

A close-up photograph of a glowing orange fiber optic cable. The cable is curved and lies on a dark blue, textured fabric surface. The light from the cable is bright and concentrated at the end, creating a soft glow on the fabric. The background is dark and out of focus, emphasizing the cable and its light.

E-textile workshop for Fabricademy 2022/23

Jessica Stanley

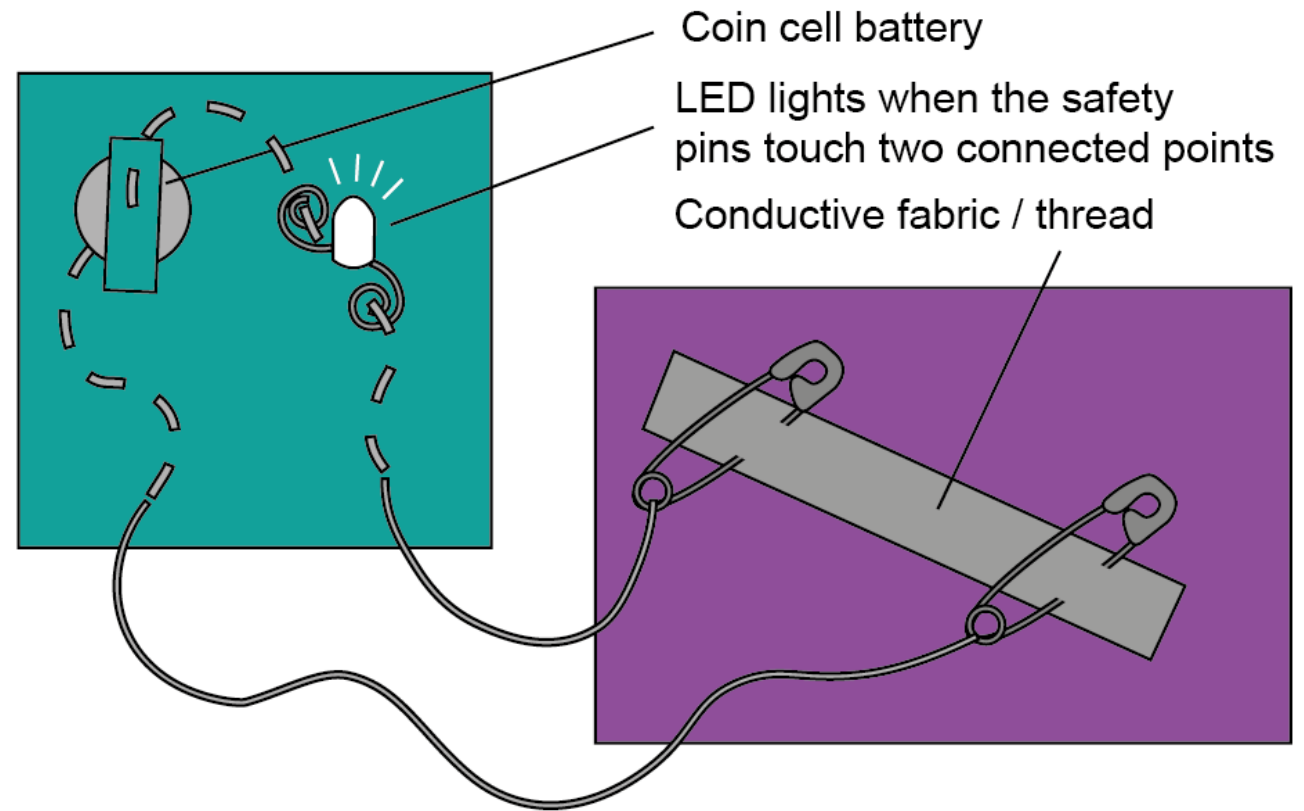
19/10/2022

Today's workshop: e-textile continuity tester

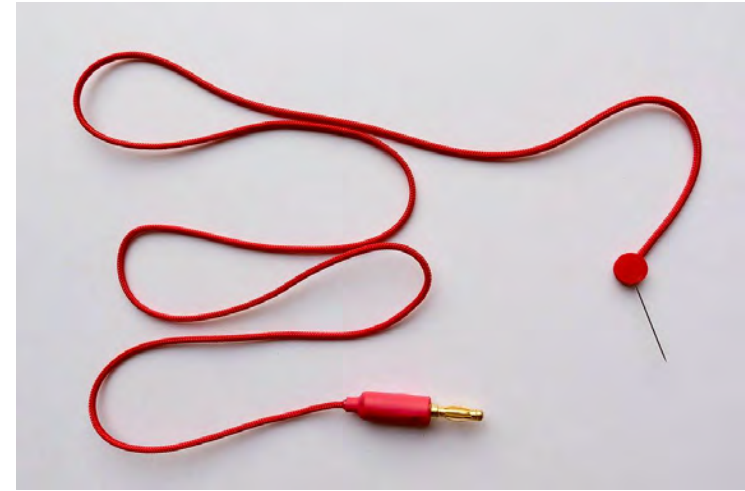
