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What's a circuit

How does the electric charge move
Let's learn about how the circuit works

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CONTENTS目录

Preface

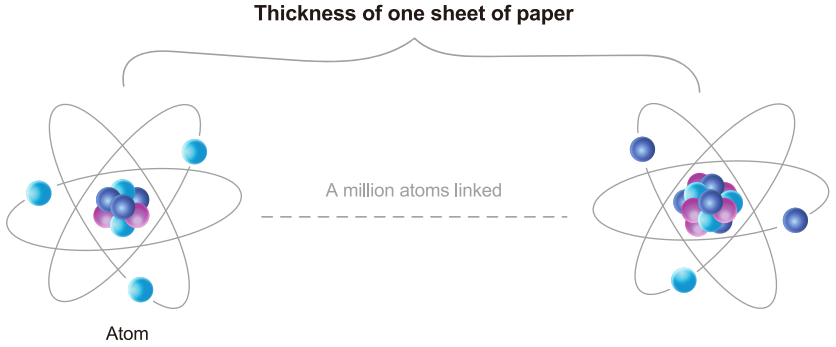
On a summer evening, rumbling sound was suddenly heard with dark clouds rolling outside the window; a jagged lightning bolt flashed across the dark sky. In less than a second, it vanished, followed by the roar of thunder.

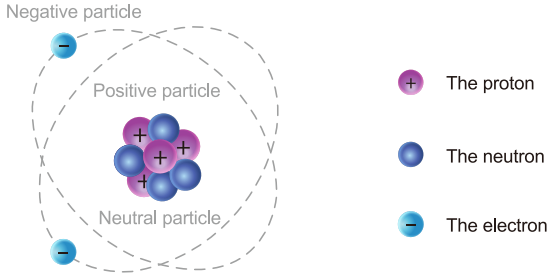
How is the zigzag lightning generated? Why is there such a magical yet dangerous thing of lightning?

Particles carrying electricity-Charges

What causes thunderclouds to produce lightning? Why are there sparks when you take off your sweater in winter?

To be aware of what happens, we have to start from the tiny atoms of matters that compose every thing.





These particles carrying electricity can be called electric charges. When there are same amounts of positively charged particles and negatively charged particles in one object, the object is neutral; otherwise, the static electricity can be generated.

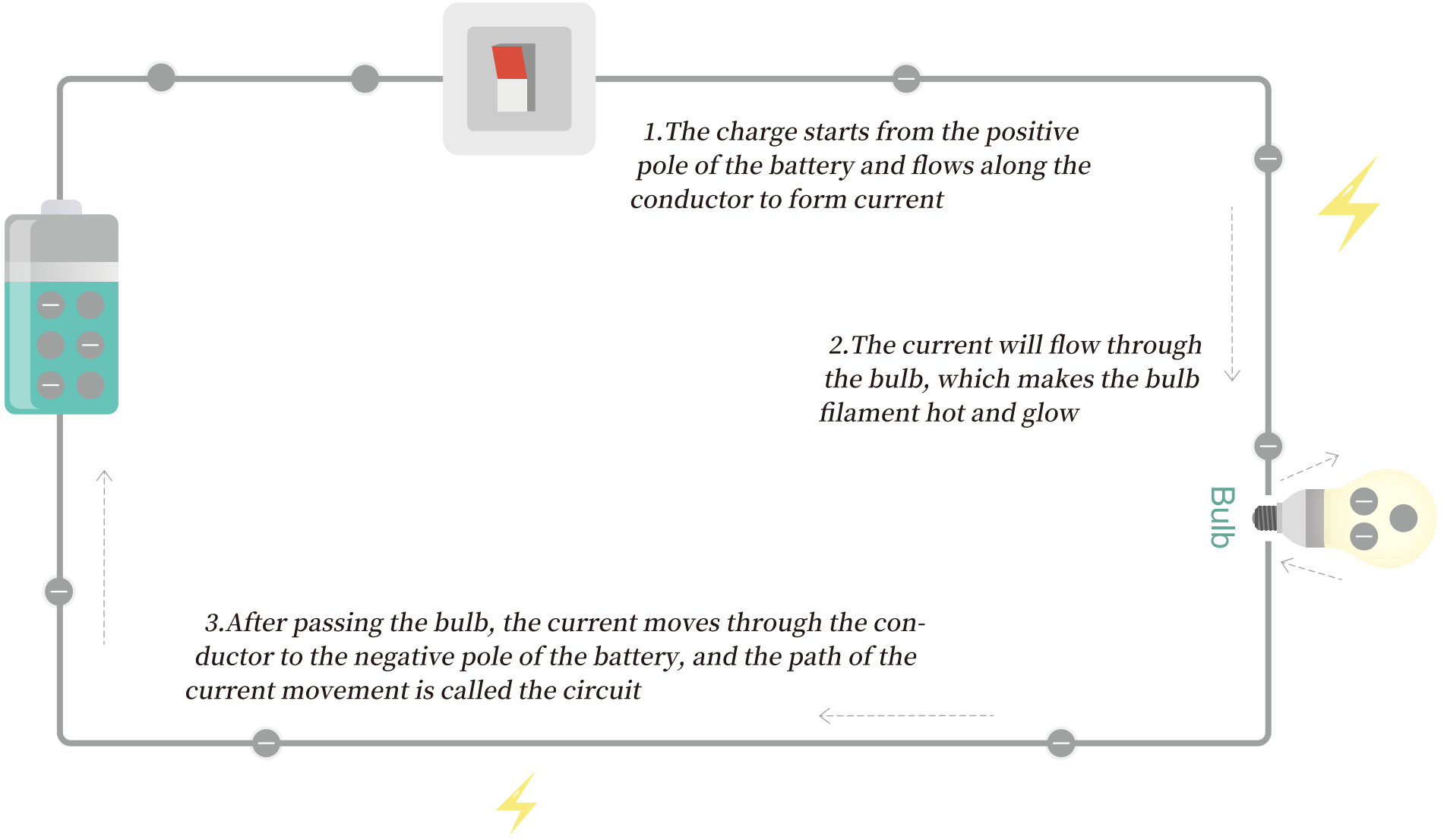
Moving charges-Current

The electric charges can transfer among nearby objects, which are always in motion. When the charges move from one spot to another, the charges in the directional motion can be referred to as current.

Lightning is one form of electric charges in motion. As the uncontrolled electric current, lightning can spread in any direction.

The current out of control is quite dangerous, so the current we see in daily life is mostly controllable current (safe current).

Let us get the hang of how the charges move in the circuit model below.



In different types of materials, the charges move at different speeds. In some materials, they move fast. We call such materials conductors. While in other materials, the charges cannot move freely. We call such materials insulators. We generally wrap the insulators around the conductors to ensure the safety of the circuit.

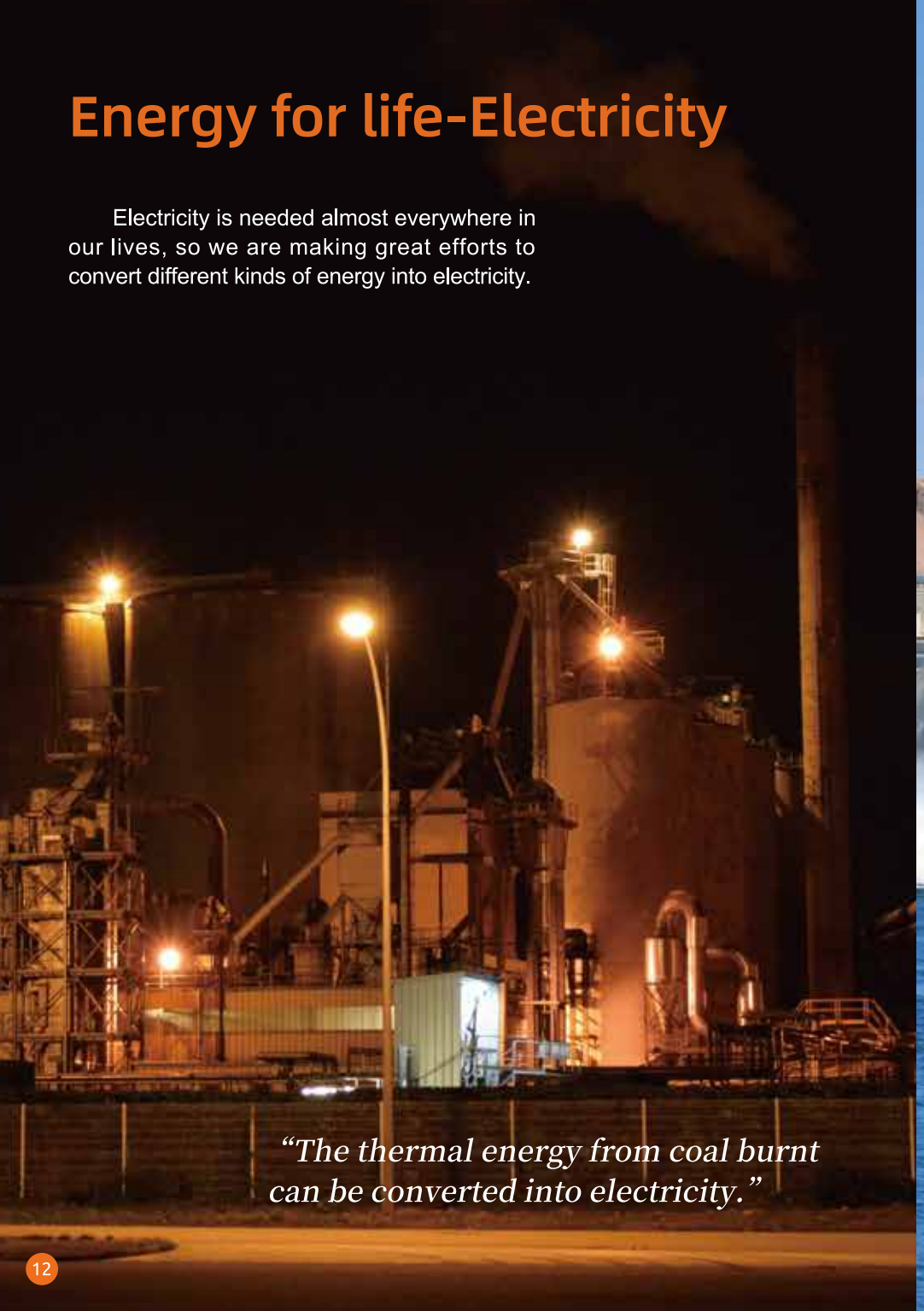
Common conductors and insulators in everyday life

Conductor

Insulator

Energy for life-Electricity

Electricity is needed almost everywhere in our lives, so we are making great efforts to convert different kinds of energy into electricity.



"The thermal energy from coal burnt can be converted into electricity."

"The kinetic energy of the flowing water can be converted into electricity. "

"The solar energy can be used to generate electricity."

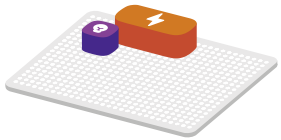
"The kinetic energy of wind can be converted into electricity. "

Think

1. What happens when the electricity is led to our house?

2. What would happen to our live without electricity?

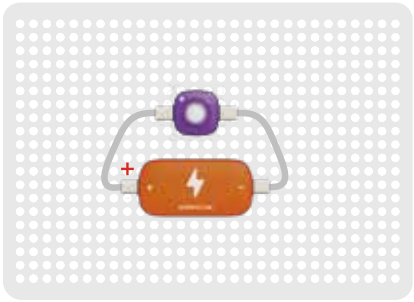
01-Learn about the simple circuits



Let the current flow through a simple circuit to light up the bulb

Tips: Is the bulb on? If it's on, which means that you have finished the first circuit.
If not, then you should check whether the conductor is connected correctly, and make sure that the battery is connected properly.

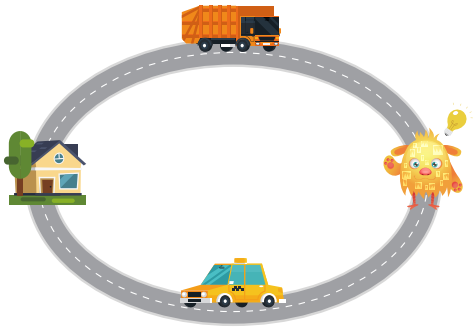
Wiring up



1. Insert one end of the conductor into the port on the positive pole of the power supply
2. Plug the other end of the conductor into the port on either side of the bulb
3. Insert one end of the other conductor into the port on the negative pole of the power supply
4. Plug the other end of the conductor into the port on the other side of the bulb

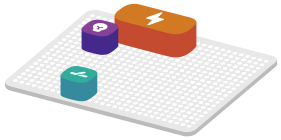
Why it happens?

