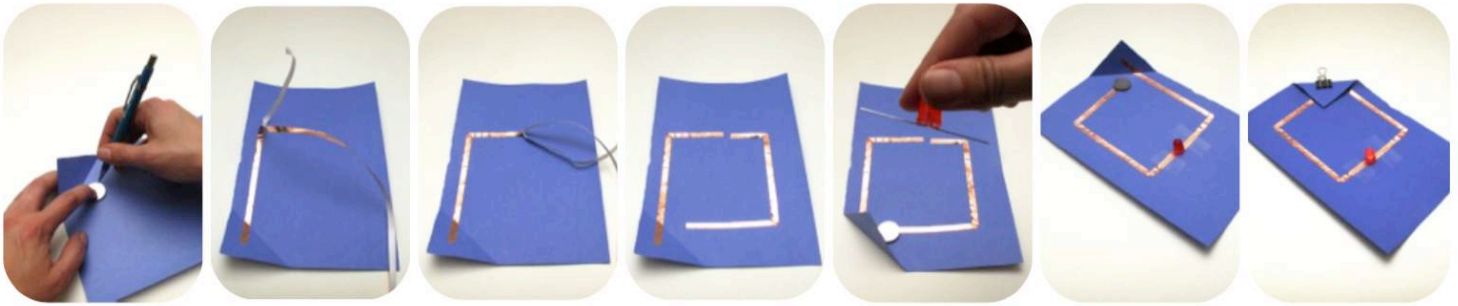




# e-Origami and other papercrafts

Maker Programs in  
Vermont Libraries: Spark  
a Culture of Innovation  
workshop handout

## Basic Circuit



Fold one corner of your paper. Trace a coin battery. This will be your on/off **switch**.

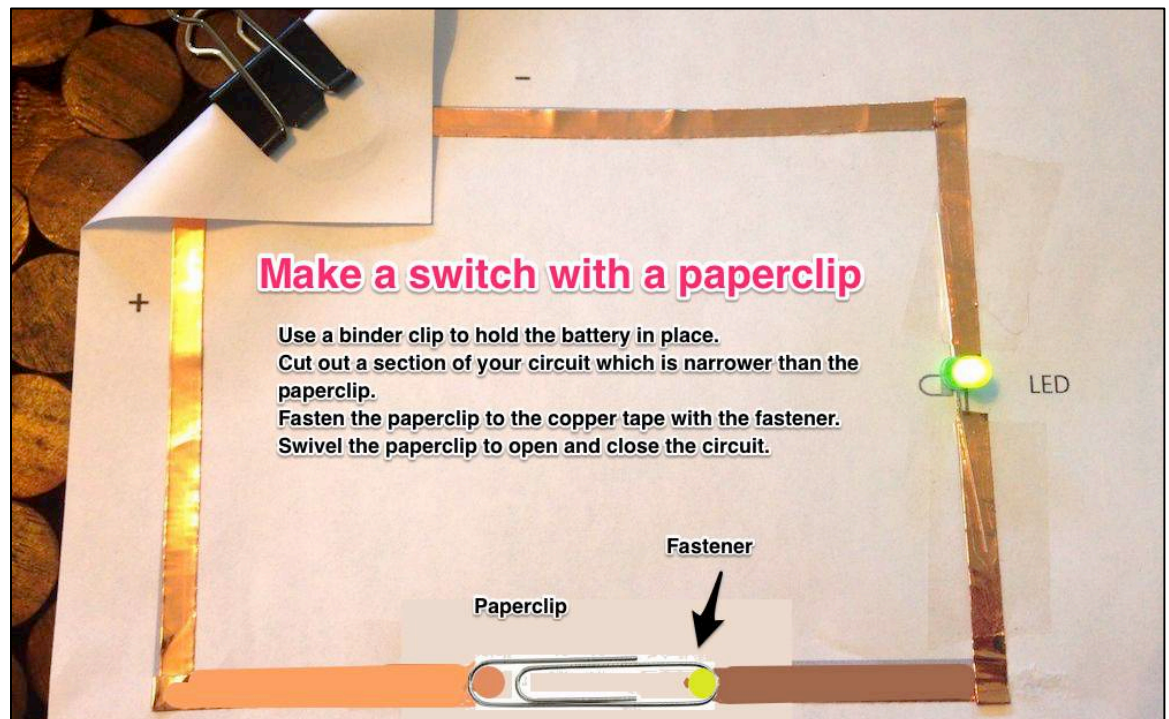
Electricity will flow through the **conductive** copper tape. Start the circuit at the corner, peeling off the backing as you go. The sticky part does not conduct electricity, so bend (don't cut) to make curves or corners. Leave a gap where the LED will go. Finish your circuit on the circle battery trace at the corner.

