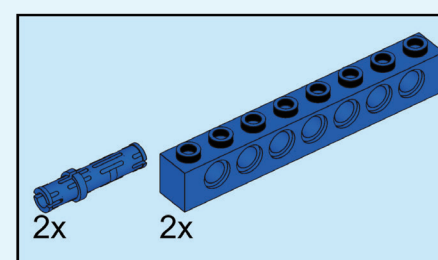
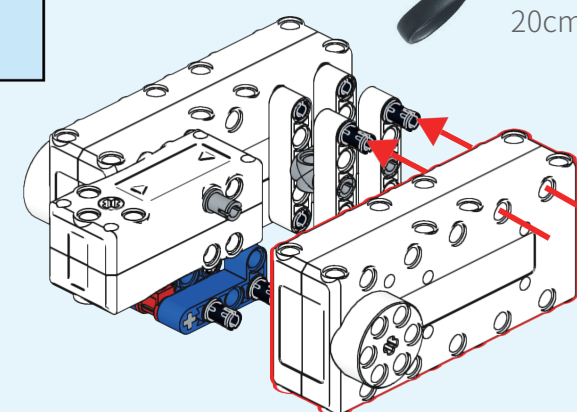


**Note:** There is a "Servo Motor" sign below.

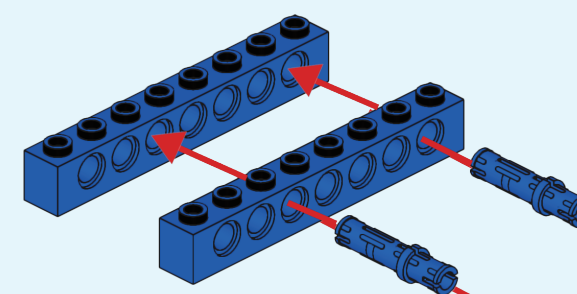


**Note:** Please first connect two 20cm cables.

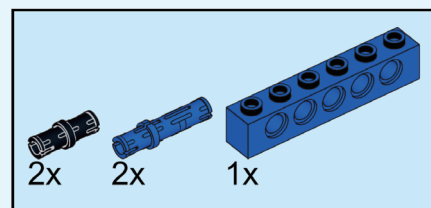
7



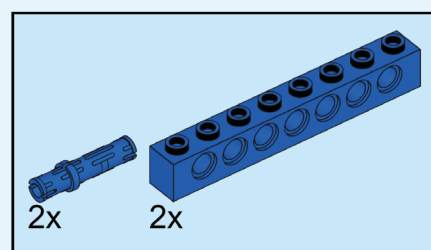
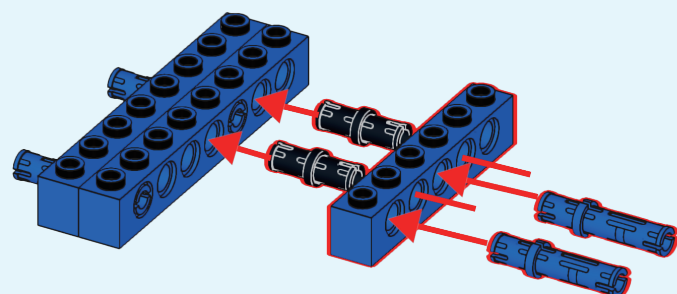
8



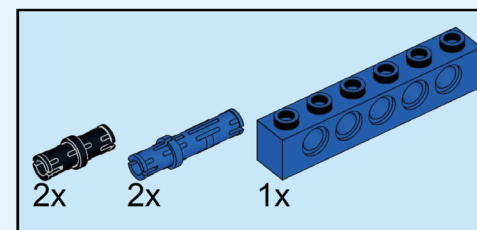
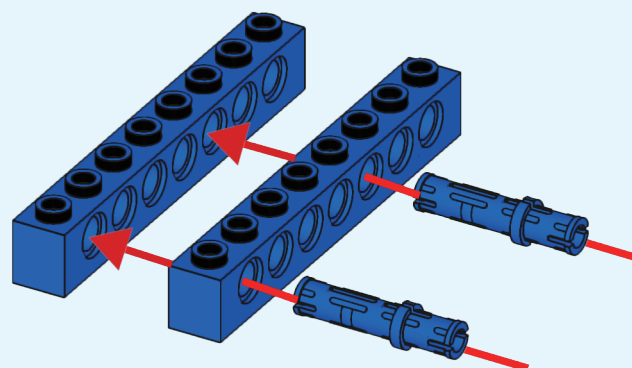




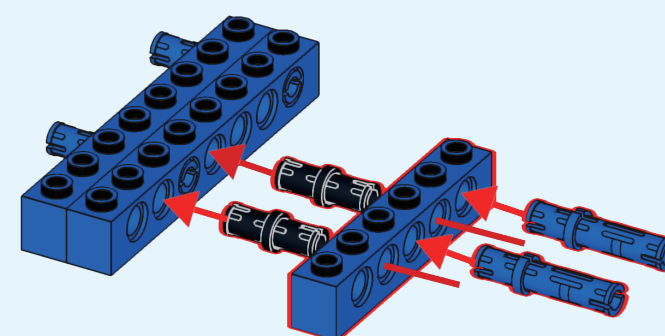
9



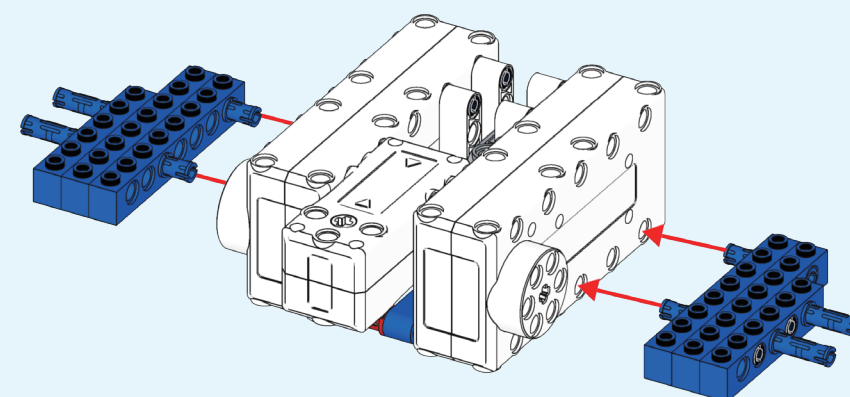
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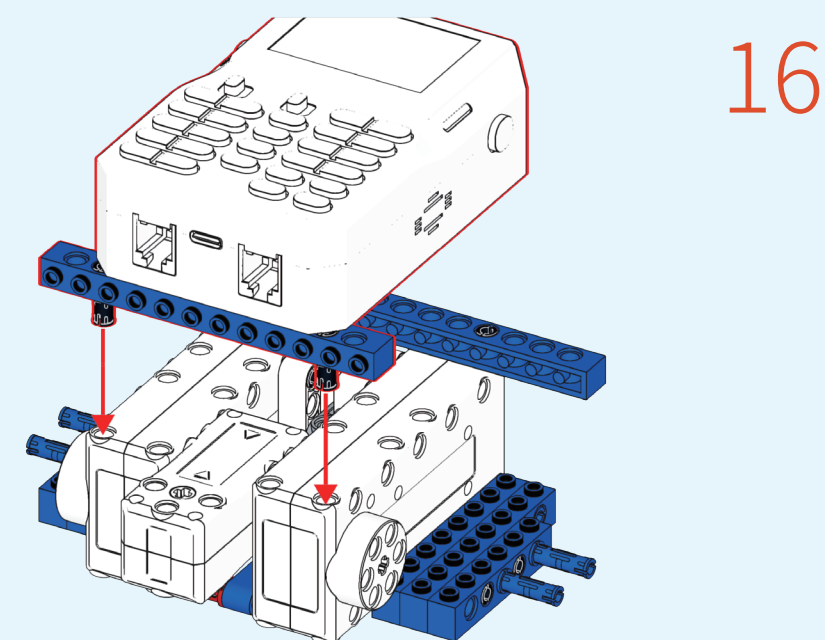
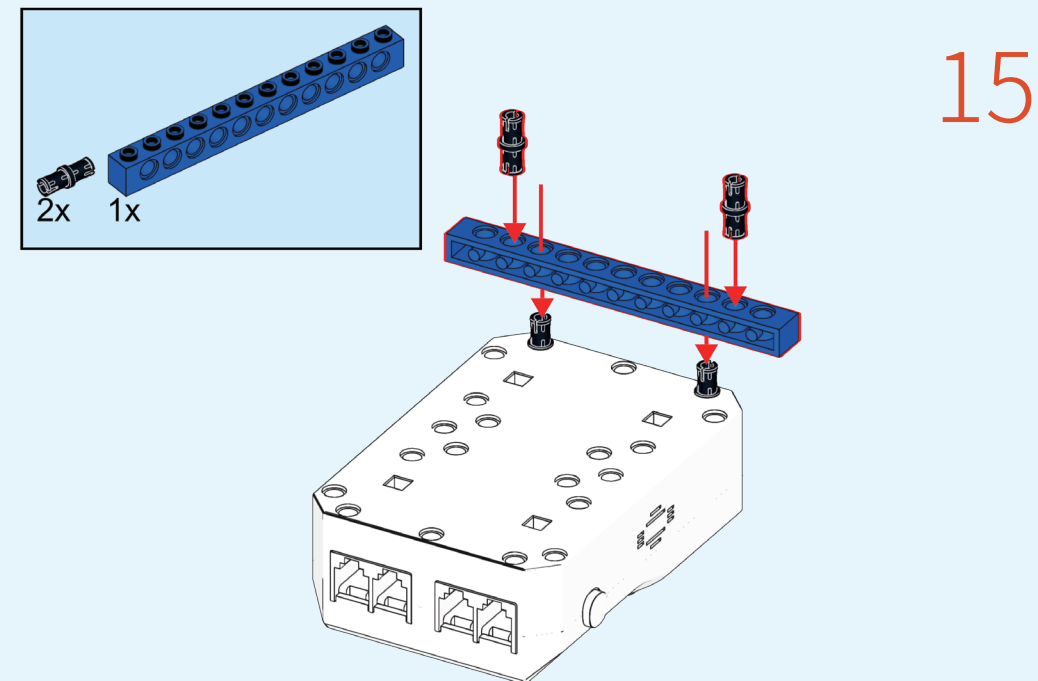
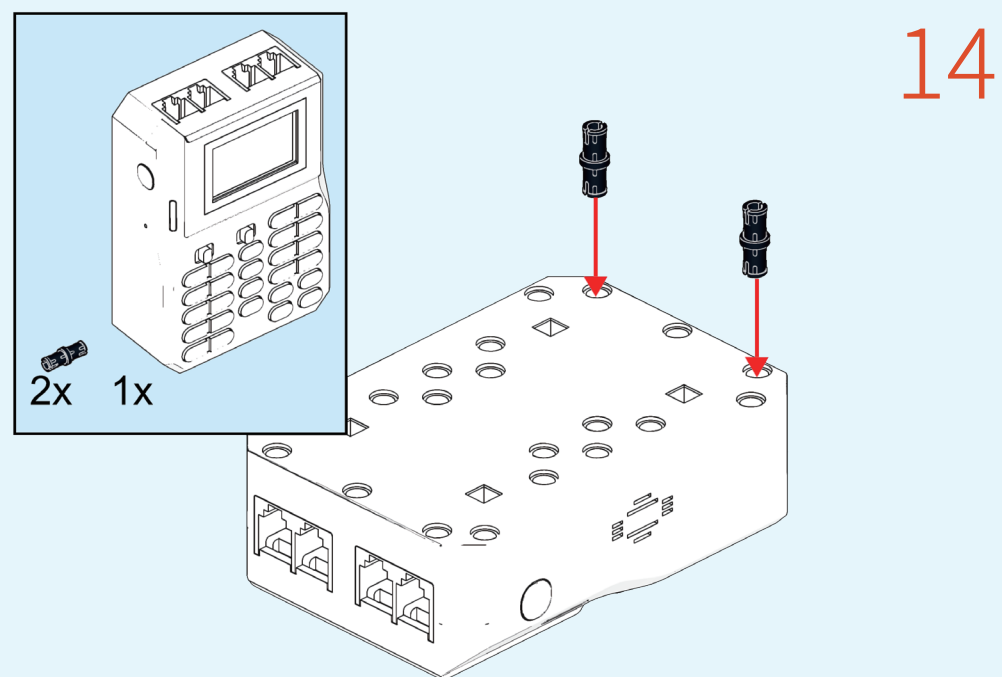
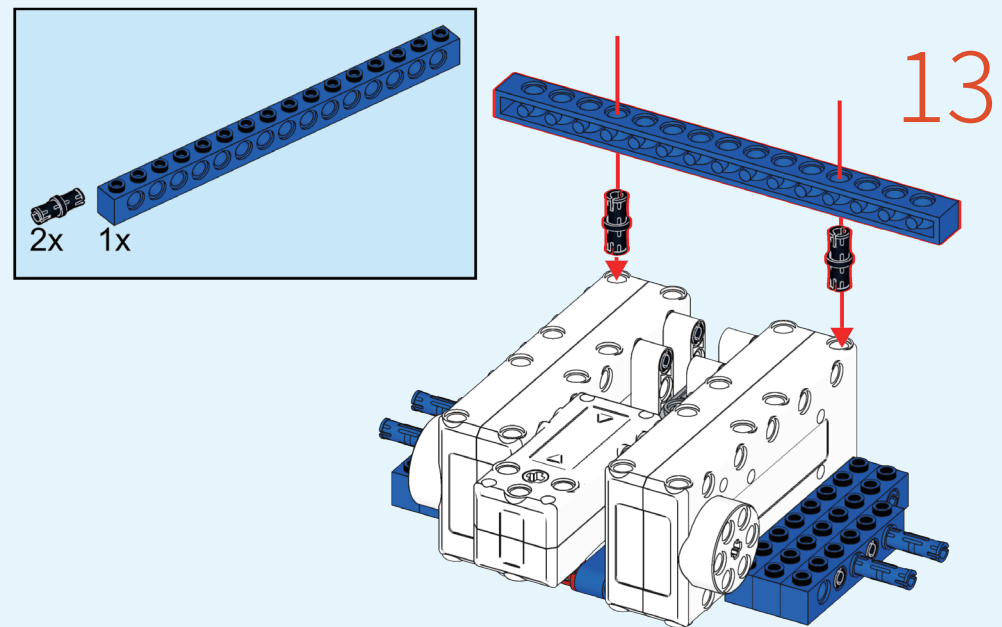


