Smart Textiles

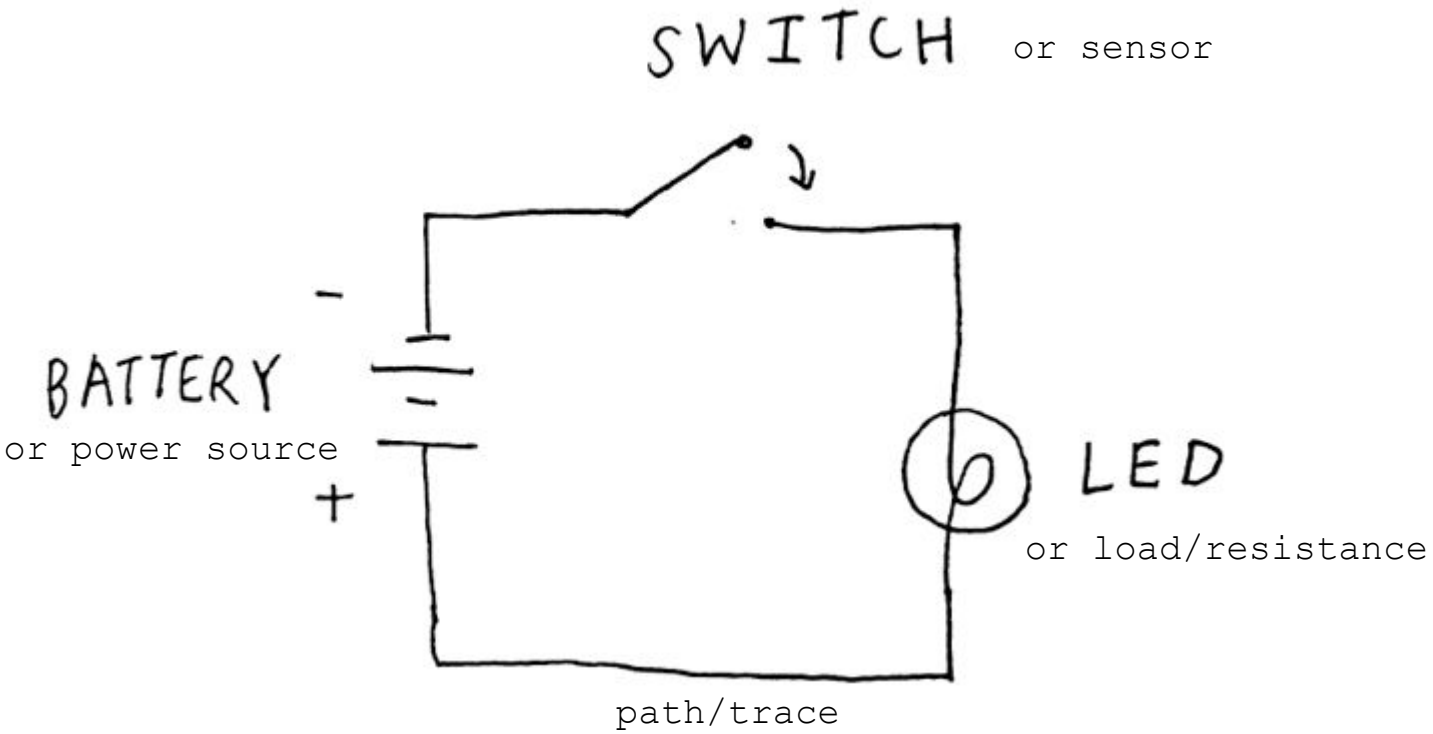
Soft Fabrication Skills

What is it?

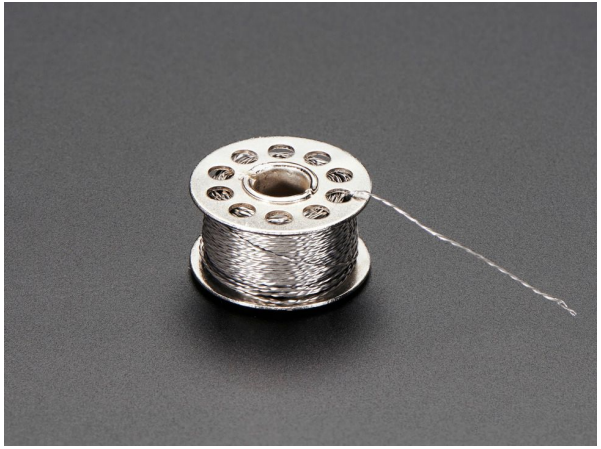
- Textile materials embedded with digital and electronic components
- Textiles that can react to environmental stimuli
- e-textiles, soft circuits, wearable tech, wearable electronics...


Materials
Overview

Basic Circuit



Path: Making Connections



conductive thread
(stainless steel / silver)

conductive fabric
(wide variety!)

conductive ink
(drawing/printing)

Switches

zippers

beads

Buttons
& snaps

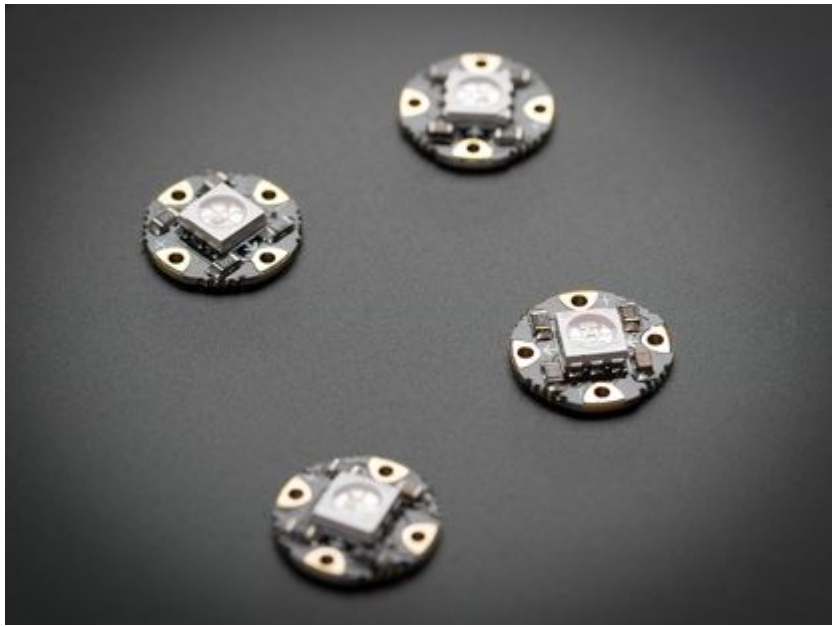
Make sure you test!

