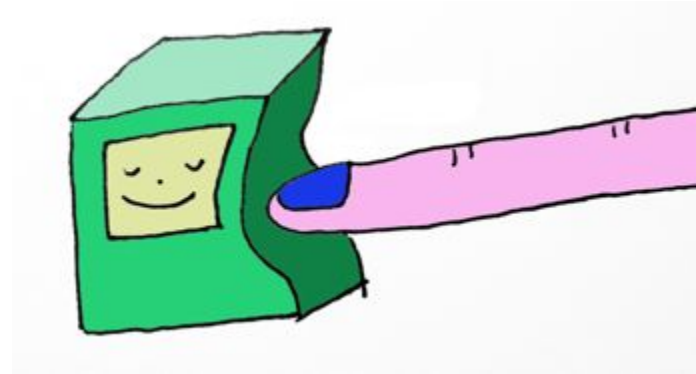
A close-up photograph of a flexible printed circuit board (FPCB) with a repeating pattern of small, glowing yellow LEDs. The board is light-colored and has a textured surface. The LEDs are arranged in a regular grid pattern, and their glow creates a shimmering effect. The background is slightly blurred, emphasizing the texture and light of the board.

Soft Circuits

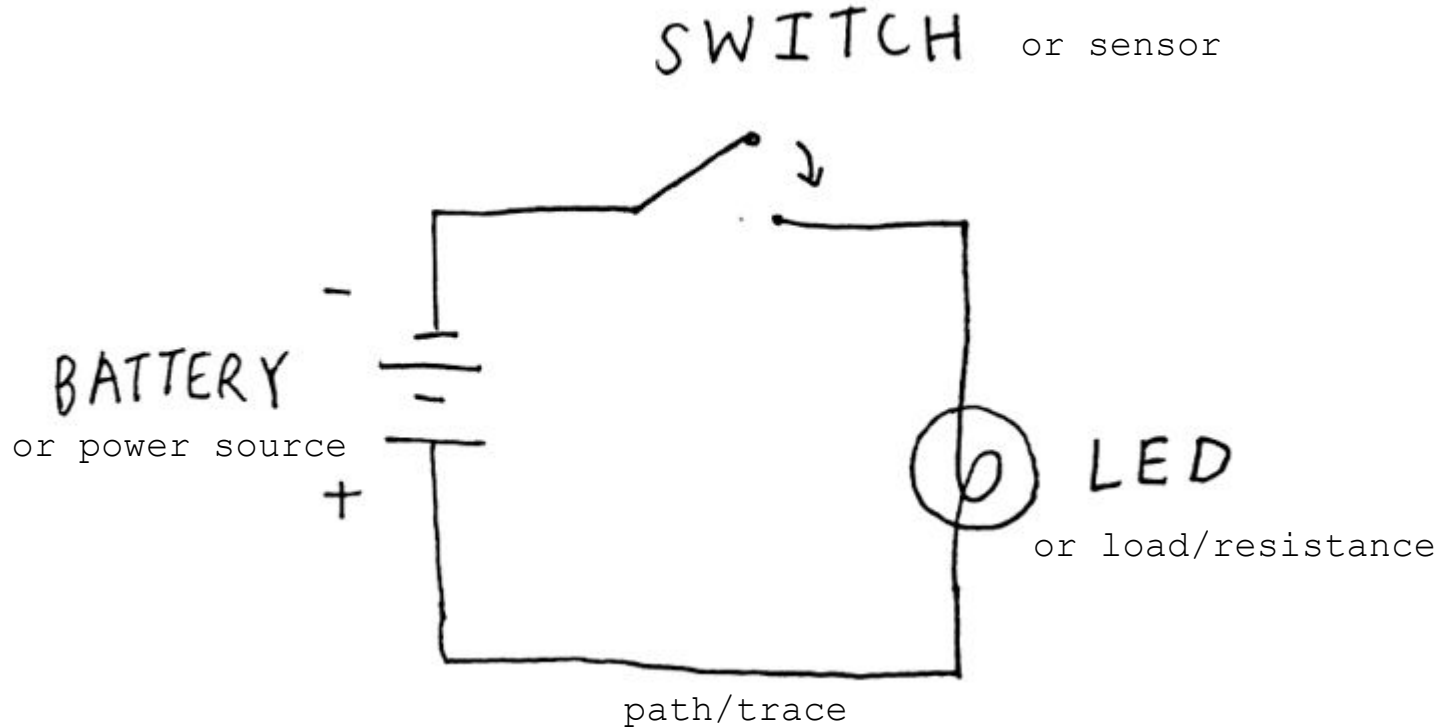
Soft Fabrication Skills

What is it?

