

# ZOKE

## Electronic Kits

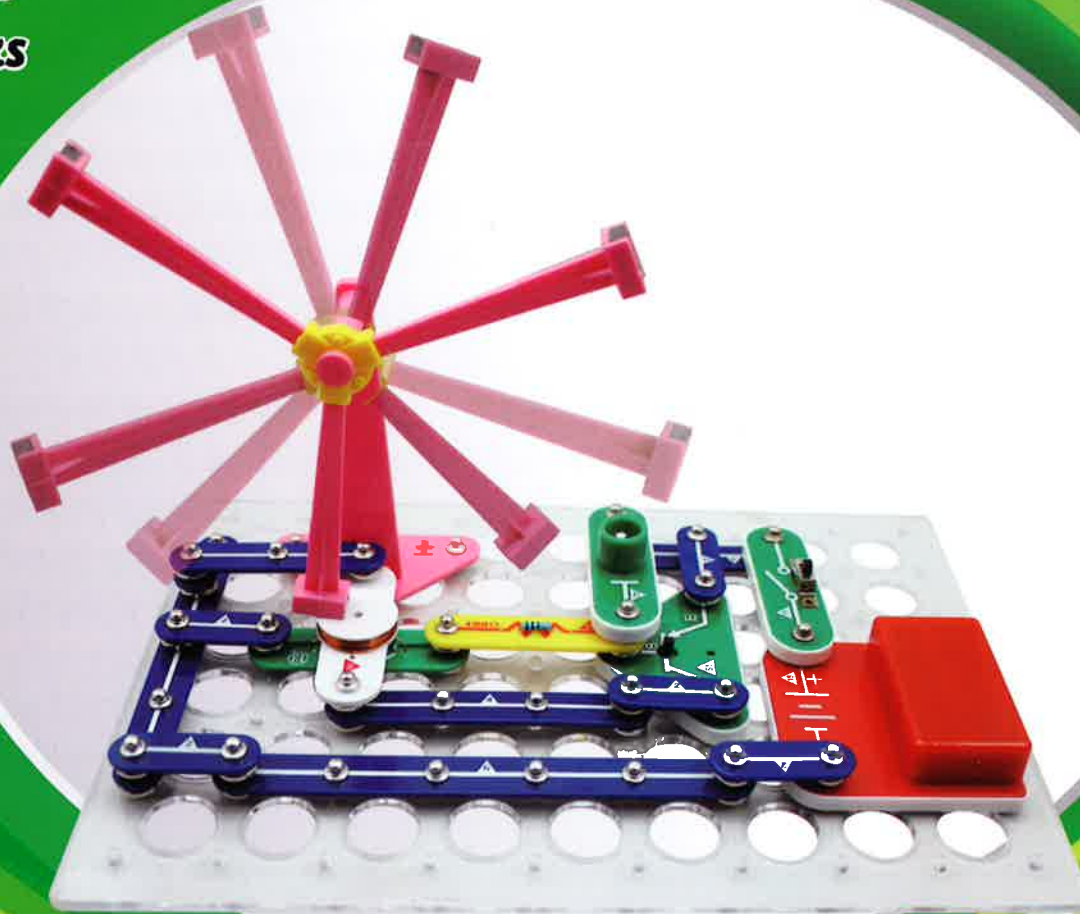
Electronic building blocks

ZK799

8+

Assembly Instructions

Intended for children 8 years old or above



Practical ability Creative ability

Train children's **3** types of abilities

Thinking ability

- Manual control
- Magnetic control
- Light control
- Sound control
- Water control
- Electric control
- Touch control

# To Parents and Teachers

Hello! Thanks for your love and support to our products. Outside your busy schedule, please spend more time with your children playing our ZOKE Electronic Building Blocks, because the game can train children's rich creative ability, thinking ability and practical ability. Moreover, it can stimulate children to invent, discover and create. Meanwhile, in the practice of assembly, the children can learn a lot of practical electronic basics and principles. You can imagine that the children will take great interest in electronic scientific knowledges, just like the old saying "Interest is the best teacher". Bringing teaching into entertainment is the best motivation for children to voluntarily study knowledge.

ZOKE Electronic Building Blocks will take the children into a miraculous and wonderful electronic world. In order to become true national pillars of 21st century, the children still need to study and explore. For this purpose, we will strive to provide more better and new products for children. In the course of assembling ZOKE Electronic Building Blocks, the children will be certain to innovate and make progresses. Here we sincerely wish the vast children can healthily grow up and become the national pillars in an early day!

Finally during assembling the blocks, we'd like the parents and teachers to note the following. In designing new circuits, wrong operation may cause potential safety problems. For example, battery short circuit or inversed can lead to rising temperature on the battery surface or liquid leakage. If components are inversely connected, the temperature on their surfaces will rise, etc. Flying disc should avoid people. And these matters will also be pointed out at appropriate places. In addition, there is important information in this instructions, please well keep it.

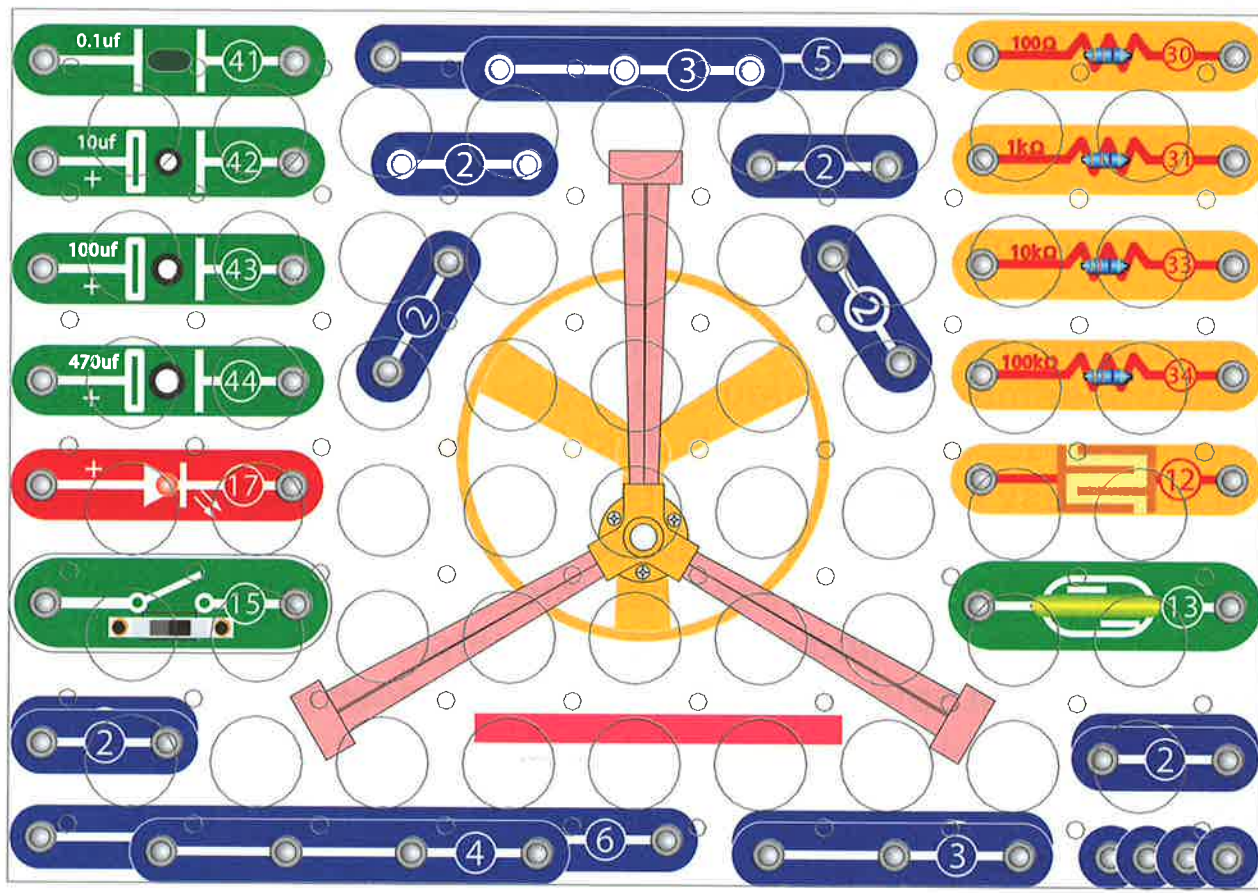
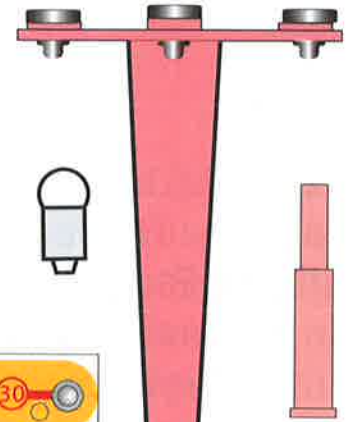
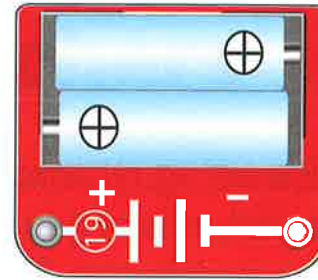
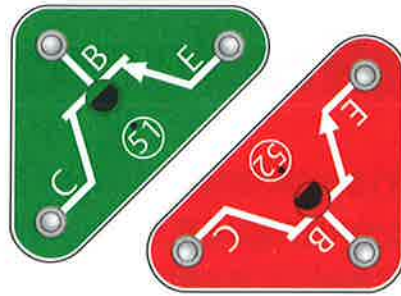
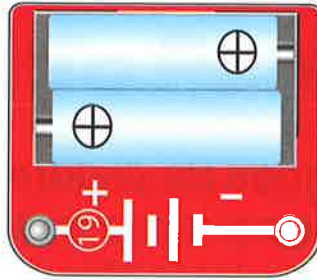
## Preface

