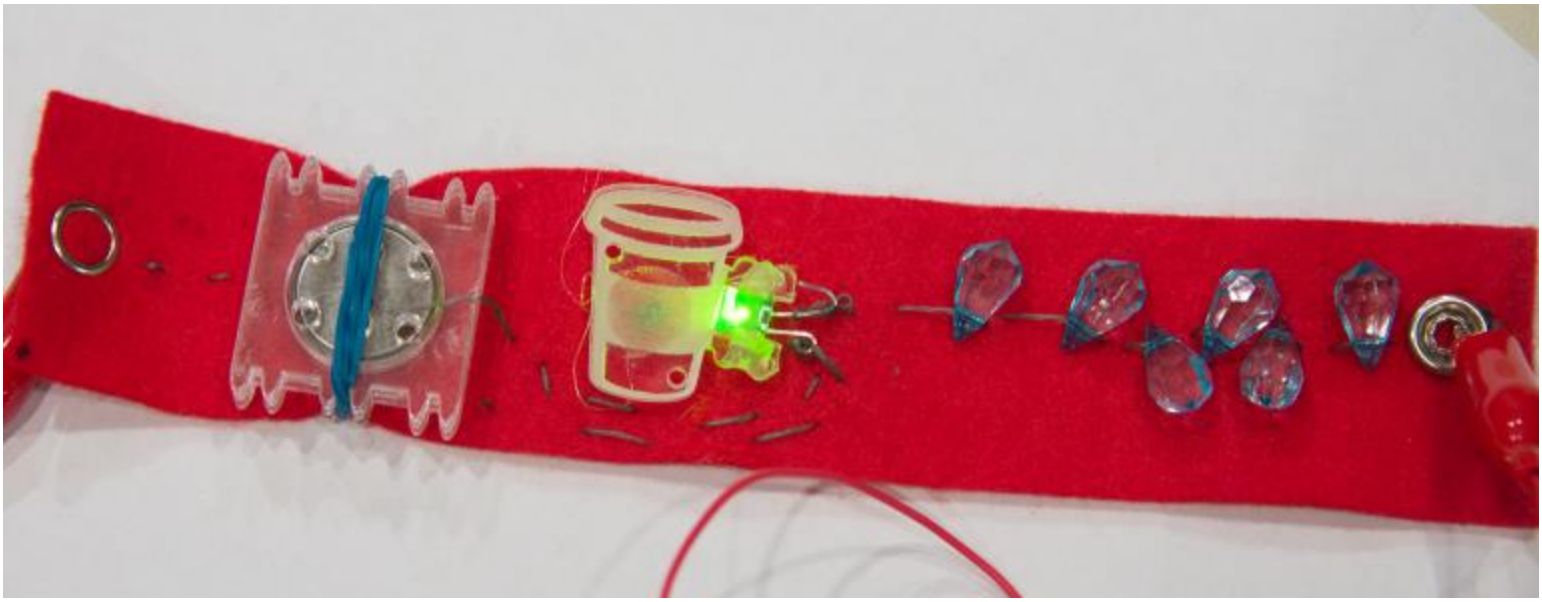


L.E.D. Bracelets

What are we making? An LED bracelet. A battery, an LED, stitched onto some felt. The LED lights up when the circuit is completed with snaps.

Materials:

- **Consumables:**
  - **Felt**
  - **Acrylic parts - charms, battery holder parts**
  - **LEDs**
  - **Batteries**
  - **Rubber bands**
  - **Snaps - crimp style or sew style**
  - **Zip-lock bags for unfinished projects**
  - **Conductive thread: https://www.sparkfun.com/products/11791 $40.00**
  - **Thread that matches felt colors**
  - **Beads and other decorations for the bracelet**
  - **Hot glue for putting on decorations without stitching**

- **Tools:**
  - **Snap crimper**
  - **Sewing needles that can fit the conductive thread - Crewel needles**
  - **Needle threaders**
  - **Wire cutters**
  - **Scissors for cutting felt and thread**
  - **Round-nose pliers / needle-nose pliers (for bending LED leads)**
  - **Magnetic bowl/pin cushion**
  - **Hot glue guns to add decorations without stitching**
  - **Multimeter for testing circuits**

Instructor preparation:

- **Using a wire bending jewelry tool, bend all the leads of the LEDs into loops that are easy to stitch through. Students could do this if they have time. In my 1.5 hour sessions, it took too much time.**
- **Cut the acrylic pieces.**
  - **Adjust for your needs - battery size, LED sizes, etc**
  - **Make sure acrylic stock is same the thickness of your battery.**

While students are gathering

- **Hand out parts of battery holder**
- **Get them to remove the backing from the parts that still have backing**
- **Have them pick a charm if you think they'll get that far**
- **Pick some beads if there is time**

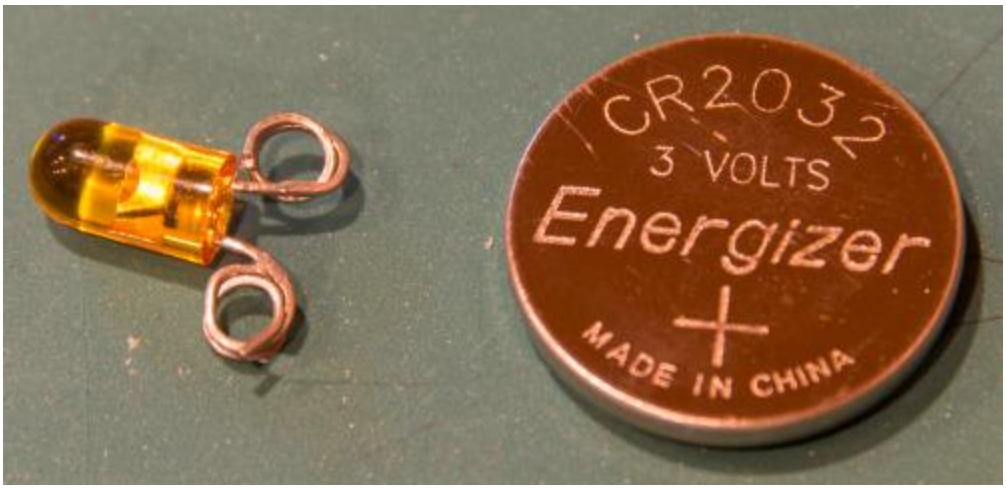
Start with quick explanation of:

- **Battery safety**
  - **Have students brainstorm this**
  - **Never put in mouth**
  - **Keep away from younger siblings**
  - **Dispose of it properly (library) or give it to your parent to dispose of properly**
- **Needle safety**
  - **Have students brainstorm this**
  - **Always put needles in the magnetic tray when done with them**

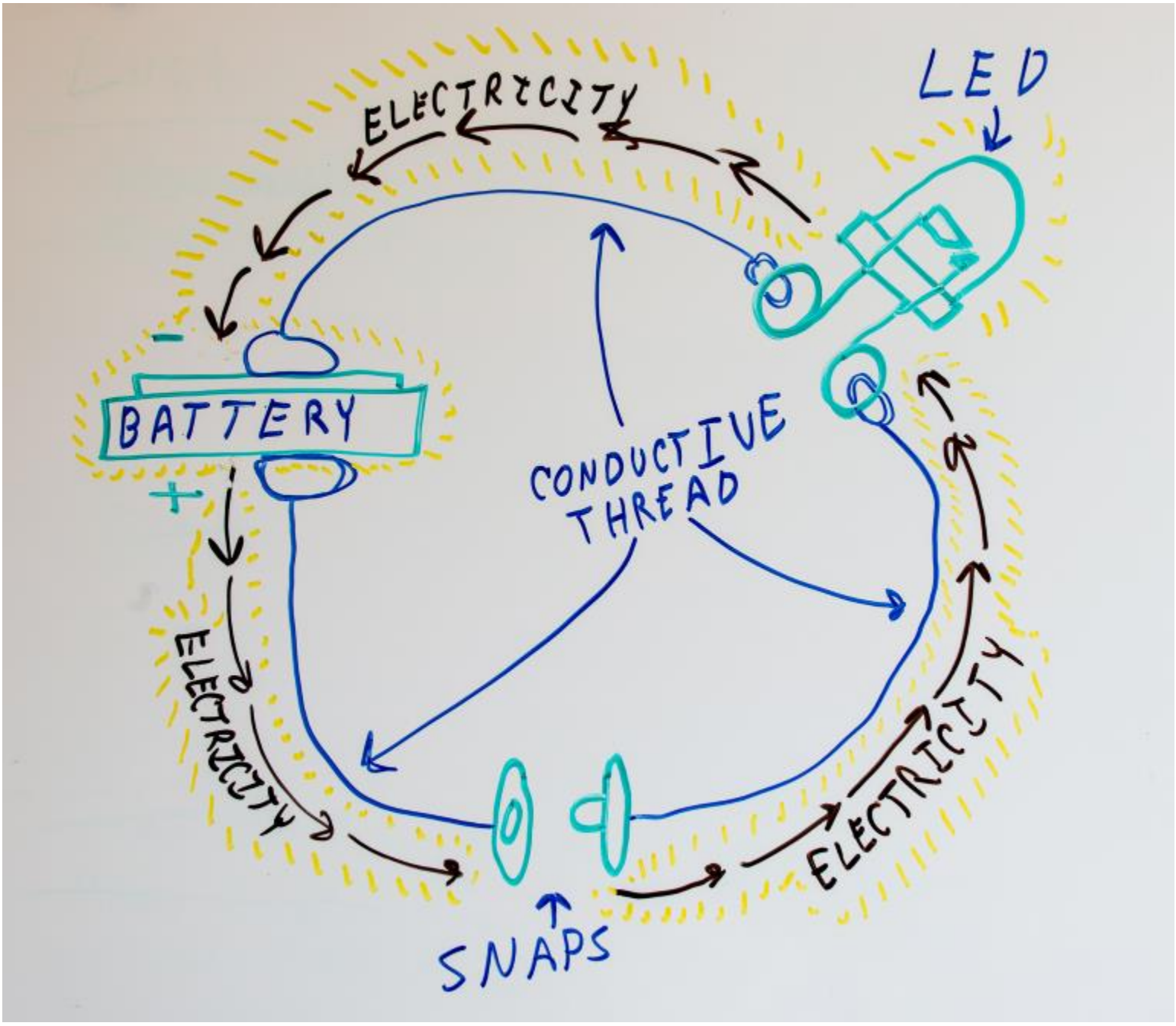
First Activity:

Pick an LED and get it to light up with battery

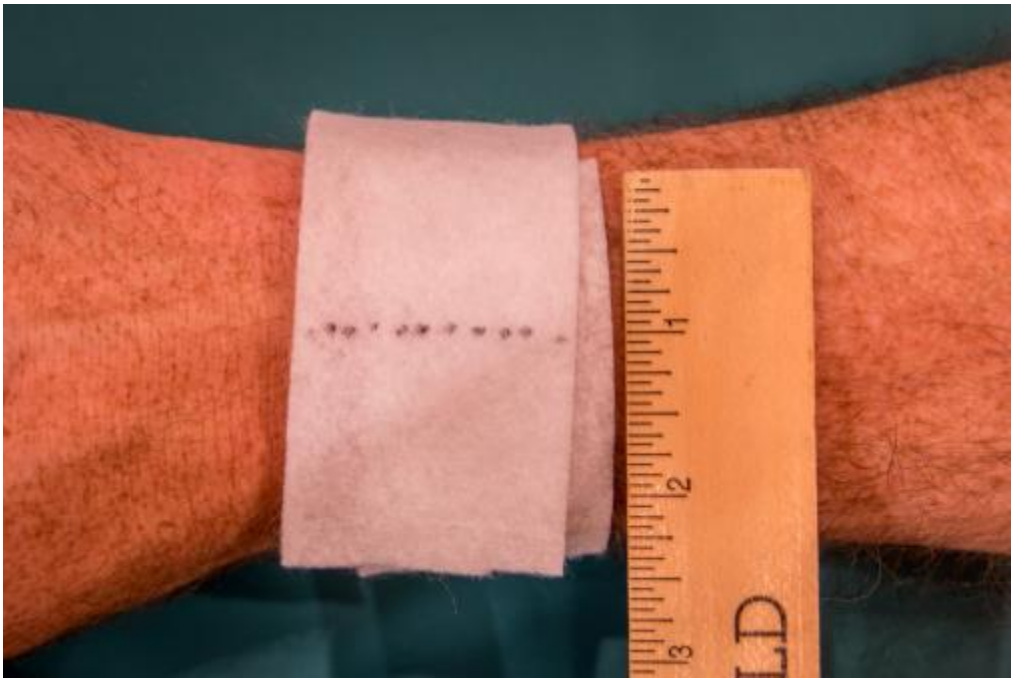
- **Make sure it's bright enough (some of the LEDs are lame)**
- **Explain that it only works one way**



