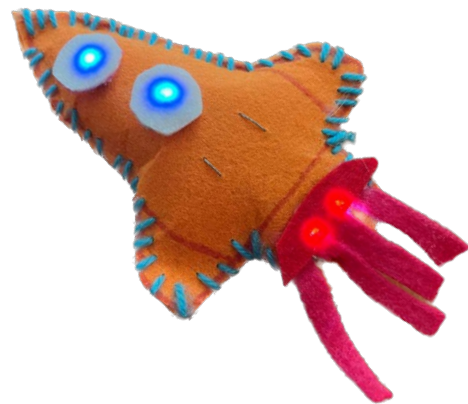




Felt Funsters

Maker Project



Use conductive thread to light up some crafty creations!

The stuffies are made from felt, hand-sewn with yarn, then stuffed with polyester fluff.

They must have at least one LED that lights up when the battery pack is turned on.



Front



Back

Use this project in any academic area

Geometry

Ecology

Civics

Literature

SEL

History

Geography

??

Sample Project Description for Students

- Maximum size of unstuffed shape is 6" x 6"
- Decorations can be added with more pieces of felt or other craft materials (sewn or glued on)
- Circuit materials are a battery holder with an on/off, a 3V coin cell battery such as CR2032, conductive thread, LED "sequins"
- **Option 1:** Include up to 3 LEDs in parallel in your circuit
- **Option 2:** Include an additional connection that must be made for the LED to light up (the conductive thread contacting another piece, or connecting through another conductor such as a paper clip)

Project Goals

By the end of this project, students will be able to

- Plan a pattern for a small stuffed object (aka “stuffie”)
- Cut and lay out felt and craft materials
- Sew simple stitches by hand
 - *Optional: embroider with yarn on the stuffie*
- Make a series circuit with “LED sequins”, conductive thread, and a battery holder with switch.
 - *Optional: Add more LEDs to the basic circuit in parallel to the first LED*
 - *Optional: Add a switch feature (i.e. touching two parts together to complete the circuit)*
 - *Optional: Decorate stuffie with craft materials*
- Identify and describe all parts of the circuit
 - *Optional: explain how the stuffie met the project criteria*



Sample Project Prompts

Create a creature or mini-monster that

... is a companion who can listen to you as you work through problems and activities

... is a character in a story

... shows an emotion

... has a superpower

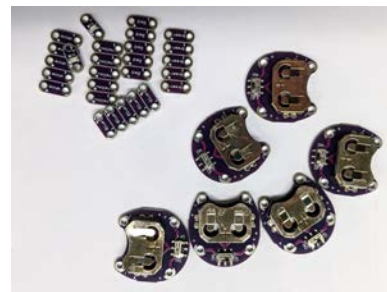
... represents you or someone you admire

... is a companion with a superpower that is useful to you

??

Felt Funster Materials and Tools

- Felt (soft)
- LED sequins
- Conductive thread
- Yarn (weight 3 or 4)
- Needles with big eyes
- Polyester stuffing (“polyfill”)
- Scissors
- Markers
- Craft materials for decorations
 - Googly eyes, pipe cleaners, feathers, sequins, etc.
 - *Optional: glue for decorations*
- 3V Coin cell battery, CR2032)
- Battery holder with on/off switch



Felt Funster Steps

1. Design your Felt Funster (aka “stuffie”)
2. Create a pattern for the felt body
3. Cut out the front and back felt pieces
4. Plan and test the circuit
5. Sew the circuit
6. Sew most of the perimeter of the stuffie
7. Add stuffing and finish sewing the perimeter
8. Check the circuit and switches
9. Add decorations and finishing touches