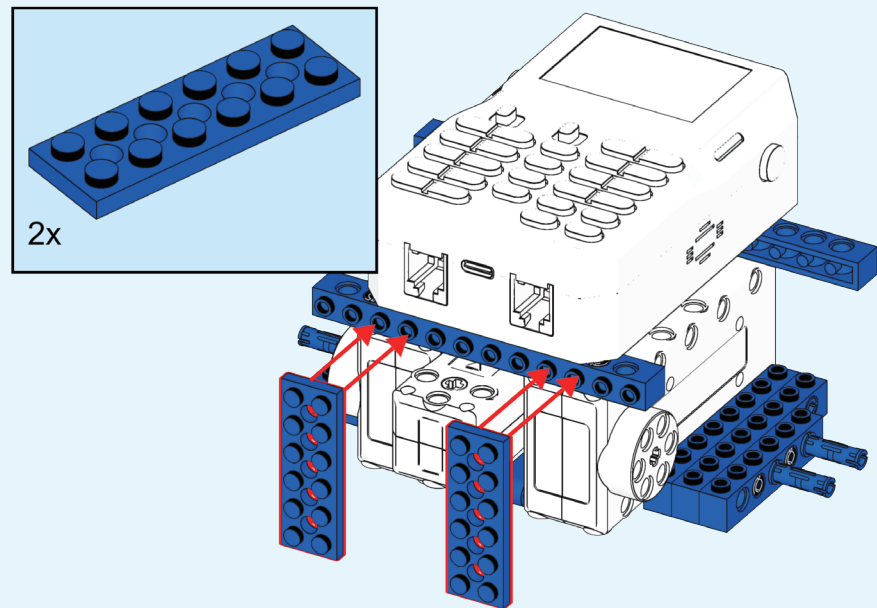
11



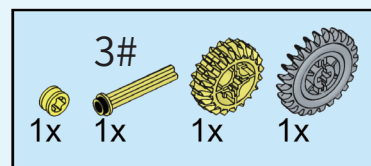
12



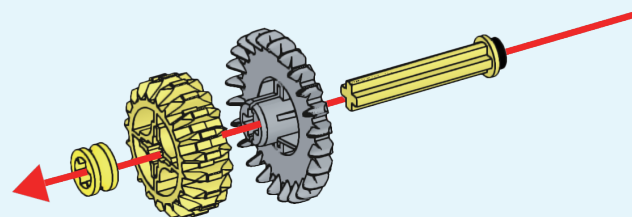




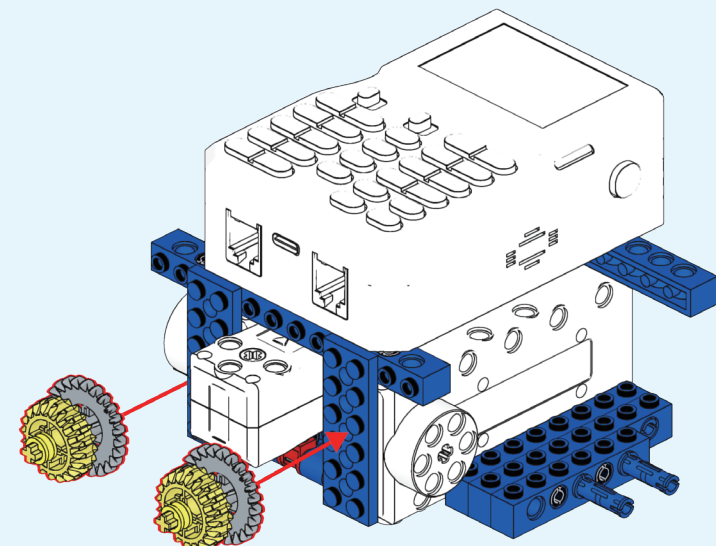
17



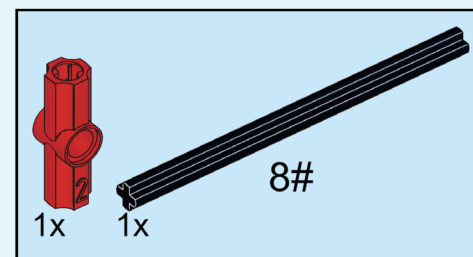
18



x2



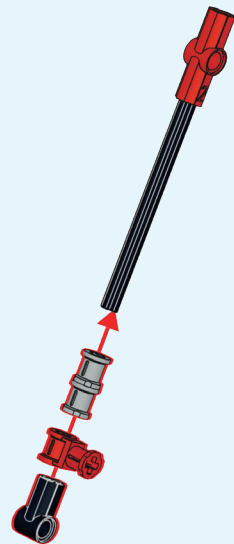
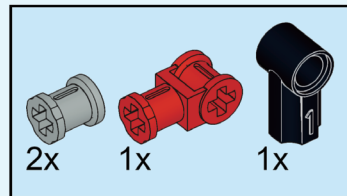
19



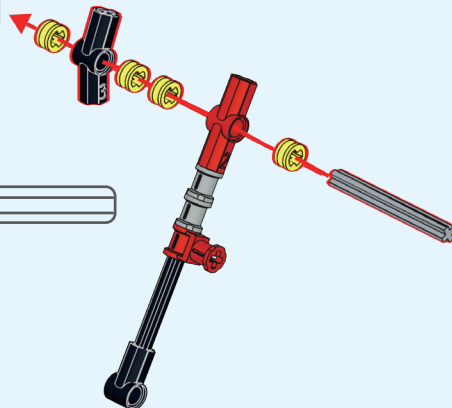
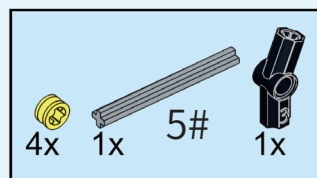
20



8# 1:1

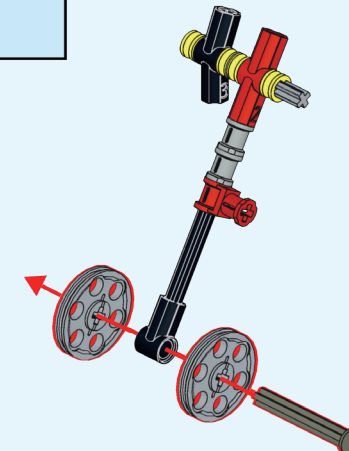
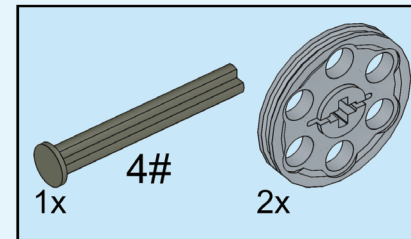