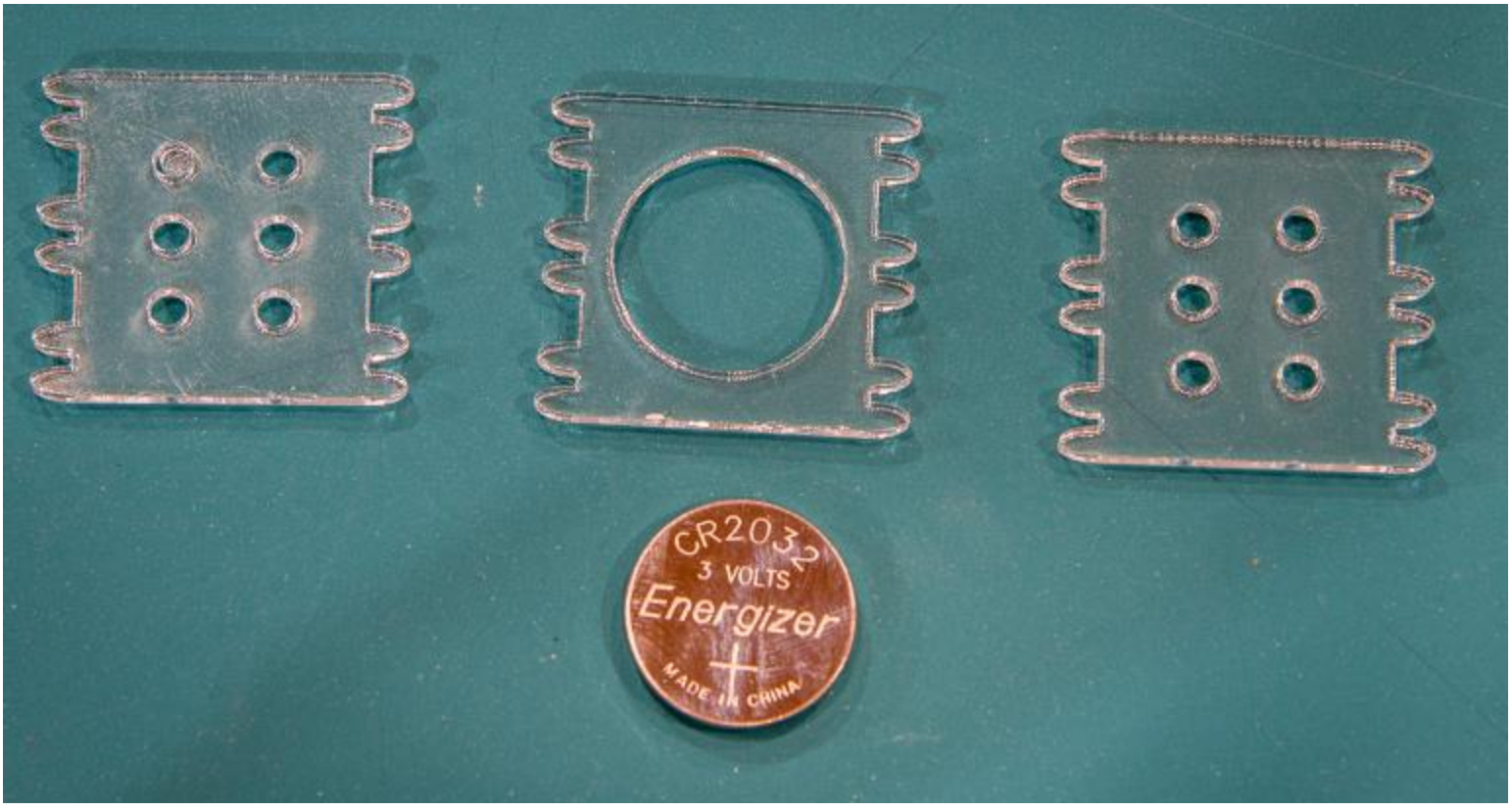
Give some explanation of the whole project, how things are wired, avoiding short circuits, etc.