- an electrical circuit that is made using flexible conductive materials
- e-textiles, smart textiles, wearable tech...



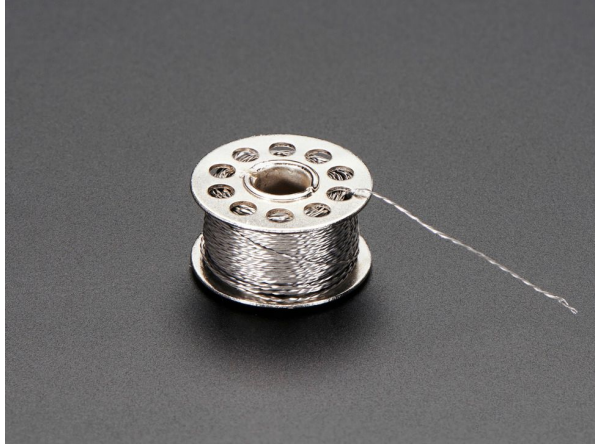
Basic Circuit





Materials Overview

Path: Making Connections



conductive thread
(stainless steel / silver)



conductive fabric
(wide variety!)



conductive ink
(drawing/printing)

Switches



zippers



beads



buttons

Make sure you test!

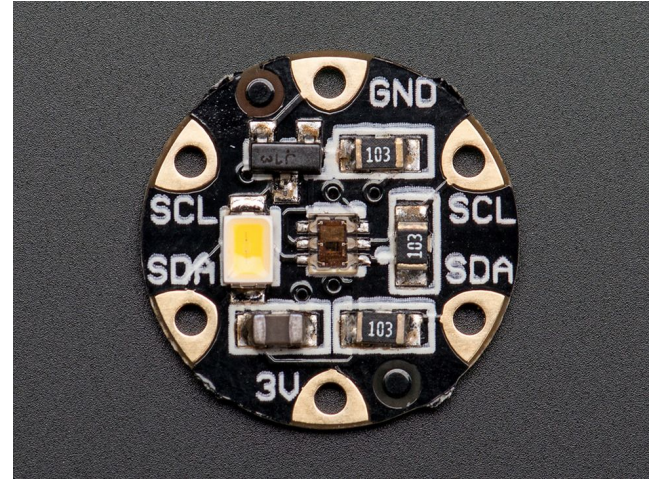
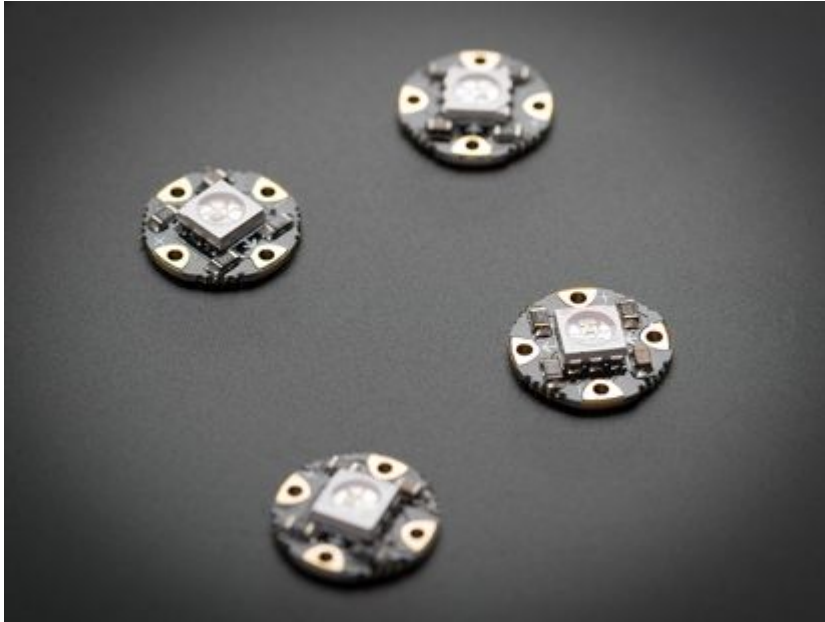