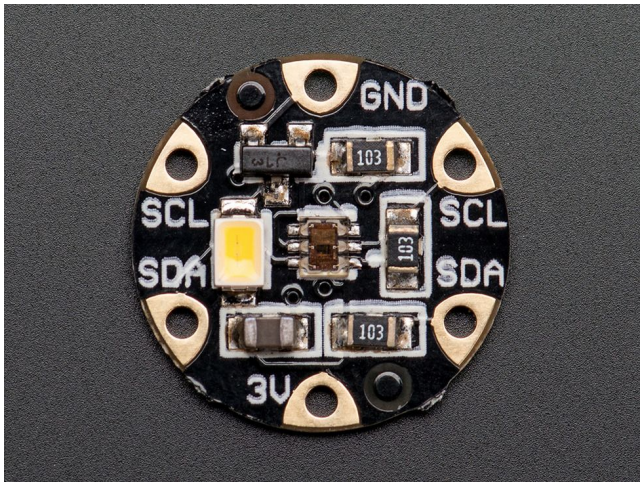
Sensors

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

Kobakant: [HOW TO GET WHAT YOU WANT]

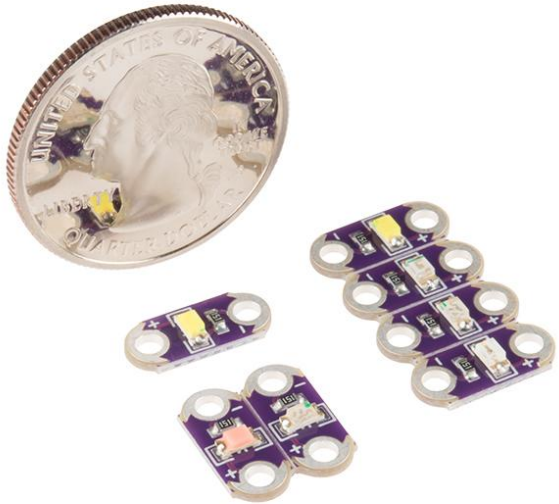
Adding Electronic Components

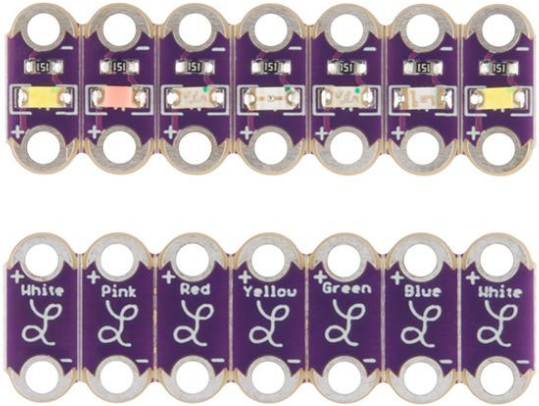




sewable components from Adafruit

Sewable Electronic Components

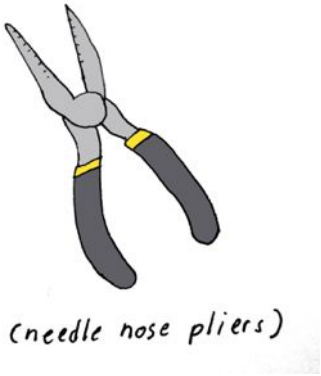


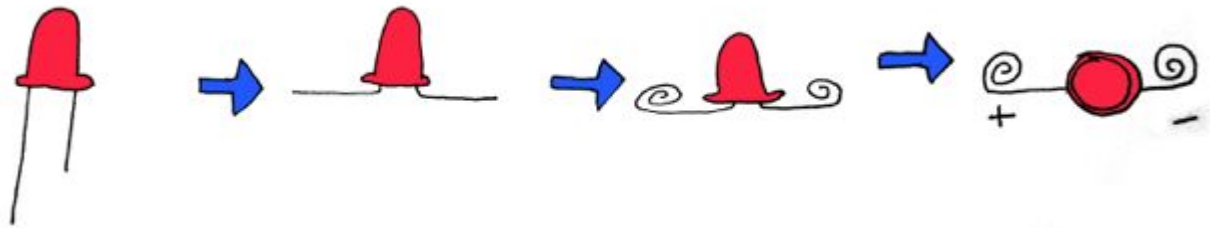


Sparkfun Lilypad sewable LEDs

(Adafruit also makes sewable LED sequins)

