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makerzoid

Smart Robot Premium

MANUAL

Scratch Junior



CREATING STEAM

Science · Technology · Engineering · Arts · Mathematics

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APP Download APP icon



CHAPTER 1 INTRODUCTION

1. APP Introduction



APP Download APP icon

① Scan the QR Code

②APP store-search "makerzoid" IOS

②APP store-search "makerzoid" Android

1 APP Download



The APP includes different robot kits, you can choose the kit you have purchased

2 Choose the Robot Kit



It teaches you how to build a robot

3 Build a robot

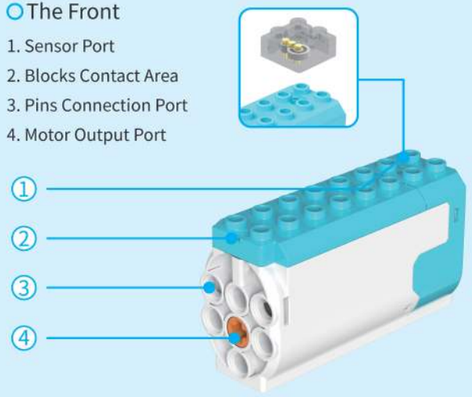


Please scan the QR code to enter our website: www.makerzoid.com

2. Motor

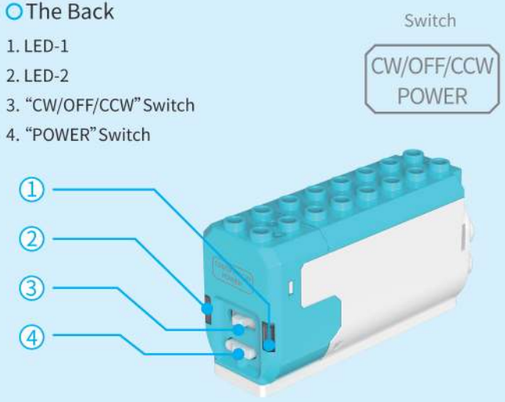
The Front

1. Sensor Port
2. Blocks Contact Area
3. Pins Connection Port
4. Motor Output Port



The Back

1. LED-1
2. LED-2
3. “CW/OFF/CCW” Switch
4. “POWER” Switch



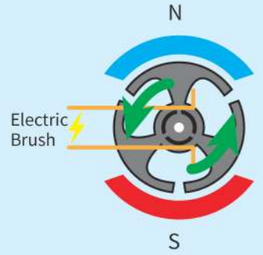
Battery Installation Instructions

- Non-rechargeable batteries cannot be charged.
- Rechargeable batteries should be charged under adult supervision.
- Used batteries should be removed from the product.
- The power terminals should not be short-circuited.
- Batteries of different sizes or old/new batteries cannot be used together.
- The toy cannot be connected to over one power source.
- Batteries should be inserted with the correct polarity.

How the motor works

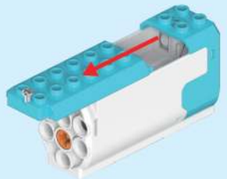
- According to the Electromagnetic Induction, the electrified wire rotates under the force in the magnetic field (As pictured on the right).
- The motor turns electric energy into kinetic energy enpowering and activating the robots.



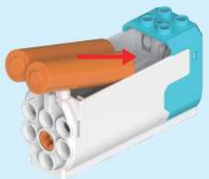


How to insert the batteries

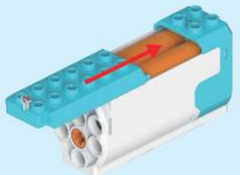
① Remove the cover on the motor.



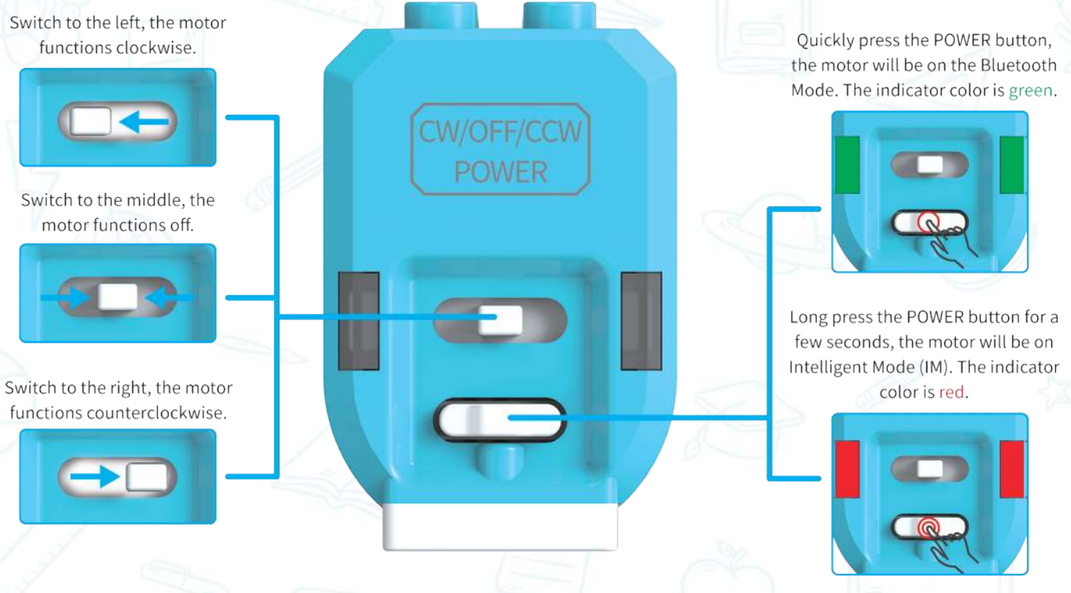
② Insert 2 AAA batteries (Not Included), the total voltage of the two batteries must not exceed 3.3 volts.



③ Push back the cover.



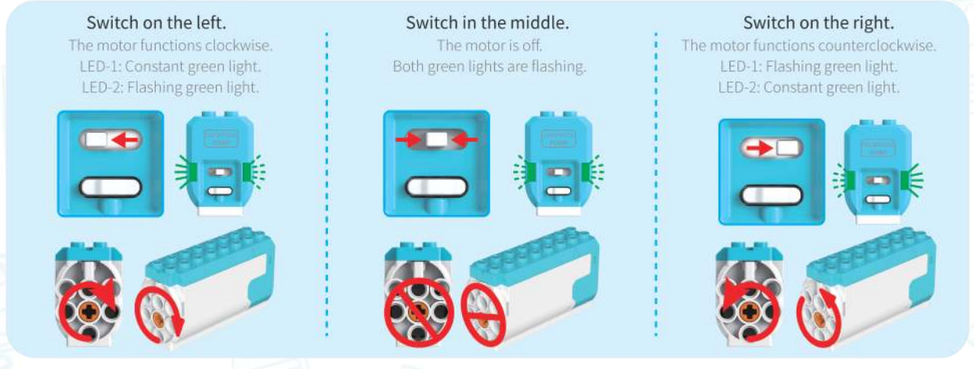
How to turn on



Bluetooth Mode



How to control the motor



After connecting with the phone, the motor will be on Bluetooth Mode(graphical programming).



Intelligent Mode (IM)



IR Sensor



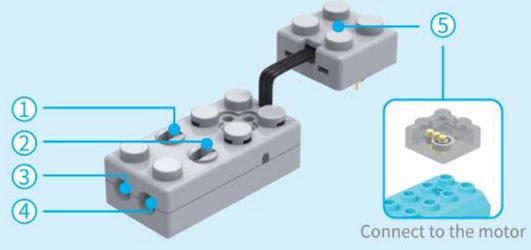
Switch on the left	Switch in the middle	Switch on the right
When the sensor detects an object, **the motor starts working clockwise.**	When the sensor detects an object, **the motor starts working counterclockwise.**	When the sensor detects an object, **the motor starts working counterclockwise.**
		
When the sensor does not detect an object, **the motor stops working.**	When the sensor does not detect an object, **the motor starts working clockwise.**	When the sensor does not detect an object, **the motor stops working.**
		

3. IR Sensor

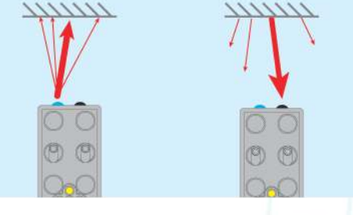
1. Introduction

- The IR Sensor judges distance and obstacles through the infrared light.Interference of infrared light from other sources, e.g a very bright room, will affect the detection range of the sensor.
- The two small “eyes” on the sensor are used for transmitting and receiving the infrared.

1. Infrared strength
2. Logical Decision
3. Infrared reception
4. Infrared emission
5. Joint

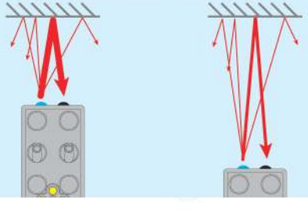


2. How the sensor works



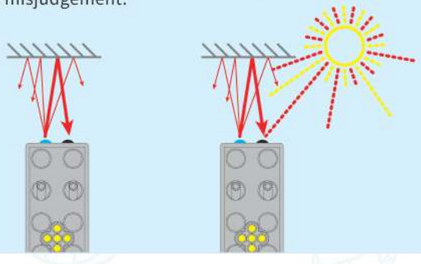
3. Measure the distance

- Measure the distance between the object by the strength of the infrared received.



4. Influence of the sunlight

- Sunlight contains strong infrared light which will affect the insensity of the infrared light received by the sensor and cause its misjudgement.

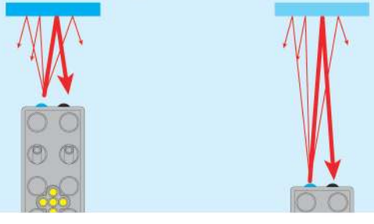


5. Color reflection

- Color of the object will affect the strength/weakness of the reflected light.

The darker the color, the weaker the reflected light.

The lighter the color, the stronger the reflected light.



6. Disassembly

- The sensor is made of silicone, please do not pull it out.
  (Squeezing it with blocks or gears may cause damage to the wire.)



- Please use a splitter to remove the sensor.



Choose Mode:
Logical Decision



Motor stops after the sensor detects of an object.
the sensor output "0"

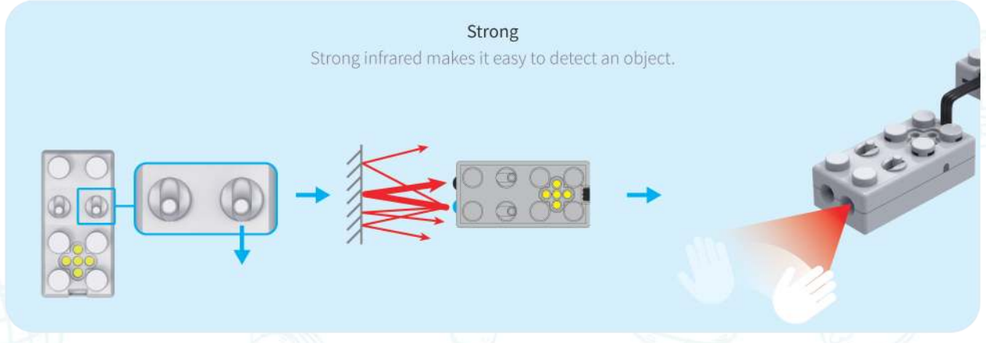


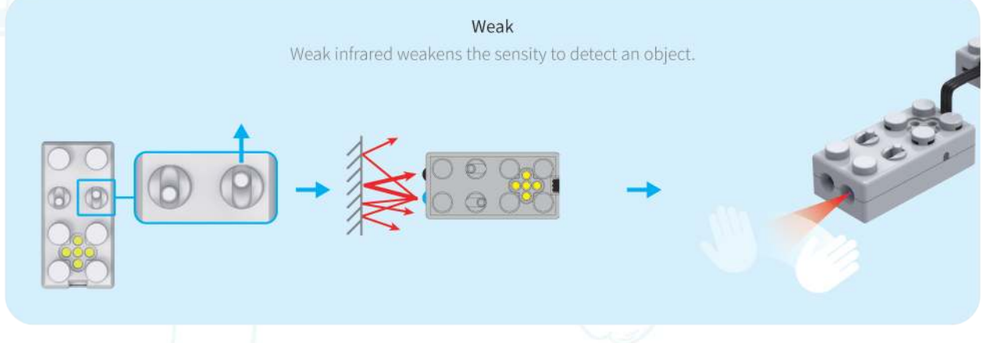
Motor starts after the sensor detects of an object.
the sensor output "1"



Choose Mode:
Infrared Strength







4. Scratch JR

4.1 What is the Scratch Jr graphical programming?

Scratch Jr is a programming platform of entry level. With graphical modules only, it' s much easier for kids to learn how to code than Scratch 3.0.



4.2 How to access the Programming page.

Open the Makerzoid App,and connect the APP to the host controller via bluetooth. Tap "Create" or choose the robot that needs to be coded, then tap "Code" to access the programming page.



4.3 Introduction to the Programming Area

There are 4 areas: Module, Edit, Menu, Data.



Module Area:
To choose Modules with different functions.

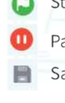
Edit Area:
To drag modules here to make some executable codes.

Data Area:
To display the value of the sensor.