Sensors



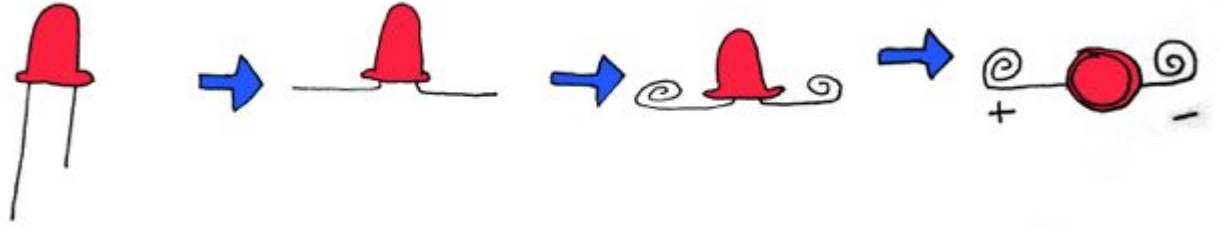
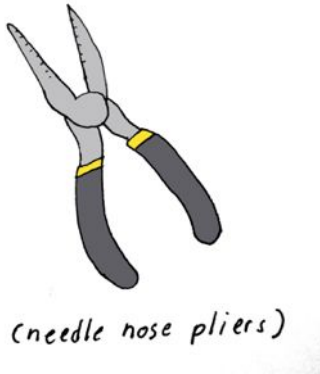
from top left:
stroke sensor,
knit/crochet sensor,
soft push button,
pom pom switch,
fabric potentiometer

Adding Electronic Components



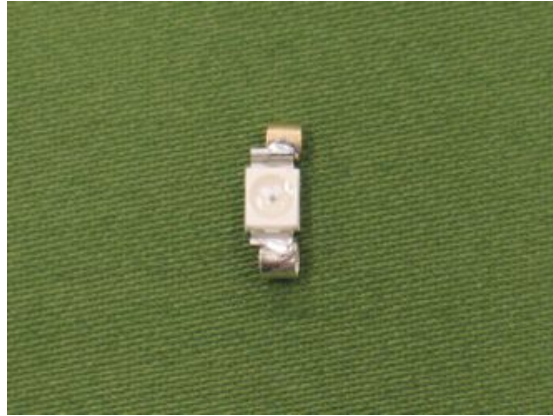
sewable components from Adafruit

DIY Sewable Electronic Components



good for diodes, capacitors and other things with "legs"

For those with soldering experience...

