Find more ideas here.

iOS

Android

APP Download

RoHS

MACHINIST BUILDING BLOCKS

MANUAL

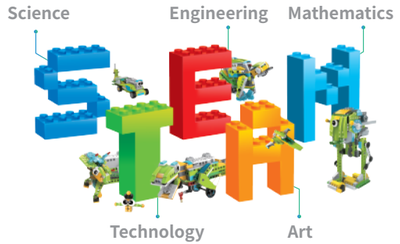
makerzoid



MKZ-EC-MCT

What is STEAM?

STEAM stands for science, technology, engineering, mathematics and art. STEAM Education aims at cultivating children's comprehensive scientific thinking and abilities and emphasizing the interdisciplinary integration. It is very popular in the United States, Germany, the United Kingdom, Finland and other countries.



PBL (Project-based Learning) The Main Teaching Mode of STEAM

Project-based learning is a teaching and learning method that takes children as the center to design and implement projects, thereby promoting children's learning effects. Within a certain period of time, the child chooses, plans, proposes a project idea, and solves practical problems through various forms such as display.

Compared with traditional learning methods, project-based learning can effectively improve children's practical thinking and problem-solving abilities. The goal of project-based learning is to enable children to master subject knowledge more efficiently through practical methods that combine with reality, and to cultivate children's social and emotional skills in the process.

Makerzoid Robot Lab

As the leader of STEAM education, Makerzoid adopts interesting PLB guidance, so that children can enjoy valuable STEAM courses at home to learn while playing.

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Log in to the App for more tutorials.

1.1 APP Instruction

iOS Android makerzoid

APP Download APP icon

①Scan 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



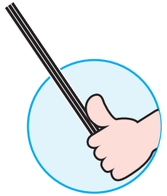
It teaches you how to build and control (should be connected to the host controller first) a robot

3 Build and Control the Robot

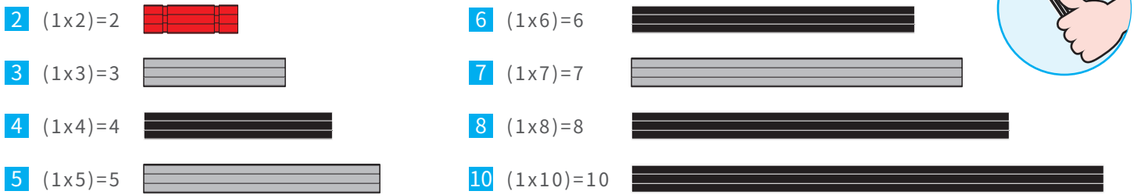
Video tutorials

1.2 Size:1:1 Reference List

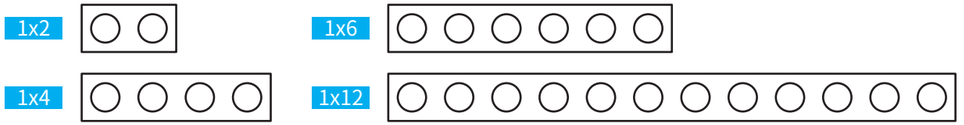
1:1 Size Reference List



Shaft



Plate



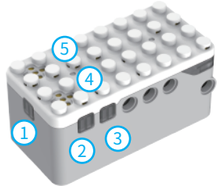
NOTICE

When you receive the product, please first read the contents of the parts list carefully, understand the shapes of various parts, and check the actual number of parts according to the list. After carefully watching these parts, the tutorials become much easier to understand. (Due to the need for production batches or display, the color of the parts you see in the illustrations may be different from the actual ones. Please distinguish different parts according to the shape. If you find any missing parts, please contact customer service.)

1.3 The Host Controller

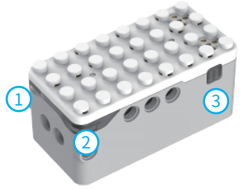
The Front

1.Power
2.Motor -1 Clockswise
3.Motor -1 Counterclockwise
4.Motor Port -1
5.Motor Port -2



The Back

1.LED-1
2.LED-2
3.Motor-2 Clockwise and Counterclockwise



Host Controller Switching Mode



App Control Pairing Mode
Press the power switch and then release, it lights up red lights for 10 seconds and turns into green light, then it enters App control pairing mode.



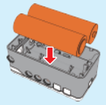
Built-in Program Executing Mode
Long press the power switch for 10 seconds then release, the robot will automatically execute the built-in program (You can modify the program on programming page in the APP).

Installing the Battery

Remove the battery cover



Insert two AAA batteries
(batteries are not included)



Put the battery cover back

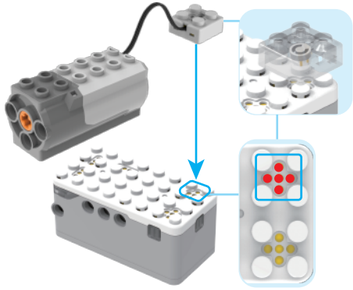


Battery Installation Instructions

1. Non-rechargeable batteries cannot be charged;
2. Please charge the rechargeable battery under adult supervision;
3. Used batteries should be removed from the product;
4. The rechargeable battery should be removed from the toy before charging;
5. The power terminals should not be short-circuited.
6. Batteries of different sizes or old and new batteries cannot be used together;
7. The toy cannot be connected to more than one power source;
8. The battery should be inserted with the correct polarity.

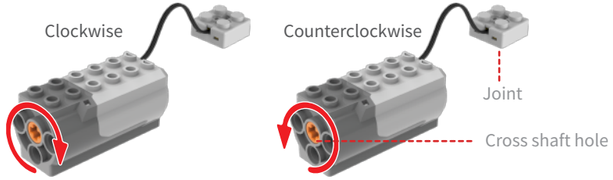
1.4 Motor

Connected to the host controller



Introduction to the motor

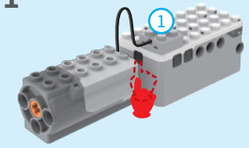
Based on the principle of the conversion of electric energy to kinetic energy, the motor provides strong power for the robot to make the robot move.



Warm tips:
1. The motor is made of silicone material, please do not pull it, squeeze it with blocks or gears, which may cause the wire to break.
2. To remove the motor connector, please use a starter, do not pull the wire.

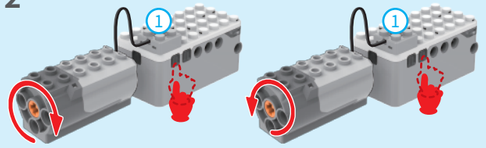
The use of the motor

1



Switch on

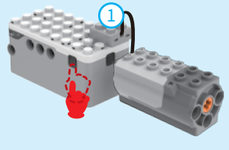
2



Press the clockwise button

Press the counterclockwise button

3

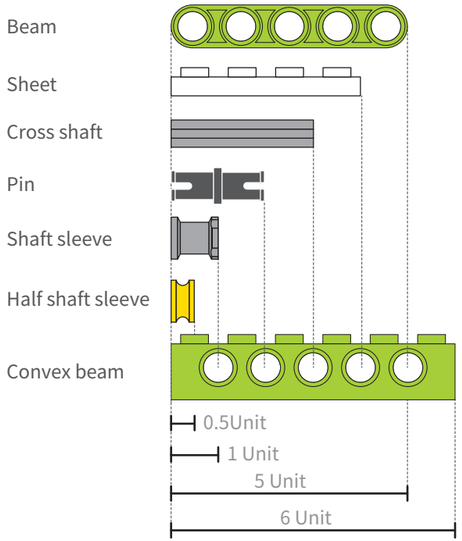


Press the stop button

1.5 Basic Knowledge for Robot Parts

1.The Unit Size

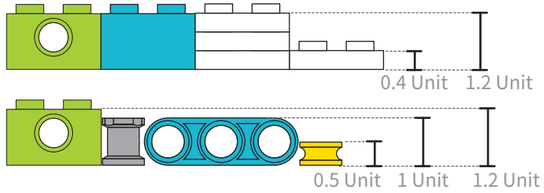
One unit equals to eight millimeters. Generally the width, height, length of the part and the unit size are integer multiples.



2.The Height of the Beam and the Hamburger Structure

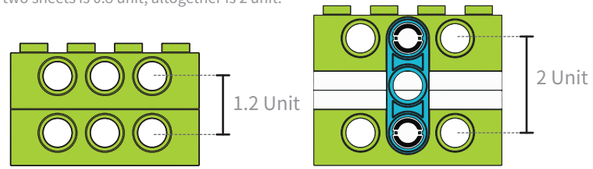
The height of the beam and brick

The height of beam (or brick) = 1.2 unit = 9.6mm
The height of a beam (or brick) equals to 3 sheets, so the height of each sheet is 0.4 unit, equals to 3.2mm.

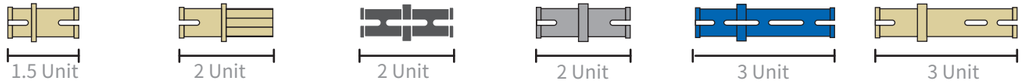


Hamburger Structure

The height of of two beams (or two bricks) and two sheets is 3.2 unit, the distance between two holes is 2 unit, simply understand as “2 thick+2 thin” (the two sheets should be put in the middle).
The distance between the two holes of two beams (or bricks) is 1.2 unit, the height of two sheets is 0.8 unit, altogether is 2 unit.



3.The Difference Between Pins



Half pin
The half part of it is combined with a 0.5 unit accessory

Half pin shaft
The pin of it has little friction with the hole so it is easily to rotate

Black pin
It has great friction with the hole so it is used for fixation

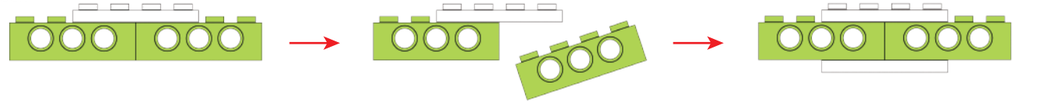
Grey pin
It has little friction with the hole so easily to rotate

Long pin
It has great friction with the hole

Long half pin
It has little friction with the hole so easily to rotate

4.Use skills

Interlock

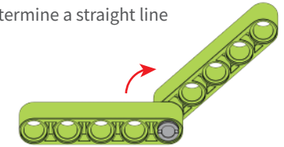


Lock with one block

Easily come off

Lock with two blocks to make it firmer

Two points determine a straight line



Connected with a pin, able to rotate



Connected with two or more pin, able to fix the shape

1.6 Precautions

The four most important points to read this manual

Firm Bricks

Make sure the building steps and connect all the bricks firmly. A small gap can easily hinder the complete set of actions.

Moveable Shaft

The shaft determines of the rotation of the object. Make sure not to let anything block it, and do not continue to rotate when it is blocked or stuck.

Unlimited Creativity

The number of blocks in each robot is not absolute, and children can replace it flexibly. For example, 8-shaft can be replaced with 10-shaft, and the building steps of the robot are also not constant. Children can also build the same robot in their own way.

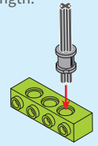
Be Patient

Please read each step carefully before building the robot to ensure that it is built strictly in accordance with the diagrams in this book. It doesn't matter if you fail, keep going.

How to keep a brick-thick length for the connected object on the shaft?

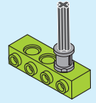
Put the connecting object on the lower end of the shaft sleeve so that the shaft sleeve exposes a little length.

1



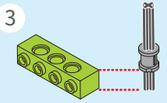
Place a brick hole face up on the table, align the exposed part of the shaft sleeve with the brick hole, and insert it down until the shaft sleeve touches the tabletop.