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

Thermochromic Ink and Dyes

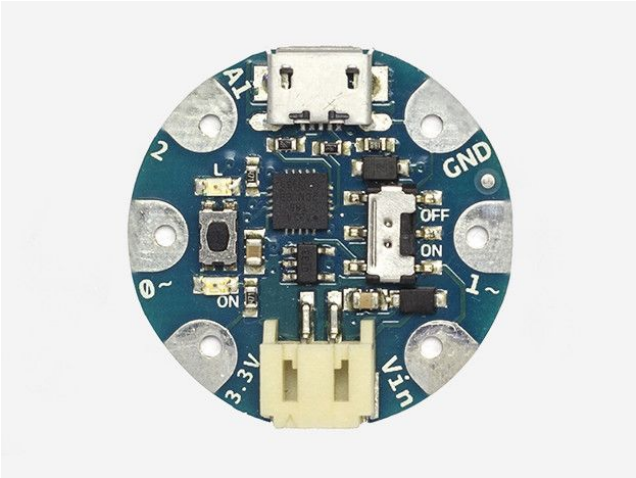
Maggie Orth - Dynamic Double Weave

Nikolas Bentel - Aerochromic

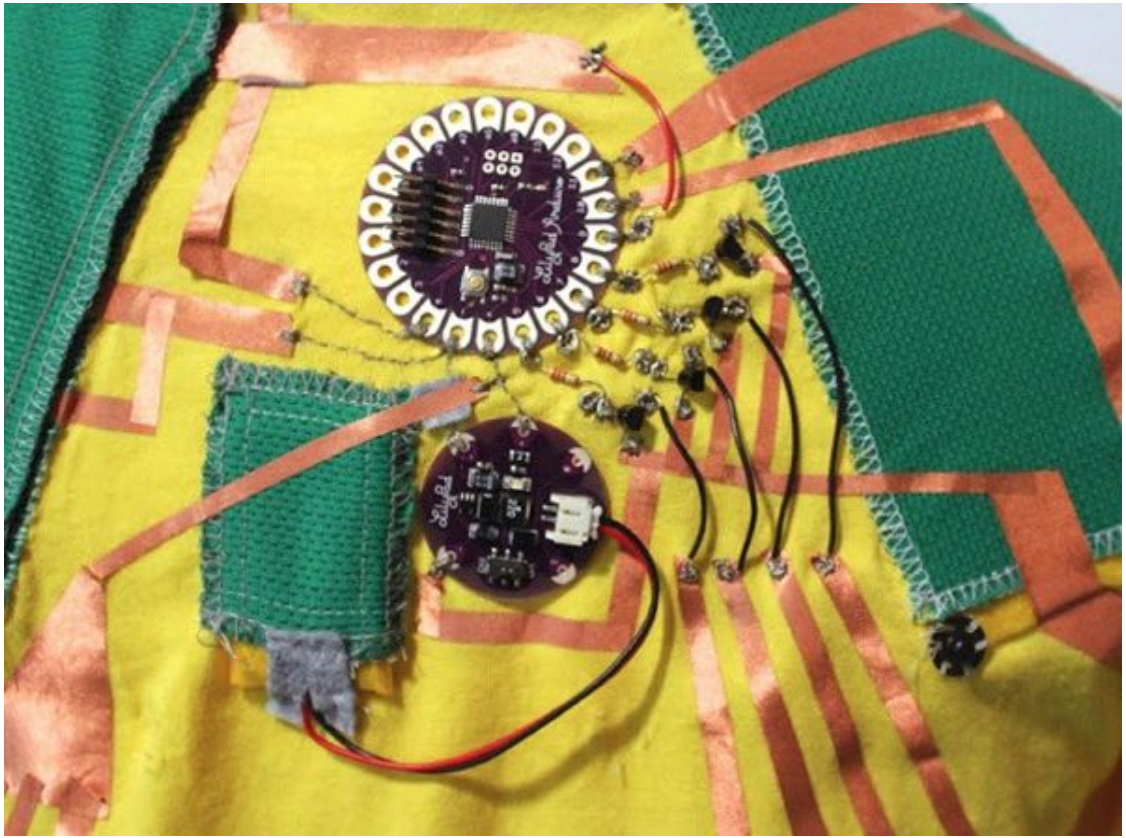
- Leuco dyes- switch between two chemical forms(color and colorless)