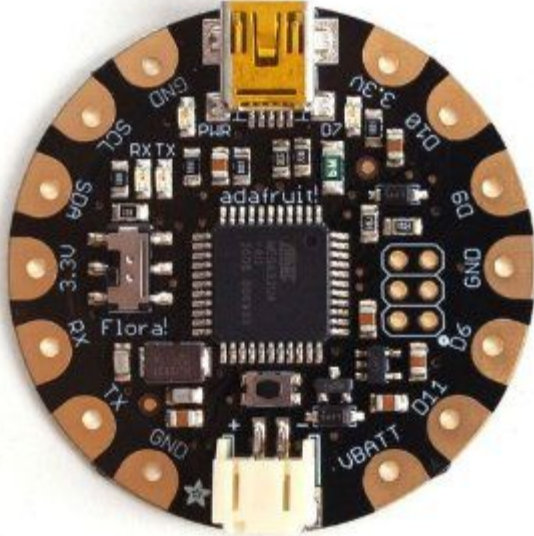


Solder sewable connections onto SMD (surface mount) LEDs

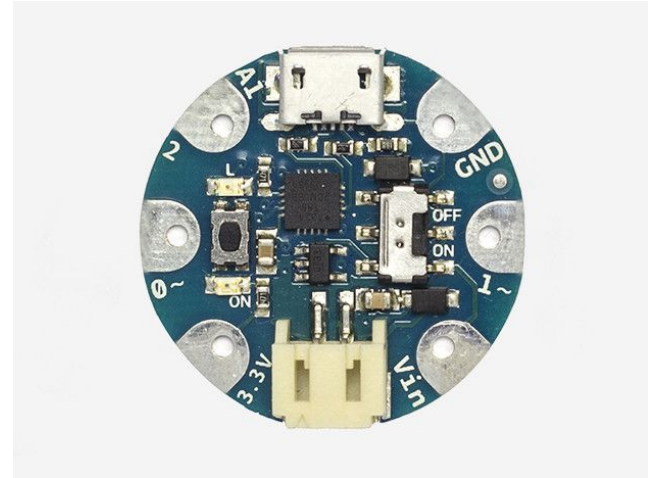
Shape Memory Alloy



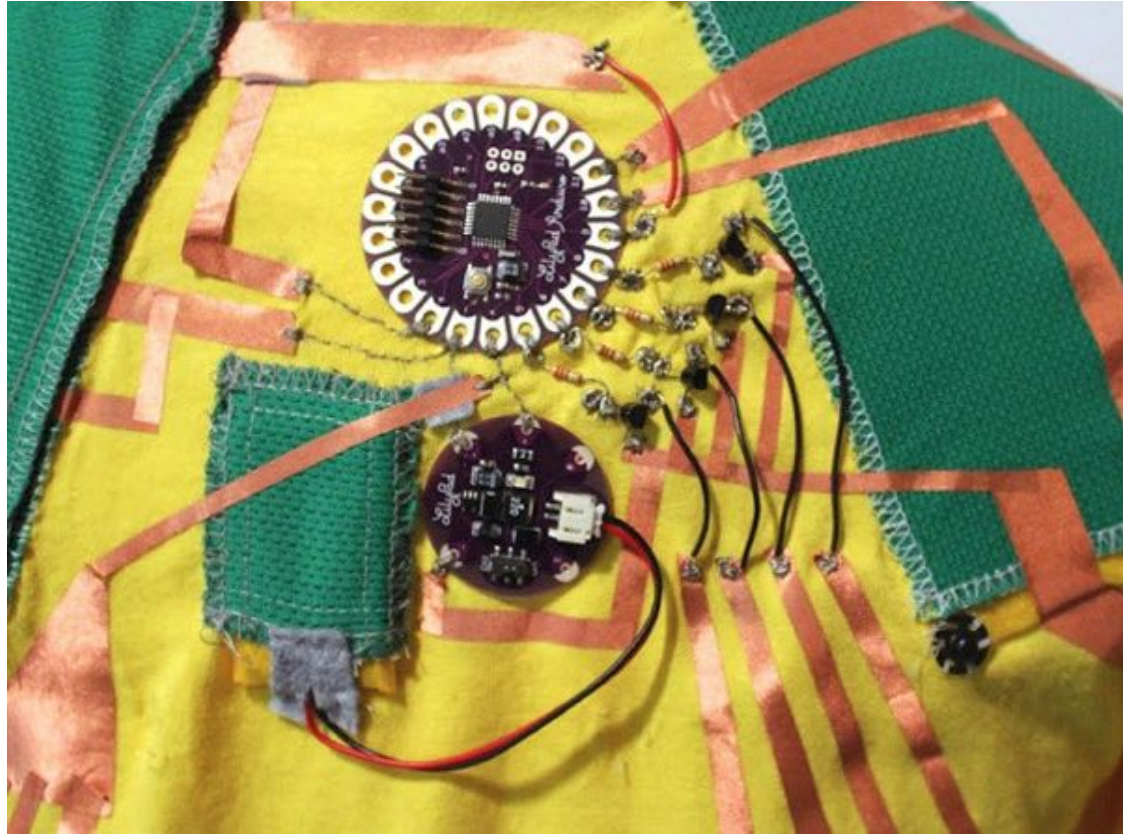
Sewable Microcontrollers



Adafruit Flora

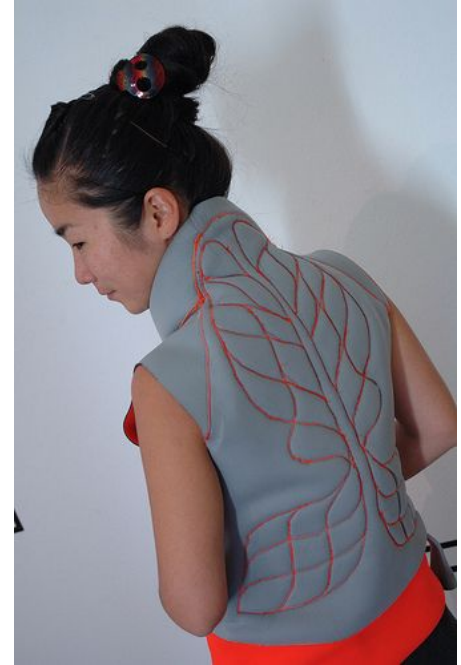


Arduino Gemma



Arduino Lilypad with FTDI plug-in!