Get started: Measure and cut Felt - one inch overlap when wrapped around wrist

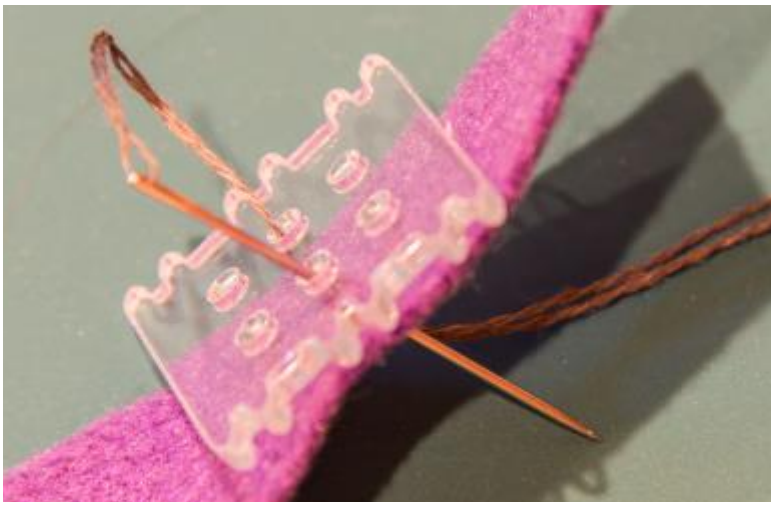


Explain the parts of the battery holder
Bottom and top are the same thing

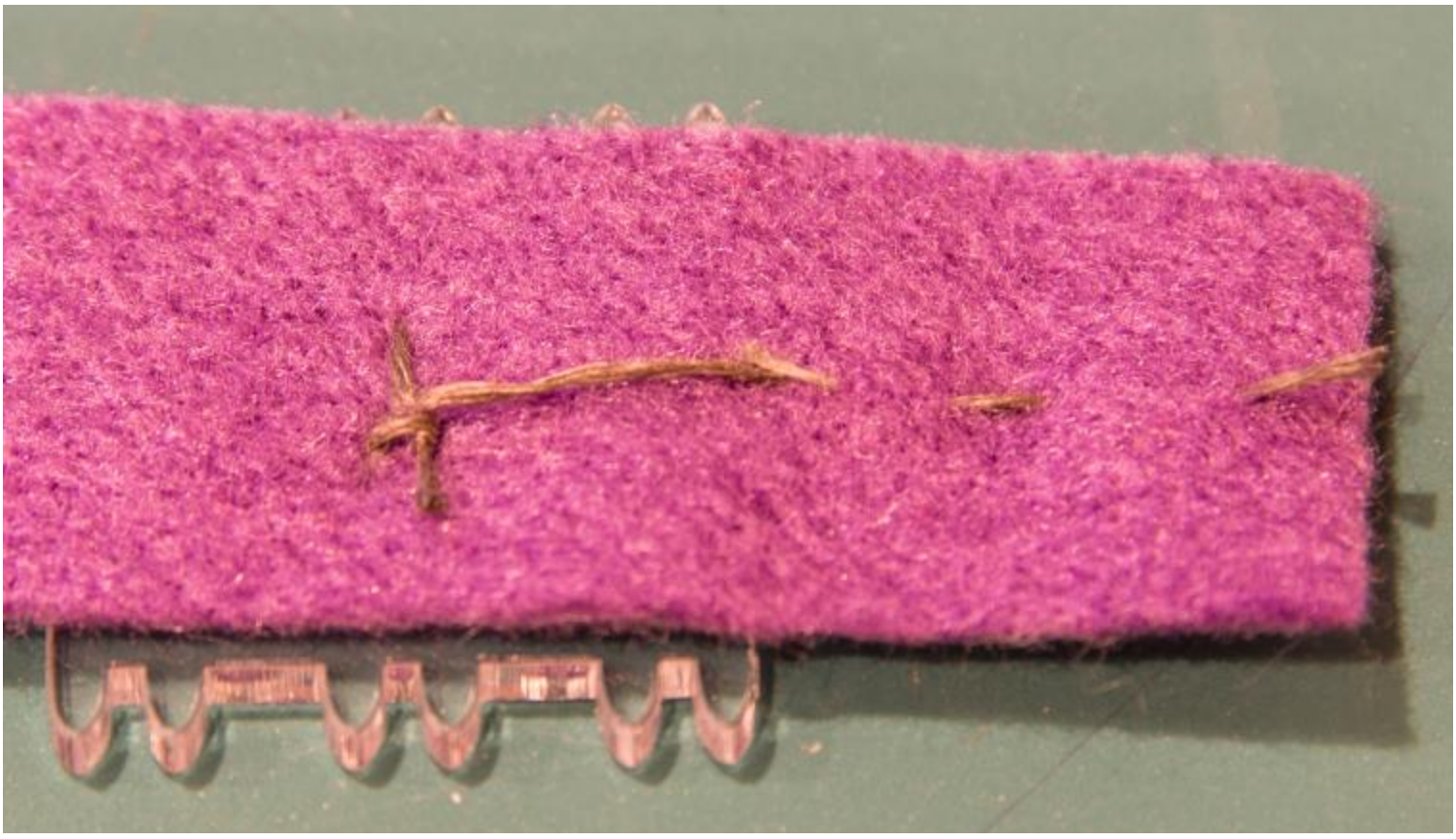


Stitch bottom of battery holder to felt band about one inch from the end of the band

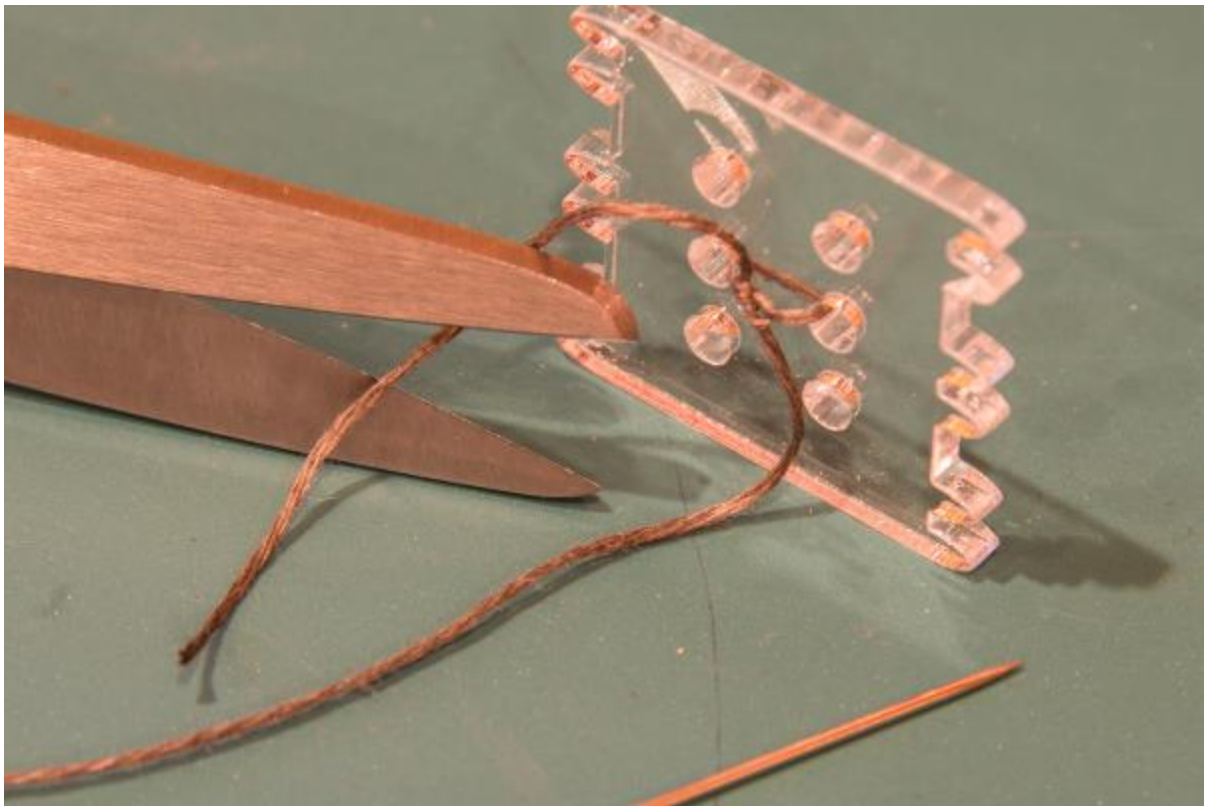
- **Double thread through needle. A single strand can be hard to work with**
- **Only stitch through middle two holes with conductive thread to prevent shorts**
- **At least two loops through holder and felt band**
- **Make sure excess thread on battery holder is cut off to prevent short circuits**