The current flows through the power supply, conductors and bulbs, which then returns to the power supply through the conductors, forming a complete circuit. When the current flows, the bulb will be lit up due to electrical energy.



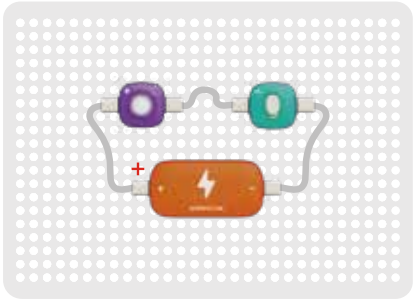
The power supply is like a house full of food, and the bulb is like a little monster. The little monster is so hungry that he needs a lot of food. While the conductor is like a small truck, constantly transporting food to the little monster, who will glow happily after eating food.

02-Learn about the switch



Watch how the switch controls the circuit

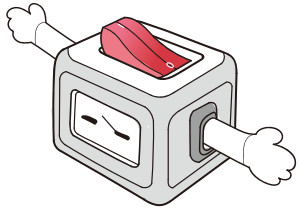
Wiring up



1. Connect the positive pole of the power supply to the bulb
2. With another conductor, link the bulb to the switch
3. With the third conductor, connect the switch with the negative pole of the power supply

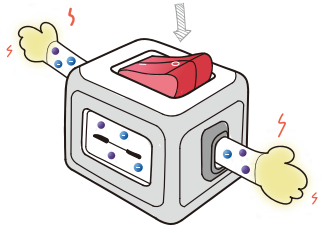
Operation

Turn on the switch. What will happen to the bulb?

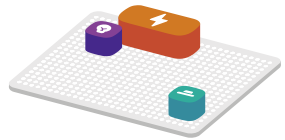


Why it happens?

There is a piece of metal inside the switch. Once the switch is turned on, the metal touches both conductors inside the switch. It is like a bridge to help the current flow to the bulb, making the circuit complete. Once the switch is turned off, the metal gets away from the conductors, and the current cannot flow through.

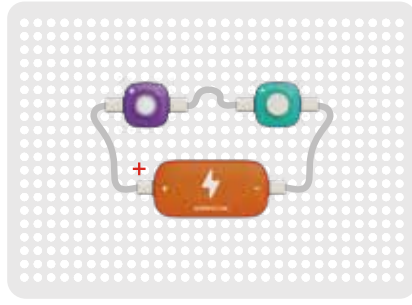


03-Learn about the power key



Watch how the power key controls the circuit

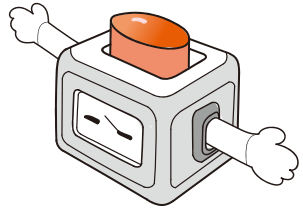
Wiring up



1. Connect the positive pole of the power supply with the bulb
2. With another conductor, connect the bulb with the power key
3. With the third conductor, link the power key with the negative pole of the power supply

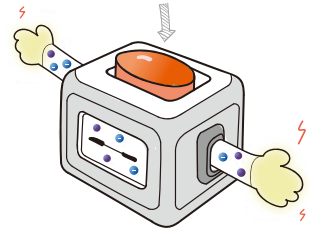
Operation

Turn on power key. What occurs to the bulb?

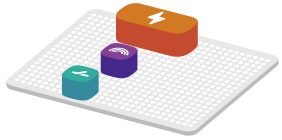


Why it happens?

The power key works in the same way as a switch. When the power key is pressed, the metal on the power key touches the conductors and makes the circuit complete. When the power key is released, the metal detaches from the conductors, disabling the current to flow through.



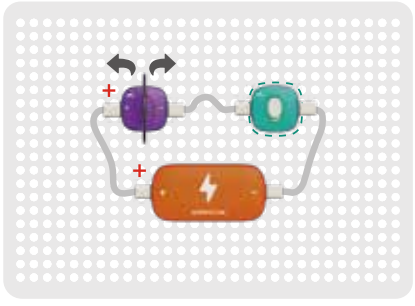
04~05-Learn about the LED light (Color lamp)



Try to exchange both ends of the color lamps to see if the color lamps can be lit up

Tips: The conductors can conduct electricity in both directions, but some electrical elements can only allow the current to flow in one direction, so they may sometimes cause danger when they were connected reversely. In the circuit below, we have to know the positive pole and the negative pole of the power supply.

Wiring up



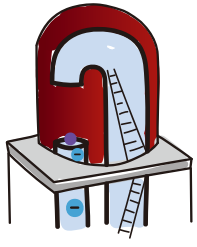
1. Connect the positive pole of the power supply to the positive pole of the color lamp
2. With another conductor, link the negative pole of the color lamp to the switch
3. With the third conductor, connect the switch with the negative pole of the power supply

Operation

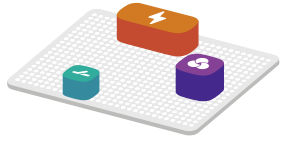
1.Turn on the switch. Is the color lamp on?
2. Swap the positive pole and the negative pole of the color lamp. Is the color lamp on?
3. Replace the switch. Try to control the color lamp with a power key. Is there any change in the color lamp?(Experiment 5)

Why it happens?

The color lamp is a diode, which only allows current to flow from its positive pole to its negative pole. When the current flows through the color lamp, it will emit light; otherwise, the color lamp will not be lit up.

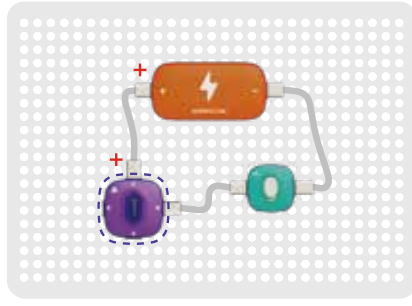


06~08-Learn about the RGB lamp



Turn on the red light, green light and blue light

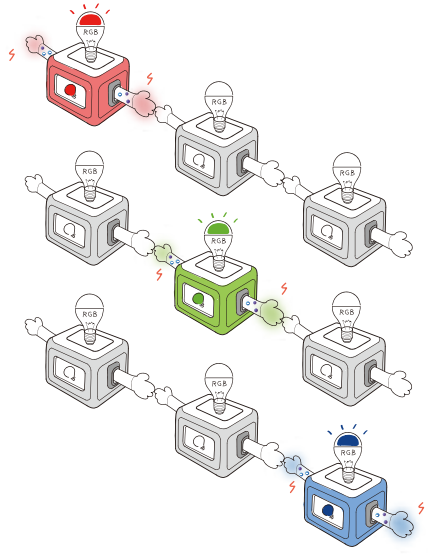
Wiring up



1. Connect the positive pole of the power supply to the positive pole of the RGB lamp
2. With another conductor, link the R port of the RGB lamp to the switch
3. With the third conductor, connect the switch with the negative pole of the power supply

Operation

1.Turn on the switch. Which color light of the RGB lamp will be on?
2. Disconnect the conductor from the R port of the RGB lamp, and insert it into the B port or G port. Which color light of the RGB lamp will be on? (Experiment 7 & 8)



Why it happens?

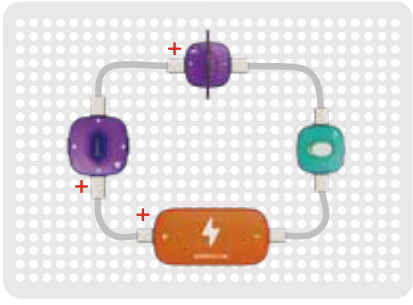
The RGB lamp is a combination of three LEDs in different colors; each port represents one color:

R: Red G: Green B: Blue

09-Learn about the series circuit

Connect the RGB lamp and the color lamps in one circuit

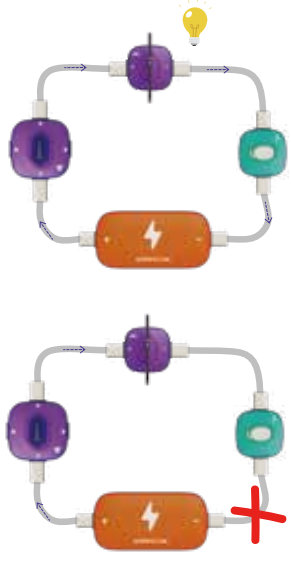
Wiring up



1. Connect the positive pole of the power supply to the positive pole of the RGB lamp
2. With another conductor, link the G port of the RGB lamp to the positive pole of the color lamp
3. With the third conductor, connect the negative pole of the color lamp with the switch
4. With the fourth conductor, link the switch to the negative pole of the power supply

Operation

Turn on the switch. What happens to the circuit?



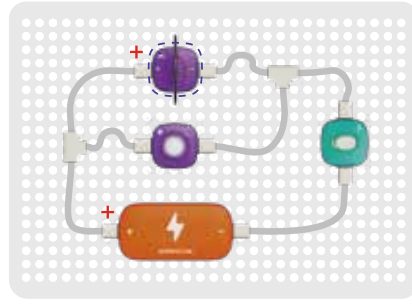
Why it happens?

When two electrical elements are connected in one circuit, like the candied haw on one skewer, the circuit is called the series circuit.
Such kind of circuit can be controlled with one switch, but the electrical elements work dependent on each other. In case of any disconnection in the circuit, the entire circuit will not work.
Moreover, when two electrical elements are connected in series, the voltage of the power supply will be split, and the power of the electrical element will be reduced.

10~11-Learn about the parallel circuit

Connect two electrical elements in a parallel circuit

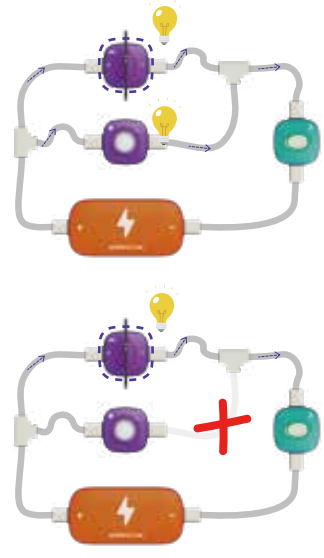
Wiring up



1. With the T-shaped conductor, connect the positive pole of the power supply to the positive pole of the color lamp and the bulb
2. With another T-shaped conductor, hook the negative pole of the color lamp and the bulb to the switch
3. Connect the switch to the negative pole of the power supply with the third conductor

Operation

1.Turn on the switch. What occurs to the circuit?
2. Replace the color lamp with the RGB lamp, and press the switch; what happens to the circuit? (Experiment 11)



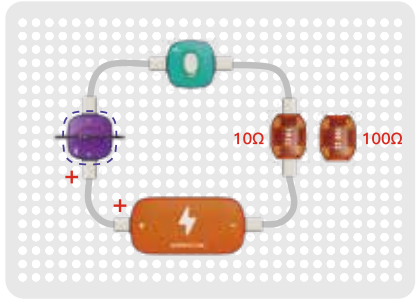
Why it happens?

When there are multiple paths in one circuit, and one electrical element is connected in each path, such type of circuit is called the parallel circuit.
The electrical elements in this circuit are independent of each other, causing no interference to each other. When one path is open and the other path can still work properly. When two electrical elements are connected in parallel, the voltage of the power supply will not be split and the power of the electrical elements will not be affected

12~13-Learn about the resistance

Connect one resistor in series in the circuit

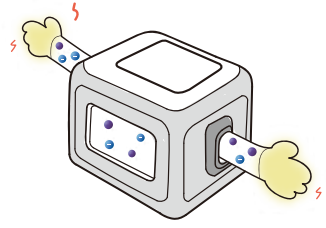
Wiring up



1. Connect the positive pole of the power supply to the positive pole of the color lamp
2. With another conductor, connect the negative pole of the color lamp to the switch
3. Link the switch to 10Ω resistor with the third conductor
4. Connect the 10Ω resistor to the negative pole of the power supply via the fourth conductor

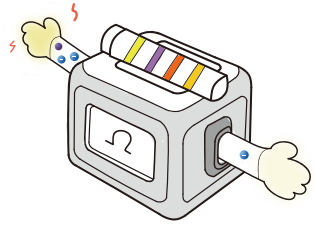
Operation

1. Turn on the switch. What occurs to the color lamp?
2. Replace it with the 100Ω resistor, and press the switch. What happens to the color lamp?
3. Replace the color lamp with the RGB lamp. Repeat the above actions. What occurs to the RGB lamp? (Experiment 13)



Why it happens?