Kobakant: *Massage Me*





Adidas Superglide Nova Bra



Manisha Mohan's Safety
Harnessing Equipment (SHE)

T.Ware's T. Jacket



Social Body Lab: *Prosthetic
Technologies of Being (Nautilus)*





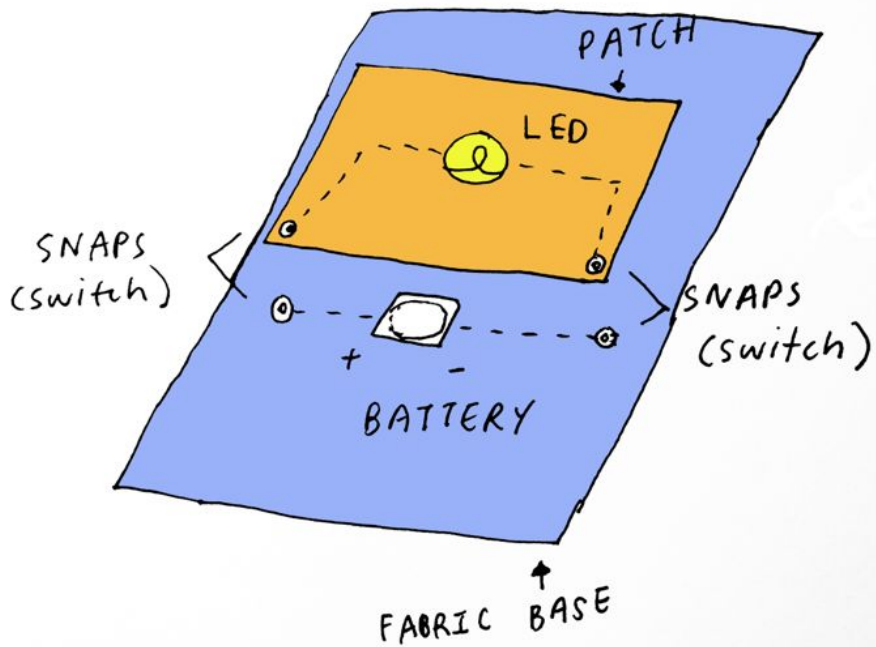
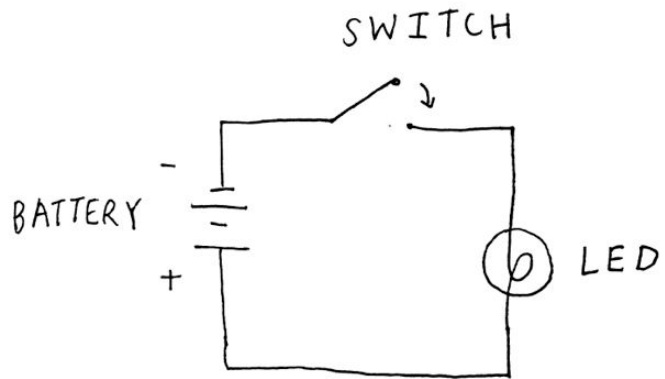
#techstyle exhibit at
Museum of Fine Arts in
Boston

Open until July 2016!

DEMO TIME !

