

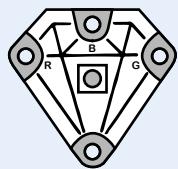
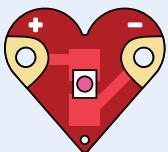


MAKERSPACE KIT INVENTION GUIDE

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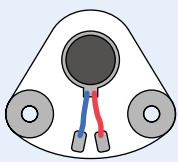
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YOUR MATERIALS:



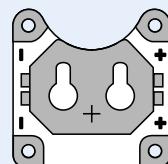
SEWABLE LEDBOARDS

The LEDs in your kit are smaller surface mount LEDs. The positive and negative metal pads are where you will sew to connect the board to the circuit. It's also the most popular way to test a circuit: when electricity is flowing through them they turn "on" and produce light. Each LED has a positive and negative pad.



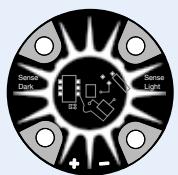
MOTIONBOARD

These mini motors are usually found in phones that have a "vibrate" feature. They have an offset weight that makes them vibrate as the motor spins.



BATTERYBOARD

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



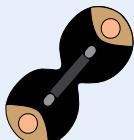
LIGHT SENSOR BOARD

This sensor can measure light and trigger an output based on the environment. You can connect to turn something on with "sense light" (brightness) or "sense dark" (darkness). This needs to connect to the batteryboard as the sensor needs to be powered.
Also add there are 3 +, and 1 -



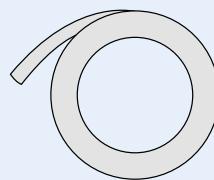
ALLIGATOR CLIPS

Alligator clips are also made of conductive material meaning they let electrons pass through them. Use the alligator clips to attach parts without making a permanent connection. Just squeeze the ends to open the claws and clip them on.



MAGNETIC REED SWITCH

The reed switch is triggered by magnets. Inside there are two pieces of metal sitting slightly apart. When a magnet is nearby, the metal pieces move and make contact, closing the switch.



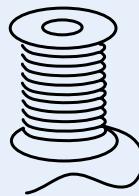
CONDUCTIVE TAPE

This tape is made of a conductive material meaning it can let electrons pass through it. It can be used to carry or transmit power and signals through a circuit.



TEMPERATURE SWITCH

This switch has two modes: you can connect to turn something on with "sense cold" (below 70 °F) or "sense hot" (above 80 °F).



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.

CIRCUIT BASICS

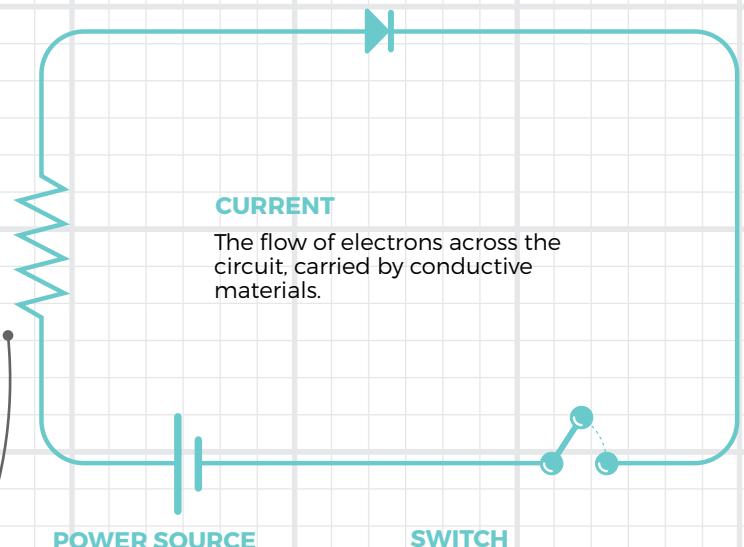
THINGS TO REMEMBER:

- A CIRCUIT IS ALWAYS A LOOP.
- ELECTRICITY FLOWS FROM POSITIVE TO NEGATIVE AROUND THE LOOP.
- EVERYTHING IN THE CIRCUIT MUST BE ORIENTED IN THE SAME DIRECTION FOR THE CIRCUIT TO WORK.
- ANYTIME A COMPONENT IS PUT INTO THE CIRCUIT BACKWARDS, IT CAUSES A BREAK IN THE CIRCUIT, MEANING IT BREAKS THE LOOP.
- ELECTRICITY WILL ALWAYS TAKE THE PATH OF LEAST RESISTANCE.



OUTPUT

This is the part that is powered in a circuit. The LEDs and buzzer are outputs in your kit.



CURRENT

The flow of electrons across the circuit, carried by conductive materials.



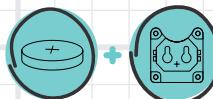
RESISTANCE

Restricts the rate at which electrons flow through circuits.

Conductive materials have different resistances.

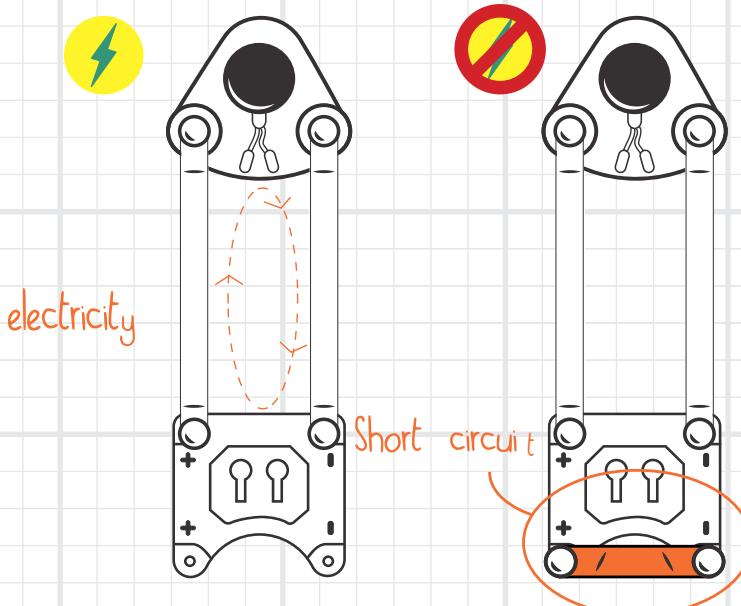
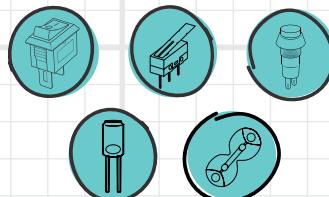
POWER SOURCE

Provides power to the circuit. Yours is the coin-cell battery.



SWITCH

Closes and opens a break in the circuit.

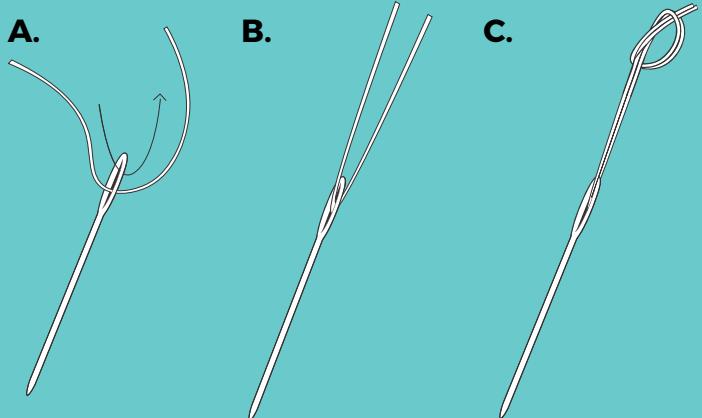


If you were to connect the circuit line in the diagram to the right, the current will flow through the shorter (orange) path and skip the path that connects to the LED.

This will result in a short circuit – a short circuit is basically equivalent to connecting from the positive end of the power source to the negative, without putting anything in between.

This will drain or “burn out” your battery very quickly. You should always make sure there are no short circuits in your design.