Zoke Electronic Building Blocks series products are intended for children at the age of eight or above. This book is all about graphic examples specially compiled to match Zoke Electronic Building Blocks Series products. The graphic examples are illustrated from easy to difficult, and can be flexibly applied to different kinds of control methods such as manual control, magnetic control, light control, water control, sound control, electric control, touch control, timing control, and temperature control, etc. directly according to the circuit principle. So it is easy and quick to assemble various kinds of interesting and practical circuits. After each circuit is assembled, you can immediately hear or see the sound, light, electricity and magnet effects. So whatever you are a child studying in a kindergarden or an adult, you can find appropriate product suitable to your assembly.




































Zoke Electronic Building Blocks integrates knowledge, interest, and practicability into one body. Experiencing assembling the electric circuits, the children can soon learn a lot of relevant knowledge and skills about electric circuit. And the readers can rapidly step into the miraculous electronic world in an easy entertainment. It is completely synchronous with students' physic course, labor and skill course, so it is the students' second class to study and invent.


In the graphic examples, only one assembly method is listed for each circuit. Many circuits have lots of assembly methods, and many new circuits can be invented. We are confident that your wisdom and innovation spirit will certainly create more practical and miraculous circuits.

### Components arrangement diagram



## Components packing list

NO.	Name	Quantity	Effect graph	NO.	Name	Quantity	Effect graph	NO.	Name	Quantity	Effect graph
1	Single connecting piece	4		20	Speaker	1		52	NPN triode	1	
2	Double connecting piece	8		21	Integrated music circuit	1		96	Inductance	1	
3	Triple connecting piece	3		22	Integrated alarm circuit	1		108	Electromagnetic windmill set components	1	
4	Quadruple connecting piece	1		24	Electric motor	1			Big baseboard	1	
5	Quintuple connecting piece	1		30	100Ω resistance	1			Magnetic bar	1	
6	Sextuple connecting piece	1		31	1KΩ resistance	1			Flying saucer	1	
11	Sound-activated switch	1		33	10KΩ resistance	1			Electric bulb	1	
12	Touch pad	1		34	100KΩ resistance	1					
13	Magnetic switch	1		41	0.1UF capacitance	1					
14	Pressure switch	1		42	10UF capacitance	1					
15	Slide Switch	1		43	100UF capacitance	1					
16	Light-activated switch	1		44	470UF capacitance	1					
17	Red diode	1		51	PNP triode	1					
18	2.5V bulb	1									
19	3V battery case	2									

 **Warning** When installing the electric bulb, please install it according to its corresponding volts so as to prevent it from burning!

## ZOKE Classroom

### Theorem of storing electricity to light bulbs

When the capacitance being charged discharges its electricity to the triode, the base of the triode is power-on because of getting positive current, and the bulb lights. After the capacitance finished its discharge, the triode can not get through, so the bulb is off.

### Dimmer bulb theorem

This is a multiple-unit tube amplification circuit composed of two triodes. The adjustment of variable resistance can change the base current of the triode. When the current is amplified by the triode, the output current of the multiple-unit tube also increases, which leads to the variable brightness of the bulb.

### Capacitance theorem

Capacitance is capable of storing electricity, just like a water tank that can store water. Connect a capacitance between two ends of the power source and switch on, the power source begins to charge the capacitance due to lack of electricity. Switch off and connect the capacitance with a conductive wire, which can let the capacitance discharge up its electricity. Repeat the above steps, charging the capacitance can be started again.

### Multiple-unit tube theorem

Connecting two triodes together in a certain connecting method can constitute a multiple-unit tube. According to the polarity of the triodes selected and the methods of triode connection, a multiple-unit tube can be divided into PNP typed and NPN typed one. Generally, this type of multiple-unit tube can amplify relatively many times.

### Theorem of sound controlled buzzer

A buzzer is made of two pieces of sheet metals between them piezoelectric ceramic chips are clamped. When the buzzer is vibrated, a tiny current between the two sheet metals will be generated due to the piezoelectric effect. By utilizing this tiny current, circuits can be controlled to make corresponding changes.

### Electric motor controlling theorem

Inside the electric motor contains magnet and coils. Driving the small shaft of the motor, the magnetic field in the coils will change and at the same time generate a tiny current. By utilizing this tiny current, circuits can be controlled to make corresponding changes.

### Power amplification intergrated circuit

Intergrate multiple-stage power amplification circuits into a chip and sealed. This circuit only needs a few electronic components to be connected outside. This circuit boasts high reception sensitivity and large amplification.

### Theorem of frequency modulation (FM) intergrated circuit (IC)

FM intergrated circuit is composed of reception circuit, amplification circuit, signal treatment circuit and others sealed in an IC. Adding partial outside electronic elements to it, a complete FM receiver circuit can be formed. Connecting the power source, the audio-frequency signal can output. While in use, what you need to do is connecting a power amplification circuit outside to amplify the output signal of the IC, the FM radio station can be listened in to.

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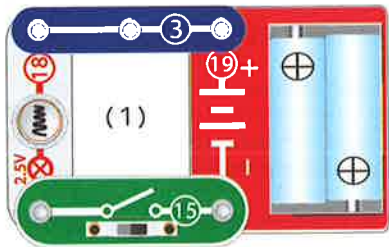
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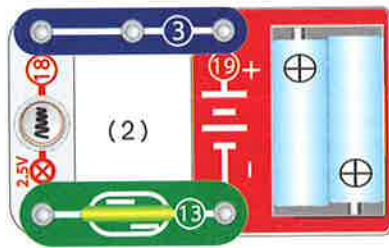
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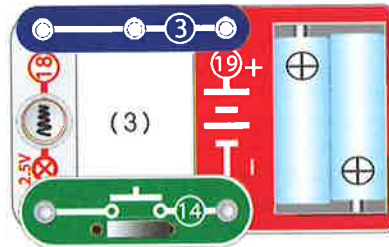
**1. Bulb circuit**

As is known bulbs can light, but do you know how does the lighting circuit work? Assemble the circuit according to the graph and slide slide switch to on, the bulb is alight. Slide slide switch to off, the bulb is off.



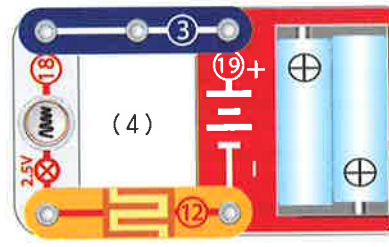
**2. Magnetic switch bulb circuit**

Magnetic switch is one kind of switch. It will on when you take a magnet to pick up its two magnets and recover its original state when you take away the magnet. Assemble the circuit according to the graph and take one end of the magnetic bar close to the magnetic switch, wow, the bulb is alight. But when you take away the magnetic bar, the bulb is off again.



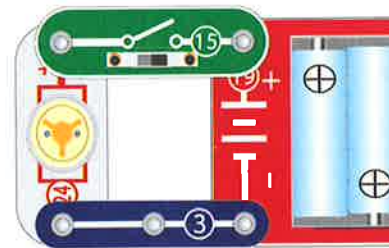
**3. Pressure switch bulb circuit**

Pressure button is also one kind of switch. As long as you press the pressure button, it can open the circuit. The difference from switch is that it will automatically break when you release your hand. Assemble the circuit according to the graph, is the bulb alight? It is not. Then press the pressure button by hand, it is alight. And when you release your hand, it is off.



**4. Touch controlled switch bulb circuit**

Touch pad is one kind of switch extended from light touch switch. As long as you press its copper platinum surface with a conductor, it will on. Assemble the circuit according to the graph, is the bulb alight? No, it is not. As long as you take a sheet metal to touch the copper platinum of the touch pad, the bulb is alight. And as you take away the sheet metal, the bulb is off.