21



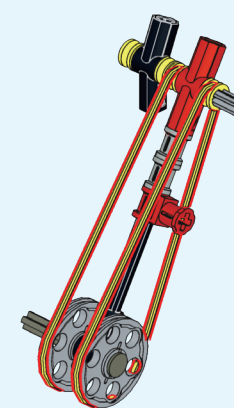
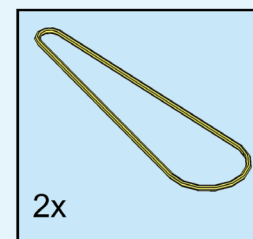
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22

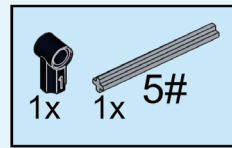


4# 1:1

23

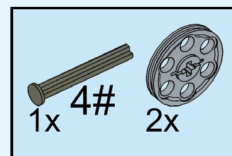
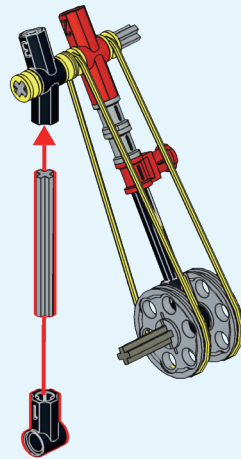


24

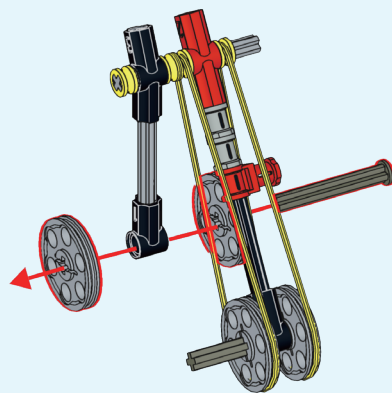


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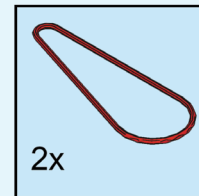
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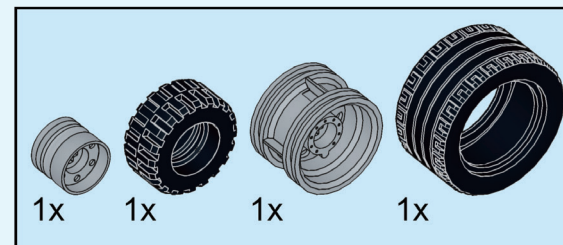
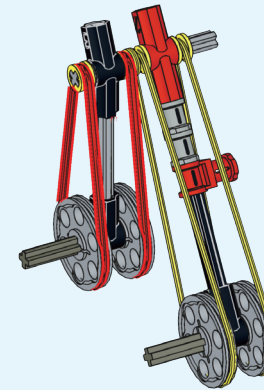
26



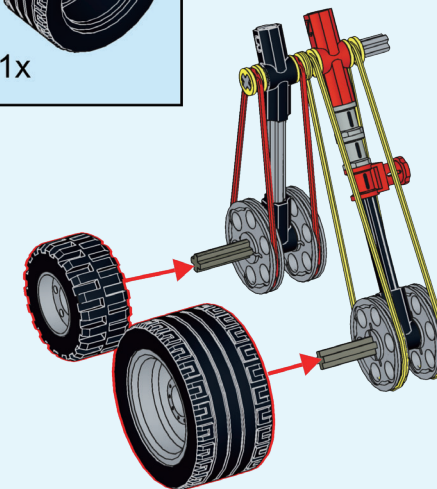
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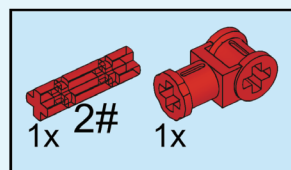
27



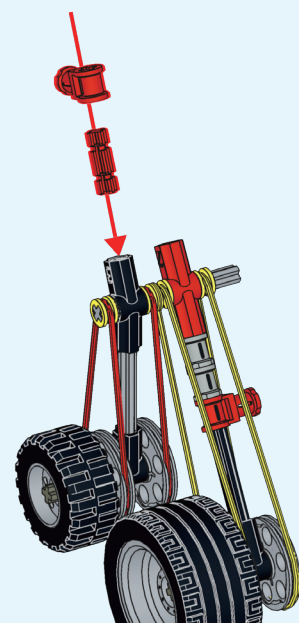
28



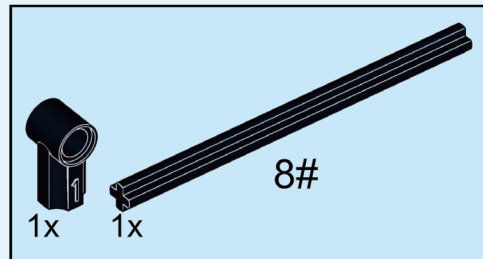




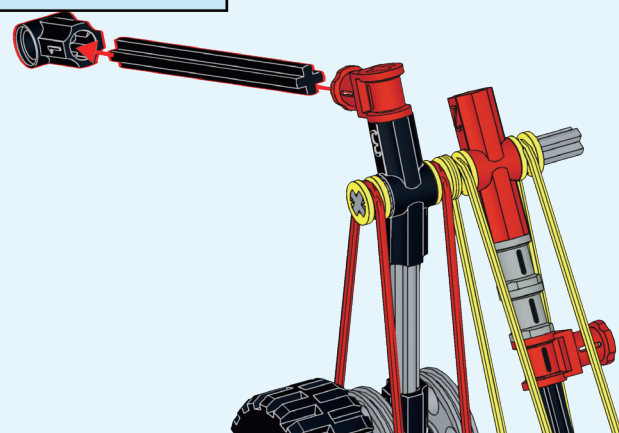
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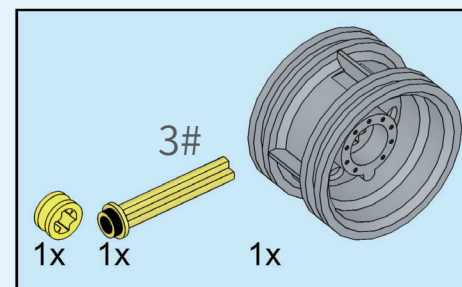
29



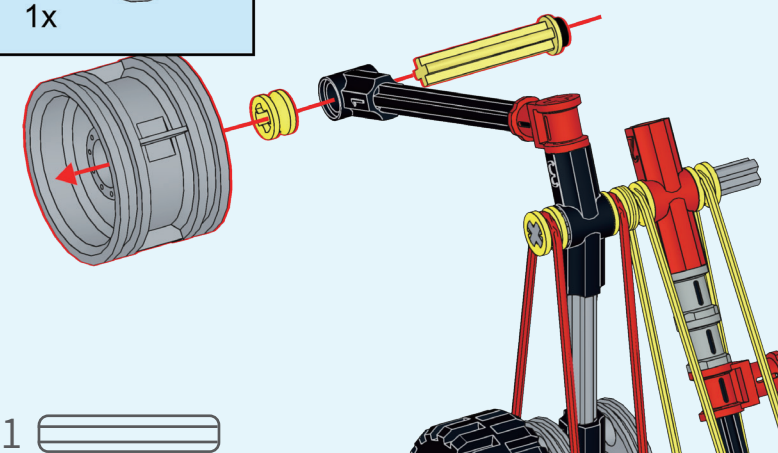
8# 1:1



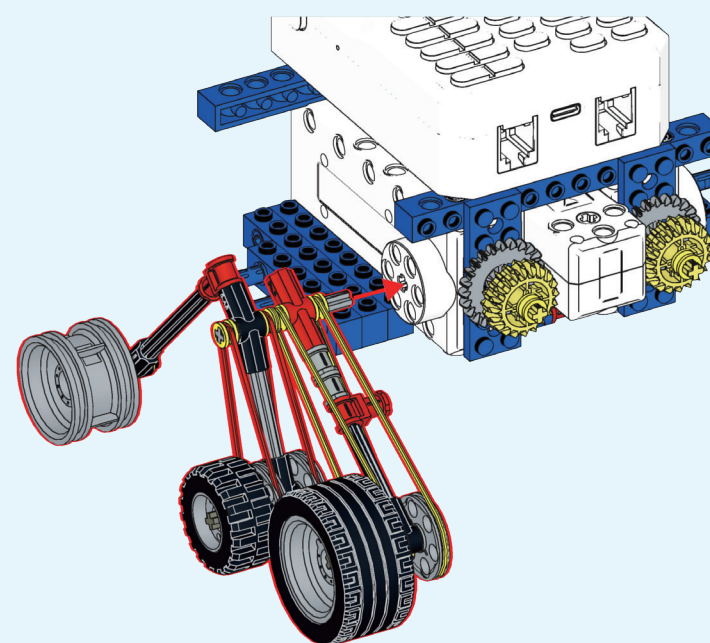
30



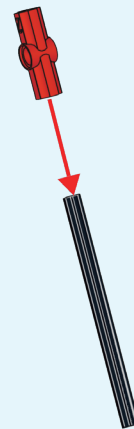
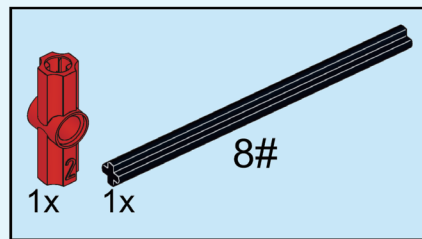
3# 1:1



31

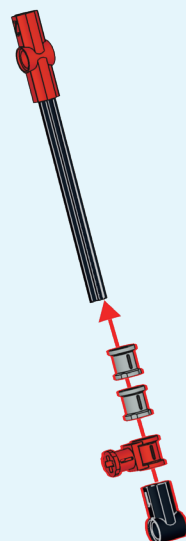
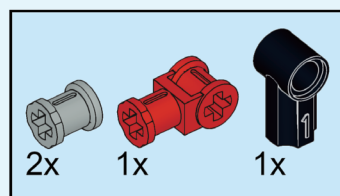