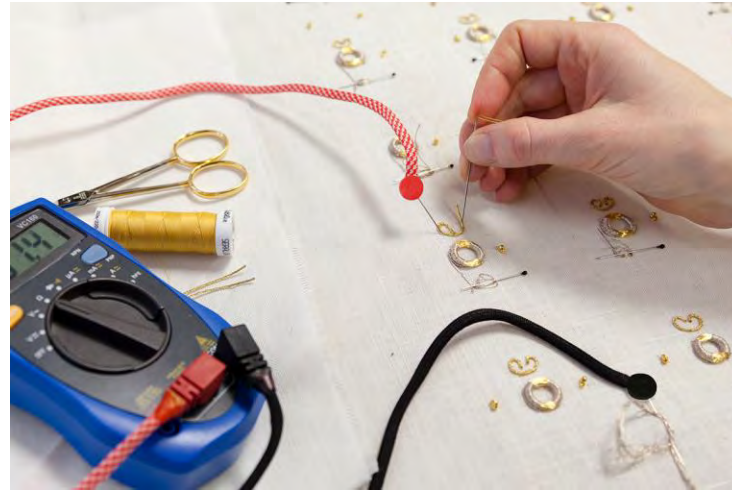
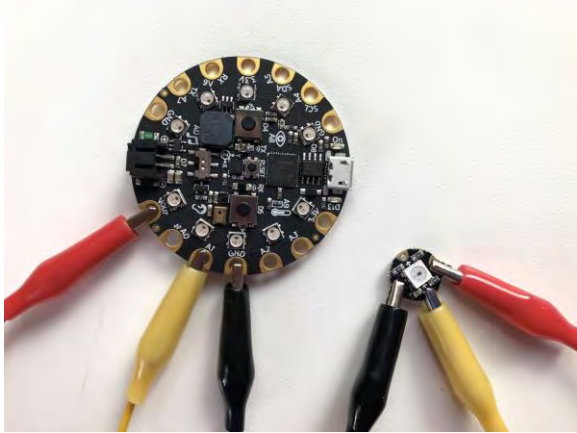
What: simple circuit for testing whether two parts of a circuit are connected

Why: a handy tool to help you test your e-textile circuits

- Check that parts that should be connected actually are
- Find short circuits, i.e. parts that are connected but shouldn't be



Background – tools for e-textiles



Conventional electronic tools can be adapted for e-textiles, but aren't designed for them

