

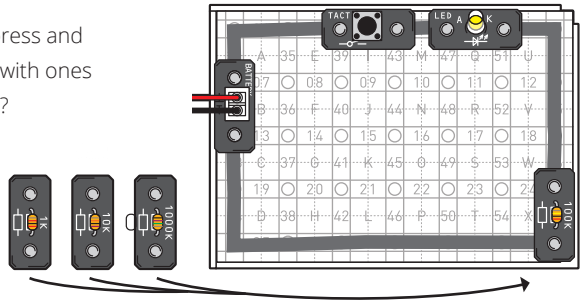
Let's create circuits

Circuit 1: Lighting up LED

You will study about...

- Switch
- LED
- Resistor (1kΩ, 10kΩ, 100kΩ, 1000kΩ)

Let's light up an LED. Draw this circuit, then press and release the switch. Then replace the resistor with ones with other values. How does the light change?



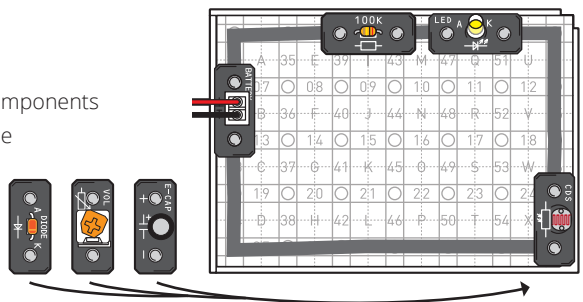
Circuit 2-5: Various components

You will study about...

- Light Sensor
- Capacitor
- Volume
- Diode

Replace the resistor in Circuit 1 with other components and see how the light changes. What do those components do?

How to use components



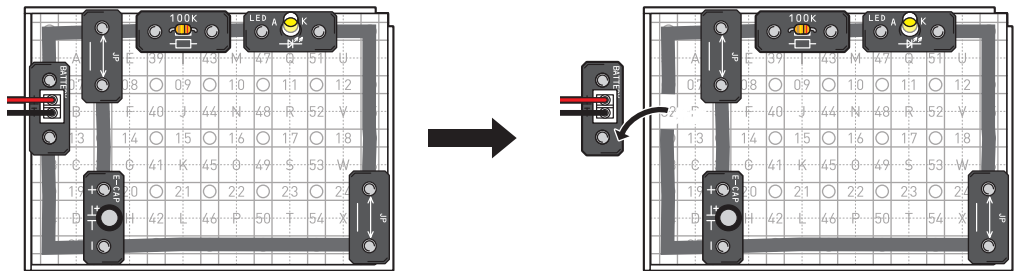
- Light sensor
Cover the sensor with the pen cap to control the light.
- Capacitor
Discharge electricity in the capacitor once you use it in this circuit by placing it on a line.
- Volume
Use a screwdriver to adjust the value.

Circuit 6: Capacitors in parallel

You will study about...

- Capacitor (in parallel)

Insert a capacitor in series into a circuit with an LED and a resistor. Take the resistor off as you see the LED lights up. How does the light change?

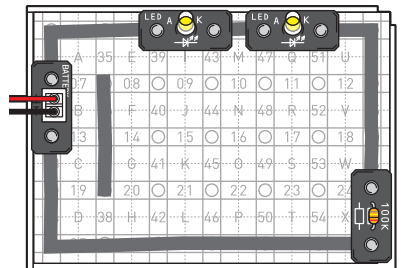


Circuit 7: Making series circuit

You will study about...

- LED (in series)

Make a circuit with 2 LEDs in series. Insert a resistor for safety too. Check the brightness of the light.

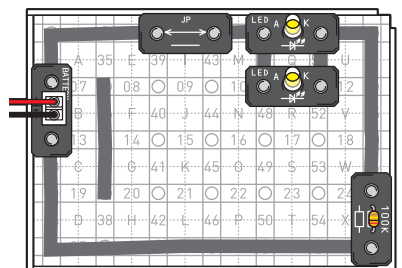


Circuit 8: Making parallel circuit

You will study about...

- LED (in parallel)

Make a circuit with 2 LEDs in parallel. Circuit 7 and 8 both have 2 LEDs. Is there any difference?

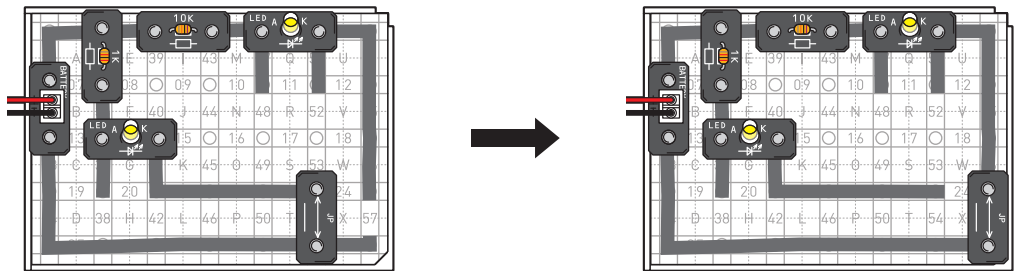


Circuit 9: Switching circuit with jumper

You will study about...

- Switching circuit

Make the circuit on the left with two LEDs and two resistors. Then move the jumper at the bottom right to make the circuit on the right. Are two lights different?

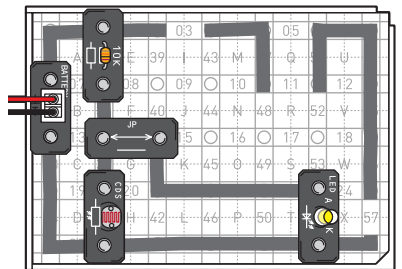


Circuit 10: Dark-detecting LED circuit

You will study about...

- Practical application of light sensors

Make the circuit and confirm that the LED lights up in the dark, and guess how this circuit works.

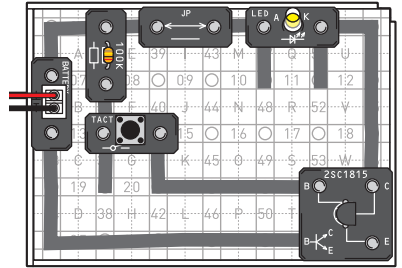


Circuit 11: Studying transistors 1

You will study about...

- Transistor: Basic function

Make this circuit with a transistor, and push the switch. See the light and guess how the transistor works. Current flows from collector to emitter while current flows from base to emitter.

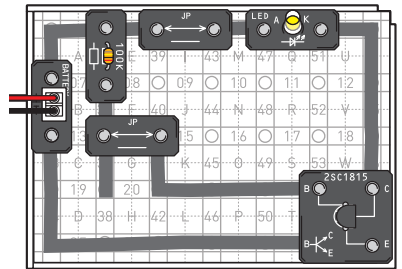


Circuit 12: Studying transistors 2

You will study about...

- Transistor: Amplifying current

Replace the resistor in Circuit 11 with 1kΩ, 10kΩ, 1000kΩ resistor and see how the light changes. The more current flows from base, the brighter the LED lights up.



Circuit 13, 14: Making LED dimmer with transistor

You will study about...

- Combining light sensor and transistor

Now you have learned how to use light sensors and transistors. Make a dimmer using them as the diagram below. Then replace the light sensor with a volume to make the circuit right.

