teknikio®

FABTRONIC SEWING INVENTION GUIDE

FRONT AND BACK x2

TABLE OF CONTENTS

YOUR MATERIALS

2X COINCELL BATTERIES
These small batteries can provide power and fit in tight places. The top smooth side and rim of the battery are positive and the bottom textured side is negative. The batteries are CR2032.

2X SEWABLE STAR LEDS
The LEDs in your kit are smaller surface mount LEDs. The positive and negative gold pads are marked. These pads are where you will sew to connect the board to the circuit.
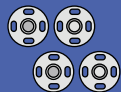
4X FABRIC SNAPS
These can be used to hold pieces of fabric together or you can sew them into the circuit and use them as a switch!
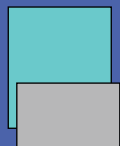
1X SEWING NEEDLE
This is what you will use to sew your project together. Be careful, the needle has a sharp point!

1X BATTERYBOARD
The conductive pads on the corners are labeled as positive and negative. When inserting your battery in the board make sure the smooth side with the "+" is facing up.

1X FELT PACK
This is your prototyping canvas. You can draw and stitch any circuit design onto this felt! You may need to supplement with additional scrap fabrics.

1X SPOOL OF CONDUCTIVE
This thread has silver strands which are conductive. The silver in the thread lets electrons pass through the thread and allows it to carry or transmit power and signals through a circuit. Steel is another metal commonly used to make conductive thread.

BELOW IS A LIST OF TOOLS AND MATERIALS THAT COMPLIMENT YOUR SET. WE ENCOURAGE YOU TO COMBINE THIS SET WITH OTHER TEKNIKIO SETS & PARTS.

OPTIONAL TOOLS	OPTIONAL MATERIALS
Wire cutters/Strippers	Googley eyes
Sewing needle/Machine	Fabric and thread
Multimeter	Cardboard
Scissors	Velcro
Pen	Fabric and thread
Glue/ Hot glue	Cotton stuffing
	Beads and Sequins

BASIC CIRCUITS

OUTPUT
The output, or part that is powered in a circuit. The LEDs are the outputs in your kit.

RESISTANCE
If we have more resistance the electrons flow slower, other times we have less resistance so that the electrons flow faster.

CIRCUIT
The flow of electrons across the circuit, carried by conductive materials. measured in amps.
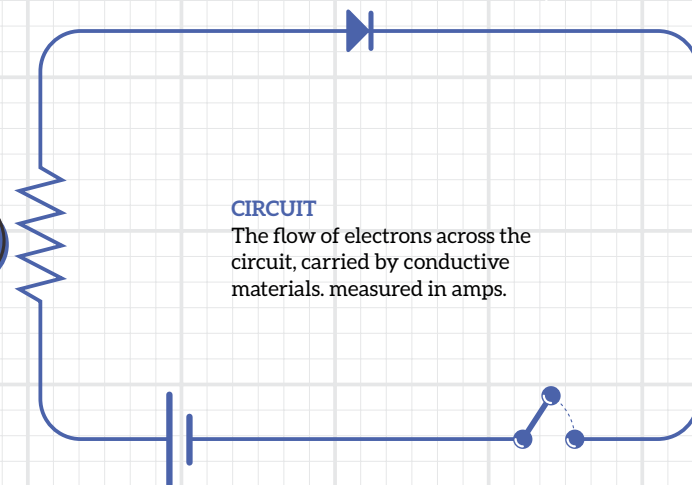
POWER SOURCE
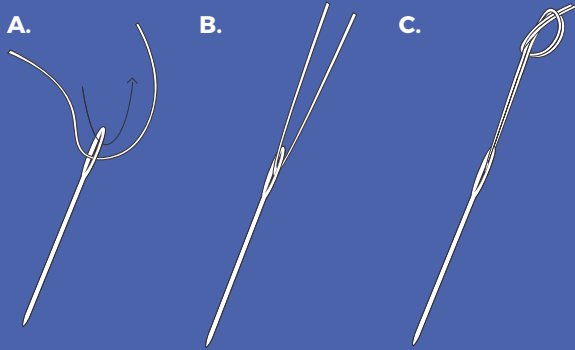Provides power to the circuit. Yours is the coincell battery.

