3. DIY SWITCH

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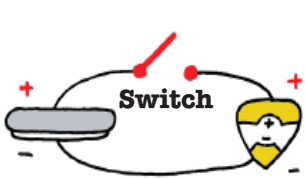
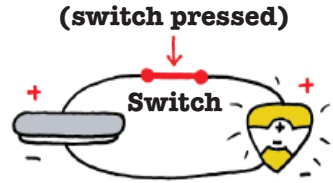
You can make your projects interactive by using a switch to control your lights! A **switch** is a gap in your circuit that can be connected and disconnected using another piece of foil, turning things on and off.



OPEN switch:
LED is OFF



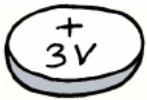
CLOSED switch:
LED is ON

When the switch is **closed** the light turns **on** because the loop is complete and electrons will flow through your circuit. When the switch is **open**, electrons cannot find a closed loop; so, they will stop flowing, and the light will turn **off**.

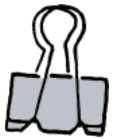
Let's make a paper push-button switch that turns a LED on when you press the button!

You will need:

x 1 LED circuit sticker



x 1 3V coin cell battery



x 1 binder clip

conductive foil tape

Directions:

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

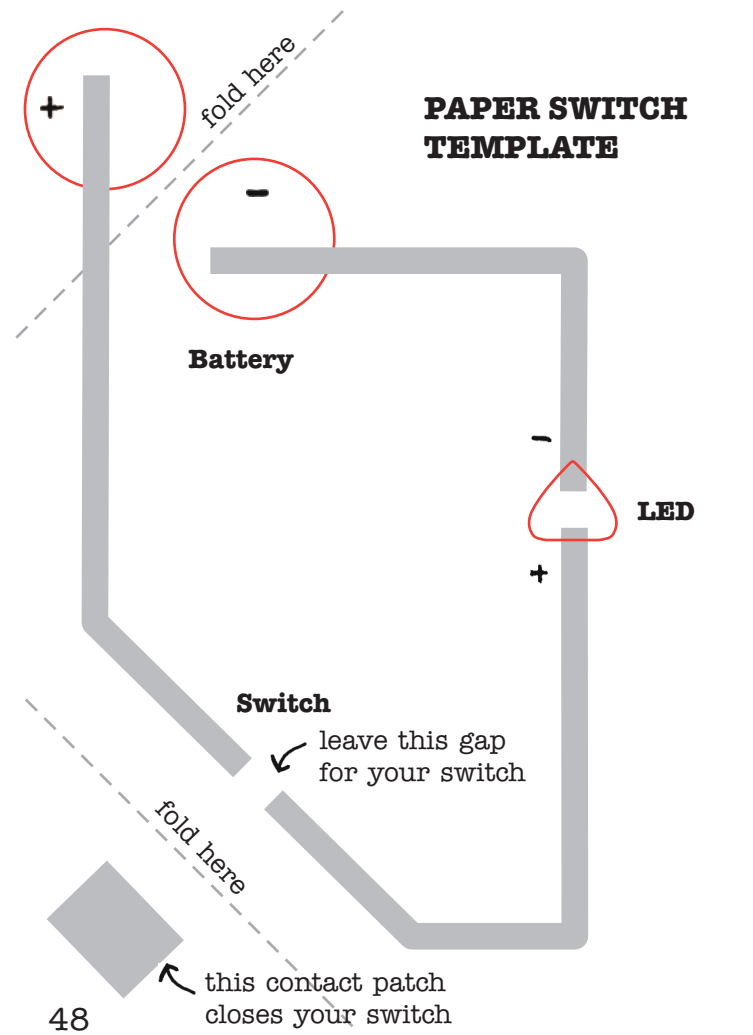
2. Cover the lonely gray patch with conductive foil. This forms the contact of the switch.

3. Fold the bottom page corner along the dotted line so that the patch closes the gap. Congrats! You just made a switch.

4. Crease the top page corner along the dotted line and clip your battery in place with a binder clip (see previous activities for details).

5. Stick an LED sticker over the footprint. When you press down on the switch, your LED will glow!

6. Now turn the page. What happens when you press the “do not press” button? Draw it on the page!

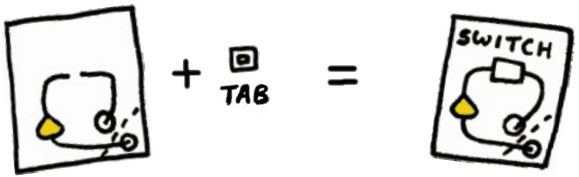

+
fold here
PAPER SWITCH TEMPLATE
−
Battery
−
LED
+
Switch
leave this gap for your switch
fold here
this contact patch closes your switch

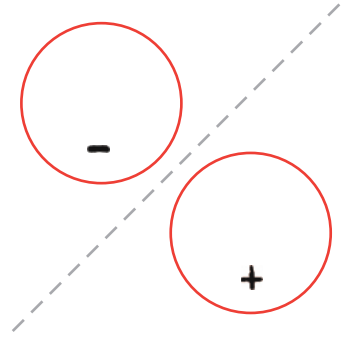

DO NOT
PRESS

What happens when you press the button? Draw it here!

YOUR TURN!

Switches don't have to be just at the corner of the pages. Just glue or tape a flap of paper with copper foil on the bottom side anywhere on the page, and use this to close the gap in your switch. Try making a switch somewhere in the middle of the page!

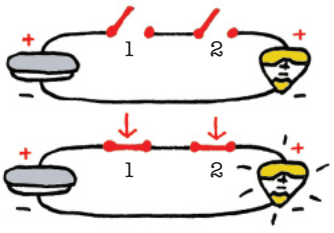




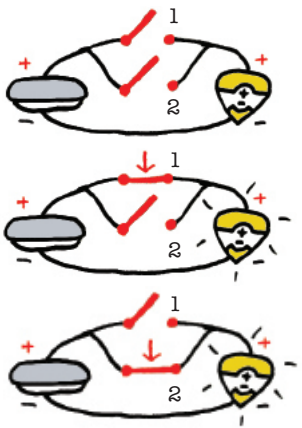
TRY THIS!

Putting multiple switches in one circuit creates even more complex interactions. Create a story for these types of logic switches!

AND/OR Switch logic



If you put multiple switches in a single loop ("in series"), you have to press all the switches at the same time to turn on your light. This is called a logical **AND** because you have to press *Switch 1* ***and*** *Switch 2* to make a complete circuit.



You can also connect multiple switches using different branches ("in parallel"), so that pressing any one of them will turn on your circuit. This is called a logical **OR** because you can press *Switch 1* ***or*** *Switch 2* to make a complete circuit.