2



Pull out the shaft sleeve from the brick hole. At this time, the connecting object on the shaft sleeve is exactly the thickness of a brick from the bottom of the shaft sleeve.

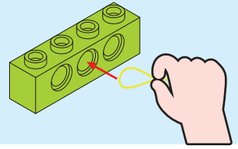
3



(Tip: How to make a wider distance? Build more bricks until it is thick enough, then the next step is the same as above.)

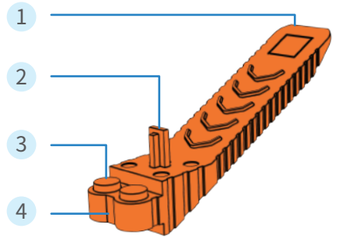
How to pass the rubber band through the brick hole?

Use your thumb and index finger to pinch one end of the rubber band into a small ring. Pass this small ring through the brick hole until you can catch the rubber band from the other end.



1.7 Disassembly Skills

The function of the splitter is to use the principle of leverage to dismantle parts, which is easy to use and quick to disassemble.



Don' t bite the blocks.



Detach the blocks

As shown in Figure 1, the blocks are tightly attached. You can hold a hole brick with two hands, press down at the same time and then pull it out. You will find that the lower block is separated from the other block.

Figure1

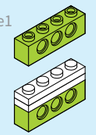
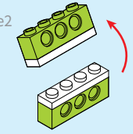
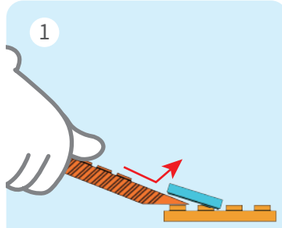


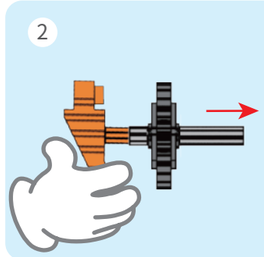
Figure2



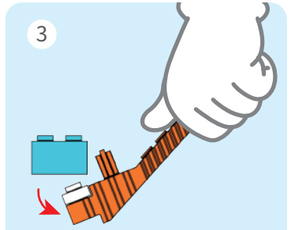
1



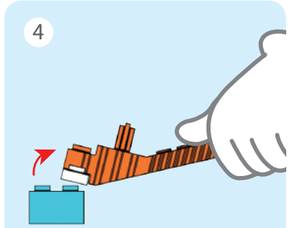
2



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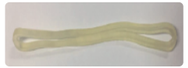


4



2.1 Elasticity

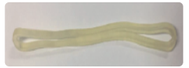
The force generated by the elastic deformation of an object is called elastic force. After the object is deformed by force, if the external force disappears and the object can return to its original shape, such deformation is called elastic deformation.



Original Shape

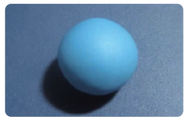


Deformation



Recover When External Force Disappears

The force generated by the elastic deformation of an object is called elastic force. After the object is deformed by force, if the external force disappears and the object can return to its original shape, such deformation is called elastic deformation.



Original Shape



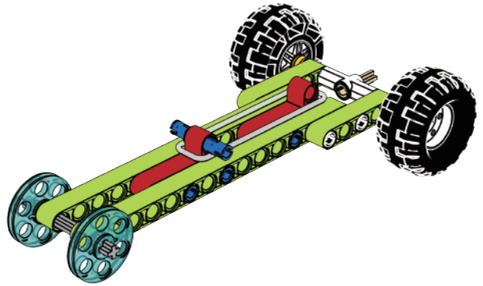
Deformation

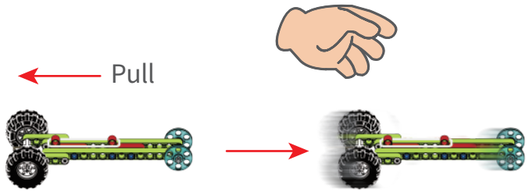


Keep the Same When External Force Disappears

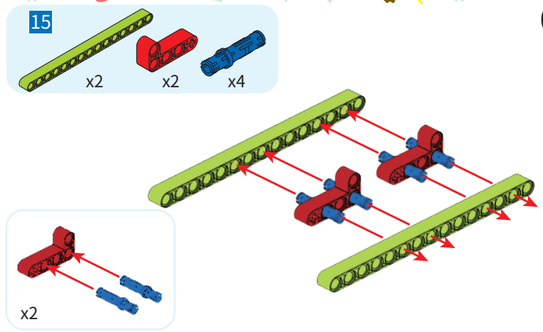
Think together:
What is the relationship between the magnitude of elasticity and the degree of deformation? Find out the answer in the process of playing the car.

Elastic Car

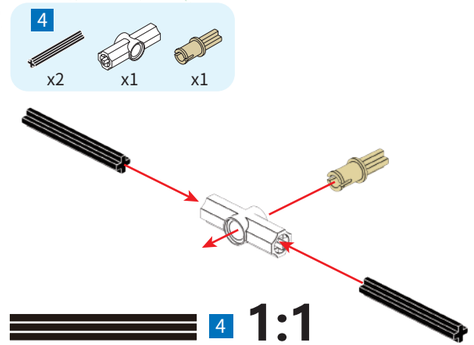




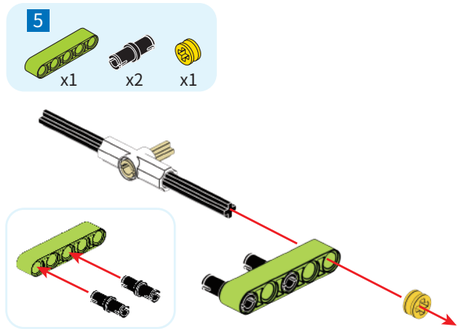
01



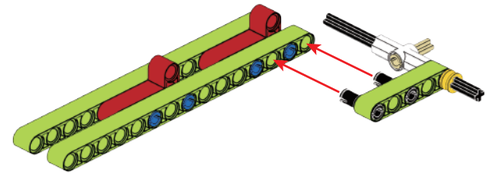
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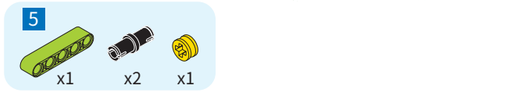
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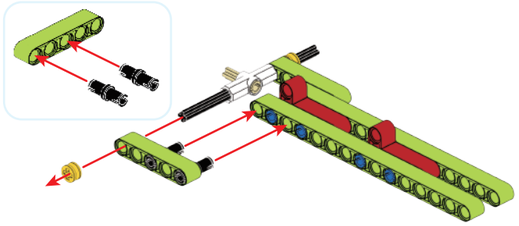


04

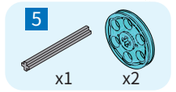


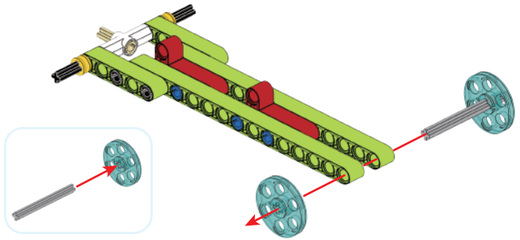
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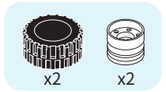


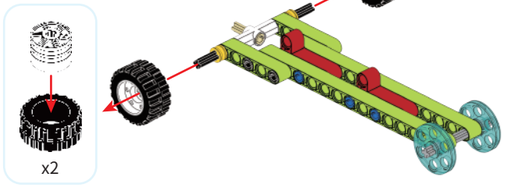
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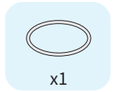


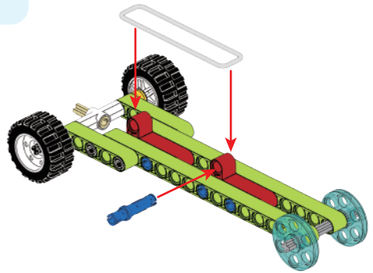
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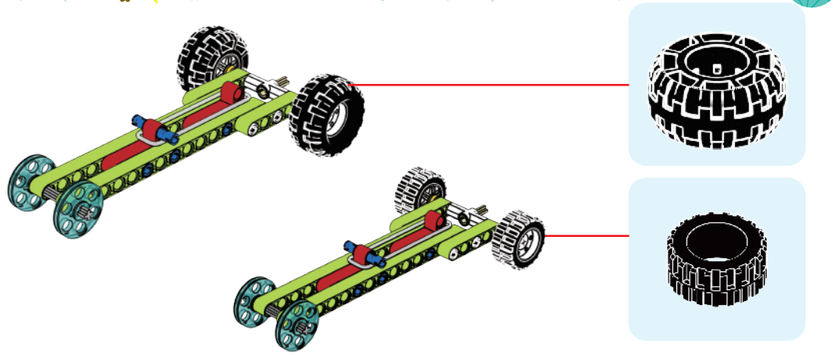


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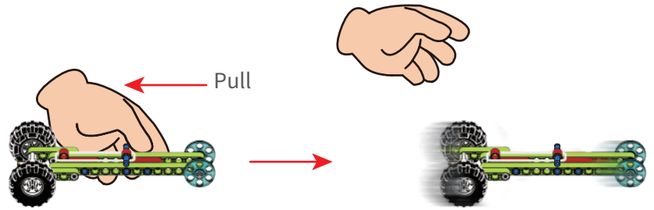




Car Race Game





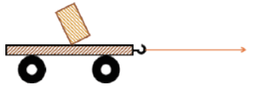


1. Fasten the rubber band (do not loosen it) and pull the car back.

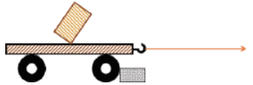
2. Release the elastic car, the elastic force of the rubber band makes the car move forward.

2.2 Inertia

The property of an object in a static state or a state of direct motion at a constant speed is called inertia.



When the car is suddenly pulled, the block falls backward due to inertia.



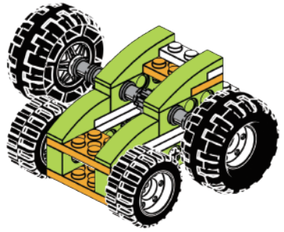
When the car stops suddenly, the block falls backward due to inertia.

When the driver brakes suddenly, people will fall forward due to inertia, so you must remember to fasten the seat belt when riding in a car.



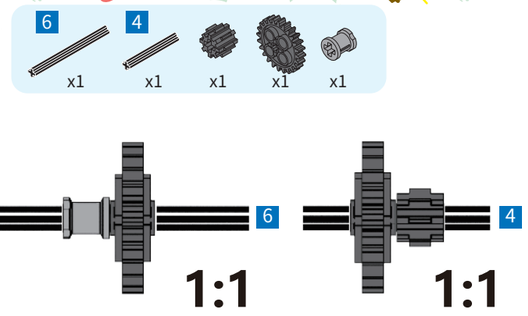
Think together:
What is the magnitude of inertia related to?Find out the answer in the process of playing the car.