32



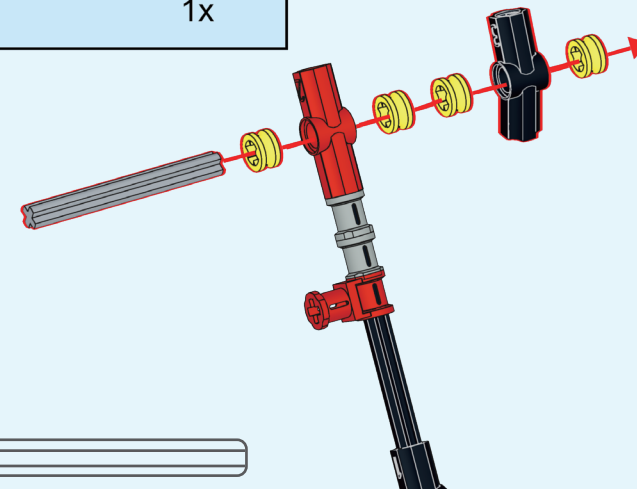
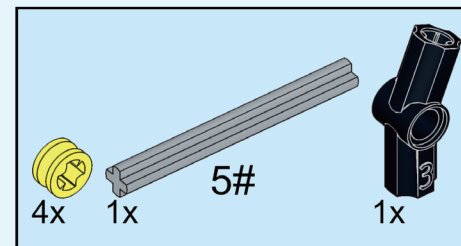
33

8# 1:1



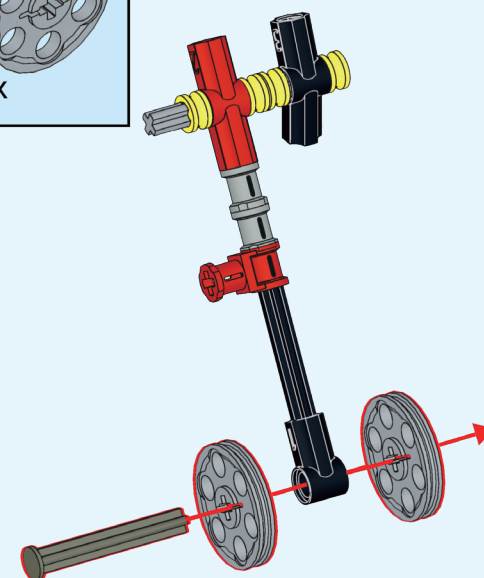
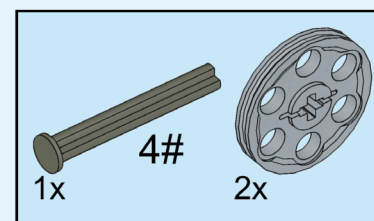
34

52



35

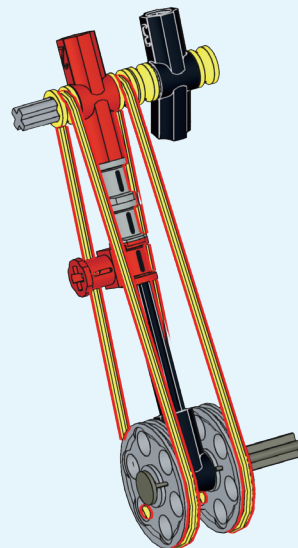
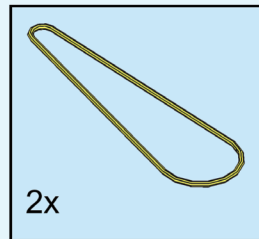
5# 1:1



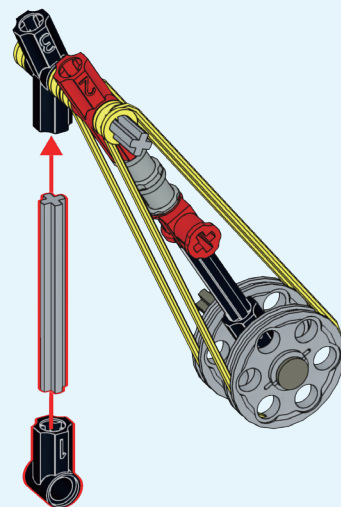
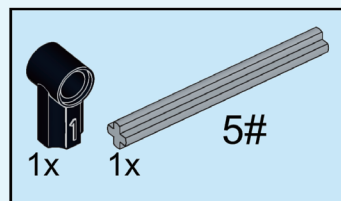
36

4# 1:1

53

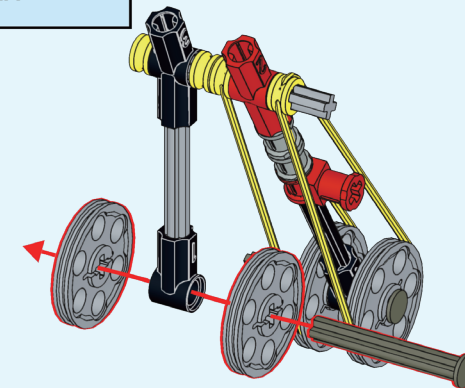
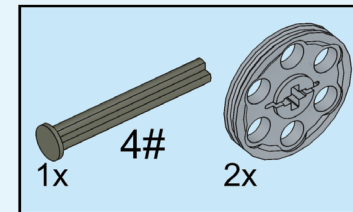


37



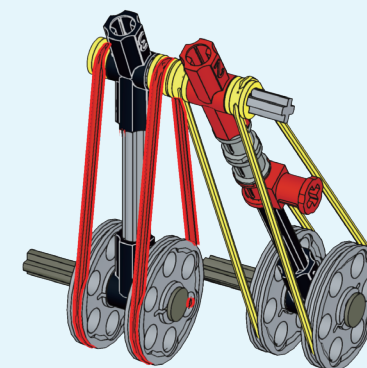
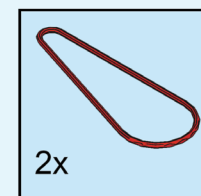
38

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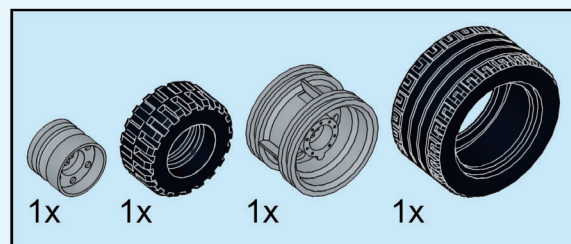


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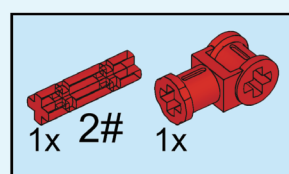
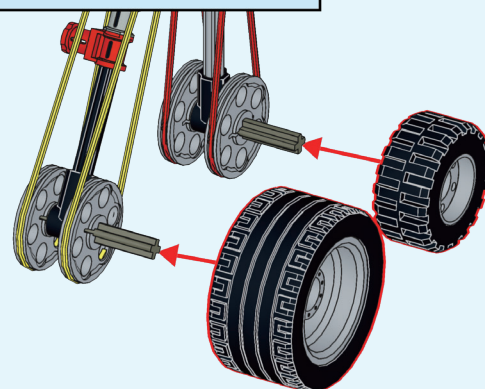
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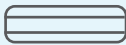
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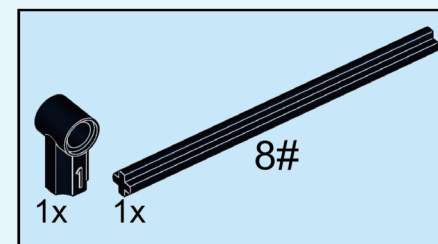
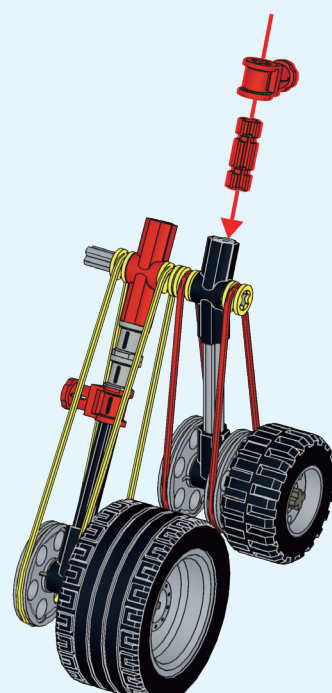


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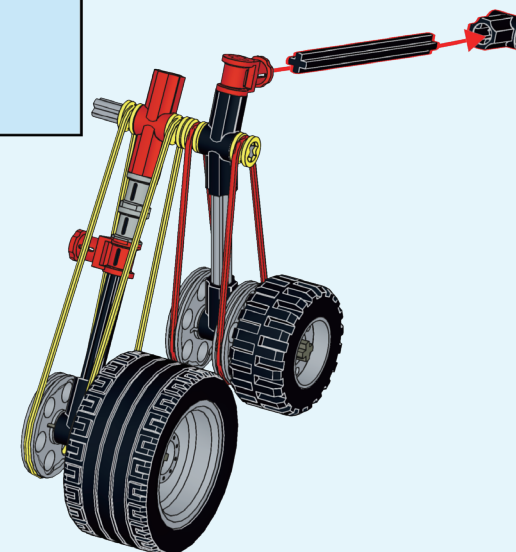


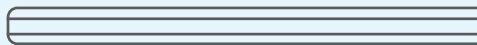
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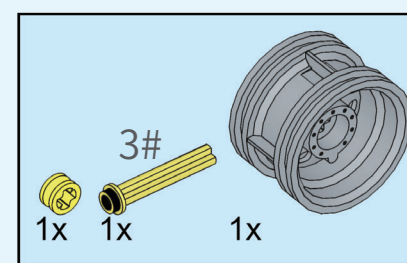
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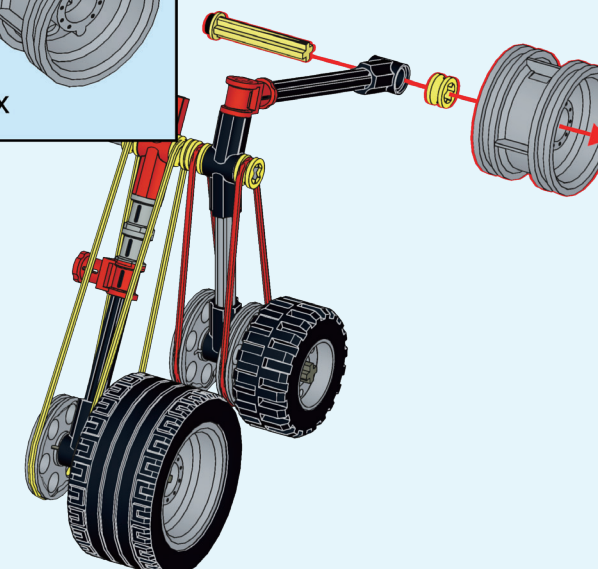
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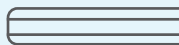