Sewable Microcontrollers

Adafruit Flora

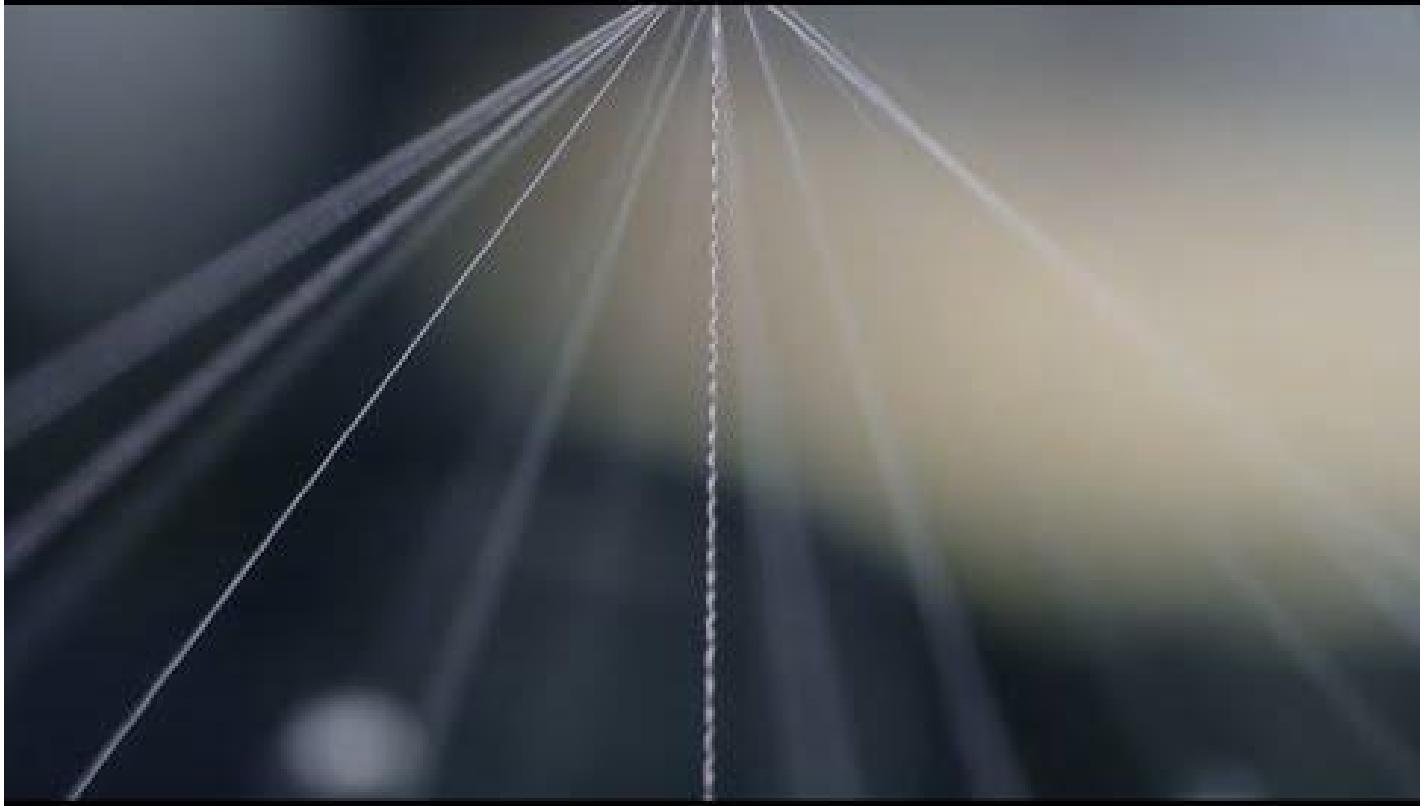


Arduino Gemma

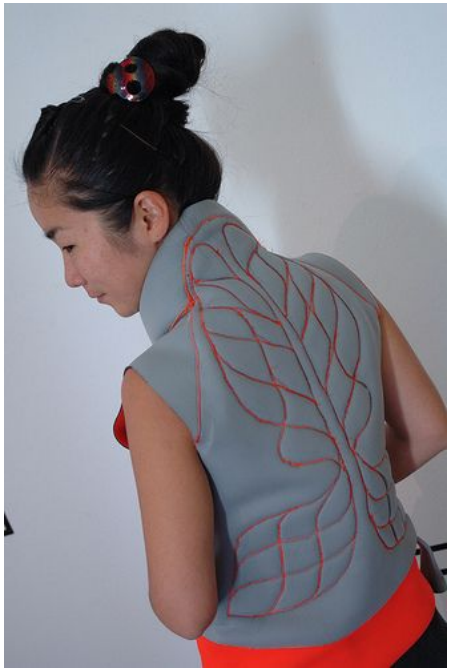


Arduino Lilypad with FTDI plug-in!