Mini Inertia Car

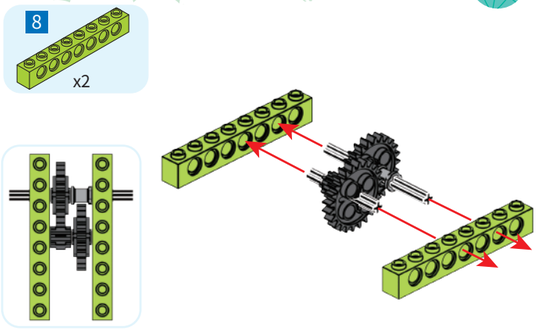




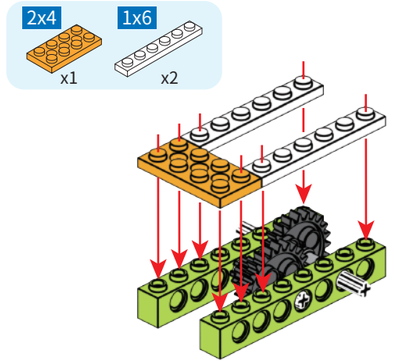
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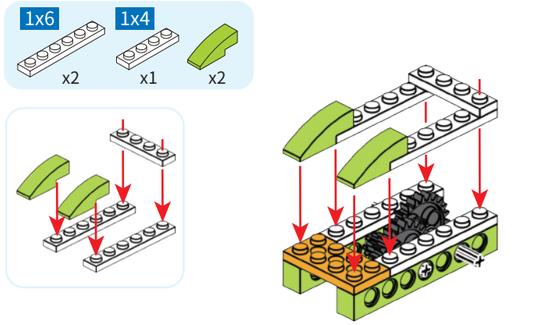
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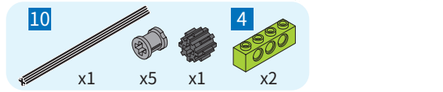
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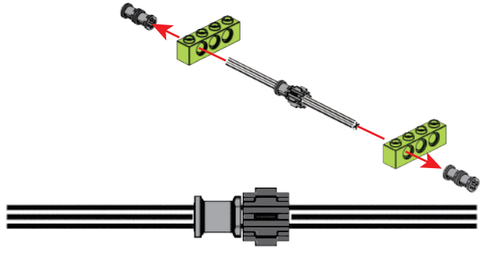


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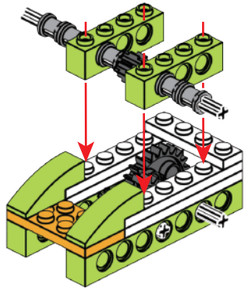


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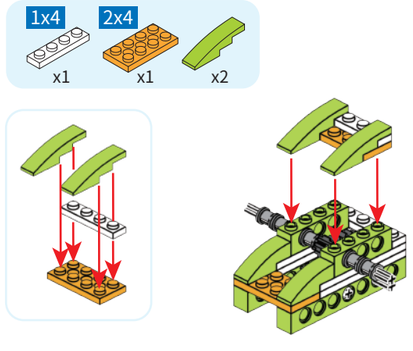




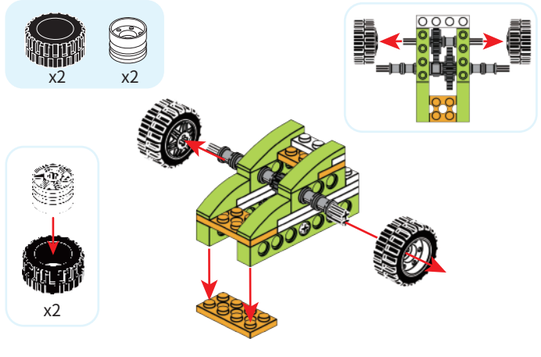
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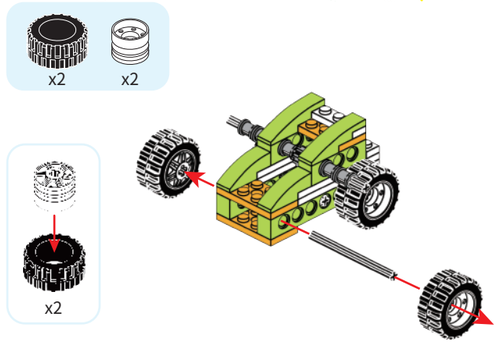
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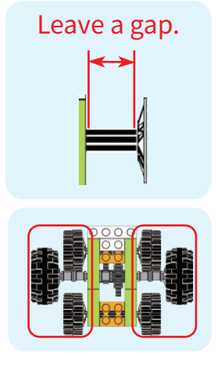


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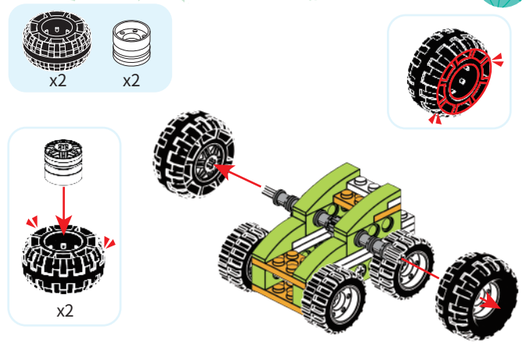


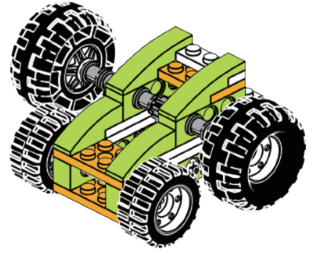
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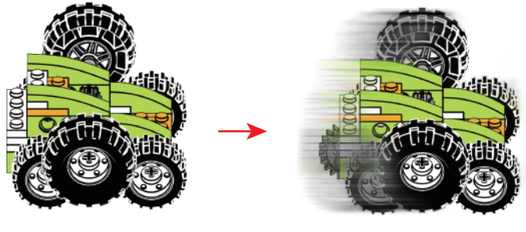




10







2.3 Gravity

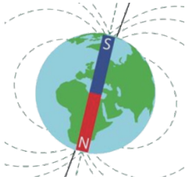
Why do leaves, raindrops and people after high jumping fall to the ground?





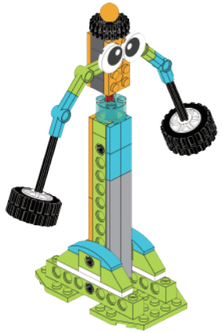


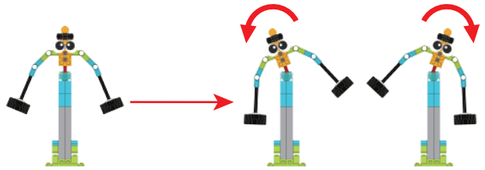
This is because the earth is like a big magnet, attracting everything to the ground. The earth's attraction to objects is called gravity.



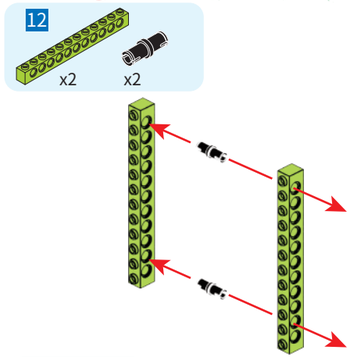
Think together:
What is the magnitude of gravity related to?Find out the answer while playing.

Tumbler

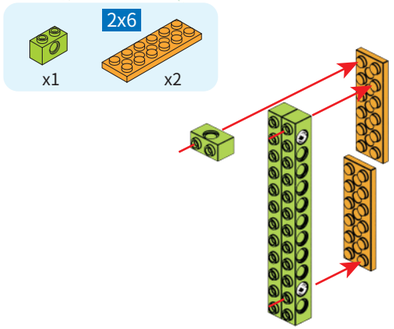




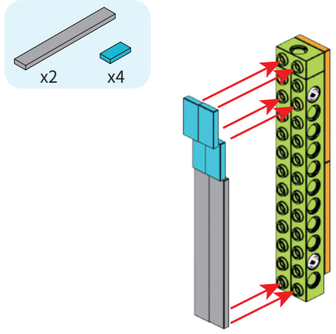
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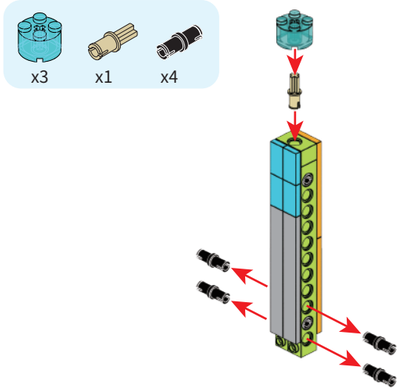
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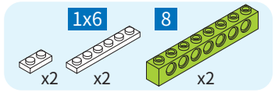
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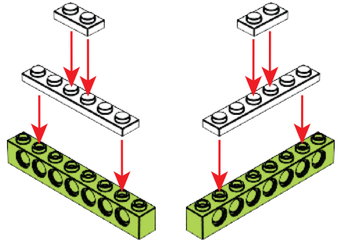


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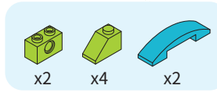


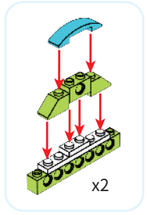
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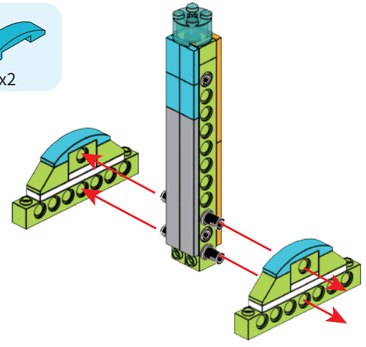




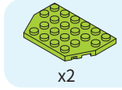
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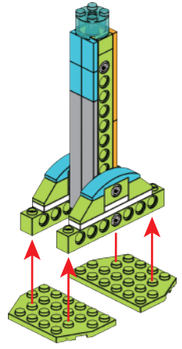




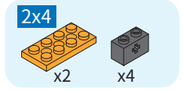


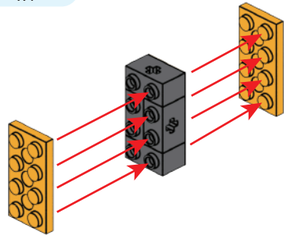
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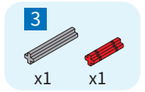


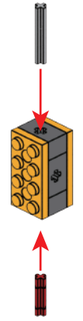
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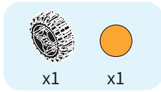


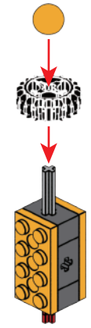
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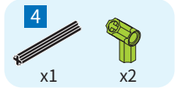


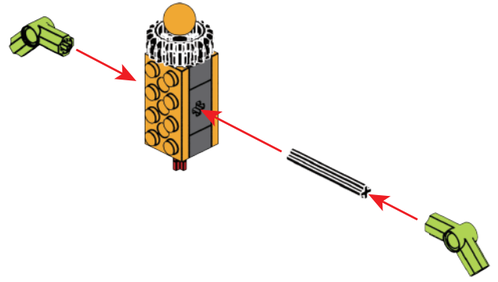
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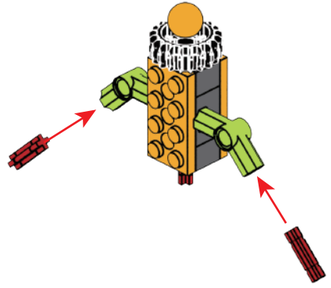
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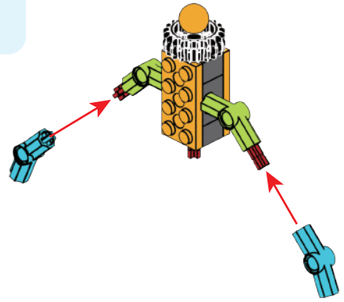
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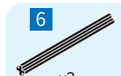