Sensor Value
Microphone Value

Menu:



Start
Pause
Save

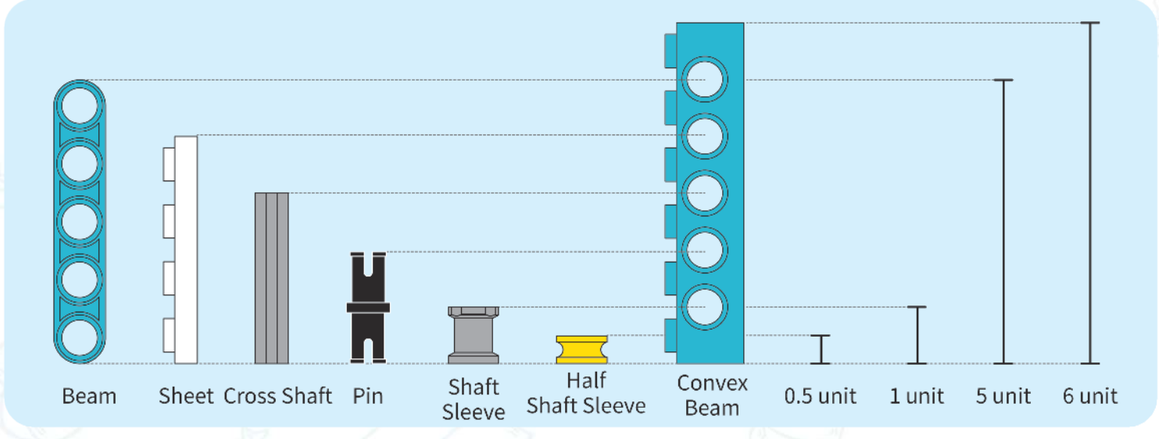
Programming Command

1		Execute the program when clicking the green flag
2		Execute after receiving the message of “meow”
3		End program.
4		Send a message of “meow”
5		Set the color of the No.1 LED light or turn off the light
6		Set the color of the No.2 LED light or turn off the light
7		Set the motor to rotate clockwise by the specified speed (Low Speed)
8		Set the motor to rotate clockwise by the specified speed (Medium Speed)
9		Set the motor to rotate clockwise by the specified speed (High Speed)
10		Set the motor to rotate clockwise by the specified value (Microphone Volume)
11		Set the motor to rotate clockwise by the specified value (Random Value)
12		Set the motor to rotate counterclockwise by the specified speed (Low Speed)
13		Set the motor to rotate counterclockwise by the specified speed (Medium Speed)
14		Set the motor to rotate counterclockwise by the specified speed (High Speed)
15		Set the motor to rotate counterclockwise by the specified value (Microphone Volume)
16		Set the motor to rotate counterclockwise by the specified value (Random Value)
17		Stop the motor
18		Execute the embedded module when the sensor value equals to the specified value (Microphone Volume)
19		Execute the embedded module when the sensor value equals to the specified value (Random Value)
20		Execute the embedded module when the sensor value is smaller than the specified value (3)

21		Execute the embedded module when the sensor value is bigger than the specified value (3)
22		Execute the embedded module when the microphone volume is bigger than the specified value (3)
23		Execute the embedded module when the microphone volume is smaller than the specified value (3)
24		Keep executing the modules
25		Execute the embedded module with the specified value (Microphone Volume) as the loop times
26		Execute the embedded module with the specified value (Random Value) as the loop times
27		Execute the embedded module with the specified value (4 times) as the loop times
28		Execute after the specified value (1s) of seconds
29		Execute after the specified value of seconds (Microphone Volume/Random Value); Execute after the specified condition (the sensor value is decreasing/increasing)
30		Out of the loop
31		Play music (Random Value/Song Number)
32		Display the specified pattern on the screen (Random Value/Pattern Number)
33		Print strings (123) on the screen
34		Display the current context being printed
35		Add the number(1) to the one showing on the screen
36		Subtract the number(1) from the one showing on the screen
37		Multiply the number(1) to the one showing on the screen
38		Divide the number(1) by the one showing on the screen
39		Execute the embedded module when the screen is showing specified strings (123)

CHAPTER 2 BASIC KNOWLEDGE OF ROBOT PARTS

1. The Unit Size



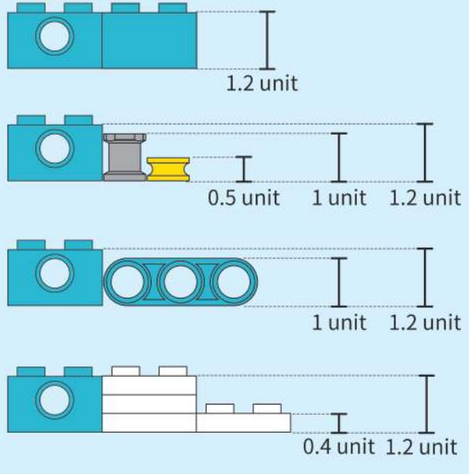
○ 1 unit = 8mm. Generally the width, height, length of the parts are integral multiples of the size of the unit .

Example: 

The part is called convex beam. Its length is 4 unit and width is 1 unit.

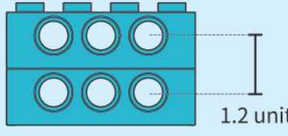
The height of the beam and brick

○ Height of the beam(or brick)=1.2 unit=9.6mm
Height of 1 beam(or brick)=Height of 3 sheets
Height of 1 sheet=0.4 unit=3.2mm

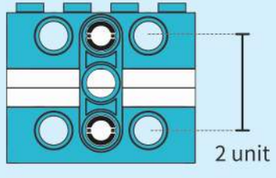


Hamburger Structure

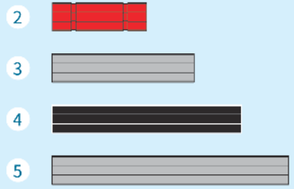
○ Height of 2 beams(or bricks) piled up is 2 unit.
The distance between two holes is 1.2 unit.



○ Height of 2 beams(or bricks) + 2 sheets piled up = 3.2 unit. Distance between two holes is 2 unit.
(2 sheets should be in the middle)



Size Reference List - Shaft





Size Reference List - Plate





NOTICE

When you receive the product, please read the contents on the "Parts List" first. Understanding the shapes of various parts and confirm the number of the parts received according to the list would be highly recommended. The tutorials will be much easier to understand afterwards. (Colors of the parts you see on the illustrations may be different from the actual ones due to the need for production batches or display. Please distinguish different parts based on their shapes. If there are any parts missing, please contact customer service.)

2. Differences Between The Parts

1. Difference between pins

Half pin	 1.5 unit	The half part of it is combined with a 0.5 unit accessory.
Grey pin	 2 unit	It has little friction with the hole, so it' s easy to rotate.
Black pin	 2 unit	It has great friction with the hole, so it' s mostly used for fixation.
Half pin shaft(loose)	 2 unit	The pin of it has little friction with the hole, so it' s easy to rotate.
Half pin shaft(tight)	 2 unit	The pin of it has great friction with the hole, so it' s mostly used for fixation.
Long half pin	 3 unit	It has little friction with the hole, so it' s easy to rotate.
Long pin	 3 unit	It has great friction with the hole, so it' s used for fixation.

2. Difference between gears

8-teeth gear		Combined with 24-teeth gear to achieve a triple acceleration or deceleration.
12-teeth gear wheel		Mostly Used to change the direction of axis hole' s motion.
12-teeth gear		Combined with 20-teeth gear to achieve acceleration or deceleration.
20-teeth gear wheel		Mostly Used to change the direction of axis hole' s motion.
20-teeth gear		Combined with 12-teeth gear to achieve acceleration or deceleration.
24-teeth gear		Combined with 8-teeth gear to achieve a triple acceleration or deceleration.
2M worm		Mostly used to combine with gears to achieve acceleration or deceleration.
1x4 gear strip		Mostly used to combine with gears in reciprocating motion.

3. Difference between sleeves

Shaft sleeve		Mostly used to steady the parts in the cross shaft in 1 unit.
Half shaft sleeve		Mostly used to steady the parts in the cross shaft in 0.5 unit.

4. Universal joint

Universal joint		Mostly Used to change the direction of axis hole' s motion.

3. Use Skills

1. Interlock



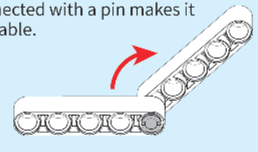
Lock with one block

Easily come off

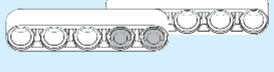
Lock with two blocks to make it firmer

2. Two points determine a straight line

- Connected with a pin makes it rotatable.



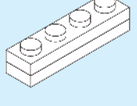
- Connected with two or more pins makes it steady.



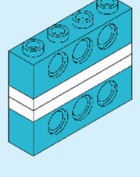
3. Detach the blocks

- As picture 1, sheets are tightly attached. Put one piece of convex beam on each side as picture 2. Sheets could be detached easily by pressing out the two convex beams simultaneously.

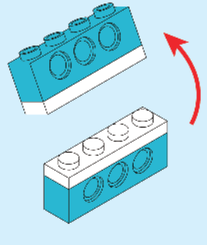
1



2



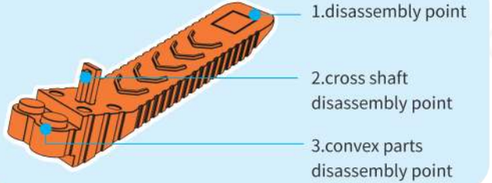
3



4. Disassembly Skills

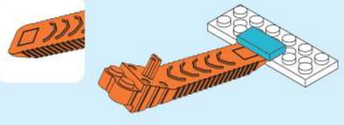
Introduction of the splitter

- Based on the principle of leverage, the splitter is designed to be easily used to disassemble parts.



Tips for disassembly

1. Disassembly point

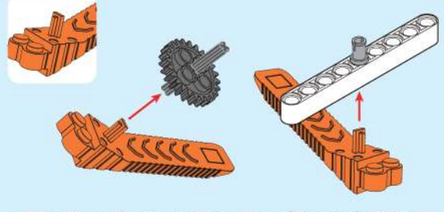


- As pictured, aim at the gap between the parts and push in the splitter.



Don’ t bite on the blocks.

2. Cross shaft disassembly point



- As pictured, aim at the bottom of the shaft with the cross shaft disassembly point and push gently in case the shaft drops out.

3. Convex parts disassembly point



- Aim at the bottom or top of the convex parts with the disassembly point and press it accordingly as pictured.

Intelligent Car



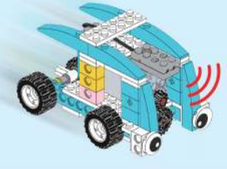
Scenario:

Hey guys, have you ever seen an automatic car?

An intelligent car can drive and stop automatically with computer, AI and Automatic Control technology.



Would you like to build your own intelligent car?
Let' s do it together!



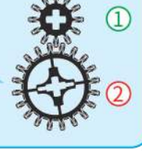
Knowlege:

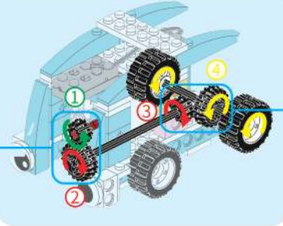
Comparison of gear acceleration and vertical engagement structures

Gear Deceleration Structure

Drive wheel is the small one. Engaged wheel is the big one.

The number of my teeth is 8 more than the Drive wheel' s.It goes a round leading me goes 3/5 round, so my speed is slower but power is stronger.





Vertical Engagement Structure

Vertical engagement means gears rotate on two vertical surfaces. The direction of force changes when the direction of rotation changes.

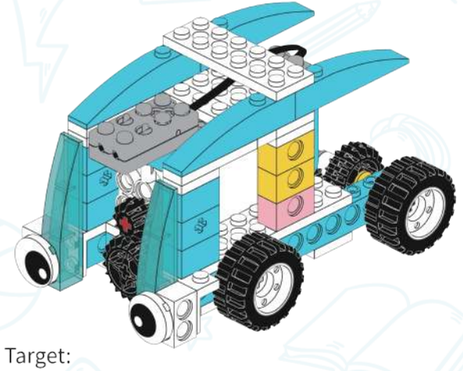


Intelligent Car

★ ★ ★ ☆ ☆

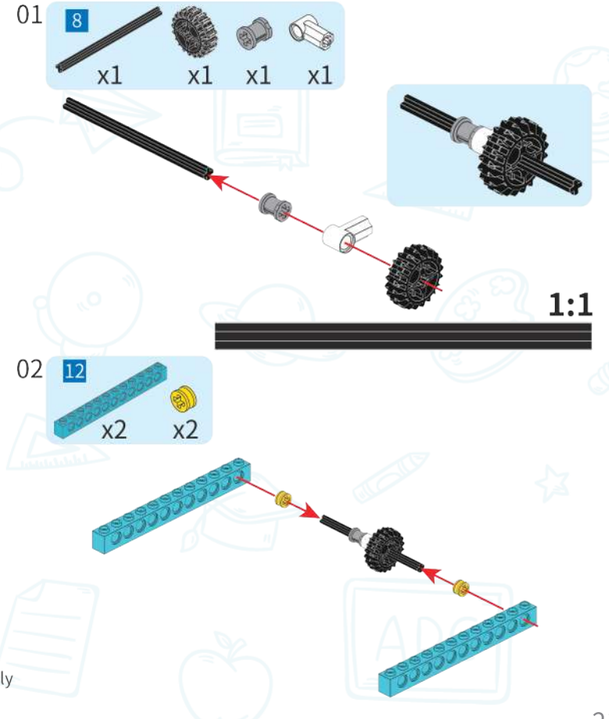
Build:

Hey guys, please follow the steps to build the intelligent car with your fastest speed. You will find something interesting and useful!