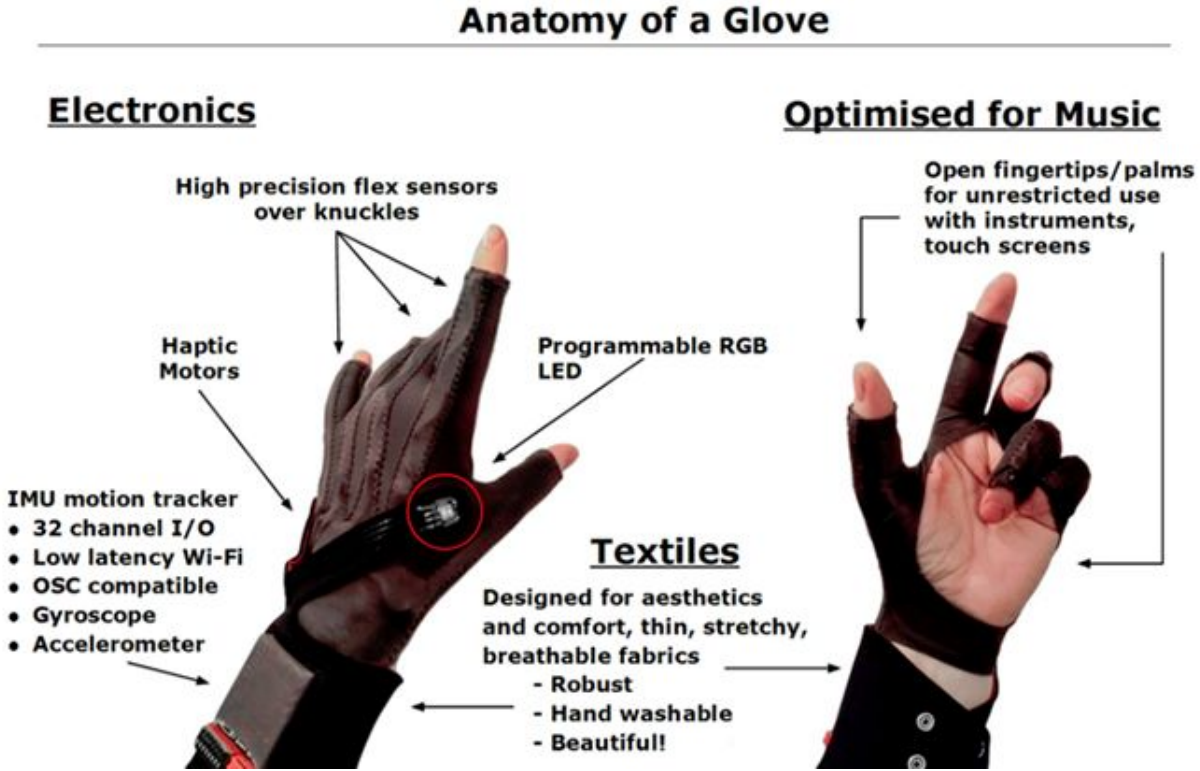
Google Jacquard



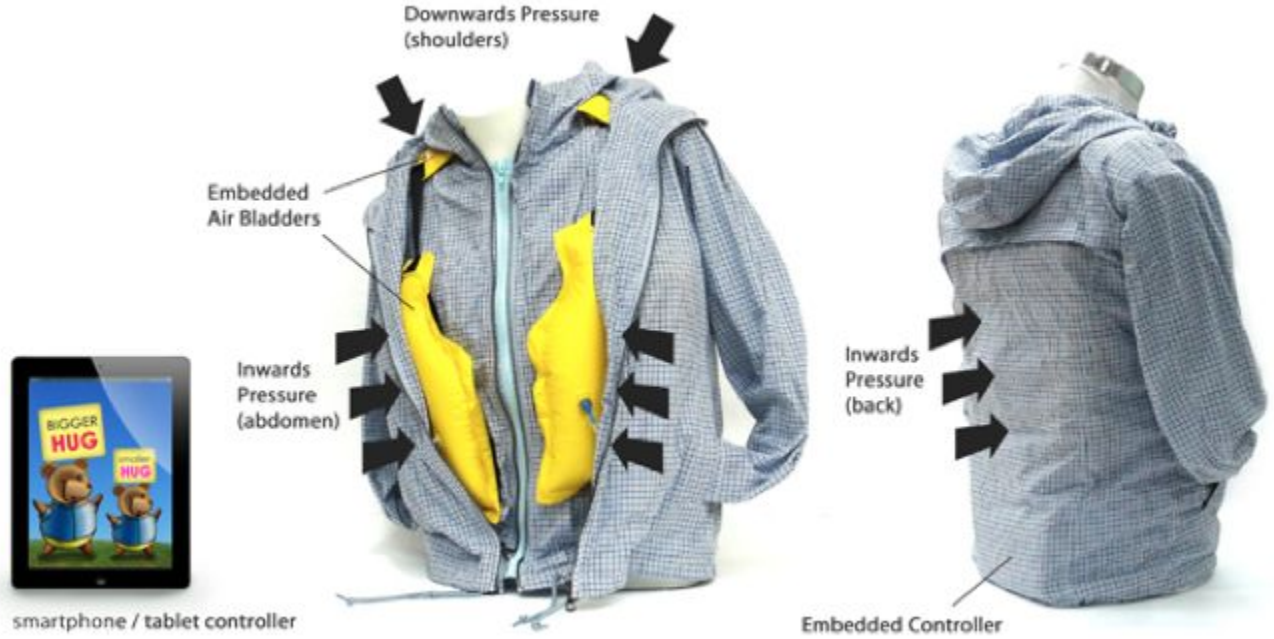
Kobakant: *Massage Me*



Miu miu gloves



T.Ware's T. Jacket



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

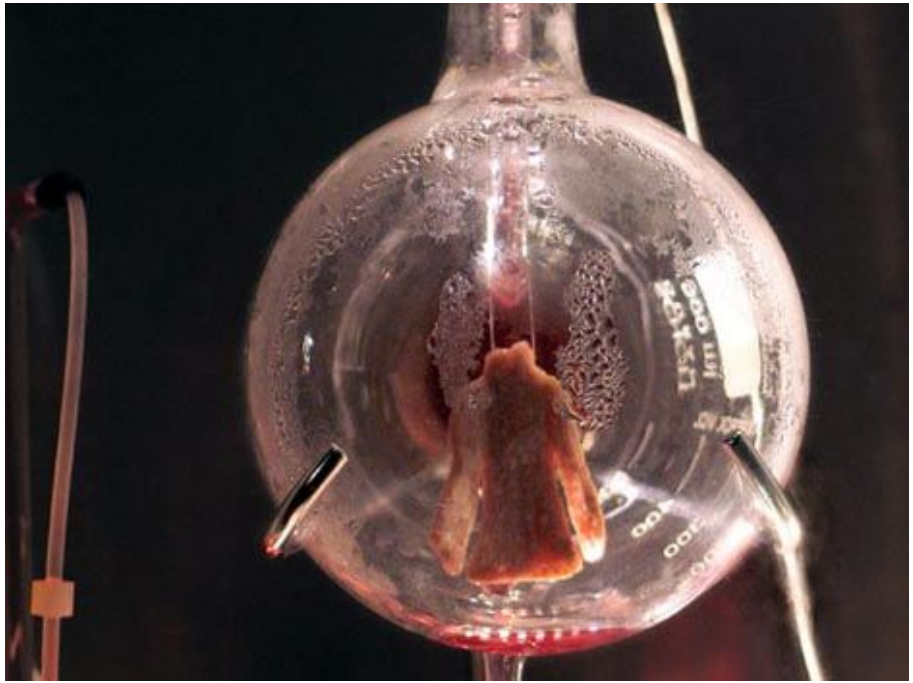
Haley Profita + Microsoft Research: Lightwear