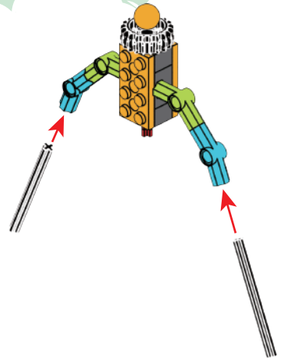
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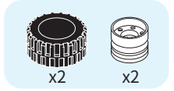


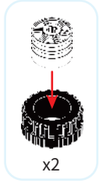
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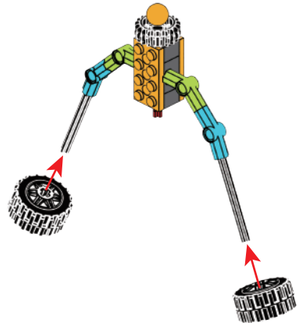




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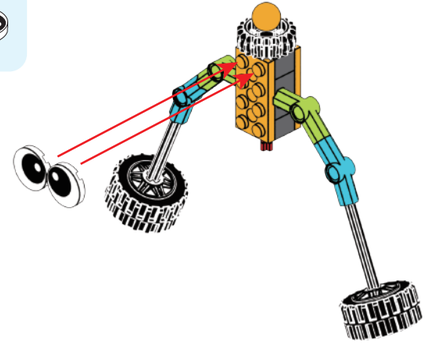




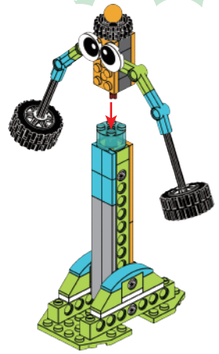


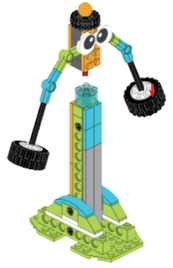
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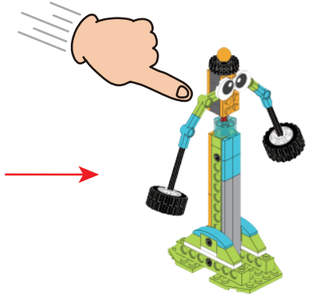




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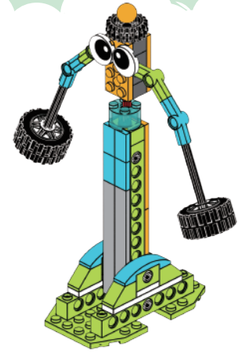


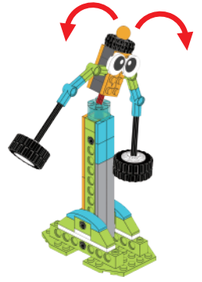


1 Place the tumbler on the base.

2 Toggle the tumbler.

18

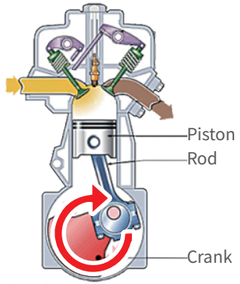




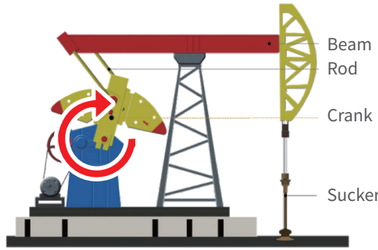
3 The tumbler sways from side to side without falling.

2.4 Rod Drive

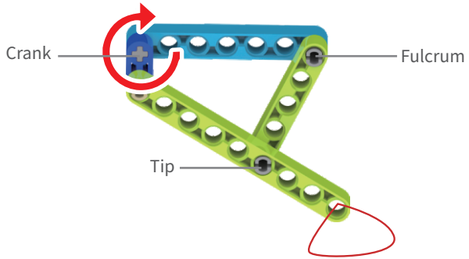
The crank connecting rod mechanism can mutually convert the circular motion and the back and forth reciprocating motion.



The car engine turns the back and forth, reciprocating motion of the piston into the circular motion of the crank.

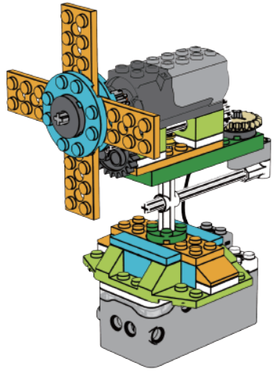


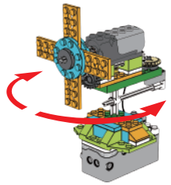
The beam pumping unit converts the circular motion of the crank into the up and down reciprocating motion of the sucker rod.

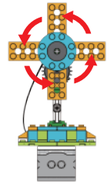


◀ Chebyshev linkage is often used to simulate robot walking.

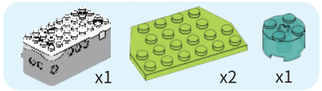
Pivoting Fan

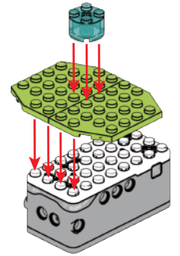




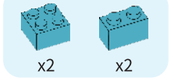


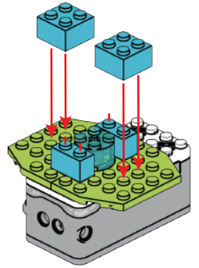
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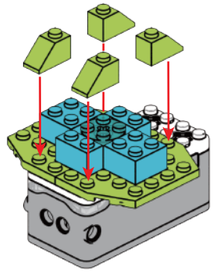
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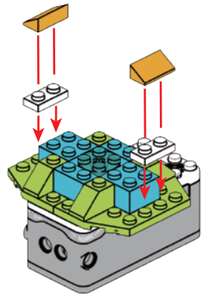
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x4



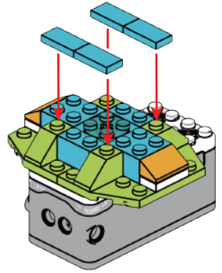
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x2 x2



05

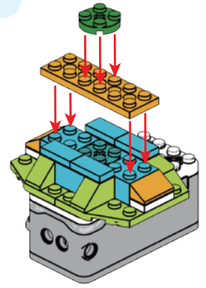
x4



06

2x6

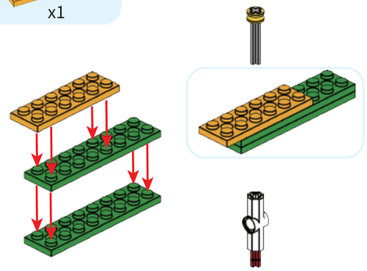
x1 x1



07

2x8 2x6

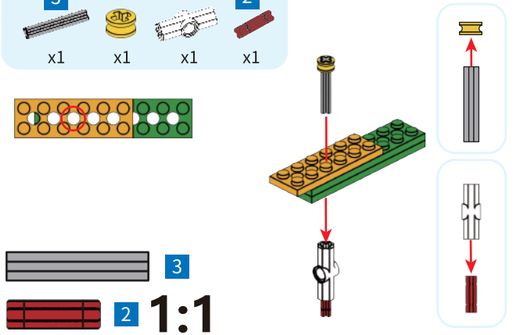
x2 x1



08

3 2

x1 x1 x1 x1



3

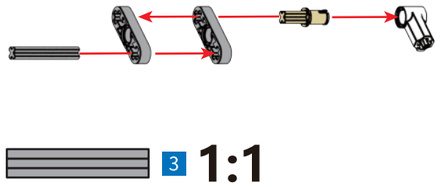
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1:1

09

3

x1 x2 x1 x1

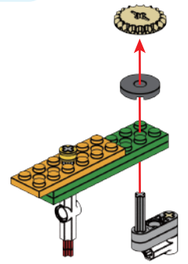


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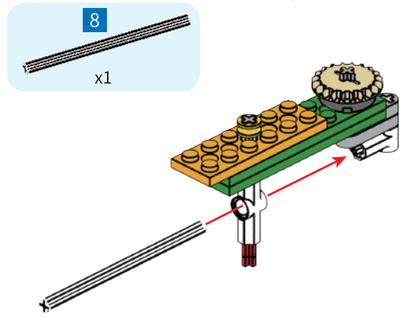
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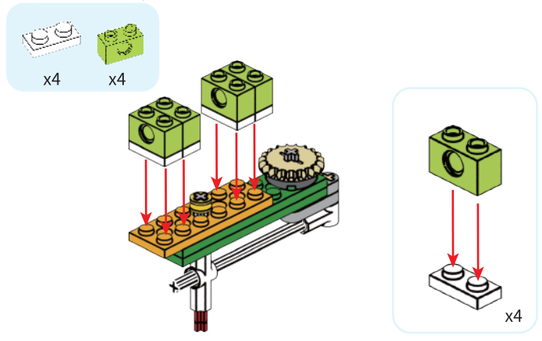
x1 x1



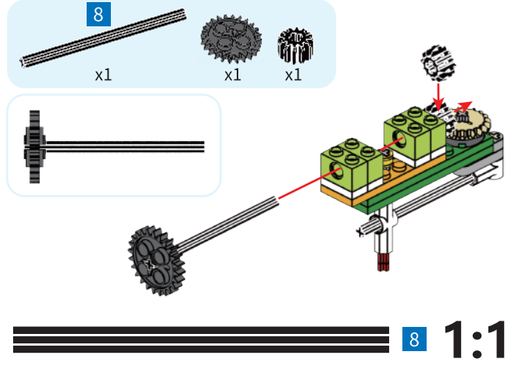
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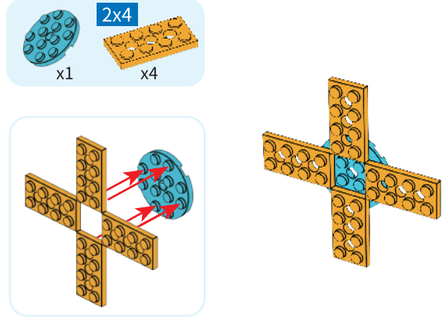
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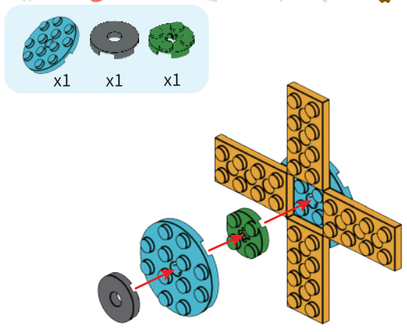
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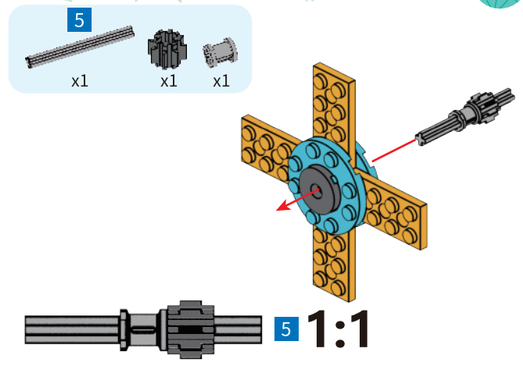
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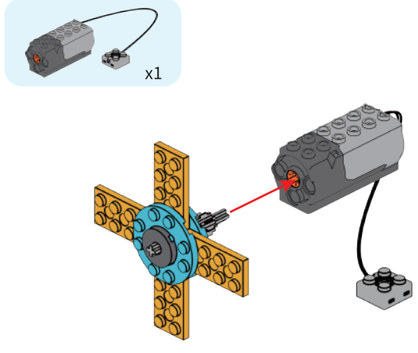
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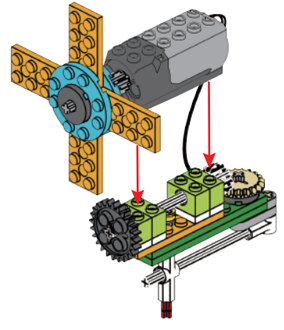
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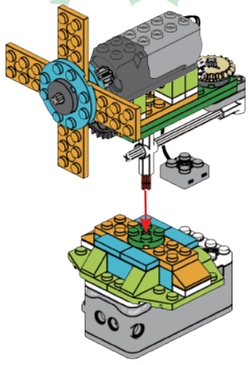
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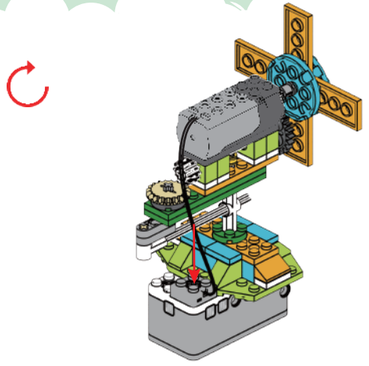
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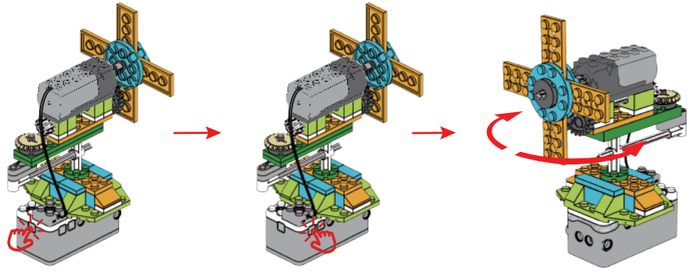