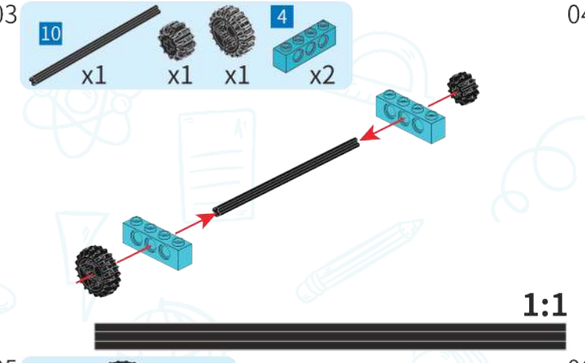


Target:

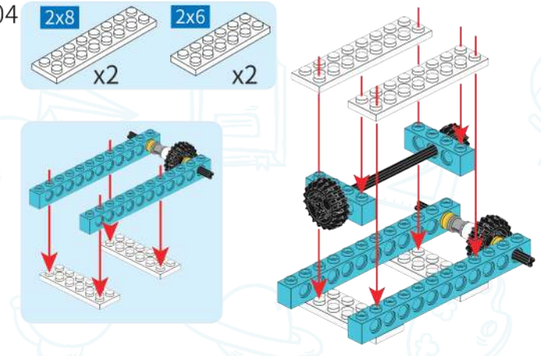
1. Learn about the gear vertical drives theory when building the car.
2. Learn how to set the car move forward and backward.
3. To achieve the goal that the car can move and stop automatically in front of obstacles with the IR sensor.



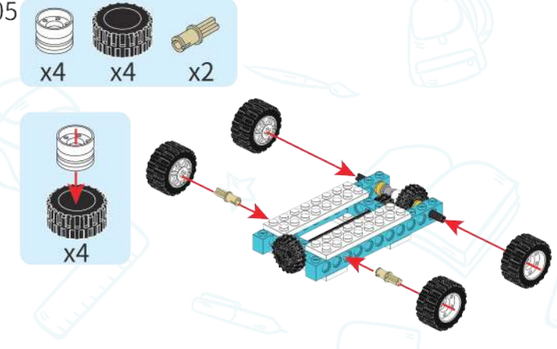
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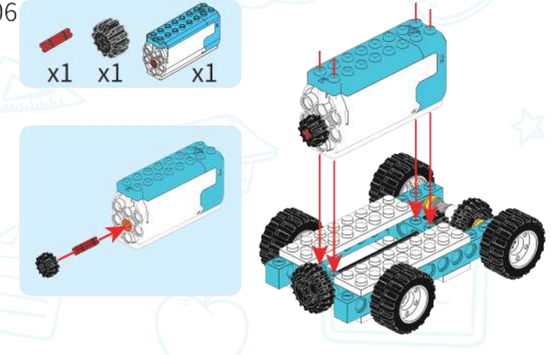
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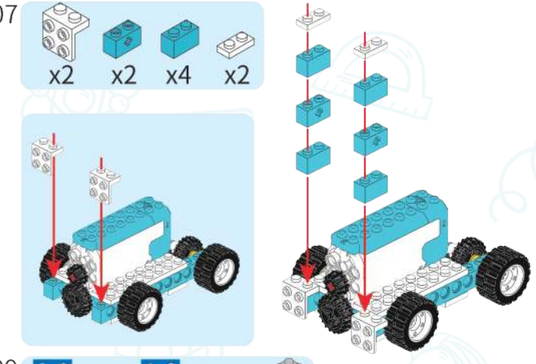
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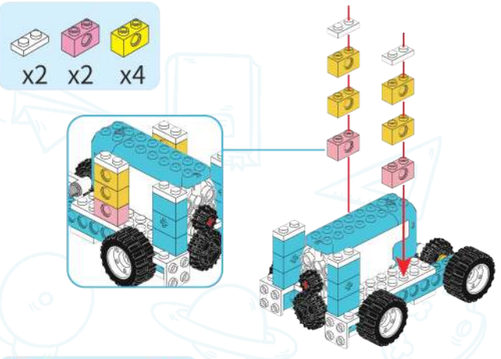
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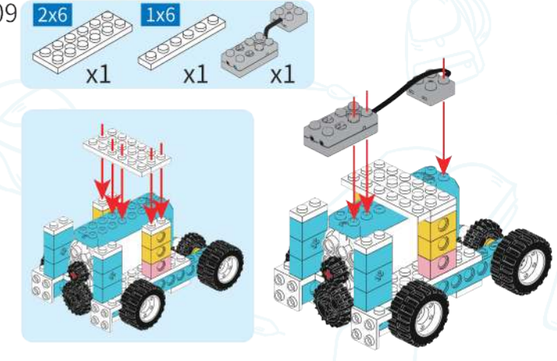
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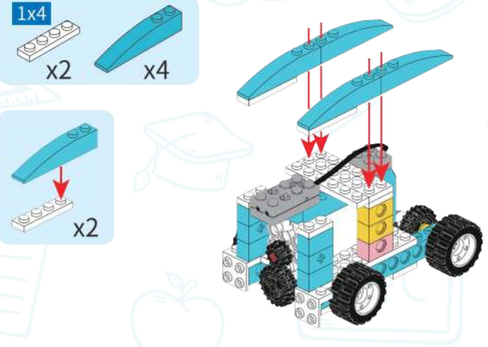
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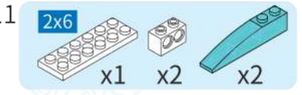
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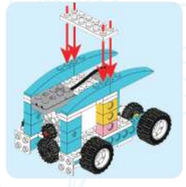


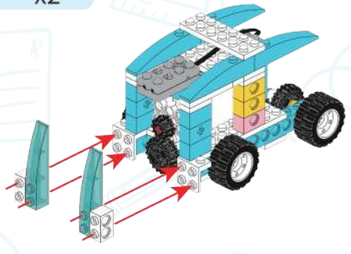
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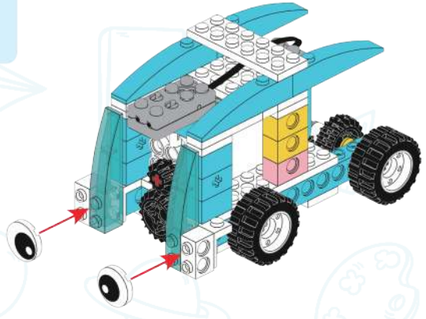






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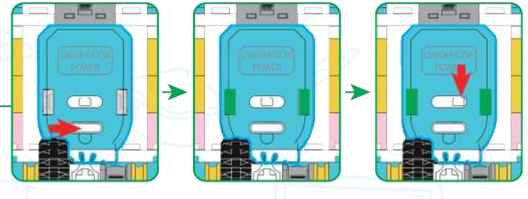




Play:

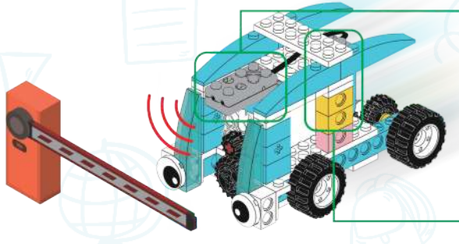
The intelligent car is done now. Please have some fun!

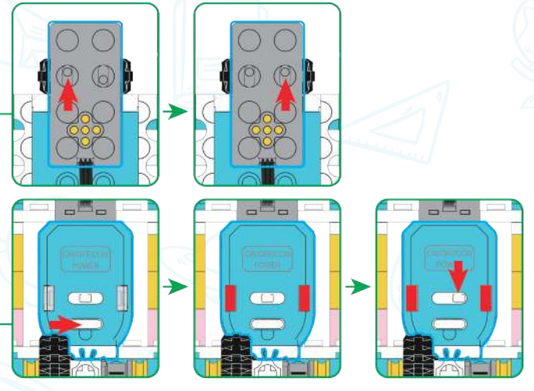
Test and play:
Quickly press the "POWER" button and turn the switch to the right(CCW) to see how it works.





Now we are going to do some coding on the car and make some magic together.
First, we set the sensor to “Stop when detecting obstacles” mode as pictured. Then Long press the "POWER" button to enter the IM mode, and turn the switch to CCW(Counterclockwise).

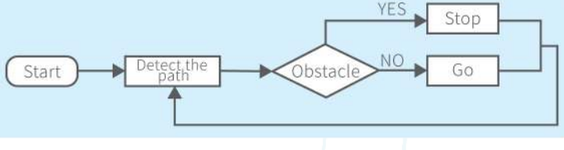




When the program is being executed,the car will starts. It will stop in front an obstacle and start again after the obstacle is gone.

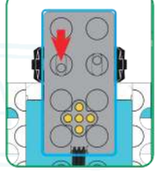
○ Programming Flowchart

Analysics of how the program works.



○ Create:

Do you know how to adjust the IR sensor after learning the Programming Flowchart?
Please try to adjust the sensor to “Start when detecting obstacles”. When the car detects an object in front, it will start going.



Tap on the "Code" to access the program page.



1 Create



2 Start programming

When the sensor value is smaller than 3, the car will move forward at a low speed.



The car stops when it detects an obstacle upfront.
If the sensor value is bigger than 3, that means it has detected an obstacle, so it will stop moving forward.

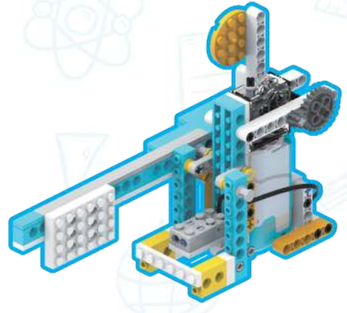


Finally, drag the Forever module to intelligentize the car and make it work repeatedly.



Forever

Intelligent Barrier Gate



Scenario

Barrier gate is quite usual in our life. Have you ever seen one like this before?

When a car approaches the barrier gate, the gate keeping anyone out will lift up automatically. When the car leaves, the gate will fall back to its original position.



Now let' s build an intelligent barrier gate together!

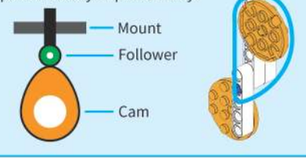


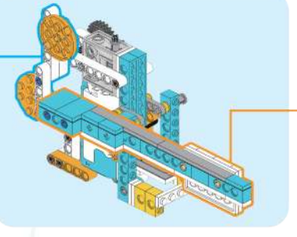
Knowledge

Cam Mechanism and Hard Lever

Cam Mechanism

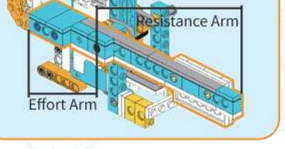
Cam and follower mechanism is a pair of higher links that are used to move links spontaneously or periodically.





Hard Lever

Lever with a longer effort arm than the resistance arm is called labor saving lever.
e.g scissors, chopsticks, barrier gates.

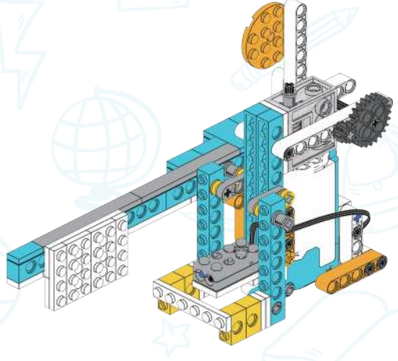


Intelligent Barrier Gate

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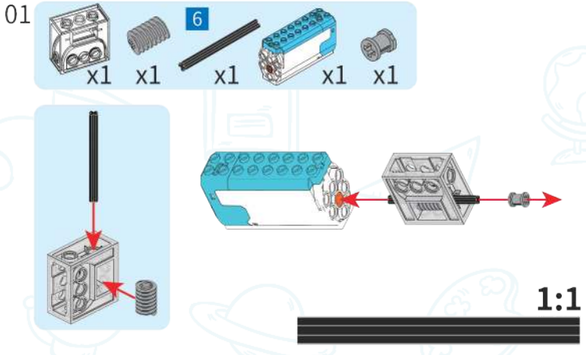
Build:

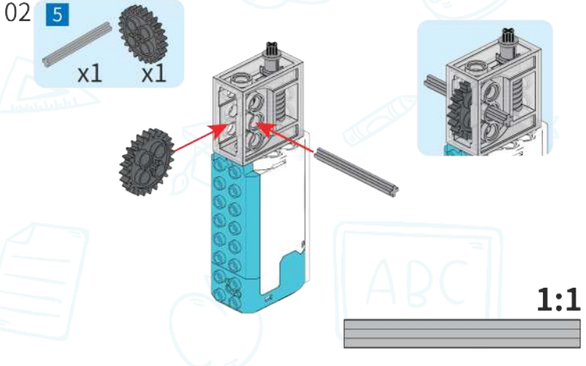
Hey guys, please follow the steps to build the intelligent barrier gate with your fastest speed. You will find something interesting and useful!