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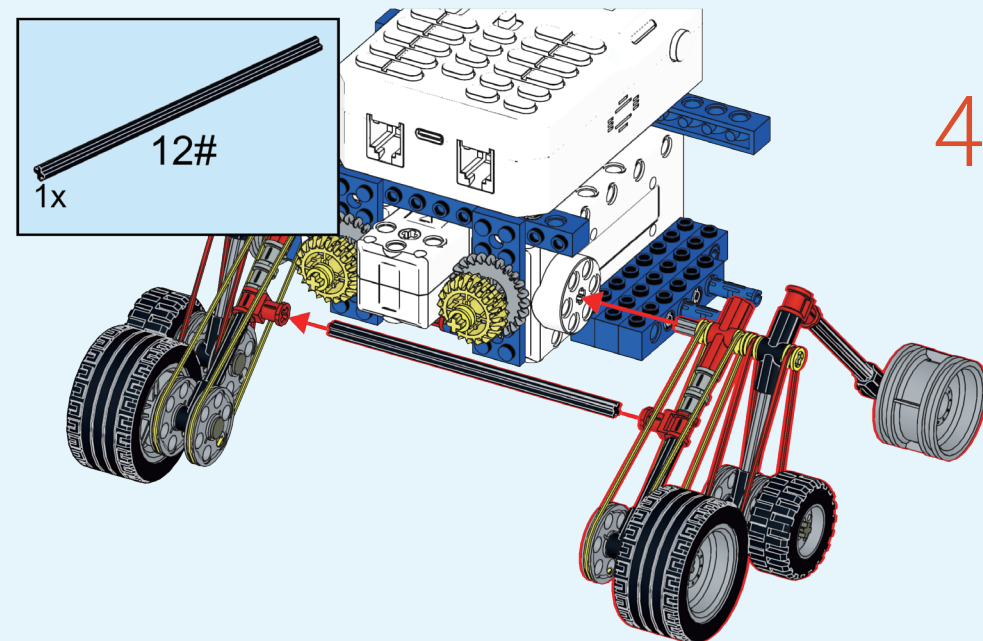


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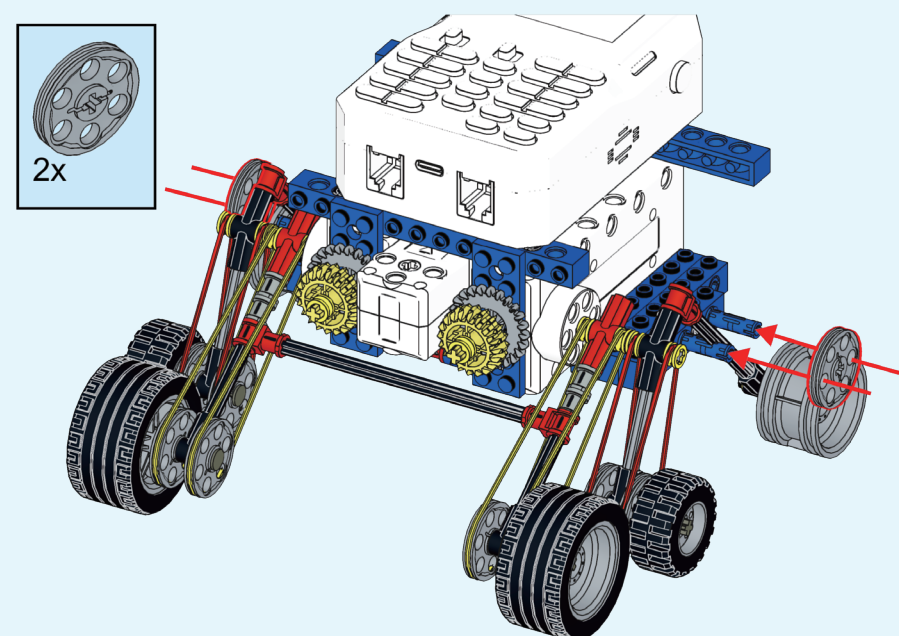
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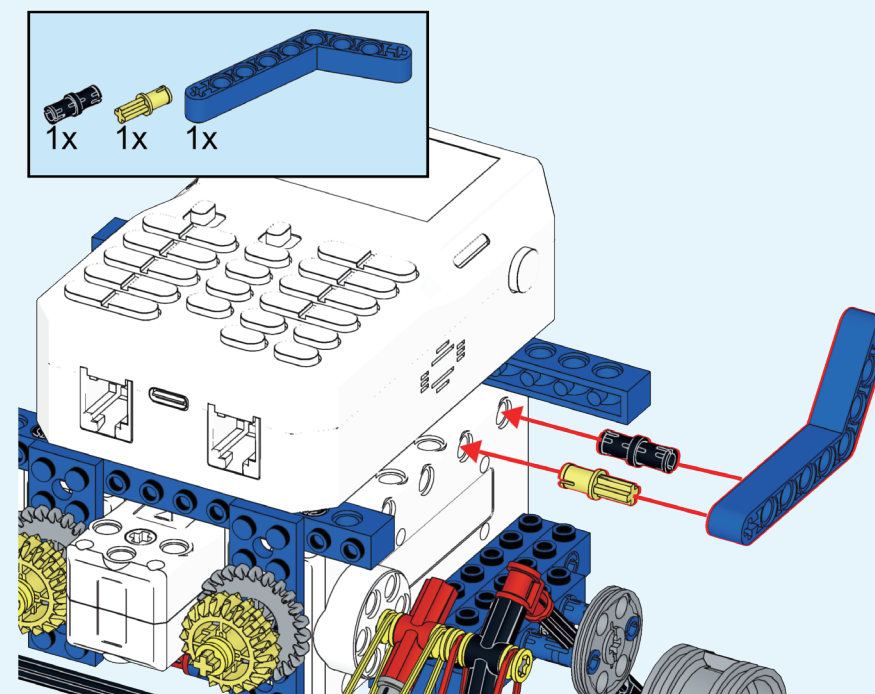


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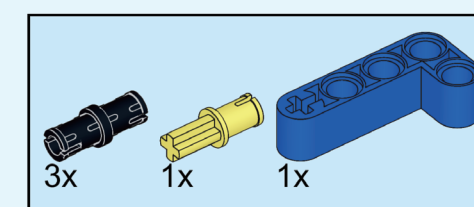
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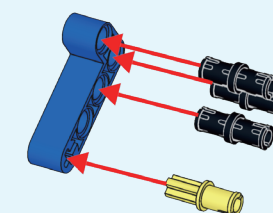
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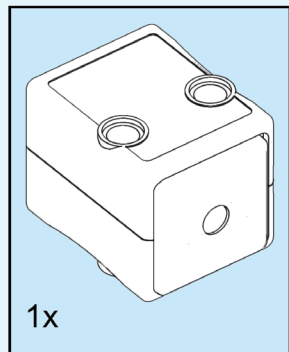
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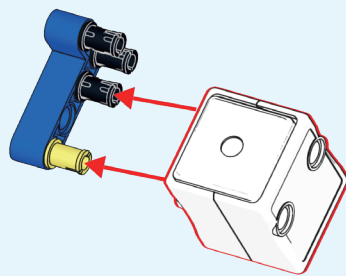
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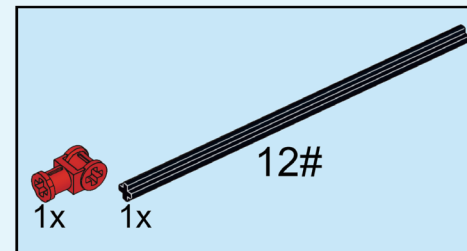
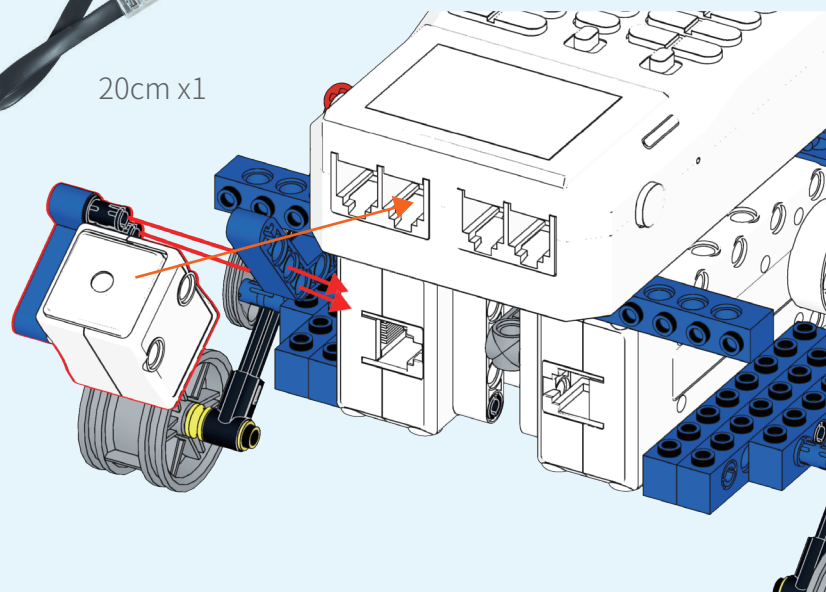
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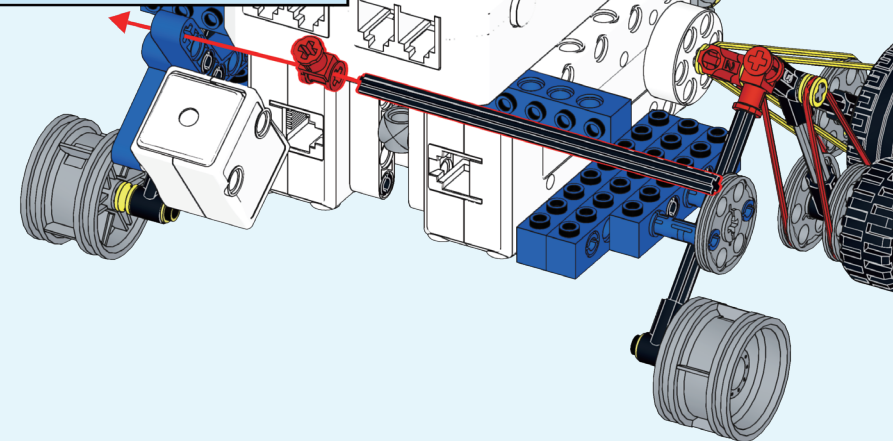
**Note:** Please first connect the cable.