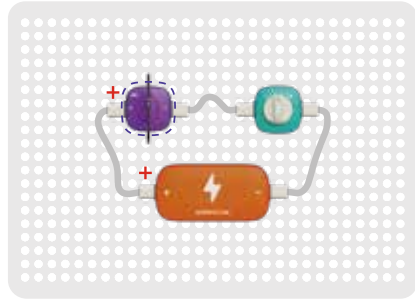
The resistor can hinder the flow of current. Increasing the resistor in the circuit will reduce the current flowing through the color lamp, and the color lamp will become less bright.Ω is the symbol of resistance. The larger the value of Ω, the greater the resistance to the current.



14~15-Learn about the knob

Observe how the knob controls the circuit

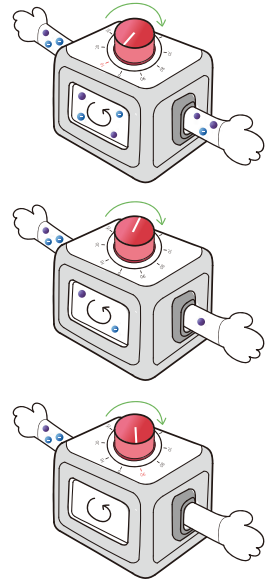
Wiring up



1. Connect the positive pole of the power supply to the positive pole of the color lamp
2. With another conductor, link the negative pole of the color lamp to the knob
3. Connect the knob with the negative pole of the power supply via the third conductor

Operation

1. Rotate the knob clockwise and counterclockwise. What occurs to the color lamp?
2. Replace the color lamp with a bulb, and rotate the knob clockwise and counterclockwise. What happens to the bulb? (Experiment 15)



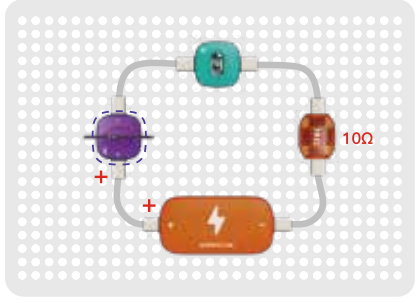
Why it happens?

The knob is an adjustable resistor, whose resistance can be changed when it is rotated clockwise and counterclockwise. The current in the circuit can be regulated accordingly.

16~17-Learn about the photoresistor

Watch how the photoresistor controls the circuit

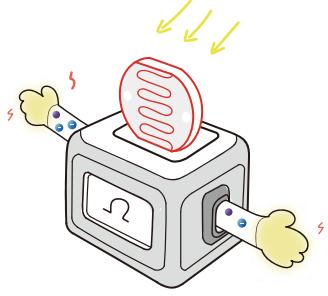
Wiring up

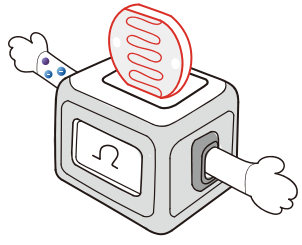


1. Connect the positive pole of the power supply to the positive pole of the color lamp
2. With another conductor, wire the negative pole of the color lamp to the photoresistor
3. Link the photoresistor to the 10Ω resistor via the third conductor
4. Connect the 10Ω resistor to the negative pole of the power supply with the fourth conductor

Operation

1. Turn on and off the flashlight on the mobile phone to illuminate the photoresistor. What occurs to the color lamp?
2. Replace the color lamp with a bulb. Turn on and off the flashlight on the mobile phone. What occurs to the color lamp? (Experiment 17)





Why it happens?

The photoresistor is a type of resistor made of photosensitive materials. As the light becomes stronger, the resistance of the photoresistor drops, so does its limitation on current. The weaker the light intensity, the greater the resistance to the current.

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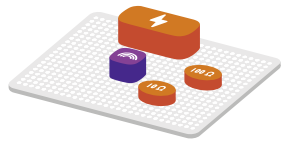
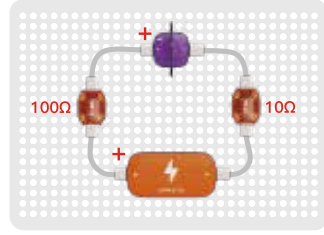
18~19-Learn about the Ohm's Law

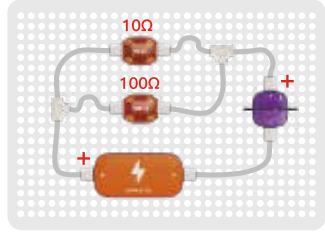


Control circuit with resistors in series and parallel

Wiring up



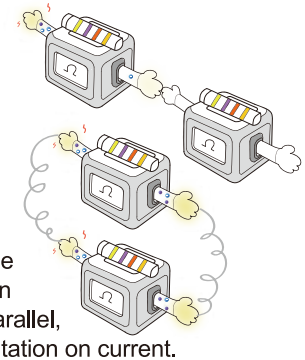
1. Connect the positive pole of the power supply to the 100Ω resistor 2. With another conductor, connect the 100Ω resistor to the positive pole of the color lamp
3. Link the negative pole of the color lamp to the 10Ω resistor via the third conductor
4. Connect the10Ω resistor to the negative pole of the power supply with the fourth conductor



1. With the T-shaped conductor, connect the positive pole of the power supply to the 10Ω resistor and the 100Ω resistor
2. With another T-shaped conductor, connect the 10Ω resistor and the 100Ω resistor to the positive pole of the color lamp
3. Connect the negative pole of the color lamp to the negative pole of the power supply with the third conductor

Operation

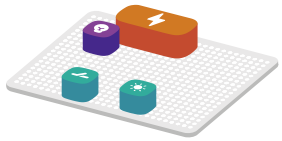
1.When the resistors are connected in series, what happens to the bulb? 2. What occurs to the bulb when the resistors are connected in parallel?



Why it happens?

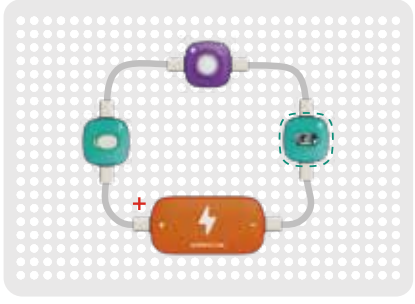
In one circuit, when two resistors are connected in series, the resistance in the circuit will be increased, so will the limitation on current. In one circuit, if two resistors are connected in parallel, the resistance in the circuit will be decreased, so will the limitation on current.

20~21-Learn about the AND circuit



Connect two switch modules in series

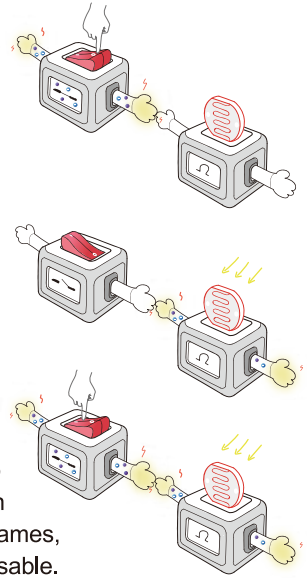
Wiring up



1. Connect the positive pole of the power supply to the switch
2. With another conductor, connect the switch to the bulb
3. Link the bulb to the photoresistor with the third conductor
4. Connect the photoresistor to the negative pole of the power supply via the fourth conductor

Operation

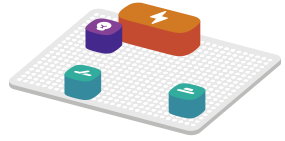
1. Turn on the switch. What happens to the bulb?
2. Turn off the switch and then illuminate the photoresistor. What occurs to the bulb?
3. Turn on the switch and illuminate the photoresistor at the same time. What occurs to the bulb?
4. Replace the photoresistor with a power key, and repeat the above steps. What happens to the bulb? (Experiment 21)



Why it happens?

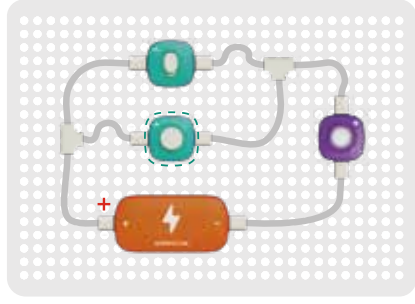
In the AND circuit, two switch modules are connected in series. Turn on the first switch and the current will stop at the second switch. Only by pressing the second switch can the current flow to light up the bulb. Like the chess games, you need to play with your friend, and neither is indispensable.

22~23-Learn about the OR circuit



Connect two switch modules in a parallel circuit

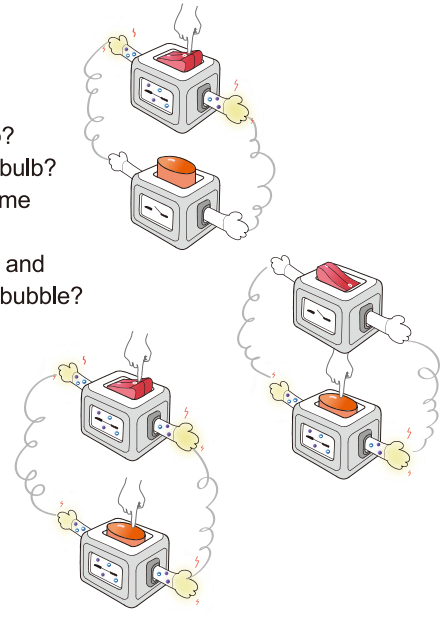
Wiring up



1. Connect the positive pole of the power supply to the positive pole of the RGB lamp
2. With another conductor, link the R port of the RGB lamp to the switch
3. With the third conductor, connect the switch with the negative pole of the power supply

Operation

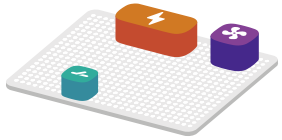
1. Turn on the switch. What occurs to the bulb?
2. Turn on the power key. What occurs to the bulb?
3. Turn on power key and the switch at the same time. What occurs to the bulb?
4. Replace the power key with a photoresistor and repeat the above steps. What happens to the bubble? (Experiment 23)



Why it happens?

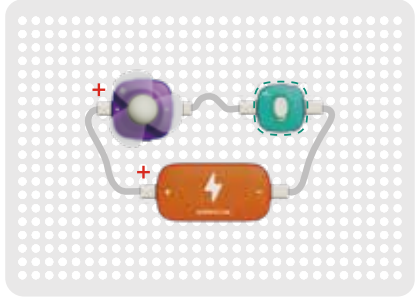
In the OR circuit, two switch modules are connected in parallel, either of which is connected in one path; both paths can control the circuit. Like the chess games, you can just practice alone, your friend can play alone, or both of you can play together.

24~25-Learn about the motor module



Run the motor in the circuit

Wiring up



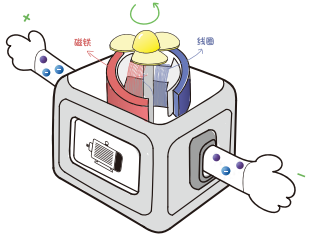
(The motor is pre-installed with a fan)
1. Connect the positive pole of the power supply to the positive pole of the motor
2. With another conductor, connect the negative pole of the motor to the switch
3. Connect the switch with the negative pole of the power supply via the third conductor

Operation

1.Turn on the switch. What occurs to the motor?
2. Replace the switch with a knob, and rotate the knob. What happens to the motor? (Experiment 25)

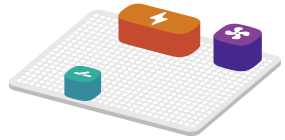
Why it happens?

A motor is a kind of energy converter and electrical element that can convert electric energy into kinetic energy.
Inside the motor, there is a coil made of copper conductor and a magnet. When the current flows through the coil, a magnetic force is generated, which repels the coil and the magnet, so the motor starts to rotate.