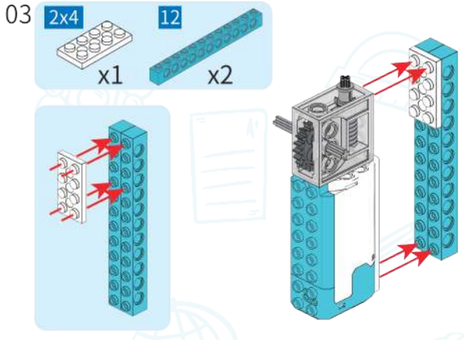


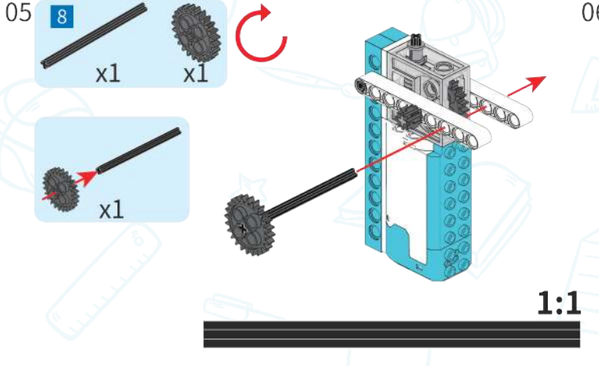
Target:

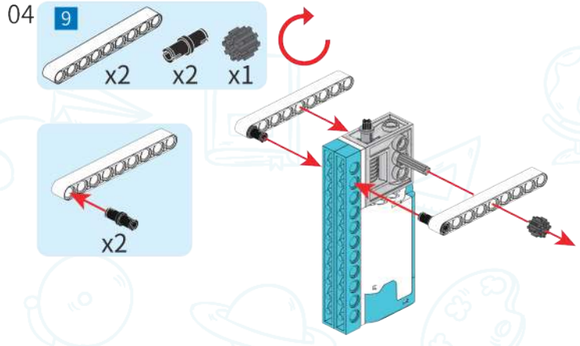
1. Learn about the intelligent gate system.
2. Learn about the theory of lever.
3. Use the cam and lever combination to control the gate.
4. To achieve the goal that the gate can lift up and down automatically with the IR sensor.

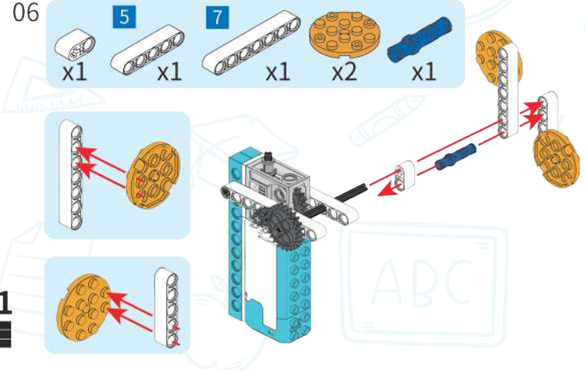




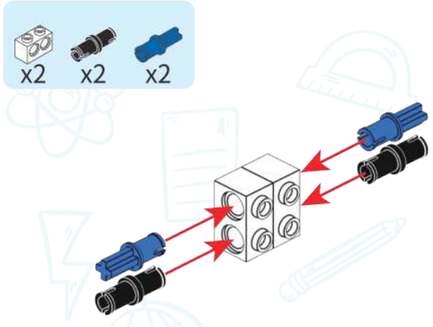




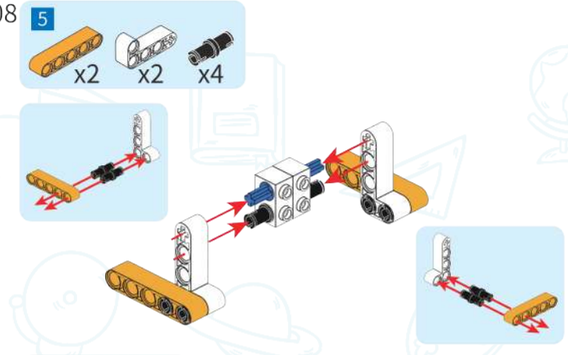




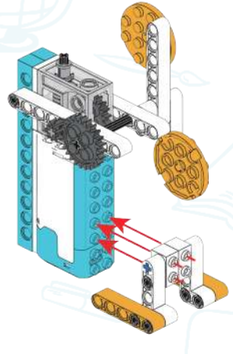
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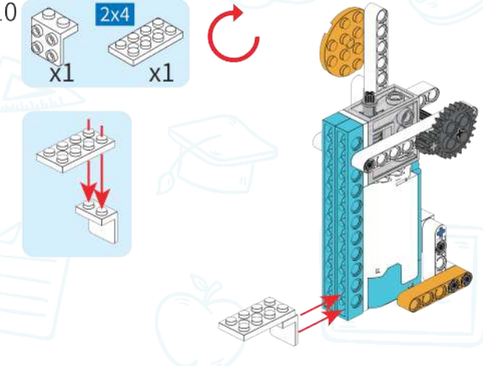
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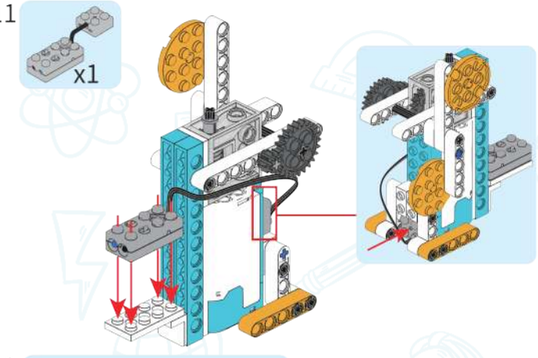
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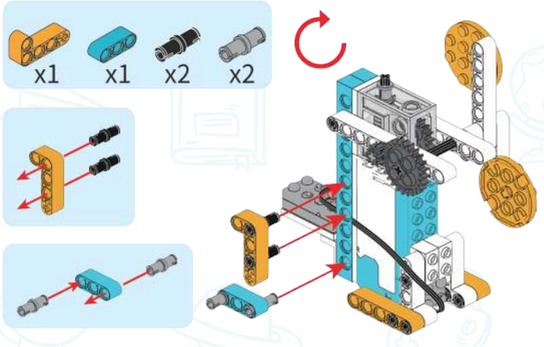
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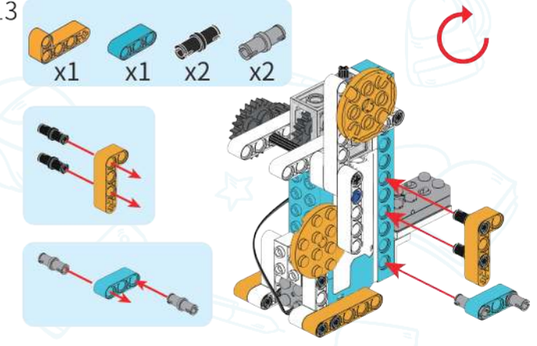
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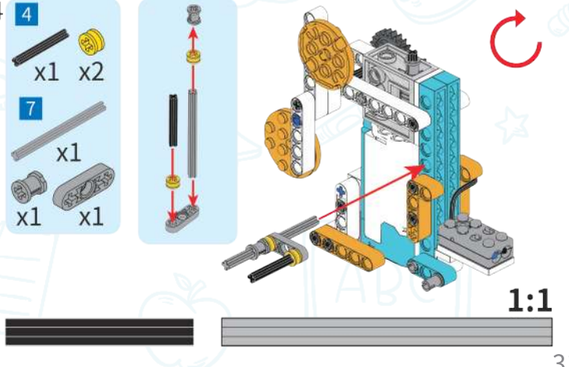
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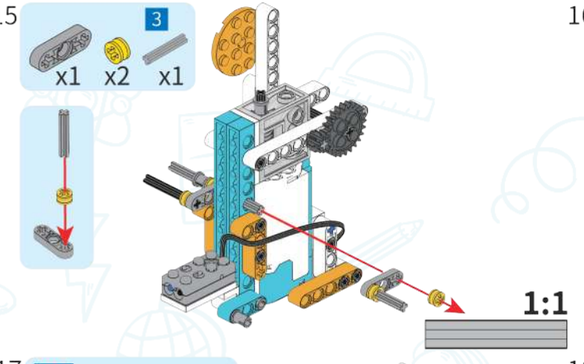
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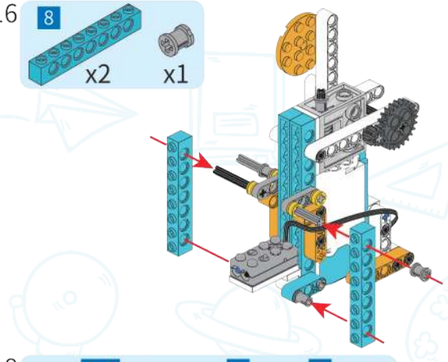
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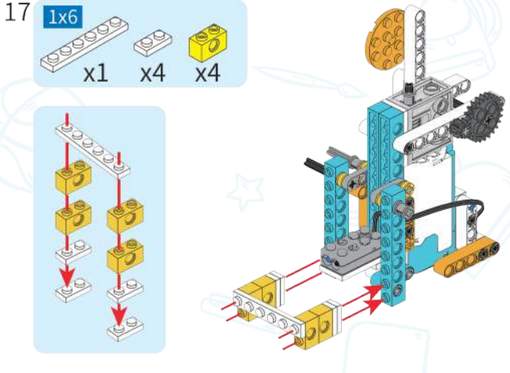
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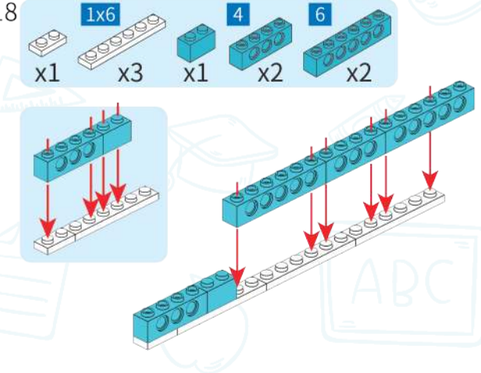
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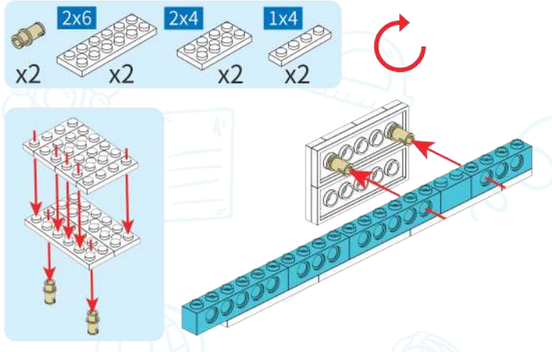
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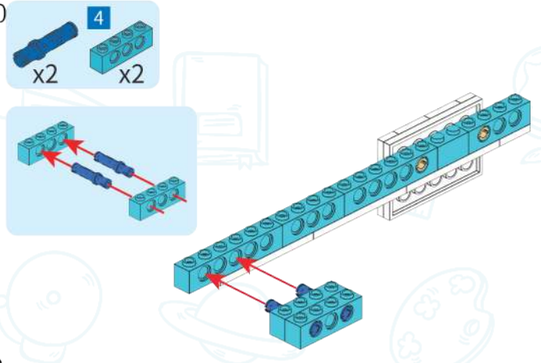
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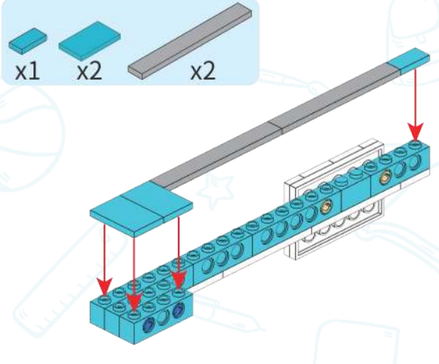
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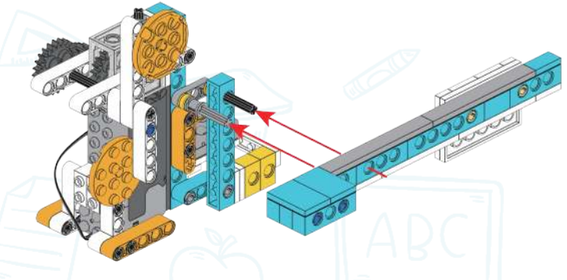
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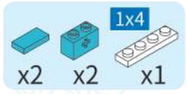
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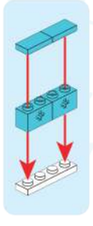