(5-8)

**5. Electric motor circuit**

Assemble the circuit according to the graph and slide slide switch to on, the motor rotates. Slide slide switch to off, the motor stops running. Isn't it amazing? Be quick to have a try!

**6. Magnetic switch electric motor circuit**

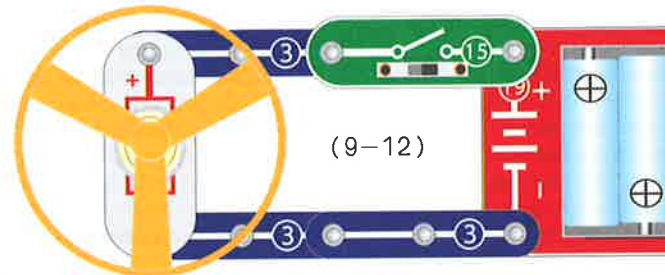
Replace the slide switch in the circuit with magnetic switch. As long as you take magnetic bar close to the magnetic switch, the electric motor will rotate. When you take away the magnetic bar, the electric fan stops revolving.

**7. Pressure switch electric fan circuit**

Replace the switch in the circuit with pressure button, and as long as you press the pressure button, the electric fan will rotate. When you release your hand, the electric motor will stop running.

**8. Touch controlled switch electric fan circuit**

Replace the slide switch in the circuit with touch pad, and as long as you press the copper platinum of the touch pad with a sheet metal (or female button for No. 1 conductive piece), the electric fan will rotate. When you release your hand, the electric motor will stop running.



**9. Electric fan circuit**

Assemble the circuit according to the graph. Then install the flying saucer on the motor and slide slide switch to on, the electric fan rotates. Now can you feel a bit of cool wind?

**10. Magnetic switch electric fan circuit**

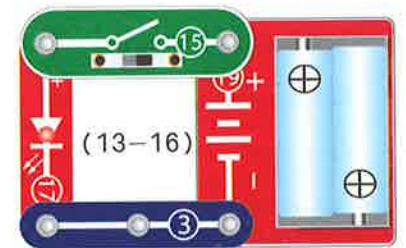
Replace the slide switch in the graph with magnetic switch and take the magnetic bar close to it, then the electric fan will rotate. Take away the magnetic bar, the fan will stop running.

**11. Pressure switch electric fan circuit**

Replace the switch in the circuit with pressure button. Press the pressure button by hand, the fan rotates. Release the pressure button, the fan stops running.

**12. Touch controlled switch electric fan simulation circuit**

Replace the slide switch in the circuit with touch pad, and as long as you press tight the copper platinum of the touch pad with a sheet metal (or female button for No. 1 conductive piece), the electric fan will rotate. Now can you feel a bit of cool wind?



**13. LED circuit**

LED is one kind of diode. It can give out light when it is turned on, so it is usually called "lighting emitted diode". It is small in power, and saves electricity. It can be made into different kinds of colors, usually used as the indicating lamps of different kinds. Assemble the circuit according to the graph and slide slide switch to on, the LED is alight.



**14. Magnetic switch LED circuit**

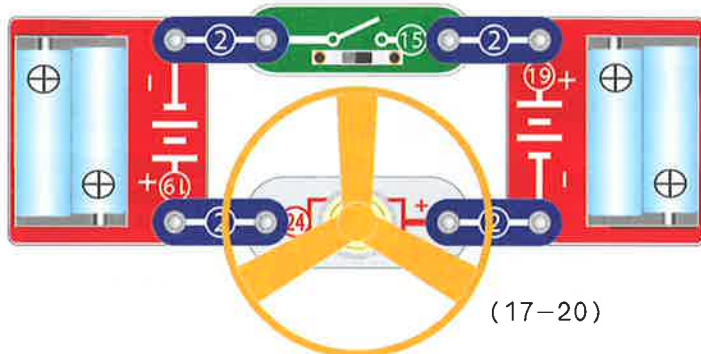
Change the slide switch in the graph into magnetic switch and take the magnetic bar close to it, then the LED will be alight. Take away the magnetic bar, the LED will be off.

**15. Pressure switch LED circuit**

Replace the slide switch in the circuit with pressure button and press the pressure button by hand, the LED is alight. Release your hand, the LED will be automatically off.

**16. Touch controlled LED circuit**

Replace the switch in the circuit with touch pad, and as long as you press tight the copper platinum of the touch pad with female button for No. 1 conductive piece, the LED will be alight. Isn't it very amazing?



(17-20)

**17. Flying saucer circuit**

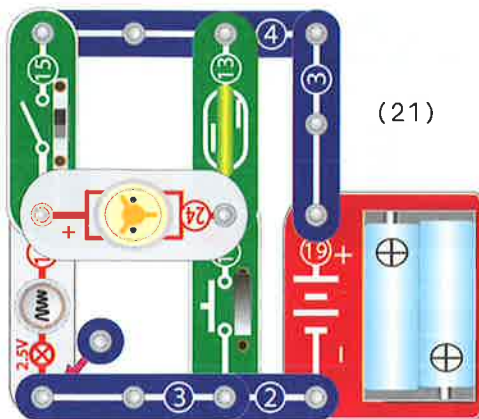
Assemble the circuit according to the graph. Then install the flying saucer and switch on, the electric motor will rotate. When the motor runs at a certain speed, then suddenly switch off, the flying saucer will fly up. (Note: Flying saucer at people is strictly forbidden!)

**18. Magnetic switch Flying saucer circuit**

Change the slide switch in the graph into Magnetic switch and take one end of the magnetic bar close to it, the motor rotates. When the motor runs at a certain speed, then suddenly take away the magnetic bar, the flying saucer will fly up into the sky. Isn't it miraculous? (Note: Flying saucer at people is strictly forbidden!)

**19. Pressure switch Flying saucer circuit**

Change the switch in the graph into pressure button



(21)

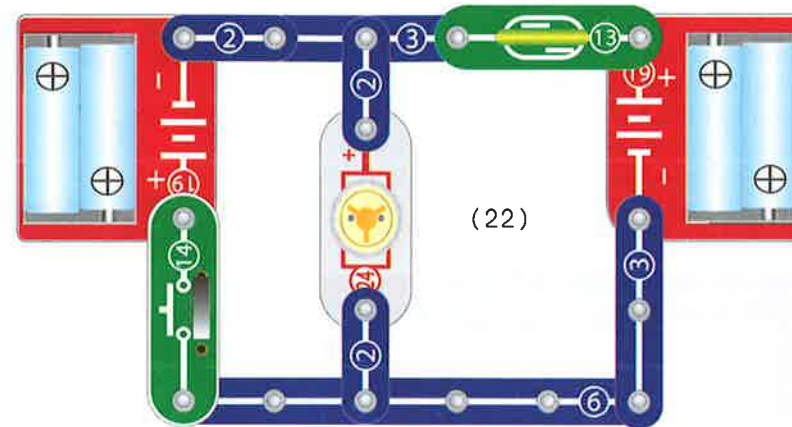
**21. Electric motor positive and negative rotation circuit (1)**

After assembling the circuit and take the magnetic bar close to the magnetic switch, the electric motor rotates and the bulb is alight. Take away the magnetic bar and switch on, the bulb is alight. Then press the pressure button, the motor runs reversely.

and press it tightly by hand, the motor rotates. When the motor runs at a certain speed, release your hand, and the flying saucer will automatically fly up into the sky. (Note: Flying saucer at people is strictly forbidden!)

**20. Touch controlled switch flying saucer circuit**

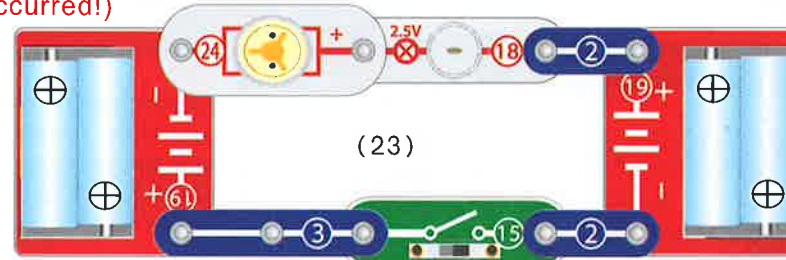
Replace the slide switch in the graph with touch pad and press tight the copper platinum of the touch pad with a sheet metal (or female button for single connecting piece), the motor rotates. When the motor runs at a certain speed, release your hand, and the flying saucer will automatically fly up into the sky. (Note: Flying saucer at people is strictly forbidden!)