Sewn LED Patch

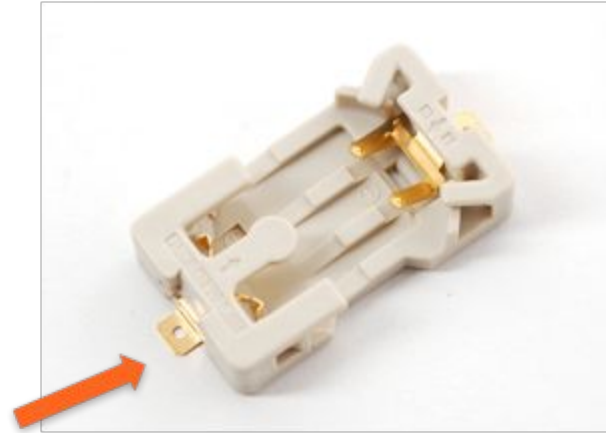




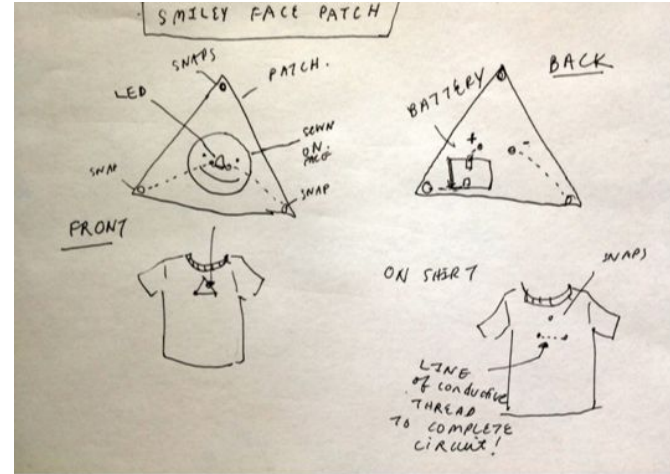
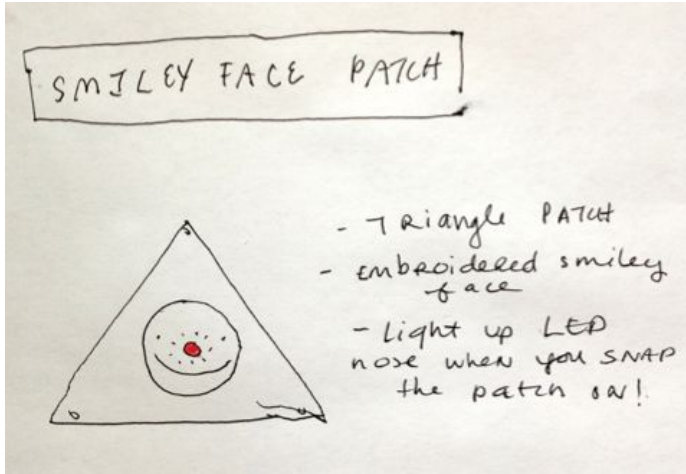
Important note!



Positive side



Design it



- Draw out what you want to make!
- Make sure you include placement of traces and components

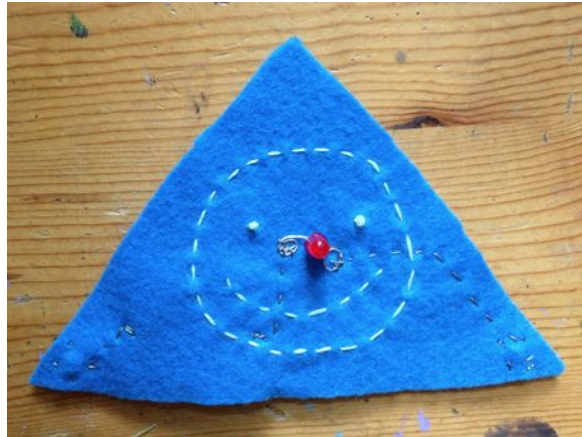
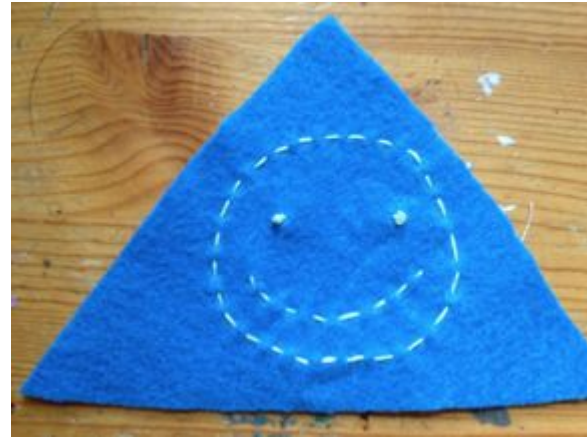
Important note!