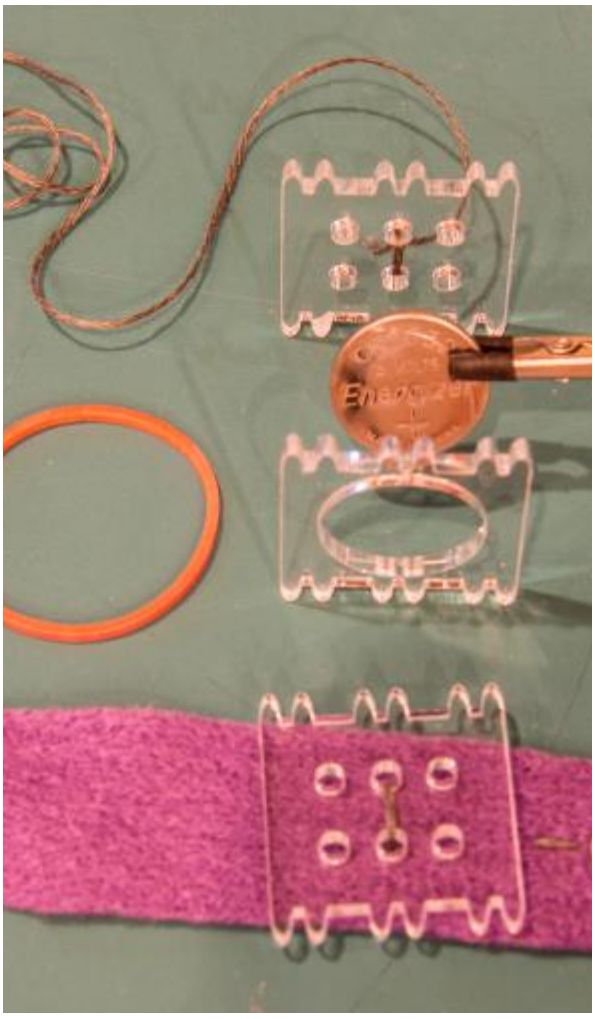
Continue stitching to end of band where snap will go
Cut thread



With needle attached, loop conductive thread through top of battery holder twice and tie a knot on the non-needle end. Trim the non-needle end.

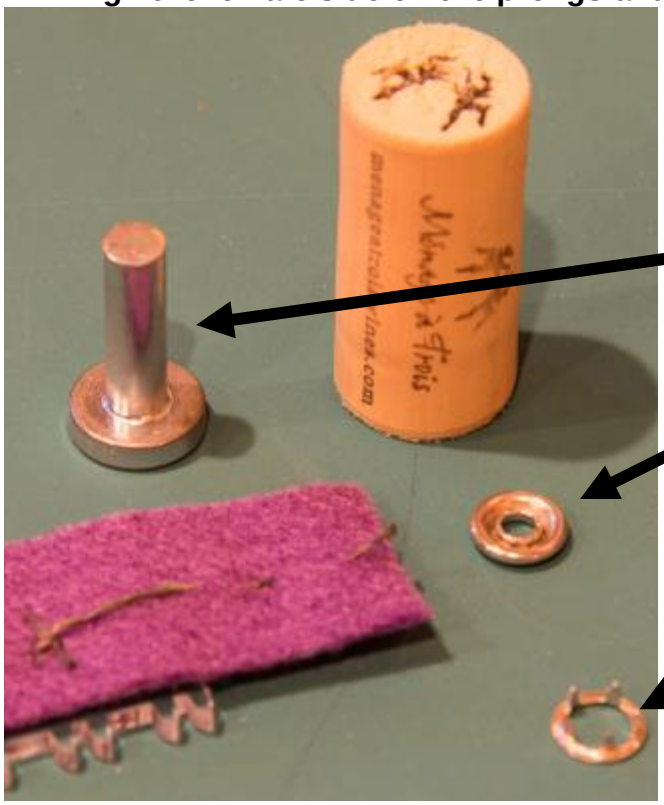


Assemble battery holder with middle piece, battery, and rubber band

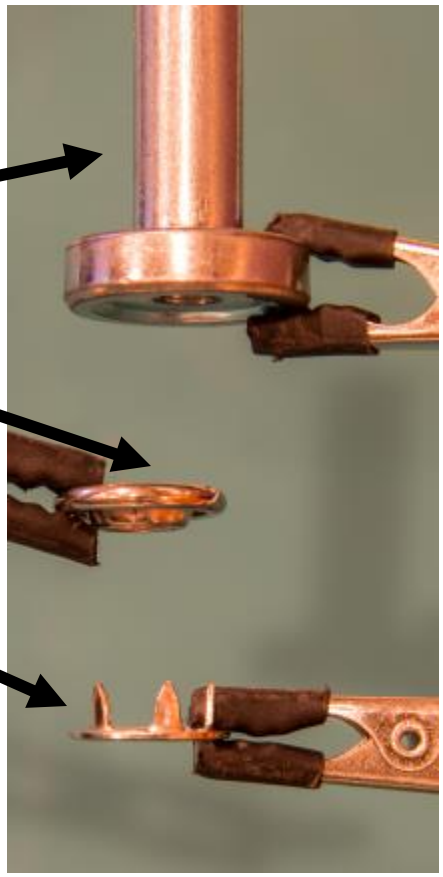


Put in female side of snaps

- **Look at sample and/or loop the felt band around your wrist to visualize how snaps should be oriented**
- **Push prong side through fabric with thread - Use pencil eraser, cork, etc. to really get them through so the prongs are visible on the other side**
- **Align the female side on the prongs and use the die and a hammer to crimp it together**