For Seasonal Affective Disorder

Cute Circuit + EasyJet: Engineer uniforms for airplanes

Kombocha Leather

SCOBY: Symbiotic Culture of Bacteria and Yeast



Tina Gorjanc: *Pure Human*

Symbiotica: *Victimless Leather*

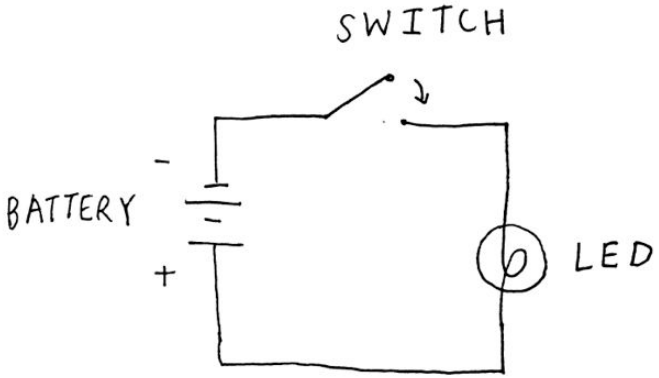
Jae Rhim Lee: *Mushroom Burial Suit*

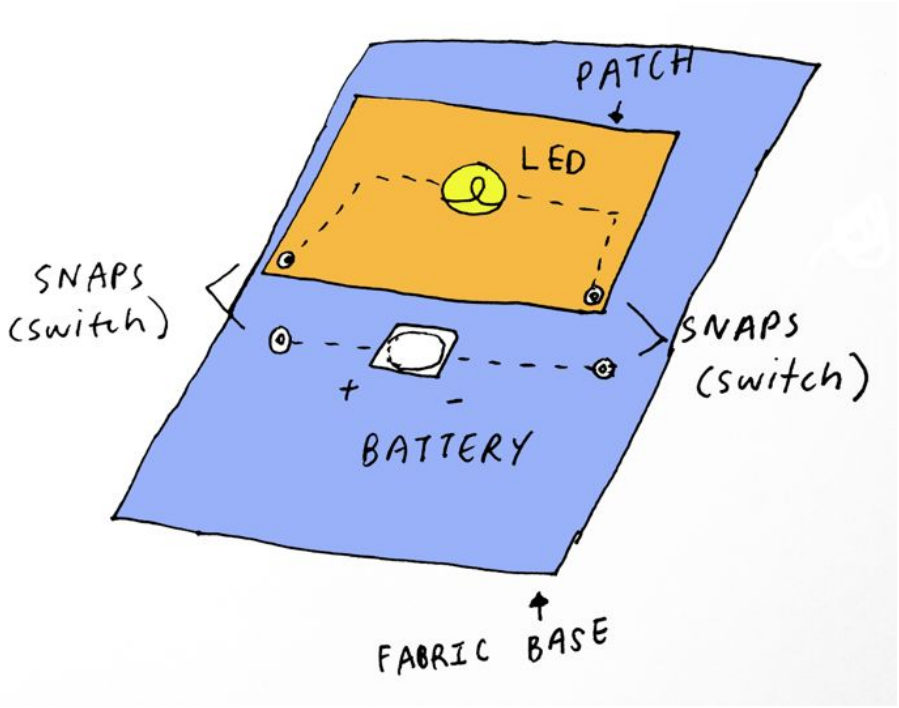
https://vimeo.com/142208383

Biologic - Lining Yao

DEMO TIME!

Sewn LED Patch

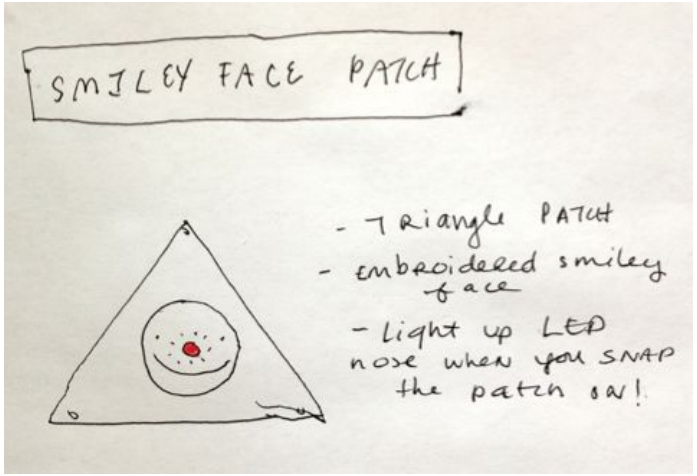

SWITCH
BATTERY
-
+
LED

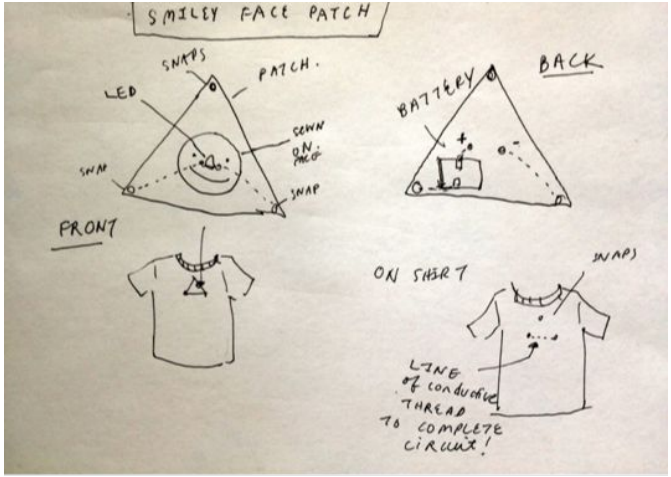

PATCH
LED
SNAPS (switch)
SNAPS (switch)
+
-
BATTERY
FABRIC BASE

Important note!

Positive side

Design it





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

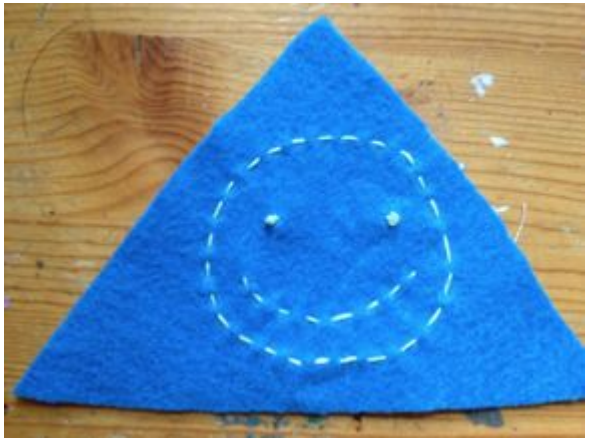
Important note!

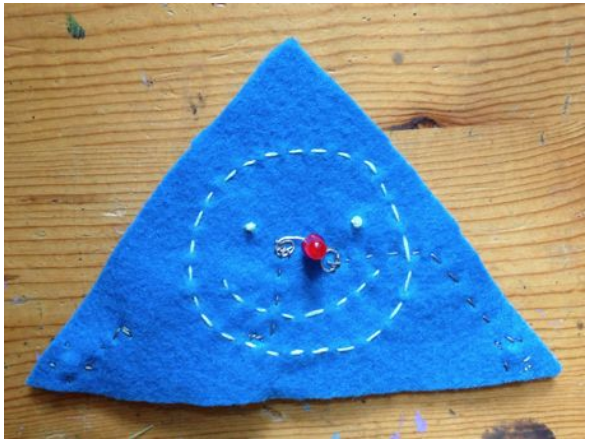
Do not connect the legs of the LEDs or both sides of the battery pack together. When this happens, you are creating a short circuit!