SEWING BASICS

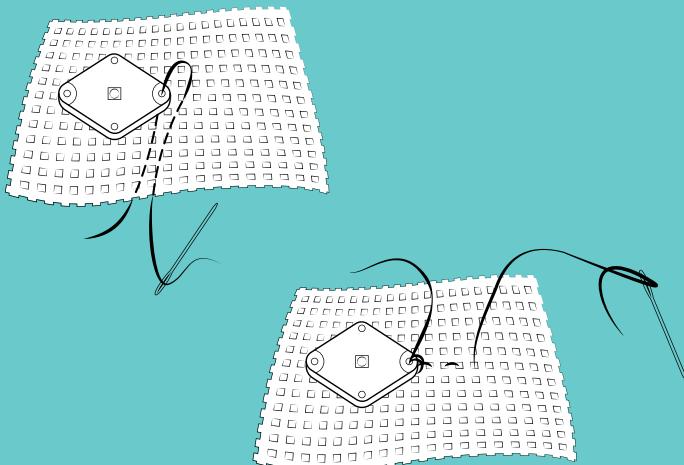


HOW TO THREAD A NEEDLE

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

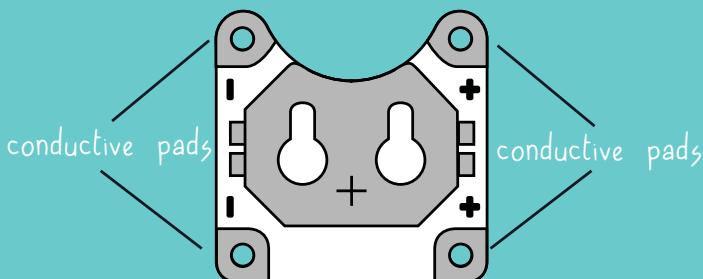
C. Take the two ends of the thread and tie a knot



HOW TO SEW A CIRCUITBOARD

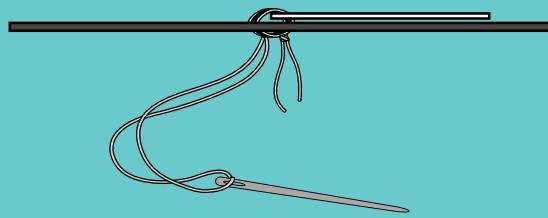
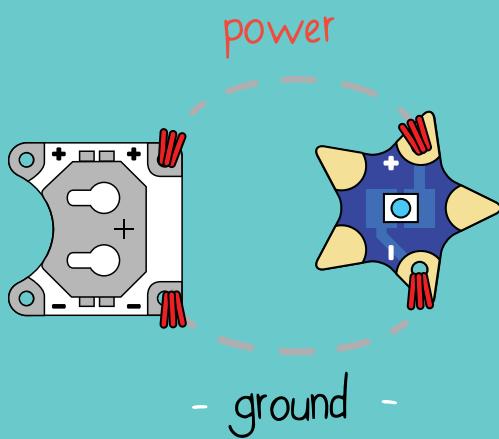
Take your **Felt**, your **threaded (conductive thread) needle**, and a **Sewable LEDboard**.

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.



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 alligator clips by clipping them to connect parts of a circuit together by clipping to the conductive pads.



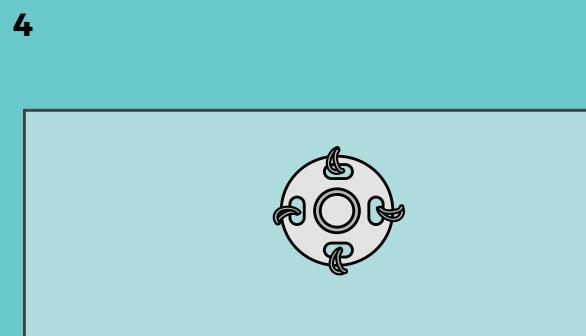
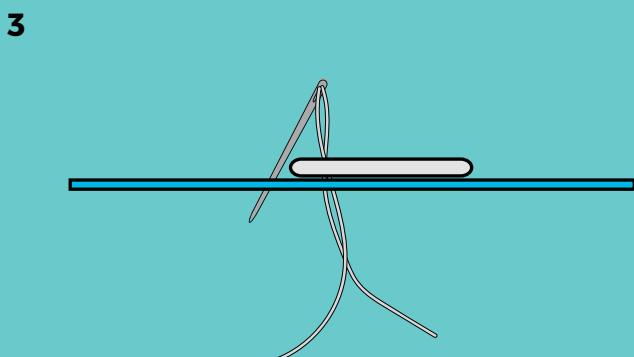
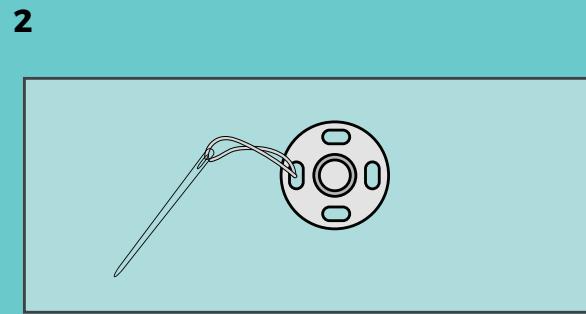
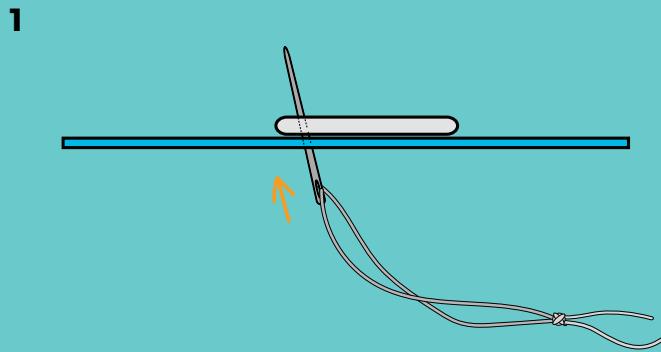
HOW TO SEW A CIRCUIT

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.

HOW TO SEW A SNAP

Poke your needle through the bottom of the fabric and through one of the holes on the snap. Pull all the way to anchor the thread and stick the needle back down next to the edge of the snap. Repeat through all 4 holes until secure.





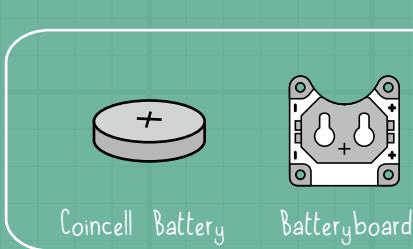
Superhero Face Mask

PARTS AND MATERIALS:

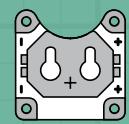


x2

Star LEDboards



Coincell Battery



Batteryboard



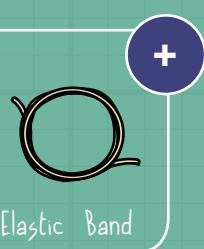
Conductive Thread



x1



Felt Pieces



+

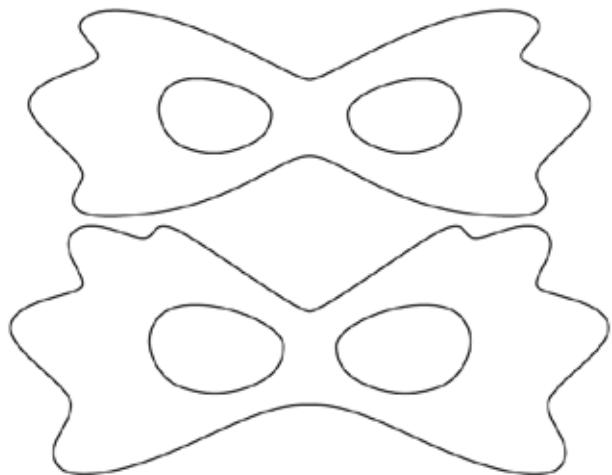
Elastic Band

1

PREP

Cut the felt into shape of the mask using the provided template. This mask has two layers of fabric. The back layer is slightly larger than the front.

You can also come up with your own design, just make sure your eye-holes line up with your eyes.



2

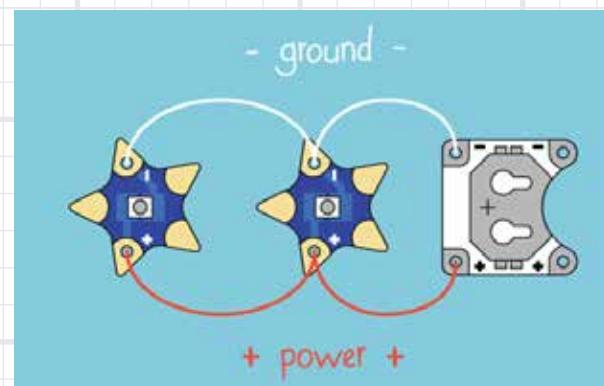
PLAN YOUR CIRCUIT

Sew the LEDs in *parallel*, which means you should connect all the positives (+) on one side, and all the negatives (-) on the other.

Lay out the LEDboards where you'd like them to be placed on the mask.