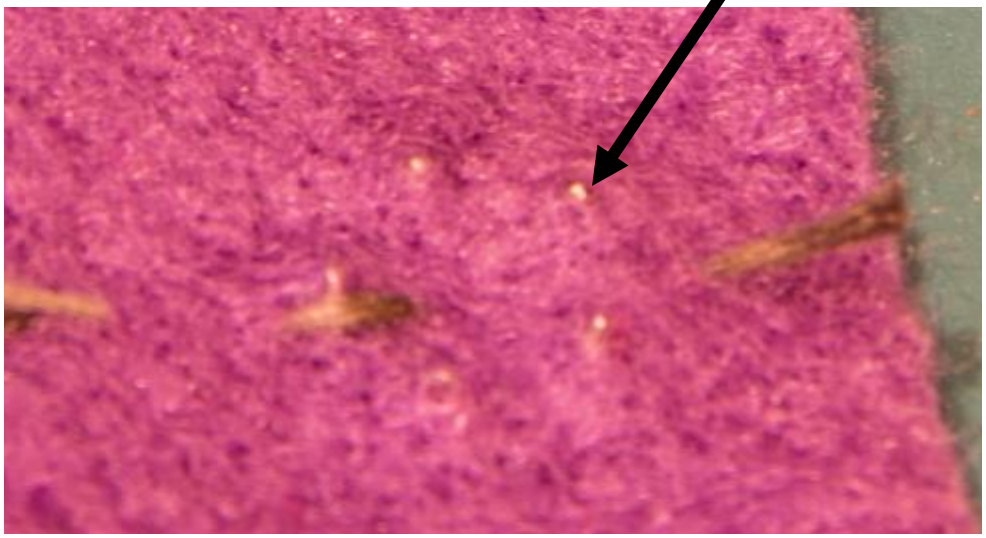


Die

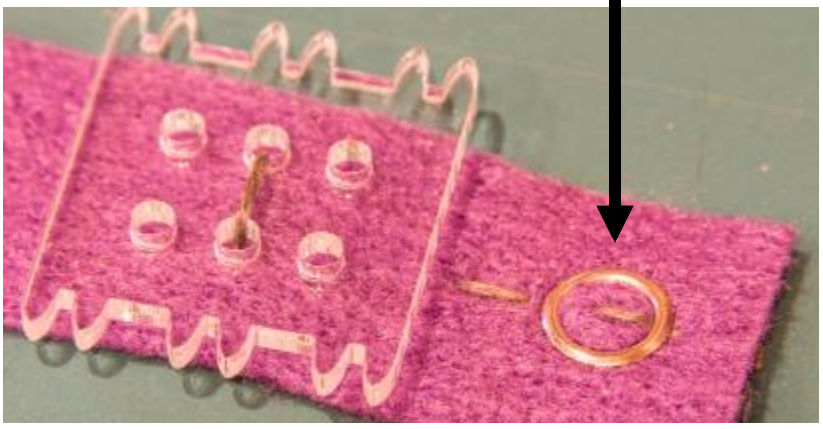


Female snap

Prongs



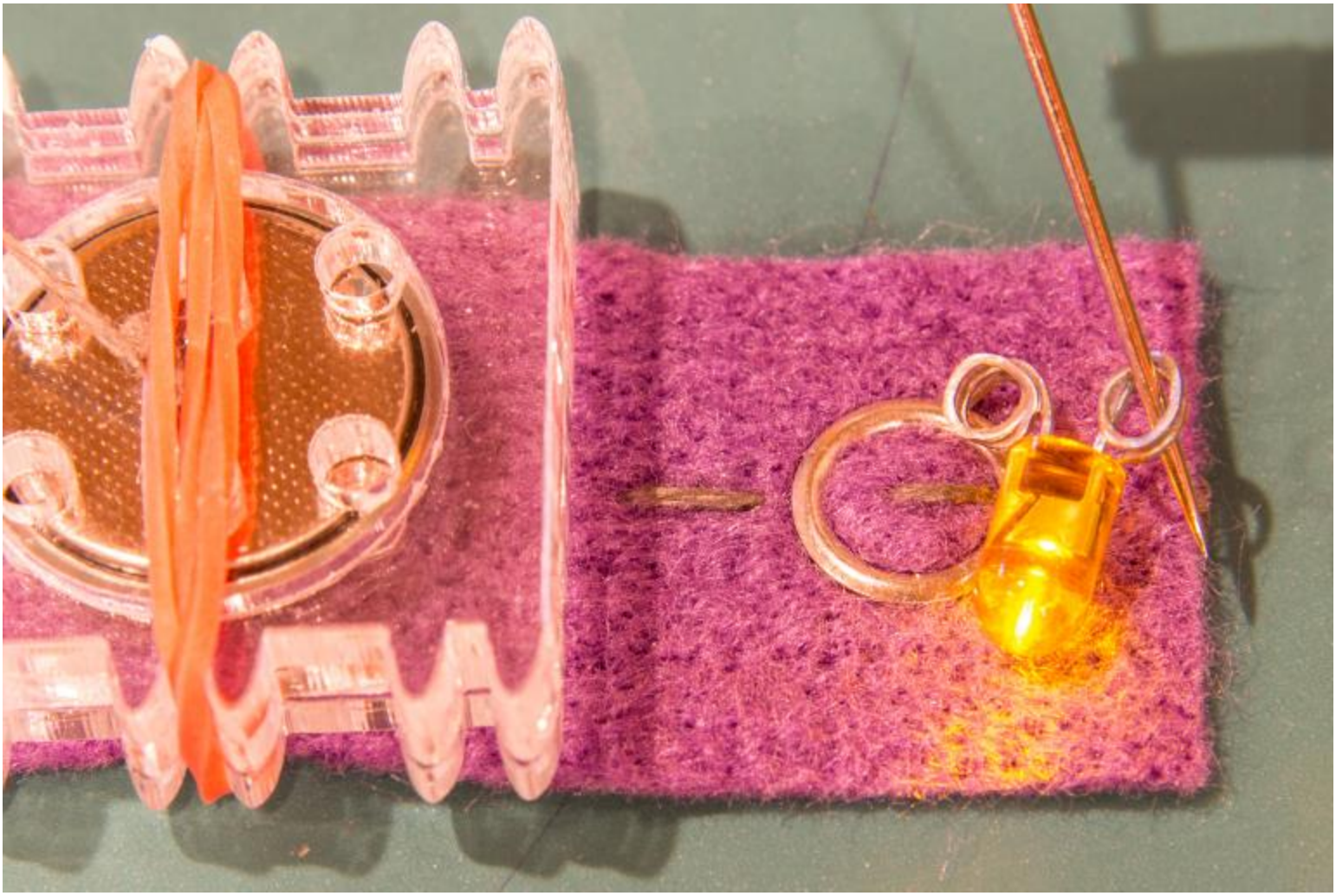
Crimped snap with back of prong side showing