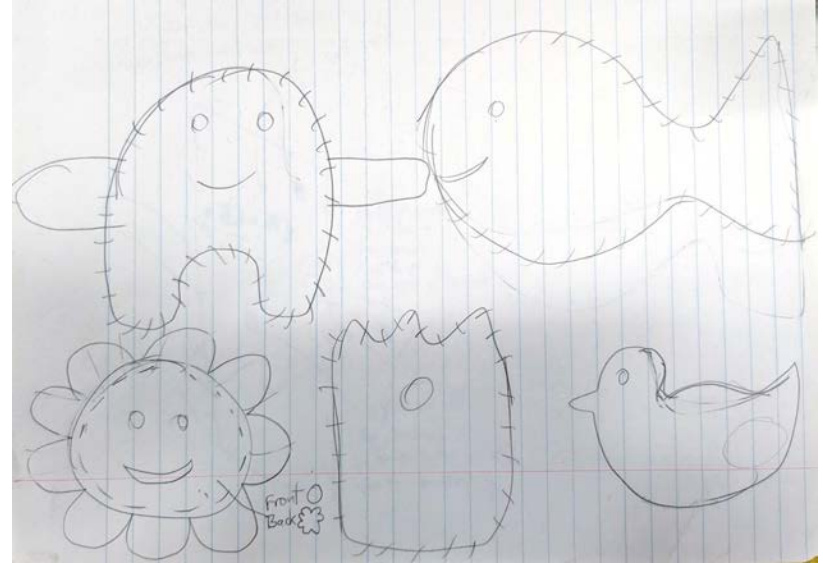


Step 1 - Design your Felt Funster

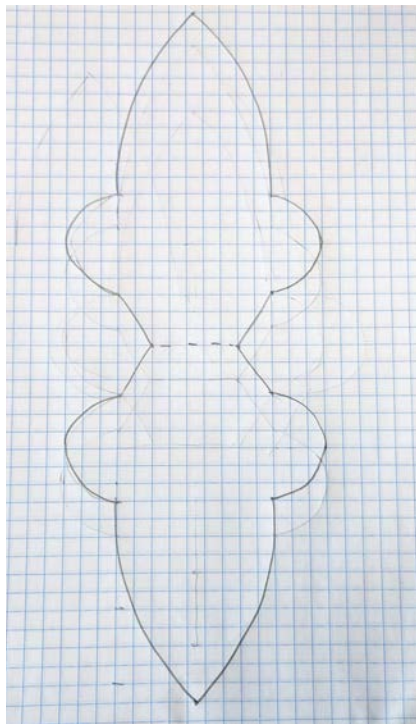
Design your Felt Funster (aka “stuffie”)

Pick a shape, number and color of LEDs, and decorations.

It is best to consider a few designs, see how well they meet the project criteria, and choose one that you can finish on time.



Step 2 - Create a Pattern



Create a pattern for the felt body

Pick a shape for your stuffie. Stuffing the felt makes it puff out and the outline will be smaller, so make the shape a bit bigger on all sides to allow for the stuffing.

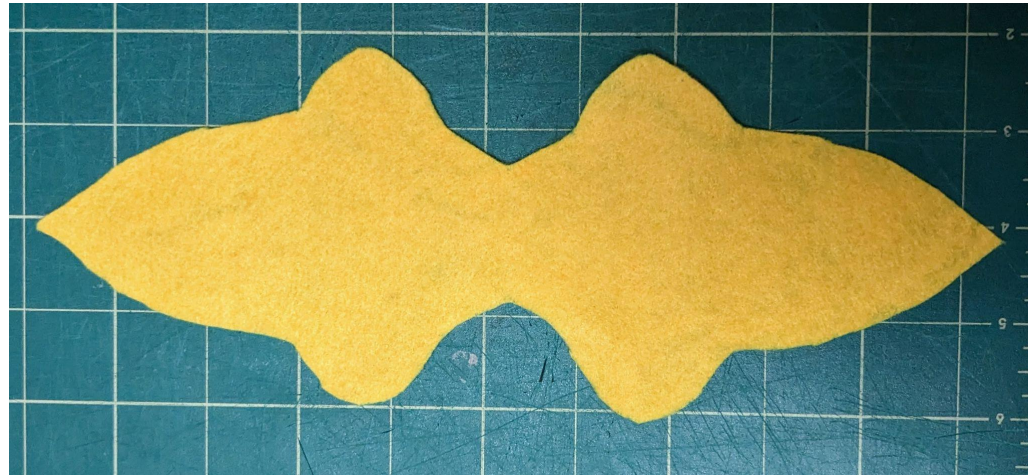
Draw the shapes for the front and back pieces on paper. Lay out the pieces so that they touch on one edge. This will help keep the pieces aligned, and reduce the amount of sewing needed.

