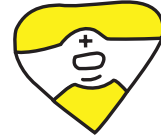


# 1. SIMPLE CIRCUIT

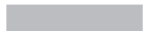


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## Directions:

1. Turn to the template on the next page and stick foil tape over the gray lines.



**Note:** Apply the foil as a continuous piece, rather than separate pieces, even when turning corners. The adhesive on the bottom side of the foil makes a weak connection.

2. Fold the page corner along dotted line and place the battery “+” side-up over the “-” circle.

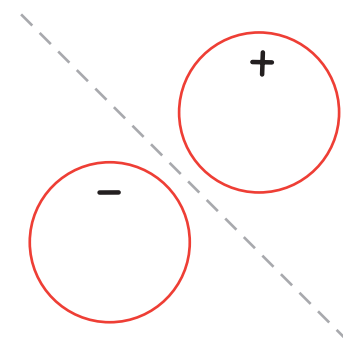
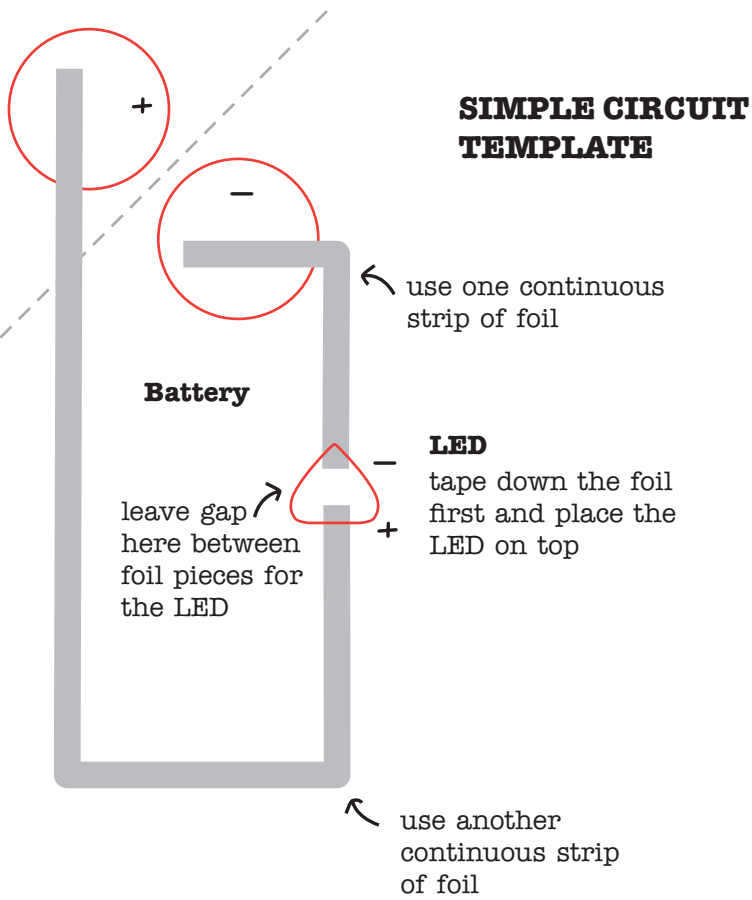


3. Fold the corner flap over, and clip the battery in place with a binder clip.



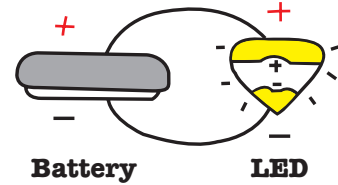
4. Stick the LED sticker onto the foil, over the footprint. The light will turn on!





## 1. SIMPLE CIRCUIT

Let's get started by lighting an LED! We will use the foil tape to connect a battery to the LED in a loop. The "+" side of the LED sticker needs to connect to the "+" side of the battery and the "-" point of the sticker to the "-" side of the battery. This continuous loop is a **complete circuit**.



Electrons only flow in loops, and this complete circuit allows electrons to flow from the battery, through the LED, and back into the battery. This round-trip flow of electrons, called **current**, causes the light to turn on and shine.

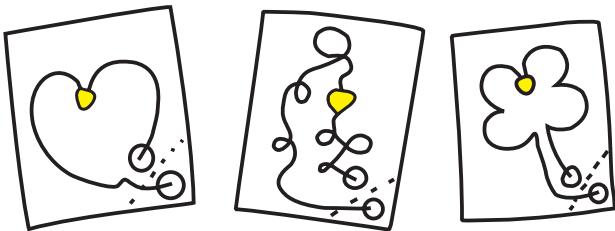
Electrons are lazy, and always take the path of least resistance. Since electrons prefer to take a "shortcut" through foil, rather than do work lighting an LED, an accidental foil connection from + to - will quickly drain the battery, and the LED will not light. This condition is called a **short circuit**.

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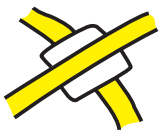
SIMPLE CIRCUIT 17

### YOUR TURN!

On the blank template to the right, build another circuit that turns on a light. Play with the foil to make different lines and shapes!



Make sure that the two pieces of copper do not touch or cross, or else you will create a short circuit.



If you want two pieces of copper to cross without connecting, just place a piece of paper in between the two copper foils.



To connect two pieces of copper foil, tape one piece over the other and press the tape down firmly for the conductive adhesive to make a good contact. For more permanent connections, you can also solder the copper tape pieces together.

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5. With the LED on, flip to the next page.

You've turned on the lightbulb! What is the lightbulb illuminating? Complete the scene with your own drawing!

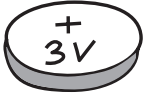
SIMPLE CIRCUIT 21

## You will need:



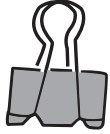
x 1

LED circuit sticker



x 1

3V coin cell battery



x 1

binder clip

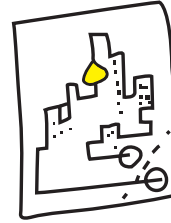


conductive foil tape

## TRY THIS!

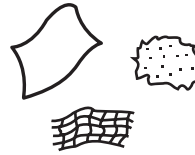
Now that you've learned how to make a light shine, here are some more things to try!

### Make a circuit drawing

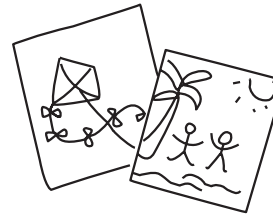


Use the foil tape in your circuit to create a design. Decorate your circuit with other craft materials to complete the scene.

### Play with light diffusion



What happens when you put a tissue over the light? How about a piece of fabric? Or even a photograph?



Try diffusing your LED's light through different materials and see what effects you can come up with!



What does the lightbulb illuminate?  
Draw it here!