Make sure the LEDboards are in the same orientation, so the positive (+) holes are aligned and negative (-) holes are aligned. You can mark the felt with a marker or chalk where you will sew.

On the back of the same piece of felt, place your batteryboard. In this case, the batteryboard is about the same width of the LEDboard. Again, make sure you are aligning the "+" holes and all the "-" holes.



3

ATTACH THE LEDS

Thread your needle with conductive thread. We recommend doubling the thread for a stronger electric connection.

Attach the first LEDboard by holding it in place on the felt and looping around the hole 3 - 5 times. You can start with the negative holes, but the order doesn't matter.

Use a running stitch to connect the negative holes. Sew around the second hole 3 - 5 times, secure with a knot, and trim the extra thread. Repeat this process to connect the positive holes.

- * Do not connect the positive to the negative, and make sure the positive and negative connections do not touch at any point.

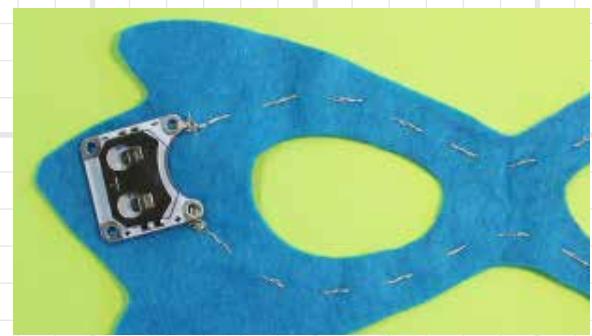


4

ATTACH THE BATTERYBOARD

Using conductive thread again, attach the batteryboard (without a battery) to the back of the mask. Make sure the "+" and "-" holes on the batteryboard are aligned with the ones on the LEDboards.

- * To make the components extra secure, you can sew the extra sew-holes to the felt with non-conductive thread.



5

TEST YOUR CIRCUIT

You can insert your battery into the battery holder. Make sure the "+" faces up to match the batteryboard.

If your LEDs flicker or do not light up: Check that your battery has enough charge to power the LED lights! If you have a voltmeter you can make sure the battery is above 2.5 volts. Check that your positive and negative connections do not cross or touch. Check that your thread is tight around all the conductive holes. You may need to take out and re-sew your connections.

If your LEDs do light up, you can add extra security to your circuit by adding a dab of glue to each knot. This will prevent fraying and loose threads, which can cause your circuit to stop working.

6

ATTACH THE BACK OF THE MASK

Using small beads of glue, attach the second piece of felt to the back of the mask. Make sure you can still access the batteryboard to eventually remove or change out the battery.



7

MAKE IT WEARABLE

Cut a small hole on each side of the facemask and tie the elastic in one end. Hold the mask to your face, bring the elastic around the back of your head, and mark the elastic where it meets the other hole. Loop the elastic through the second hole and tie a knot to secure it.





LED Bracelet

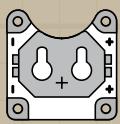
PARTS AND MATERIALS:



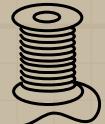
HEART LEDboard



Coincell Battery



Batteryboard

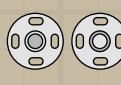


Conductive Thread

x1



Felt



Sewable Metal Snaps

+

1

PREP

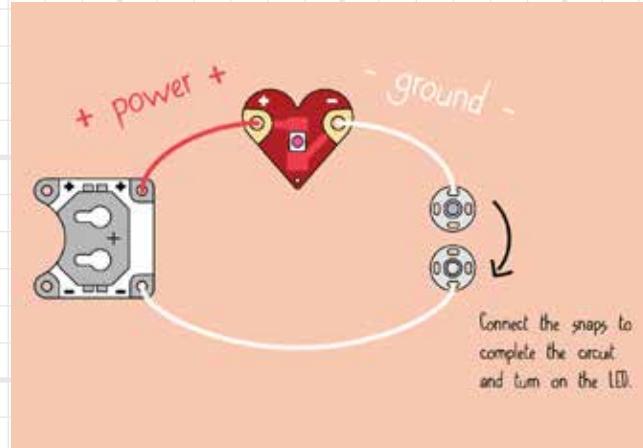
Cut the felt about 1 1/4 inches wide and long enough to wrap around your wrist with a 1 inch overlap.

2

PLAN YOUR CIRCUIT

This circuit contains a LED, a battery, and a pair of snaps. The snaps are made of conductive metal, meaning electricity can flow through them when they touch. In the circuit, the snaps act as a switch to turn the light off and on.

The snaps will also secure the wristband on your wrist, so when you are wearing the band it will light up, and when you take it off, the LED will turn off. Lay out your components on your felt. You can mark the fabric with a marker or chalk where you will sew.

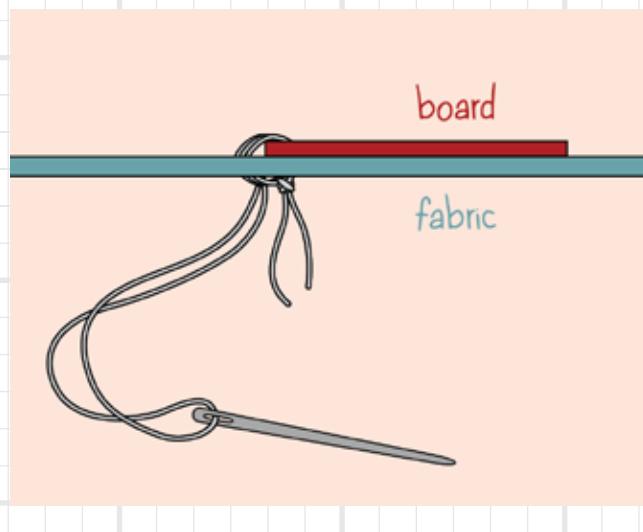


3

ATTACH THE LEDBOARD & BATTERYBOARD

Thread your needle with conductive thread. We recommend doubling the thread for a stronger electric connection.

Attach the LEDboard to the felt by holding it in place on the fabric and looping around the hole marked with "+" 3 - 5 times.

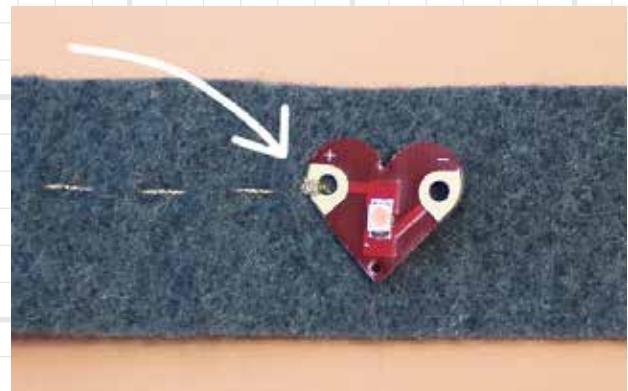


4

CONNECTING THE POSITIVES (+)

Use a running stitch to connect the positive side of the LEDboard to the positive side of the batteryboard. Attach the batteryboard by sewing around one of the holes marked "+" 3 - 5 times, secure with a knot, and trim the extra thread.

* Remember that the LED is on the front and the batteryboard is on the back.

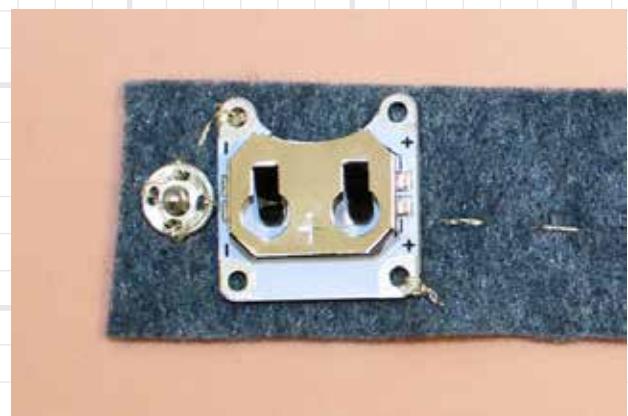
**5**

ATTACH THE FIRST SNAP PIECE

Connect the negative side of the batteryboard to one of the snap pieces on the back of the wristband.