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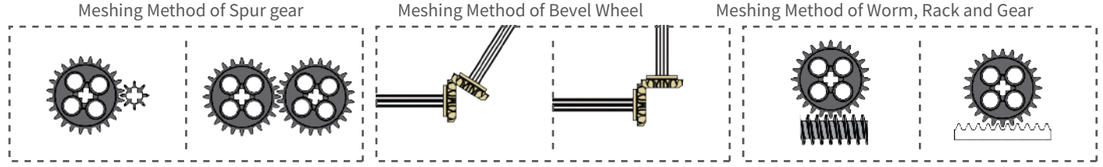
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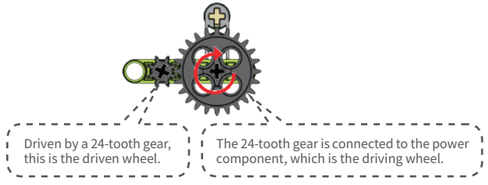
2.5 Gear Drive

1.Gear Meshing Method

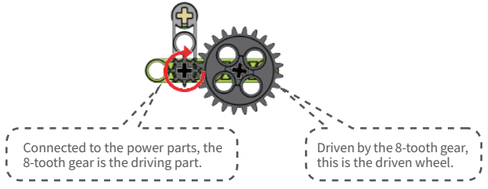


2.Drive Ratio

Driving wheel: The gear that provides the main power output, generally is connected to a power component such as a motor.
Driven wheel: A gear that rotates is driven by the driving wheel. The driven wheel only transmits power.

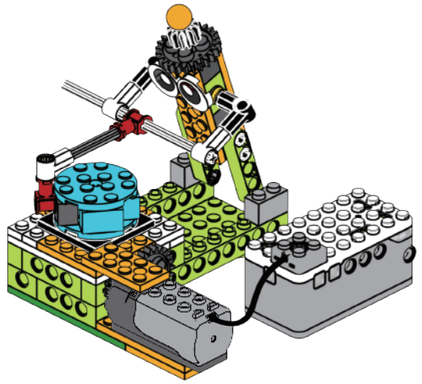


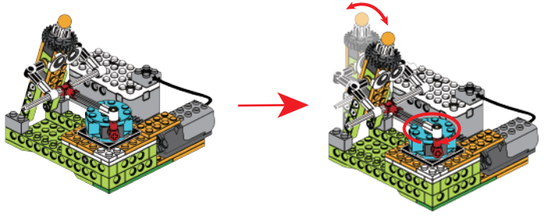
The gear ratio of the driving wheel to the driven wheel is 24:8=3:1, that is, the driving wheel makes 3 turns and the driven wheel makes 1 turn, which is equivalent to a three-fold increase in the speed of the driving wheel.



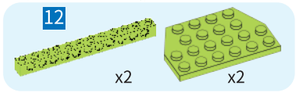
The gear ratio of the driving wheel to the driven wheel is 8:24=1:3, that is, the driving wheel makes 3 turns and the driven wheel makes 1 turn, which is equivalent to reducing the speed of the driving wheel by 3 times.

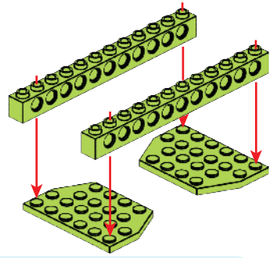
Grinder





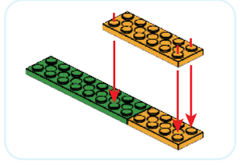
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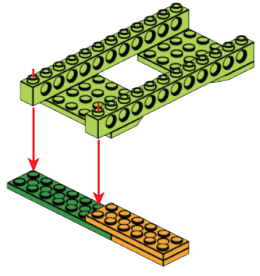




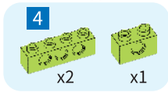
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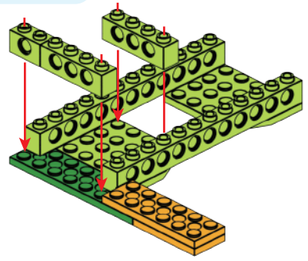




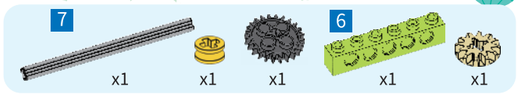


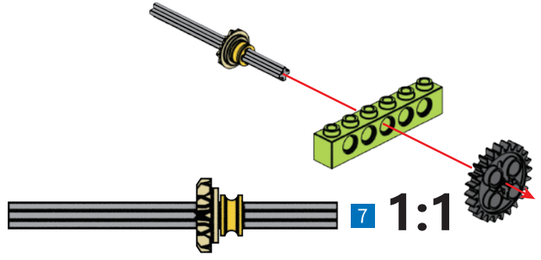
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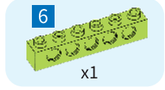


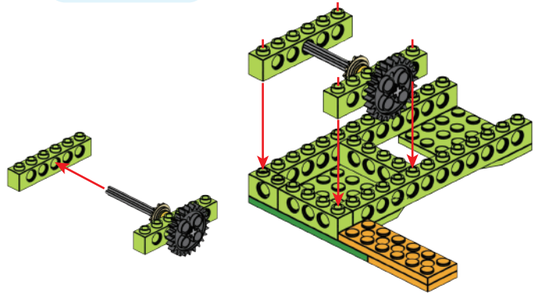
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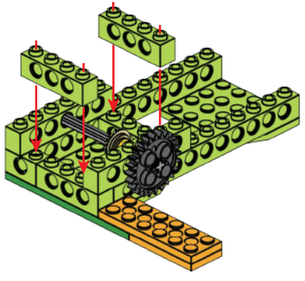
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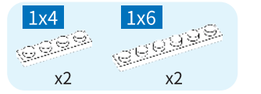


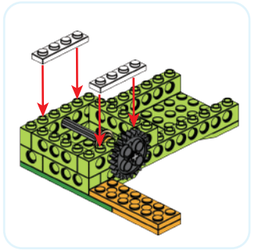
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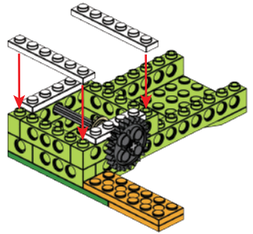




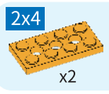
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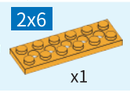






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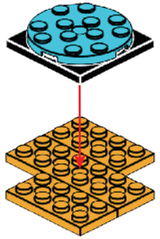


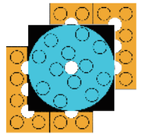










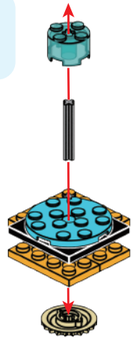


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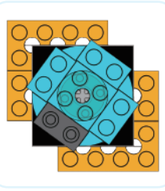


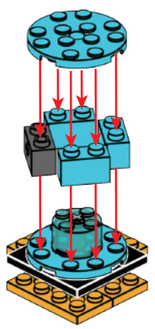
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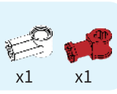


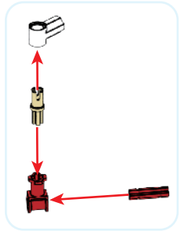


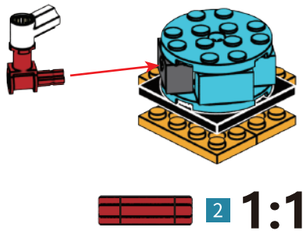
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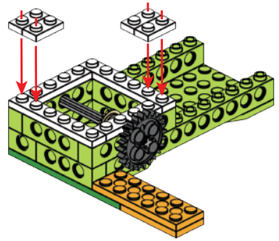




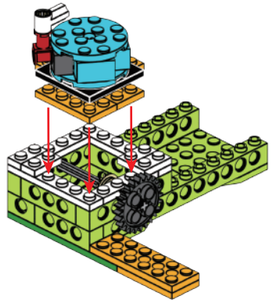
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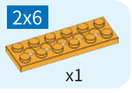
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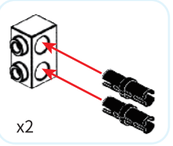


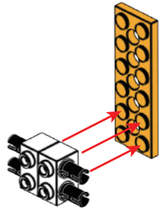
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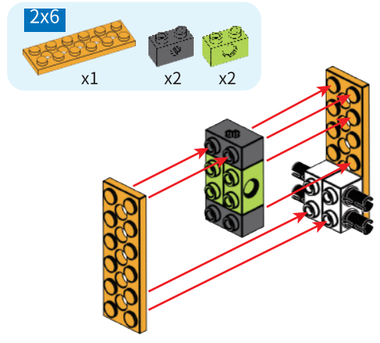




