Part Two

HAPPY FARM Bountiful Fields MANUAL

makerzoid

APP Introduction

APP Download

APP icon

① Scan the QR Code

②APP store-search “makerzoid” IOS

②APP store-search “makerzoid” Android

1 APP Download

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

2 Choose the kit

It teaches you how to build a robot

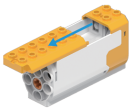
3 Build a robot

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

Battery Installation Instructions

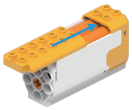
- Non-rechargeable batteries cannot be charged.
- Rechargeable batteries should be charged under adult supervision.
- Used batteries should be removed from the product.
- The power terminals should not be short-circuited.
- Batteries of different sizes or old/new batteries cannot be used together.
-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

How to insert the batteries



① Remove the cover on the motor.

② Insert 2 AAA batteries,(NOT included).



③ Push back the cover.

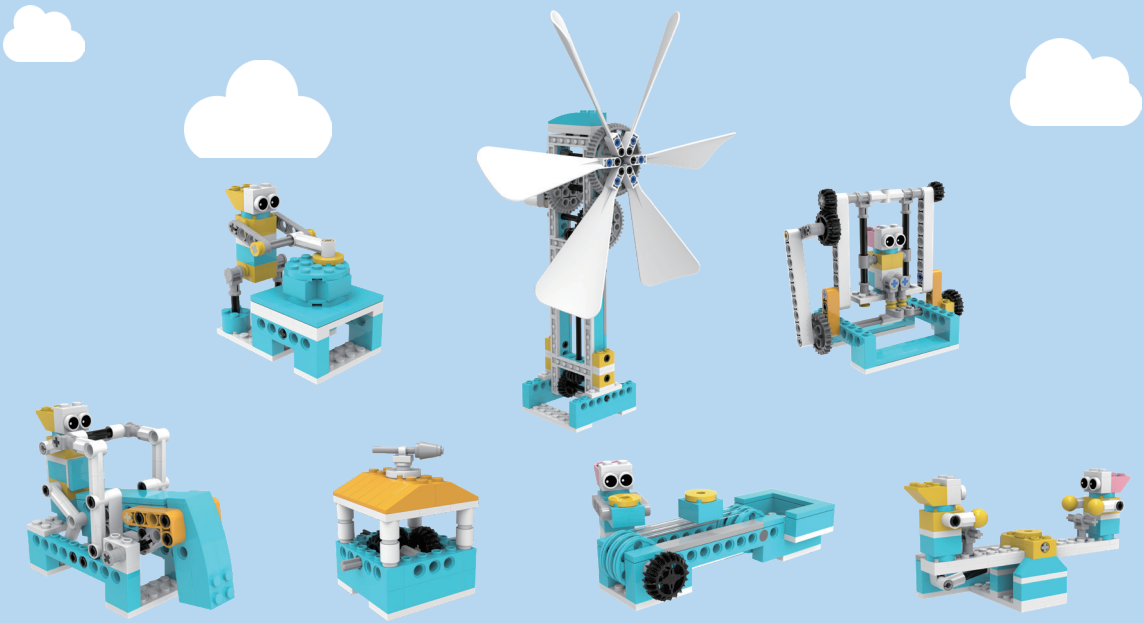
Product Details

Product Name:Happy Farm - Bountiful Fields
Product Model: MKZ-HF-02
Power Supply: 2×AAA batteries(not included)
Rated Power: 5W
Suitable for: 6+
Made in China

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

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

Catalog



1. Rice Huller

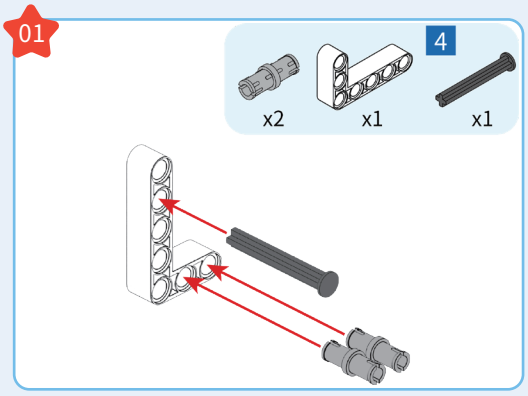
Thinking

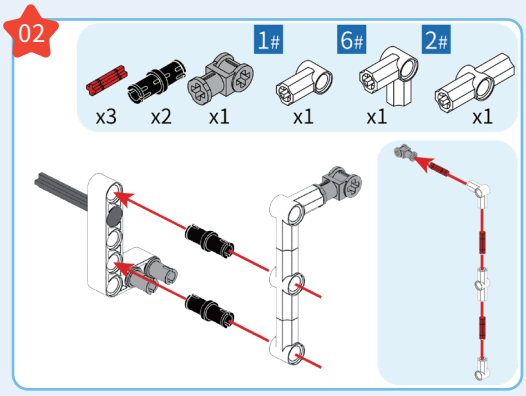
1. How does a rice huller work?

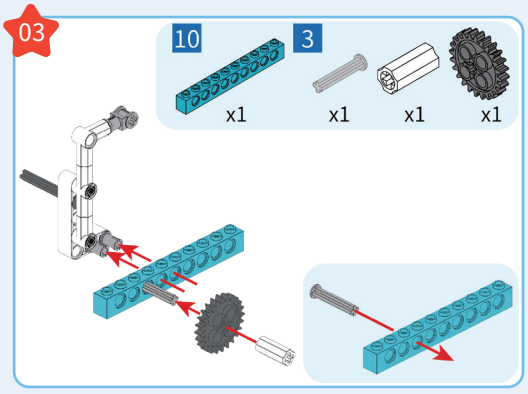
2. How can the speed of rice hulling in a rice huller be increased?

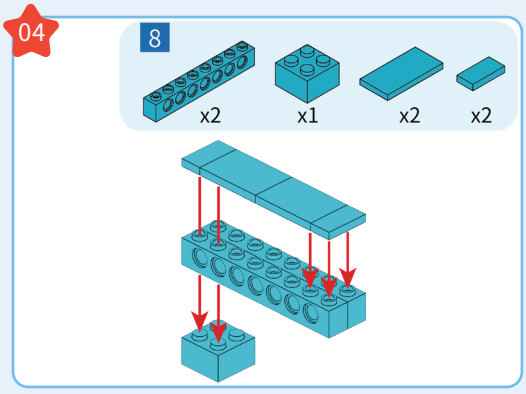
Build:

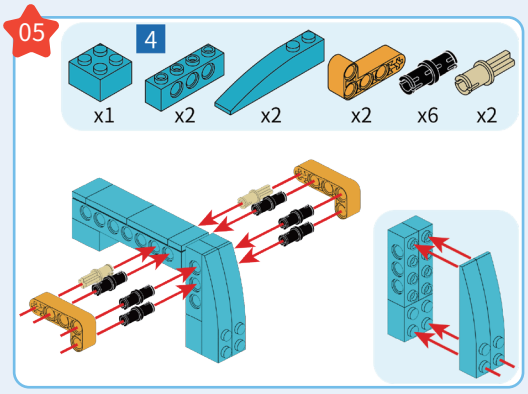
Hey guys, please follow the steps to build the rice huller with your fastest speed.
You will find something interesting and useful!

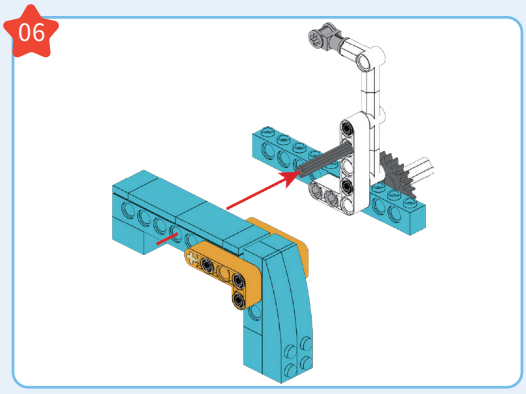








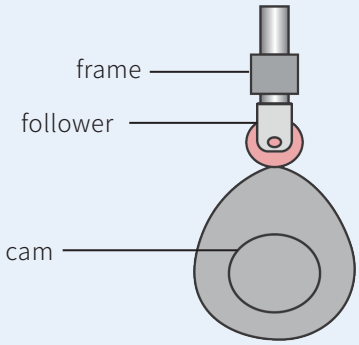


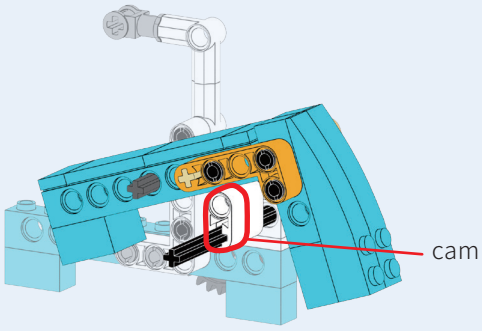


Knowledge

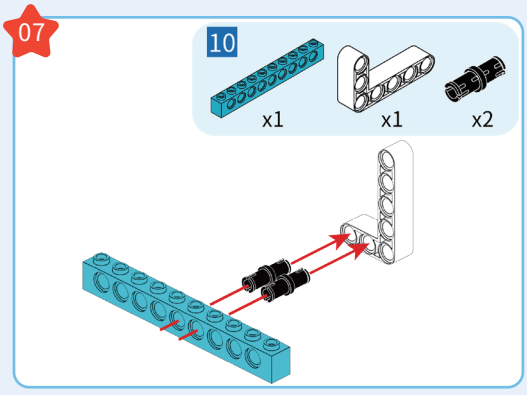
Cam Mechanism

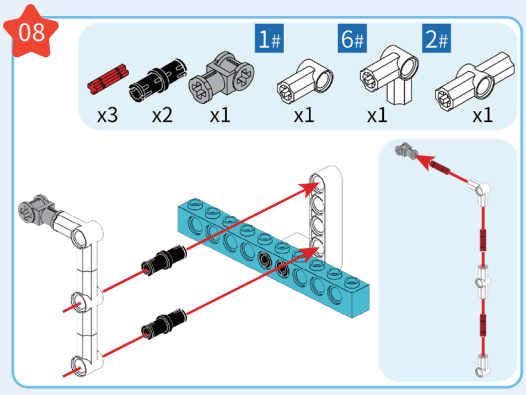
A cam mechanism consists of three basic parts: the cam, the follower, and the frame. The cam mechanism converts the uniform motion of the cam into the reciprocating or oscillating motion of the follower.

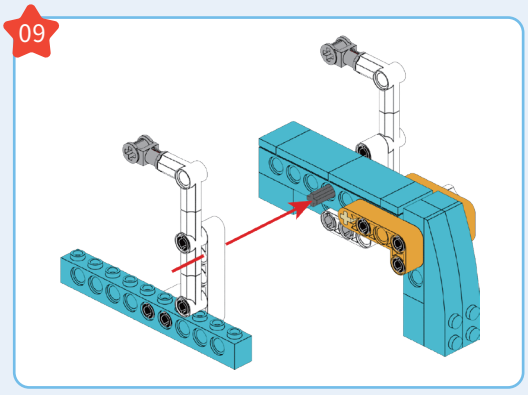


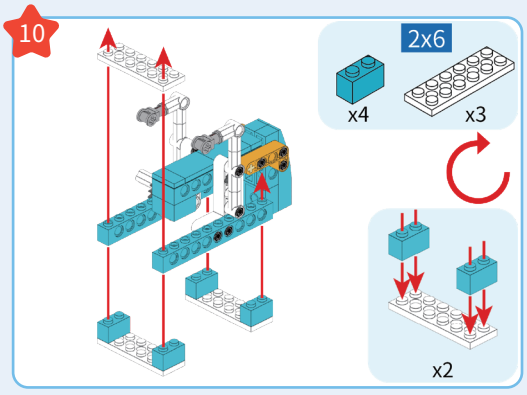


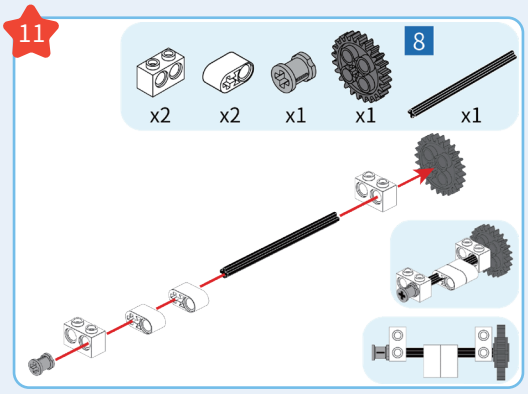
The rice huller uses a cam mechanism to achieve the intermittent motion of the rice hulling hammer.







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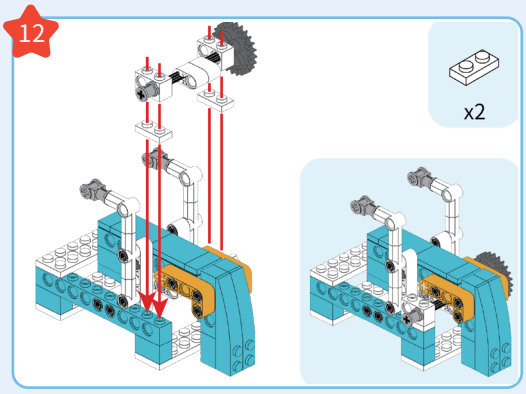
x1
x1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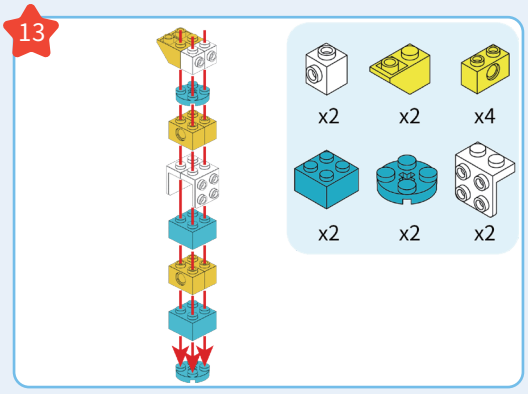
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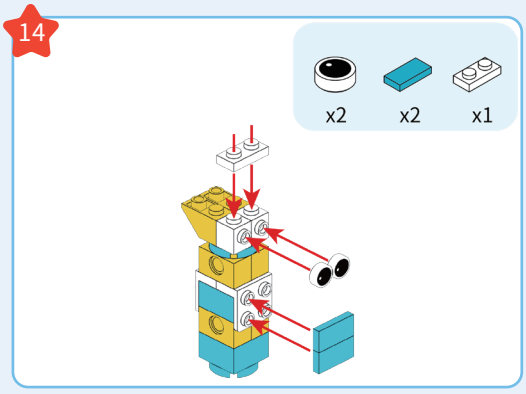
x2
x2
x2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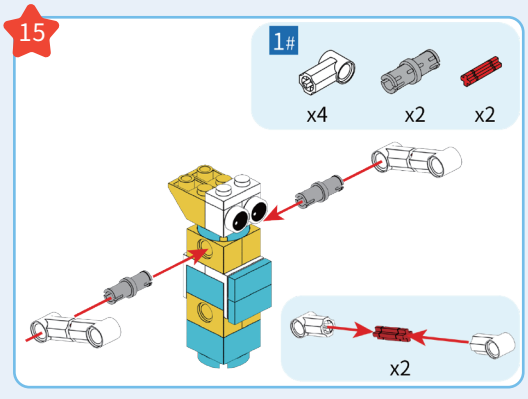
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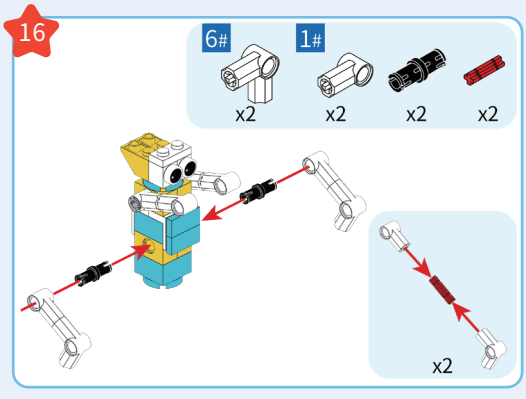
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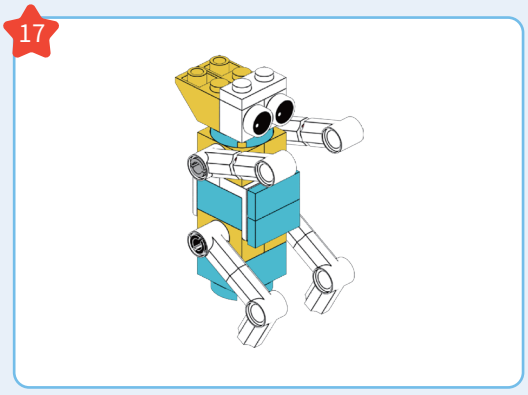
x2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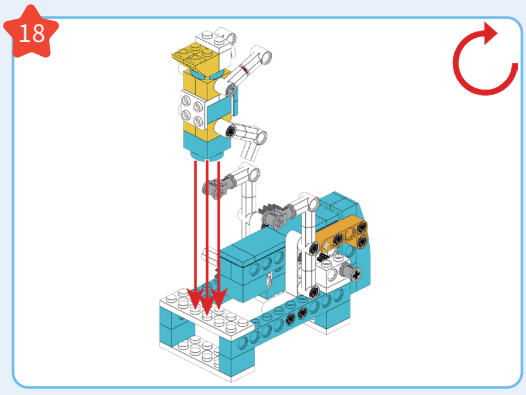
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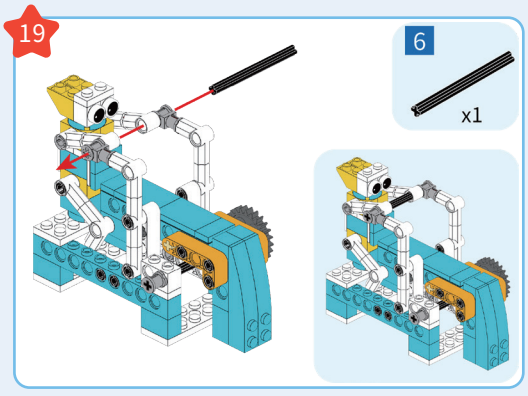
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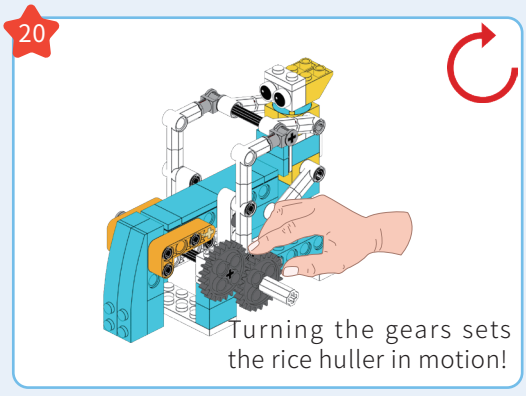
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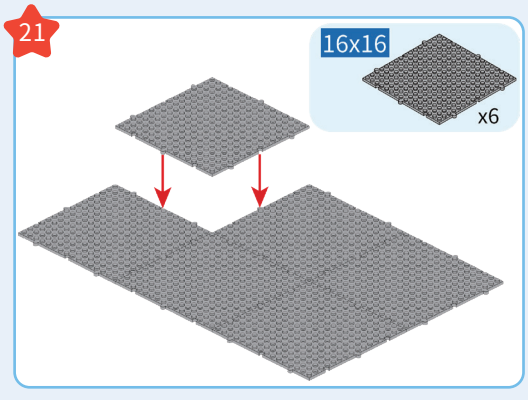
Turning the gears sets
the rice huller in motion!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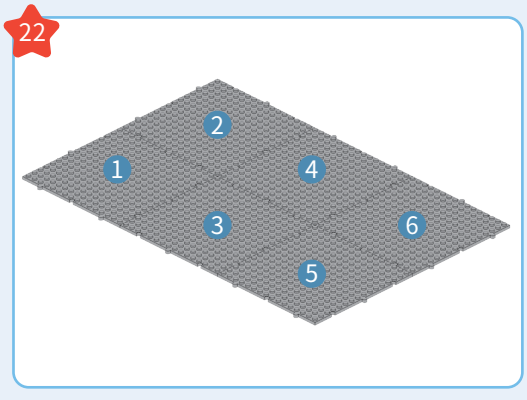
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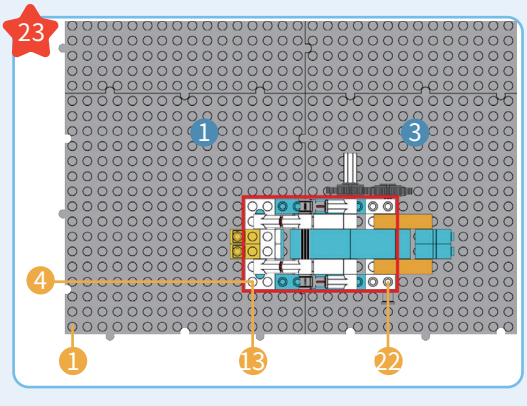
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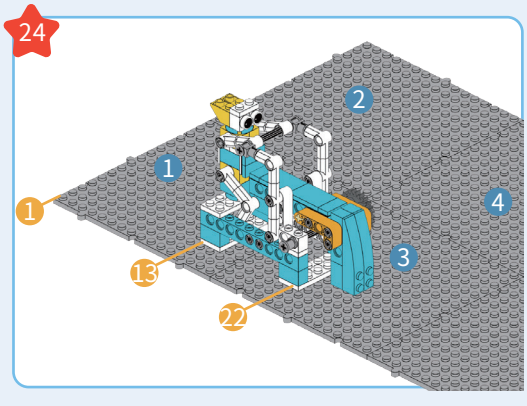
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4
3
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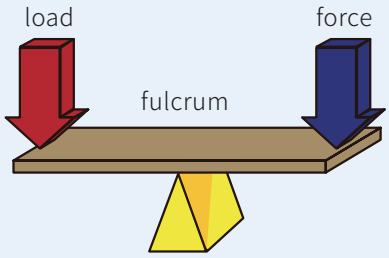
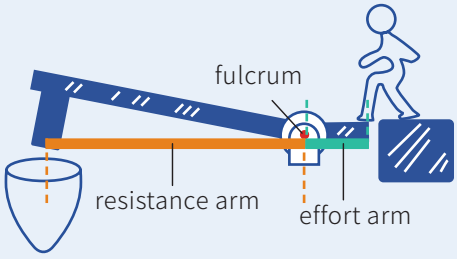
Knowledge



A lever consists of a force arm and a fulcrum. The fulcrum is used to support the force arm and can be positioned at any point beneath the force arm.