(22)

**22. Electric motor positive and negative rotation circuit (2)**

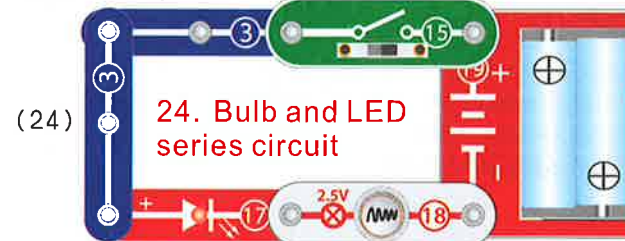
Assemble the circuit according to the graph and take one end of the magnetic bar close to the magnetic switch, the electric motor rotates. Take away the magnetic bar and as you press the pressure button, the motor will rotate reversely. (Note: In this circuit, the magnetic switch and pressure button can not be turned on at the same time, otherwise short circuit may be occurred!)



(23)

**23. Bulb and electric motor series circuit**

Assemble the circuit according to the graph and slide slide switch to on, does the electric motor rotate? Yes, it rotates and the bulb is also alight. Slide slide switch to off, both the motor and the bulb "rest".

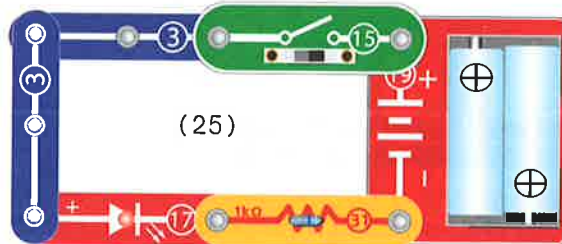


(24)

**24. Bulb and LED series circuit**

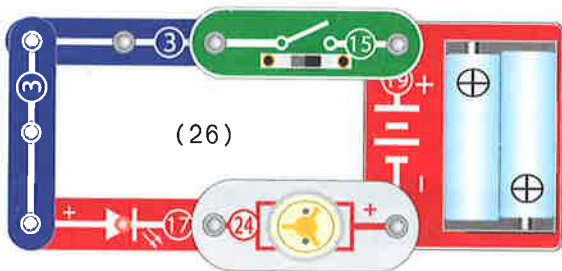
**24. Bulb and LED series circuit**

Assemble the circuit according to the graph and slide slide switch to on, the LED is alight but the bulb can not light. What is the reason? Because the current passing through the LED is very small, much fewer than the working current for the bulb, not big enough to light it.



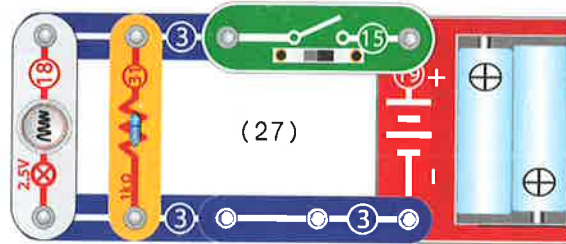
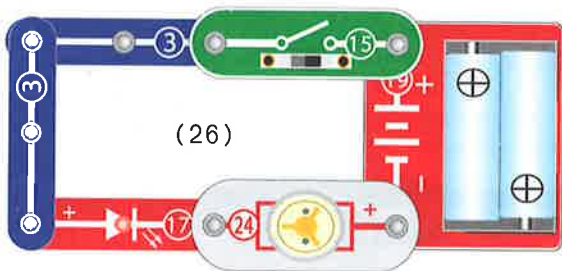
**25. LED and resistance series circuit**

Assemble the circuit according to the graph and slide slide switch to on, the LED is alight. Slide slide switch to off, the LED is off.



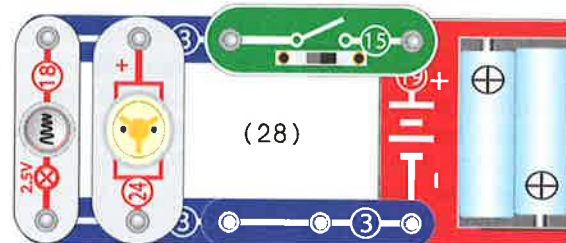
**26. LED and electric motor series circuit**

Assemble the circuit according to the graph and slide slide switch to on, the LED is alight, but the electric motor can not rotate. Do you know why? Because the current passing through the LED is very small, while the working current of the motor is much larger. This is the reason why the motor can not rotate.



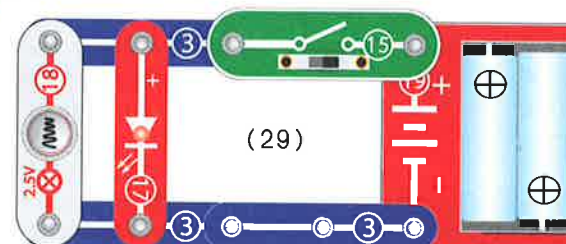
**27. Bulb and resistance parallel circuit**

Assemble the circuit according to the graph and slide slide switch to on, the LED is alight. Slide slide switch to off, the bulb is off.



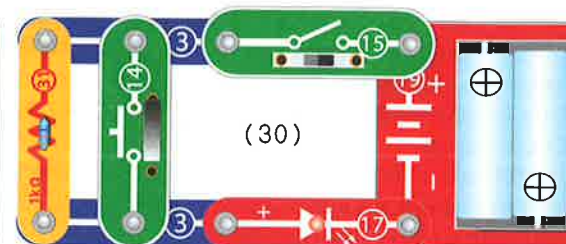
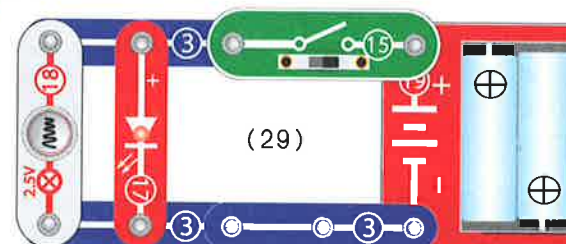
**28. Bulb and electric motor parallel circuit**

Assemble the circuit according to the graph and slide slide switch to on, the bulb is alight and the motor rotates at the same time. Slide slide switch to off, both the bulb and the motor will stop working.



**29. Bulb and LED parallel circuit**

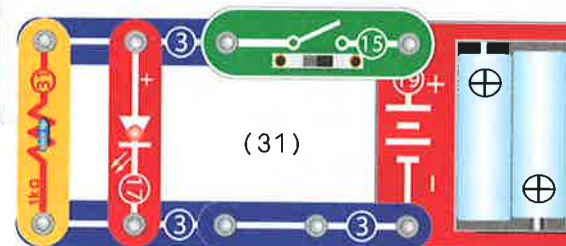
Assemble the circuit according to the graph and slide slide switch to on, both the bulb and the LED will be alight. Slide slide switch to off, they will be off at the same time.



**30. Circuit showing resistance's current-limiting function**

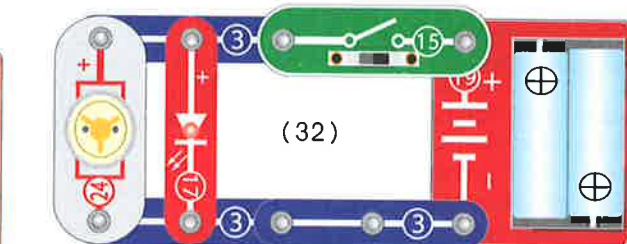
Resistances function limiting the current in the circuit, used to protect other

components. Assemble the circuit according to the graph and slide slide switch to on, the LED is alight, but very dim. Because the resistance limits the current passing through the diode. As long as you press the pressure button, the LED will become brighter, for the current by passed the resistance and passed through the pressure button directly. The smaller resistance, the larger current passes through the circuit, and the brighter the LED.



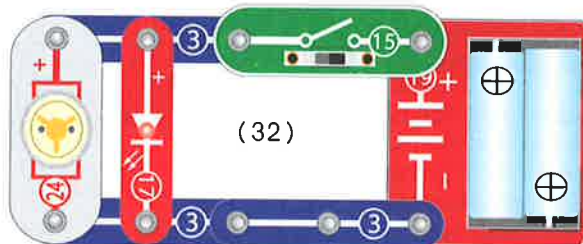
**31. LED and resistance parallel circuit**

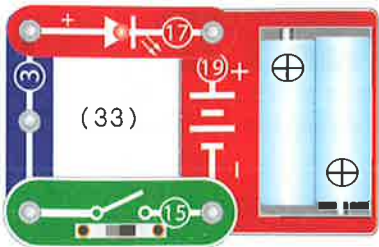
Assemble the circuit according to the graph and slide slide switch to on, the LED is alight. Slide slide switch to off, the LED is off.