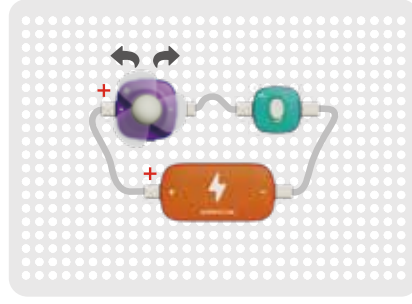
SCIENCE CAN 科學罐頭

26~27-Learn about the forward and backward rotation of the motor



Swap the positive and negative poles of the motor, and see what will happen

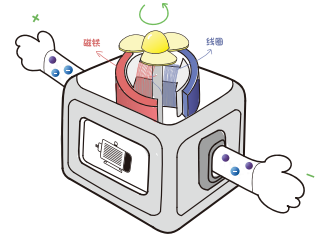
Wiring up



(The motor is pre-installed with a fan)
1. Connect the positive pole of the power supply to the positive pole of the motor
2. With another conductor, connect the negative pole of the motor to the switch
3. Link the switch to the negative pole of the power supply via the third conductor

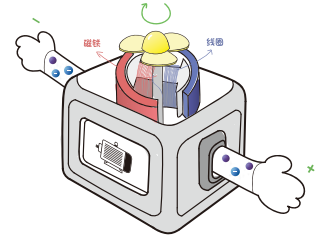
Operation

1.Turn on the switch. What occurs to the motor?
2. Swap the positive and negative poles of the motor and turn on the switch. What happens to the motor? (Experiment 27)

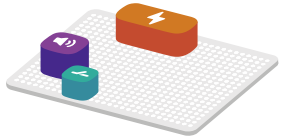


Why it happens?

Inside the motor, there is a coil and a magnet. When current flows through the coil in different directions, the polarity of the coil's magnetism will change, so will the direction of rotation of the motor.

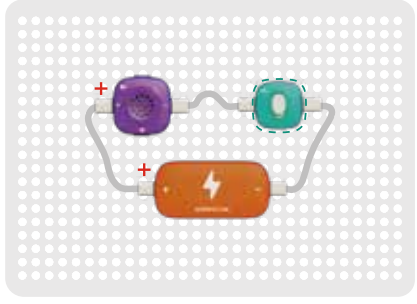


28-29-Learn about the speaker module



Let the circuit make a sound

Wiring up



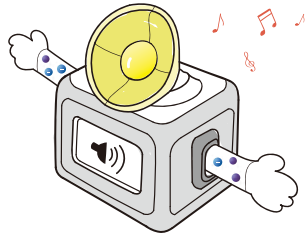
1. Connect the positive pole of the power supply to the positive pole of the speaker module
2. With another conductor, connect the negative pole of the speaker module to the switch
3. Connect the switch to the negative pole of the power supply via the third conductor

Operation

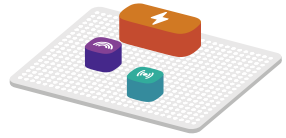
1. Turn on the switch. What occurs to the speaker module?
2. Replace the switch with a knob, and rotate the knob. What happens to the speaker module? (Experiment 29)

Why it happens?

The speaker module is a type of energy converter that can convert electric energy into sound.

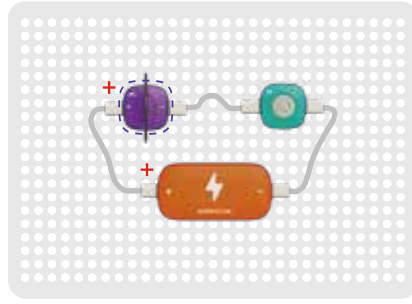


30-Learn about the vibration module



Set up the control circuit with vibration module

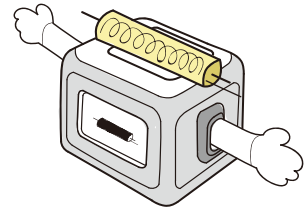
Wiring up



1. Connect the positive pole of the power supply to the positive pole of the color lamp with the conductor
2. Take another conductor and connect the negative pole of the color lamp to the vibration module
3. Take the third conductor and connect the vibration module to the negative pole of the power supply

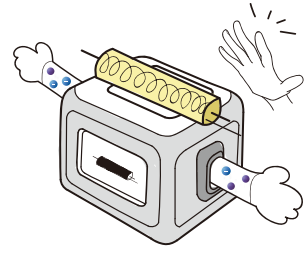
Operation

1. Gently tap the vibration module. What happens to the bulb?
2. Replace the color lamp with the speaker or the motor, and repeat the above steps. What occurs to the circuit? (Experiment 30)

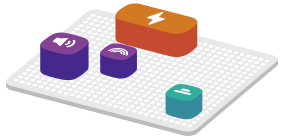


Why it happens?

The vibration module is a kind of switch, which can be used to control the circuit in the same way as the switch. There are two conductors and one spring in the vibration module. When it is tapped, the spring will vibrate and connect both conductors form a closed circuit to light up the bulb.

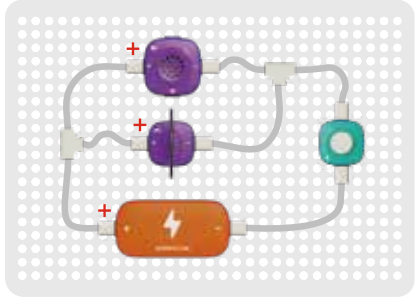


31-Christmas Eve



Play the music and make a light show for your Christmas

Wiring up



1. With the T-shaped conductor, connect the positive pole of the power supply to the positive pole of the color lamp and the positive pole of the speaker
2. With another T-shaped conductor, connect the negative pole of the speaker and the negative pole of the color lamp to the switch
3. Connect the switch to the negative pole of the power supply via the third conductor

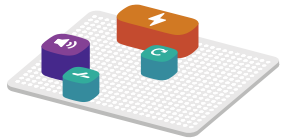
Operation

Turn on the switch. What happens to the speaker module and the color lamp?

Why it happens?

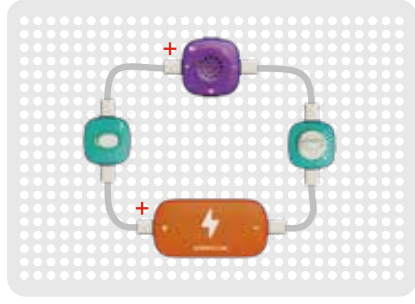
The speaker and the color lamp module are connected in parallel in the circuit; turn on the power key, and a loop forms for the current. Both electrical elements starts working at the same time to emit sounds and light.

32-Secret of sound



Let's tune up/down the sound together

Wiring up



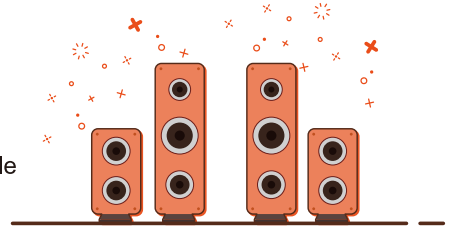
1. Connect the positive pole of the power supply to the switch
2. With another conductor, connect the switch to the positive pole of the speaker module
3. Link the negative pole of the speaker to the knob via the third conductor
4. Connect the knob with the negative pole of the power supply with the fourth conductor

Operation

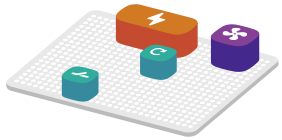
1. Turn on the switch.
2. Rotate the knob. What occurs to the speaker module?

Why it happens?

Rotate the knob to change the resistance, as well as the current flowing through the speaker module, so that the speaker module gives out sounds at different levels.

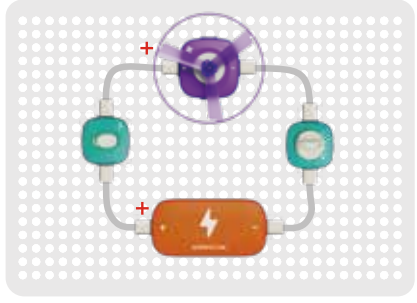


33- Propeller with changing speed



Spin your propeller up with the knob

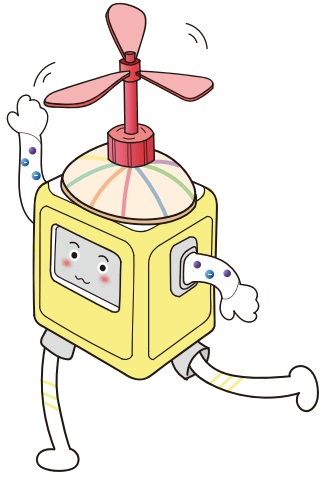
Wiring up



(The motor is pre-installed with a propeller)
1. Connect the positive pole of the power supply to the switch
2. With another conductor, connect the switch to the positive pole of the motor
3. Link the negative pole of the motor to the knob via the third conductor
4. Connect the knob with the negative pole of the power supply with the fourth conductor

Operation

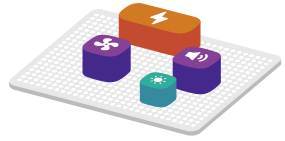
1. Turn on the switch.
2. Remove the fan blade and replace it with the propeller module.
3. Rotate the knob. What happens to the propeller module?



Why it happens?

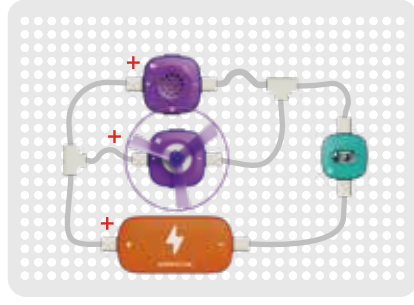
Rotate the knob to change the resistance, as well as the current flowing through the motor module. The speed of the motor module changes, so does the speed of the propeller.

34- Flying alarm



Make an alarm device with the circuit module

Wiring up



(The motor is pre-installed with a propeller)
1. Take the T-shaped conductor and connect the positive pole of the power supply to the positive pole of the motor module and the positive pole of the speaker module
2. With another T-shaped conductor, connect the negative pole of the speaker module and the motor module to the photosensitive module
3. Connect the photosensitive module to the negative pole of the power supply with the conductor

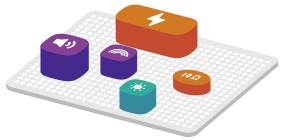
Operation

Illuminate the photosensitive module with the flashlight on the mobile phone. What occurs to the circuit?

Why it happens?

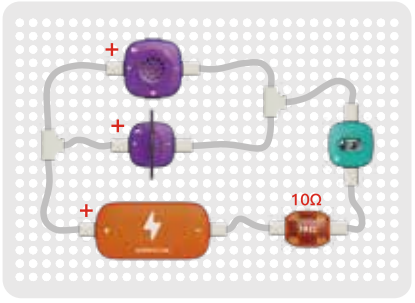
When the photosensitive module detects the light, the resistance in the circuit becomes lower; the current flows through the motor module and the speaker module, which start to work.

35-Siren tester



Set up a circuit to emit light and sound

Wiring up



1. With the T-shaped conductor, connect the positive pole of the power supply to the positive pole of the speaker module and the positive pole of the color lamp
2. Connect the negative pole of the speaker module and the negative pole of the color lamp to the photoresistor via another T-shaped conductor
3. Link the photoresistor to the 10Ω resistor via the third conductor
4. Take the fourth conductor and connect the 10Ω resistor to the negative pole of the power supply

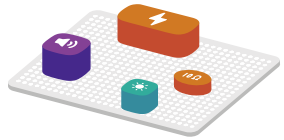
Operation

Illuminate the photoresistor. What happens to the color lamp and the speaker module?

Why it happens?

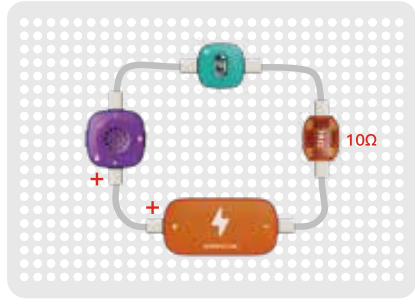
When the photoresistor is illuminated, the resistance of the photoresistor is reduced; the current flows through the speaker module, making the color lamp module give out light and sound.

36-Wake-up call of rooster



Let the electronic rooster wake you up

Wiring up



1. Connect the positive pole of the power supply to the positive pole of the speaker module
2. With another conductor, link the negative module of the speaker to the photoresistor
3. Connect the photoresistor to the 10Ω resistor with the third conductor
4. Take the fourth conductor and connect the 10Ω resistor to the negative pole of the power supply

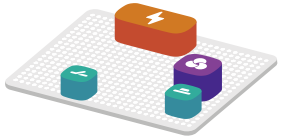
Operation

Bring the connected circuit into a dark room and turn on the lights. What happens?

Why it happens?

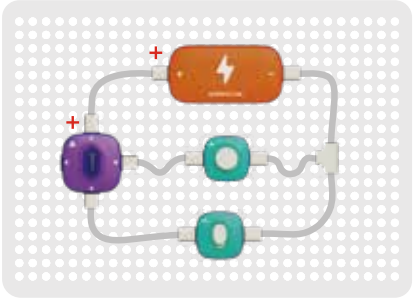
When the photoresistor is illuminated, the resistance of the photoresistor is reduced; when the current flows through the speaker module, the sound will be generated.