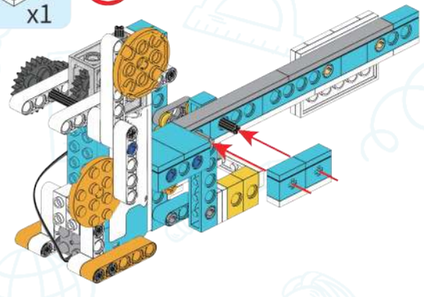
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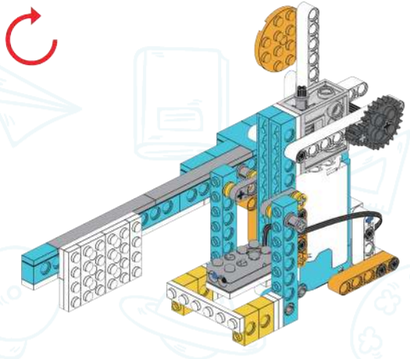
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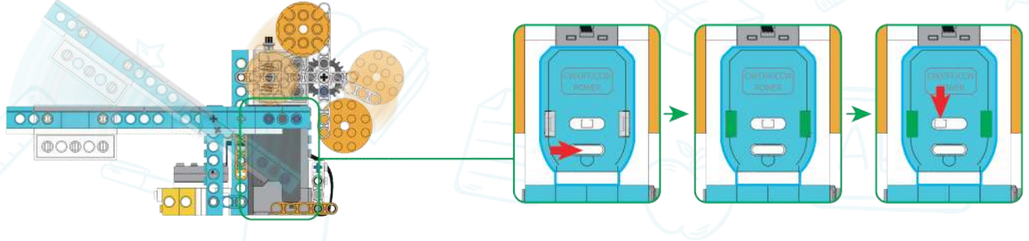
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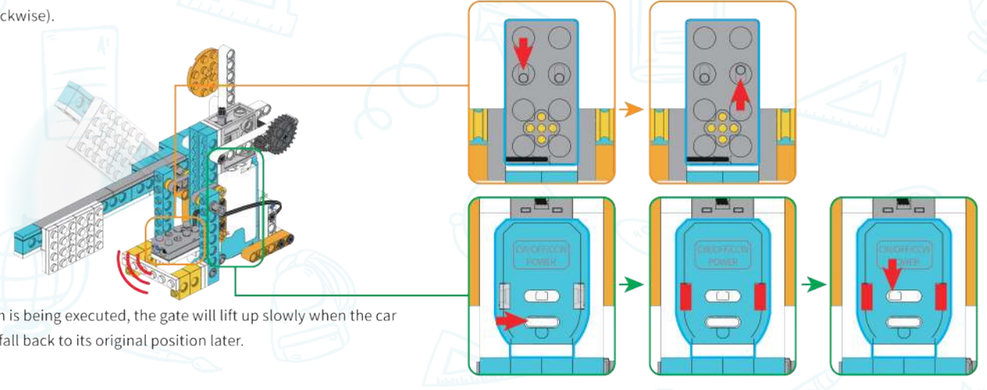
Play:

Now the intelligent gate is done. Let's have some fun!

Quickly press the "POWER" button and turn the switch to the left(CW) to see how it works.

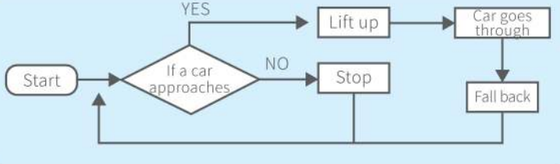


Now we are going to do some coding on the gate and make some magic together. First, we adjust the IR sensor to "Start when detecting an object" mode as pictured. Then Long press the "POWER" button to enter the IM mode, and turn the switch to CW(Clockwise).



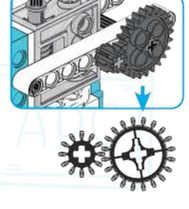
After the program is being executed, the gate will lift up slowly when the car approaches and fall back to its original position later.

Programming Flowchart



Create:

Do you know if there are any ways to make the gate lift up faster? Please try to replace the drive and engaged wheels with the 12-teeth gear and 20-teeth gear wheel to see if it's faster.

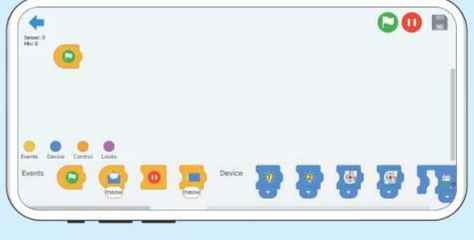


Intelligent Barrier Gate Programming

Tap on the "Code" to access to the program page.



1 Create



2 Start programming

When the car reaches to the barrier gate, the gate has to be lifted up to get it through.

Drag the following two modules to the Edit Area, and set the value to 3.



When the car drives away, the sensor value on the barrier gate is smaller than 3. Then the barrier gate will be closed.

Drag the following two modules to the Edit Area, and set the value to 3.



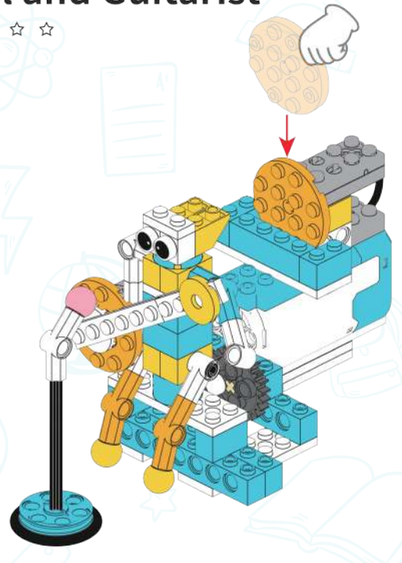
Finally, drag the Forever module to intelligentize the barrier gate and make it work repeatedly.

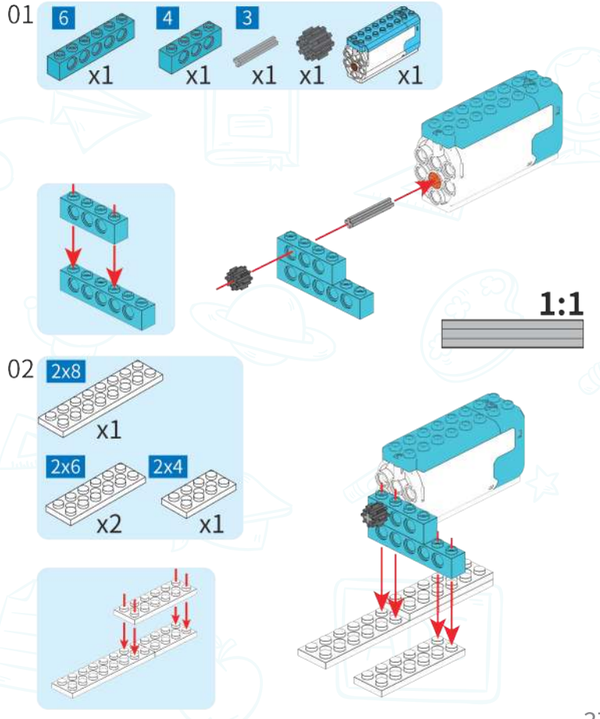


Forever

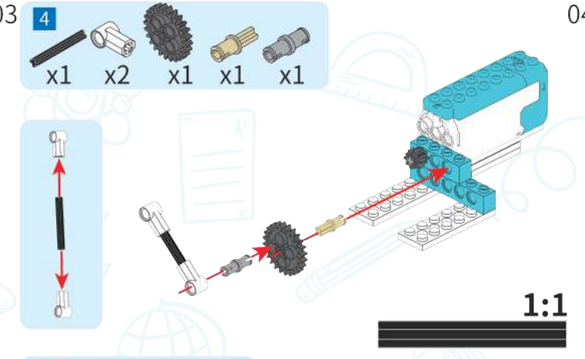
Vocal and Guitarist

★ ★ ★ ☆ ☆

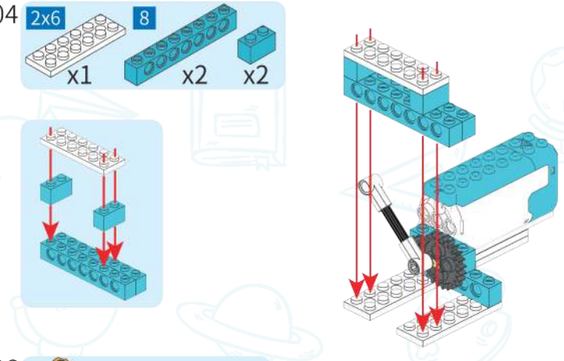




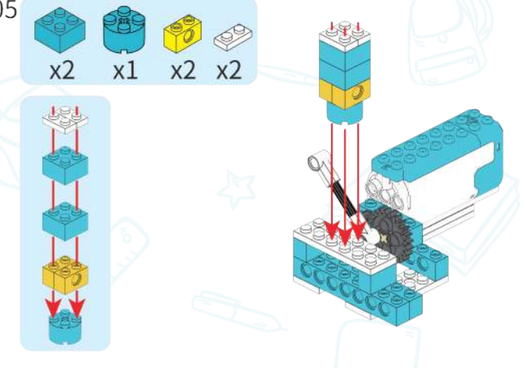
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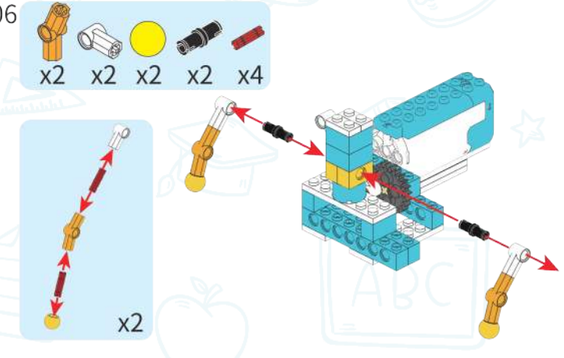
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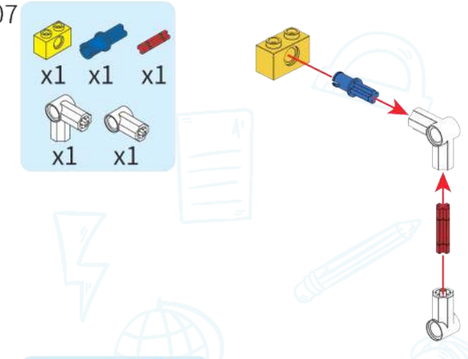
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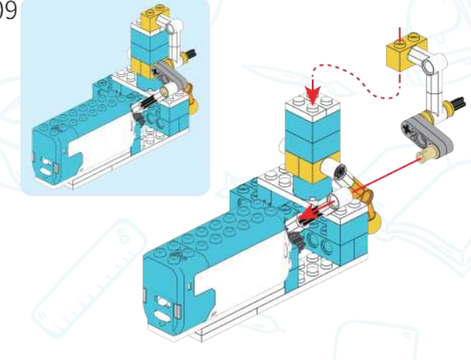
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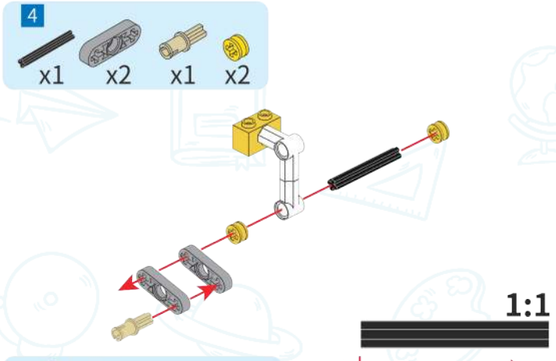
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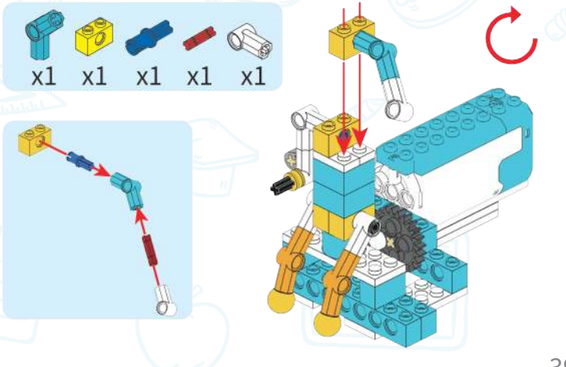
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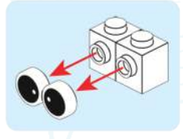


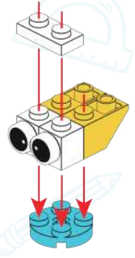
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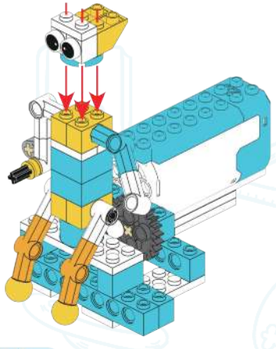
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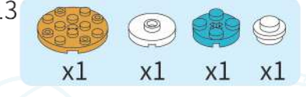


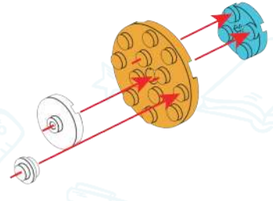


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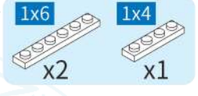


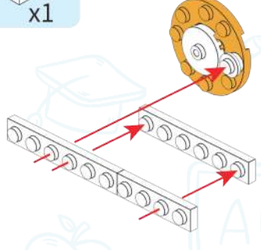
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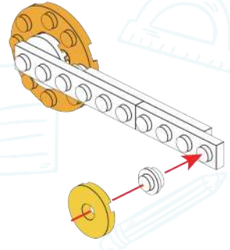
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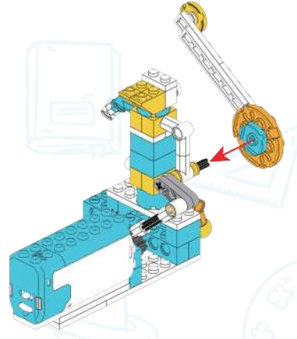