Pick place where LED will go and mark it with tape or sharpie on bottom
Take into account where charm may go

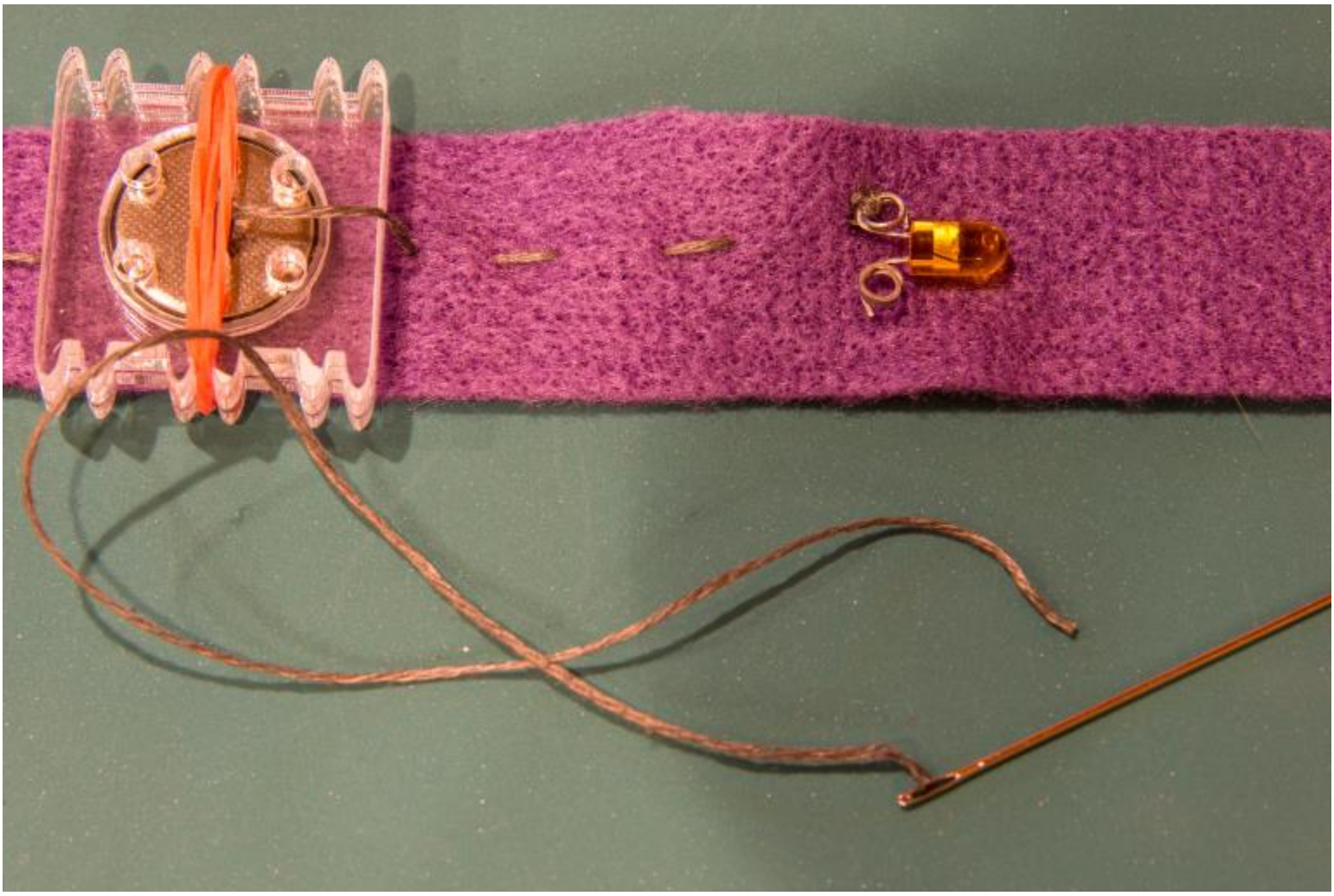
Figure out which end of LED wil connect directly to the battery holder

- **Touch one lead of the LED to the thread, touch the other to the stitch on the other side of the battery**
- **If it lights up, great, of not, switch the terminals of the LED**