SWITCH
When the switch is closed electrons can flow through the circuit. When the switch is opened electrons cannot flow.
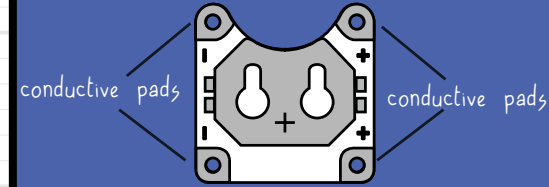
HOW TO THREAD A NEEDLE

A. Cut about an arm's length of thread. Stick one end of your thread through the eye of the needle

B. Pull your thread until it is folded in half on the needle

C. Take the two ends of the thread and tie a knot

CONDUCTIVE PADS

Conductive pads are the silver or gold ends of the circuitboards that have holes in the middle. This is what you sew around when connecting a board to another part of the circuit or materials. You can also use aligator clips by clipping them to connect parts of a circuit together by clipping to the conductive pads.

conductive pads   conductive pads

HOW TO SEW A CIRCUITBOARD

Take your Felt, your threaded (conductive thread) needle, and a Sewable LEDboard.

First, place the LEDboard where you want to attach it to the cloth.

Then, take your threaded needle and starting from the back, push your needle through the cloth and the positive or negative pad of the LED.

Loop the thread through the hole and cloth multiple times so the LED is secured tightly.

After looping a few times, push the needle down through the fabric next to the LED. Push the needle up through the fabric about 1/4 inch away and repeat up and down.
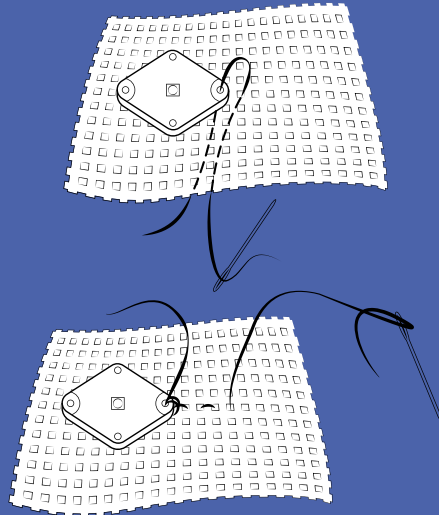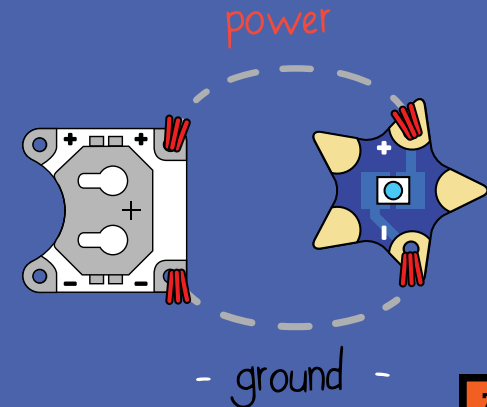

HOW TO SEW A CIRCUIT

Sew between the positive pad of the battery and the positive pad of the LED. It should light up.

The red stitches indicate where the thread ends. Once you get to a red stitch or a hole on the board, tie a knot, cut the thread, and start with a new piece. When you are sewing around a conductive pad, make sure to loop around it a couple of times to make sure it is secure.

Made over 17,000 years ago, the first needles had split heads instead of an eye and were made out of bone. Most needles today are stainless steel and plated in gold or nickel to prevent corrosion.

THERE ARE 2 SEPARATE PIECES OF THREAD IN THIS CIRCUIT


power

ground

THE NEXT SECTION CONTAINS TWO PROJECTS:
YOU CAN SEW A CIRCUIT ONTO A FACEMASK
OR
SEW A PLUSH OWL WITH LIGHT UP EYES!

1. Trace and enlarge the mask so that it fits across your eyes. Cut out two pieces (one for the front and one for the back).

2. Follow the circuit on the next page as a guide. Place an LED board on one side of top piece of mask, sew the positive pad to the mask. Then sew to the other side of the mask, place another LEDboard and sew the positive pad of that LED. Tie a knot and cut your thread.

3. Repeat with the negative pads on the LEDboards. Place the battery-board onto the back side of the front piece. Sew the positive to the positive side of the closest LEDboard, and negative of the batteryboard to negative of the closest LED.