**32. LED and electric motor parallel circuit**

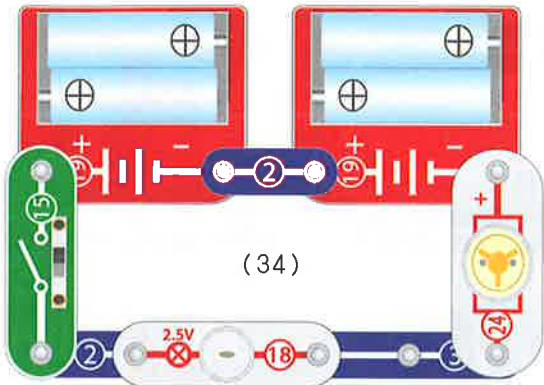
Assemble the circuit according to the graph and slide slide switch to on, the LED is alight and the electric motor rotates at the same time. Slide slide switch to off, both the LED and the motor will stop working.





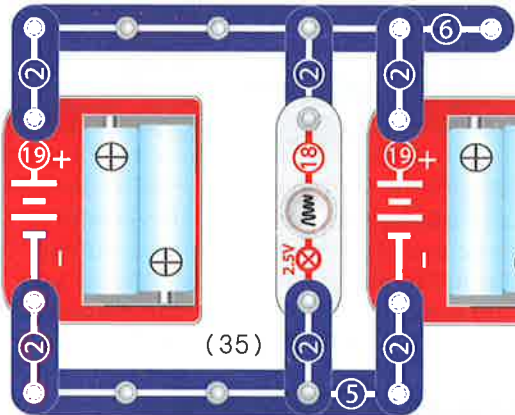
**33. Unilateral conductivity of LED**

Assemble the components according to the graph and slide slide switch to on, the LED is not alight. This is because the LED is the same as the common LED, having the performance of unilateral conductivity. Now try to connect the positive pole to the switch side, wow, the LED is alight.



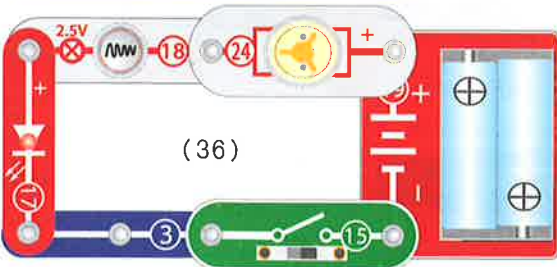
**34. Batteries series circuit in positive direction**

Assemble the circuit according to the graph. Since the batteries are connected in positive series, the total voltage is the sum of two batteries' voltage but the current is the same. Two 3V batteries are connected in series in the circuit, so the total voltage is 6V. Slide slide switch to on, the electric motor rotates and the bulb is alight.



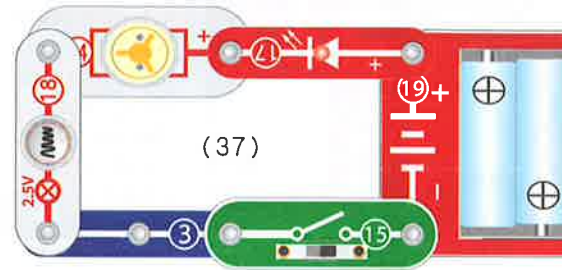
**35. Batteries parallel circuit**

Assemble the circuit according to the graph. Since the two 3V batteries are connected in parallel, the voltage of the same type of batteries is the same. But the service time of the batteries is prolonged.



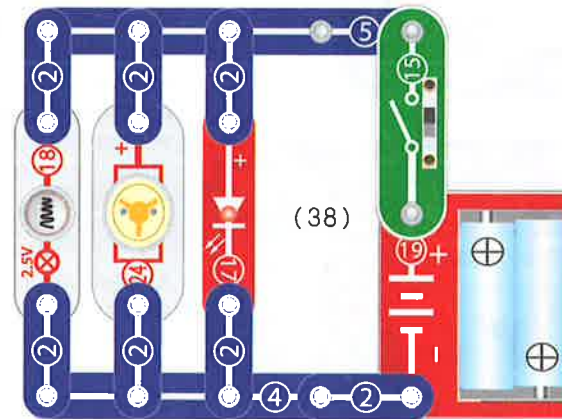
**36. Bulb, LED and electric motor series circuit (1)**

Assemble the circuit according to the graph and slide slide switch to on, only the red LED is alight, while the bulb and the electric motor can not work because of the small current in the circuit.



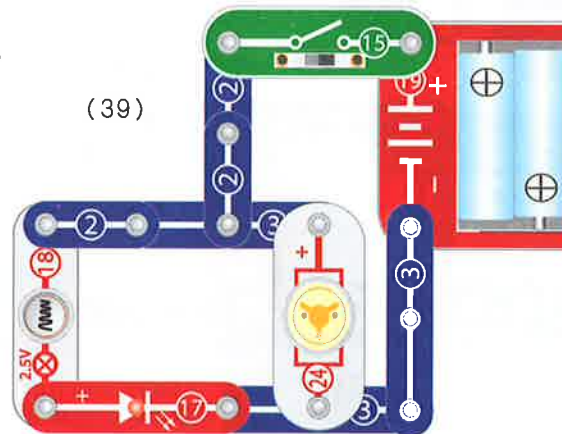
**37. Bulb, LED and electric motor series circuit (2)**

Assemble the circuit according to the graph and slide slide switch to on, it is the same that only the red LED is alight, but the bulb and the electric motor can work



**38. Bulb, electric motor, and LED parallel circuit**

Assemble the circuit according to the graph and slide slide switch to on, both the LED and the bulb are alight, and the electric motor also rotates. If the LED is damaged, can the bulb and the electric motor still work? Yes, they can. Think about it why it is so.

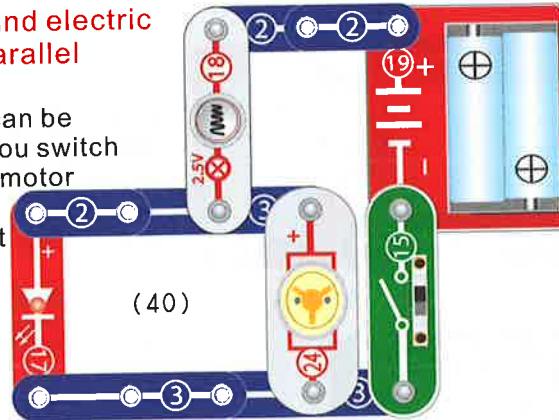


**39. Bulb, LED and electric motor series-parallel circuit (1)**

Assemble the circuit according to the graph. In the circuit, the bulb and the LED is in series first, then in parallel with the electric motor. This connection method is called series-parallel connection. Slide slide switch to on, both the motor and LED can work, but the bulb can not light. What is the reason? Because the bulb is connected with the LED in series, so the current passing through the bulb is too small to light it.

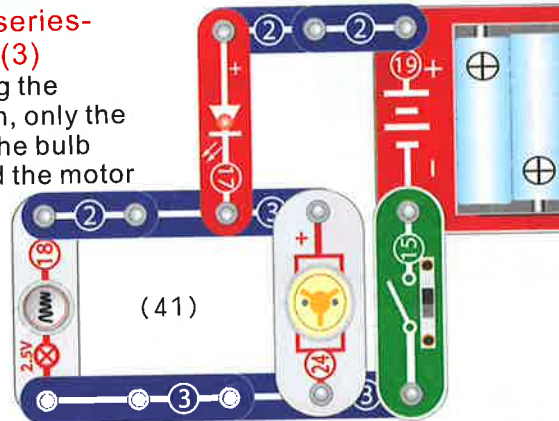
### 40. Bulb, LED and electric motor series-parallel circuit (2)

What response can be occurred when you switch on? The electric motor rotates and the bulb is alight, but the LED can not light. Why? Use your heads to think about it!



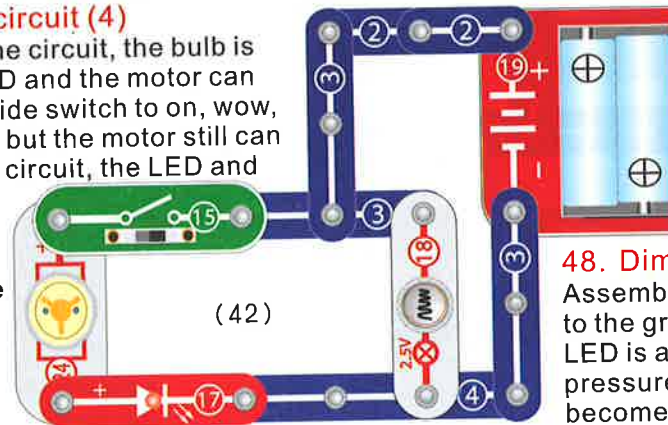
### 41. Bulb, LED and electric motor series-parallel circuit (3)

After assembling the circuit, switch on, only the diode is alight, the bulb can not light and the motor can not rotate.