37-RGB traffic light



Make a traffic light and control the traffic together

Wiring up



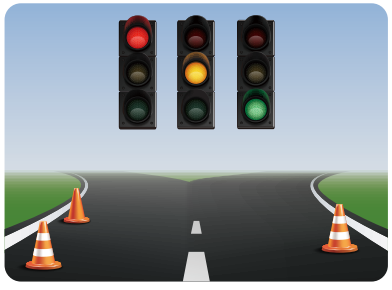
1. Connect the positive pole of the power supply to the positive pole of the RGB lamp
2. With another conductor, connect the R port of the RGB lamp to the power key
3. Connect the G port of the RGB lamp to the switch with the third conductor
4. Take the T-shaped conductor and connect the power key and switch to the negative pole of the power supply

Operation

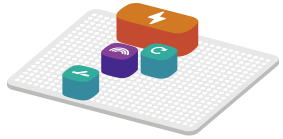
1. Turn on the switch. What occurs to the RGB lamp?
2. Turn off the switch and then press the power key. What occurs to the RGB lamp?
3. Turn on the switch and press the power key at the same time. What happens to the RGB lamp?

Why it happens?

Press the switch, and the current flows through the green light of the RGB lamp, which will be on. Press the power key, and the current flows through the red light of RGB lamp, which will be on. Turn on the switch and the power key at the same time, the red and green lights of the RGB module will be on; the combination of the two colors will form a yellow light.

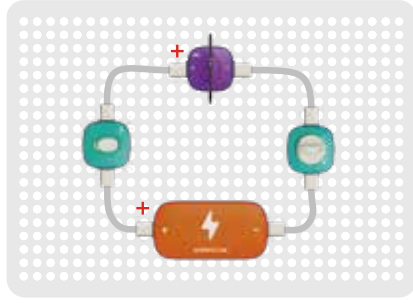


38-Dimming the light



Tune the brightness of the light

Wiring up



1. Connect the positive pole of the power supply to the switch
2. With another conductor, connect the switch to the positive pole of the color lamp
3. Link the negative pole of the color lamp to the knob with the third conductor
4. Connect the knob to the negative pole of the power supply via the fourth conductor

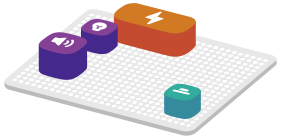
Operation

1.Turn on the switch and gently rotate the knob. What occurs to the color lamp?
2. To achieve the optimal effect, you can turn off the lights in the room.

Why it happens?

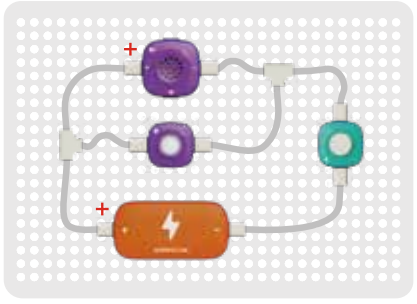
The current flowing through the color lamp varies as the knob rotates. When the current increases, the color lamp will become brighter, and vice versa.

39-Responder



Make an electronic responder

Wiring up



1. With the T-shaped conductor, connect the positive pole of the power supply to the positive pole of the speaker module and the bulb
2. Connect the negative pole of the speaker module and the bulb to the power key with other T-shaped conductor
3. Connect the power key to the negative pole of the power supply via the third conductor

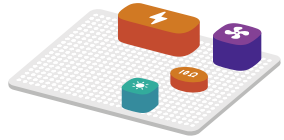
Operation

Invite your friends to play the quiz game and see who hits the button first.

Why it happens?

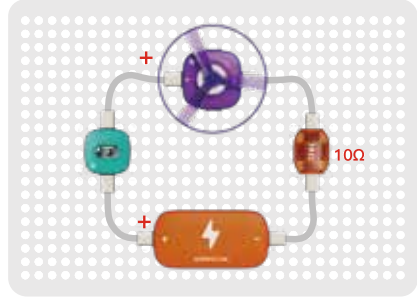
The speaker and the bulb are connected in parallel; when you press the power key, a loop will be formed for the current; both the electrical elements will start working at the same time to produce sound and light.

40-Optically controlled windmill



Let the optically controlled windmill spin

Wiring up



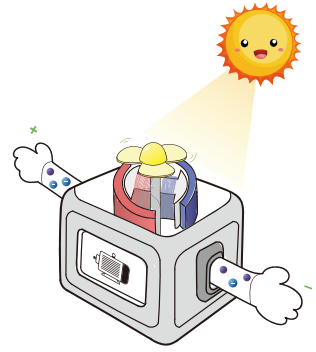
(The motor is pre-installed with the propeller)
1. Connect the positive pole of the power supply to the photoresistor
2. With another conductor, connect the photoresistor to the positive pole of the motor
3. Link the negative pole of the motor to the 10Ω resistance with the third conductor
4. Connect the 10Ω resistor to the negative pole of the power supply via the fourth conductor

Operation

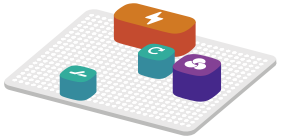
Bring the connected circuit into a dark room and turn on the lights. What happens?

Why it happens?

When the photoresistor is illuminated, the resistance of the photoresistor will be reduced; when the current flows through the motor, the motor starts rotating.

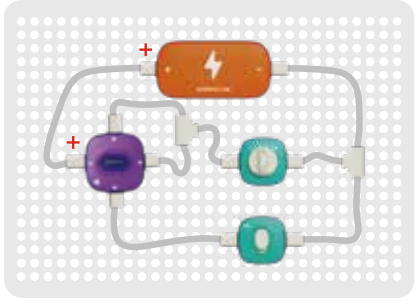


41-Light modulator



Make your own rainbow indoors

Wiring up



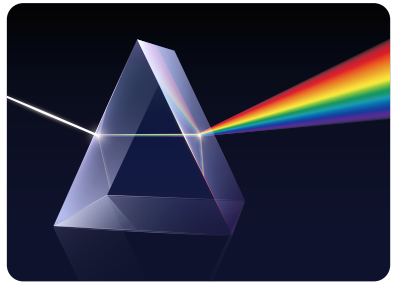
1. Connect the positive pole of the power supply to the positive pole of the RGB lamp
2. With another T-shaped conductor, connect the R port and G port of the RGB lamp to the knob
3. Link the B port of the RGB lamp to the switch with the third conductor
4. Connect the knob and switch to the negative pole of the power supply with the T-shaped conductor

Operation

1. Turn on the switch.
2. Slowly rotate the knob and observe the combination of different colors of the light.

Why it happens?

Control the three colors of the RGB lamp with the knob and switch; turn the switch on and off, and slowly rotate the knob; the current flowing through the RGB lamp will change, and the three colors output by the RGB lamp will also change.



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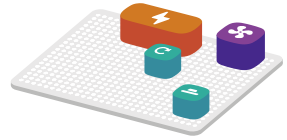
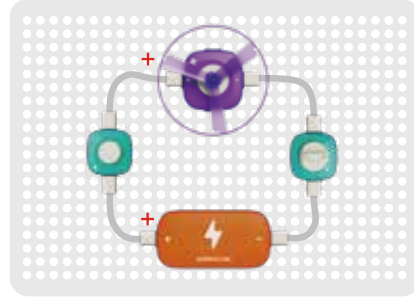
42-Flying saucer



Whirring, the flying saucer takes off

Wiring up



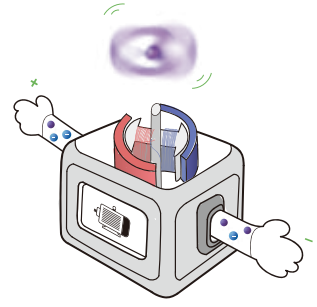
(The motor is pre-installed with the flying saucer)
1. Connect the positive pole of the power supply to the power key
2. With another conductor, connect the power key to the positive pole of the motor
3. Link the negative pole of the motor to the knob with the third conductor
4. Connect the knob to the negative pole of the power supply with the fourth conductor

Operation

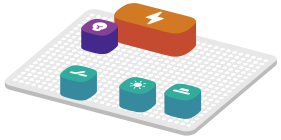
Turn on power key and rotate the knob gently; wait for the flying saucer to run at the maximum speed; release the power key and the propeller will take off while whirring!

Why it happens?

Rotate the knob, and the current flowing through the motor module will increase, so the motor rotates faster. Release the button, and the current will be cut off instantly; the flying saucer will take off due to inertia.

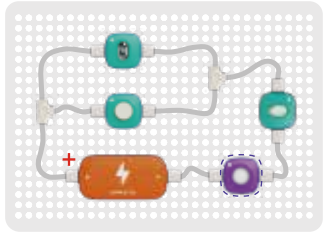


43-45-Mixed control circuit

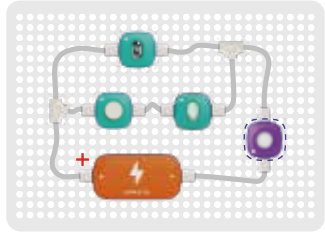


Configure a more convenient circuit

Wiring up



1. With the T-shaped conductor, connect the positive pole of the power supply to the power key and the photoresistor
2. Connect the power key and the photoresistor with the switch via another T-shaped conductor
3. Link the switch to the bulb with the third conductor 4. Take the fourth conductor and connect the bulb to the negative pole of the power supply



1. With the T-shaped conductor, link the positive pole of the power supply to the power key and the photoresistor
2. Connect the power key to the switch with another conductor 3. With the second T-shaped conductor, connect the switch and photoresistor to the bulb
4. Connect the bulb to the negative pole of the power supply with the fourth conductor

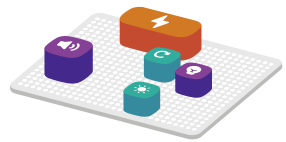
Operation

1. Turn on power key, and press the switch. What happens to the bulb?
2. Illuminate the photoresistor, and turn on the switch. What happens to the bulb?
3. Illuminate the photoresistor, and turn on the power key. What happens to the bulb?
4. Illuminate the photoresistor; turn on the power key and the switch. What occurs to the bulb? (Experiment 44) 5. Replace the bulb with a color lamp or a motor, and repeat the above steps. What happens to the circuit? (Experiment 45)

Why it happens?

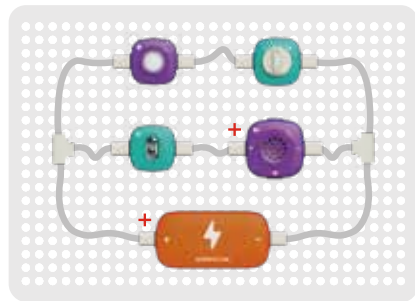
To make the operation of electrical elements easier in life, multiple switch modules can be employed for control.

46-47-Light and sound engineer



Play a symphony with light

Wiring up



1. With the T-shaped conductor, connect the positive pole of the power supply to the bulb and the photoresistor
2. Connect the bulb to the knob via another conductor
3. Link the photoresistor to the positive pole of the speaker module via the third conductor
4. With the T-shaped conductor, connect the knob and the negative pole of the speaker to the negative pole of the power supply

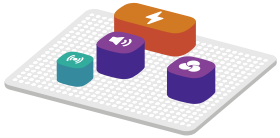
Operation

1. Rotate the knob. What occurs to the circuit?
2. Illuminate the photoresistor with the flashlight on the mobile phone. What happens to the circuit?

Why it happens?

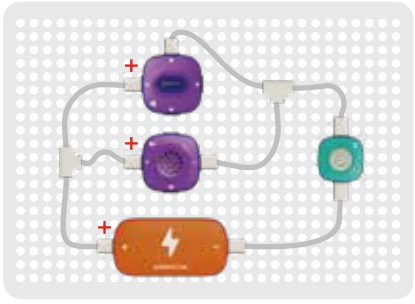
Connect the knob and bulb in one group, the photoresistor and the speaker in another group in parallel respectively; the knob can dim the bulb, and the photoresistor can control the sound level of the speaker.

48-Earthquake alert



Make an earthquake alert

Wiring up



1. With the T-shaped conductor, connect the positive pole of the power supply to the positive pole of the speaker module and the positive pole of the RGB lamp module
2. Link the R port of the RGB lamp module and the negative pole of the speaker module to the vibration module via the second T-shaped conductor
3. Take a conductor to connect the vibration module to the negative pole of the power supply

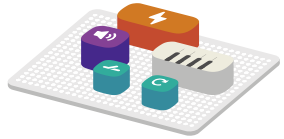
Operation

Gently tap the vibration module.
What occurs to the circuit?