4. Glue or sew (with non-conductive thread) this piece on the other. When you insert the battery in the holder the LED should light up!

power

ground
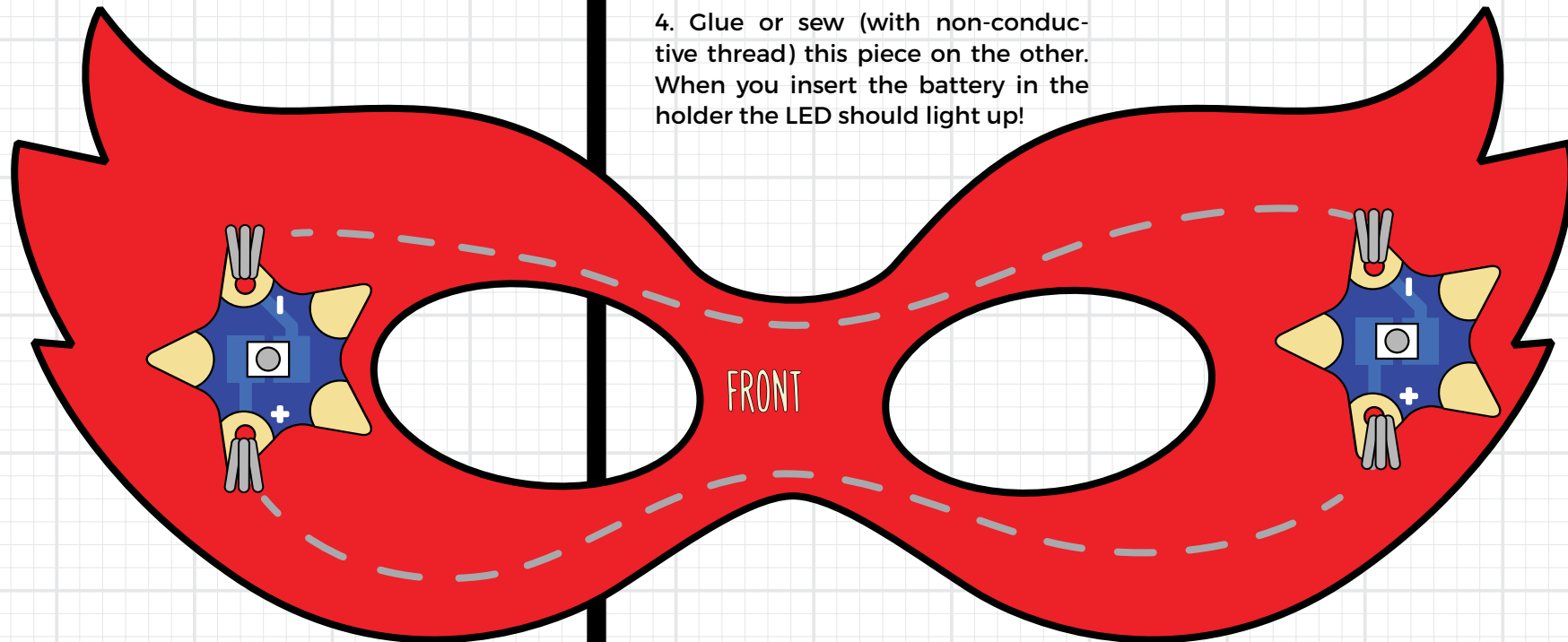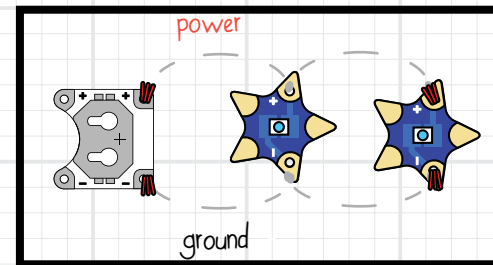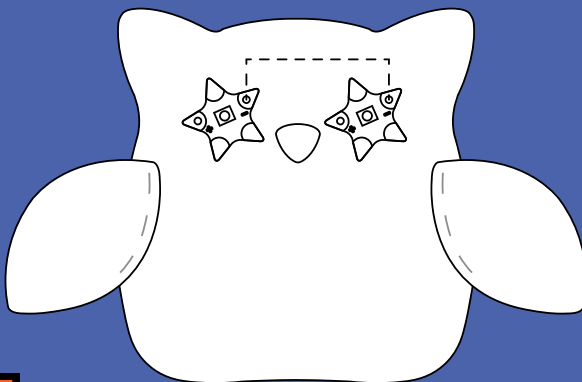
FRONT