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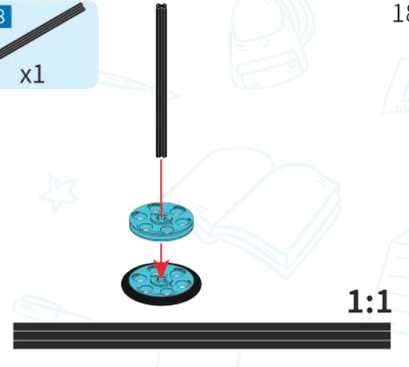
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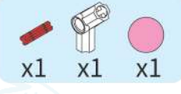
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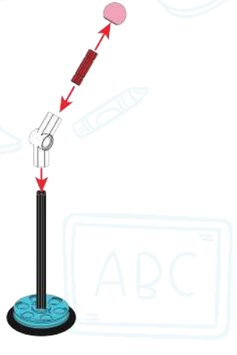




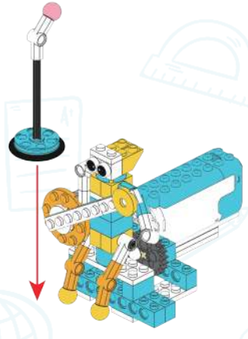


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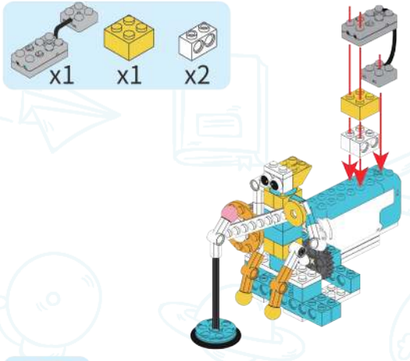




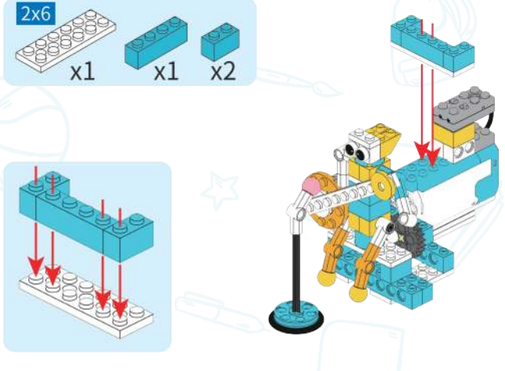
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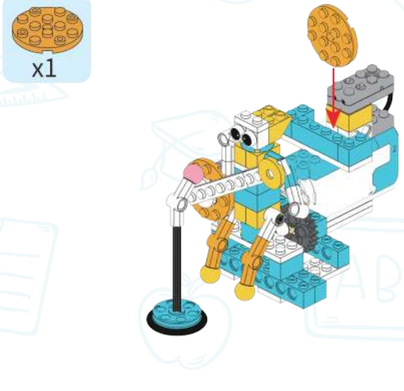
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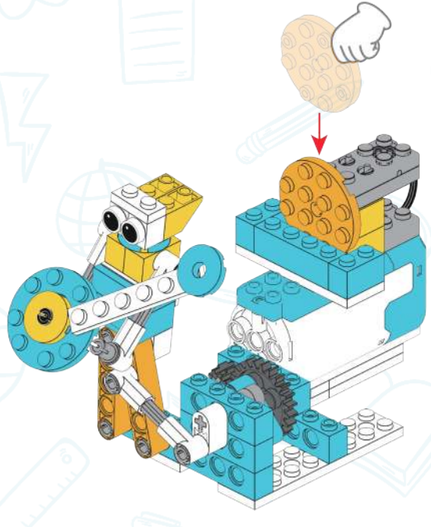


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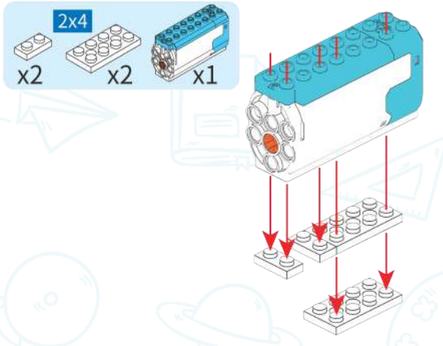


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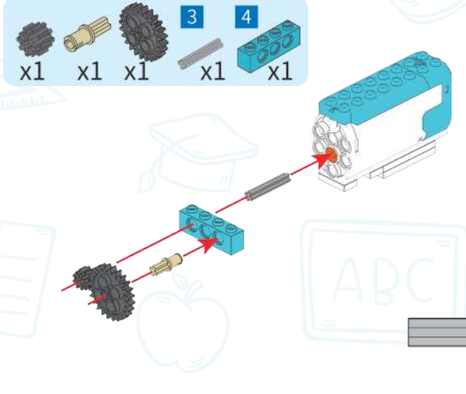
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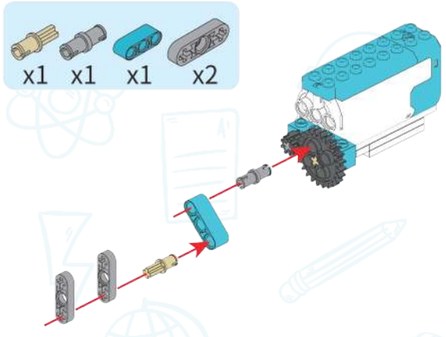


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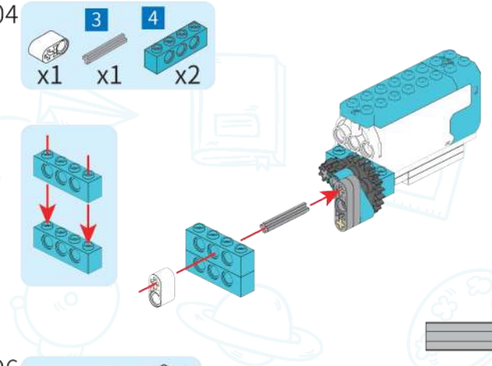


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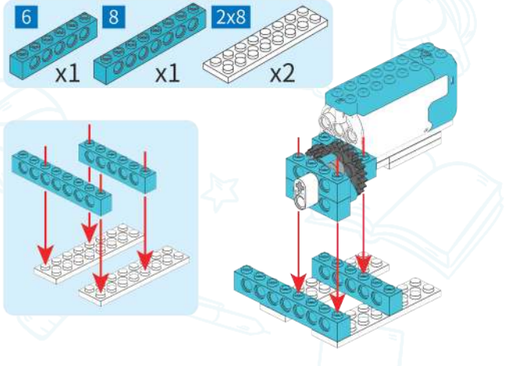


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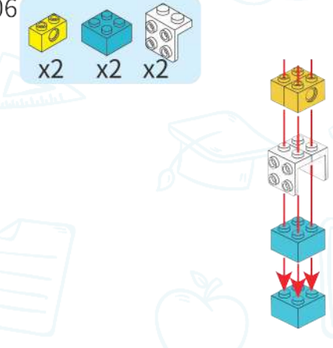


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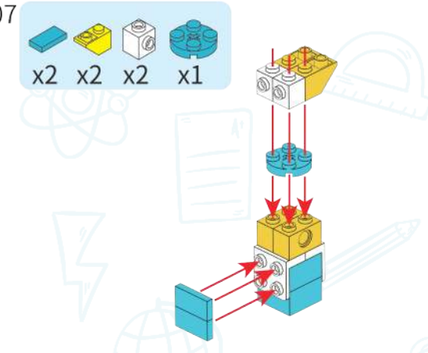
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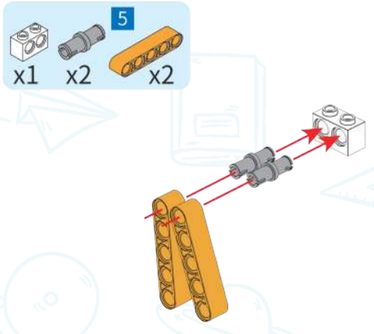
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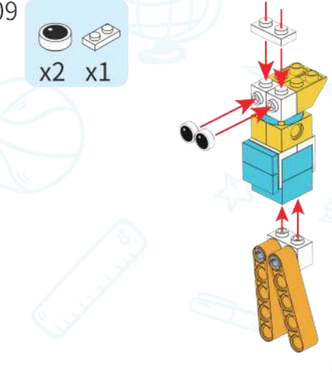
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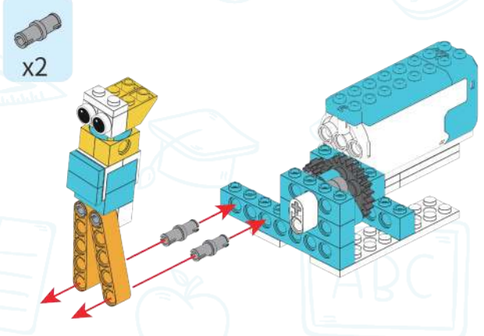
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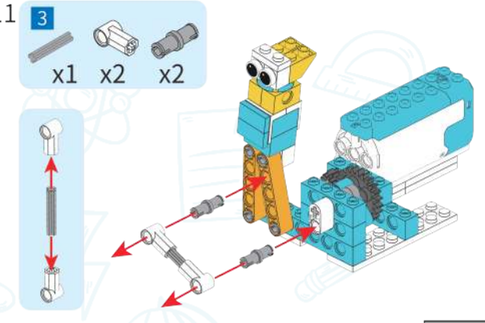
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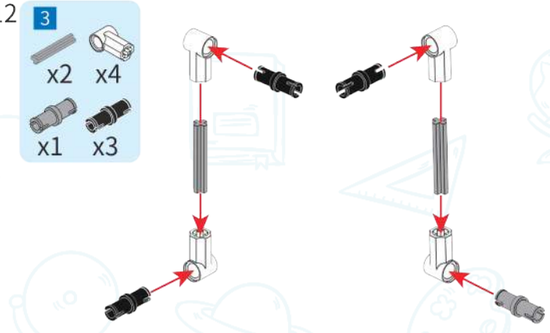
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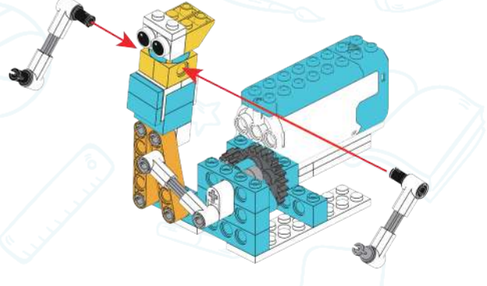


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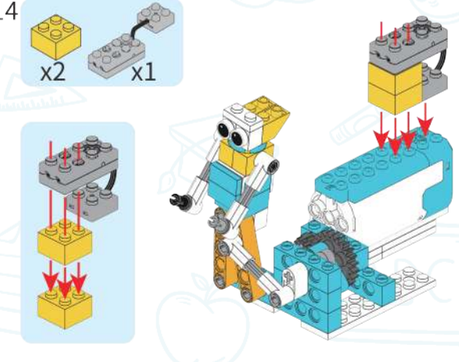


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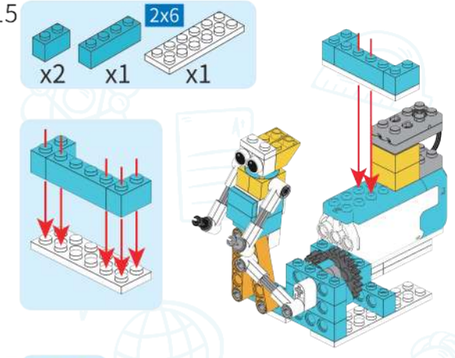
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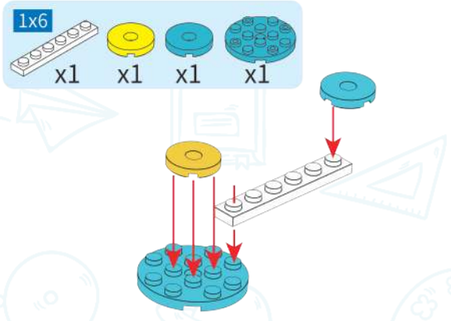
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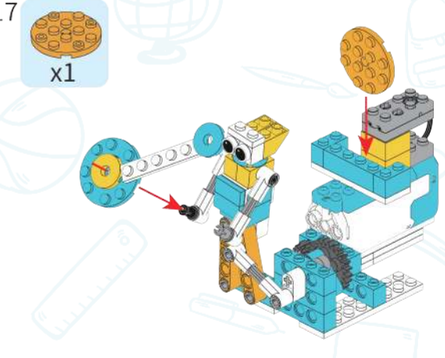
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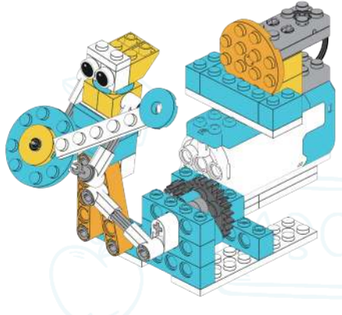
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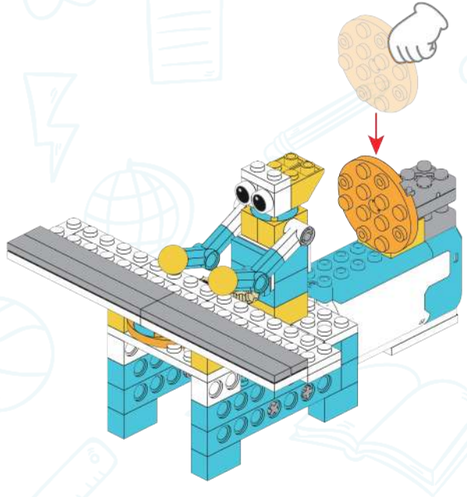