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!

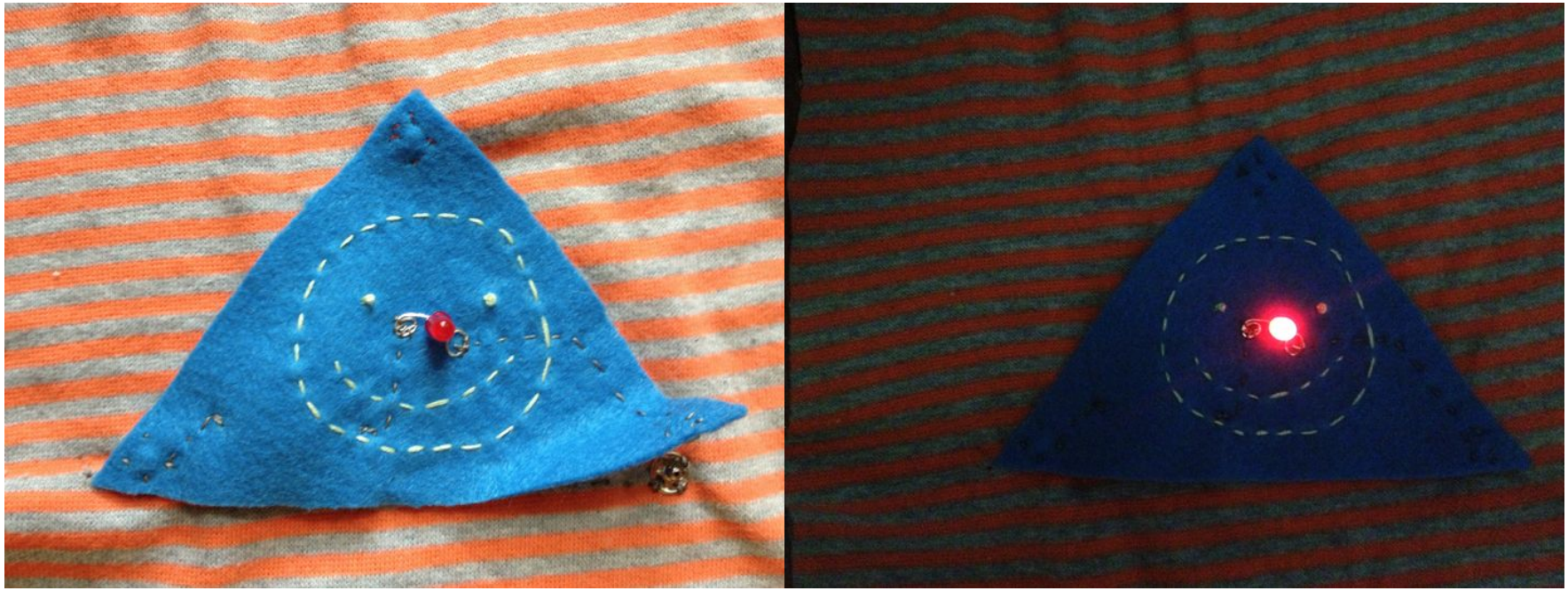
Yes you will have to tie and knot off your thread.