STEP 1: SEWING YOUR OWL
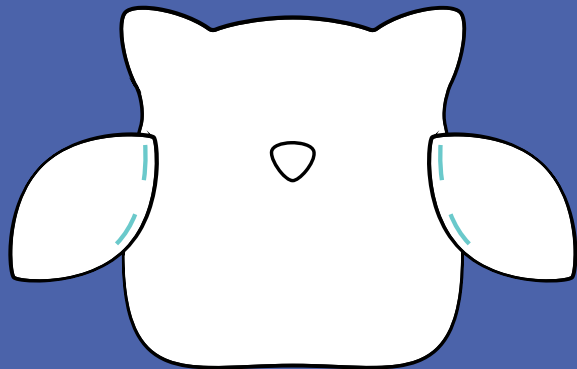
Trace and cut out the owl pattern from the back cover of this guide onto the fabric of your choice.

Place the beak piece onto the front body piece and sew it on with non-conductive thread.

Sew the wings onto the body with non-conductive thread. So that it lays flat on the front of the owl's body and angles away from the body.

STEP 2: NEGATIVE EYES

Now take the front body piece and place two **Sewable LED** lights where you want the eyes. Sew a connection between the negative pads on each board. Don't forget to loop around each negative pad a couple of times.

STEP 3: POSITIVE EYES
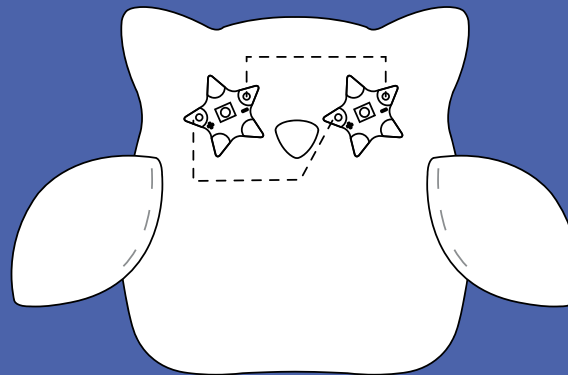
Re-thread your needle if needed. Now sew the two positive pads together on the eyes. Make sure not to touch the thread that connects the negatives to avoid a short circuit. Tie a knot and cut your thread.

Early sewing thread consisted of thin strips of animal hide that were used to stitch together larger pieces of hide and fur.

STEP 4: ATTACH THE BATTERY HOLDER
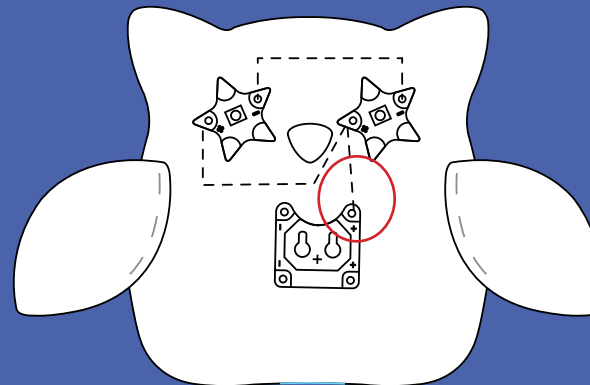
Take your **Sewable Coincell Battery Holder** and place it as close to the center of the belly as you can, with the flat end down. Starting from the positive pad of the second LED that you just attached, sew a connection to the positive pad on the battery as indicated by the red circle on the diagram. Tie a knot and cut your thread.

STEP 5: SNAP, SNAP

Next, take the one side of a snaps and place it on the body below the battery holder to the right. Sew from the negative pad on the battery holder to the snap like in the diagram. Sew around the holes on the edges of the snap (over and under) to secure it to the felt. Tie a knot and cut your thread.

Working on the underside of the wing, sew the other side of the snap so that it matches up with the bottom snap when connected. Sew around the holes on the edges of the snap (over and under) to secure it to the wing. Now sew a path to connect this snap with the negative pad on the right LEDboard. Tie a knot and cut your thread.

TO SEW THE SNAP SEW IN AND OUT AROUND ALL FOUR HOLES OF THE SNAP SO IT DOES NOT MOVE AROUND.