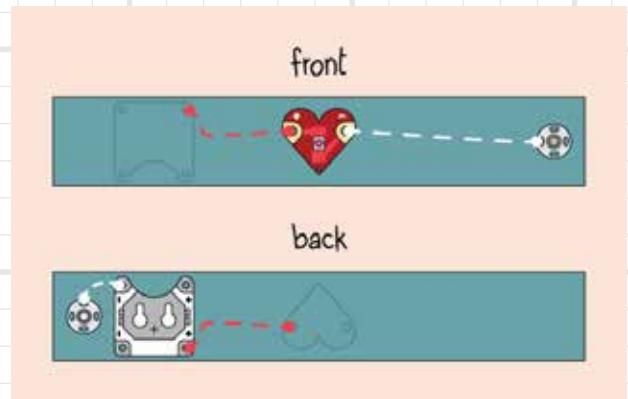
To attach the snap, you will sew around all 4 holes 2 - 3 times, secure with a knot and trim the extra thread. Sewing on a snap is similar to sewing on a button.

* Make sure your snap is facing the right direction, so that it can snap onto the other snap piece once it's sewn down.

**6**

ATTACH THE SECOND SNAP PIECE

The second snap piece will go on the front of the wristband on the opposite end of the wristband than the first. Use a running stitch to connect the snap to the hole on the LEDboard marked with "-". Sew around the hole 3 - 5 times, secure with a knot, and trim the extra thread.

**7**

TEST YOUR CIRCUIT

At this point you can insert your battery into the batteryboard. Make sure the "+" faces up to match the "+" on the batteryboard. Snap the two snap pieces together. Your LED should light up!

If your LED flickers or does not light up:

Check that your battery has enough charge to power the LED! If you have a voltmeter you can make sure the battery is above 2.5 volts. Check that your positive and negative connections do not cross or touch. Check that your thread is tight around all the conductive holes.

You may need to take out and re-sew your connections.

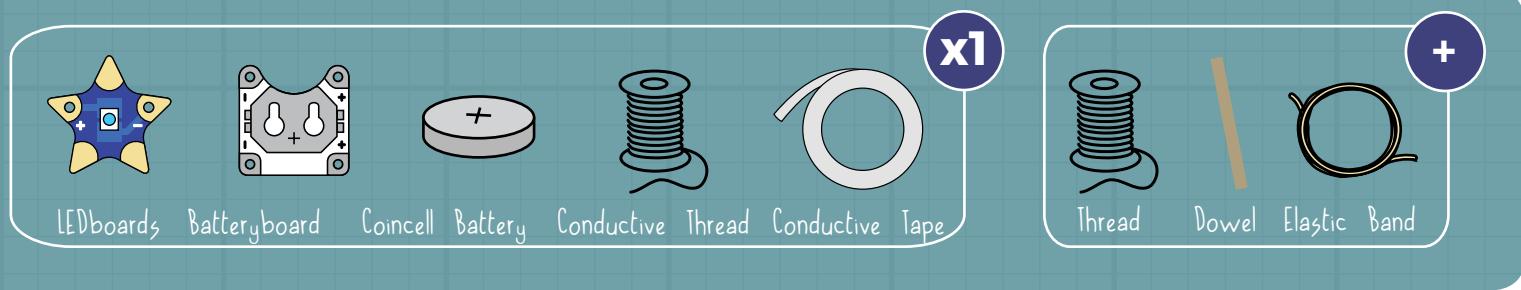




Magic Wand

WHAT YOU NEED:

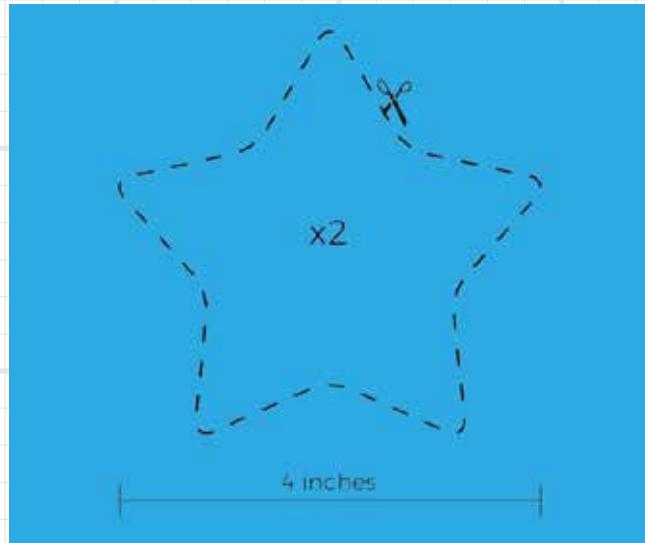
Felt should be added to materials **ADDITIONAL MATERIALS:**



1 PREP

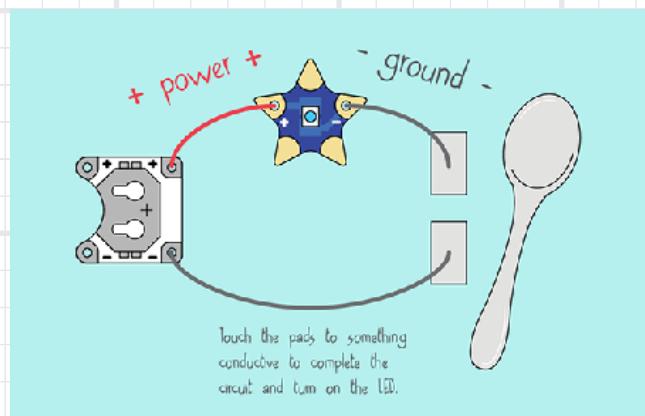
Cut the felt into two star shape pieces.

Cut 4 pieces of conductive fabric tape into strips that are $\frac{1}{2}$ to $\frac{3}{4}$ inches long.



2 PLAN YOUR CIRCUIT

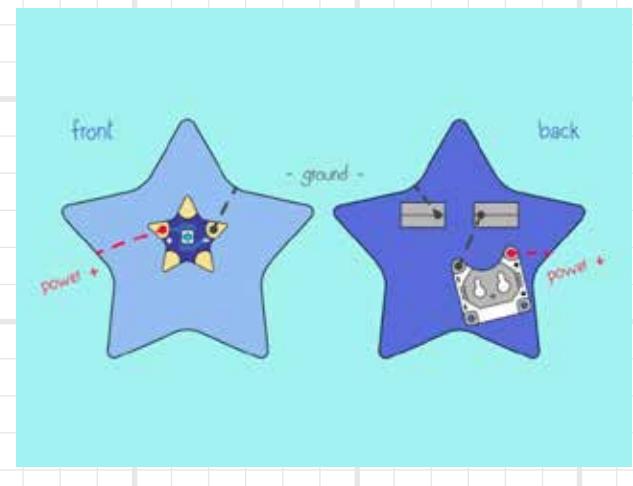
This circuit contains a LED, a battery, and two conductive fabric tape pads. In the circuit the pads act as a switch to turn the LED off and on. There is a gap between the conductive pads, so when another conductive material touches both pads the gap is closed, the circuit is complete and electricity can run through it.



3

PLACE YOUR COMPONENT

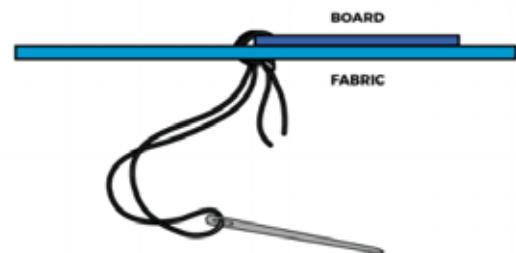
Lay out your components on the pieces of felt. You can mark the fabric with a marker or chalk where your components will go. Once you have laid out your circuit, you can peel the back of the conductive fabric tape and attach it to the fabric.

**4**

ATTACH THE BATTERYBOARD

Thread your needle with conductive thread. We recommend doubling the thread for a stronger electric connection.

Attach the batteryboard by holding it in place on the fabric and looping around the hole with “-” 3 - 5 times.

**5**

CONNECTING THE BATTERYBOARD

Use a running stitch to connect the battery board to the conductive tape. Loop through the tape and fabric 3 - 5 times, secure with a knot, and trim the extra thread.

**6**

ATTACH THE FELT STAR PIECES

Align the two star pieces. Hold them together while you begin sewing around the edge with regular (non-conductive) thread. You should only sew around half the star. Use the images below to make sure you are sewing the correct points. We chose to use a running stitch, but you can also use a decorative edge stitch.



**7**

CONNECT THE LEDBOARD TO THE BATTERYBOARD

Hold the LEDboard in place on the front star. Using conductive thread, loop around the hole marked with a "+". Use a running stitch to sew over to the edge of the fabric. Be careful to only sew through the top piece of felt.

**8**

CONNECT THE FRONT & BACK STAR PIECES

Flip your project over, and continue stitching onto the back piece of felt until you reach the batteryboard. Loop around one of the holes marked with "+", secure with a knot, and trim the extra thread.