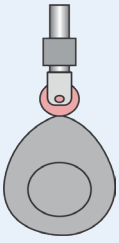
A lever with a shorter effort arm than the resistance arm is a force-disadvantage lever, while a lever with a longer effort arm than the resistance arm is a force-advantage lever.



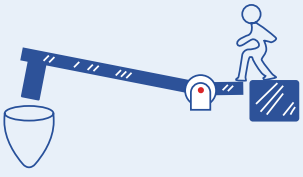
Share

Kids, review and share the knowledge about the mechanism principles of the rice huller with your parents.

Understood the rice huller



Learned about the cam mechanisms



Mastered the force-disadvantage levers

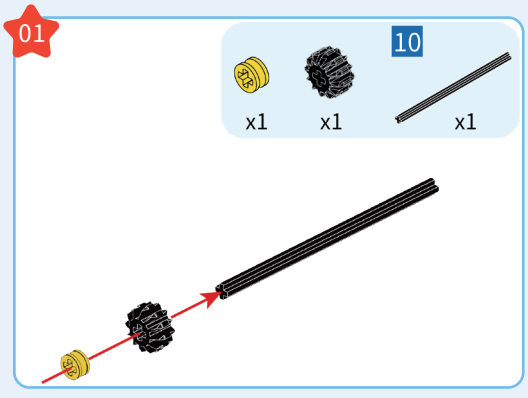
2. Grinding

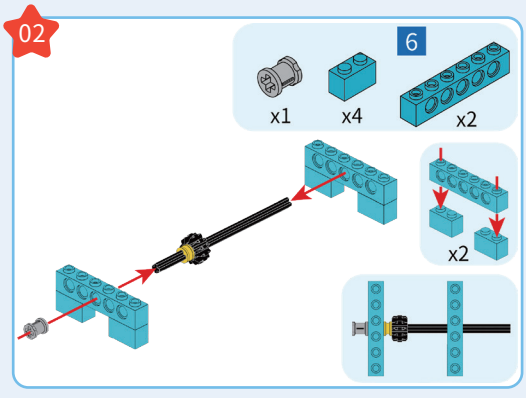
Thinking

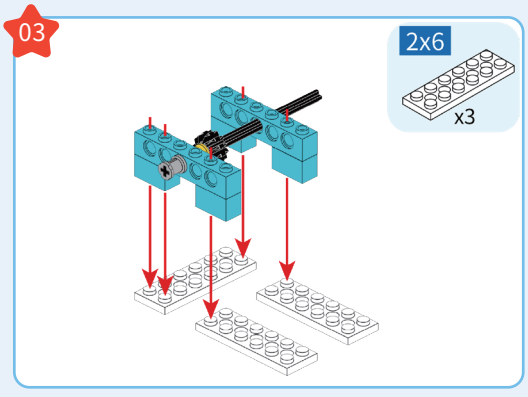
1. How does a grinding machine work?
2. How can the grinding disc's speed be increased?

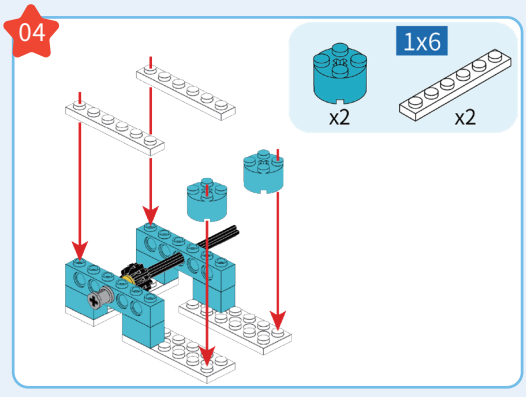
Build:

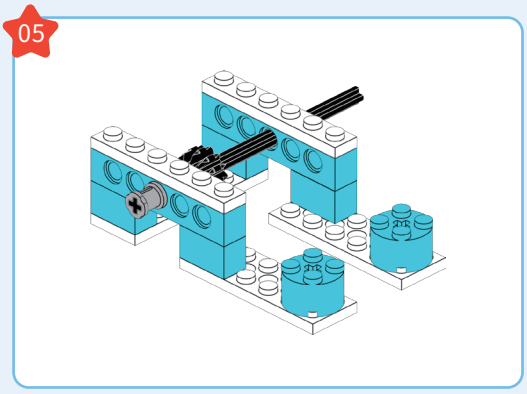
Hey guys, please follow the steps to build the grinding machine with your fastest speed.
You will find something interesting and useful!







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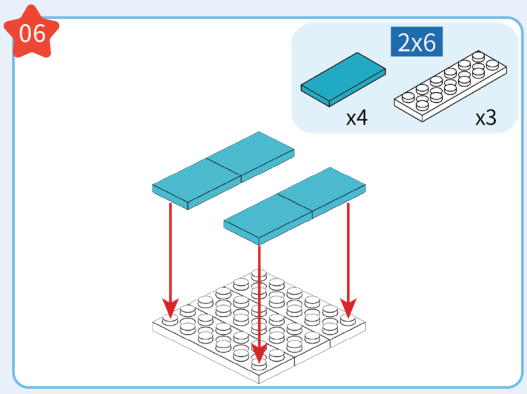
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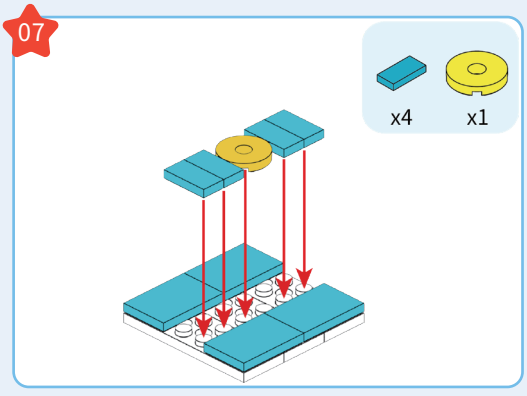
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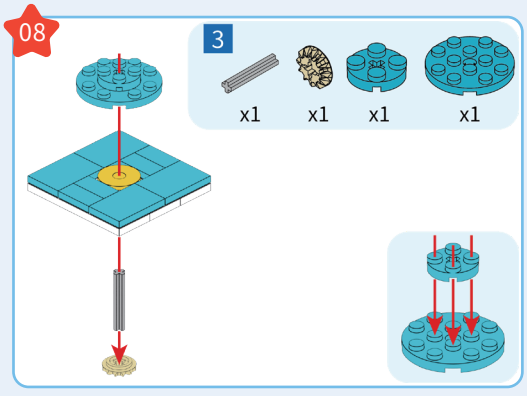
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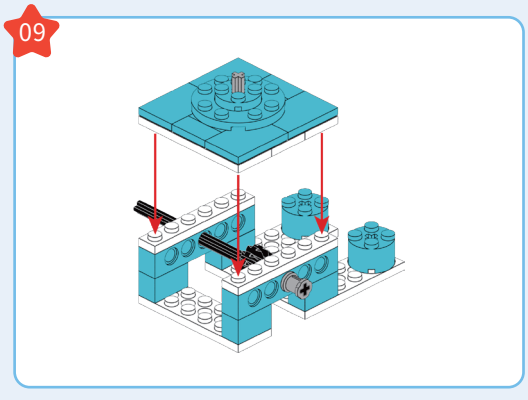
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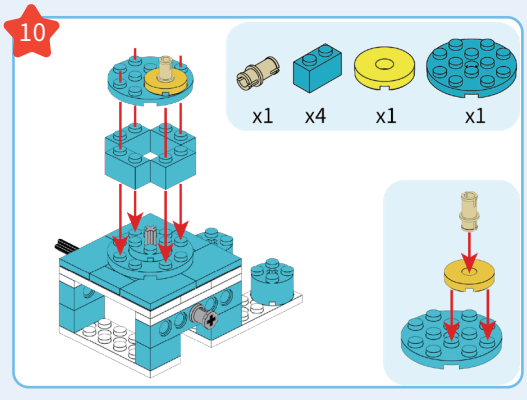
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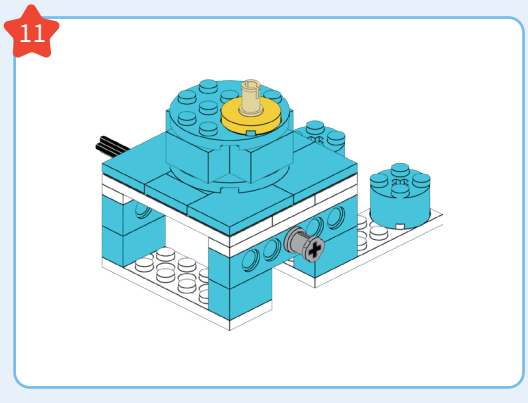
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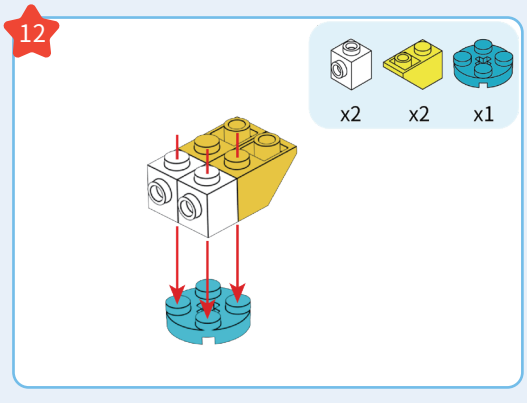
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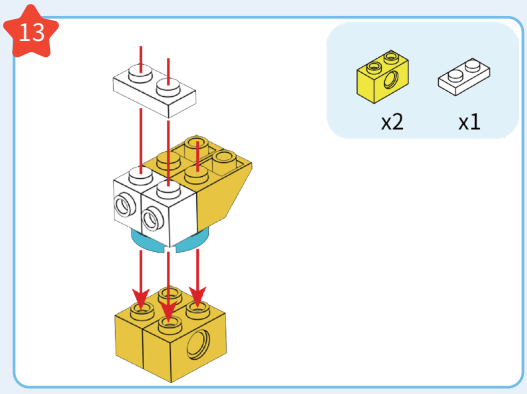
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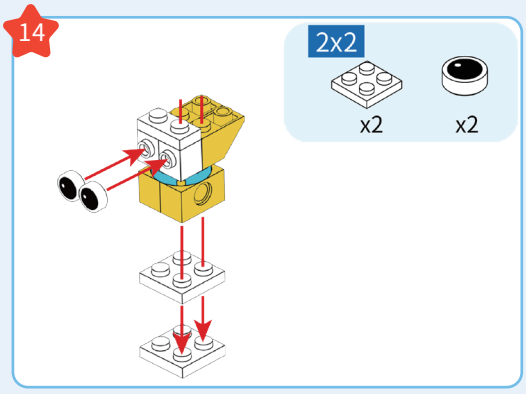
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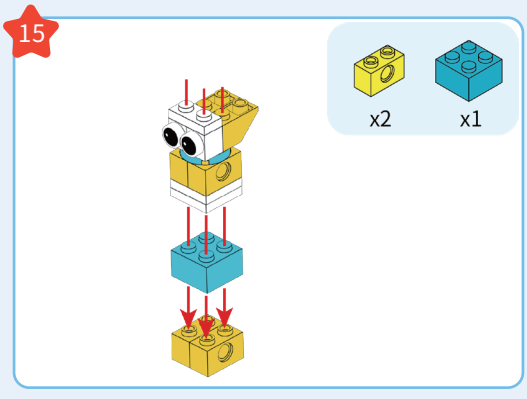
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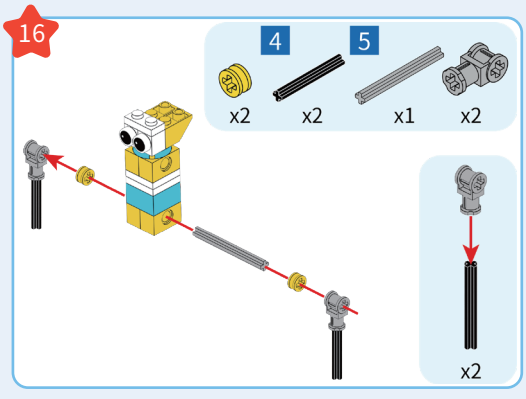
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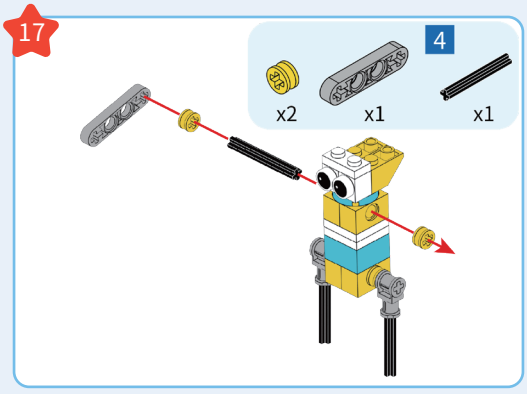
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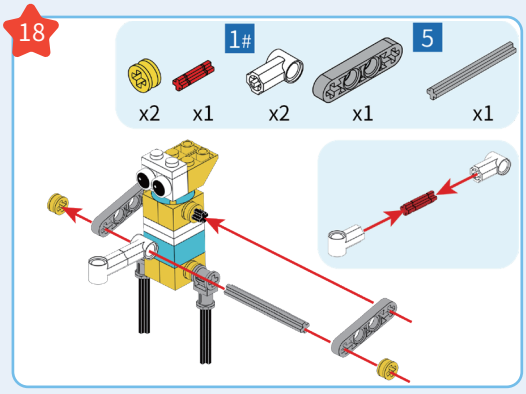
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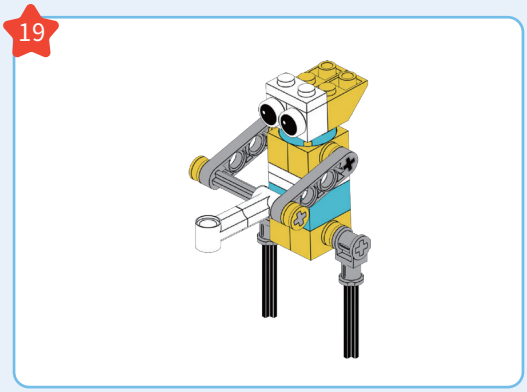
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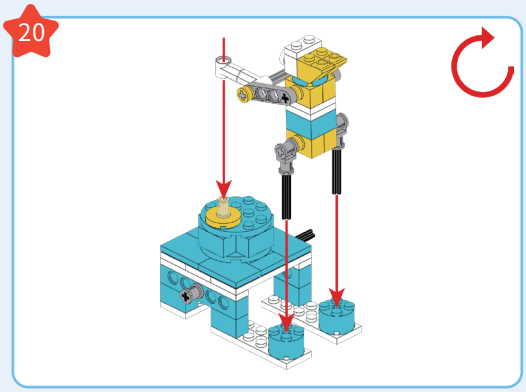
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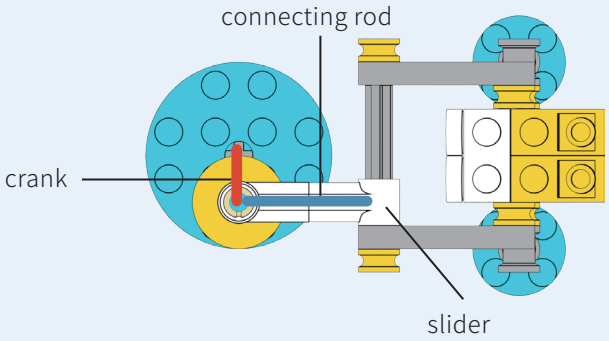
Knowledge

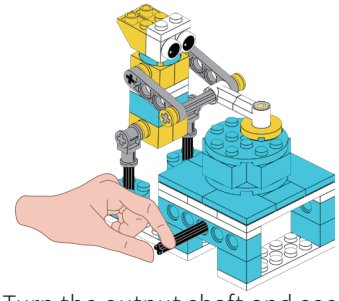
Crank-Slider Mechanism

The crank-slider mechanism is a planar linkage mechanism that converts rotary motion into linear motion and vice versa. It consists of a crank, connecting rod, slider, and guide rail.



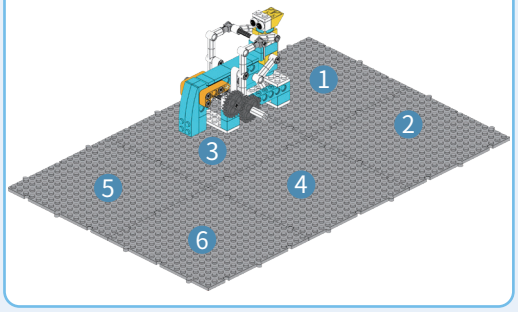
The grinding machine uses a crank-slider mechanism, where the grinding disc acts as the crank, and the crankshaft, as the driving component, moves the slider, converting rotary motion into linear reciprocating motion.