STEP 6: BACK AND BELLY

Positive to Positive
Negative to Negative!

Thread your needle with non-conductive thread. Take the belly panel and line it up with the bottom of the front panel. Sew the belly piece over the battery holder, leave a small opening on the top so that you can access the battery!

Take the back body panel and sew the bottom and sides back body piece to attach it to the front panel. They should line up nicely!

All owls have upright posture and binocular vision from their forward-facing eyes, just like humans. Owls' eyes are not spheres. They are actually tubes, which provide better depth perception and allow them to see prey from great distances. However, up close their vision is not as clear.

STEP 7: STUFF THE OWL

After you sew the bottom and sides of the body together, get some cotton stuffing (or scrap fabric) and stuff the owl.

After you have stuffed your owl, sew the top of his head shut with non-conductive thread so no stuffing spills out.

> Owls have special feathers with fringes of varying softness that help muffle sound when they fly. Their broad wings and light bodies also make them nearly silent fliers.
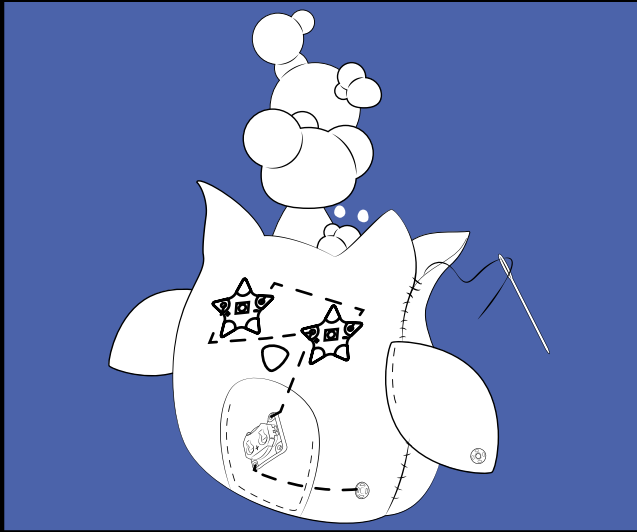

STEP 8: TEST THE OWL

Insert the battery into the batteryboard so the positive faces up. Take the wing with the snap and connect it to the snap on the body. The eyes should light up. If the eyes don't light up, refer to the troubleshooting page. Replace battery when necessary.

If you'd like to cover the stars, you can cut the eye shapes from the pattern and cut small holes in the center for the light to shine through. If you use a light colored fabric, the light will diffuse.
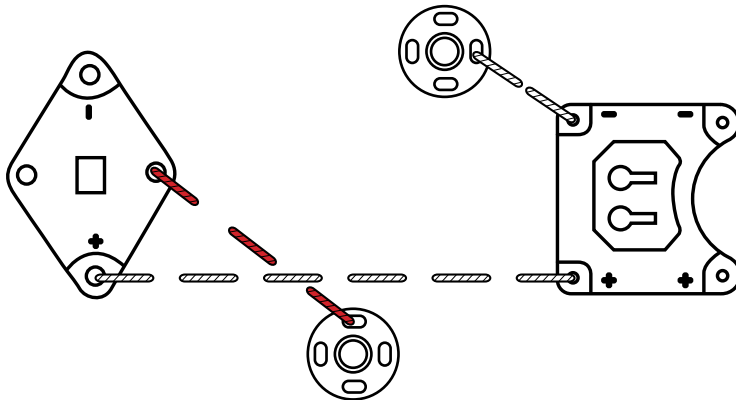
OWL PATTERN