**9**

STEP: CONNECT LEDBOARD TO CONDUCTIVE TAPE

Using conductive thread, loop around the hole on your LEDboard marked with a "-". Use a running stitch to sew over to the edge of the fabric. Be careful to only sew through the top piece of felt.



10

TEST YOUR CIRCUIT

You should make sure your circuit works before moving forward. Place a battery into your battery board, then press the conductive fabric strips on your project against something conductive. If you are having a hard time finding something conductive, you can simply fold your star in half to make the two conductive fabric pads touch. The LED should light up.

If your LED does not light up:

Check that your battery has enough charge to power the LED! If you have a voltmeter you can make sure the battery is above 2.5 volts. Check that your positive and negative connections do not cross or touch. Check that your thread is tight around all the conductive holes.



You may need to take out and re-sew your connections. It may not be fun to re-sew your circuit, but it will be good practice.

11

CONTINUE SEWING & STUFF YOUR STAR

Using regular (non-conductive) thread, sew the last point of your star. Make sure you leave a gap in the bottom of the star that is $\frac{1}{2}$ inch to insert your dowel. Use the remaining hole on the bottom of the star to insert your stuffing. If you don't have stuffing, you can use fabric scraps.

**12**

ADD YOUR DOWEL

Insert your dowel into the bottom of the star. The dowel should stay in place as is, but you can secure it using a little glue inside the star.

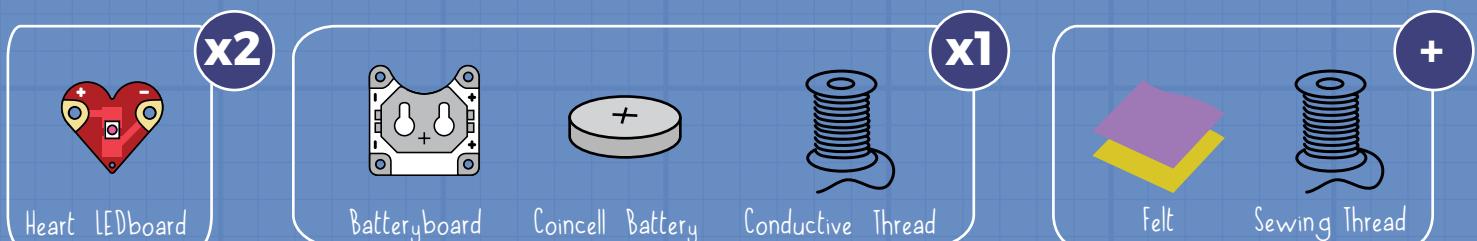
Now you can decorate your project. You can tie ribbons or yarn to the dowel. You can also add color your dowel or star with paint, markers, or embroidery.





Secret Message Emoji

WHAT YOU NEED:



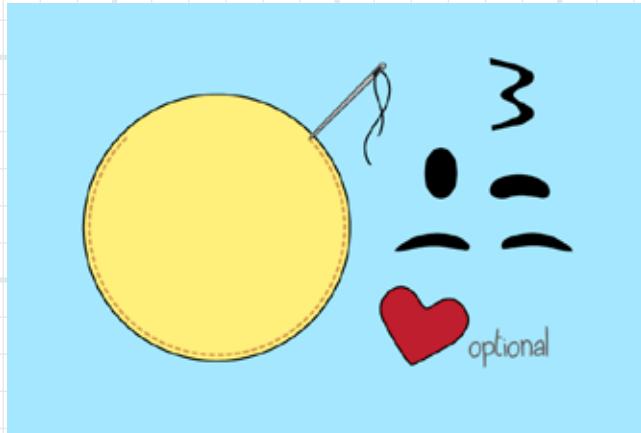
ADDITIONAL MATERIALS:

1

PREP: MAKING THE EMOJI

Using the template provided, pick which emoji you'd like to make. For this instruction, you'll be making the Blowing Kiss emoji.

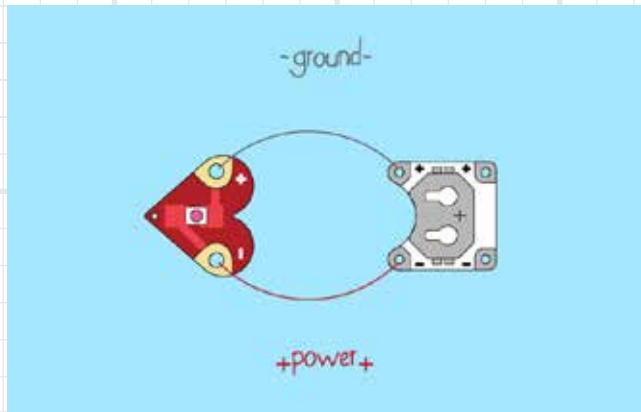
Cut out the shapes using the template. The heart for the Blowing Kiss emoji is optional. Using a running stitch, sew the two big circles along the edge. Don't sew all the way around. Leave a gap at the top so that it is big enough for you to put a secret message or gifts! Glue on the features of the emoji's face on.



2

PLAN YOUR CIRCUIT

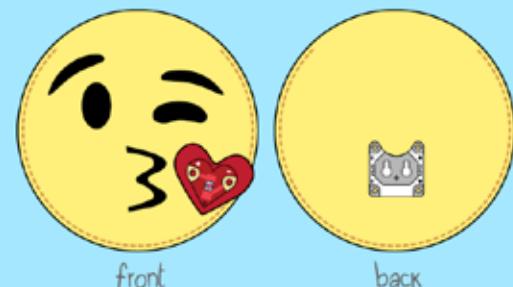
Sew the LEDs in parallel, which means you will connect all the positives (+) on one side, and all the negatives (-) on the other.



3

PLACE YOUR COMPONENTS

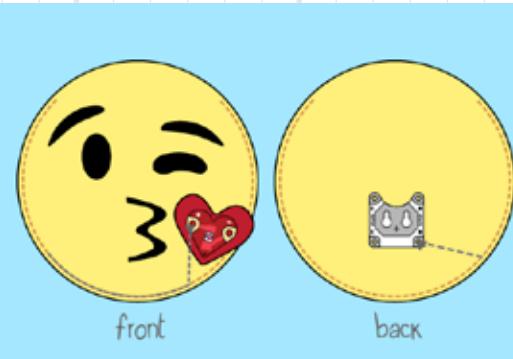
Place your components on the emoji to see how to plan your circuit. The batteryboard should be placed on the back of the emoji. Place the Heart LED on the heart shaped felt on the front.



4

CONNECTING THE POSITIVES (+)

Start sewing at the batteryboard and make sure that the hole marked "+" is looped with thread 3 - 5 times. Use a running stitch to sew around the emoji to the front and connect to the positive (+) hole of the Heart LED. Make sure that you loop around the positive (+) hole 3 - 5 times as well.

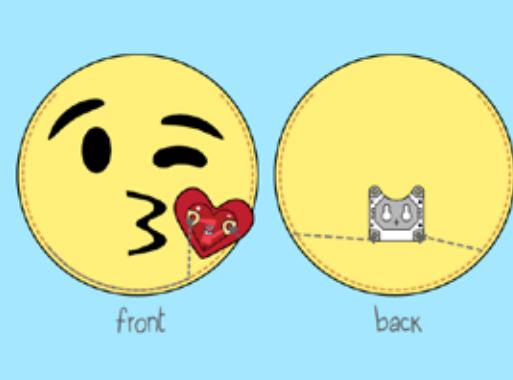


5

CONNECTING THE NEGATIVES (-)

Start sewing at the batteryboard and make sure that the hole marked "-" is looped with thread 3 - 5 times. Use a running stitch to sew around the emoji to the front and connect to the negative (-) hole of the heart LED. Make sure that you loop around the negative (-) hole 3 - 5 times as well. At this point, your circuit should be complete.

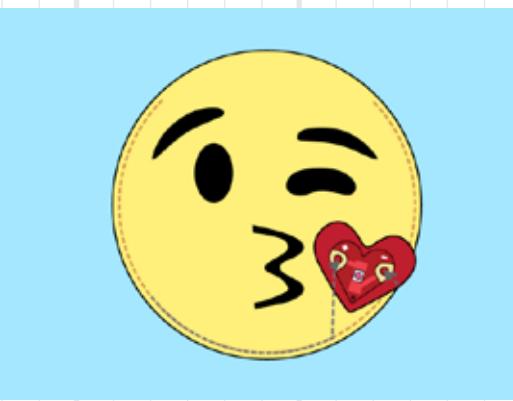
To secure your batteryboard, you can use regular thread to sew from the unused holes.