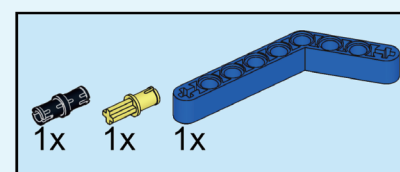
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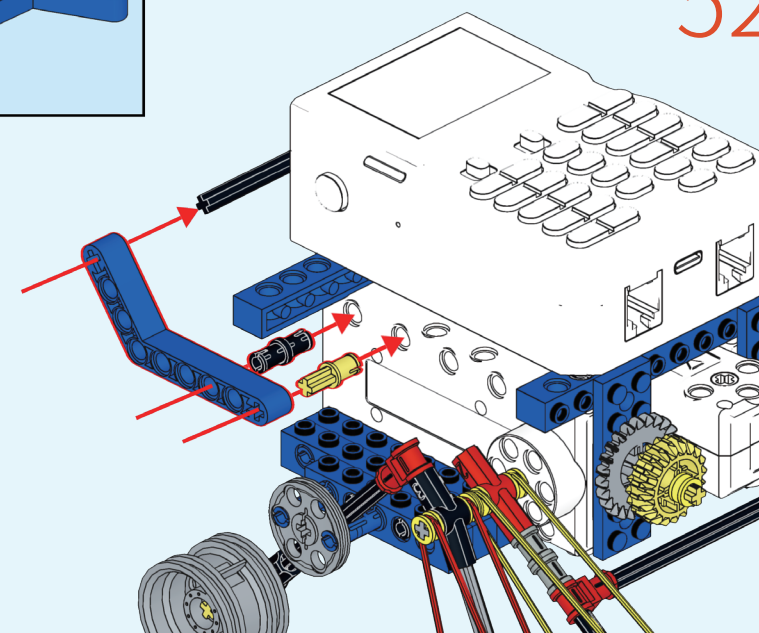
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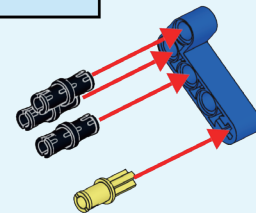
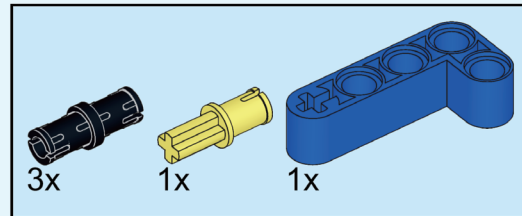


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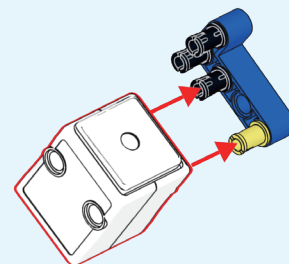
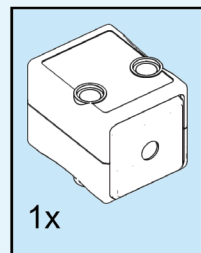


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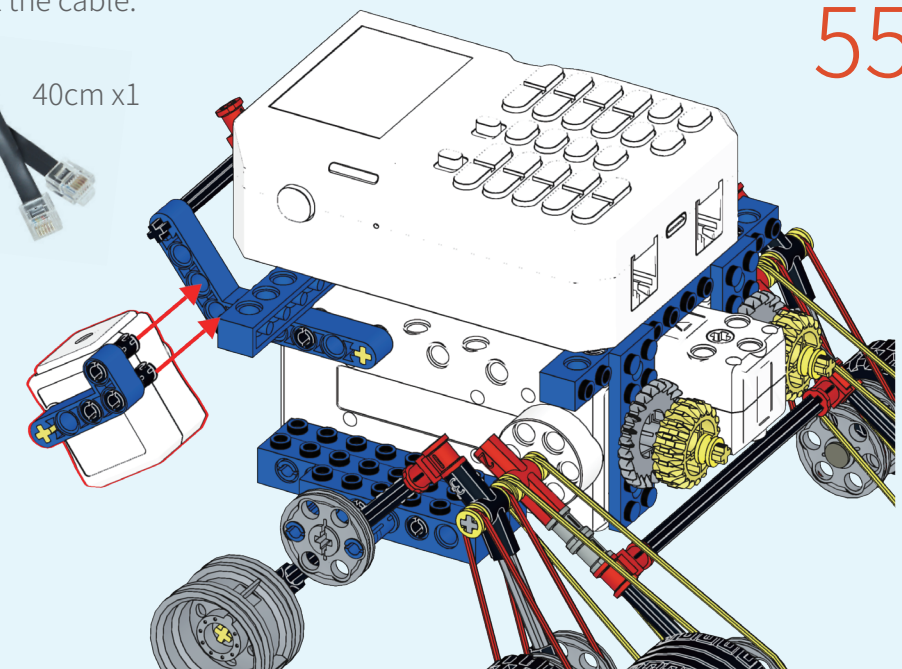


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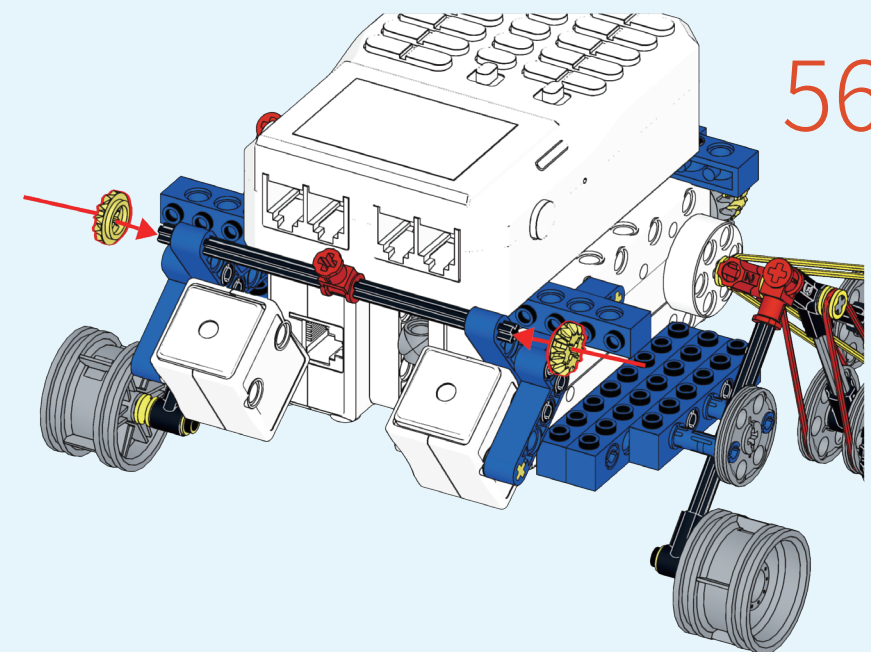
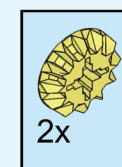


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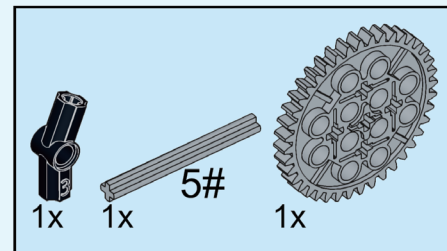
**Note:** Please first connect the cable.



55

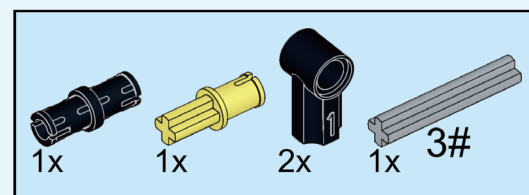
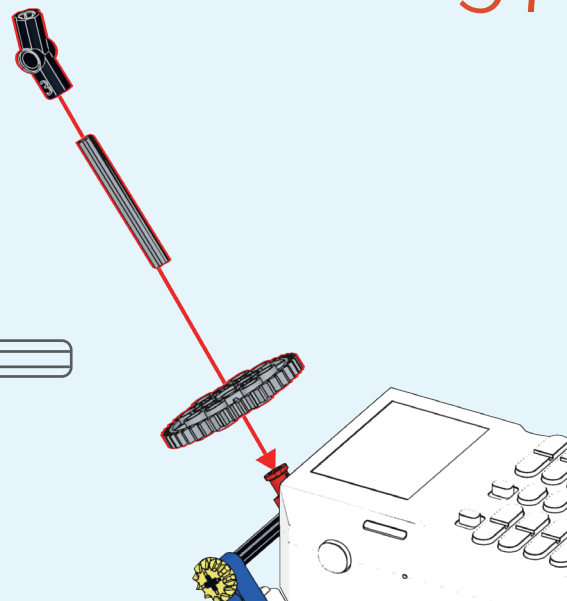


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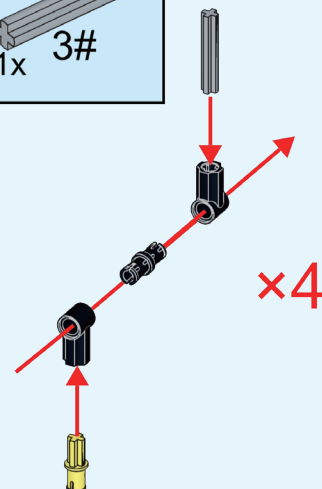


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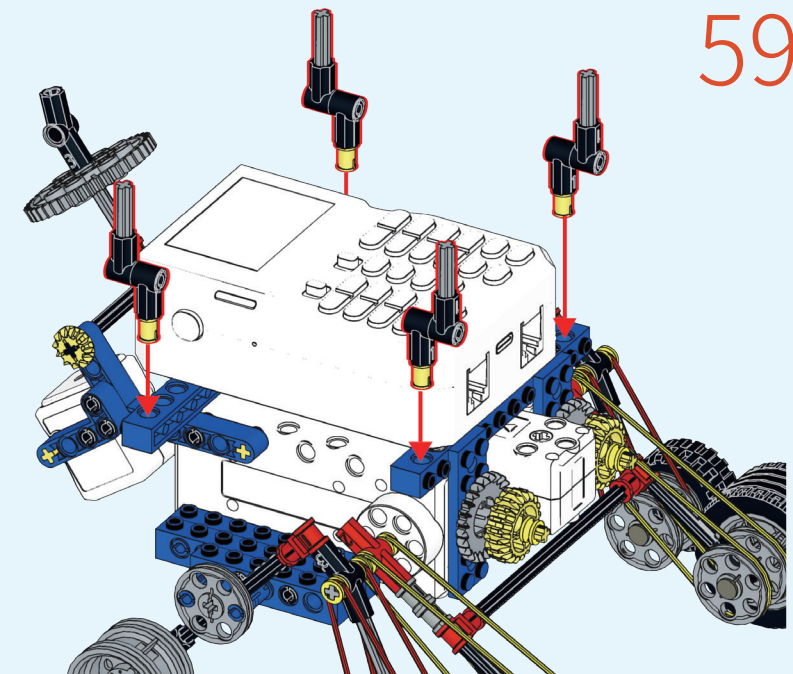
5# 1:1