21

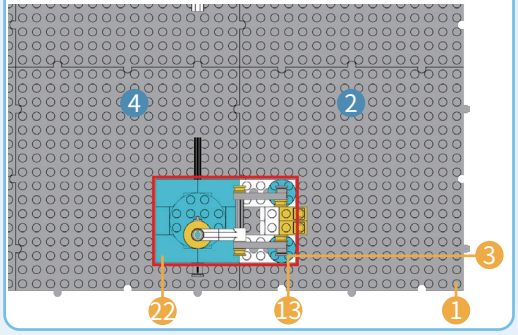


Turn the output shaft and see if your grinding machine can start moving!

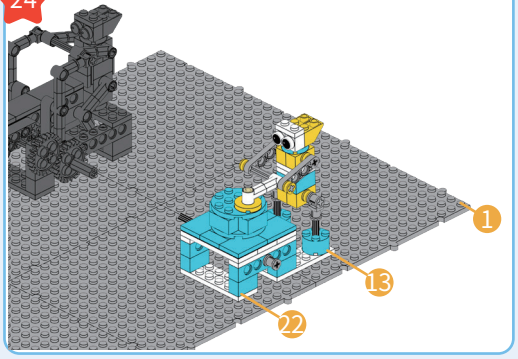
22



23

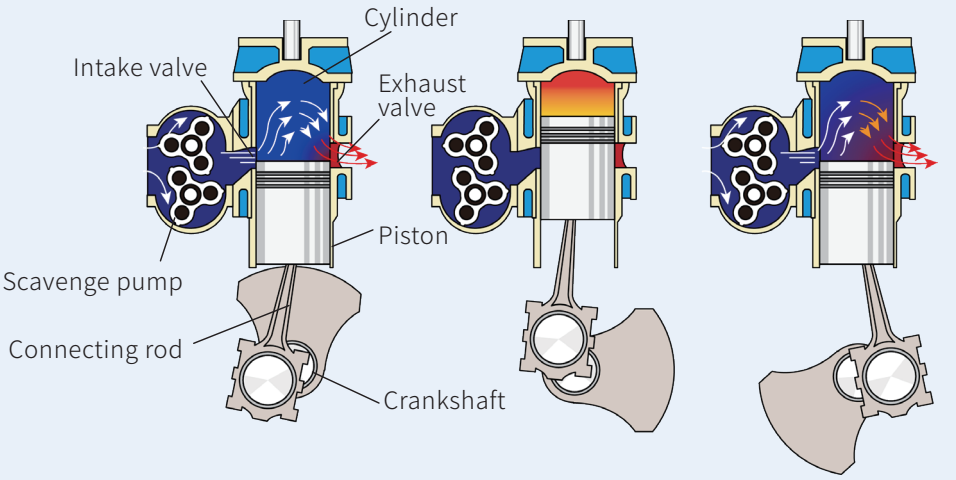


24



Knowledge

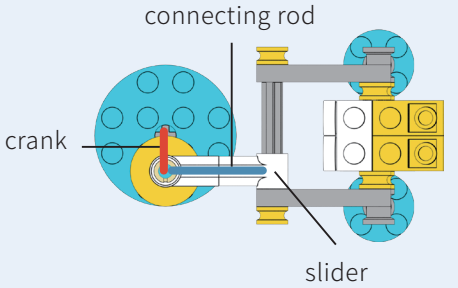
The application of the crank-slider mechanism is everywhere, and it plays a crucial role in the working principle of internal combustion engines!



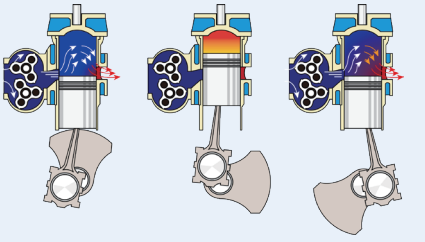
The internal combustion engine continuously repeats this cycle to convert the energy from fuel into piston motion and rotary motion, thereby driving vehicles or generating electricity.

Share

Kids, review and share the knowledge about the mechanism principles of the grinding machine with your parents.



Learned about the crank-slider mechanism



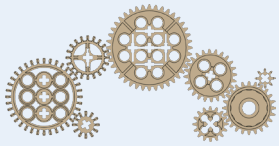
Understood the working principle of the internal combustion engine

3. Power Station

Thinking

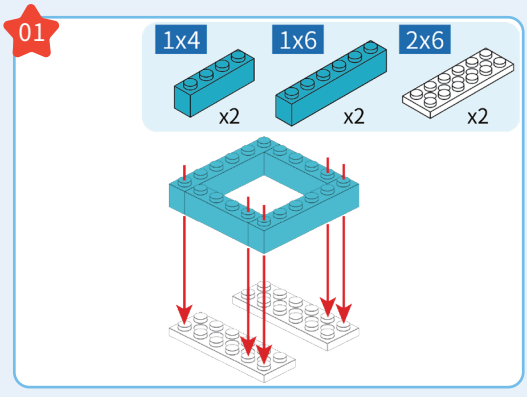
1. Is the grinding machine operating at a fast or slow speed?

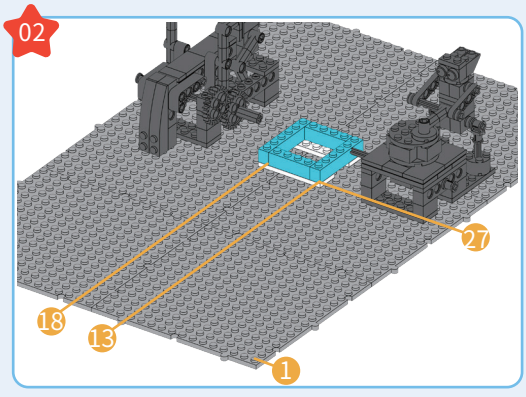
2. Is it easier to turn the gear or the shaft?

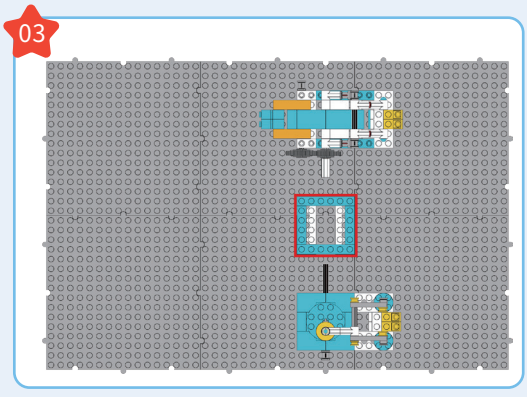


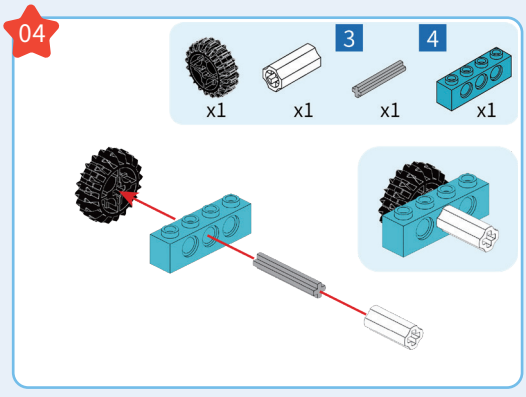
Build:

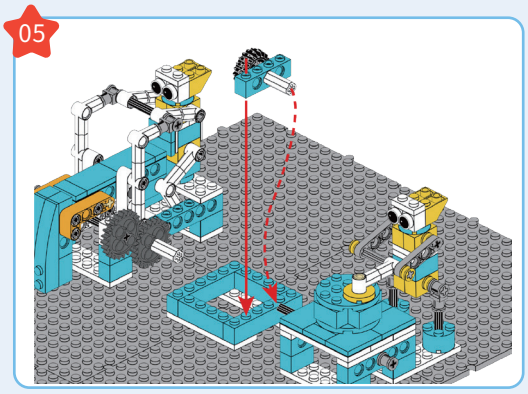
Hey guys, please follow the steps to build the power station with your fastest speed.
You will find something interesting and useful!

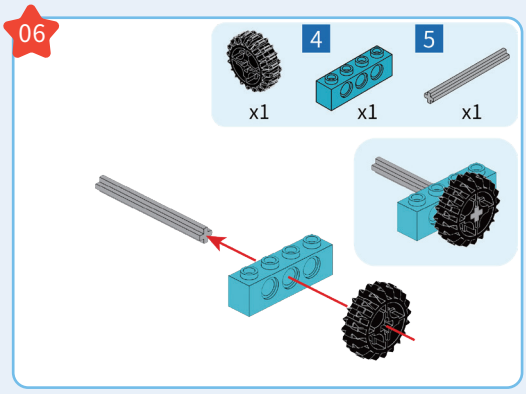


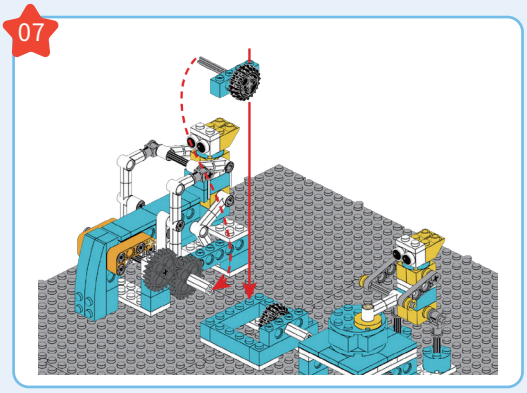


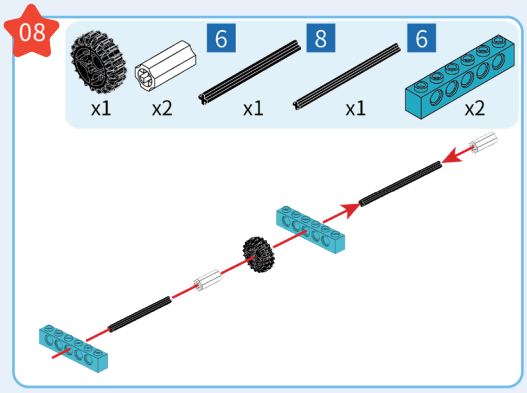


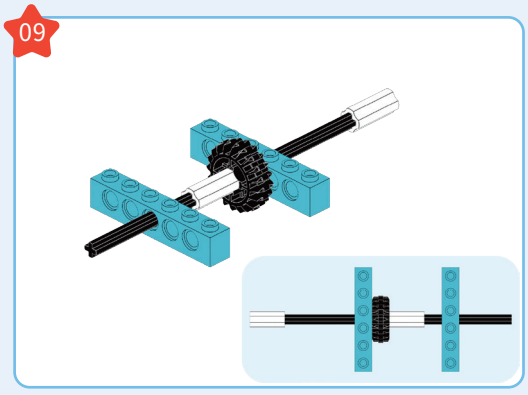


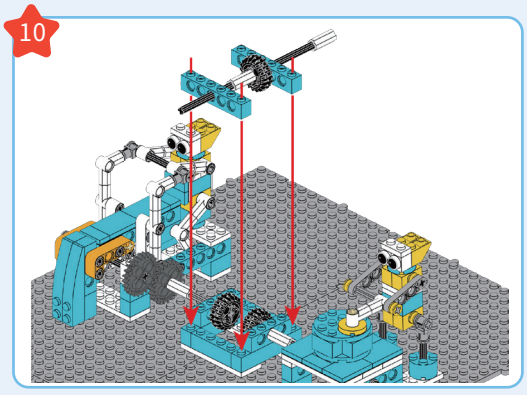








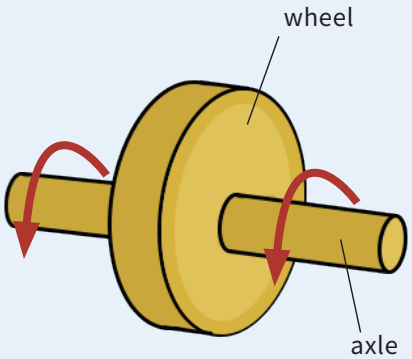


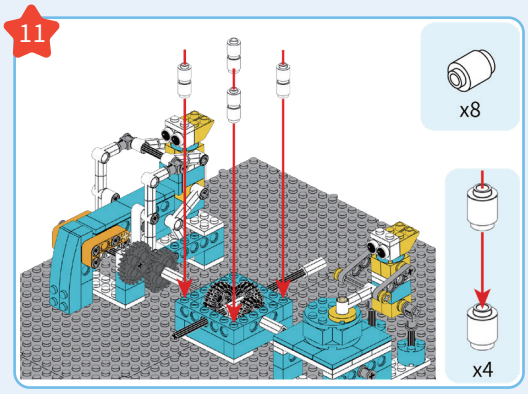


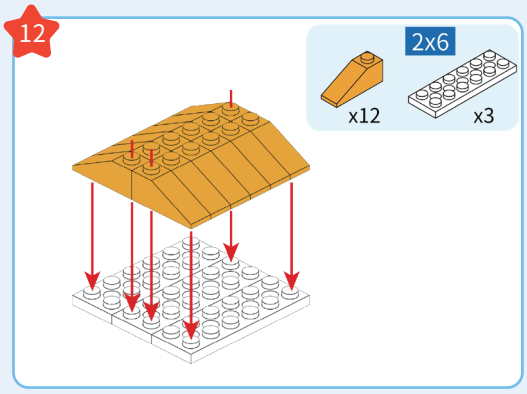
Knowledge

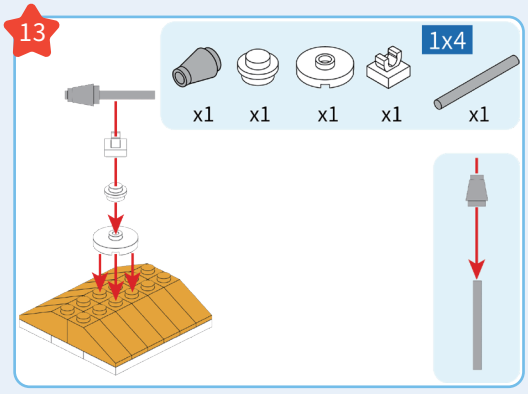
Wheel and Axle

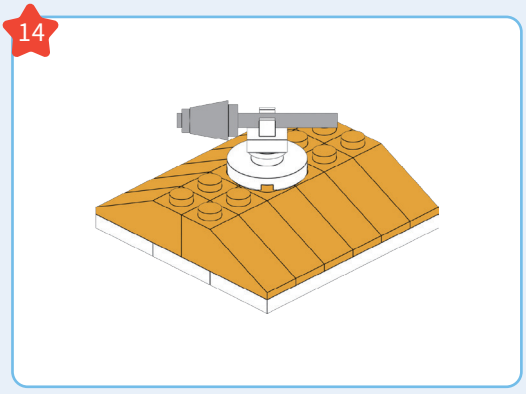
A wheel and axle consists of a wheel and a concentric shaft. These two parts rotate at the same speed. The rotation of the wheel and axle drives farm machinery, requiring very little effort.

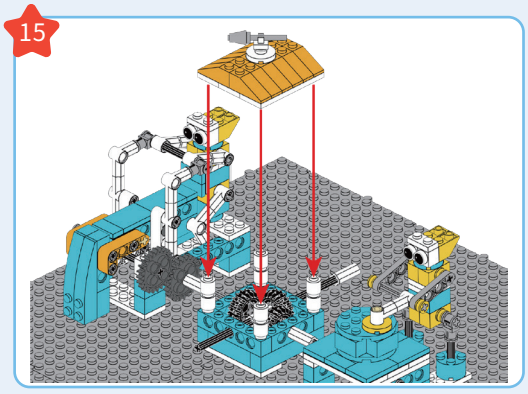


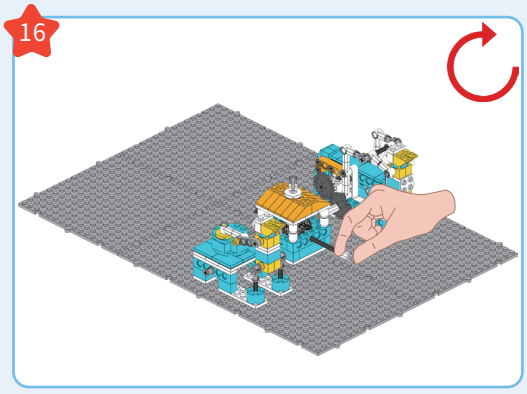








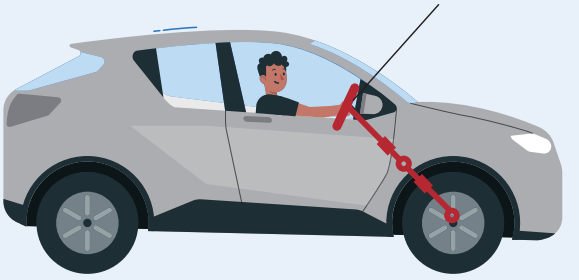




Turn the output shaft to get the rice hulling machine and rice grinder moving!

Knowledge

The steering wheel on a car

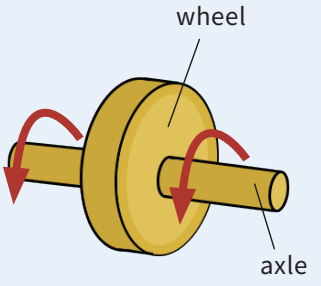


The steering wheel that the driver holds controls the direction of the car. The car turns in the direction that the steering wheel is turned. The steering wheel applies the principle of the wheel and axle.

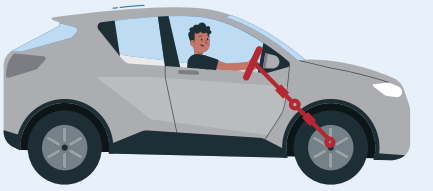
The steering wheel is connected to an axle, which is in turn connected to the car's wheels. This way, when the driver turns the steering wheel, the direction of the wheels can be changed.

Share

Kids, review and share the knowledge about the mechanism principles of the power station with your parents.



Learned the role of the axle



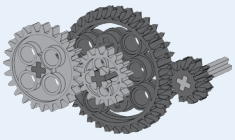
Understood the steering wheel on the car

4. Engine

Thinking

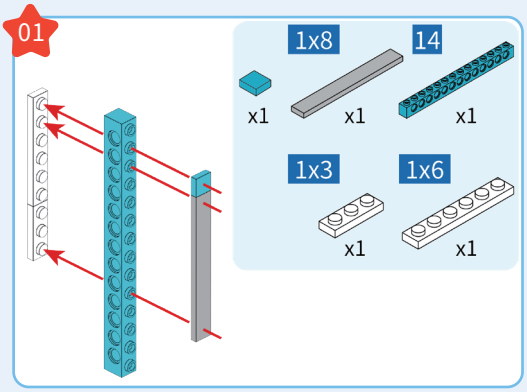
1. Can a two-stage gear reduction provide more powerful transmission for a wind turbine?

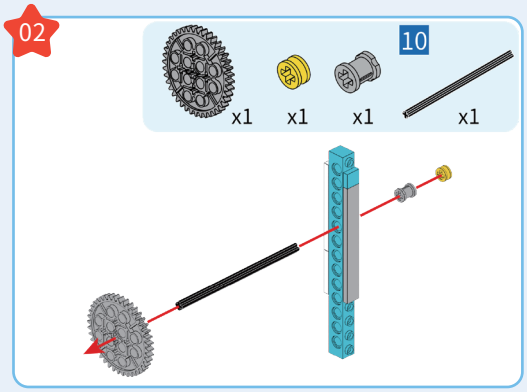
2. What are the conditions for a two-stage gear reduction to form?