6

TEST YOUR CIRCUIT

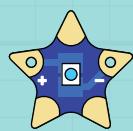
At this point you can insert your battery into the batteryboard. Make sure the "+" faces up to match the "+" on the batteryboard. Your LED should light up!



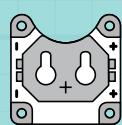


Holiday ornament

WHAT YOU NEED:



Star LEDboard



Batteryboard



Coincell Battery



Conductive Thread

x1



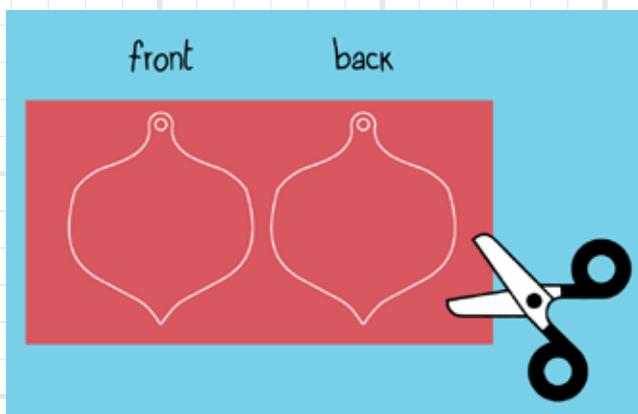
Sewing Thread

+

ADDITIONAL MATERIALS:

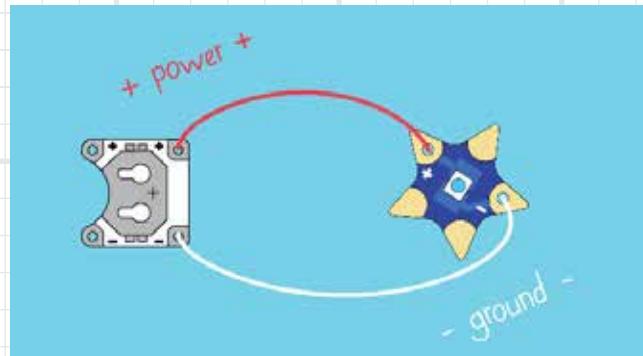
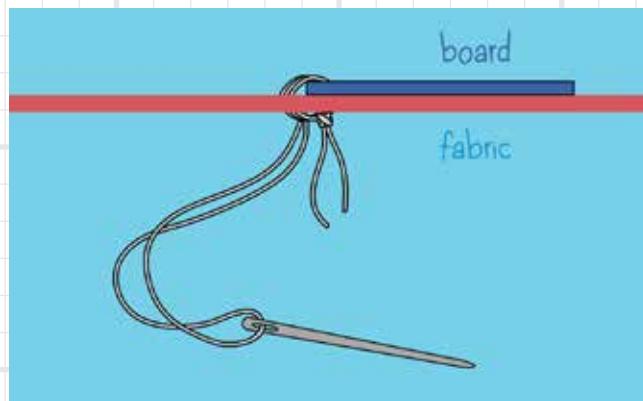
1 PREP

Cut the felt into the shape of an ornament. You can create your own unique design for the ornament. Make sure you cut two of the same shape for the front and back.



2 ATTACH THE COMPONENTS

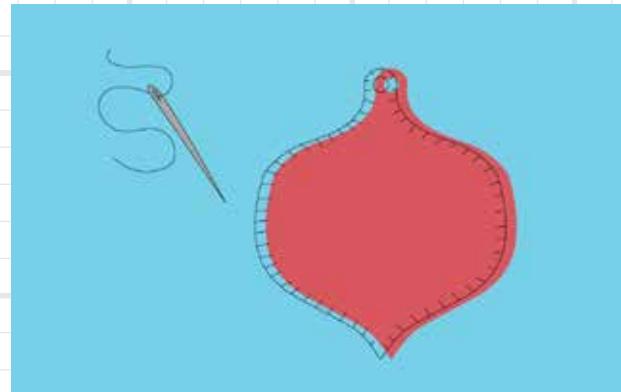
Sew on the star LEDboard for the front piece. On the back piece sew on the battery holder.



3

SEW THE FELT

Sew the two felt pieces together. Before sewing it all the way make sure you stuff the ornament so that it becomes plush. Once you finish stuffing it, you can finish sewing it together.

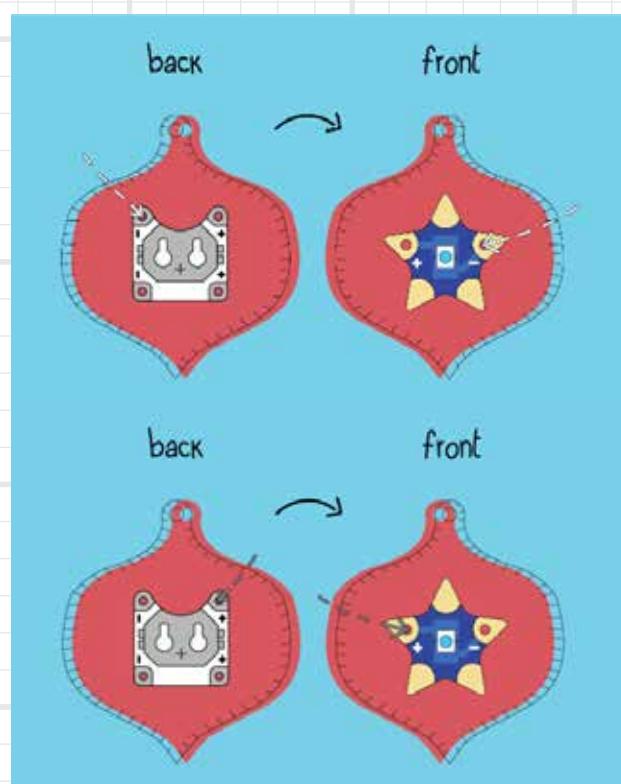


4

CONNECT THE CIRCUIT

On both the batteryboard and star LEDboard sew around one of the holes marked "+" and "-" 3 - 5 times with the conductive thread, secure with a knot, and trim the extra thread.

Use a running stitch and conductive thread to connect the negative of the LEDboard to the negative side of the batteryboard. Do the same with the positive side.



5

TEST YOUR CIRCUIT

You can insert your battery into the batteryboard. Make sure the "+" faces up to match the "+" on the batteryboard. Your LED should light up!

If your LED flickers or does not light up:

Check that your battery has enough charge to power the LED! If you have a voltmeter you can make sure the battery is above 2.5 volts. Check that your positive and negative connections do not cross or touch. Check that your thread is tight around all the conductive holes.

You may need to take out and re-sew your connections.

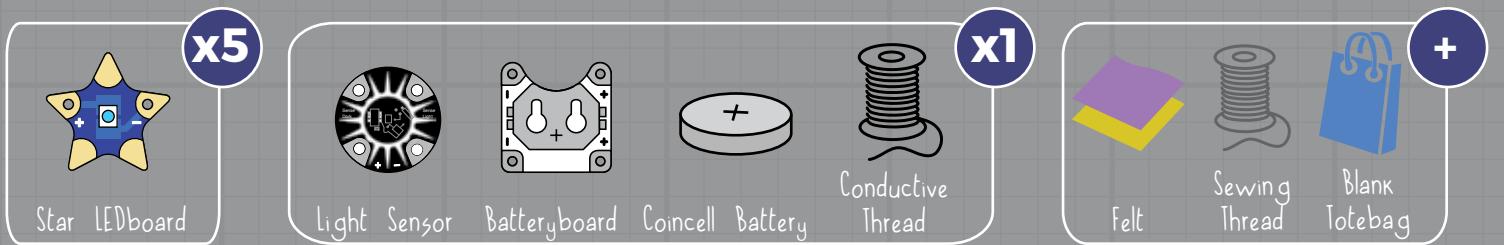
If everything works, hang it up!





Skyline Tote Bag

WHAT YOU NEED:



ADDITIONAL MATERIALS:

1 DESIGN SKYLINE

Draw or find a picture of your favorite skyline, trace it and scale it to the size of your tote bag. Then print it out and cut it out to test the size.



2 CUT THE FELT PIECES

Cut out thin felt pieces in various colors. Use your skyline picture to place your felt pieces to create the skyline. After finalizing your design, cut all of the pieces into right size and use pins to hold them in place.



3 SEW THE FELT PIECES

Sew the felt pieces together first. Then, sew the felt to the tote bag.

4

PLAN YOUR CIRCUIT

Place the felt skyline on your bag and plan where to place the star LEDs, batteryboard and light sensor. Keep in mind that the conductive thread connections in your circuit cannot cross.