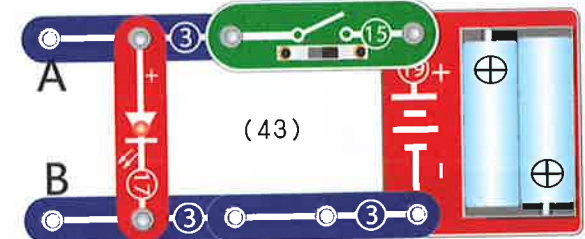
### 42. Bulb, LED and electric motor series-parallel circuit (4)

After assemble the circuit, the bulb is alight, but the LED and the motor can not work. Slide slide switch to on, wow, the LED is alight, but the motor still can not rotate. In this circuit, the LED and the motor is connected in series. The LED is alight, why the motor can not rotate? Please use your brains to think about it!



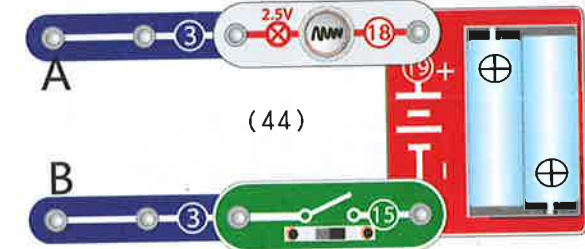
### 43. Conductor test circuit

Assemble the circuit according to the graph. In the circuit, which objects in daily life are conductors and which objects are not can be tested. Only switch on and connect the object between A and B, if the bulb is alight, then the object is a conductor, such as knife, aluminum pot, etc. If the bulb can not light, then the object is not a conductor, such as plastics and wood, etc.



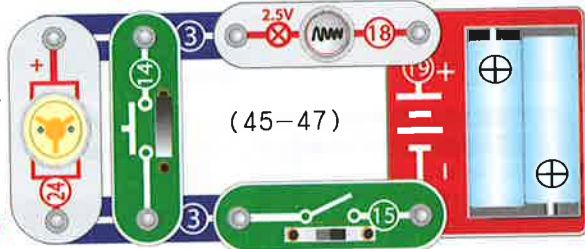
### 44. Dimmer bulb circuit

Assemble the circuit according to the graph and switch on, the bulb is alight and the electric motor also rotates. At this time if only you press the pressure button, the motor will stop running, while the bulb will become brighter.



### 45. Dimmer bulb circuit

Assemble the circuit according to the graph and switch on, the bulb is alight and the electric motor also rotates. At this time if only you press the pressure button, the motor will stop running, while the bulb will become brighter.



### 46. Touch controlled switch dimmer bulb circuit

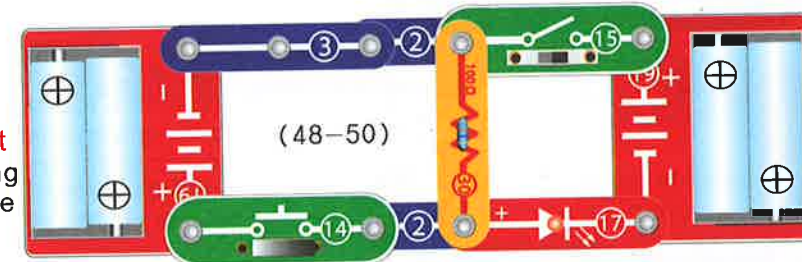
Replace the pressure button in the circuit with touch pad and switch on, the bulb is alight and the motor rotates. As long as you take the metal conductor to touch the touch pad, the bulb will become brighter.

### 47. Magnetic switch dimmer bulb circuit

Replace the key button in the circuit with magnetic switch and switch on, the bulb is alight and the motor rotates. As long as you take the magnetic bar close to the magnetic switch, the bulb will become brighter.

### 48. Dimmer red LED circuit

Assemble the circuit according to the graph and switch on, the LED is alight. Press the pressure button, the red LED becomes more brighter. Do you know what is the reason?

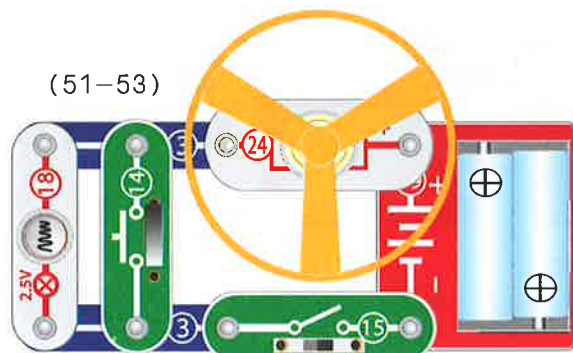


**49. Touch controlled switch dimmer red LDE circuit**

Replace the pressure button in the circuit with touch pad and switch on, the LED is alight. As long as you take metal conductor to touch the touch pad, the LED will become brighter.

**50. Magnetic switch dimmer red LED circuit**

Replace the pressure button in the circuit with magnetic switch and switch on, the LED is alight. As long as you take one end of the magnetic bar close to the magnetic switch, the LED will become brighter.



**51. Pressure switch variable speed fan circuit**

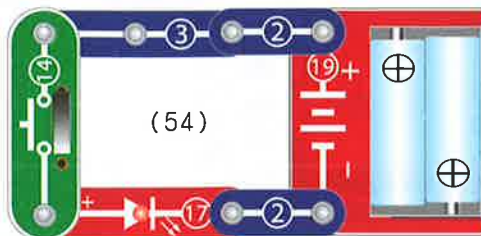
Assemble the circuit according to the graph and install the flying saucer. Switch on, the flying saucer rotates and the bulb is alight. As long as you press the pressure button, the bulb is off and the flying saucer rotates faster.

**52. Magnetic switch variable speed fan circuit**

Replace the pressure button in the circuit with magnetic switch and switch on, the bulb is alight and the flying saucer rotates. At the moment as you take one end of the magnetic bar close to the magnetic switch, the flying saucer rotates faster.

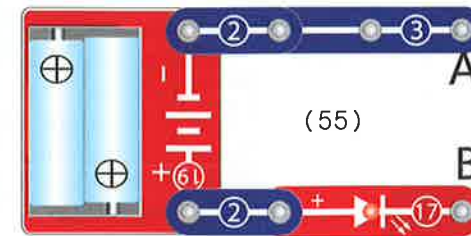
**53. Touch controlled switch variable speed fan circuit**

Replace the pressure button in the circuit with touch pad and switch on, the bulb is alight and the flying saucer rotates. At the moment as you take the a sheet metal to touch the copper platinum of the touch pad, the flying saucer will rotate faster.



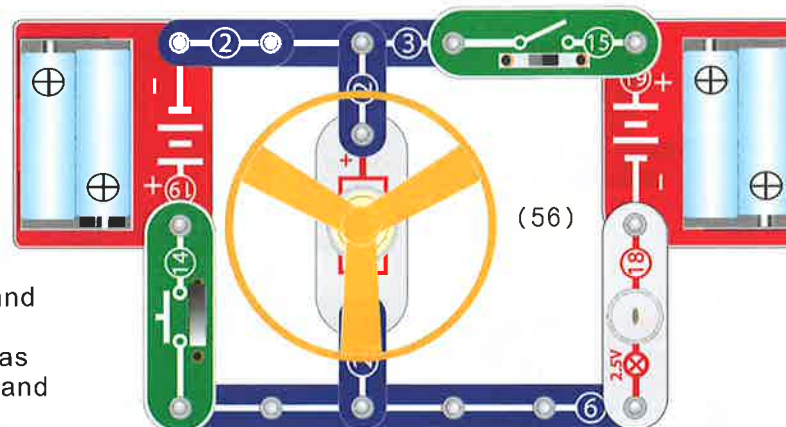
**54. Simple telegram trainer circuit**

Have you ever seen telegraph? Assemble the circuit according to the graph and press / release the pressure button with a certain rhythm, the red LED will accordingly flash. So it can be used to do simple telegram exercise.



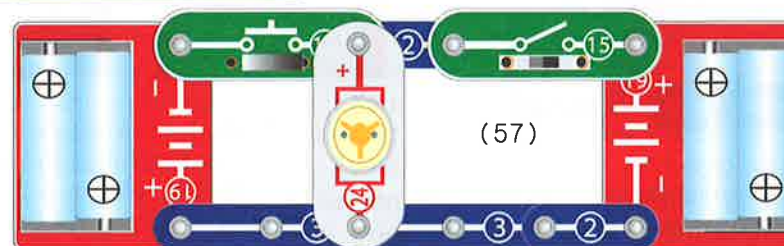
**55. Wire on-off tester circuit**

Assemble the circuit according to the graph and connect the wire between A and B. If the LED is alight, then the wire is fine. If the LED can not light, then the wire is broken somewhere. This wire on-off tester can detect whether hundreds even thousands of wire is on or off. Isn't it very miraculous?