Sew it



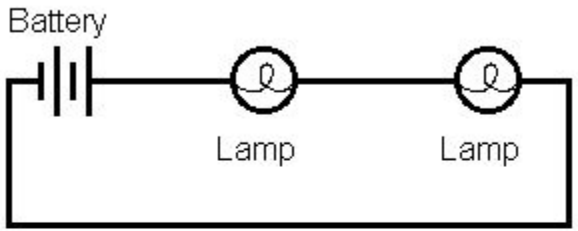


Sew it some more

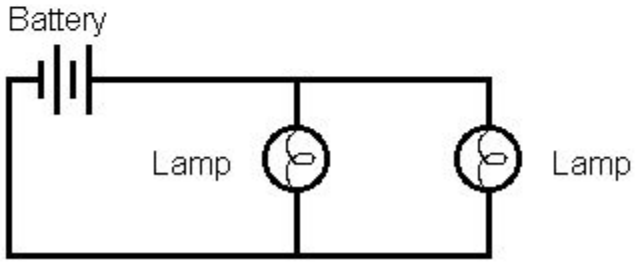


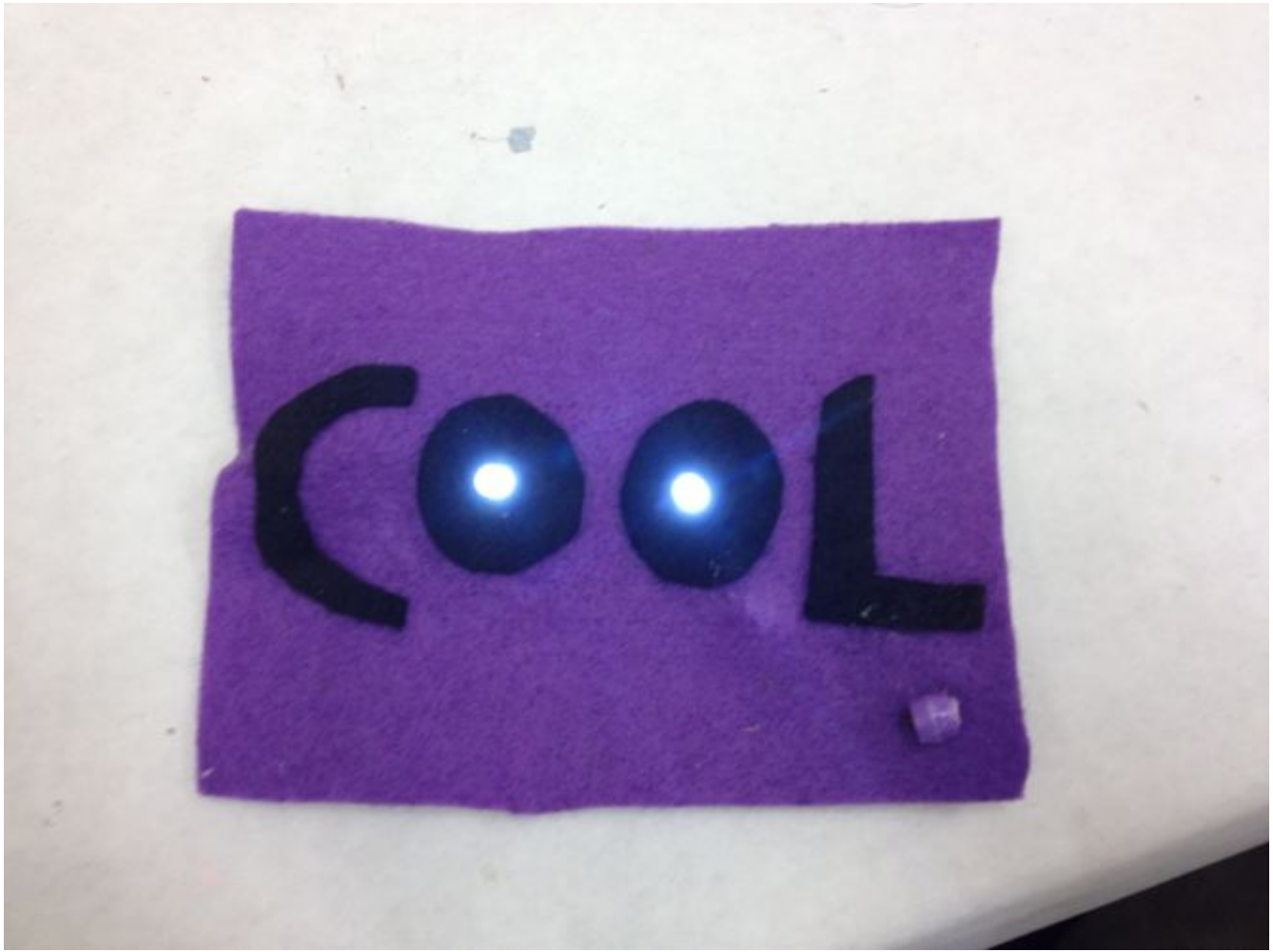
Adding More Lights: Series & Parallel

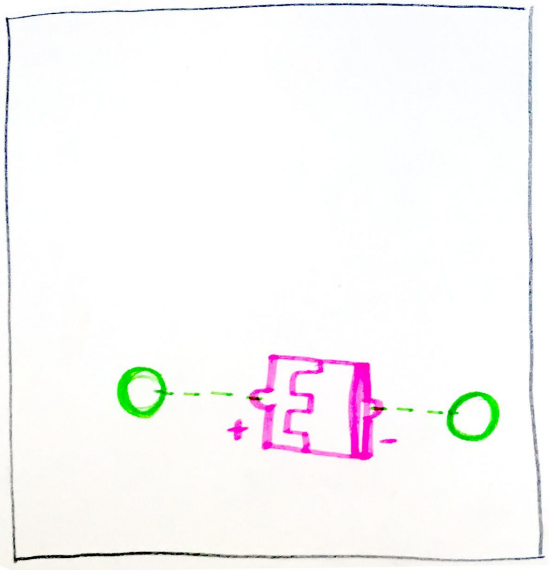
SERIES



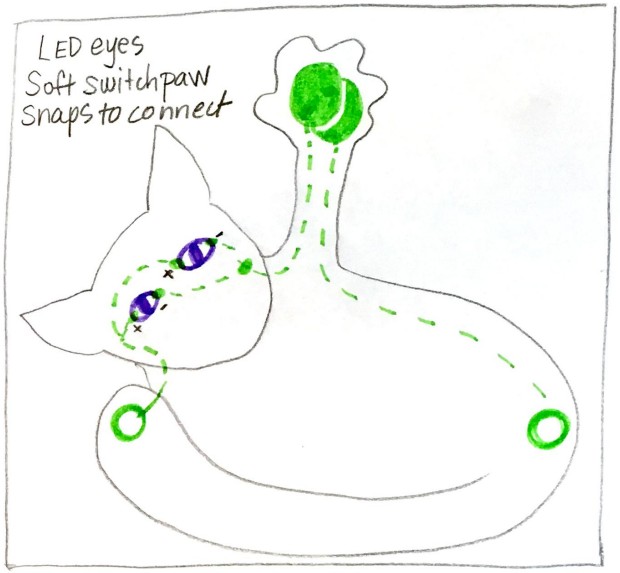
PARALLEL



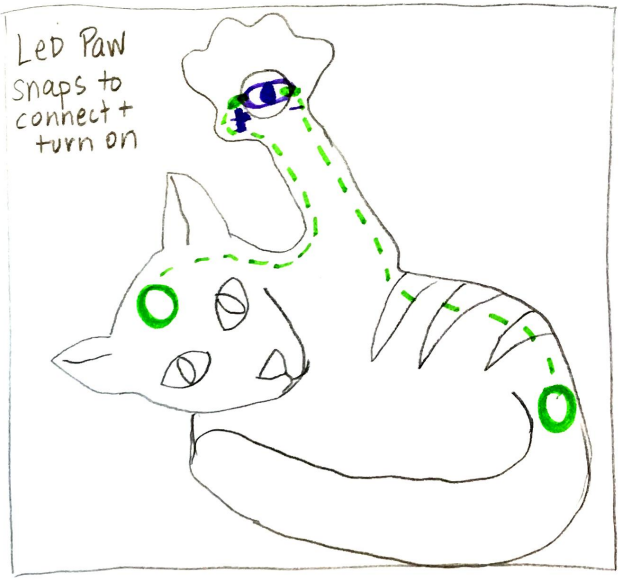

COOL



Canvas fabric with battery and silver snapes



Design with cat paw as soft switch and LED eyes in parallel



Design with one LED in cat paw

= snaps
= soft switch
= steel thread
= LED
= coin cell battery holder

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)