Step 3 - Cut out Felt

Cut out the front and back felt pieces

Cut out your pattern and trace it on the felt

Cut out the felt

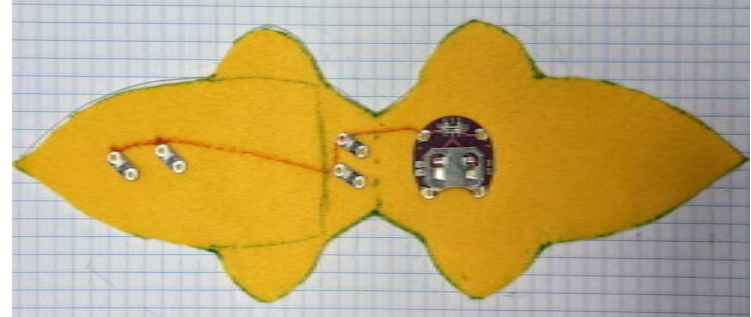


Step 4 - Plan and Test Circuit

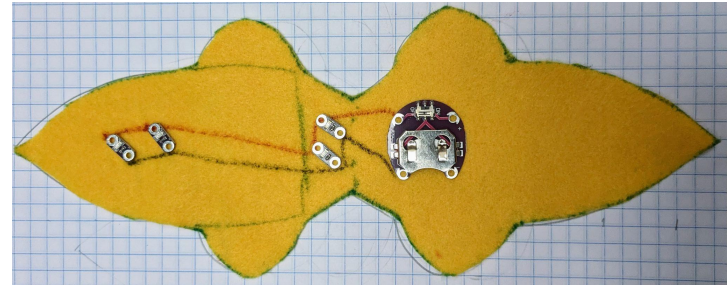
Plan and test the circuit

Lay out the components of the circuit on the outside surfaces of the felt: battery holder, the LEDs, and switches (optional)

Plan where the (+) and the (-) threads will go. It often helps to rotate the LEDs or the battery holder so the (+) and (-) threads do not cross.



The (+) stitch path and connections are marked here in **red**

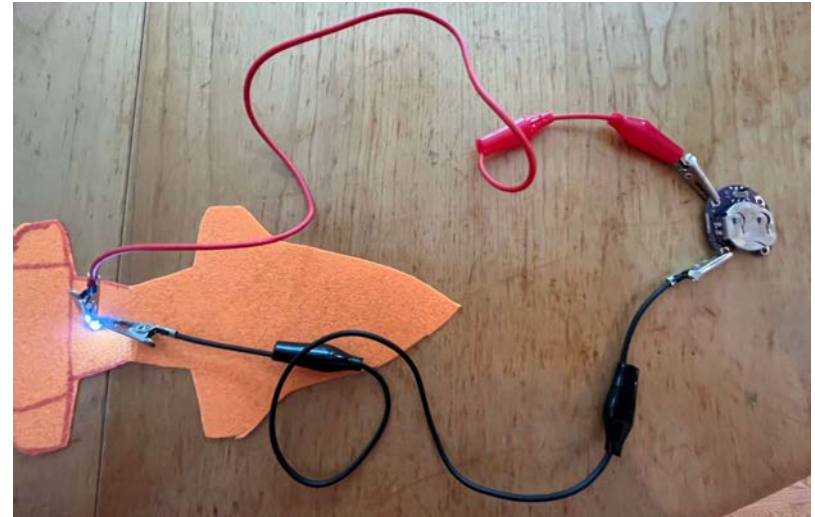
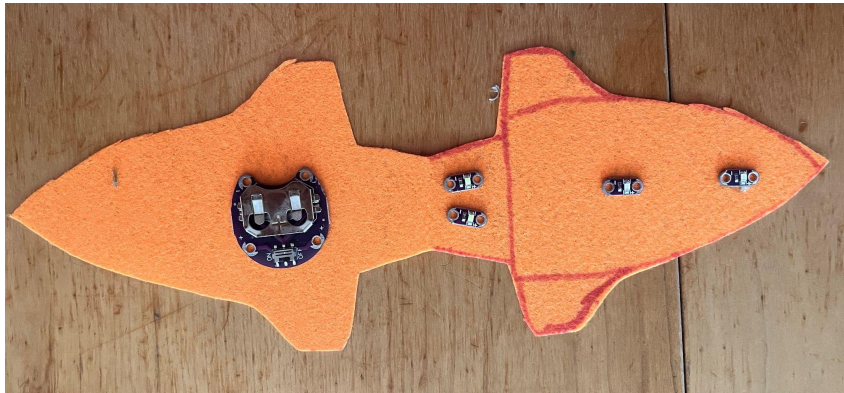