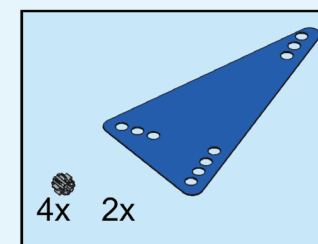
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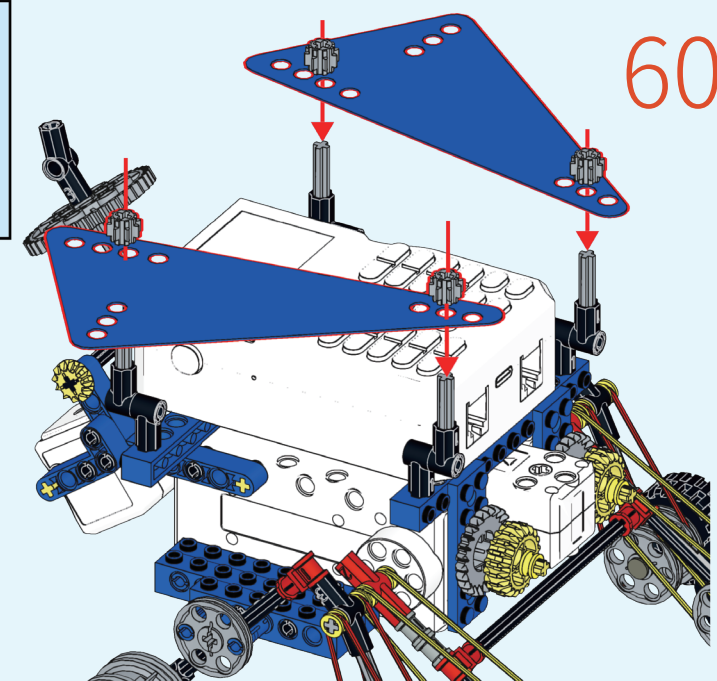
3# 1:1



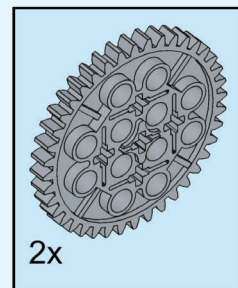
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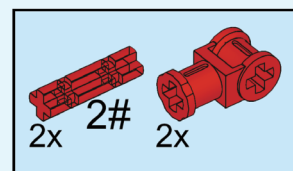
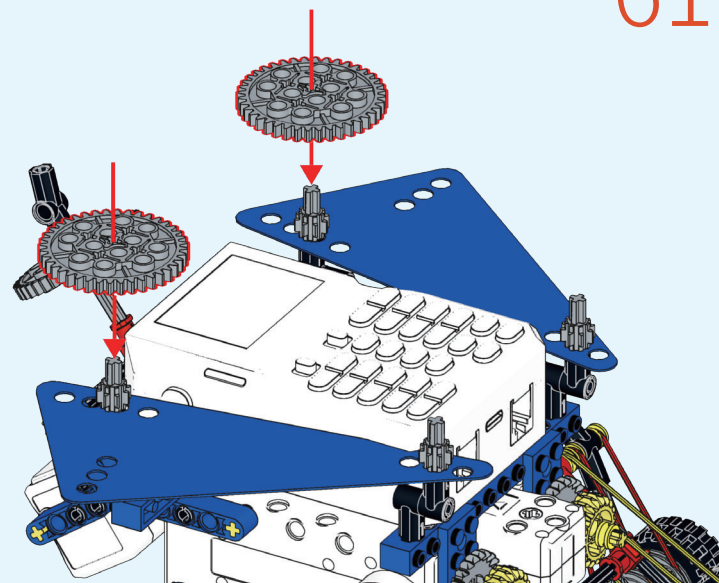
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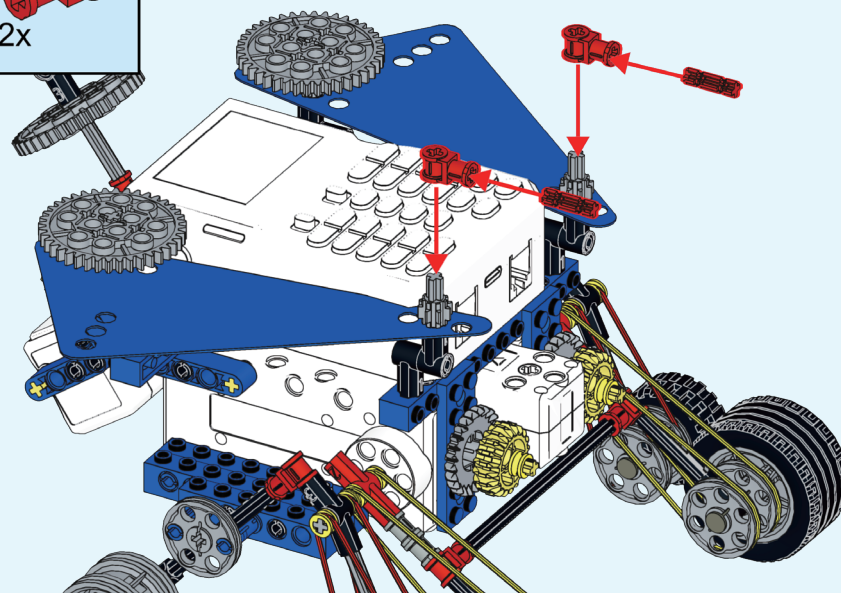


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2# 1:1

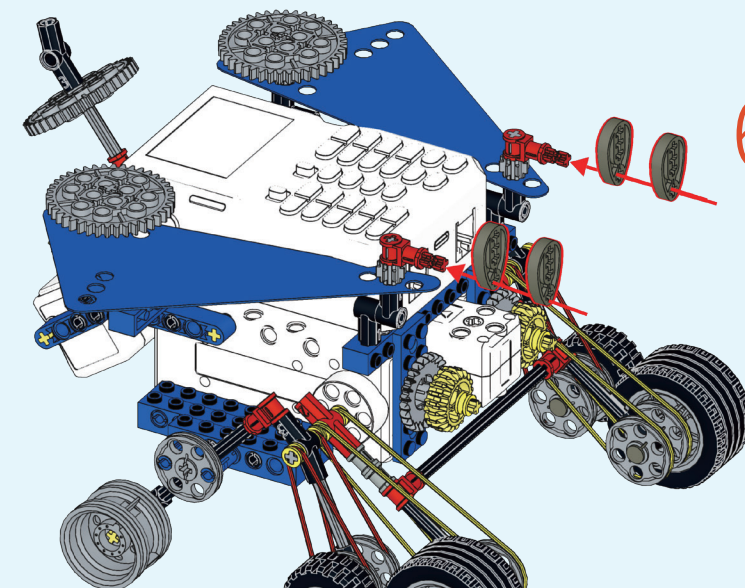
62



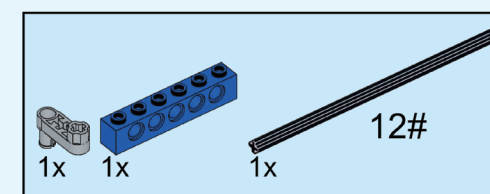
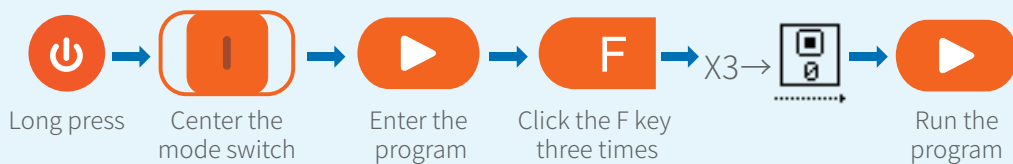
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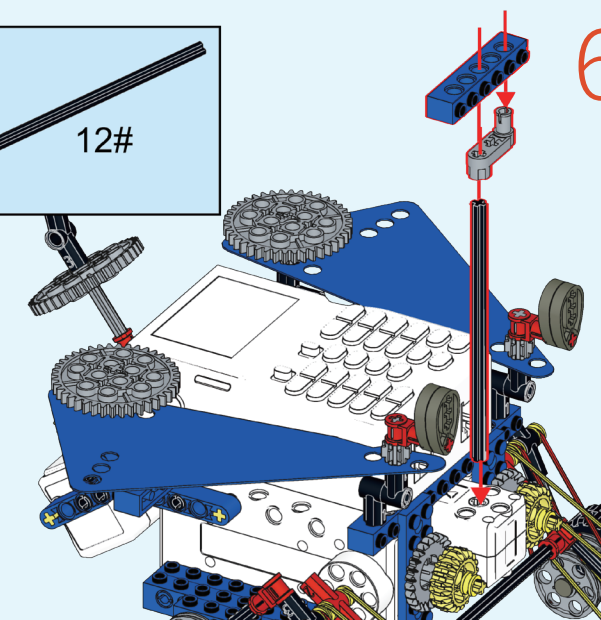
63



**Note:** Before installing the servo motor structure, connect the servo motor to the controller F port, turn on the machine, select the middle mode, and set the servo motor angle to 0°.