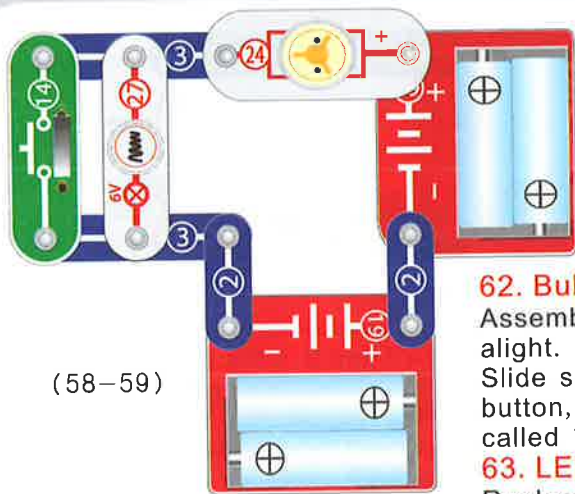
**56. Electric fan forward and reverse rotation and dimmer bulb circuit**

Assemble the circuit according to the graph and switch on, the bulb is alight and the flying saucer rotates positively. At this time, as long as you press the pressure button, the bulb will become brighter and the blade will rotate anticlockwise (negative rotation) and faster. Release the pressure button, the flying saucer will run positively again. And when you press the pressure button, the flying saucer will run reversely. Such cycle will repeat as you press and release the button. Isn't it very interesting?



**57. Motor positive and negative rotation control circuit**

Assemble the circuit according to the graph and switch on, the motor rotates positively. If you add the flying saucer, then the motor turns into an electric fan. Switch off and press the pressure button, the motor rotates reversely. At this time if you install the fan blade, it turns into a flying saucer. Isn't it very miraculous? (Note: the slide switch and the pressure button can not be closed at the same time. Otherwise, short circuit may be occurred to damage the batteries.)



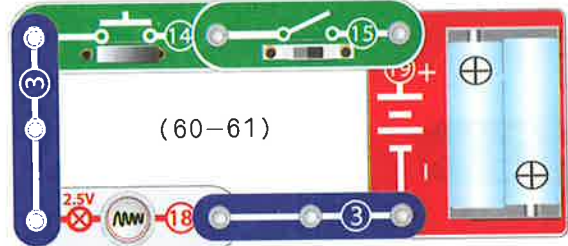
(58-59)

**58. Bulb "negater" circuit**

Assemble the circuit according to the graph. What phenomenon is happened? The electric motor rotates and the bulb is alight. As you press the pressure button, the bulb will be off. This is called "negater" circuit. Do you understand it?

**59. LED "negater" circuit**

Replace the bulb in the circuit with red LED, then it turns into an LED "negater" circuit.



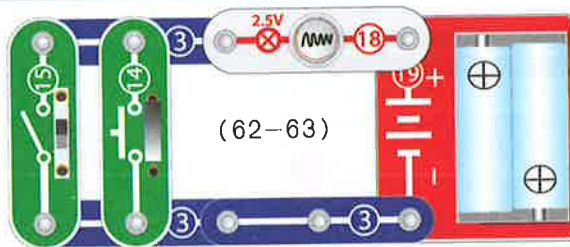
(60-61)

**60. Bulb "and gate" circuit**

Assemble the circuit and switch on. Is the bulb alight? No, it is not. Then press the pressure button, the bulb is alight. At present do you know what is "and gate"? In this circuit, you can understand it vividly as: two conditions must be existed to make the bulb alight. That is to say, two switches must be on at the same time can the bulb be alight.

**61. LED "and gate" circuit**

Replace the bulb with red LED in the circuit, it is OK.



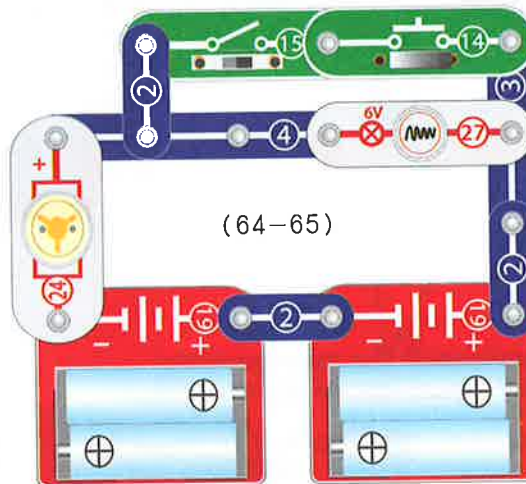
(62-63)

**62. Bulb "or gate" circuit**

Assemble the circuit according to the bulb, it is not alight. Slide slide switch to on, the bulb is alight. Slide slide switch to off, and press the pressure button, the bulb is alight again. This kind of circuit is called "or gate" circuit.

**63. LED "or gate" circuit**

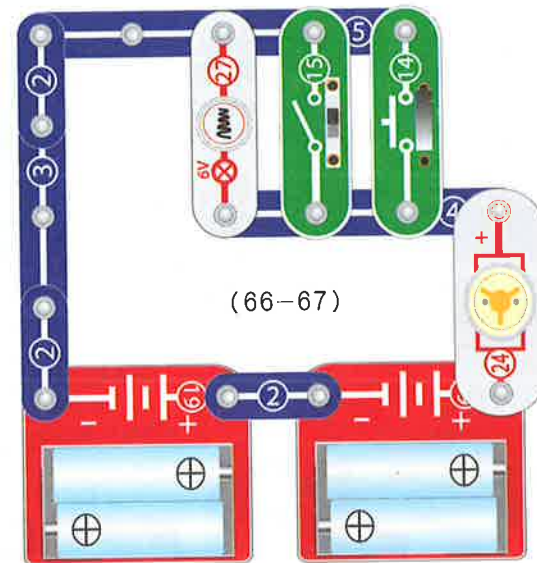
Replace the bulb with red LED in the circuit, it is OK.



(64-65)

**64. Bulb "nand gate" circuit**

After assembling the circuit, the motor rotates and the bulb is alight. But how to turn off the bulb? Switch on, the bulb is still alight. Then press the pressure button. Wow, the bulb is off. It turned out that both switches must be closed can turn off the bulb. This is called "nand gate" circuit.



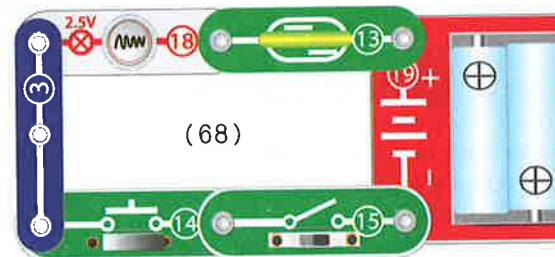
(66-67)

**66. Bulb "nor gate" circuit**

Assemble the circuit according to the graph, both the motor and the bulb work. Do you have ideas to turn off the bulb? As long as you press the pressure button or slide slide switch to on, the bulb will be off. This is the so-called "nor gate" circuit.

**67. LED "nor gate" circuit**

Replace the bulb with red LED in the circuit, it is OK.



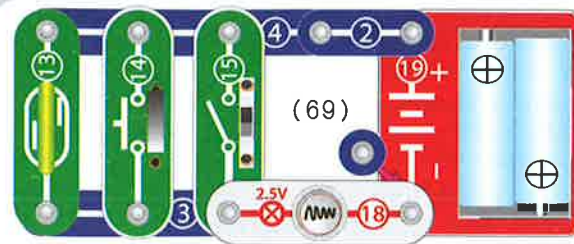
(68)

**68. Circuit of three series switches controlling one bulb**

Assemble the circuit according to the graph and slide slide switch to on, the bulb is not alight. Press the pressure button, it is still not alight. Now try to take a magnetic bar close to the Magnetic switch, the bulb is alight. This circuit is three switches in series controlling one bulb. The three switches must be closed at the same time can the bulb be alight.

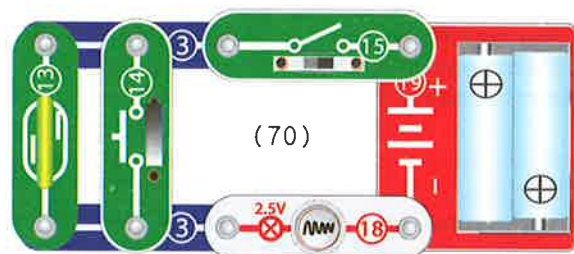
**65. LED "nand gate" circuit**

Replace the bulb with red LED in the circuit, it is OK.



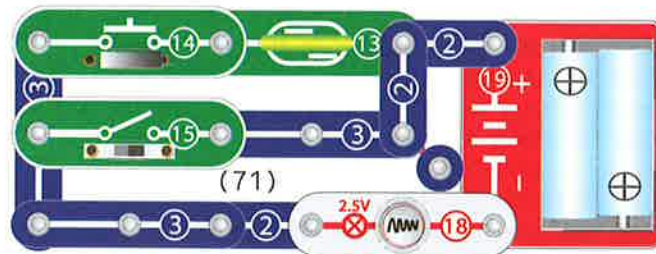
**69. Circuit of three parallel switches controlling one bulb**

Assemble the circuit according to the graph, and as long as you close any one switch, the bulb can light.