Bend out LED leads and tape each lead to one side of the circuit. Add battery and clip. No light? Flip over the battery.

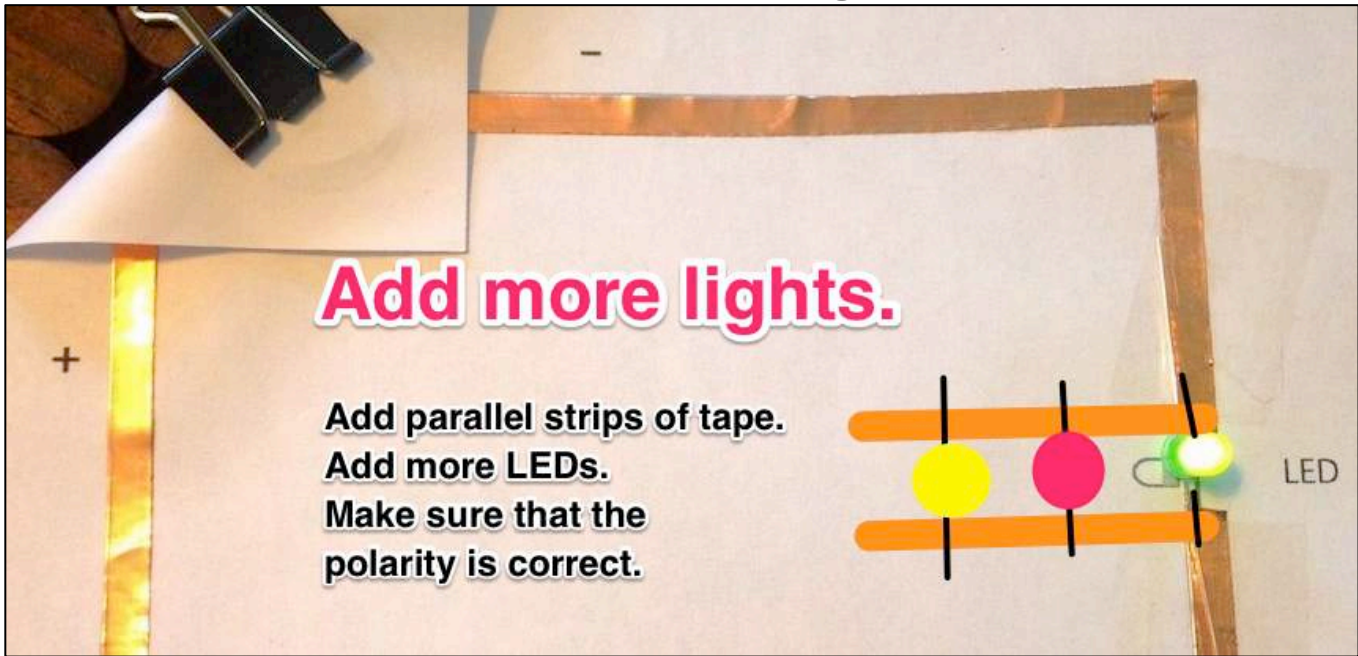
from Make:Paper Circuits, Make Magazine, 2014,  
<http://cdn.makezine.com/uploads/2014/07/papercircuits.pdf>

## Add a switch

What else could you use to make a switch? How about a piece of copper tape turned over so the metal meets the metal?

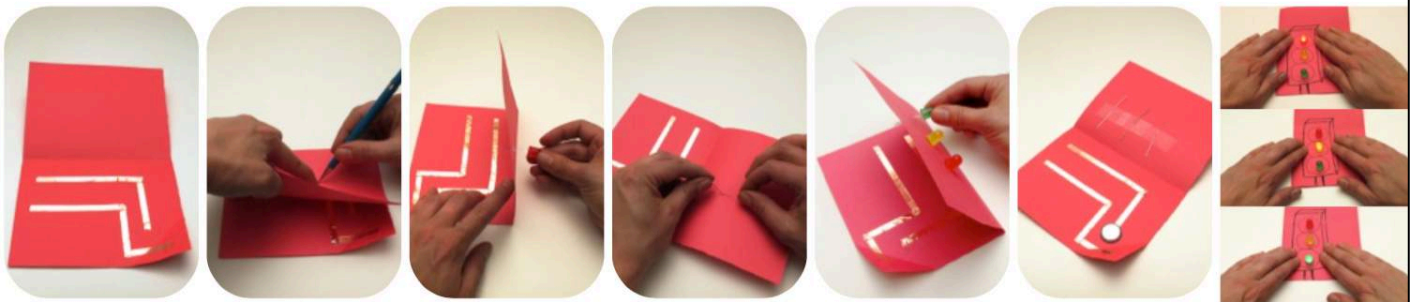


## Make a parallel circuit to add more lights.



## A parallel circuit idea: Make a stoplight

### Parallel Circuit with Pressure Switch



A **parallel circuit** lets the same electrical current flow to more than one LED. Make two copper tape lines, one starting under the corner battery fold, one over it.