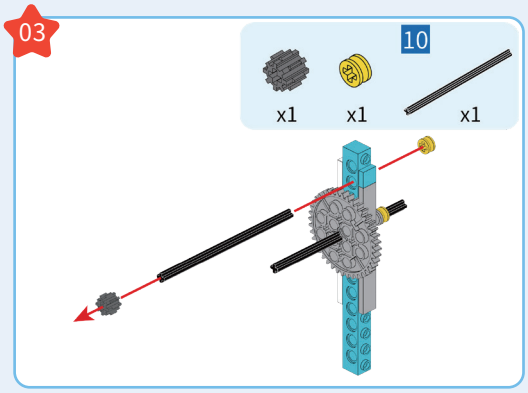


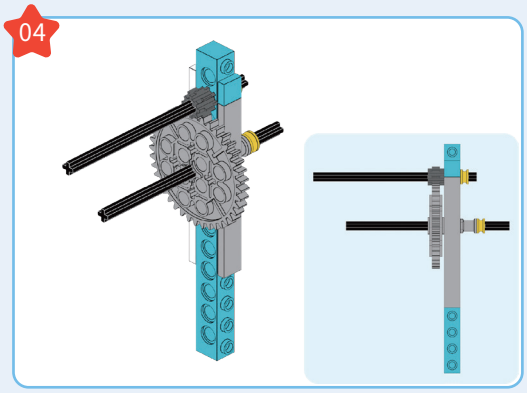
Build:

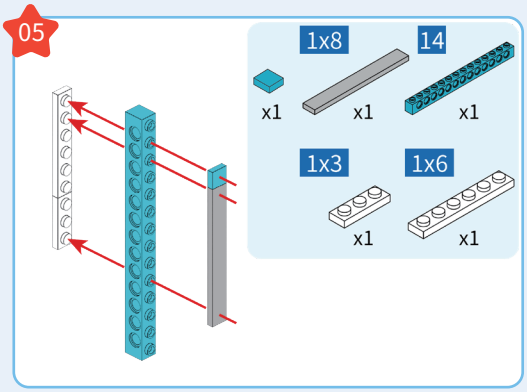
Hey guys, please follow the steps to build the engine with your fastest speed.
You will find something interesting and useful!

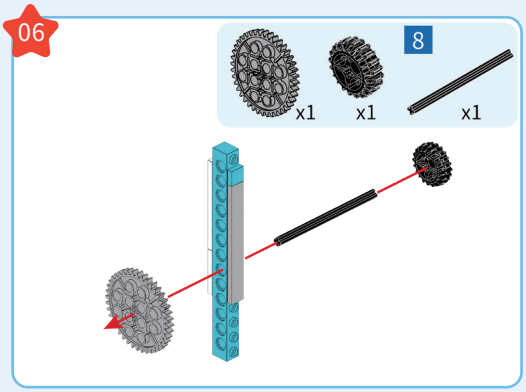


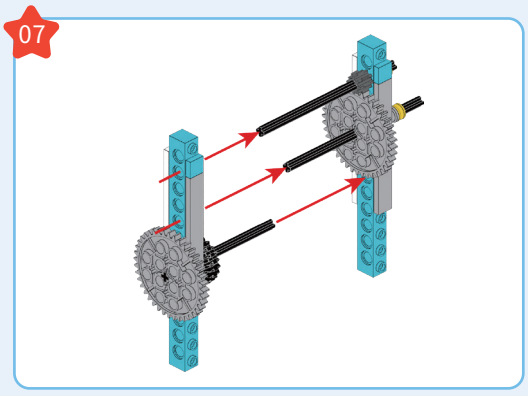


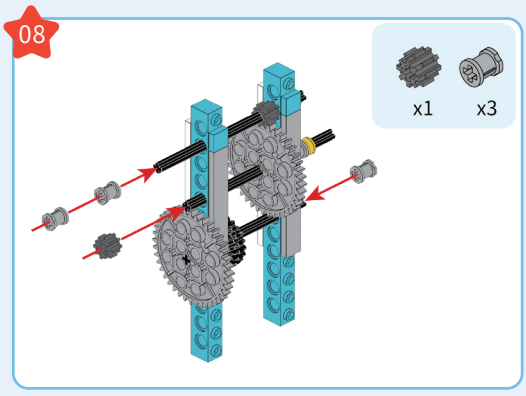








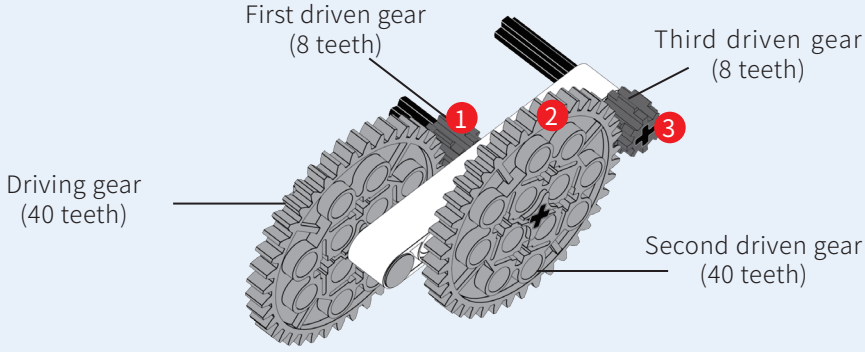




Knowledge

Two-stage Gear Acceleration Device

Power transmission is carried out through a gear drive mechanism that relies on two pairs of meshing gears.



First-stage gear acceleration:

The first driving gear rotates once, and the first driven gear rotates 5 times.

Second-stage gear acceleration:

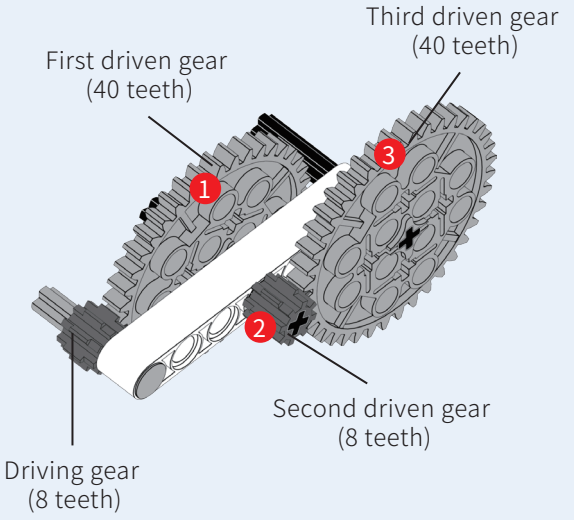
The second driven gear rotates 5 times, and the third driven gear rotates 25 times.

The rotational speed of coaxial gears is the same, and the rotational speed of the second driven gear is the same as that of the first gear. When the driving gear rotates once, the third driven gear rotates 25 times.

Knowledge

Two-stage Gear Reduction Device

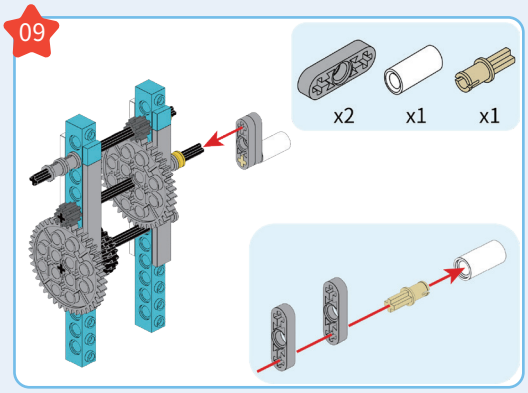
In a two-stage gear reduction device, the driving wheel is connected to the motor or other power source, while the driven wheel is connected to the equipment that requires speed reduction. The gear ratio between the driving and driven wheels is typically designed to be different, thereby achieving the reduction effect.

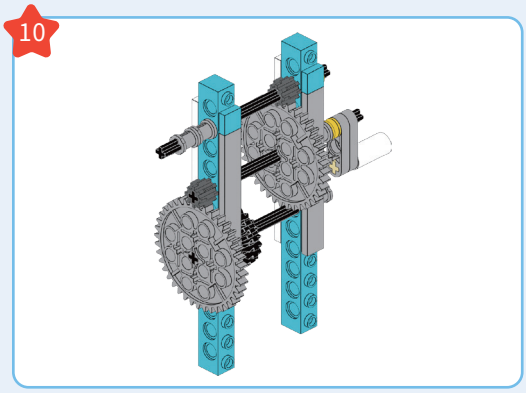


First-stage gear reduction:
The driving gear rotates 25 times, and the first driven gear rotates 5 times.

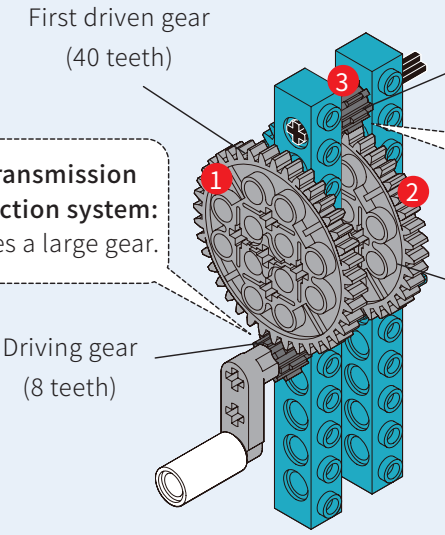
Second-stage gear reduction:
The second driven gear rotates 5 times, and the third driven gear rotates once.

Coaxial gears have the same rotational speed, and the rotational speed of the second driven gear is the same as that of the first gear. When the driving gear rotates 25 times, the third driven gear rotates once.





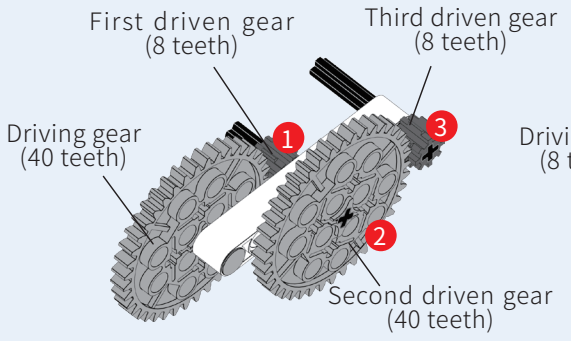
Knowledge



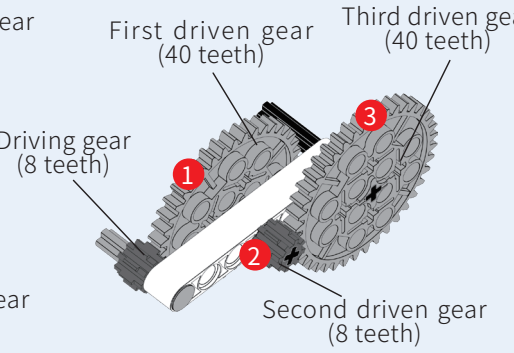
If the gears are installed in this way, changing the direction, the overall effect will neither be an acceleration nor a reduction in speed.

Share

Kids, review and share the knowledge about the mechanism principles of the engine with your parents.



Learned about the two-stage gear acceleration device



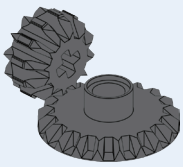
Learned about the two-stage gear reduction device

5. Wind Turbine

Thinking

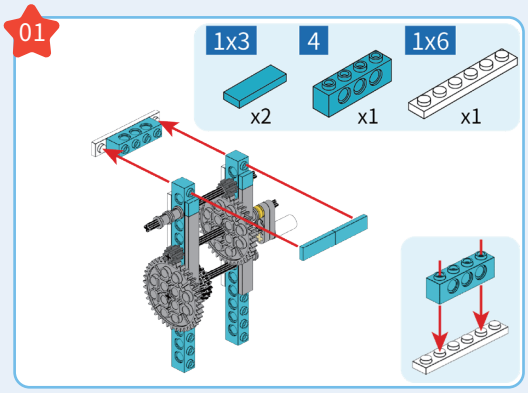
1. Which type of transmission mechanism engages with the two-stage gear reduction device for power transmission?

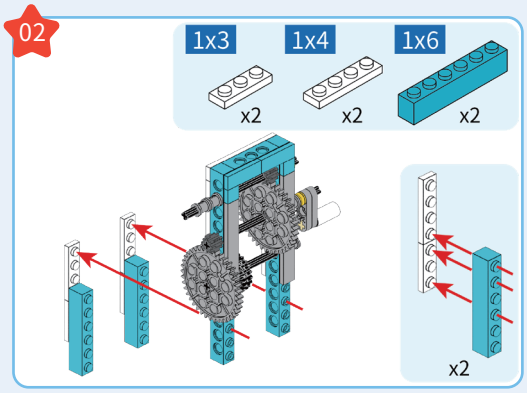
2. How can the wind turbine continue to operate?

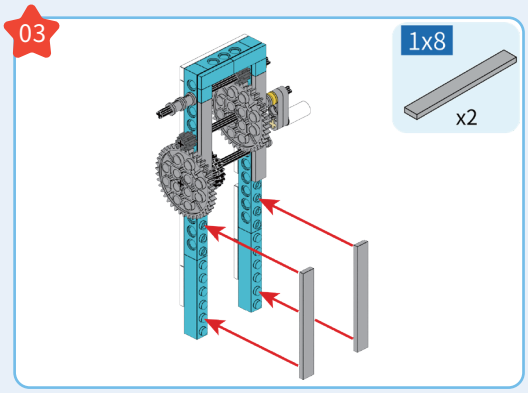


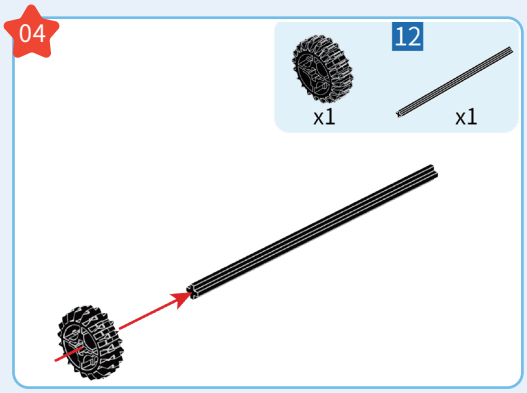
Build:

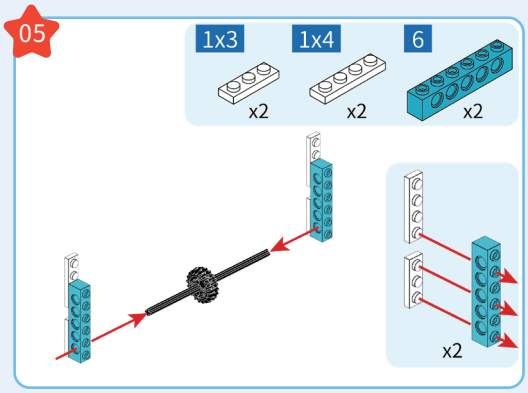
Hey guys, please follow the steps to build the wind turbine with your fastest speed.
You will find something interesting and useful!

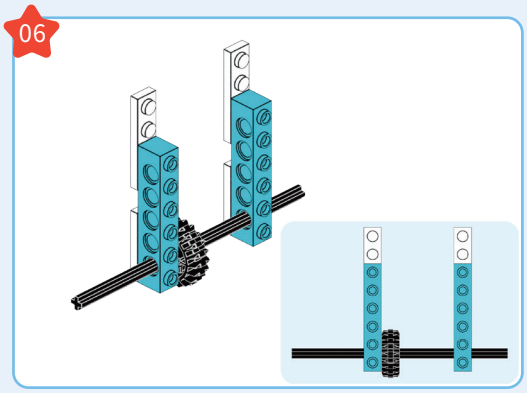


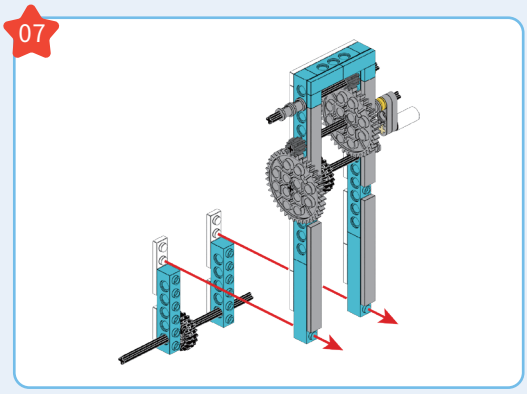


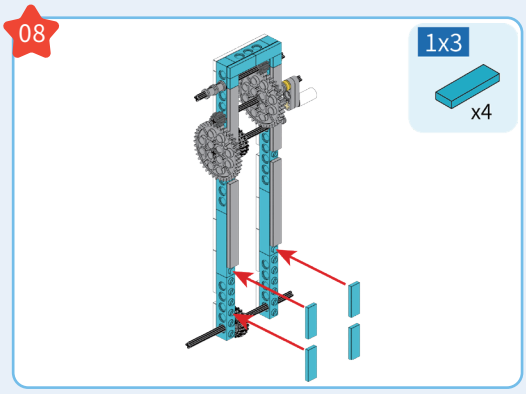


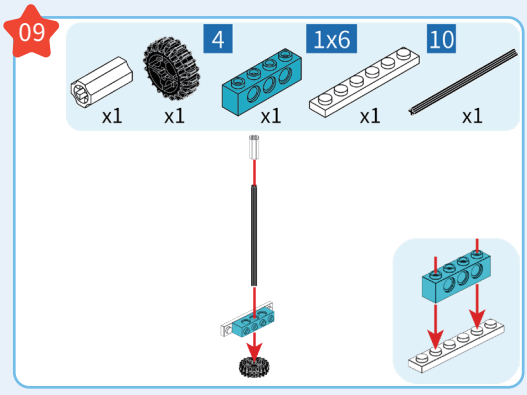


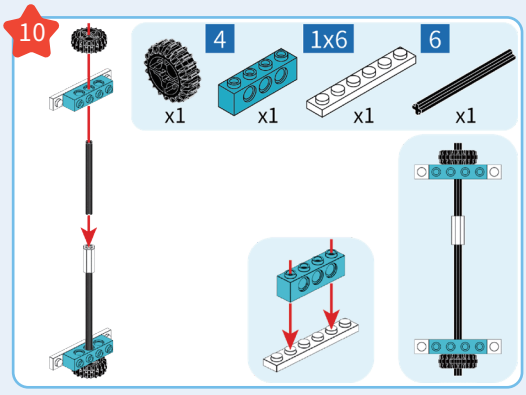




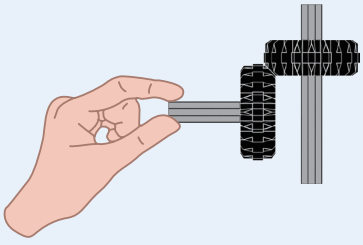


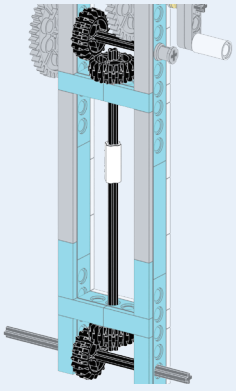






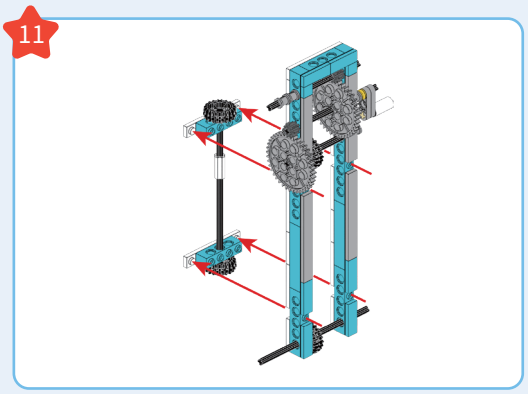
Knowledge

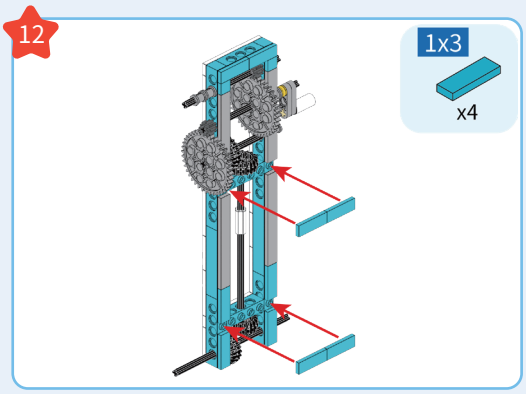




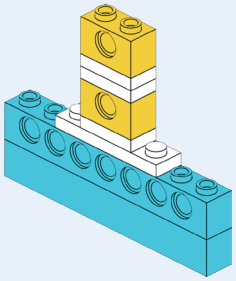
Vertical Transmission Mechanism

A vertical transmission mechanism consists of a gear transmission between intersecting shafts made up of a pair of bevel gears, also known as bevel gear transmission. Vertical gear transmission can change the direction and position of transmission but must adhere to the rules of gear transmission.