EYES x2

BEAK

BOTTOM

WINGS x2
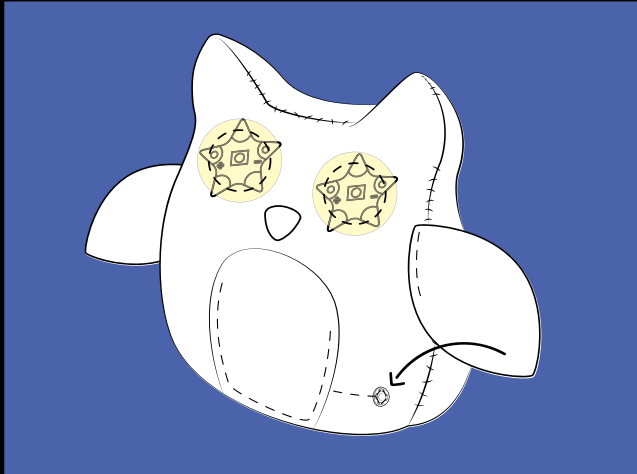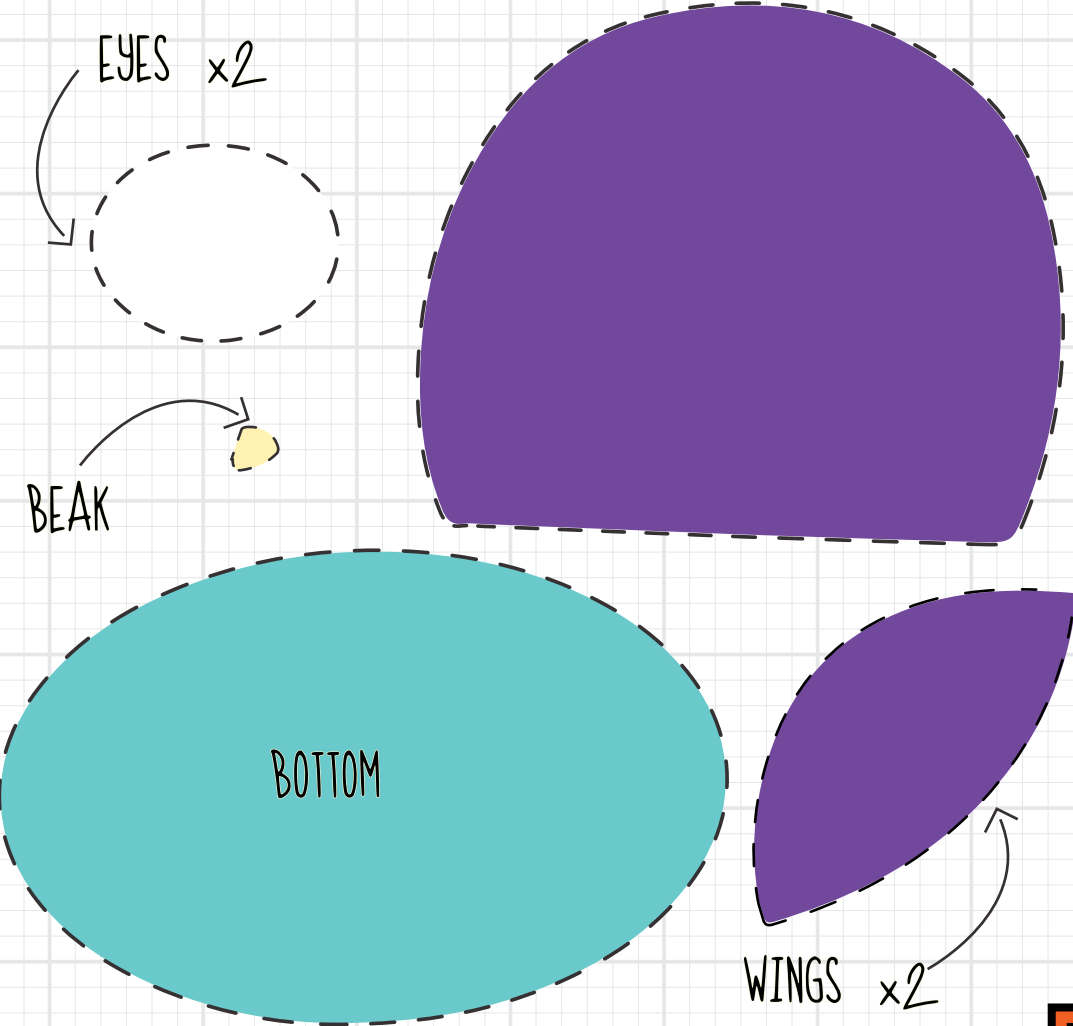
There are 2 common problems that can break the circuit. The first is that the positive and negative paths are crossing. Make sure none of your paths look like the image above.

Then make sure none of the thread coming off the knots on the back of your circuit are touching.

The second common problem is a bad connection. This can happen anywhere your thread is connecting to a board or snap. Make sure all of these connections are tight and that the thread is making good contact with the silver surface on the boards and/or with the snaps.