The LEDs go between the tape lines. Mark where they go with a pencil. Poke through. All long (+) leads go the same direction. Spread leads flat, then tape down the center. The leads must touch the copper tape to complete the circuit.

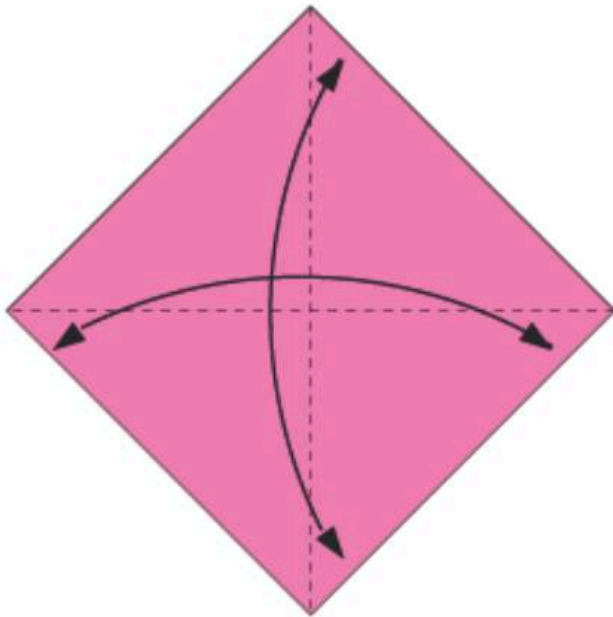
Add the coin battery and clip closed. To turn on an LED, press down on its two leads.

from Make:Paper Circuits, Make Magazine, 2014,  
<http://cdn.makezine.com/uploads/2014/07/papercircuits.pdf>

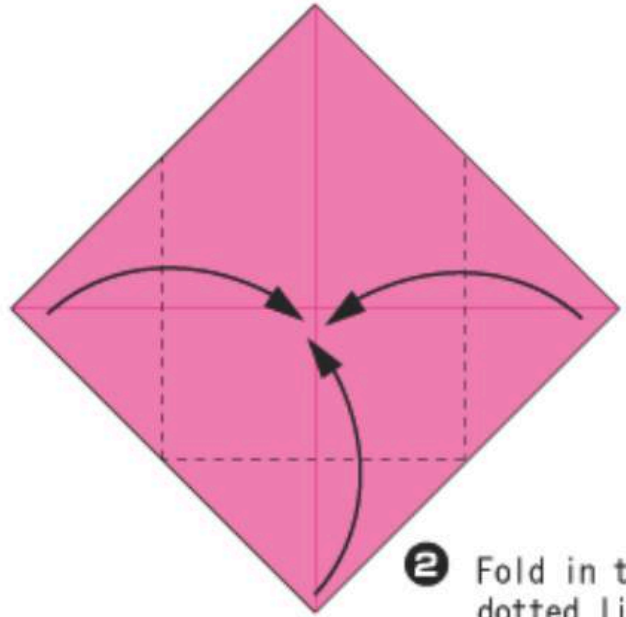
## Make an origami e-candle

### Making the basic shape

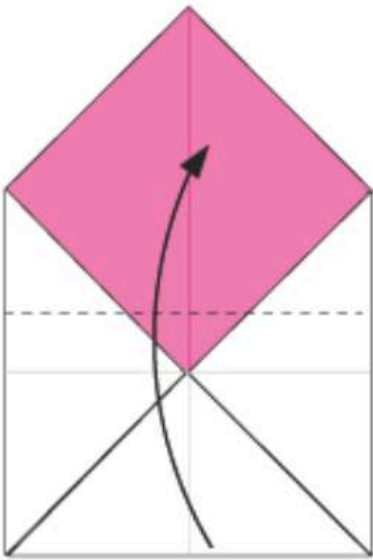
Follow these directions to make an origami candle from a piece of the origami paper.