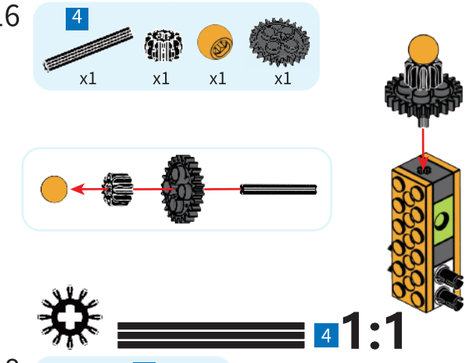




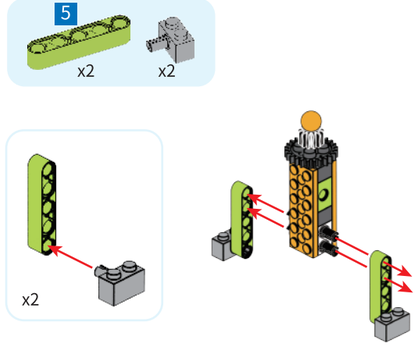
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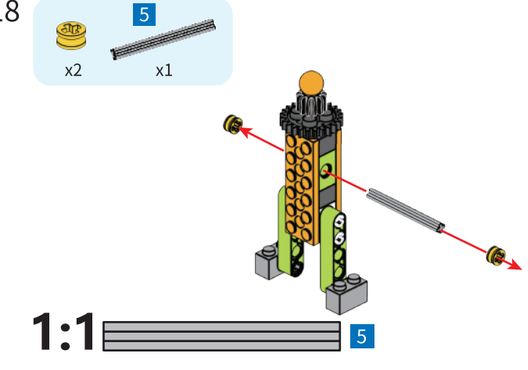
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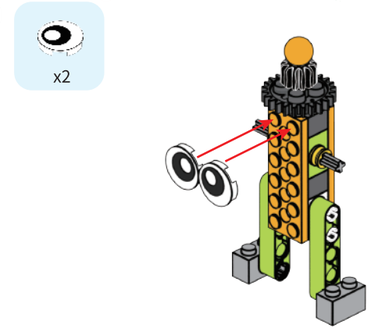
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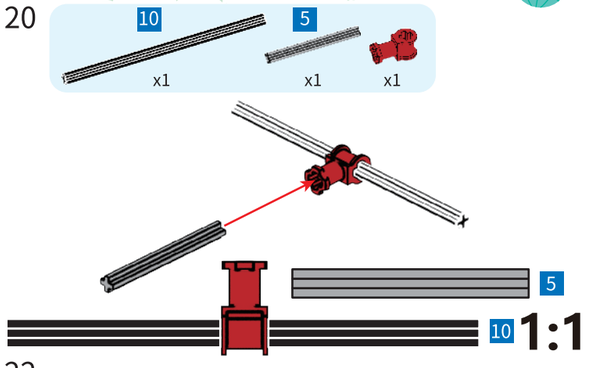
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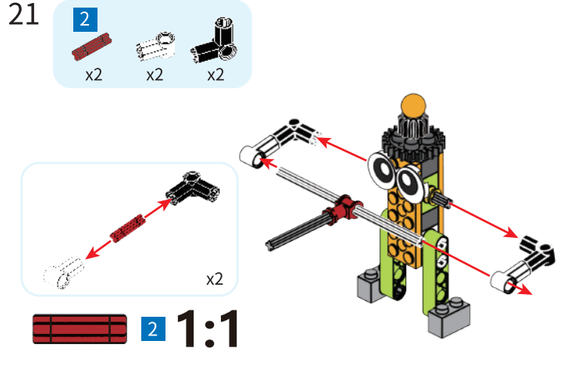
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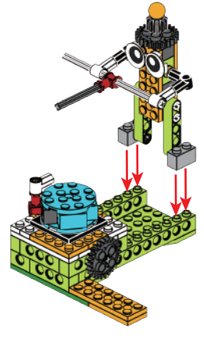
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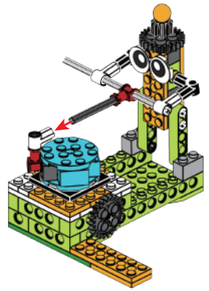
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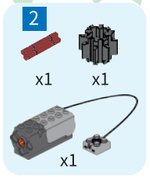


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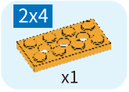


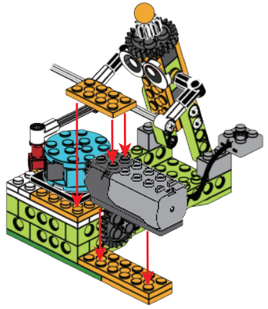


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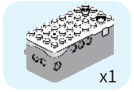


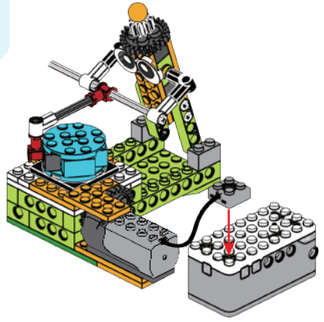
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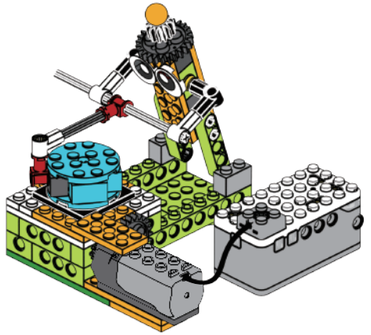


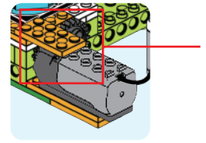


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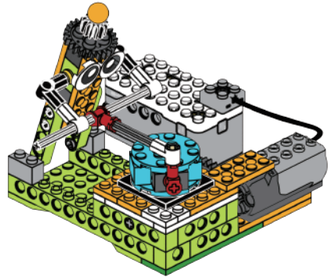
Change the gears and see what is different.



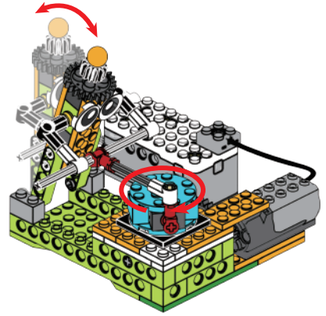
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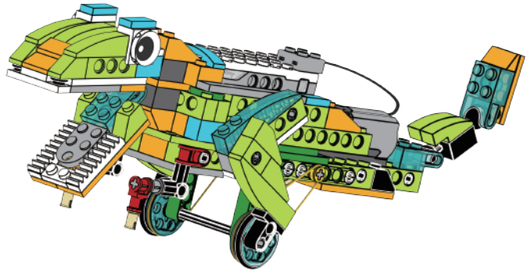
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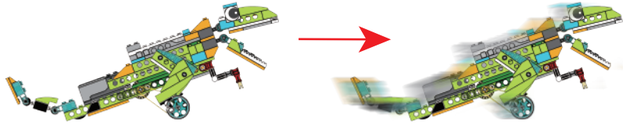




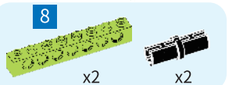


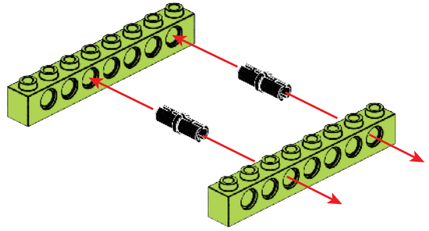
Tyrannosaurus Rex



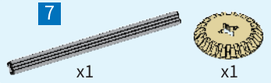


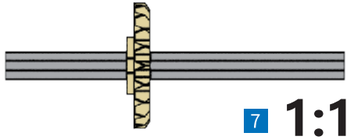
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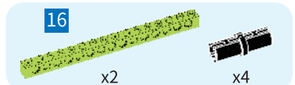


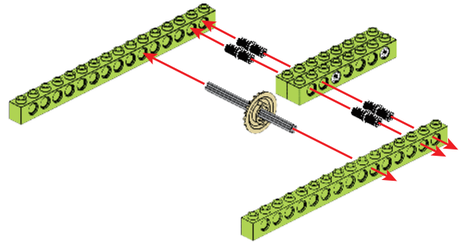
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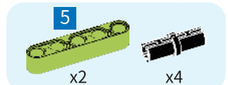


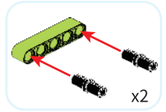
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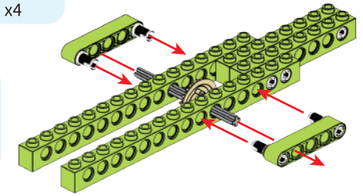




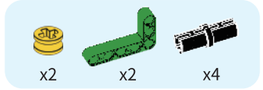
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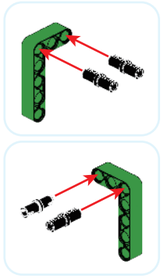


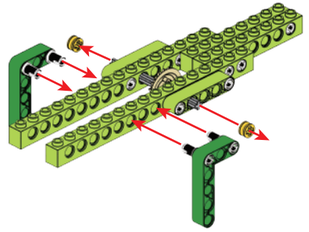




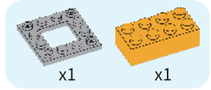
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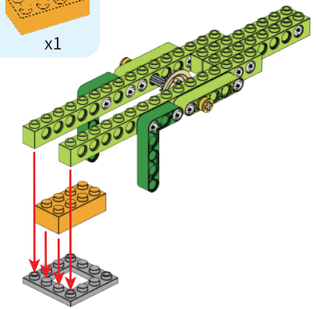




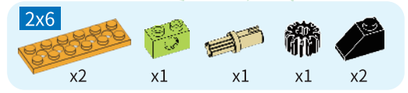


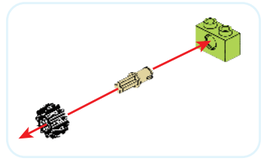
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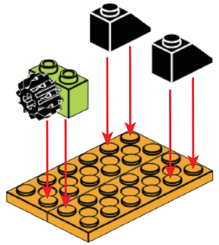




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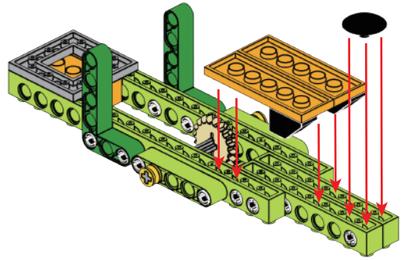




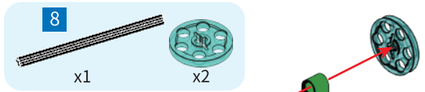


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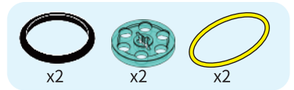


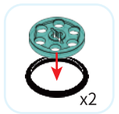
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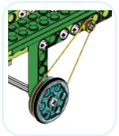


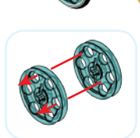


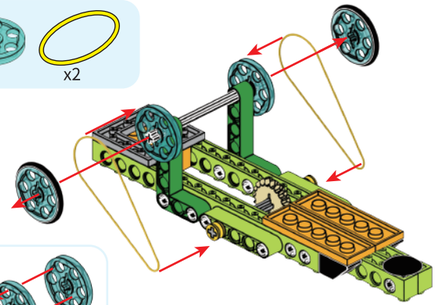
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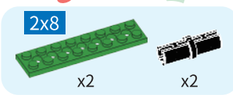


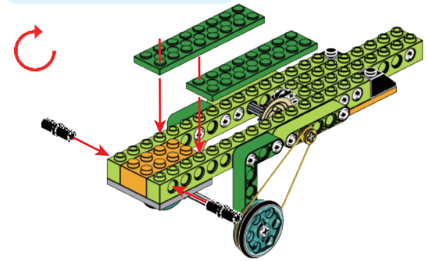




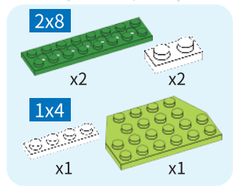


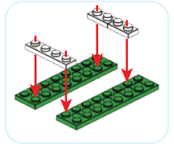
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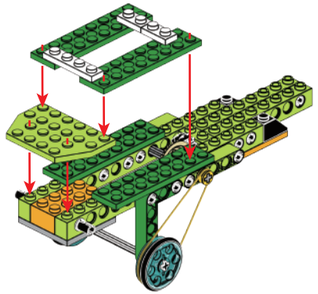