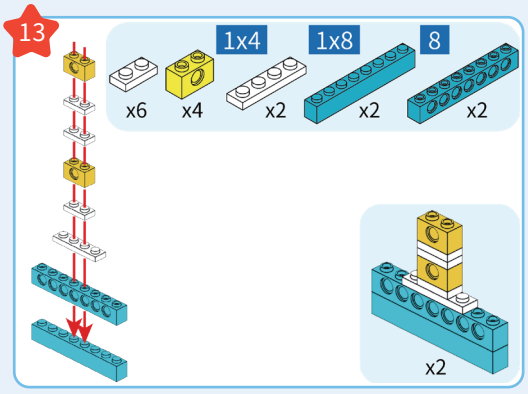


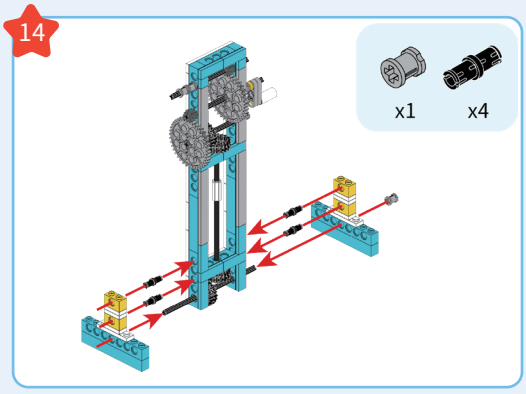
Knowledge

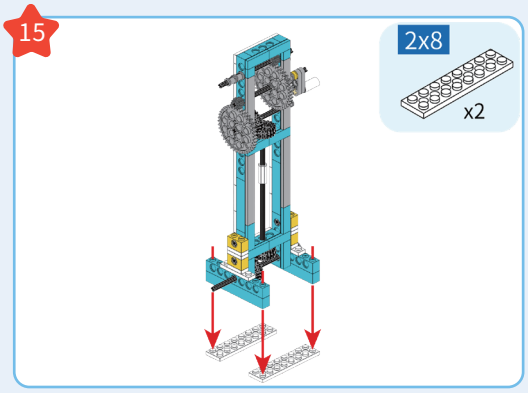


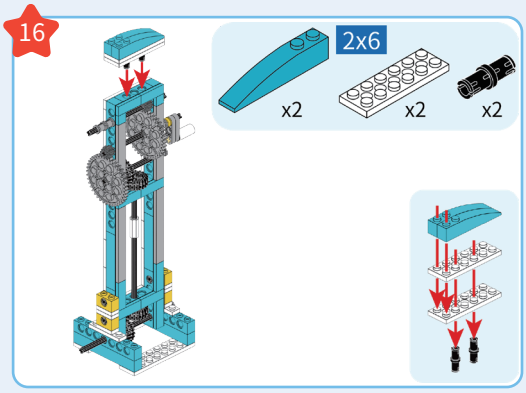
Hamburger Structure

By converting different unit components and applying the principle of determining a straight line through two points, the purpose of linking and fixing beams is achieved.









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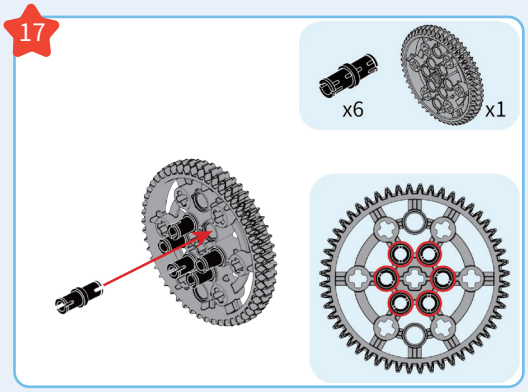

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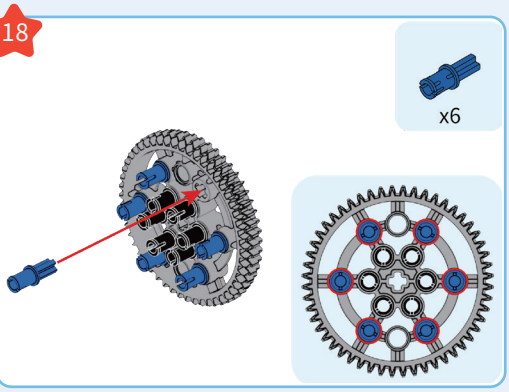

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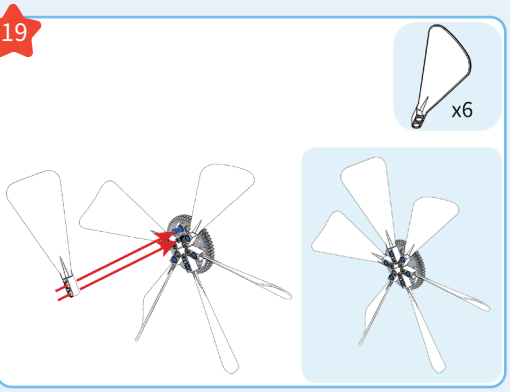

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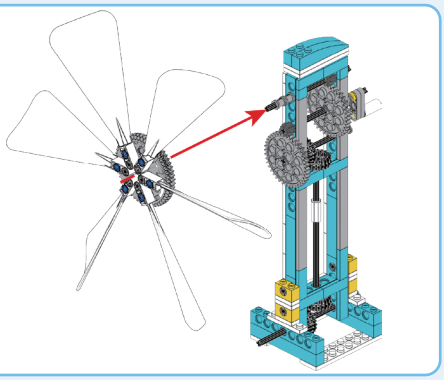

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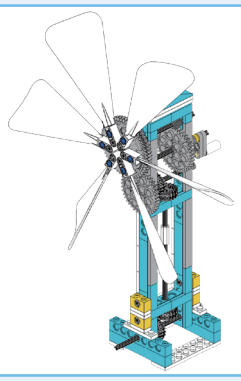

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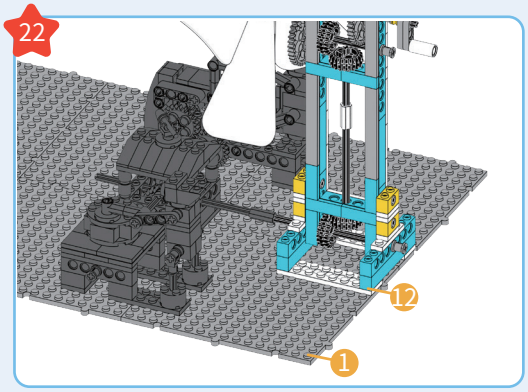

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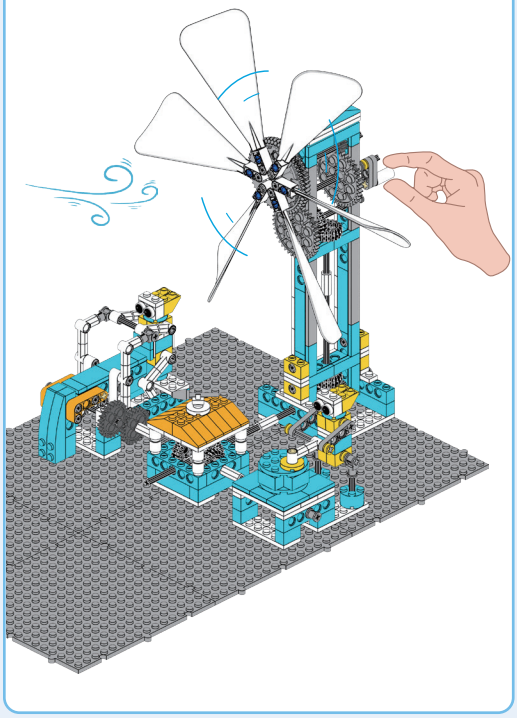
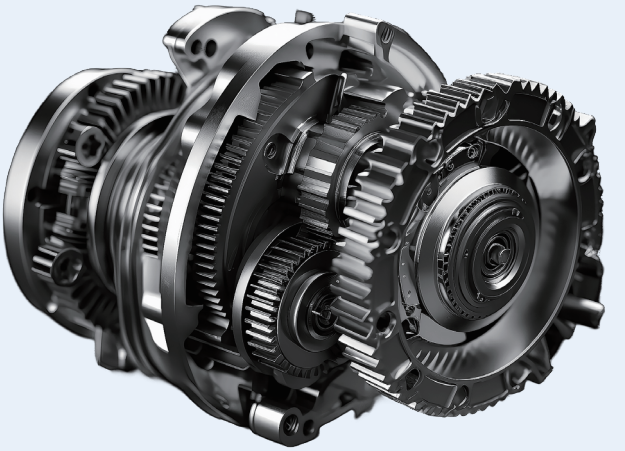


Knowledge

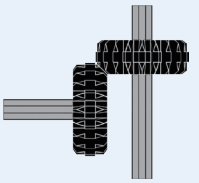
What device is commonly used to output the rotational speed of the generator in electric vehicles?



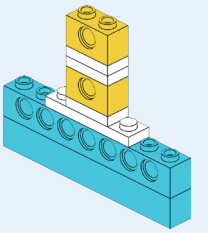
In hybrid or electric vehicles, the generator typically uses a two-stage gear reduction device to slow down the high rotational speed output from the engine, making it suitable for the generator's operational requirements.

Share

Kids, review and share the knowledge about the mechanism principles of the wind turbine with your parents.



Learned about vertical transmission mechanisms

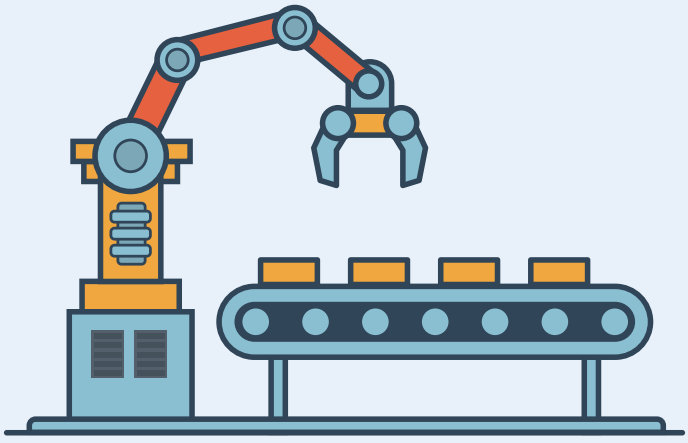


Reviewed the use of the hamburger structure

Understood the components of the generator's output speed device

6. Transport Magician

We only need to place the ground powder on the conveyor belt, and it will automatically transport the rice flour from the grinding area to the outside.

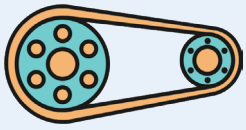


A conveyor belt is a mechanical device with a movable belt.

Using a conveyor belt can greatly reduce our labor burden.

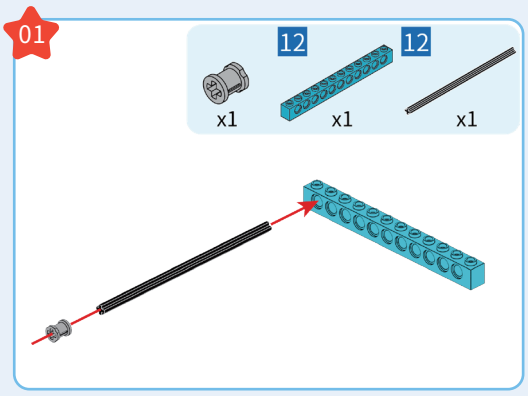
Thinking

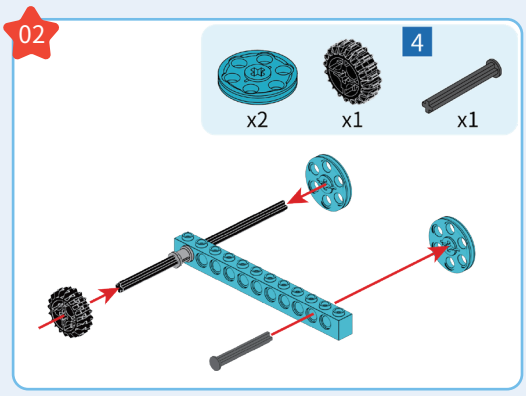
1. What type of transmission device is used as the output device for a conveyor belt?
2. How can the direction of the conveyor belt's movement be kept consistent?

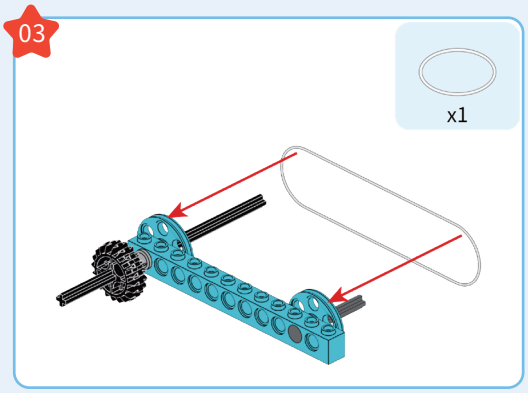


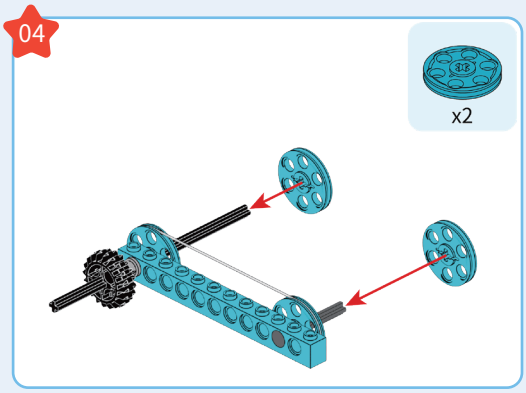
Build:

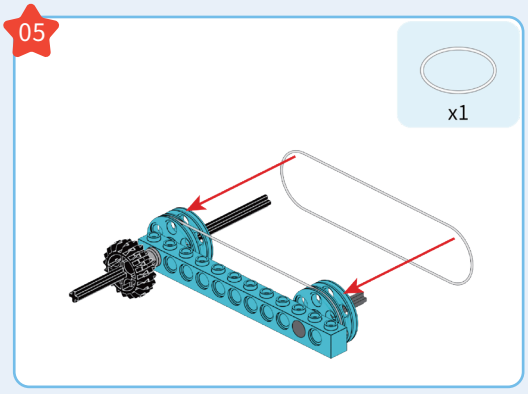
Hey guys, please follow the steps to build the conveyor belt with your fastest speed. You will find something interesting and useful!


01
12
12
x1
x1
x1


02
4
x2
x1
x1


03
x1


04
x2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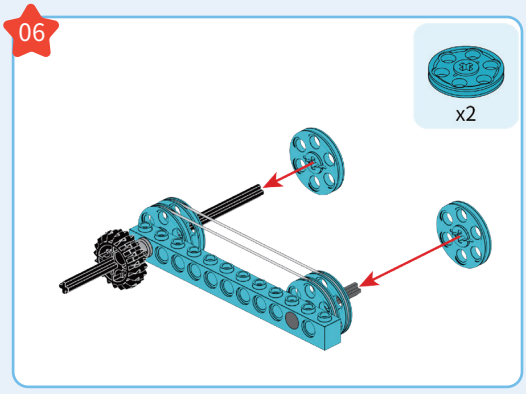
x1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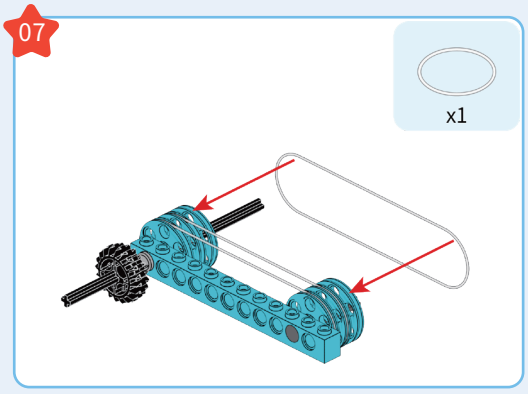
x2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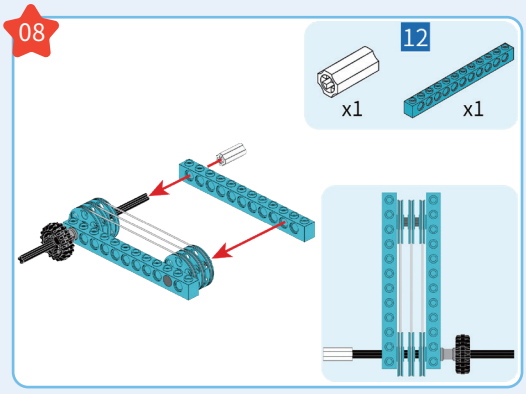
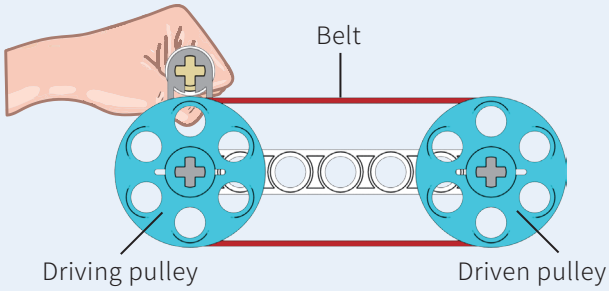
x1

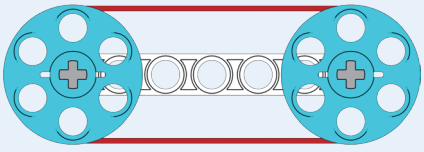

08
12
x1
x1

Knowledge

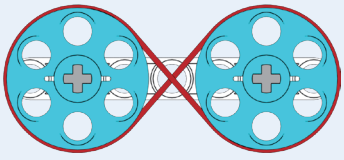
Belt Transmission Method

Belt transmission can connect wheels that are far apart, transferring power from one place to another, allowing the machine to perform various tasks.



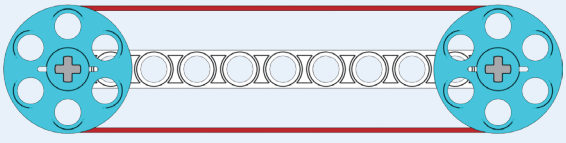


Open belt drive

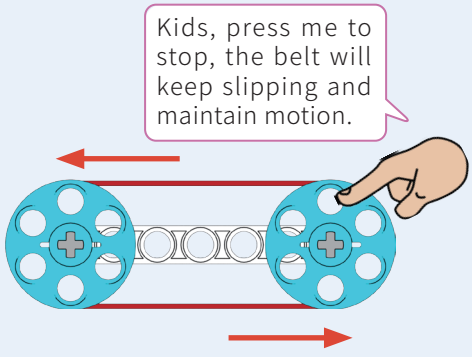


Cross belt drive

Belt transmission includes open belt drive and cross belt drive.