The (-) stitch path and connections are marked here in **black**

Step 4 - Plan and Test Circuit

Plan and test the circuit

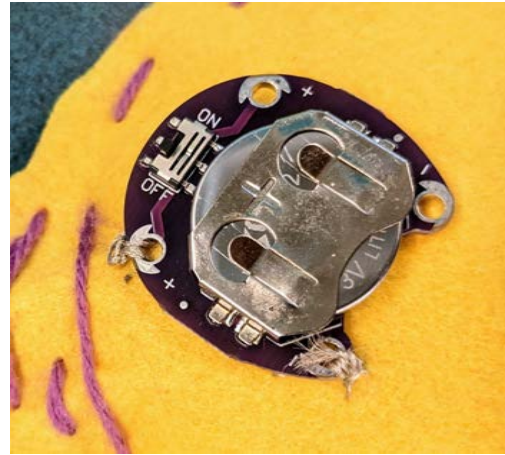
Connect all the components with alligator clips and get it to work the way you want



Step 5 - Sew the Circuit

Sew the circuit

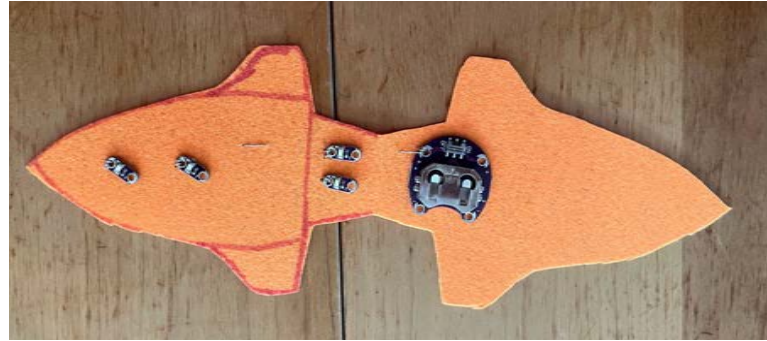
Note on sewing to the components: to make a good electrical connections to the components, **stitch through each connection 3 times and pull the thread tight.**



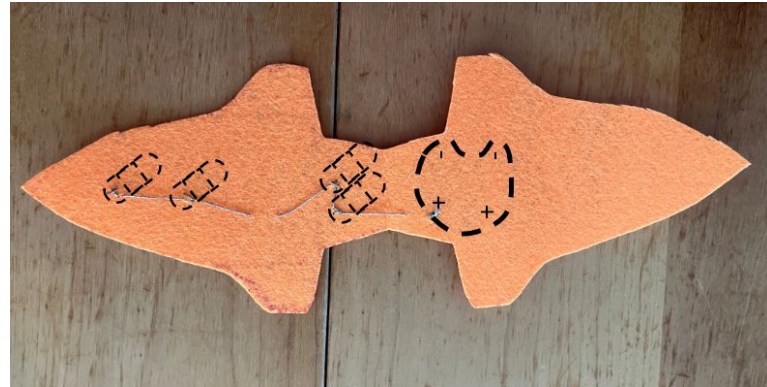
Step 5 - Sew the Circuit

Sew the (+) connections with
conductive thread.