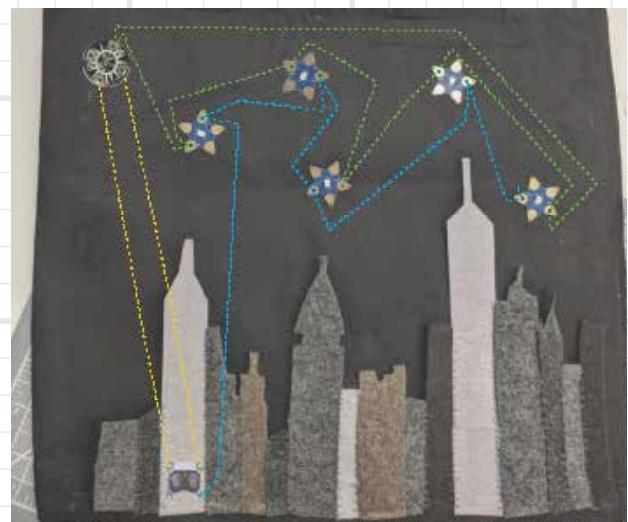


5

SEW YOUR CIRCUIT

Sew both the batteryboard and star LEDboard around one of the holes marked "+" and "-" 3 - 5 times with the conductive thread, secure with a knot, and trim the extra thread.

Use a running stitch with conductive thread to connect the negative sides of LEDboards to each other and to the negative sides of the batteryboard. Connect the positive sides to all the positive side of LEDboards. Make sure to begin and end the connection on the light sensor.



6

CHECK YOUR CIRCUIT CONNECTION

Make sure your light sensor is connected to the batteryboard with both "+" and "-" sides. When connecting the LED lightboards, you can choose whether to connect them to "Sense Dark" or "Sense Light" function. This will determine how your circuit will be activated



7

TEST YOUR CIRCUIT

You can insert your battery into the batteryboard. Make sure the "+" faces up to match the "+" on the batteryboard. Your LED should light up!

If your LED flickers or does not light up:

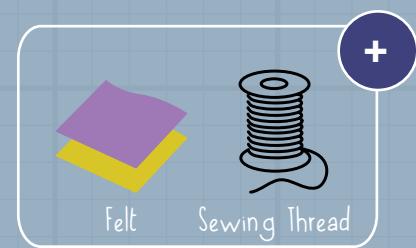
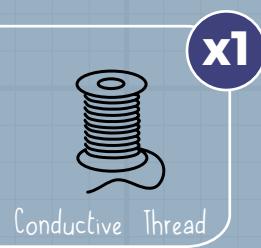
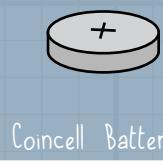
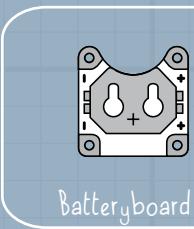
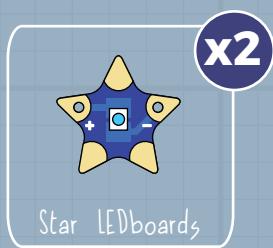
Check that your battery has enough charge to power the LED! If you have a voltmeter you can make sure the battery is above 2.5 volts. Check that your positive and negative connections do not cross or touch. Check that your thread is tight around all the conductive holes.





Magnetic Owl

WHAT YOU NEED:

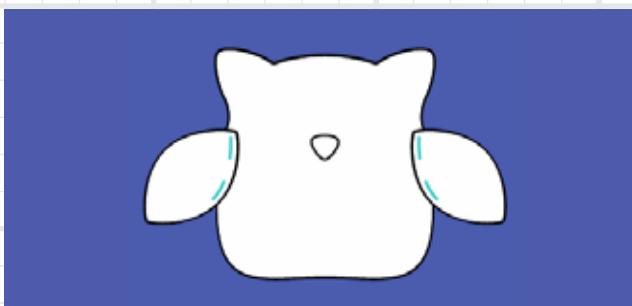


ADDITIONAL MATERIALS:

should also say sewable snaps

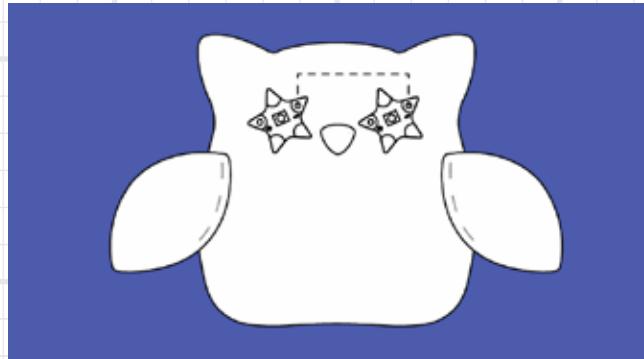
1 PREP: OWL PATTERN

Trace and cut out the owl pattern from the template onto the felt 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.



3 SEW THE POSITIVES OF THE EYES

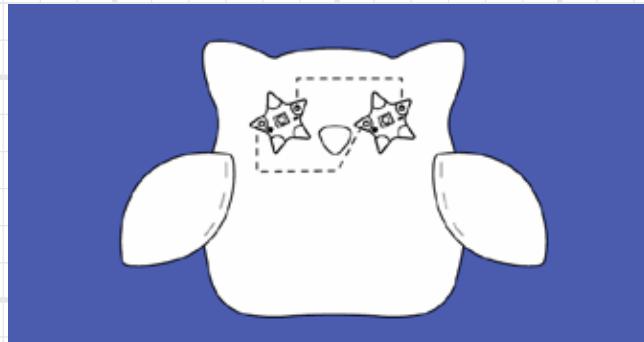
Re-thread your needle if needed. Now sew the two positive holes together on the eyes. Make sure not to touch the thread that connects the negatives to avoid a short circuit. Tie a knot and cut your thread.



should switch text boxes of steps 2 and 3

2 SEW THE NEGATIVE OF THE EYES

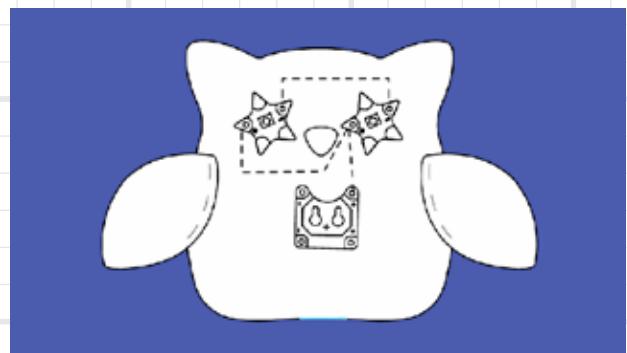
Now take the front body piece and place two Sewable LED lights where you want the eyes. Sew a connection between the negative pads on each board. Don't forget to loop around the eye pads a couple of times.



4

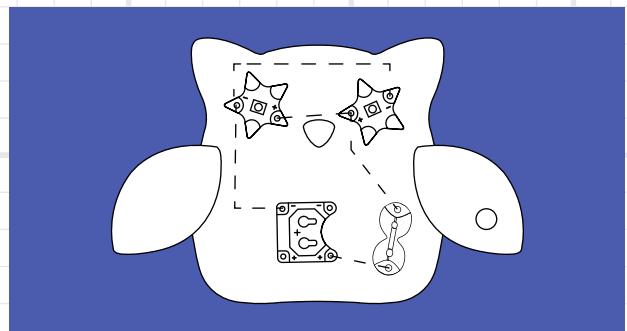
ATTACH THE BATTERYBOARD

Take your batteryboard and place it as close to the center of the belly as you can. Starting from the negative pad of the second LED that you just attached, sew to the negative pad on the battery. Tie a knot and cut your thread.

**5**

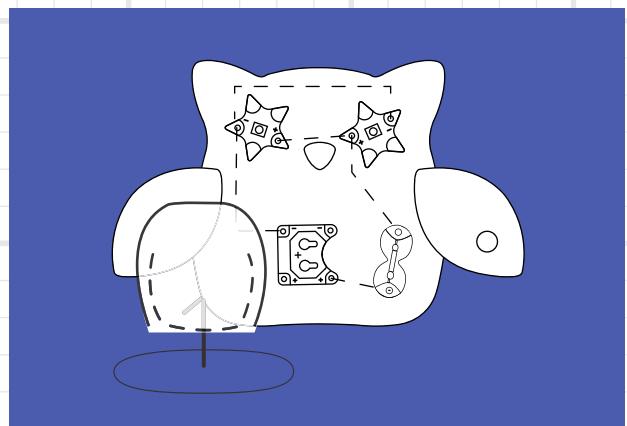
PLACE THE MAGNETIC SWITCH

Next, take the magnetic switch and sew it to your circuit connecting batteryboard and eyes LEDs. Follow the diagram and sew from the positive hole on the batteryboard and negative hole from star LED.