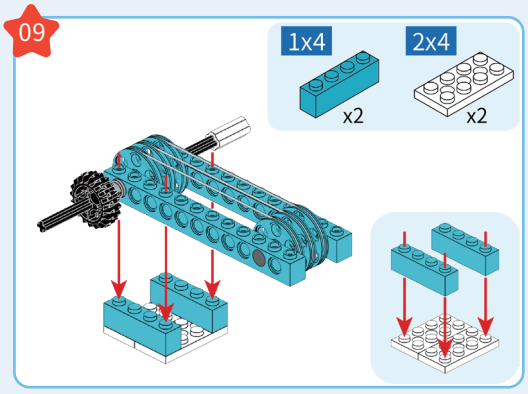


Long-distance transmission



belt slipping, protects the machinery

Belt transmission can achieve long-distance transmission. In belt transmission, when an external force is suddenly applied, the load is too high, or there is a sudden change in speed, the belt will slip, thus protecting the machinery and preventing damage to the parts.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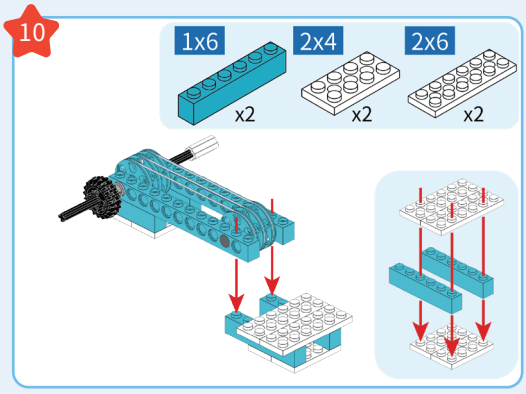
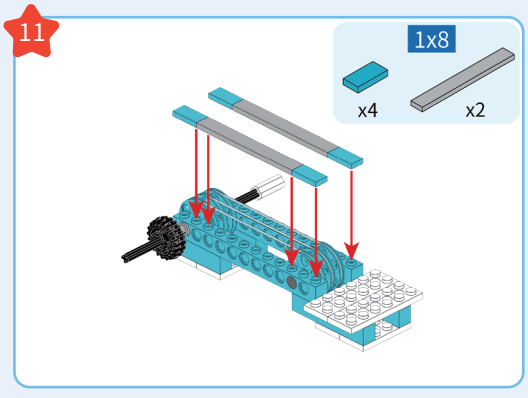
x2
2x4
x2


10
1x6
x2
2x4
x2
2x6
x2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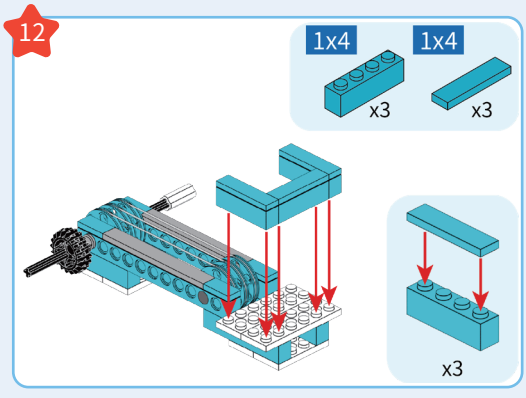
x4
x2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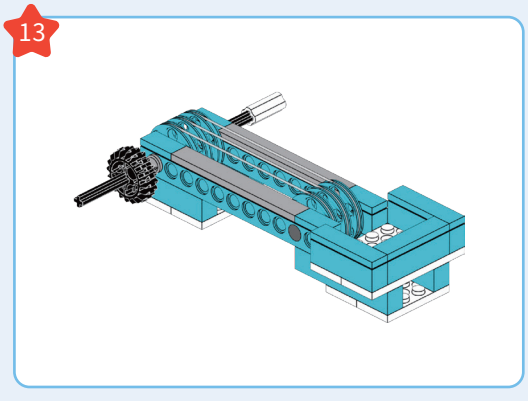
x3
1x4
x3
x3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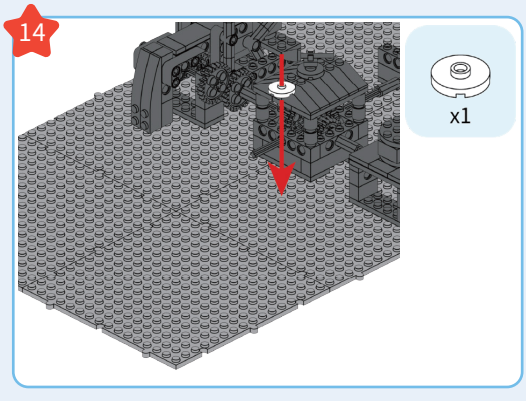
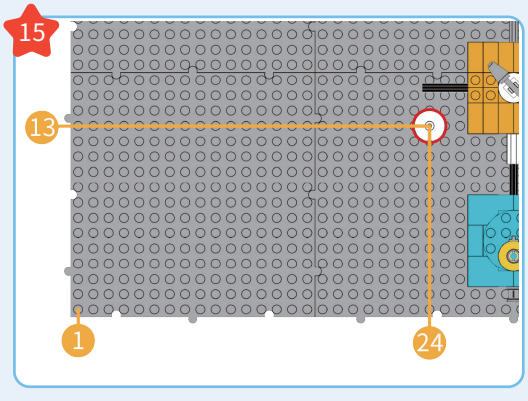

14
x1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13
1
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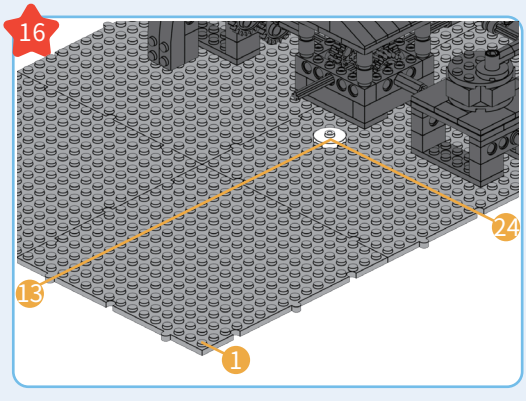
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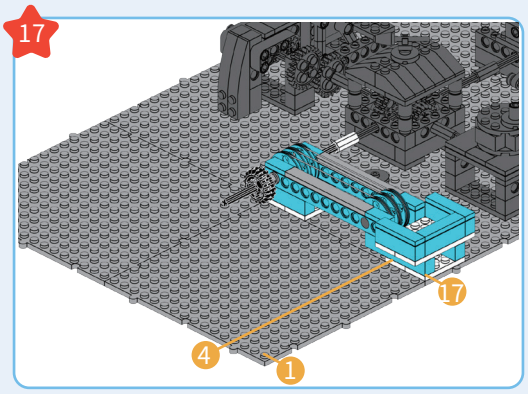
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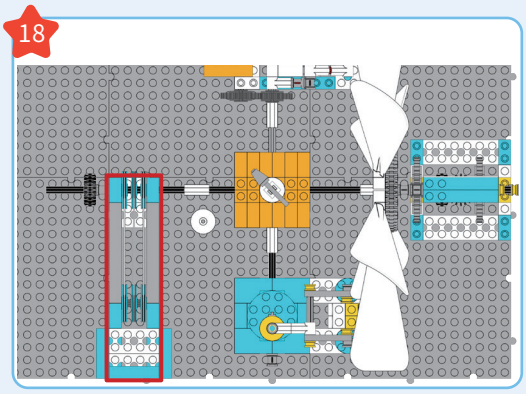
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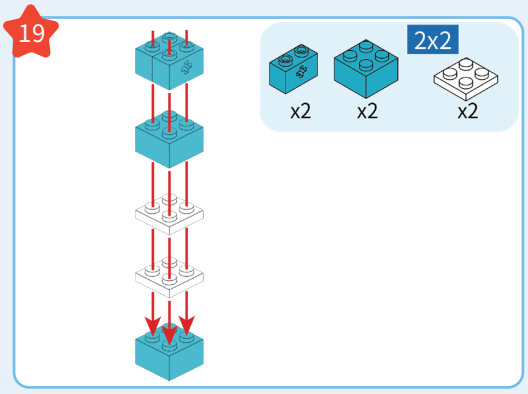
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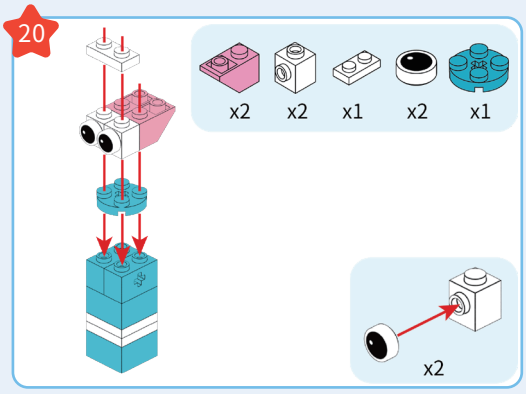
x2
x2
x2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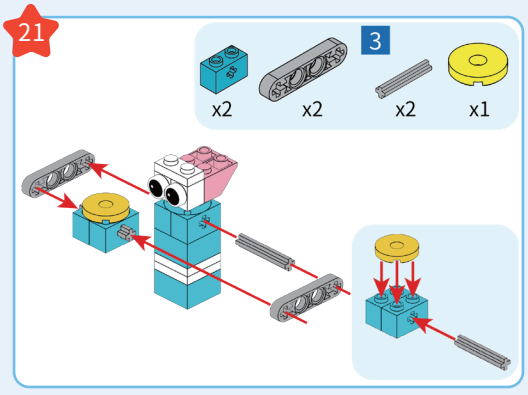
x2
x2
x1
x2
x1
x2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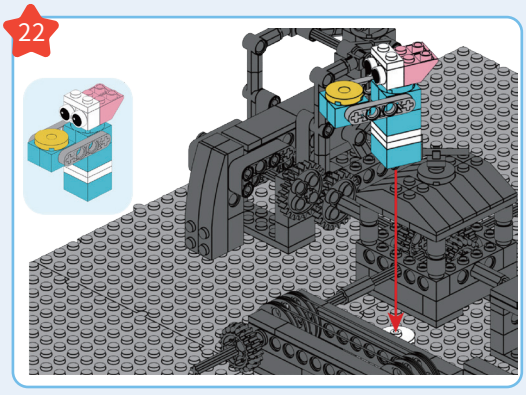
3
x2
x2
x2
x1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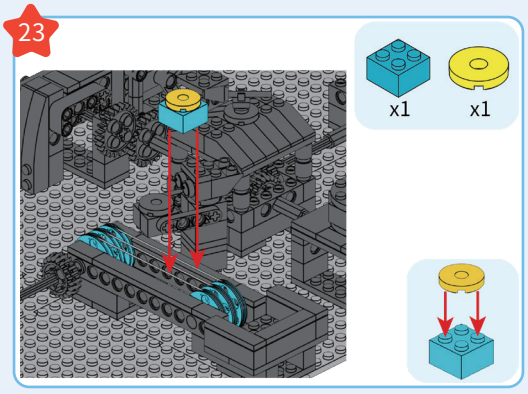
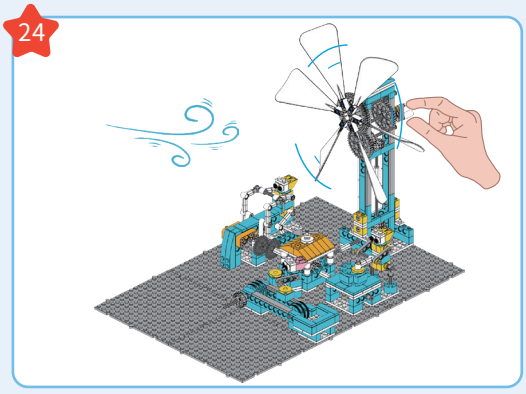
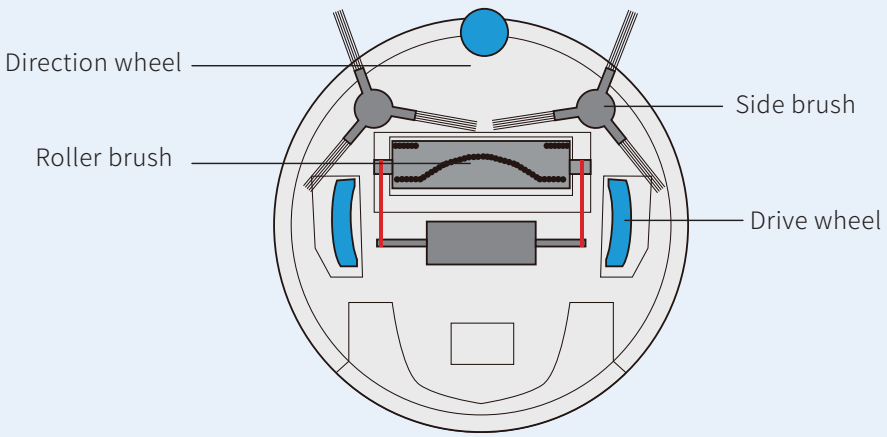

23
x1
x1


24

Knowledge

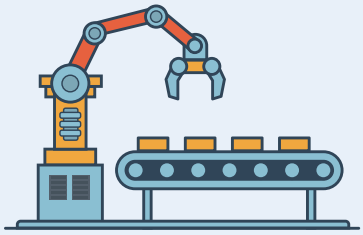
Some robotic cleaning devices also use belt transmission to drive the rotation of brushes or vacuuming devices. The brushes can rotate, helping to sweep dust, dirt, and hair from the floor.



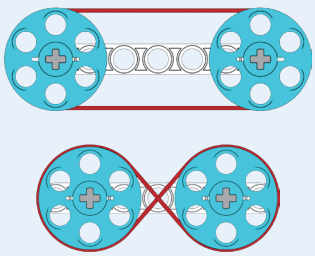
In these devices, an electric motor transfers power to the brushes or vacuuming device through belt transmission.

Share

Kids, review and share the knowledge about the mechanism principles of the conveyor belt with your parents.



Learned about conveyor belts



Learned about the methods of belt transmission

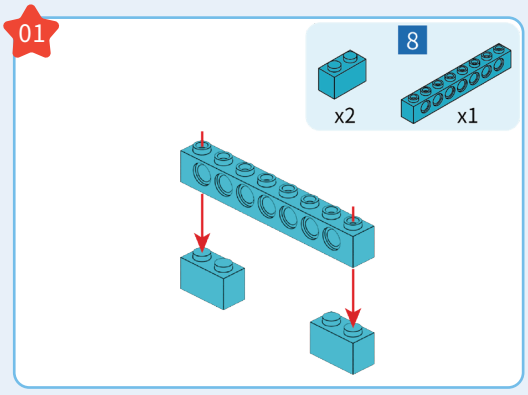
7. Swing

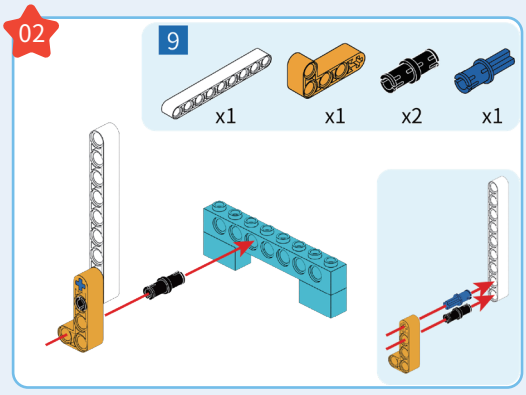
Thinking

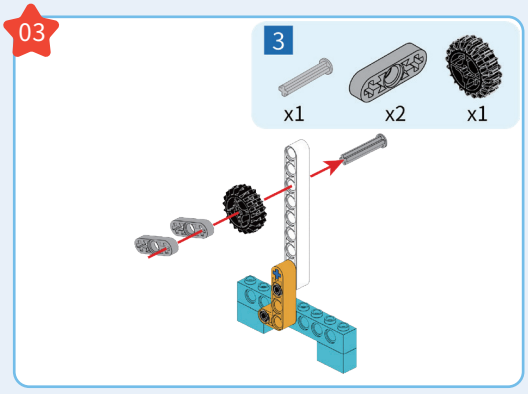
1. How can you swing higher on a swing?
2. How can you make the swing move within a defined range?

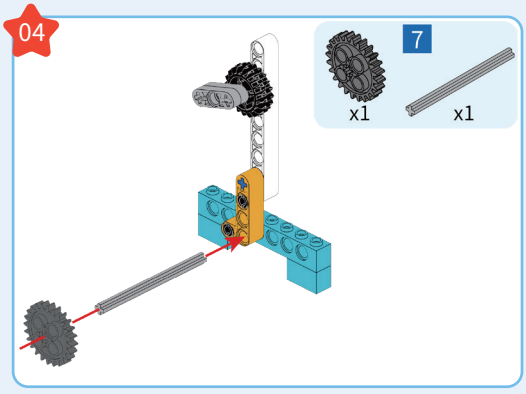
Build:

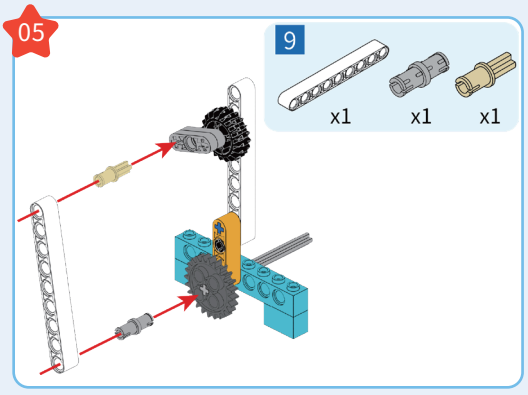
Hey guys, please follow the steps to build the swing with your fastest speed.
You will find something interesting and useful!

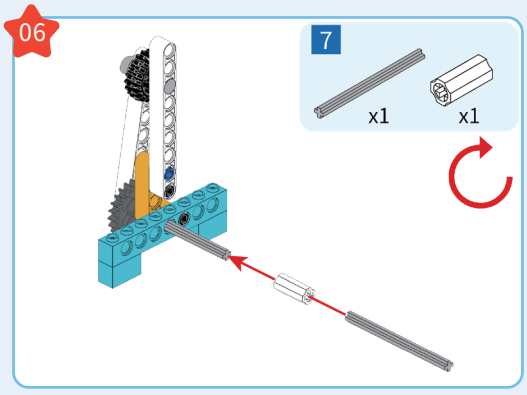






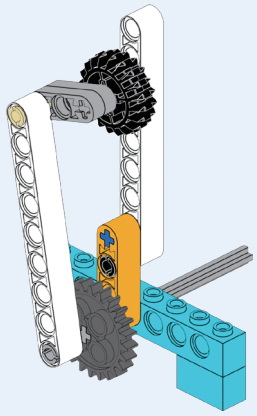




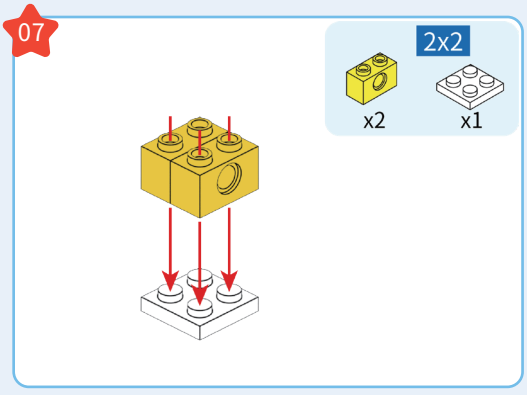


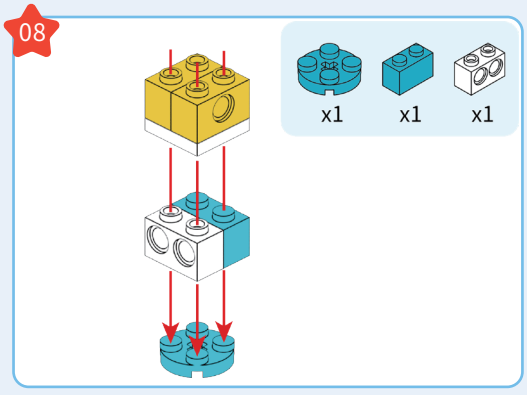
Crank-rocker Mechanism

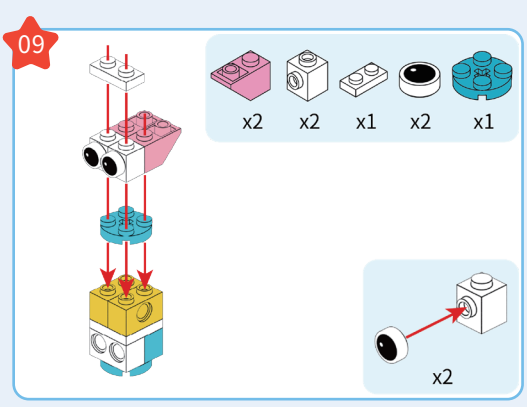
The swing uses a crank-rocker mechanism to move within a defined range.