Why it happens?

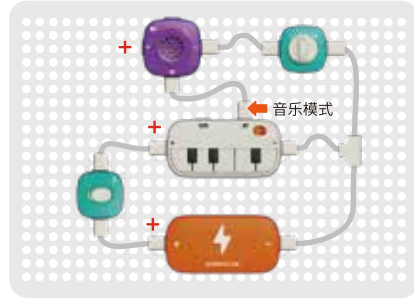
Vibration occurs in case of an earthquake; when the vibration module receives the signal, and the current flows through the color lamps and the speaker module to issue an alarm message.

49-Rhythmic music box



Listen to the music

Wiring up



1. With the conductor, link the positive pole of the power supply to the switch
2. Connect the switch to the positive pole of the piano module via another conductor
3. Connect the SP port of the piano module to the SP port of the speaker module with the third conductor
4. Take the fourth conductor and connect the negative pole of the speaker module to the knob
5. With the T-shaped conductor, connect the knob and the negative pole of the piano module to the negative pole of the power supply

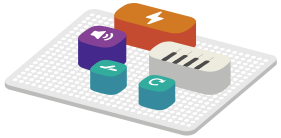
Operation

1. Toggle the button of the piano module to the left to switch to the play mode. Turn on the switch. What happens to the speaker module?
2. Press the first three piano keys. What occurs to the speaker module?
3. Rotate the knob module to control the volume.

Why it happens?

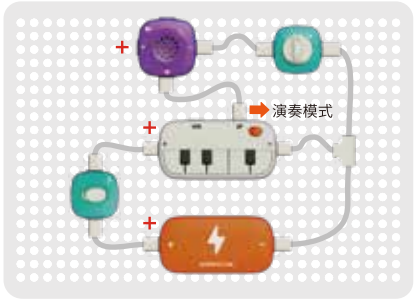
The piano module is an integrated mini PC, in which various music and tones are stored. When the play mode is selected and it is connected to the speaker, the music will be played.

50-Dream pianist



Let's play the piano together

Wiring up



1. With the conductor, connect the positive pole of the power supply to the switch
2. Connect the switch to the positive pole of the piano module via another conductor
3. Link the SP port of the piano module to the SP port of the speaker module with the third conductor
4. Connect the negative pole of the speaker module to the knob with the fourth conductor
5. Take the T-shaped conductor to connect the knob and the negative pole of the piano module to the negative pole of the power supply

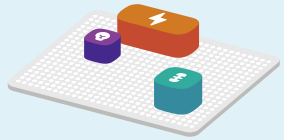
Operation

1. Toggle the button of the piano module to the right to the play mode. Turn on the switch, and press the different piano keys. What happens to the speaker module?
2. Let's play a song together
3. Rotate the knob module to control the volume

Why it happens?

The piano module is an integrated mini PC, in which various music and tones are stored. When the play mode is selected and it is connected to the speaker, the music will be played.

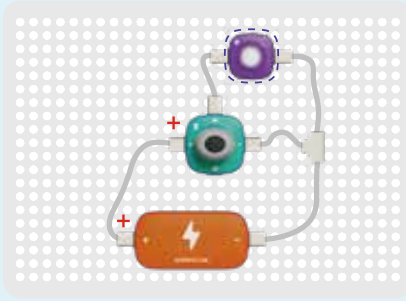
51-52-Learn about the voice-operated switch



Control the bulb with voice

Tips: The circuit module of the advanced kit may be used subsequently. If necessary, the relevant module can be supplemented.

Wiring up

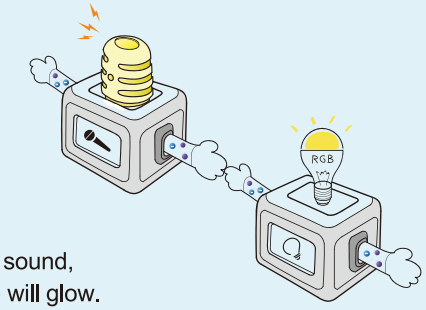


1. With the conductor, connect the positive pole of the power supply to the positive pole of the microphone module
2. Take another conductor to connect the M port of the microphone module to the bulb
3. With the T-shaped conductor, connect the negative pole of the microphone module to the bulb to the negative pole of the power supply

Operation

1. Press down the talk module to switch to the voice-operated switch mode; then, snap your fingers next to the microphone. What occurs to the circuit?
2. Replace the bulb with a speaker module, and shout again. What happens to the circuit? (Experiment 52)

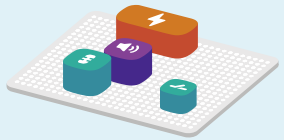
Voice-operated switch mode



Why it happens?

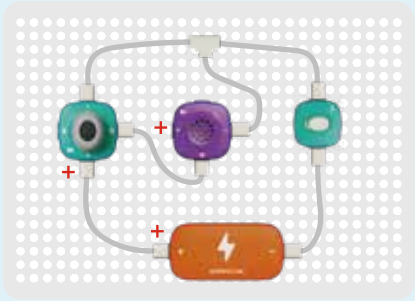
In the voice-operated switch mode of the microphone module, the sound signal can be converted into an electric signal. When there is sound, the current flows through the bulb, and the bulb will glow.

53-Alien voice changer



Let's play the voice change game

Wiring up

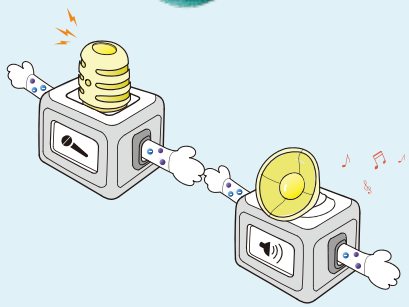


1. With the conductor, connect the positive pole of the power supply to the positive pole of the microphone module
2. Connect the microphone module and the negative pole of the speaker to the switch via the T-shaped conductor
3. Take the second conductor and connect the switch to the negative pole of the power supply
4. With the third conductor, wire the sp port of the microphone to the sp port of the speaker

Operation

Press the button and switch the microphone module to the voice changer mode; talk next to the microphone. What occurs to the circuit? Try to perform this experiment in a quiet environment!

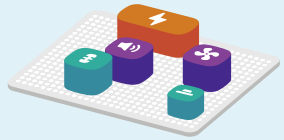
Voice changer mode



Why it happens?

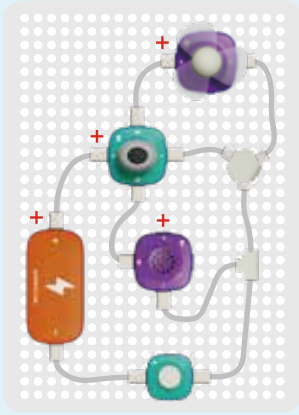
In the voice changer mode, a mini PC in the microphone module can convert our voice into electronic voice, which will be played out through the speaker module.

54-Voice control & voice changer combiner



Demonstrate the functions of the microphone module in the circuit

Wiring up



(The motor is pre-installed with the fan)
1. With the conductor, connect the positive pole of the power supply to the positive pole of the microphone
2. Connect the SP port of the speaker module to the SP port of the speaker module via the second conductor
3. With the third conductor, connect the M port of the microphone module to the positive pole of the motor module
4. Link the negative pole of the motor and the microphone to the three-way adapter with the fourth and fifth conductors
6. Take another T-shaped conductor to connect the three-way adapter to the negative pole of the speaker and the power key
7. Connect the power key to the negative pole of the power supply via the sixth conductor

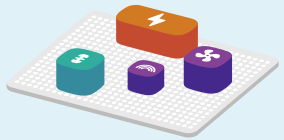
Operation

1. Toggle up and switch the microphone module to the voice changer mode, and press the power key. Talk next to the microphone. What happens to the circuit?
2. Toggle down and switch the microphone module to the voice-operated switch mode, and press the power key. What occurs to the circuit?

Why it happens?

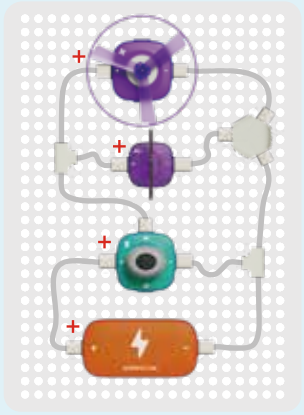
The M port and SP port of the microphone module is respectively connected to one function, which are independent of each other in controlling the operation of the circuit.

55-Call the flying saucer



Control the rotation of the flying saucer with your voice

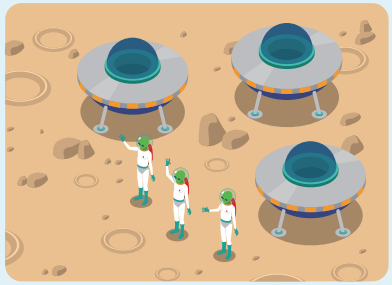
Wiring up



(The motor is pre-installed with the flying saucer)
1. With the conductor, connect the positive pole of the power supply to the positive pole of the microphone module
2. Take the T-shaped conductor and connect the M port of the microphone module to the positive pole of the color lamp module and the positive pole of the motor module
3. Link the negative pole of the color lamp module to the three-way adapter via the second conductor
4. With the third conductor, connect the negative pole of the motor module to the three-way adapter
5. Take another T-shaped conductor to connect the three-way adapter and the negative pole of the microphone module to the negative pole of the power supply

Operation

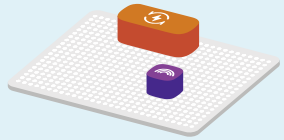
Press down the microphone module to switch to the voice-operated switch mode, and snap your fingers next to the microphone. What happens to the circuit?



Why it happens?

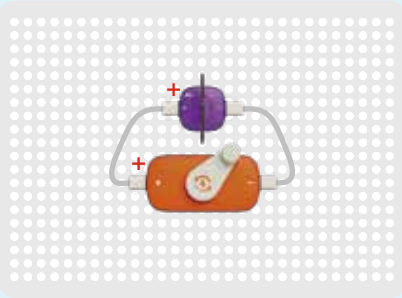
When the speaker module detects the sound, the current flows through the color lamp module and the motor module; the motor module and the color lamp module start to work.

56-Color lamp powered by the hand generator



Let's have fun in power generation by hand

Wiring up



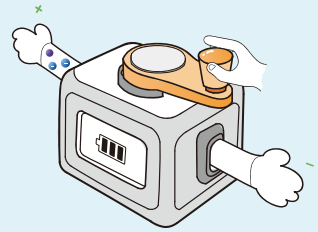
1. With the conductor, connect the positive pole of the hand generator module to the positive pole of the color lamp module
2. Take another conductor and connect the negative pole of the color lamp module to the negative pole of the hand generator

Operation

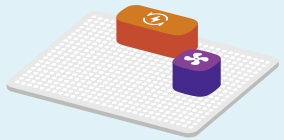
Rotate the rocker arm of the hand generator. What occurs to the circuit?

Why it happens?

In the hand generator module, there is a magnet and a coil. When the rocker arm is rotated, the coil rotates around the magnet to generate current.

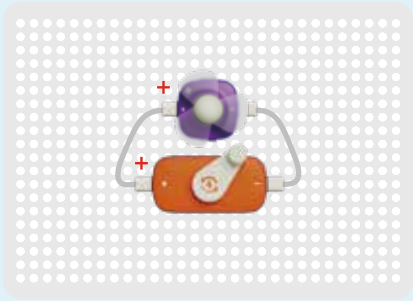


57-Fan powered by the hand generator



Drive the motor with the hand generator

Wiring up



(The motor is pre-installed with the fan)
1. With the conductor, connect the positive pole of the hand generator module to the positive pole of the motor module
2. Connect the negative pole of the motor module to the negative pole of the hand generator via another conductor

Operation

Rotate the rocker arm clockwise. What happens to the motor?

Why it happens?

Rotating the rocker arm, the hand generator can generate current; when the current flows through the motor module, the motor starts to spin and drive the fan.

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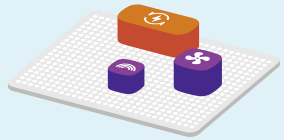
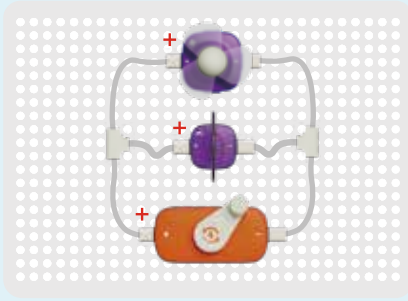
58-Power station with hand generator



Power other electrical elements with the hand generator

Wiring up



(The motor is pre-installed with the fan)
1. With the T-shaped conductor, connect the positive pole of the hand generator to the positive pole of the color lamp module and the positive pole of the motor module
2. Connect the negative pole of the color lamp module and the negative pole of the motor module to the negative pole of the hand generator via another T-shaped conductor

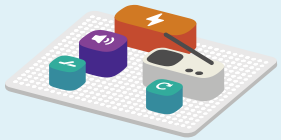
Operation

Rotate the generator rocker arm clockwise. What occurs to the circuit?