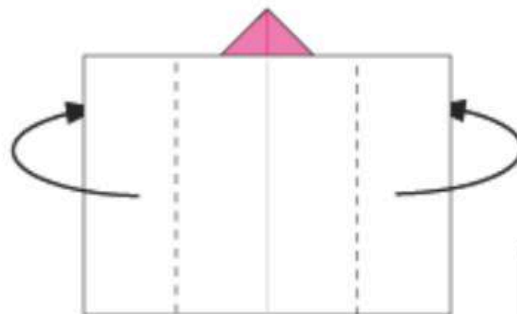
**1** Fold to make creases and fold back



**2** Fold in the dotted lines



**3** Fold in the dotted line

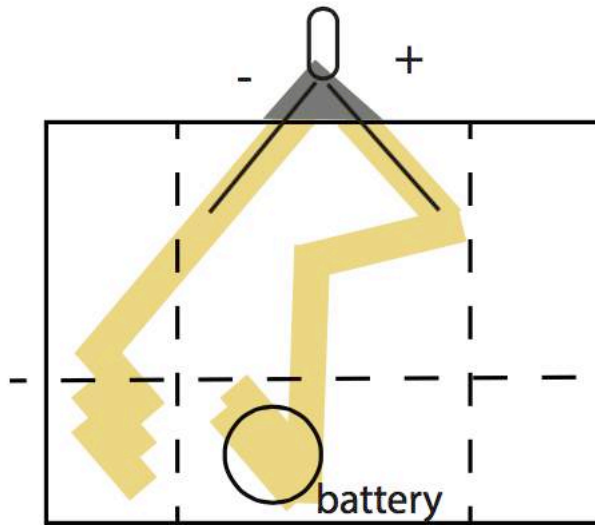


**4** Fold backward in the dotted line



**5**  
Finished

## Adding the circuit

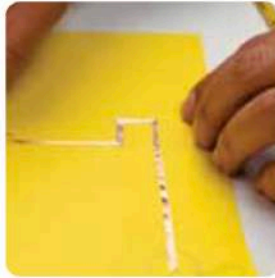
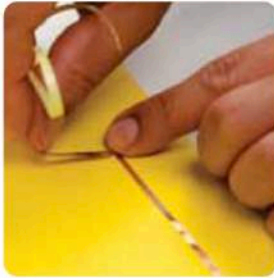
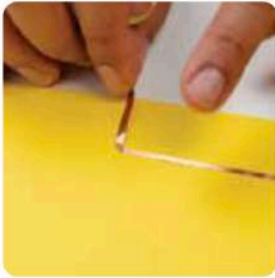


Use copper tape to build the circuit on the uncolored side of the paper.

Put the LED at the tip of the candle. Put the battery on the bottom.

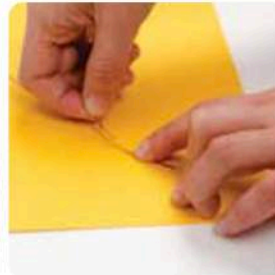
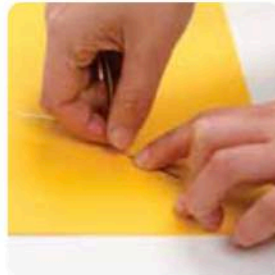
You can make one extra fold at the bottom (shown) to make your candle stand up if you wish.

### Helpful tape folding techniques:



**Making a sharp corner:** Fold the copper tape back on itself and make a sharp crease. While holding down the crease, turn the tape the direction you would like it to go. Flatten the tape with a bone folder or Popsicle stick.

**Making a curve:** This works better with thinner tape. With one hand guide the tape along with curve you'd like to make. With the other hand, push down the tape to secure it to the paper. You might notice tiny puckers in the tape; you can smooth those out with a bone folder or Popsicle stick.



from Paper Circuits Activity Guide, The Exploratorium, 2014  
[http://tinkering.exploratorium.edu/sites/default/files/Instructions/paper\\_circuits.pdf](http://tinkering.exploratorium.edu/sites/default/files/Instructions/paper_circuits.pdf)

## Vocabulary

**Circuit:** a closed path or loop around which an electric current flows

**Power source:** item that introduces energy into circuit (like a battery)

**Input:** a device (button, switch, etc.) that feeds data to a microprocessor chip

**Output:** a device that sends data to a user (light, sound, movement, etc.)

**Polarized:** a part with polarity marked as positive or negative (ground)

**Switch:** a mechanical device used to turn a current on or off in an electric circuit

**LED:** light emitting diode

**Short circuit:** an electrical circuit that allows a current to travel along an unintended path, often where essentially no resistance is encountered

**Conductive trace:** a path for current to run through a circuit (thread, paint, tape, wire) •

**Conductive:** a substance that allows electric current to pass through it

**Parallel circuit:** a circuit constructed with each component having its own loop back to the energy source

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**Grant Sponsor**



**With support from**



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