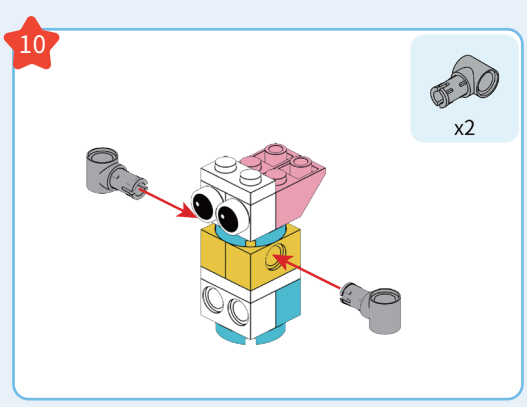


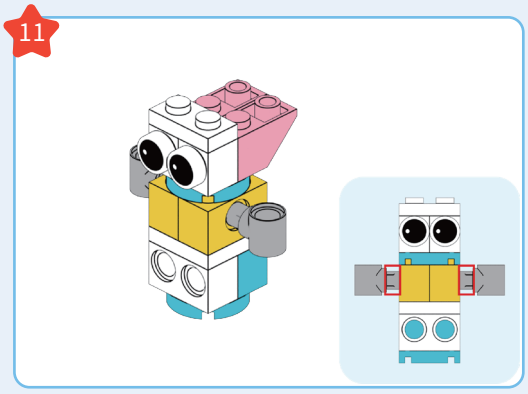
The shaft drives the connecting rod, causing the crank to move back and forth, so the person sitting on it won't be thrown off.

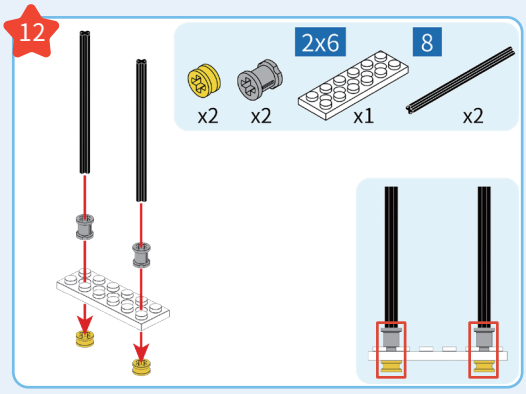











2x6
8
x2
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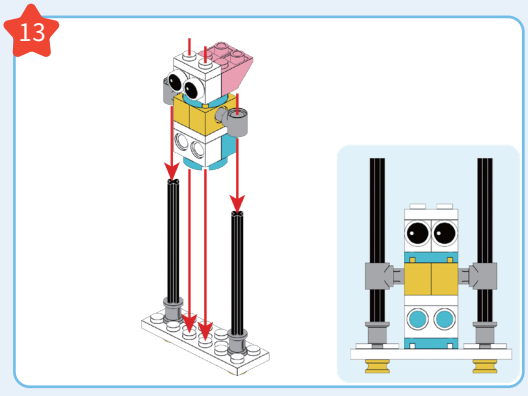

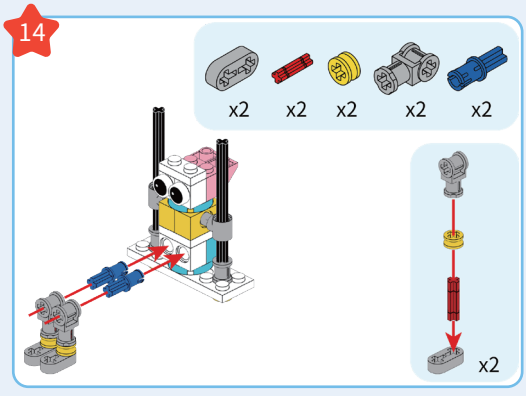
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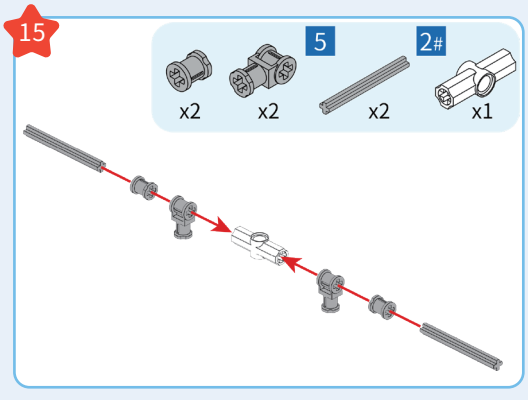
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2#
x2
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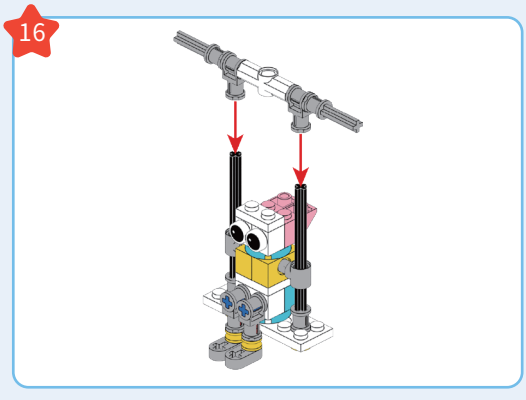
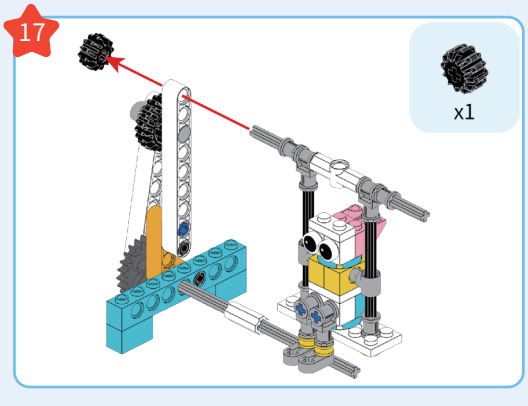
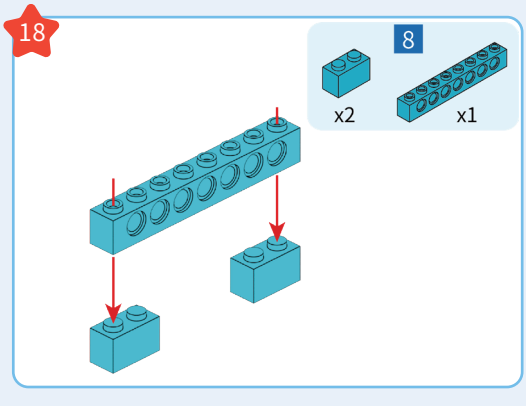
x1




x1


8
x2
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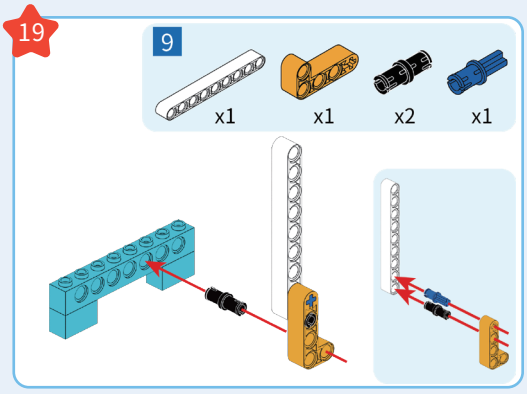
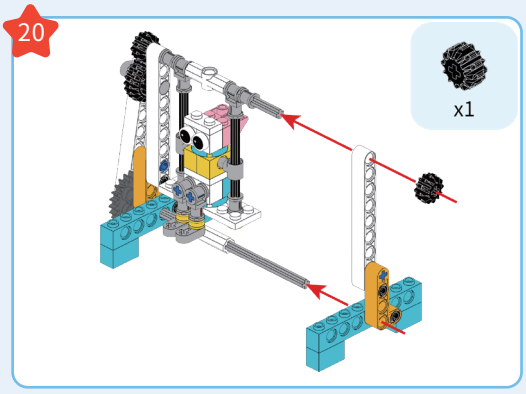
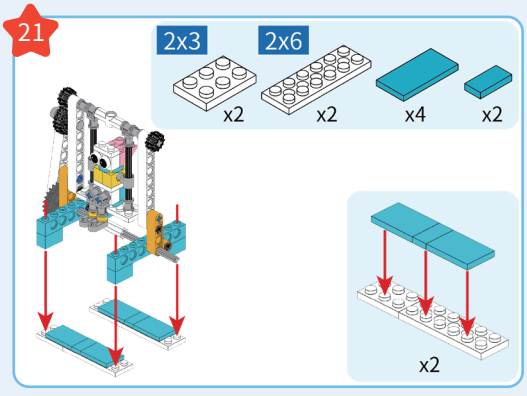
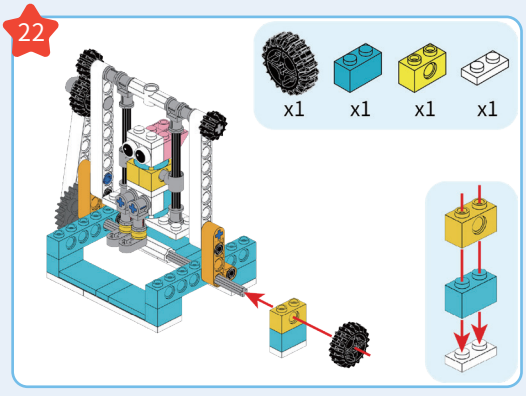






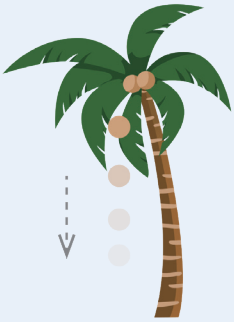


Knowledge

Kinetic Energy

The energy possessed by an object due to its motion is called kinetic energy.

For objects with the same mass, the greater the speed of motion, the greater the kinetic energy. For objects with the same speed, the greater the mass, the greater the kinetic energy.



The greater the object's mass and the higher its position, the greater its gravitational potential energy.

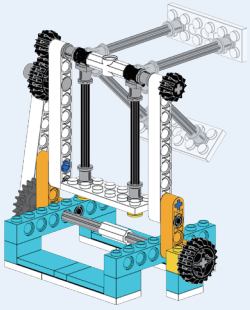
Potential Energy

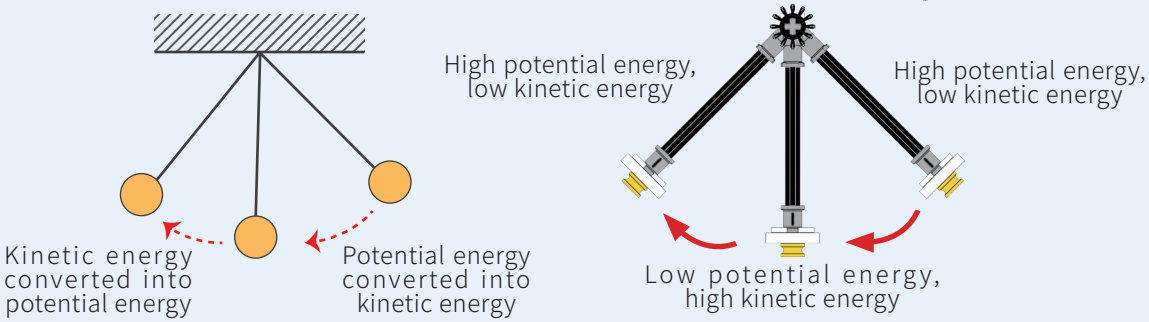
The energy possessed by an object due to its height is called gravitational potential energy.

Knowledge

Energy Conversion

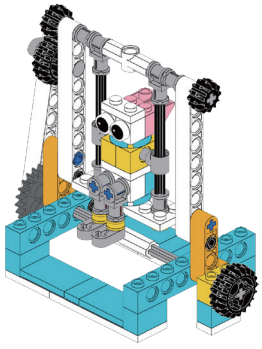
Energy can be converted from one form to another. When the swing seat is lifted, its gravitational potential energy increases. After releasing it, the seat swings downward because the gravitational potential energy is converted into kinetic energy.





During the swinging process, the seat's gravitational potential energy and kinetic energy are converted into each other. At the lowest point, the speed is at its maximum, and kinetic energy is at its highest. The seat will not stop immediately at the lowest point; driven by kinetic energy, it will swing upward.

23



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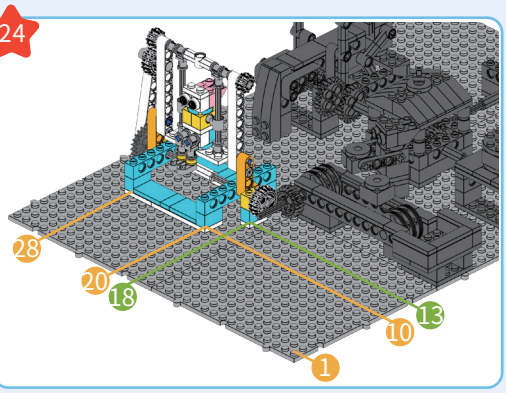

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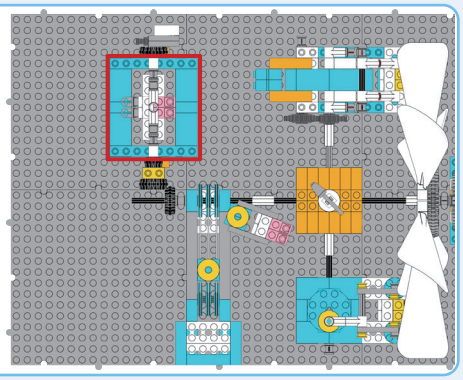

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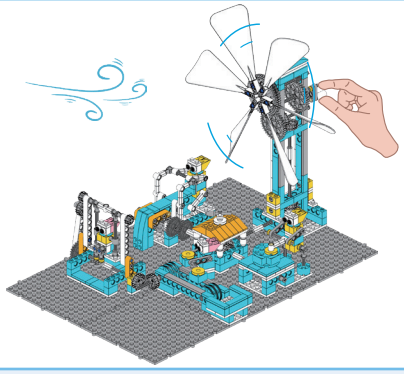


Turn the handle and get the machine moving!

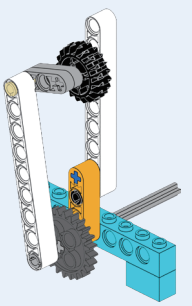
Knowledge

In a waterfall, the water flows vertically downward from a higher point, and due to gravity, the water possesses gravitational potential energy. As the water falls, the potential energy is converted into kinetic energy, which is ultimately transformed into the dynamic energy of the flowing water and the splashing water droplets.

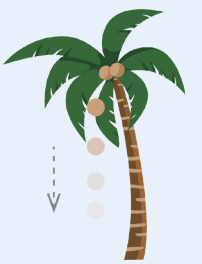
The waterfall refers to the water having high potential energy, not kinetic energy. The scene of the waterfall demonstrates the process of potential energy being converted into kinetic energy, creating a spectacular natural landscape.

Share

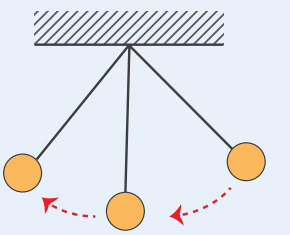
Kids, review and share the knowledge about the mechanism principles of the swing with your parents.



Reviewed the crank-rocker mechanism



Learned about kinetic energy and potential energy

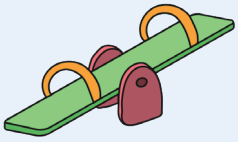


Studied energy conversion

8. Seesaw

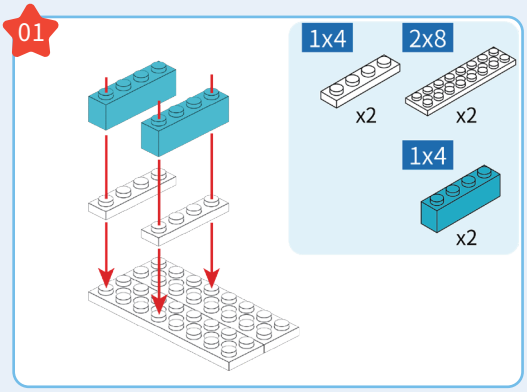
Thinking

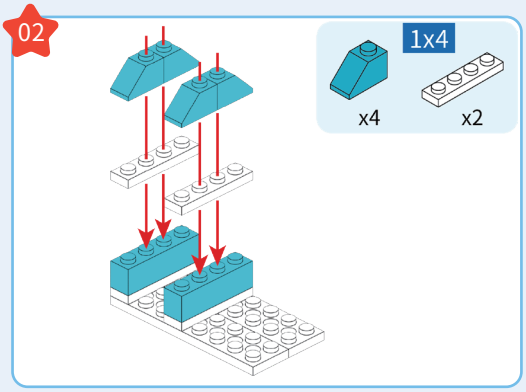
1. What type of lever is a seesaw?
2. How can balance be maintained on a seesaw?

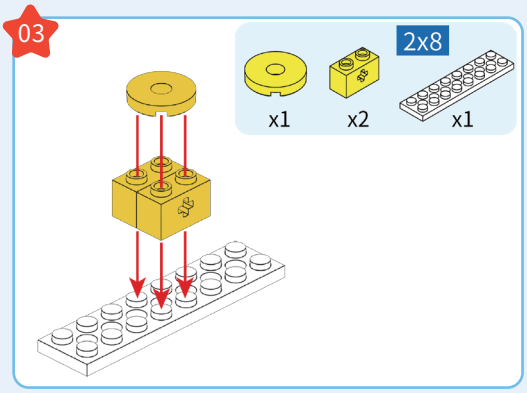


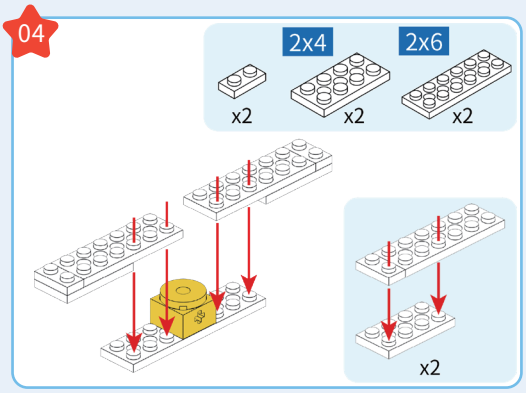
Build:

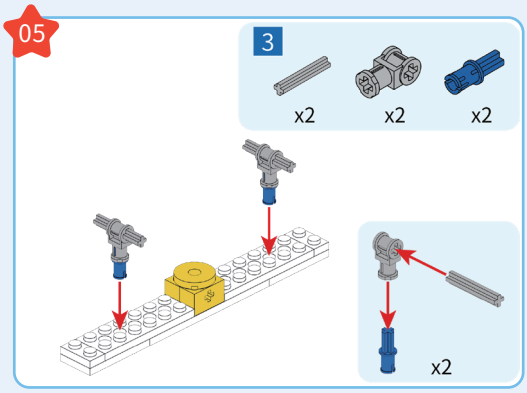
Hey guys, please follow the steps to build the seesaw with your fastest speed.
You will find something interesting and useful!