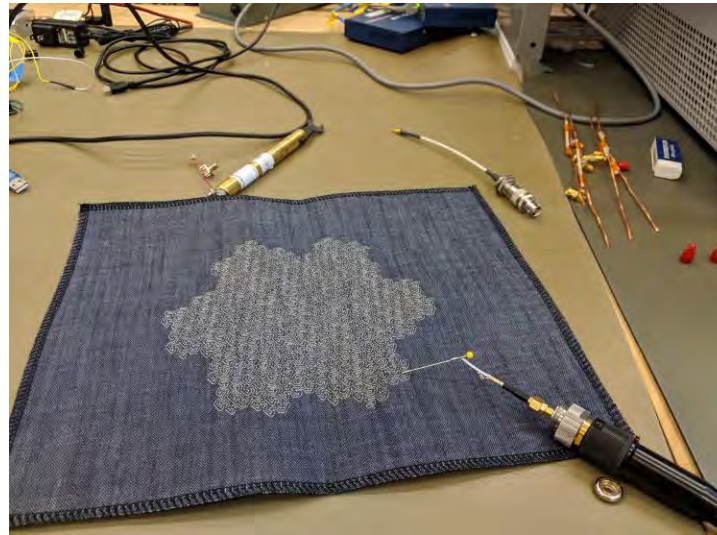
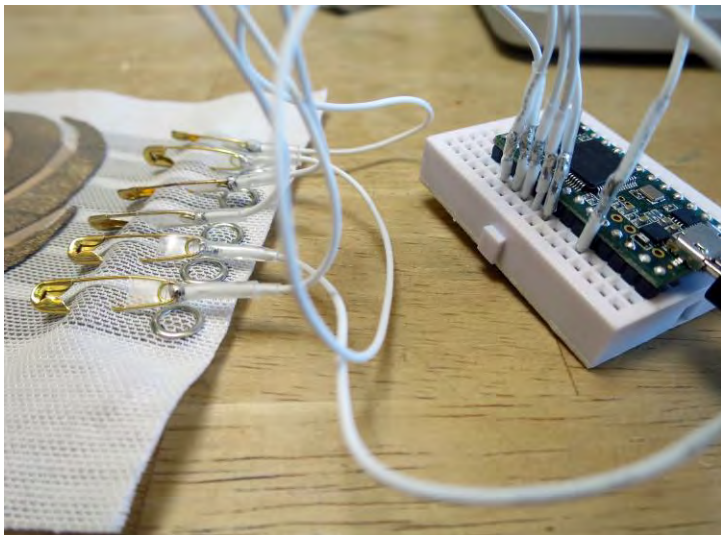


Pictured: Pin Probes + Clip Probe by Irene Posch. DIY instructions at <http://www.ireneposch.net/tooling/>
Further information: <https://www.stitchingworlds.net/experimentation/tools-for-practitioners/>
Irene Posch, Ebru Kurbak, Kobakant

Background – tools for e-textiles

Other examples building on the same concept:

Safety pin crocodile clips for e-textiles, Rachel Freire <https://www.instructables.com/Safety-Pin-Crocodile-Clips-for-ETextiles/>



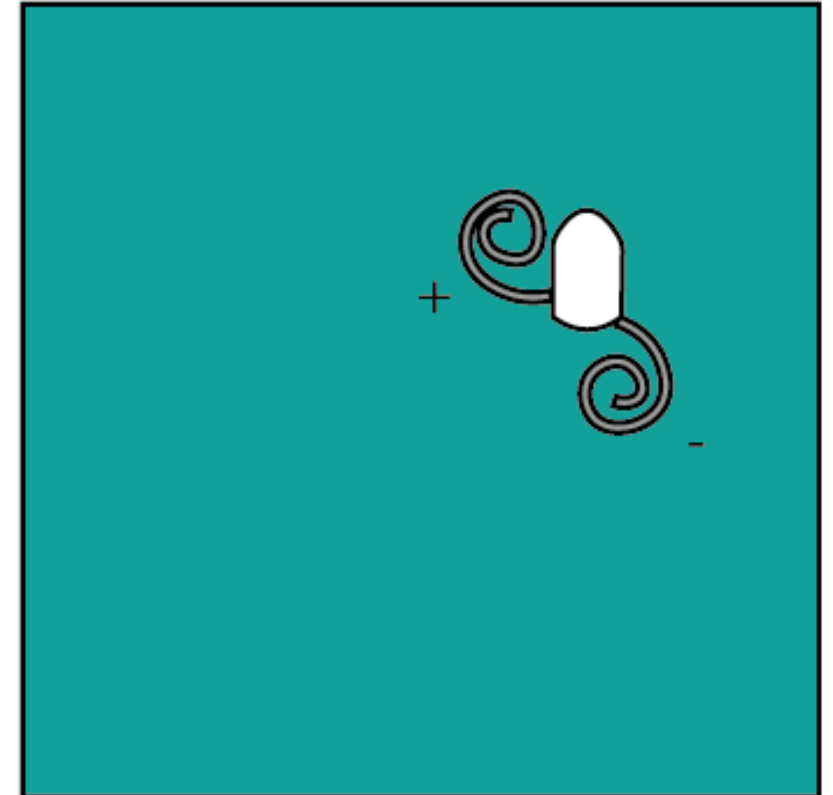
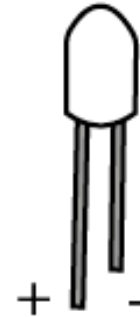
Pin connectors, Afroditi Psarra <https://afroditipsarra.com/work/embodied-rf-ecologies>