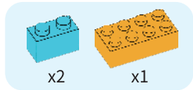
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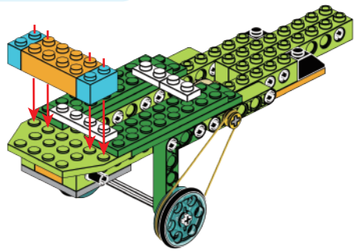




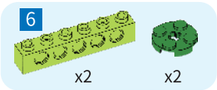


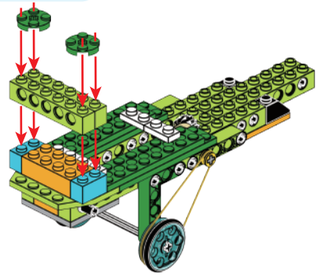
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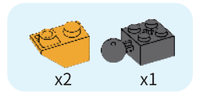


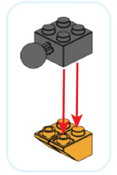
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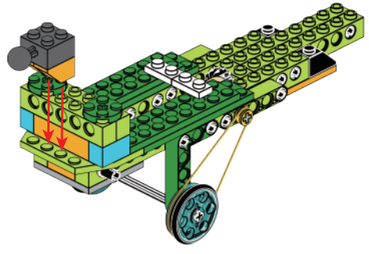




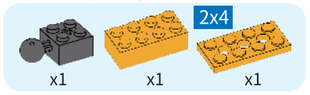
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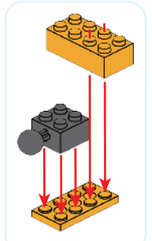


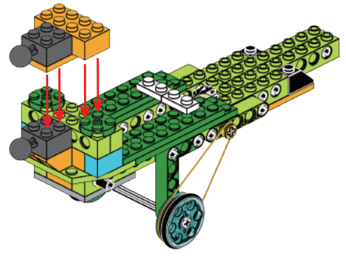




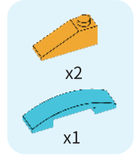
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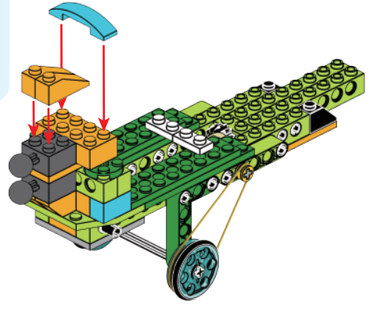




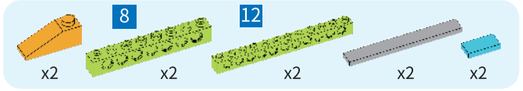


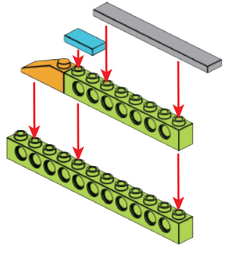
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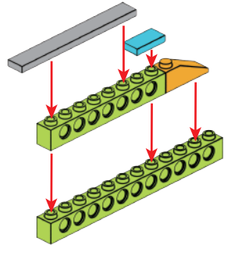




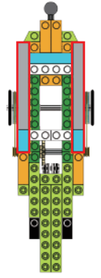
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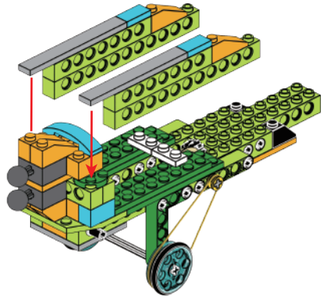




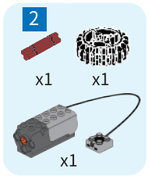


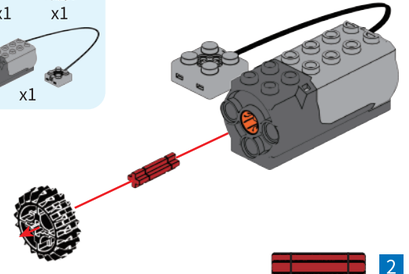
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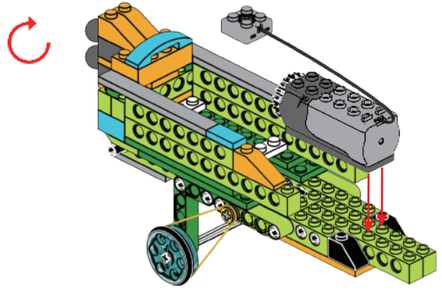
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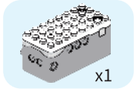


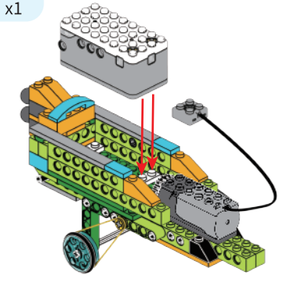


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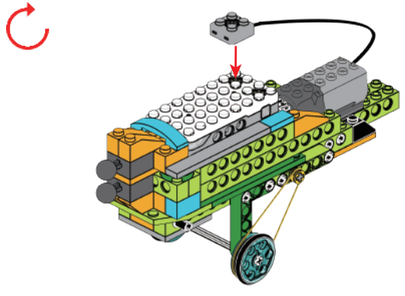


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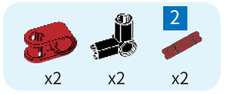


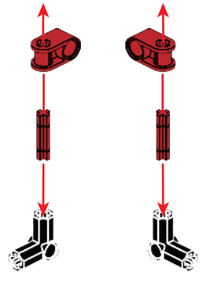


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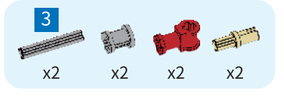


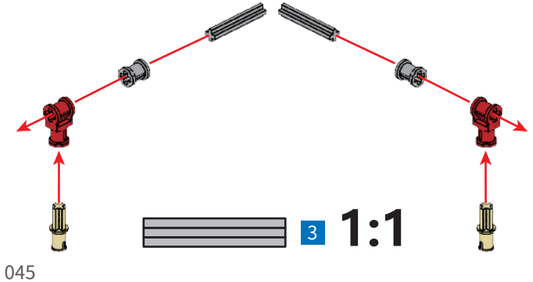
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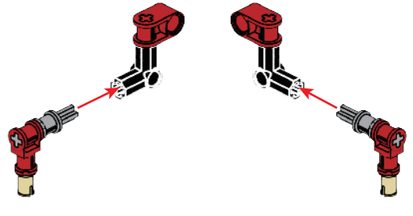


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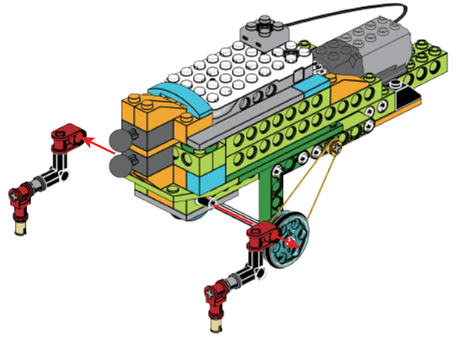




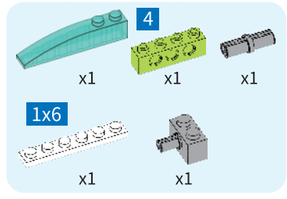
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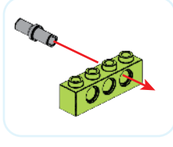


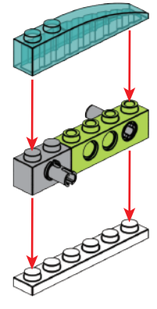
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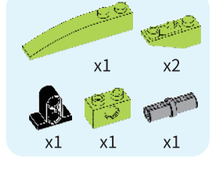
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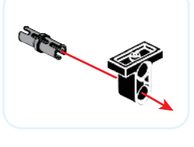


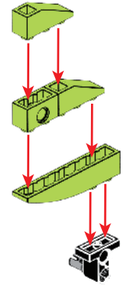




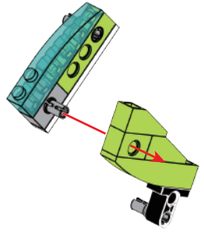
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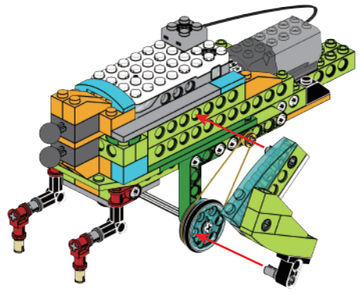




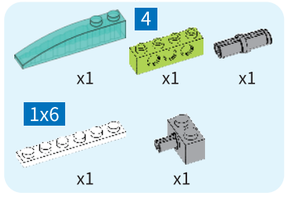
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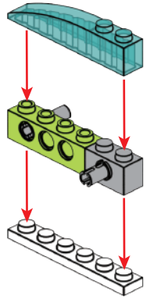


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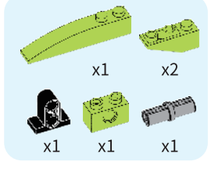


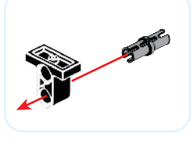
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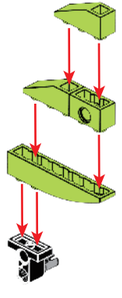




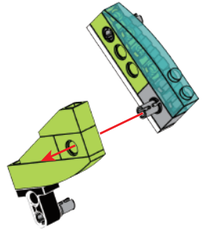
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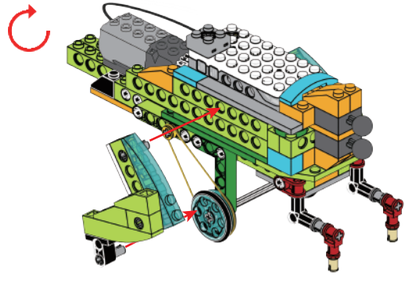




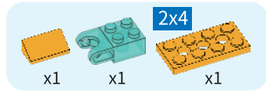
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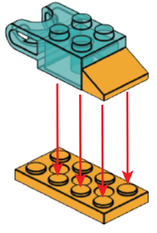


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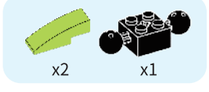


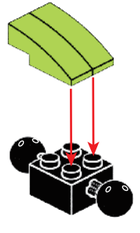
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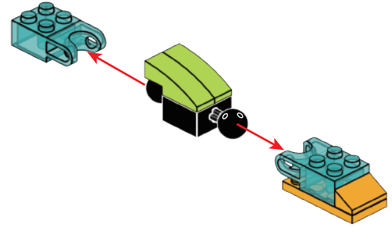
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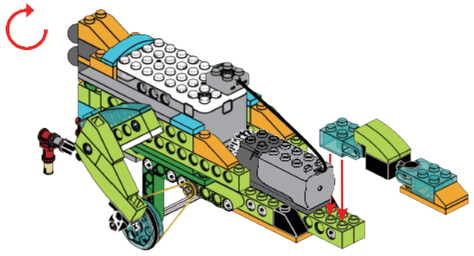


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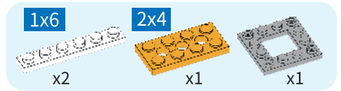


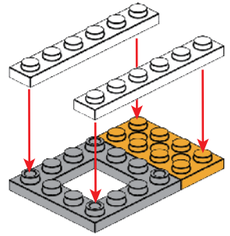


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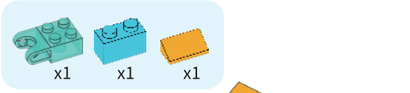