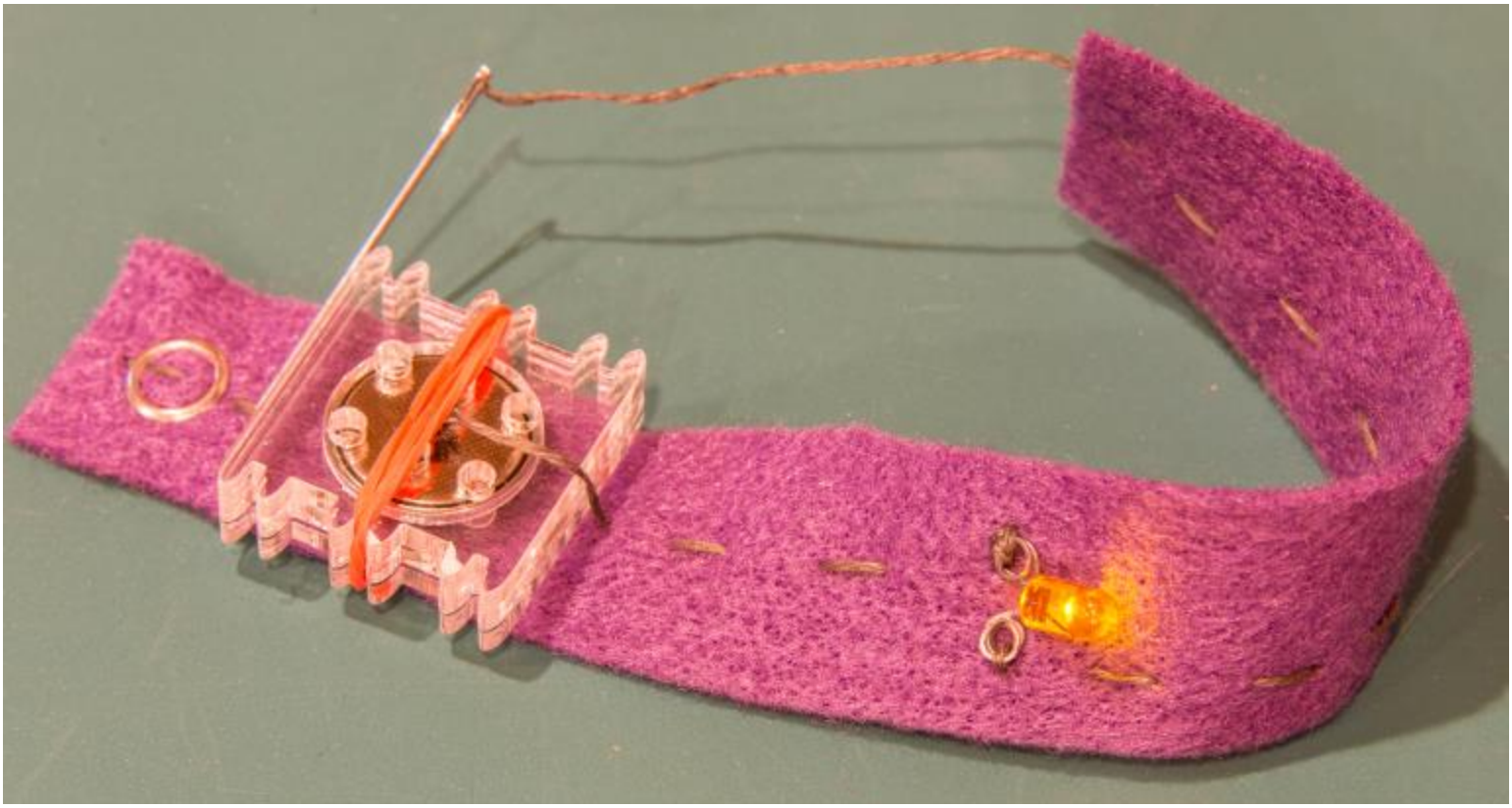
Stitch from the battery holder to the LED

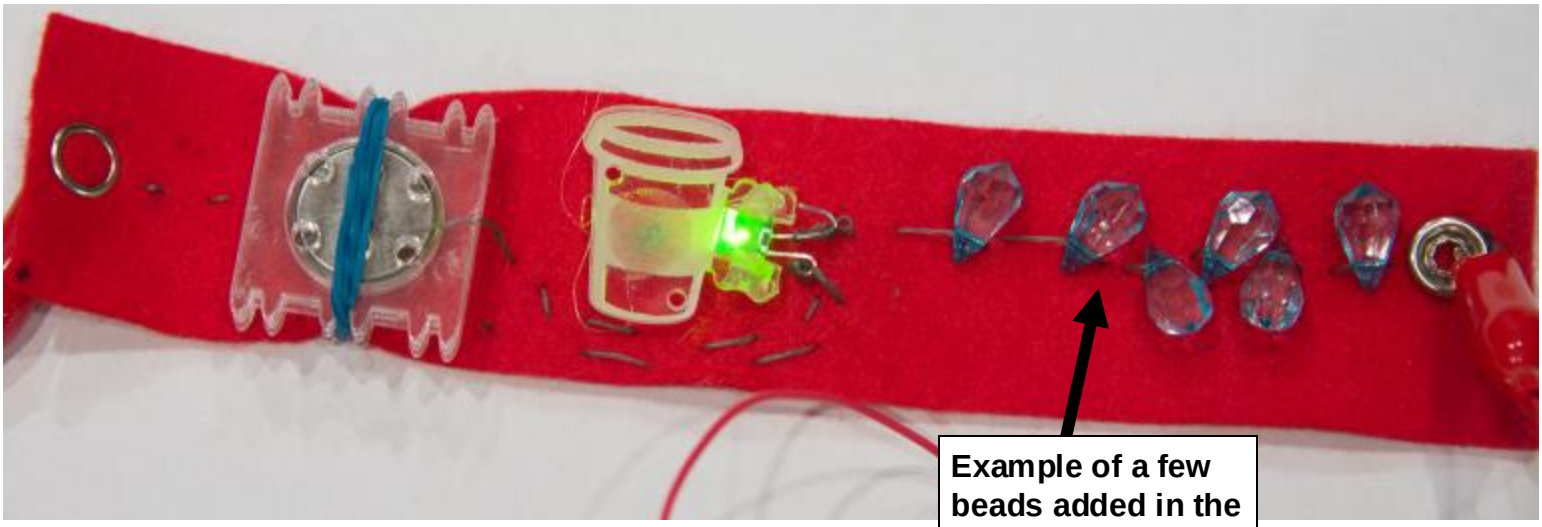
- **Put a few loops through LED connection**
- **Tie it down**
- **Cut off any excess**



Stitch from LED to location of other snap

- **Put a few stitches through LED terminal and tie it off**
- **Stitch to where snap will go**
  - **Can put in beads on this line since we are almost done**
- **Put a few extra stitches where snap will go**
- **Test the LED by touching the needle to the stitched on the other side of the battery**
- **At end, tie it off and cut off excess**





Example of a few beads added in the final product

Put in male snap

- **Look at sample and/or loop the felt band around your wrist to visualize how snaps should be oriented**
- **Be sure the snap makes good contact with the conductive thread**
- **Insert the prongs and crimp just like the female side**

Test it out, make sure snapping the snaps together lights the LED
Hot glue or stitch on charm next to or on top of LED
Add additional beads, embellishments, or even an additional LED
Additional panels of felt could be added to prevent short circuits when stored