Threadboard, Chris Hill <https://www.instructables.com/The-ThreadBoard-V2-E-Textile-Prototyping-Board/>

Step 1: getting started

- It's a good idea to sketch your circuit design before you start sewing (to catch any mistakes *before* you sew them)
- Choose your fabric and cut a piece large enough to hold the LED and battery
- If using a through-hole (standard) LED, use a pliers to twist the legs into coils to make it sewable



Step 2: sewing the first conductive tracks

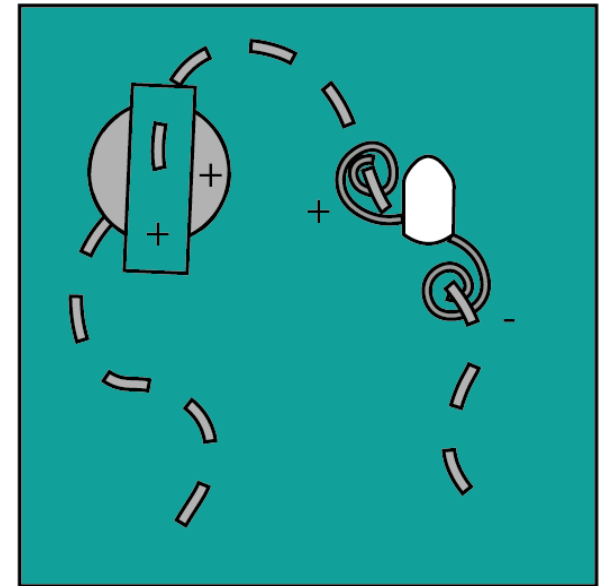
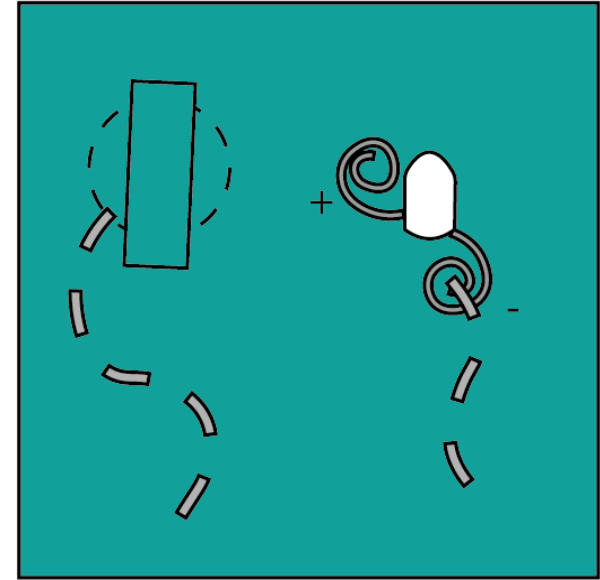
- Use conductive thread to stitch two conductive tracks
 - One from the LED to the edge of the fabric
 - Another from the edge of the fabric to under where the battery will go
- Make sure to sew these tracks separately, don't join them!
- When stitching the LED onto the fabric, stitch several times, tightly.