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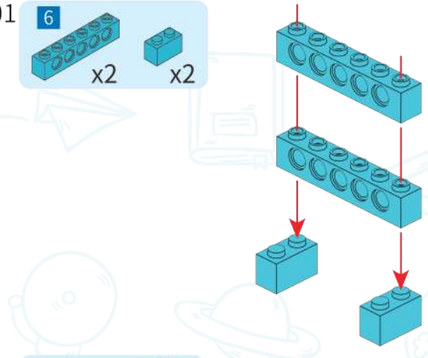


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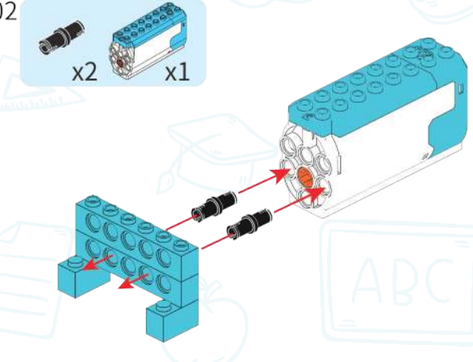
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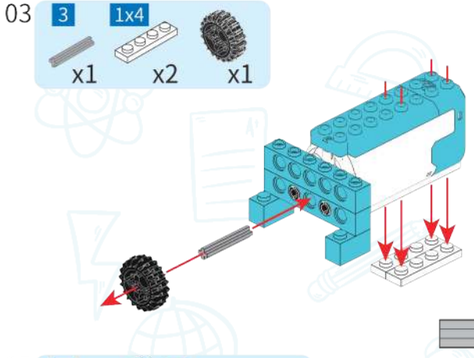
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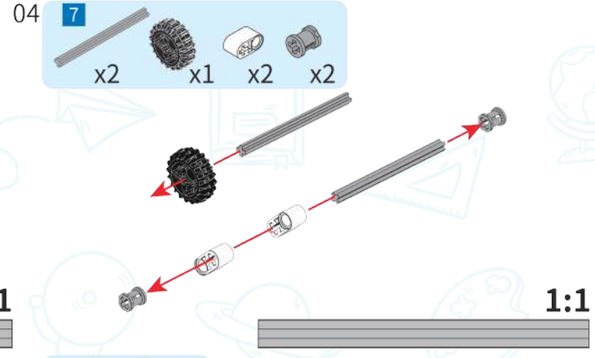
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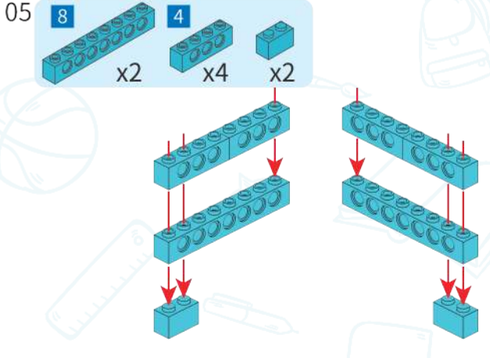
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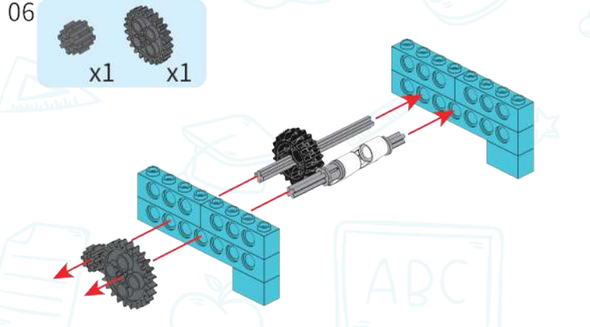
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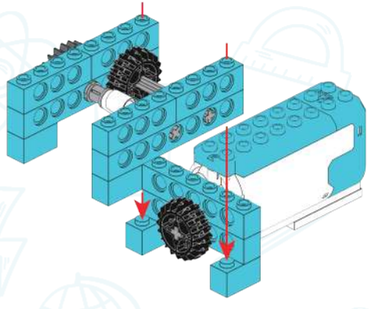
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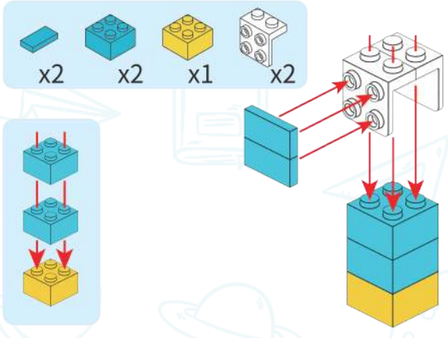
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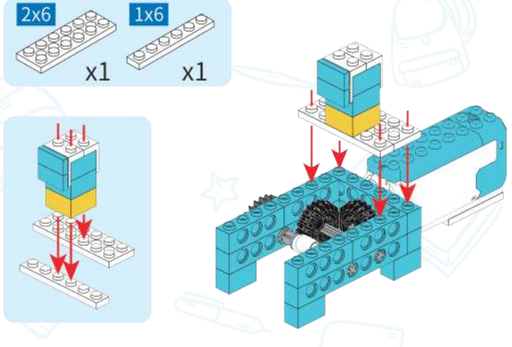
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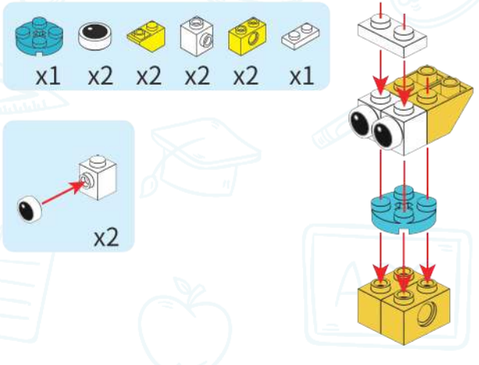
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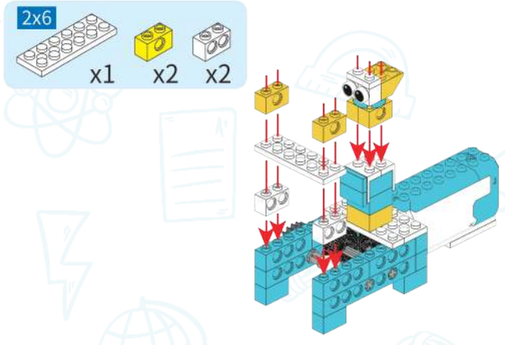
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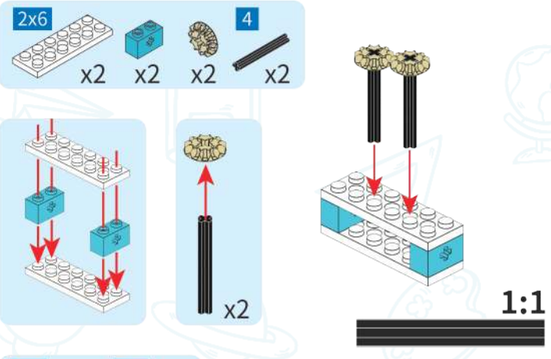
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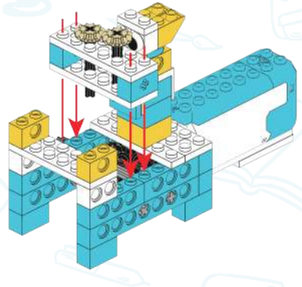
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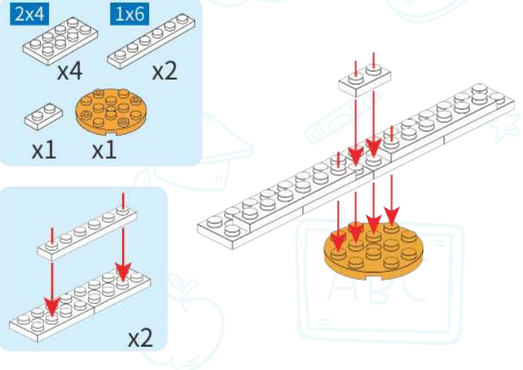
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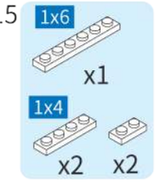
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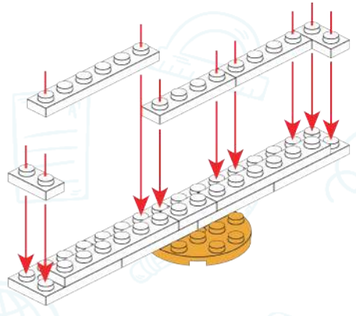


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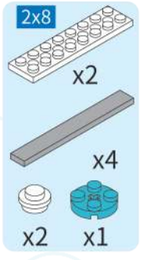


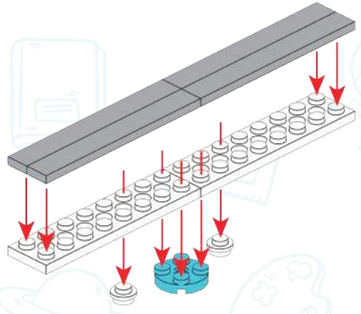
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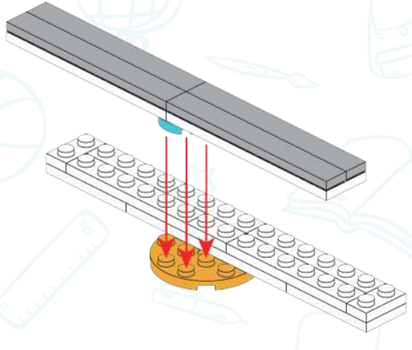


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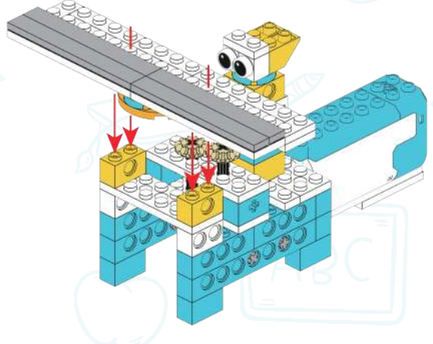




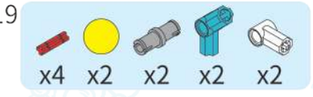
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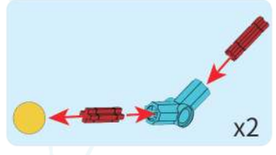


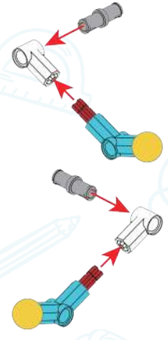
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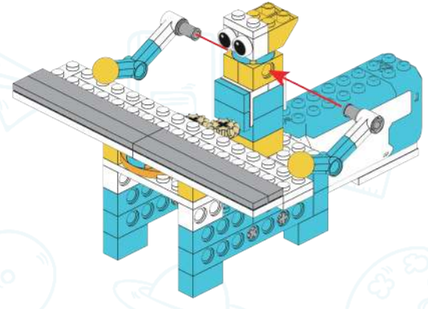
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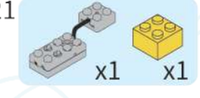


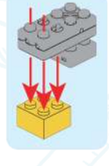


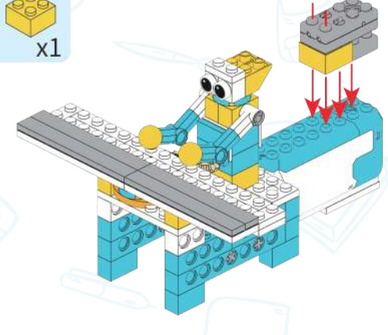
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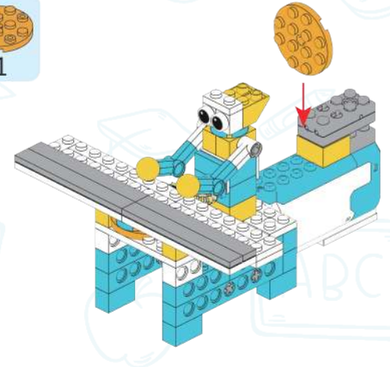