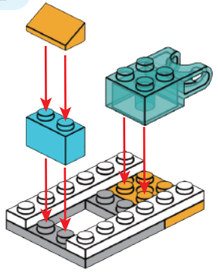
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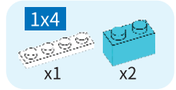


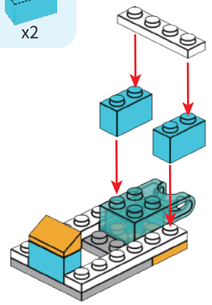
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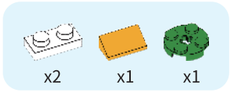


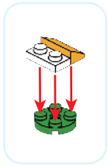
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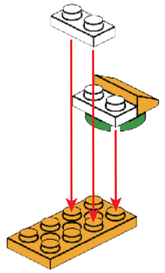




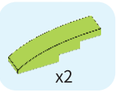
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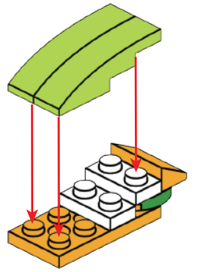




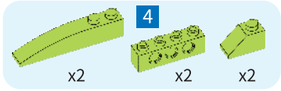


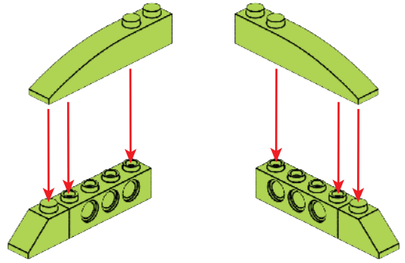
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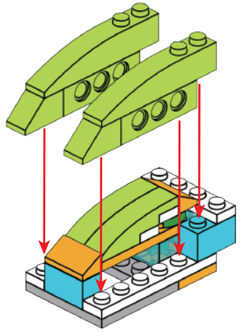


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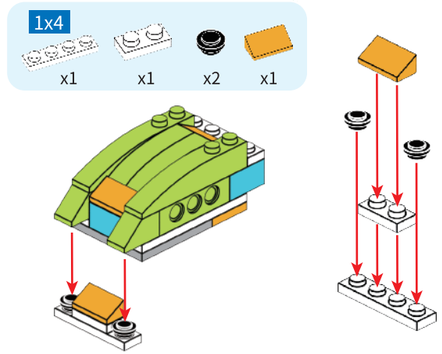




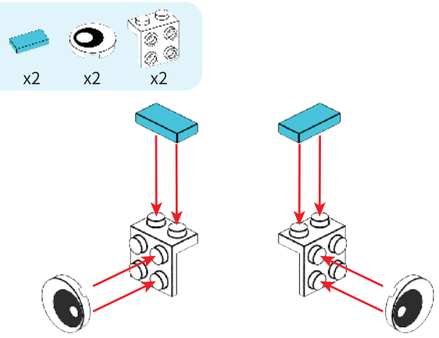
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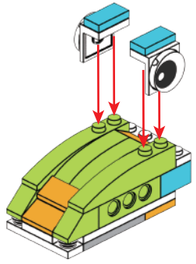
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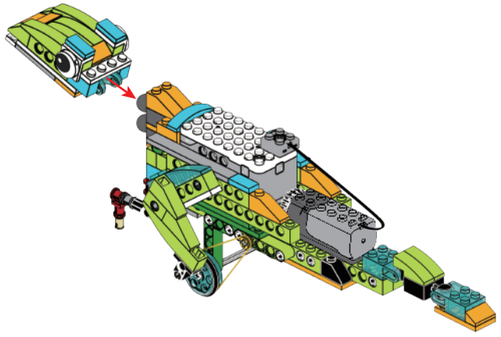
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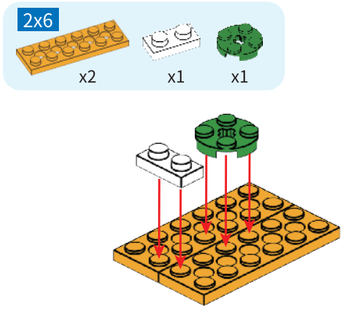
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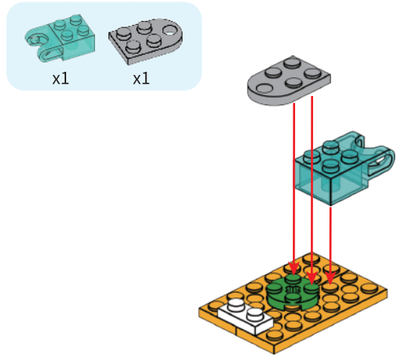
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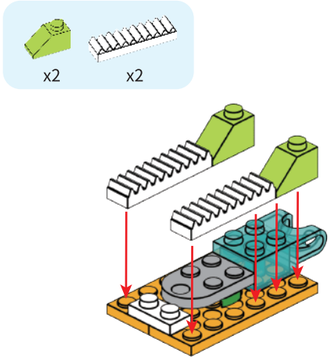
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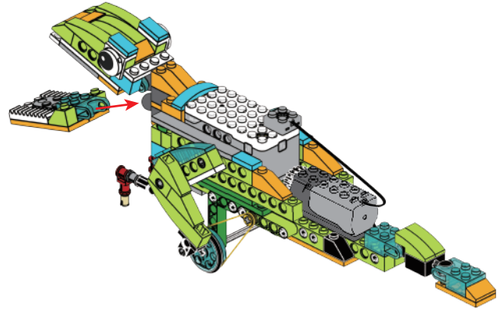
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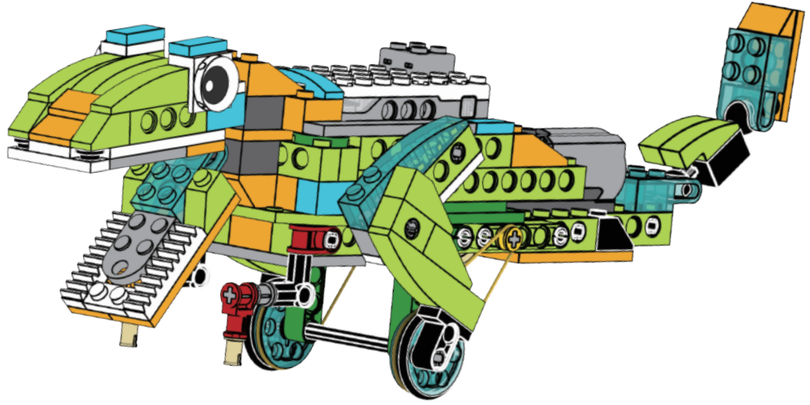


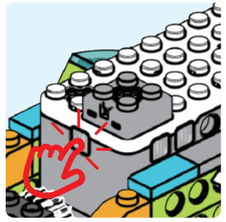
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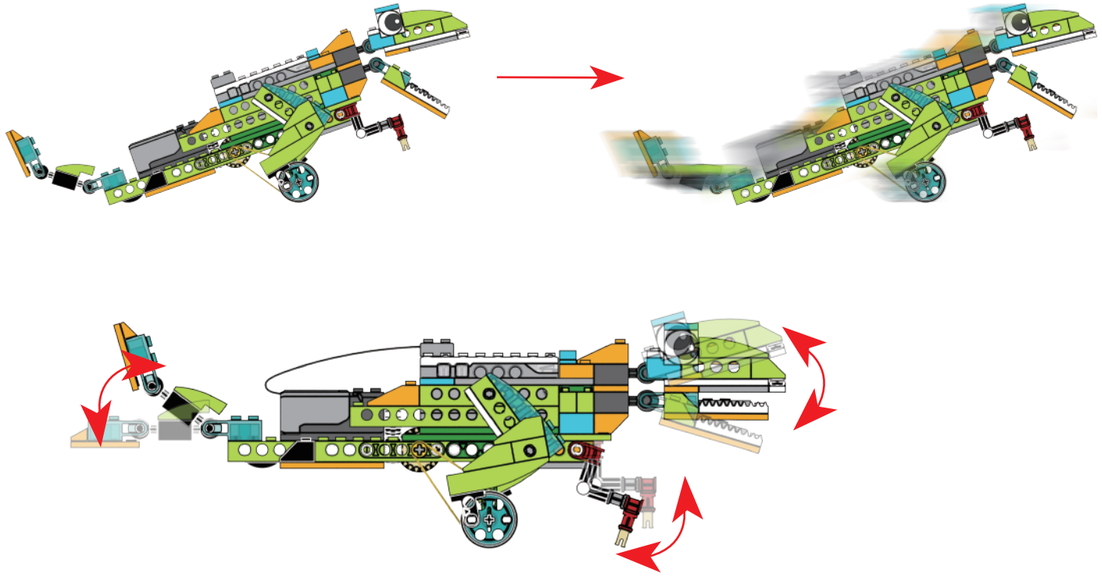
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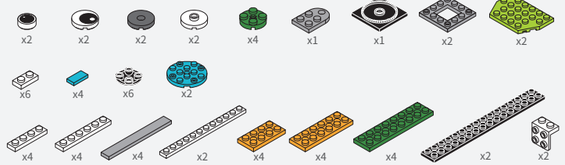




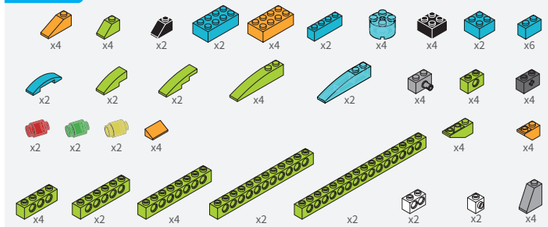
3 Robot Parts List

Robot Matser Standard version contains 370 parts and the Premium version contains 600 parts, which can meet the sequential construction of 100 kinds of mechanical devices. Please note that they are not built at the same time. The parts are divided into plates (the thickness of the plate is 1/3 of the brick), bricks, arms (compared to bricks with holes, both ends of the arms are symmetrical, which is more widely applicable), shafts, pulleys and gears, as well as connectors and bushings , rubber bands, starters and other accessories.

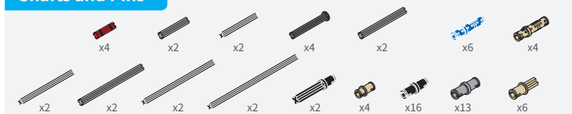
Plates



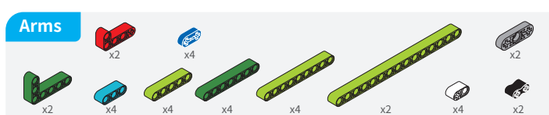
Bricks



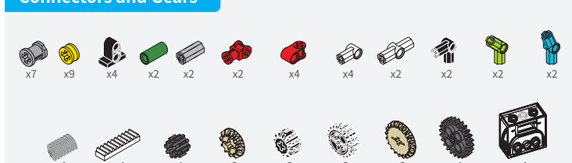
Shafts and Pins



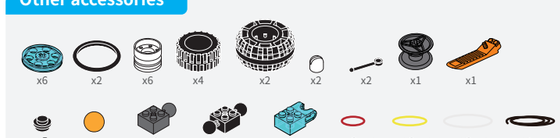
Arms



Connectors and Gears



Other accessories



4 Product Details

Product Name: MACHINIST BUILDING BLOCKS
Model No.: MKZ-EC-MCT
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.

- This product contains samll accessories, which may cause a choking hazard and is not suitable for children under three years of age.
- The users manual contains important information, please keep it for future use.
- Rechargable batteries should be charged under the supervision of an adult.
- Maintenance: This product shall not be used in water ot 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

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.