Step 3: making the battery holder (option 1)

To make a battery holder from a strip of fabric:

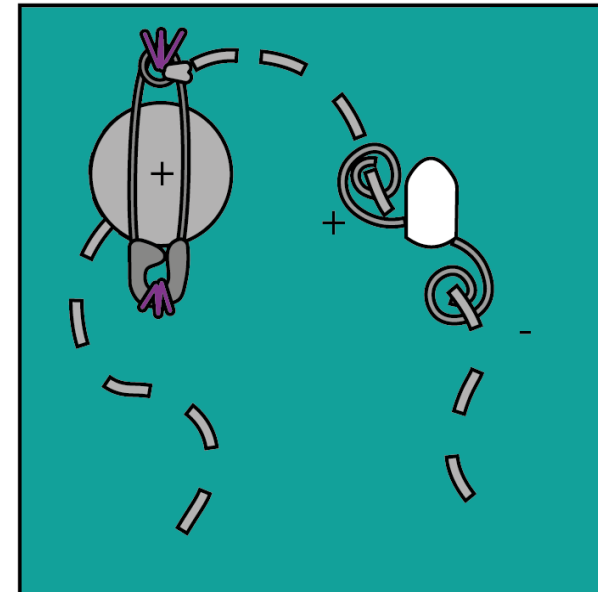
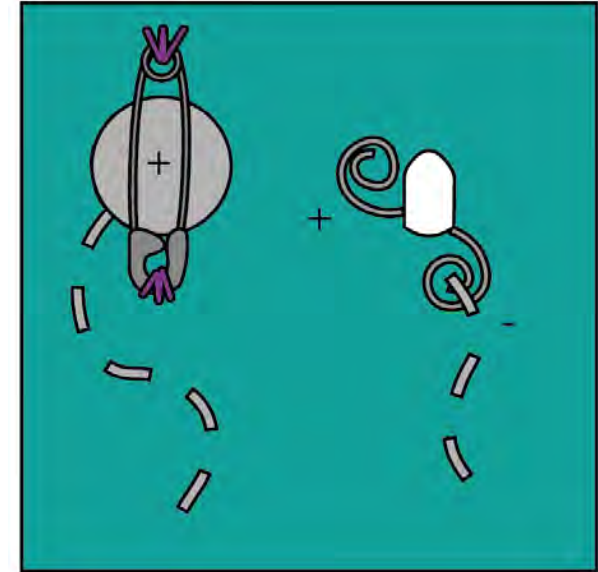
- Cut a fabric strip slightly longer than the battery, and stitch one end of it to the fabric
- Then stitch a conductive thread track from the LED to the fabric strip. Make sure not to cross over these stitches with the stitches sewn in the previous step
- Place the battery under the fabric strip and stitch the other side of the fabric strip down. Make this as tight as possible!



Step 3: making the battery holder (option 2)