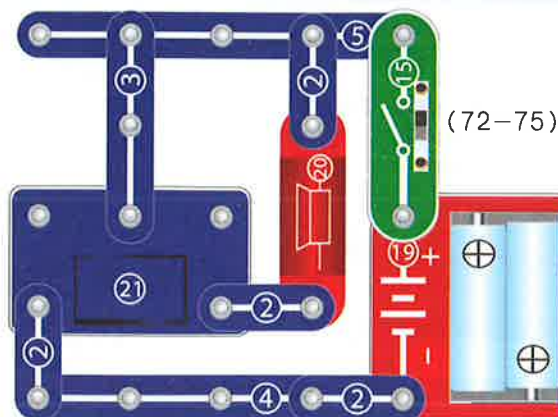
**70. Circuit of three series-parallel switch controlling one bulb (1)**

Assemble the circuit according to the graph and slide slide switch to on, the bulb is not alight. Try to press the pressure button or take a magnetic bar close to the Magnetic switch, wow, the bulb is alight. This is three series-parallel switches controlling one bulb.



**71. Circuit of three series-parallel switch controlling one bulb (1)**

Assemble the circuit according to the graph and slide slide switch to on, the bulb is not alight. Try to press the pressure button or take a magnetic bar close to the Magnetic switch, wow, the bulb is alight. This is three series-parallel switches controlling one bulb.



**72. Birthday blessing circuit**

Assemble the circuit according to the graph and switch on, the speaker will send out melodious birthday blessing music. Switch off, the speaker will stop. This circuit can be used for children to increase the party atmosphere while celebrating their birthday parties.

**73. Pressure switch birthday blessing circuit**

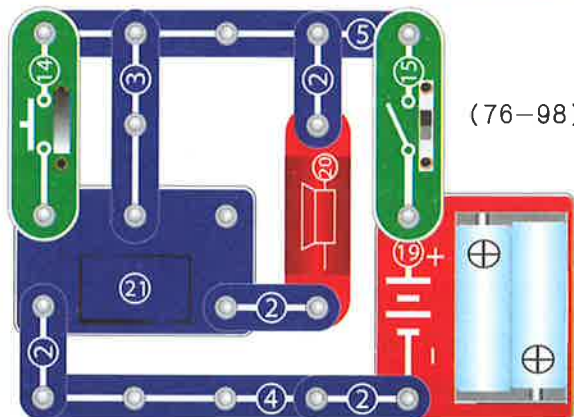
Replace the slide switch in the circuit with pressure button and as you press the pressure button, the speaker will sound melodious birthday blessing music. Release the pressure button, the speaker will stop.

**74. Magnetic switch birthday blessing circuit**

Replace the slide switch in the circuit with magnetic switch and as you take the magnetic bar close to the magnetic switch, the speaker will sound melodious birthday blessing music. Take away the magnetic bar, the Speaker will stop.

**75. Touch controlled switch birthday blessing circuit**

Replace the switch in the circuit with touch pad and as you press the copper platinum of the touch pad with a sheet metal, the speaker will sound melodious birthday blessing music. Release the sheet metal, the speaker will stop.



**76. Pressure switch delayed music door-bell circuit**

Assemble the circuit according to the graph and switch on, the speaker will send out music. Until the music stops, as you press the pressure button, the speaker will send out music again. If you connect the pressure button with wire to the outside of the house, and when the guest is visiting and as he/she pressing the pressure button, you can hear the music sound in the house. Isn't it a very practical music door-bell?

**77. Magnetic switch delayed music door-bell circuit**

Replace the pressure button in the circuit with magnetic switch and slide slide switch to on. Until the speaker stops sounding music, as you take one end of the magnetic bar close to the magnetic switch, the speaker will sound music again.

**78. Touch control switch delayed music door-bell circuit**

Replace the pressure button in the circuit with touch pad and switch on. Until the speaker stops sounding music, as you take the a sheet metal to touch the touch pad with a sheet metal (such as No. 1 conductive piece), the speaker will sound music again

## 79. Sound control switch delayed music door-bell circuit

Replace the pressure button in the circuit with buzzer and switch on. Until the speaker stops sounding music, as you tap the buzzer with hand or blow air to the buzzer, the speaker will sound music again.

## 80. Light control delayed music door-bell circuit

Replace the pressure button in the circuit with light-activated switch and switch on. Until the speaker stops sounding music, as you cover the light of the light-activated switch with hand, the speaker will sound music again.

## 81. Electric motor control delayed music door-bell circuit

Replace the pressure button in the circuit with electric motor and switch on. Until the speaker stops sounding music, as you drive the running shaft with hand, the speaker will sound music again.

## 82. Bulb control delayed music door-bell circuit

Replace the pressure button in the circuit with bulb and switch on. Until the speaker stops sounding music, as you screw the bulb with hand, the speaker will sound music again.

## 83. Water control switch delayed music door-bell circuit

Replace the pressure button in the circuit with touch pad and switch on. Until the speaker stops sounding music, as you drop a drop of water on the copper platinum of the touch pad, the speaker will sound music again.

## 84. Pressure switch delayed bulb circuit

## 85. Magnetic switch delayed bulb circuit

## 86. Touch control switch delayed bulb circuit

## 87. Sound control switch delayed bulb circuit

Replace the Speaker in the circuits of 76-83 with bulb, the phenomena of circuits of 84-90 can be realized.

## 88. Light control switch delayed bulb circuit

## 89. Electric motor control switch delayed bulb circuit

## 90. Water control switch delayed bulb circuit

Replace the Speaker in the circuits of 76-83 with bulb, the phenomena of circuits of 84-90 can be realized.

## 91. Pressure switch delayed red LED circuit

## 92. Magnetic switch delayed red LED circuit

## 93. Touch control switch delayed red LED circuit

## 94. Sound control switch delayed red LED circuit

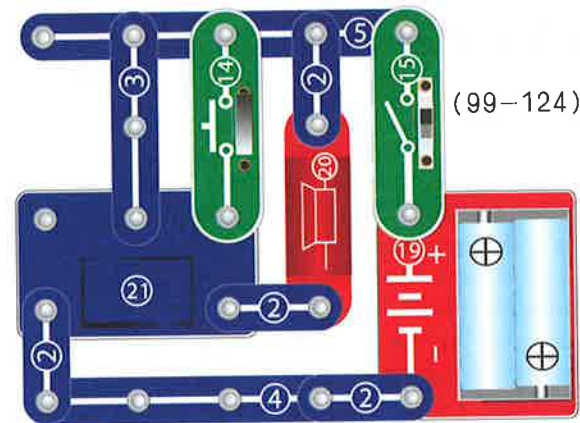
## 95. Light control switch delayed red LED circuit

## 96. Electric motor control switch delayed red LED circuit

## 97. Bulb control switch delayed red LED circuit

## 98. Water control switch delayed red LED circuit

Replace the speaker in the circuits of 76-83 with red LED, the phenomena of circuits of 91-98 can be realized.



## 99. Pressure switch birthday song circulative playing circuit

Assemble the circuit according to the graph. Hold on pressing the pressure

button with hand and switch on, the speaker will continuously and circularly repeat playing the birthday blessing songs.

## 100. Magnetic switch birthday song circulative playing circuit

Replace the pressure button in the circuit with magnetic switch and take the magnetic bar to touch the magnetic switch and hold on. Switch on, the speaker will continuously and circularly repeat playing the birthday blessing songs.

## 101. Touch controlled switch birthday song circulative playing circuit

Replace the pressure button in the circuit with touch pad and hold on pressing the copper platinum of the touch pad with a sheet metal. Switch on, the speaker will continuously and circularly repeat playing the birthday blessing songs.

## 102. Conductive piece controlled switch birthday song circulative playing circuit

Replace the pressure button in the circuit with No. 3 conductive piece and switch on, the Speaker will continuously and circularly repeat playing the birthday blessing songs.

## 103. Resistance controlled birthday song circulative playing circuit

Replace the pressure button in the circuit with 1K resistance and switch on, the speaker will continuously and circularly repeat playing the birthday blessing songs.

## 104. Light-activated switch controlled birthday song circulative playing circuit

Replace the pressure button in the circuit with light-activated switch and switch on, the speaker will continuously and circularly repeat playing the birthday blessing songs.

## 105. Bulb controlled birthday song circulative playing circuit

Replace the pressure button in the circuit with bulb and switch on, the speaker will continuously and circularly repeat playing the birthday blessing songs.