Why it happens?

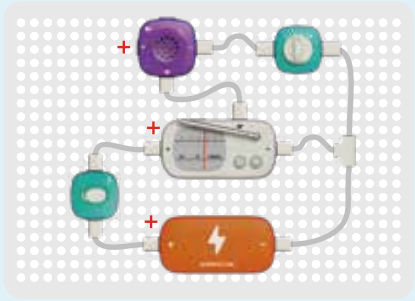
Rotate the rocker arm of the generator, and the generator generates current; when the current flows through the color lamp and the motor module, the color lamp and the motor start to work.

59- Make a radio



Let's listen to the radio made by yourself

Wiring up



1. With the conductor, connect the positive pole of the power supply to the switch
2. Link the switch to the positive pole of the radio module with the second conductor
3. Take the third conductor and connect the SP port of the radio module to the SP port of the speaker module
4. Connect the negative pole of the speaker module to the knob via the fourth conductor
5. Using the T-shaped conductor, connect the knob and the negative pole of the radio module to the negative pole of the power supply

Operation

1. Turn on the switch, keep the antenna upright and operate with the buttons on the surface of the radio module. What occurs to the circuit?
2. Rotate the knob to turn up/down the radio.

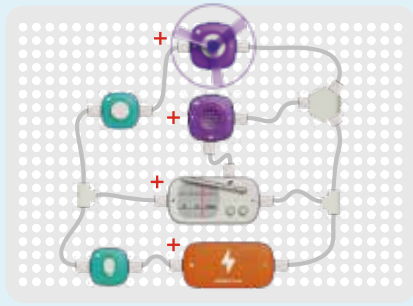
Why it happens?

The radio module is a mini PC that integrates many functions, which can receive the signal from the radio station and convert the signal into sound. The sound can be played out through the speaker module.

60-Weather radio station

Let's mimic the scene of the weather radio station

Wiring up



1. With the conductor, connect the positive pole of the power supply to the switch
2. Take another T-shaped conductor, and connect the switch to the positive pole of the radio module and the power key
3. Link the power key to the positive pole of the motor module via the second conductor
4. Take the third conductor and connect the SP port of the radio module to the SP port of the speaker module
5. With the fourth and fifth conductors, respectively connect the negative pole of the motor module to the three-way adapter and the the negative pole of the speaker module to the three-way adapter
6. Taking the second T-shaped conductor, connect the three-way adapter and the negative pole of the radio module to the negative pole of the power supply

Operation

Turn on the switch and press the power key. What occurs to the circuit?

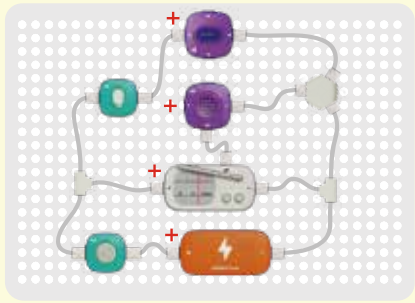
Why it happens?

Turn on the switch and press the button; the circuit forms a loop, so the current flows through the radio module and the motor module, which start to work, mimicking the weather radio station.

61-Battlefield radio station

Let's simulate the battlefield radio station

Wiring up



1. With the conductor, connect the positive pole of the power supply to the vibration module
2. Take another T-shaped conductor, and connect the vibration module to the positive pole of the radio module and the switch
3. With the second conductor, connect the switch to the positive pole of the RGB module
4. Link the SP port of the radio module to the SP port of the speaker module via the third conductor
5. Take the fourth and fifth conductor, and respectively connect the G port of the RGB module to the three-way adapter and the negative pole of the speaker module to the three-way adapter
6. With the second T-shaped conductor, connect the three-way adapter and the negative pole of the radio module to the negative pole of the power supply

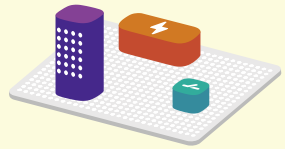
Operation

1. Tap the vibration module continuously, keep the antenna upright, and operate the buttons on the radio module. What occurs to the circuit?
2. Turn on the switch. What happens to the circuit?

Why it happens?

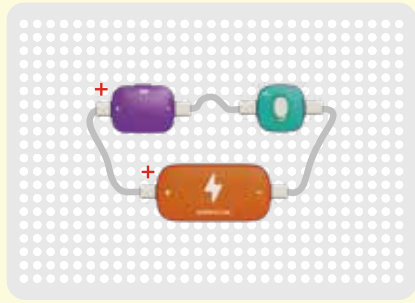
When you tap the vibration module, the circuit forms a loop, and the current flows through the radio module and the RGB lamp module; they start to work, simulating the battlefield radio station.

62-Magic light show



Let's enjoy a light show

Wiring up



1. With the conductor, connect the positive pole of the power supply to the positive pole of the light show module
2. Take another conductor and connect the negative pole of the light show module to the switch
3. With the third conductor, connect the switch to the negative pole of the power supply

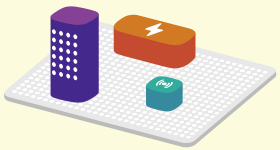
Operation

Turn on the switch. What occurs to the circuit?

Why it happens?

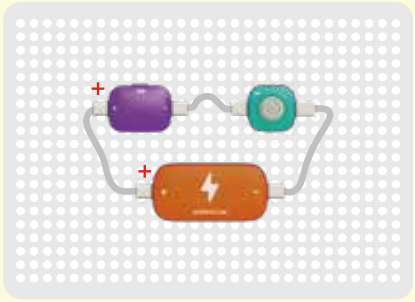
The light show module is a combination of multiple LEDs. When powered on, different LEDs will light up to form different patterns.

63-Oscillation spectrum



Let's control the spectrum

Wiring up



1. With the conductor, connect the positive pole of the power supply to the positive pole of the light show module
2. Take another conductor, and connect the negative pole of the light show module to the vibration switch
4. With the third conductor, connect the vibration switch to the negative pole of the power supply

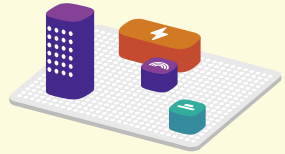
Operation

Tap the vibration switch with your hand. What occurs to the circuit?

Why it happens?

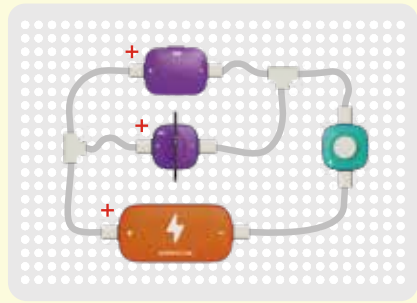
When you tap the vibration switch, the spring inside will vibrate and form a loop, so that the lattice screen inside the light show module will work

64-Colorful light show



Let's enjoy the light show

Wiring up



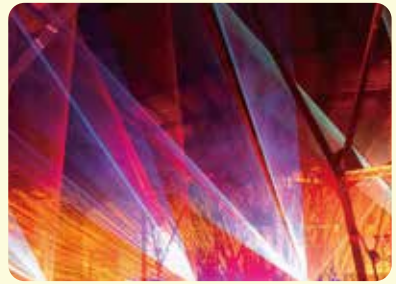
1. Take the T-shaped conductor and connect the positive pole of the power supply to the positive pole of the color lamp module and the positive pole of the light show module
2. With another T-shaped conductor, connect the negative pole of the light show module and the negative pole of the color lamp module to the power key
3. With the conductor, connect the power key to the negative pole of the power supply

Operation

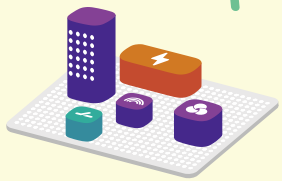
Turn on the power key. What occurs to the circuit?

Why it happens?

When you turn on the power key, the circuit forms a loop, and the current flows through the color lamp module and the light show module. They start to work and the light show is on with dazzling colors.

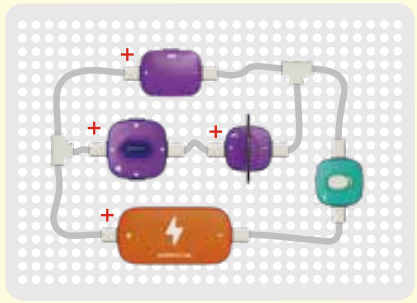


65- Shining stars



Control multiple lamps with series and parallel circuits

Wiring up



1. Using the T-shaped conductor, connect the positive pole of the power supply to the positive pole of the light show module and the positive pole of the RGB lamp
2. With another conductor, connect the G port of RGB to the positive pole of the color lamp
3. Taking the second T-shaped conductor, connect the negative pole of the light show module and the negative pole of the color lamp to the switch
4. With the fourth conductor, connect the switch to the negative pole of the power supply

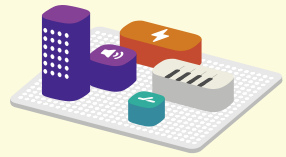
Operation

Turn on the switch. What happens to the circuit?

Why it happens?

This is a series-parallel circuit. The RGB lamps and color lamps are connected in series and then in parallel with color lamps. The switch can control three electrical elements at the same time. What's more, as the RGB lamps and the color lamps are connected in series, the voltage of the power supply will be split, so the power of electrical elements will be decreased.

66~67-Follow spot light with music (light show)



Let's rock with the music

Wiring up

1. With the conductor, connect the positive pole of the power supply to the switch
2. Take another T-shaped conductor and connect the switch to the positive pole of the piano module and the positive pole of the light show module
3. With the second conductor, connect the LED port of the piano module to the LED port of the light show module
4. Connect the SP port of the radio module to the SP port of the speaker module via the third conductor
5. Taking the fourth and fifth conductors, respectively connect the negative pole of the light show module to the three-way adapter and the negative pole of the speaker module to the three-way adapter
6. Take the second T-shaped conductor and connect the three-way adapter and the negative pole of the piano module to the negative pole of the power supply

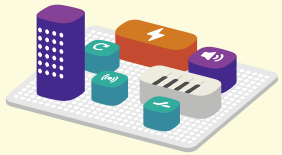
Operation

1. Turn on the switch, toggle the piano module button to the left to switch to music mode and press different piano keys. What occurs to the circuit?
2. Turn on the switch, toggle the piano module button to the right to switch to light show mode, and press different piano keys. What occurs to the circuit? (Experiment 67)

Why it happens?

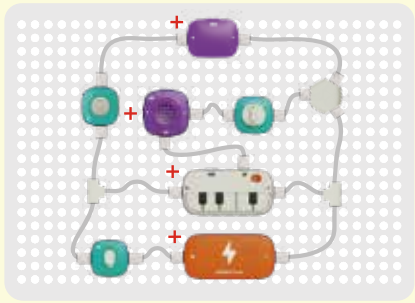
The light show module is programmed, which can receive signals from different sounds and turn on the light at corresponding positions, thereby forming different patterns.

68- DJ music festival



Let's play DJ

Wiring up



1. With the conductor, connect the positive pole of the power supply to the switch
2. Take another T-shaped conductor to connect the switch to the positive pole of the piano module and the vibration module
3. With the second conductor, connect the vibration module to the positive pole of the light show module 4. Link the SP port of the piano module to the SP port of the speaker module via the third conductor
5. Take the fourth conductor and connect the speaker module to the knob
6. With the fifth and sixth conductors, respectively connect the negative pole of the light show module to the three-way adapter and the knob to the three-way adapter
7. Wire the three-way adapter and the negative pole of the piano module to the negative pole of the power supply via the second T-shaped conductor

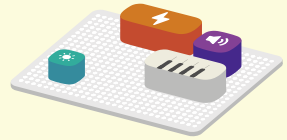
Operation

1. Turn on the switch.
2. Rotate the knob. What happens to the circuit?
3. Tap the vibration module. What occurs to the circuit?

Why it happens?