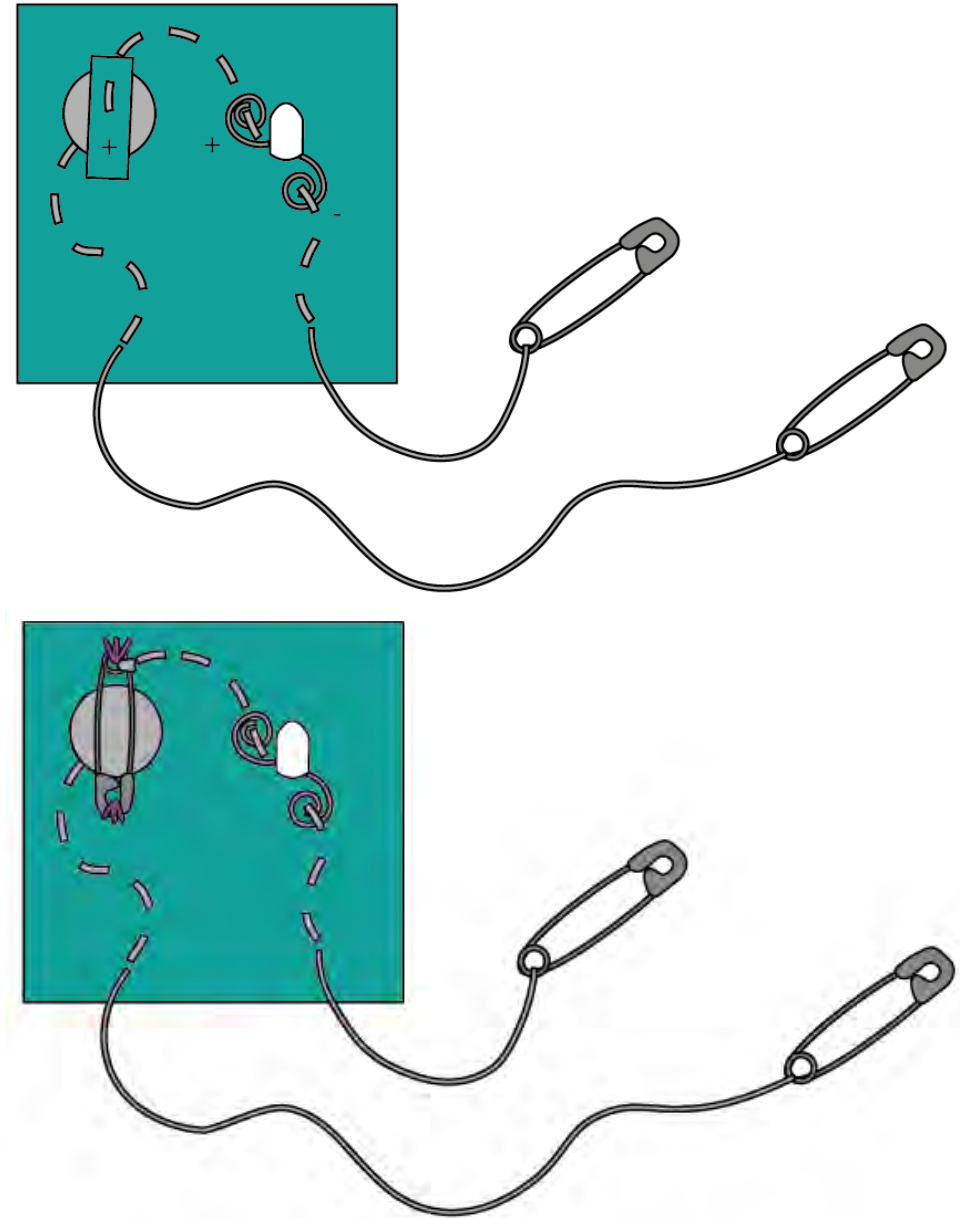
To make a battery holder out of a safety pin:

- Put the battery in place and put the safety pin on top of it. Use regular (non-conductive) thread to stitch in place. Make stitches tight so that the safety pin presses against the battery.
- Use conductive thread to stitch a conductive thread track from the LED to the safety pin, making sure not to touch the conductive thread tracks sewn in Step 2.



Step 4: Making the probes

- Use more conductive thread to make soft wires that are stitched to the conductive tracks on the fabric, and the safety pins
- Make sure all stitches are tight
- Going further: insulate the probe 'wires' by adding a non-conductive coating
- Other options: use alligator clips or insulated wire instead of conductive thread, or pins / other metal clips instead of safety pins



Step 5: Test!

- Touch / pin the safety pins to a conductive fabric and the LED should light up
- Pin the safety pins to either side of a soft switch: the LED should light when the switch is closed
- Troubleshooting: if your circuit isn't working, check:
 - That your battery hasn't run out of charge
 - For any loose connections, or short circuits where things that shouldn't be joined are touching