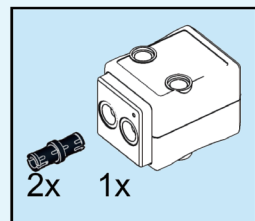


64

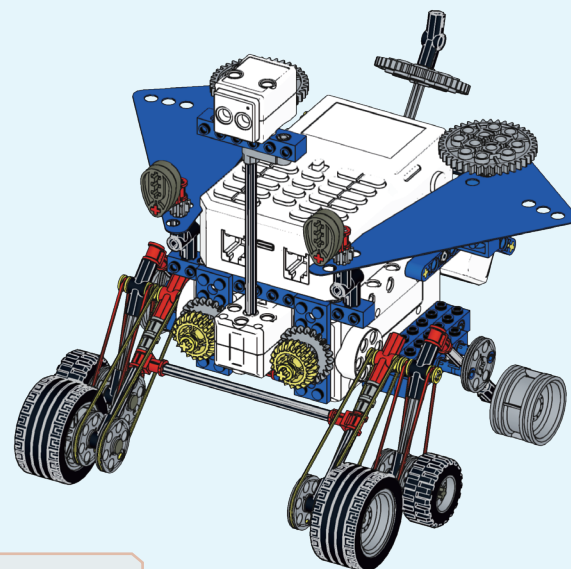
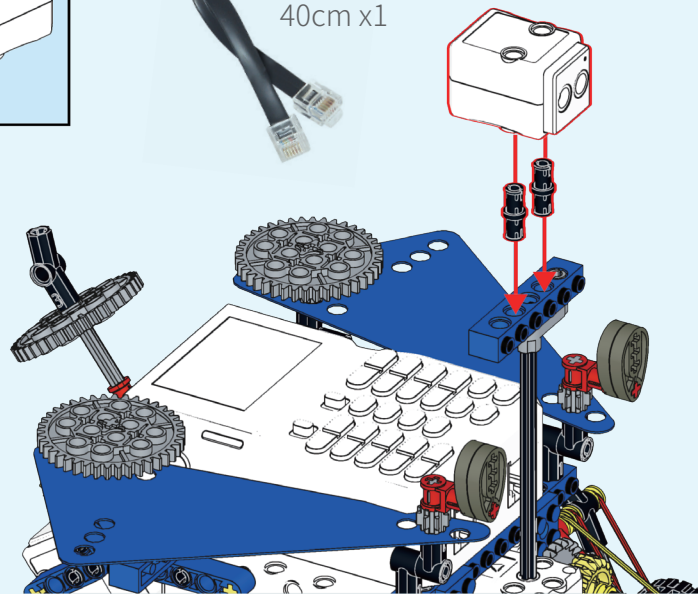


12# 1:1

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**Note:** Please first connect the cable.



1

Interface selection

The left motor is connected to port B, the right motor is connected to port A, the full color light is connected to port C/D, the infrared sensor is connected to port E, and the servo motor is connected to port F.

68

65

2

Mode selection

Push the power switch to the right and select high speed.



3

Start programming



Push the power switch to the right and select high speed.

1. X 10 →
2. X 2 →
3. X 1 →
4. X 1 →
5. X 5 →
6. X 1 →

7. X 1 →
8. X 1 →
9. X 1 →
10. X 1 →
11. X 1 →
12. X 1

Achievement display



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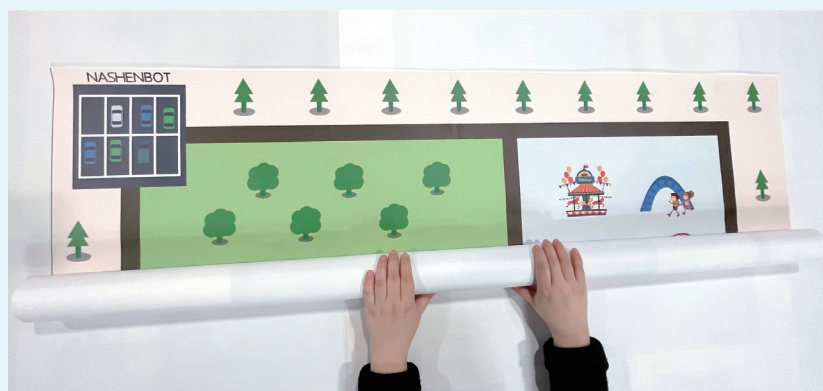
## How can we solve the following problems?

Use tips

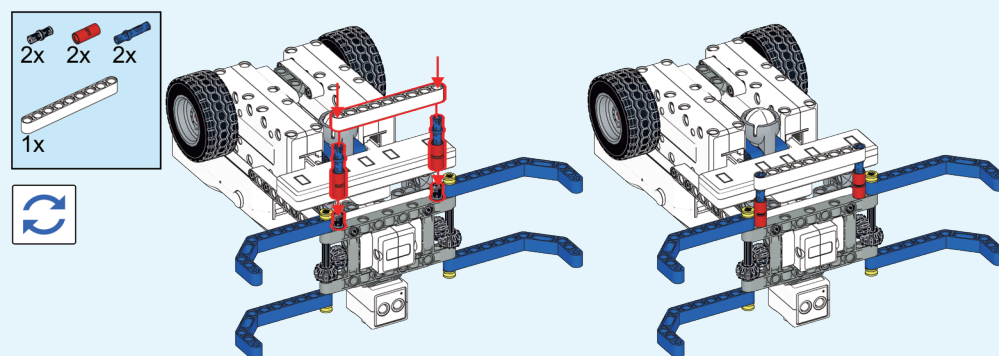
1

What should I do if the map is a little wrinkled after unpacking, and the obvious wrinkle will lead to inaccurate line inspection?

**Method 1:** You can roll the map into a reel as shown in the figure below. After 5-10 minutes, the folds will become smoother and the patrol line will be less affected.



**Method 2:** A small structure can be added to the machine according to the building diagram, and the relative position between the gray level and the map can be maintained during operation, so that the line inspection is more stable.



Bottom viewing angle

2

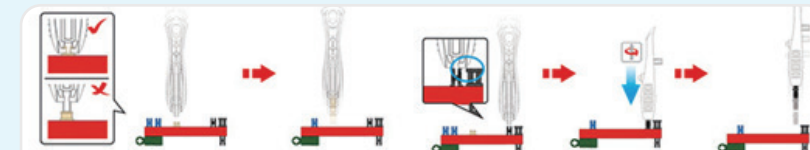
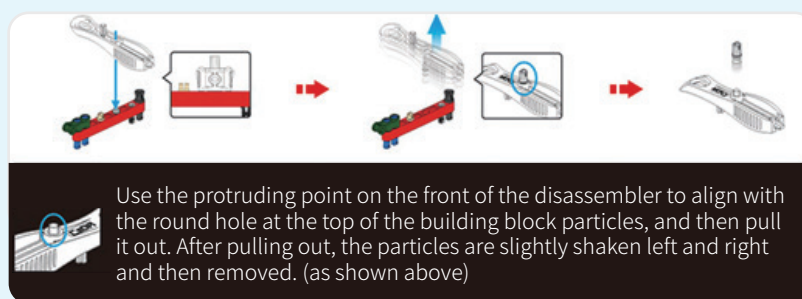
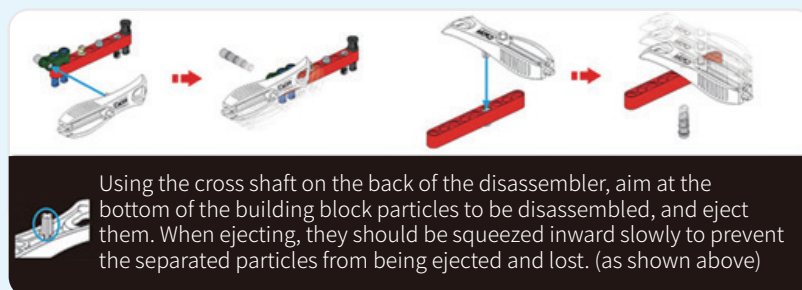
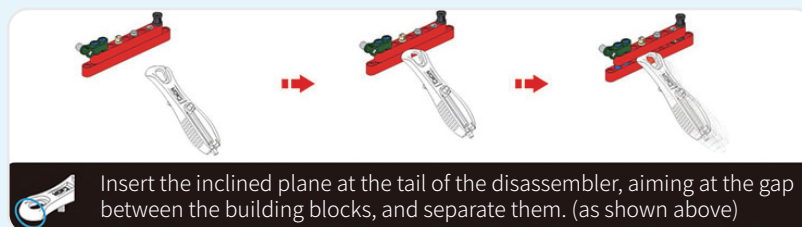
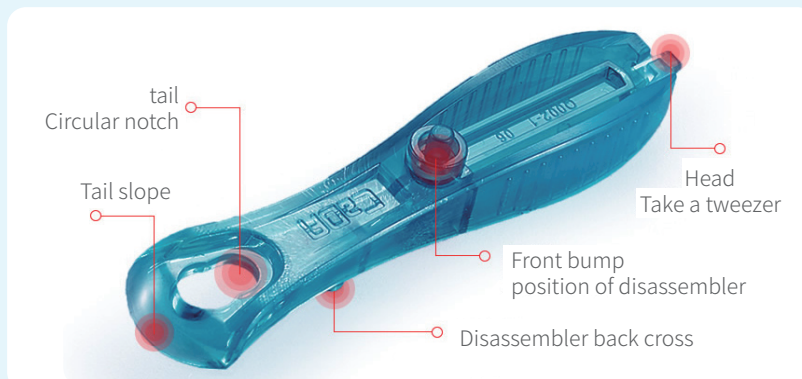
The map is flat, but what should I do if there is still deviation in the patrol line?

The light in different environments will affect the recognition status of gray scale, but our machine has a function of gray scale calibration. The following procedures can be followed.

|                                                                                                                                                                          |                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Long press switch                                                                                                                                                        | NASHENBOT                                                                                                       |
| Mode selection far right                                                                                                                                                 | Function BT Settings                                                                                            |
| Move down twice  X2<br>Click OK  X1                                                                                                                                      | Function BT Settings                                                                                            |
| Move down once  X1<br>Click OK  X1                                                                                                                                       | Advanced Calibration Versions                                                                                   |
| "Place the machine on the map, and align the grayscale with the black line (please put all five holes of grayscale on the black line).<br><br>Click OK  X1               | Please place tracking sensor directly above the black trace line<br><br>Align the grayscale with the black line |
| "Place the machine on the map, and aim the grayscale at the light-colored area (please place all five holes of grayscale in the light-colored area).<br><br>Click OK  X1 | Please place tracking sensor directly above the light white ground<br><br>Align grayscale to light areas        |
| If the calibration is successful, it is considered a success.                                                                                                            | Calibration Pass                                                                                                |
| If the calibration fails, the above operations need to be repeated.                                                                                                      | Calibration Fail                                                                                                |

### 3 Disassembler

Deal with disassembling all kinds of building block parts.



"Use the tweezers on the head of the disassembler, aim them at the building block particles and insert them (if the particles are stuck to the side when inserting, you need to rotate the disassembler 90 degrees to the left/right), press the two sides at the bottom of the disassembler hard to clamp the building block particles and pull them out. (as shown above)"



Use the circular notch at the tail of the disassembler, and after fastening the building block particles with a larger circle, the disassembler will buckle the building block particles on the small circle forward, and cover the notch with the thumb and pull it up to prevent the pulled particles from being ejected. (as shown above)

### 4 How to use the sticker

Step 1: tear off the sticker

Step 2: stick it on the blue foam block



### 5 Screen protective film

Our main control screen has a protective film at the factory. If you think it looks bad or the effect is not good, you can tear it from the corner, but it will be better to have a protective film.