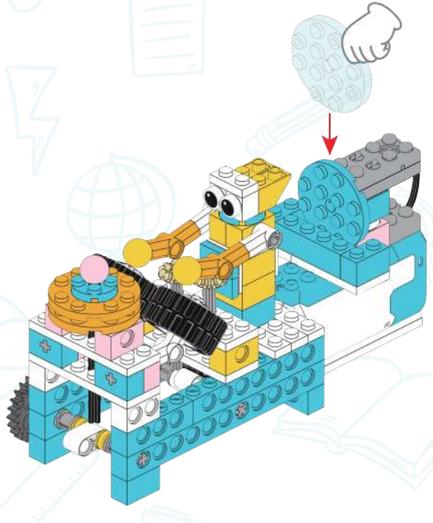
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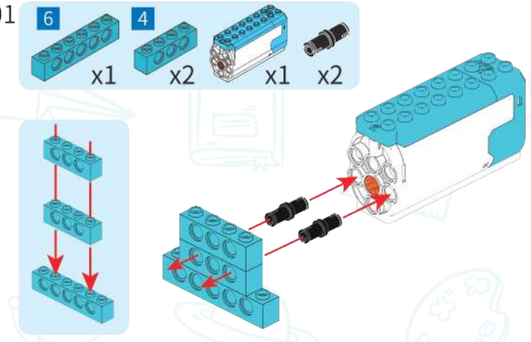


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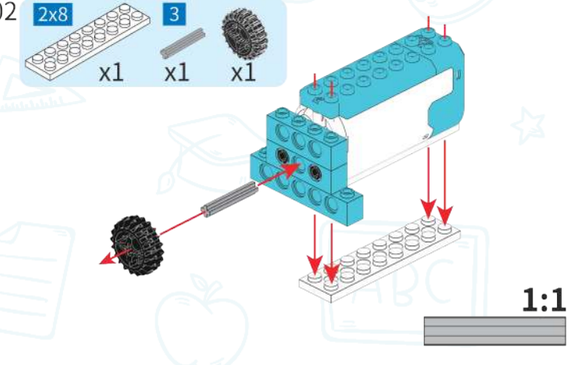
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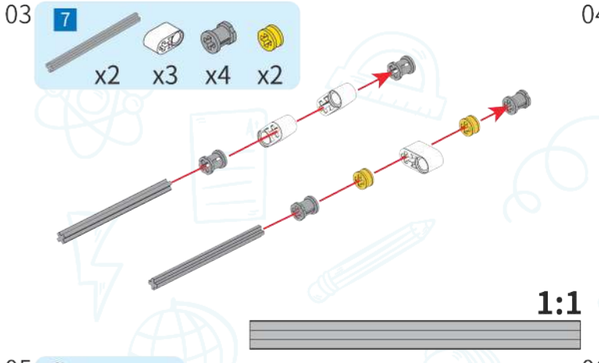
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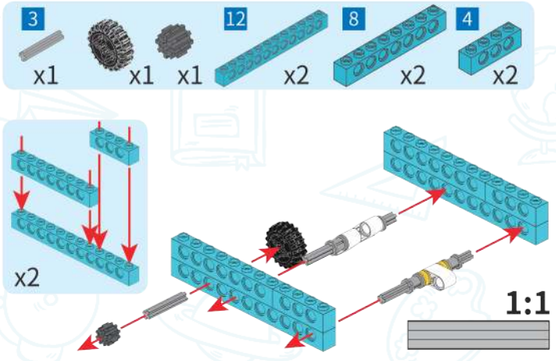
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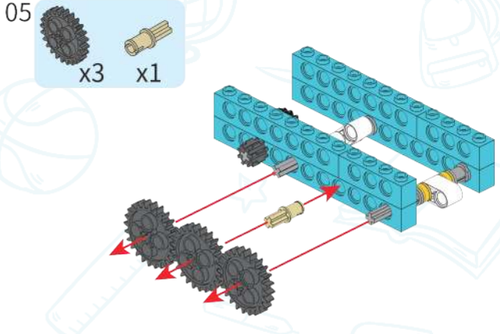
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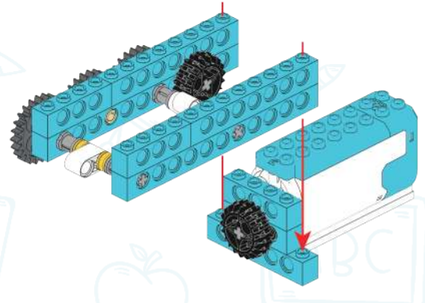
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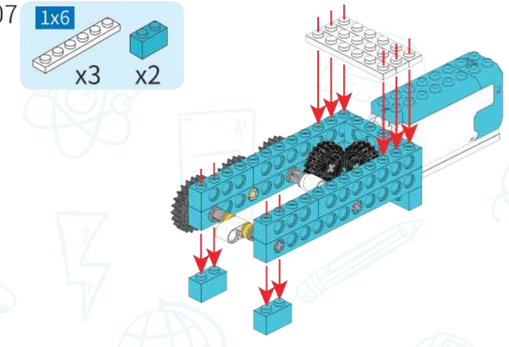
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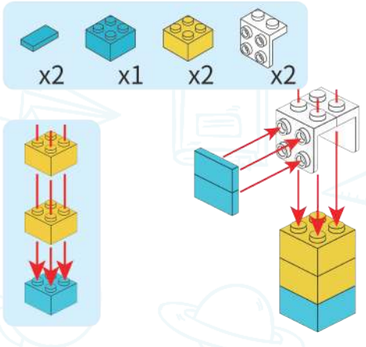
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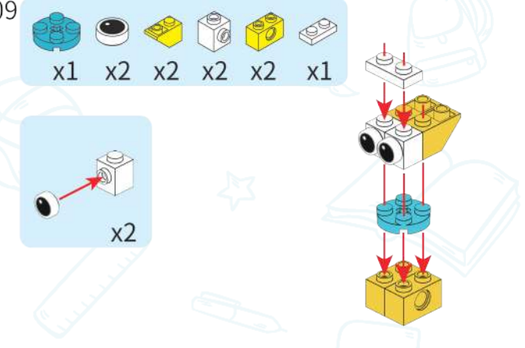
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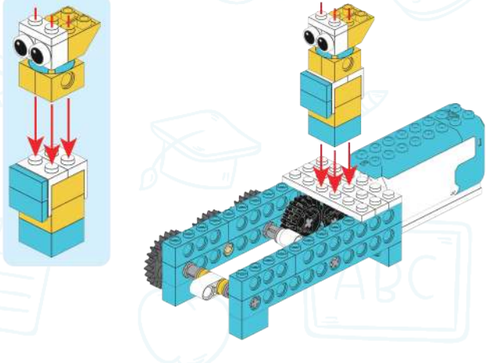
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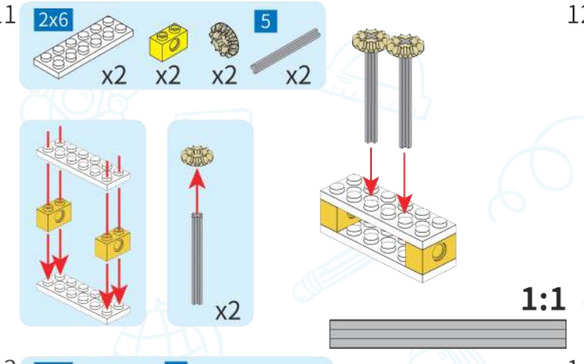
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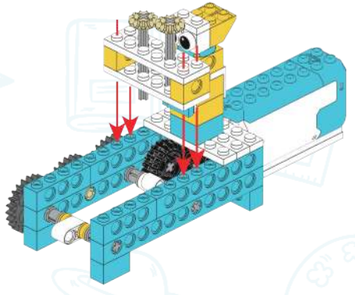
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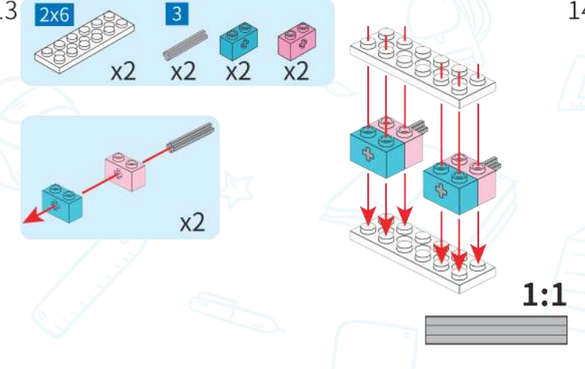
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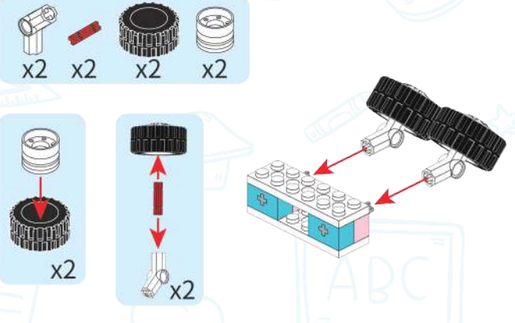
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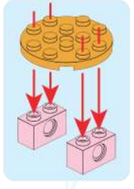


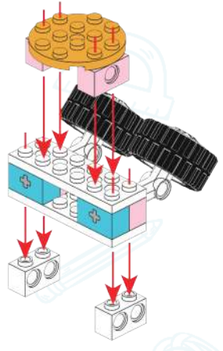
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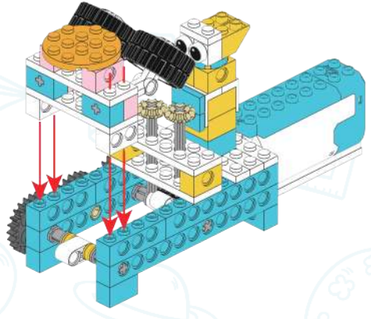
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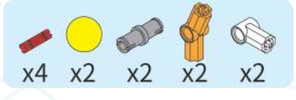


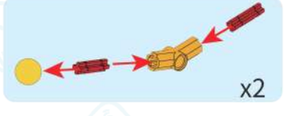


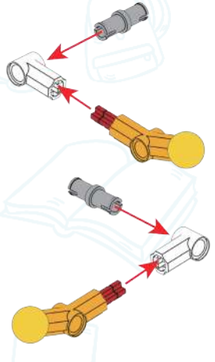
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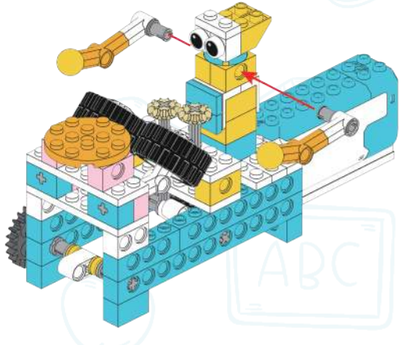
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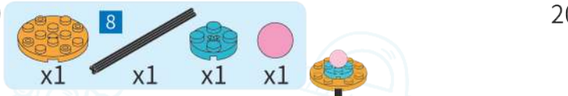




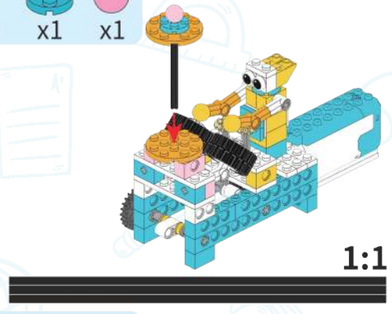
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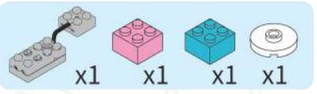
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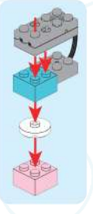


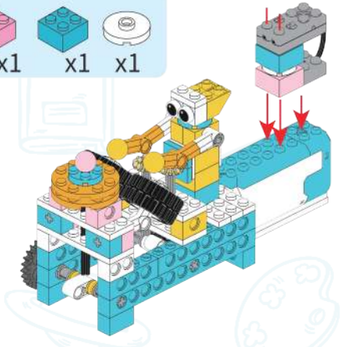




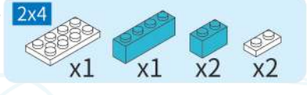
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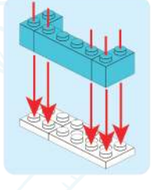


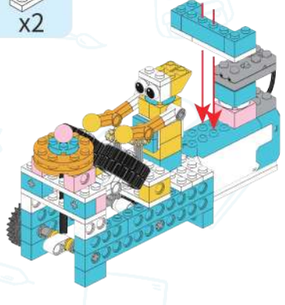




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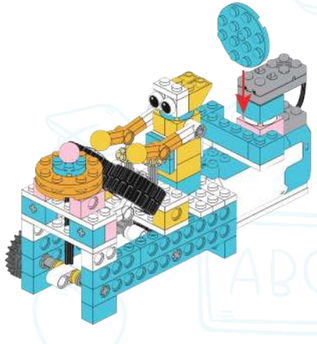






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FAQ

Product Details

Product Name: Smart Robot Premium
Product Model: MKZ-PF
Product SKU: MKZ-PF-PM
Power Supply: 2x AAA batteries (not included)
Rated Power: 5W
Suitable for: 6+
Made In China

Warning! Do not aim at the eyes or face.
Warning! Do not use projectiles not provided by the manufacturer.
Warning! This product contains small accessories, it is not for children under 3 years old.
Warning! This product contains small balls, which may cause a choking hazard and is not suitable for children under three years of age.

- The user manual contains important information, please keep it for future use.
- Rechargeable batteries should be charged under the supervision of an adult.
- Maintenance: This product shall not be used in water or a humid environment.
- Remove surface strains with a dry cloth before use.
- Do not mix old and new batteries.
- Do not mix alkaline batteries,standard(carbon-zinc) or rechargeable batteries.

FCC ID: **2A2QK009B**
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Compliance Statements
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.