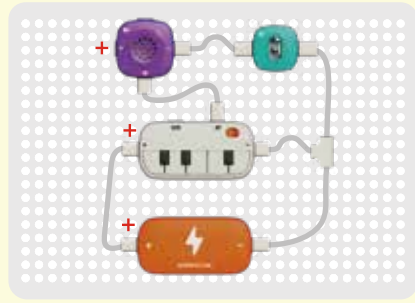
The vibration module controls the on and off of the lattice screen, and the knob controls the sound level of the piano module. By adjusting the switch module, you can change the power of the circuit and play DJ.

69-Musical alarm clock



Let your colorful alarm clock wake you up

Wiring up



1. With the conductor, connect the positive pole of the power supply to the positive pole of the piano module
2. Take the second conductor and connect the SP port of the piano module to the SP port of the speaker module
3. Connect the negative pole of the speaker module to the photosensitive module via the third conductor
4. With the first T-shaped conductor, connect the negative pole of the photosensitive module and the piano module to the negative pole of the power supply

Operation

Take the colorful alarm clock into a dark room and turn on the lights. What occurs to the circuit?

Why it happens?

When the photosensitive module is illuminated by light, the resistance in the circuit becomes lower, and the current flows through the electrical element, which starts working. The alarm clock will play music to wake you up.

70-71-Nerve-racking green light

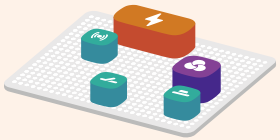
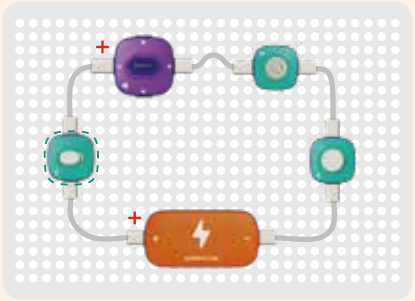


Figure out how to turn on the green light

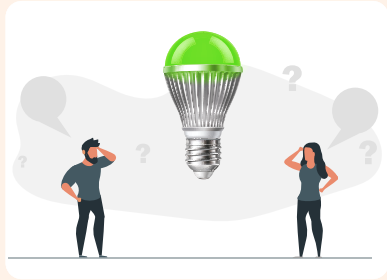
Wiring up



1. With the conductor, connect the positive pole of the power supply to the switch
2. Take the second conductor and connect the switch to the positive pole of the RGB module
3. Link the G port of the RGB module to the vibration module via the third conductor
4. Taking the fourth conductor, connect the vibration module to the key
5. With the fifth conductor, connect the power key to the negative pole of the power supply

Operation

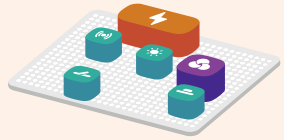
1. Work you mind. How to turn on the green light?
2. To make it harder, replace the switch with a photosensitive mode, and try to turn on the green light! (Experiment 71)



Why it happens?

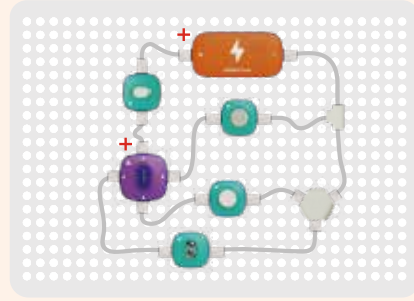
Only when all the three different types of switch modules are closed, the circuit can be complete.

72-Colorful water cube



Let's create the color you like together

Wiring up



1. With the conductor, connect the positive pole of the power supply to the switch
2. Taking another conductor, connect the switch to the positive pole of the RGB lamp module 3. Link the R port of the RGB lamp module to the vibration module via the third conductor 4. With the fourth conductor, connect the G port of the RGB lamp module to the power key
5. With the fifth conductor, connect the B port of the RGB lamp module to the photosensitive module 6. Take the sixth and seventh conductors, and respectively connect the photosensitive module to the three-way adapter and the power key to the three-way adapter
7. With the second T-shaped conductor, connect the three-way adapter and the vibration module to the negative pole of the power supply

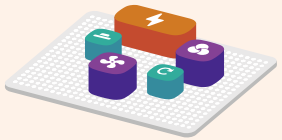
Operation

1.Turn on the switch.
2. Tap the vibration module. Which color light of the RGB module will be on?
3. Press the power key. Which color light of the RGB module will be on?
4. Illuminate the photosensitive module. Which color light will be lit on the RGB module?
5. Operate different combinations of the switch modules. Which color light will be lit on the RGB module?

Why it happens?

The RGB lamp module consists of three lights in different colors, of which different colors can be turned on in combination.

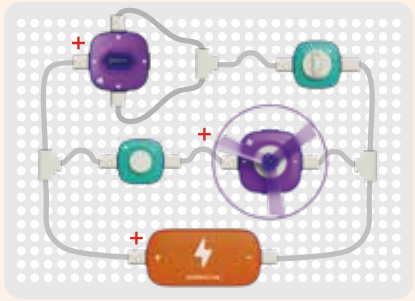
73-Flying saucer with changing color



Let's see how the radar station works

Tips: In the next game, the circuit is harder, so the kids can connect the circuit with the help of parents.

Wiring up



(The motor is pre-installed with the flying saucer)
1. Take the T-shaped conductor and connect the positive pole of the power supply to the positive pole of the RGB module and the power key
2. With the conductor, connect the power key to the positive pole of the motor module
3. Take the second T-shaped conductor, link the R port and B port of the RGB module to the knob
4. With the third T-shaped conductor, connect the knob and the negative pole of the motor module to the negative pole of the power supply

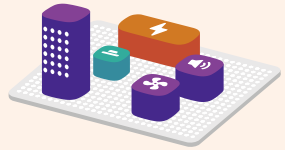
Operation

1. Turn on the power key. What happens to the circuit?
2. Turn on power key and rotate the knob module.
What occurs to the circuit?

Why it happens?

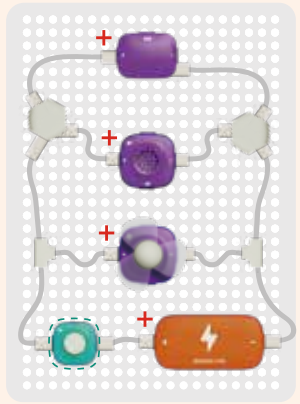
Slowly rotate the knob, and the current flowing through the RGB lamps changes. The three colors of the RGB will also change. Press the power key; the current flows through the motor, and the motor will start running.

74-76-Ultimate command



Control multiple electrical elements with one switch

Wiring up



(The motor is pre-installed with the fan)
1. With the conductor, connect the positive pole of the power supply to the power key
2. Take the T-shaped conductor and connect the power key to the positive pole of the speaker module and the three-way adapter
3. Link the three-way adapter to the positive pole of the motor module and the three-way adapter to the positive pole of the light show module via the second and the third conductor
4. Taking the fourth conductor and the fifth conductor, connect the negative pole of the light show module to three-way adapter and the negative pole of the motor module to the three-way adapter
5. With the second T-shaped conductor, connect the three-way adapter and the negative pole of the speaker module to the negative pole of the power supply

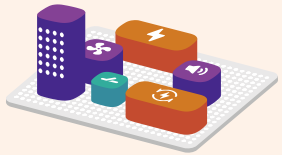
Operation

Turn on the power key. What occurs to the circuit?
Replace the key module with a vibration module, and then tap it. What happens to the circuit?
(Experiment 75)
Replace the key module with a photosensitive module, and then illuminate it with the flashlight on the mobile phone. What occurs to the circuit?
(Experiment 76)

Why it happens?

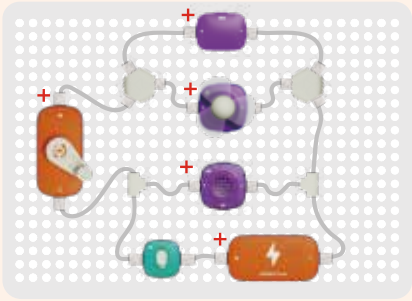
When the light show module, speaker and motor module are connected in parallel in a circuit at the same time, they will work at the same time when the power key is closed to form a loop.

77-Generating power with the hand generator



Let's "juice up" the electrical elements together

Wiring up



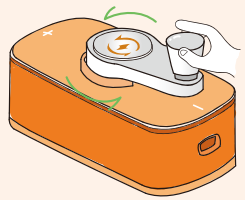
Operation

1. Turn on the switch. What occurs to the circuit?
2. Rotate the rocker arm of the hand generator clockwise. What happens to the circuit?

Why it happens?

The hand generator module is connected in series with the power supply module. When the rocker arm of the hand generator is rotated, the generator starts generating current. The more current in the circuit, the higher the power of electrical elements.

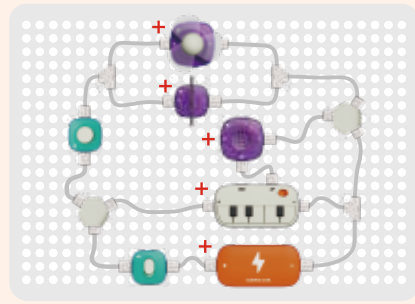
(The motor is pre-installed with the fan)
1. With the conductor, connect the positive pole of the power supply to the switch
2. Take the T-shaped conductor and connect the switch to the positive pole of the speaker module and the negative pole of the hand generator module
3. With the second conductor, link the negative pole of the hand generator to the three-way adapter 4. Connect the three-way adapter to the positive pole of the motor module and the three-way adapter to the positive pole of the light show module via the third and the fourth conductor
5. Taking the fifth and the sixth conductor, connect the negative pole of the light show module to the three-way adapter and the negative pole of the motor module to the second three-way adapter
6. With the second T-shaped conductor, connect the second three-way adapter and the negative pole of the speaker module to the negative pole of the power supply



78-Musical windmill

Let's see the windmill spinning along with the music

Wiring up



Operation

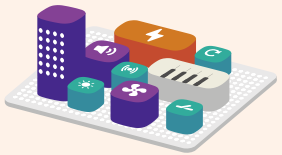
1. Turn on the switch. What occurs to the circuit?
2. Press the power key. What occurs to the circuit?

Why it happens?

The switch and the power key control the two paths respectively; the switch controls the sound; as the fan and the color lamps are connected in parallel in the same path, the power key controls them both at the same time.

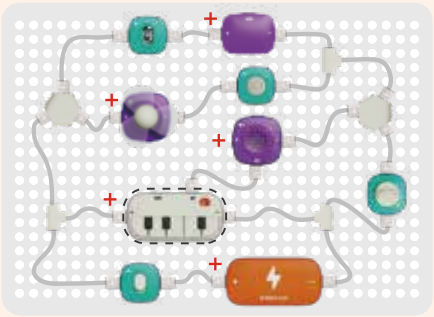
(The motor is pre-installed with the fan)
1. With the conductor, connect the positive pole of the power supply to the switch
2. Take the second conductor and connect the switch to the three-way adapter
3. Link the three-way adapter to the power key via the third conductor
4. Taking the fourth conductor, connect the three-way adapter to the positive pole of the piano 5. With the T-shaped conductor, connect the power key to the positive pole of the motor module and the color lamp module 6. Take the second T-shaped conductor to connect the negative pole of the motor module and the color lamp module to the three-way adapter 7. With the third T-shaped conductor, connect the three-way adapter to the negative pole of the piano module and the power supply
8. With the fifth conductor, link the SP port of the piano module to the SP port of the speaker module 9. Take the sixth conductor and connect the negative pole of the speaker to the three-way adapter

79-80-Master of circuit



Now you can control the circuit like a master

Wiring up



(The motor is pre-installed with the fan)
1. With the conductor, connect the positive pole of the power supply to the switch
2. Take the T-shaped conductor and connect the switch to the positive pole of the piano module and the three-way adapter
3. Link the SP port of the piano module to the SP port of the speaker module via the second conductor 4. Taking the third conductor, connect the negative pole of the speaker module to the second three-way adapter 5. With the fourth and fifth conductors, respectively connect the three-way adapter to the positive pole of the motor module and the three-way adapter to the photoresistor 6. With the sixth conductor, link the negative pole of the motor module to the vibration switch 7. Take the seventh conductor and connect the photosensitive module to the positive pole of the light show module 8. With the second T-shaped conductor, connect the negative pole of the light show module and the vibration switch to the second three-way adapter 9. Taking the eighth conductor, link the second three-way adapter to the knob 10. With the third T-shaped conductor, connect the knob and the negative pole of the piano module to the negative pole of the power supply

Operation

1. With different control modules, control the corresponding electrical elements
2. Replace the piano module with the radio module (Experiment 80)

Why it happens?

We have learnt how each module works, so let us modify the circuit like a master!