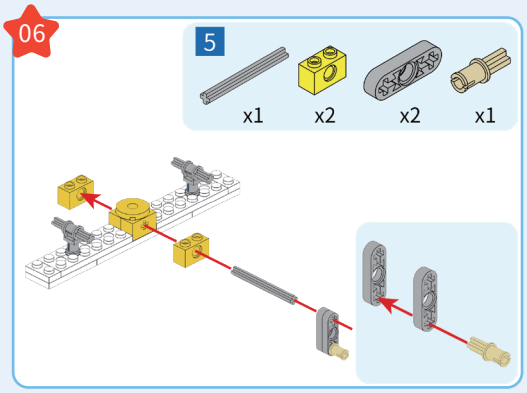












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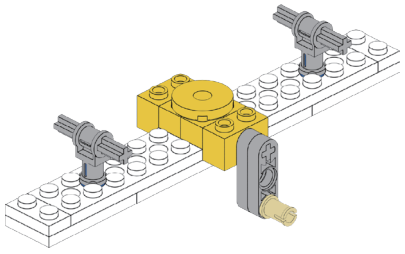

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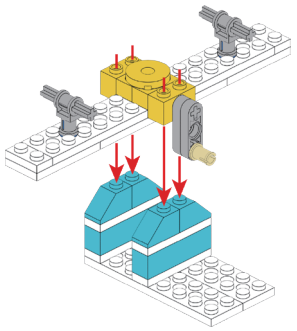

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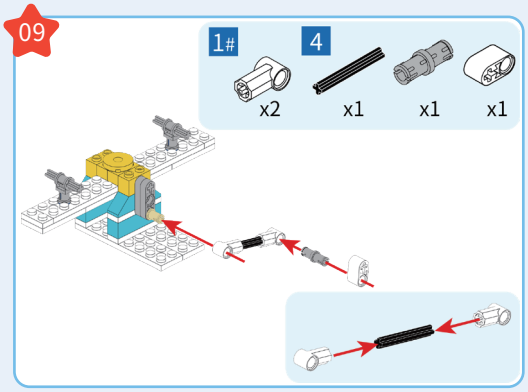

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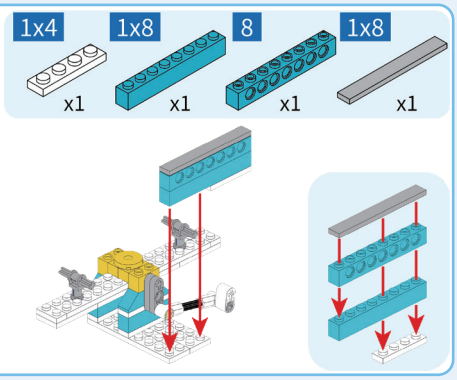

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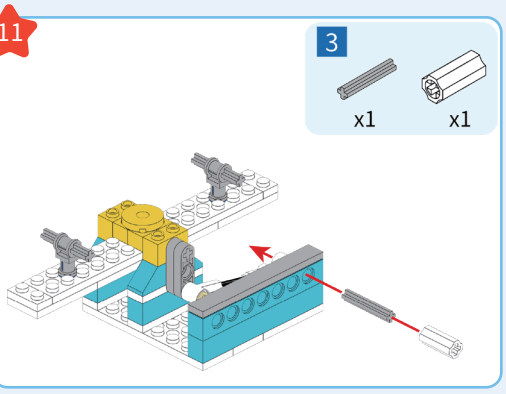

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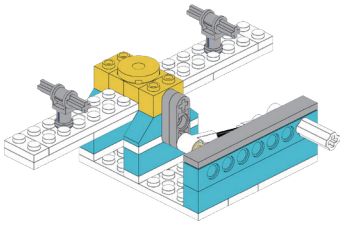

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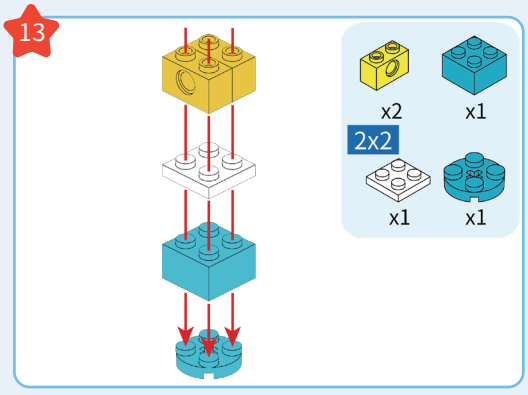

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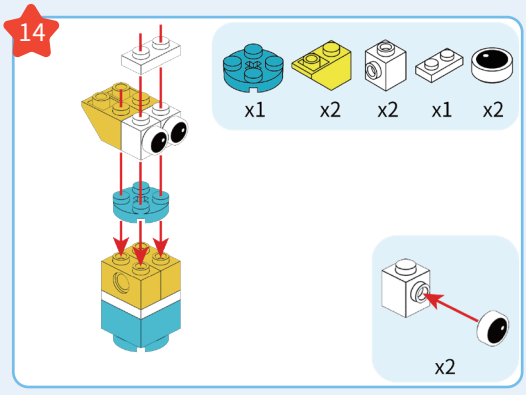
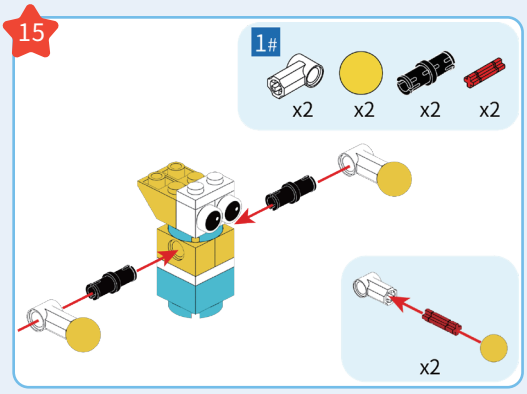
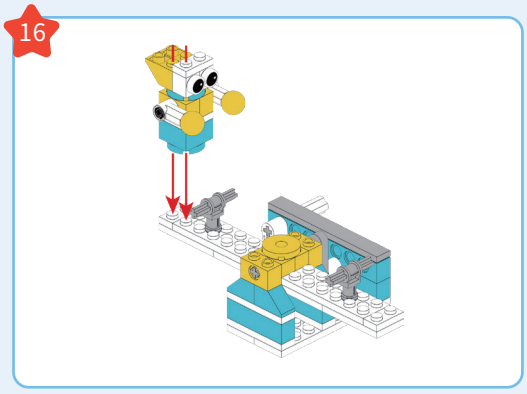
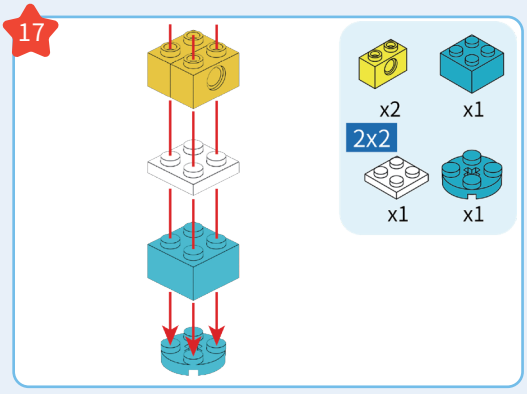
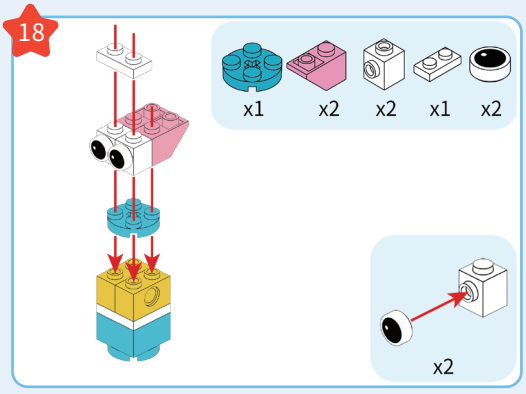
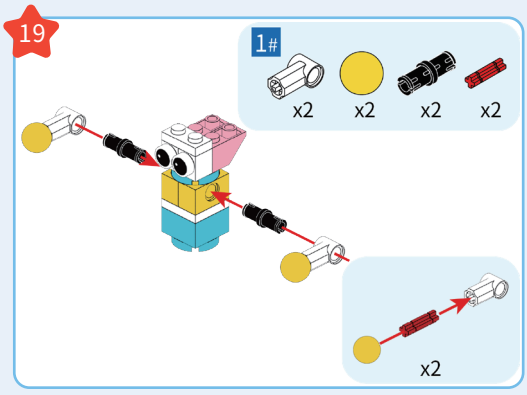


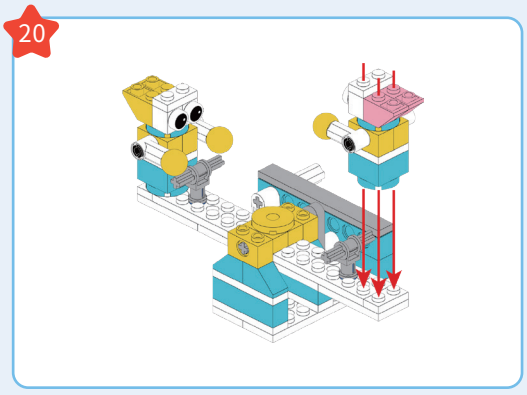








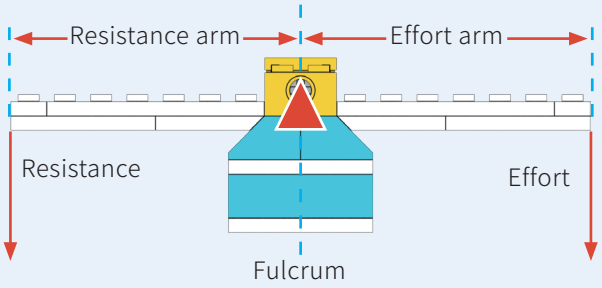




Knowledge

Five Elements of a Lever

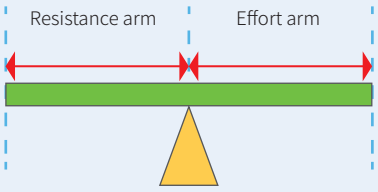
A seesaw is a lever that possesses the five elements of a lever.



Knowledge

Equal-arm Lever

A lever where the lengths of the effort arm and the resistance arm are equal is called an equal-arm lever. Common examples of equal-arm levers include balance scales and seesaws.



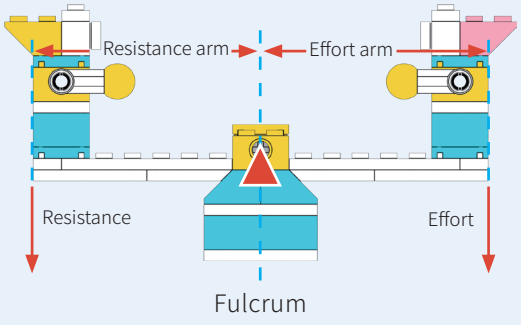
Resistance arm length = Effort arm length

Characteristics of an equal-arm lever: it neither provides mechanical advantage nor requires extra effort.

Knowledge

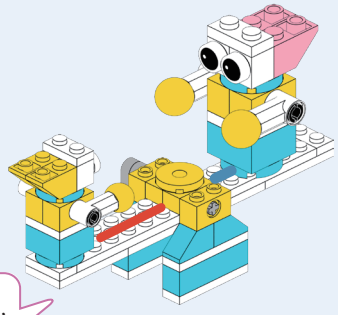
Balance of a Seesaw

When the lengths of the effort arm and the resistance arm are equal, and the same mass is placed on both sides, the seesaw will remain balanced.



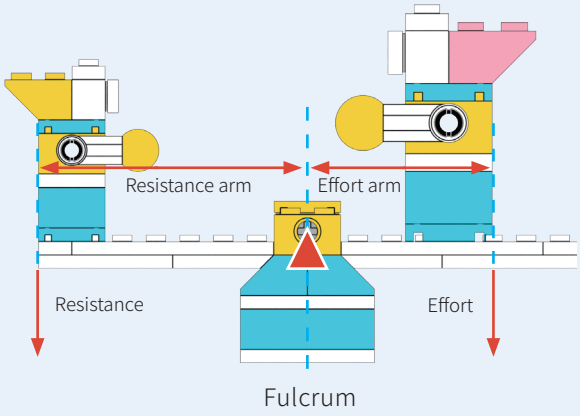
Balance of a Seesaw

To balance two objects of different masses on a seesaw, you can adjust the position of the objects to modify the lengths of the effort arm and resistance arm. Increase the length of the arm for the lighter object and decrease the corresponding arm length for the heavier object. Keep adjusting until balance is achieved.



I weigh 10 kg, and yet the smaller person on the other side can still balance the seesaw!

Although I'm a smaller person, only weighing 5 kg, I can match the bigger person on the other side by increasing my effort arm length.



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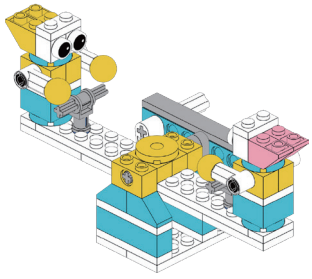

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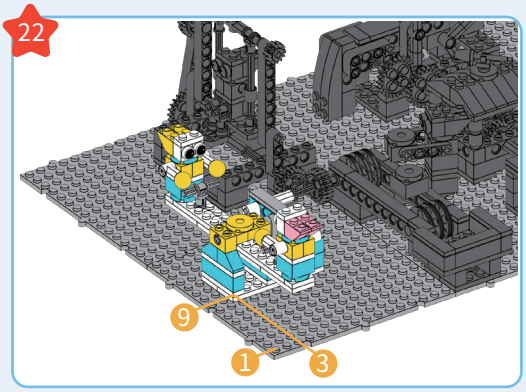
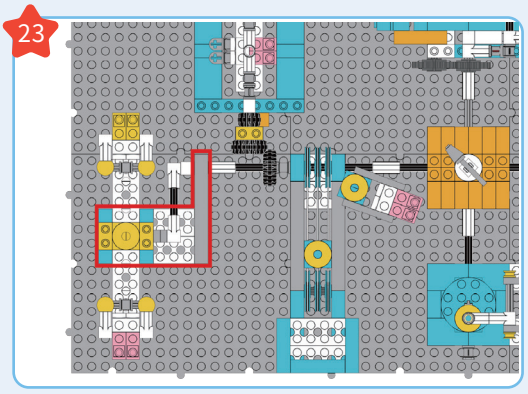
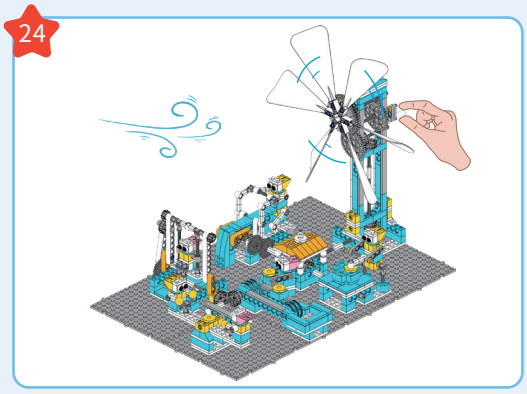
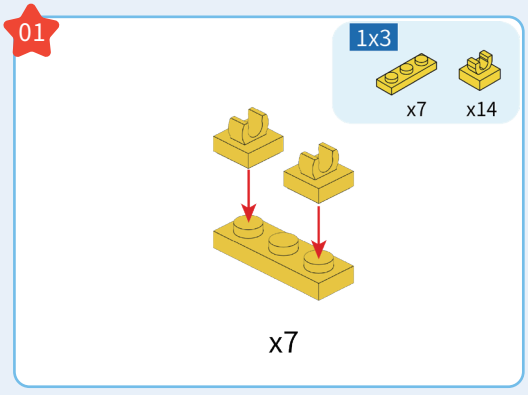


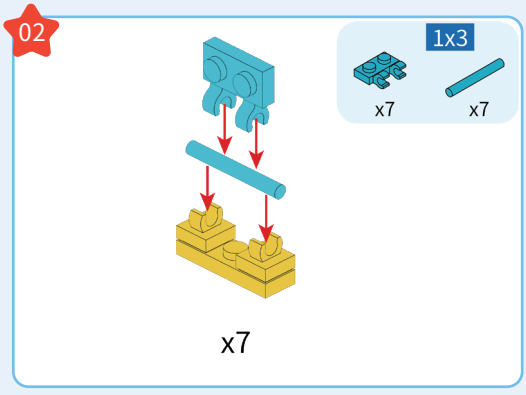


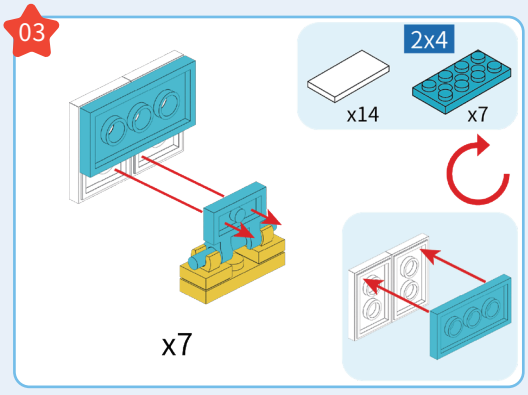


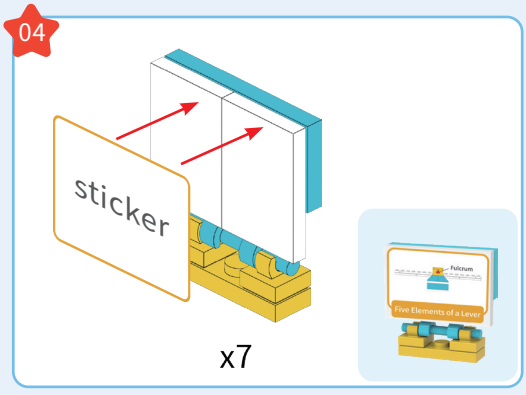
Adding the motor to keep the farm running continuously!

Kids, you need to place a **principle board** in front of each machine on the farm to fully showcase the function and features of each machine for future maintenance and repair needs.



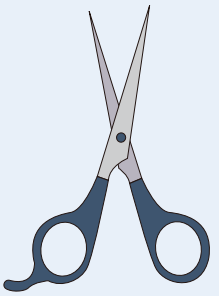




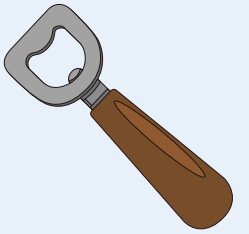


We have already applied the mechanical principle stickers!

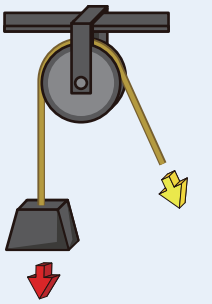
Knowledge



Scissors



Bottle opener

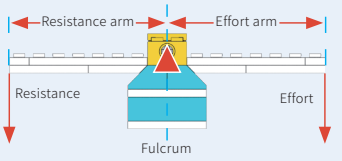


Fixed pulley

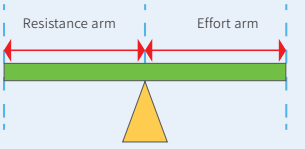
Scissors are also a common example of an equal-arm lever tool. The two blades of the scissors are equal-length arms. When we apply force to close one side of the handle, the other blade easily cuts through the object using the principle of leverage.

Share

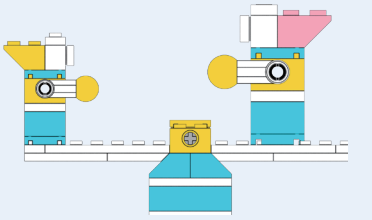
Kids, review and share the knowledge about the mechanism principles of the seesaw with your parents.



Learned the five elements of a lever



Mastered the use of equal-arm levers



Mastered the secret to balancing a seesaw

Find more ideas here.

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