Outside view - components
LEDs and the battery holder



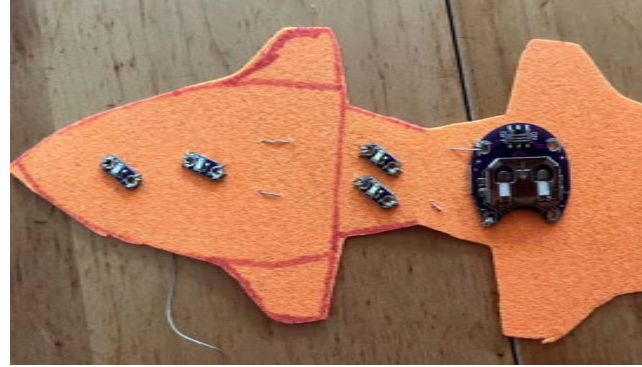
Inside view - stitching
(outlines of components were added)



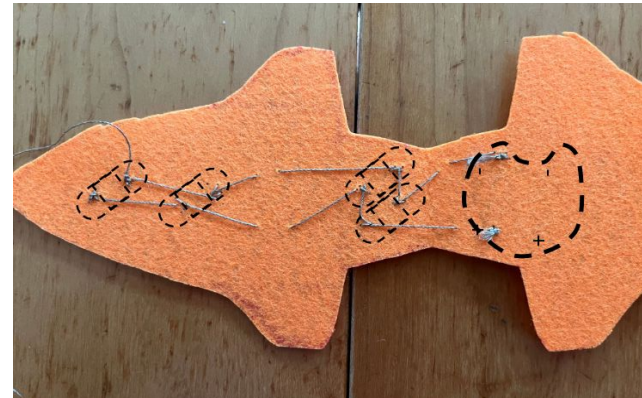
Step 5 - Sew the Circuit

Sew the (-) connections with the conductive thread. Make sure not to cross threads on the (+) and (-) parts of the circuit

Outside view - components
LEDs and the battery holder



Inside view - stitching
(outlines of components were added)



Step 6 - Test the Circuit

Troubleshoot by wiggling the components and looking for loose connections.

You can fix these by sewing tightly over loose stitches with conductive thread.



Step 7 - Sew Most of the Perimeter

Sew most of the perimeter of the stuffie

Cut about 24" of yarn, make a knot at one end and thread the needle with the other.

Use a blanket stitch or a running stitch to sew about $\frac{3}{4}$ of the perimeter (so there is an opening to insert the stuffing)

If the yarn runs out, start a new piece where you left off, and make sure to go over the last stitch a couple of times to keep it from coming out.

Leave extra yarn to finish sewing after stuffing



Step 8 - Add Stuffing, Finish Sewing

Add stuffing and finish sewing the perimeter

Stuff the felt with polyfill

Finish sewing the perimeter and fasten the yarn with 3 stitches in the same place

Check that the circuit still works



Step 9 - Decorate

Add decorations and finishing touches

Add felt pieces with hot glue or tacky glue

Embroider with yarn

Add character features with felt, yarn, and other craft materials: pom poms, pipe cleaners, googly eyes, feathers, etc.



Shortcuts

- ★ Use Tacky Glue instead of sewing
- ★ Sew with running stitches instead of blanket stitches
- ★ Make badges to practice sewing and decorating
- ★ Make light up circuits on badges or other non-stuffed items



Why we love this project

- ★ It's an engaging introduction to basic circuitry using unexpected media
- ★ Easy to differentiate by adjusting the fabrication techniques and circuit complexity
- ★ It incorporates useful hand fabrication techniques
- ★ It creates a memorable (and adorable) final product!