Do not connect the legs of the LEDs or both sides of the battery pack together. When this happens, you are creating a short circuit!

Current likes to the flow through the path of least resistance and will not provide current for your components if they are connected this way!

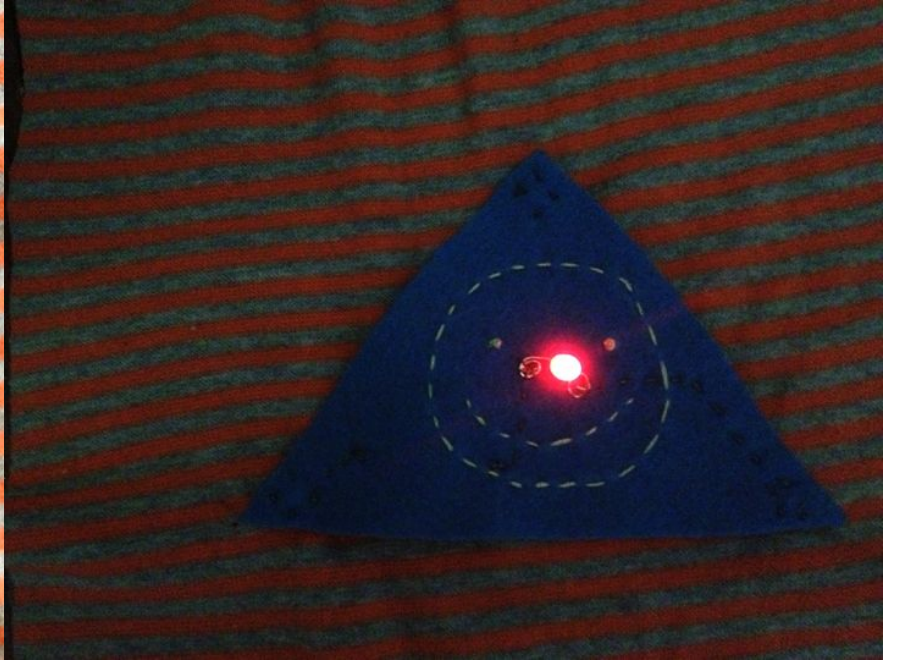
Yes you will have to tie and knot off your thread.

Sew it



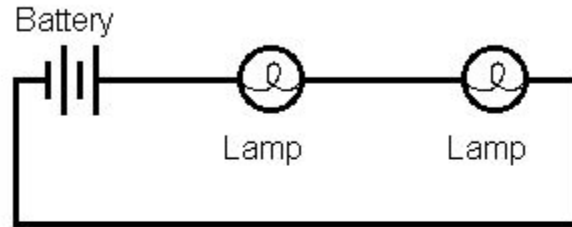
Sew it some more



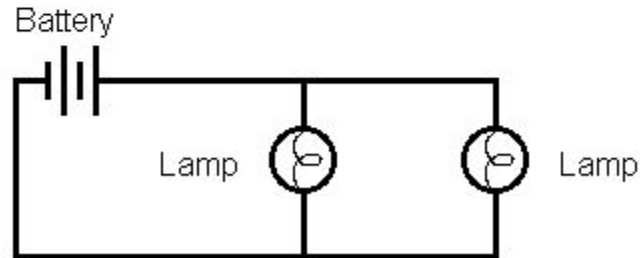


Adding More Lights: Series & Parallel

SERIES



PARALLEL





Troubleshooting

- Is your battery and/or LED connected the right way?
- Do you have any short circuits? Are any of your threads touching each other?
- Is your thread making secure connections with components?

Additional Resources

Tutorials

- [Kobakant: HOW TO GET WHAT YOU WANT](#)
- [Make: Wearable Electronics](#)

Materials

- [lessEMF](#)
- [adafruit](#)
- [sparkfun \(conductive thread spool\)](#)