**6**

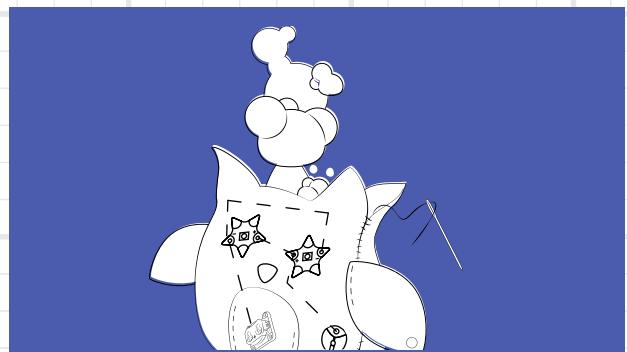
COVER THE COMPONENTS

Now 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! Don't forget to sew a magnet inside the wing!

**7**

STUFF YOUR OWL

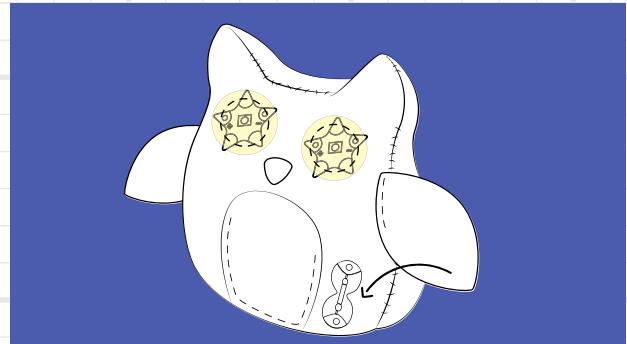
Take the back body panel and sew the bottom and sides back body piece to attach it to the front panel. They should line up nicely! If you'd like to cover the stars, you can cut the eye shapes from the pattern and cut small holes in the center for the light to shine through. If you use a light colored fabric, the light will also diffuse. Test before you sew to choose which effect you would like.

**8**

TEST YOUR CIRCUIT

Time to play around with your owl and test out the circuit! Whenever you move the wing with battery inside towards the owl's body, the owl's eyes should light up!

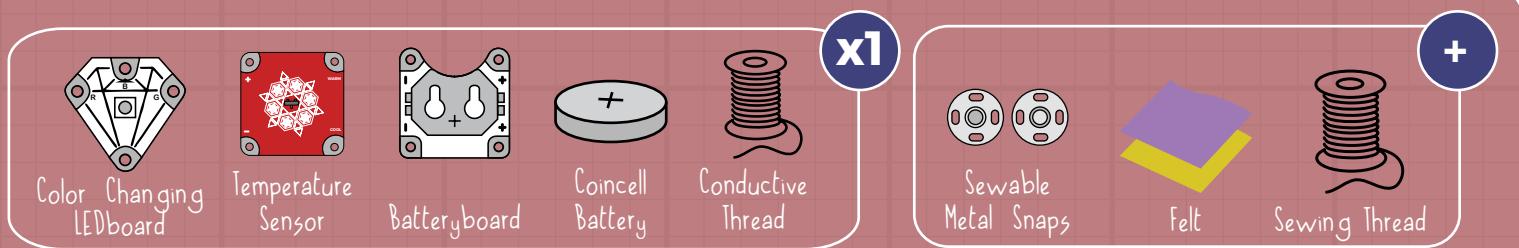
What to do if LED is does not light up, check the connection between the magnetic reed switch and snap





Mug Cozy

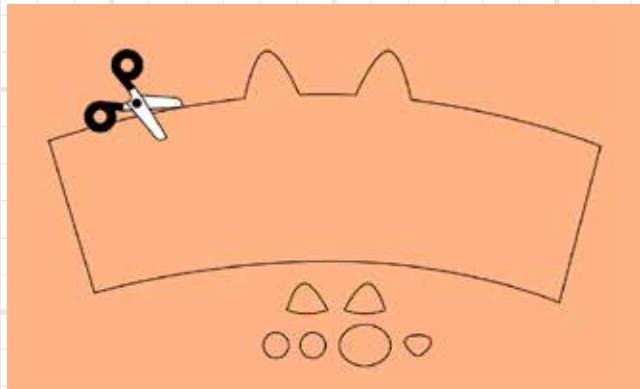
WHAT YOU NEED:



1

PREP

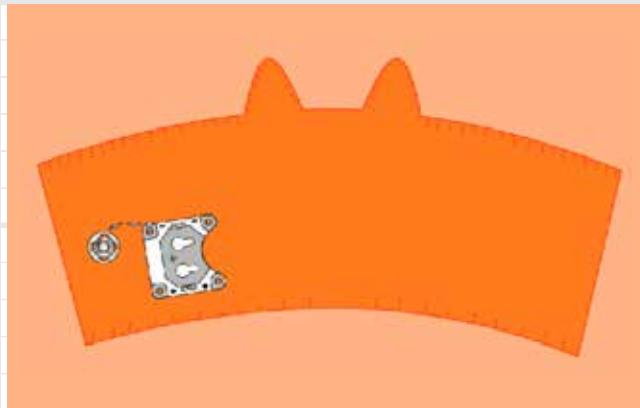
Using the template, trace and cut out the cozy pieces from the felt. You may need to make it longer to fit around the mug you are designing for.



2

ATTACH THE BATTERBOARD

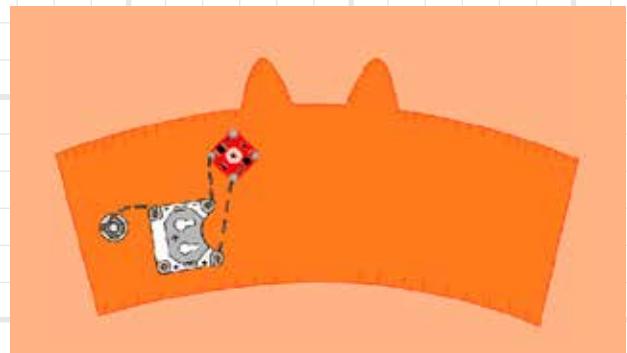
Take your needle with conductive thread and attach one side of the snap to the felt. Place the batteryboard about an inch away. Sew to connect to the negative pad of the batteryboard. Tie a knot and cut your thread.



3

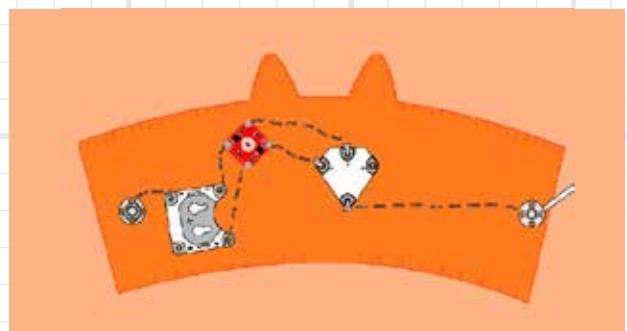
PLACE THE TEMPERATURE SENSOR

Place the temperature sensor above the batteryboard like in the diagram. Tack on the other negative pad on the batteryboard, and sew to connect to the negative pad on the temperature sensor. Tie a knot and cut your thread. Tack the positive pad on the temperature sensor. Then sew to the positive pad on the batteryboard and sew to connect the positive pad. Tie a knot and cut your thread.

**4**

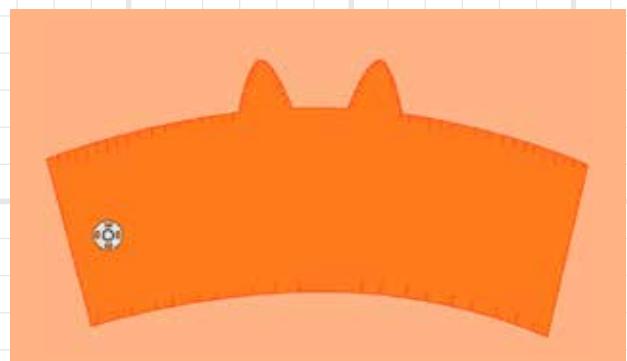
CONNECT LEDS

Now it's time to connect the LED. Sew to connect the red pad (marked R) to "sense hot" on the temperature sensor and then tie a knot and cut the thread. Sew to connect the blue pad (marked B) to "sense cold" on the temperature sensor. Tie a knot and cut your thread.

**5**

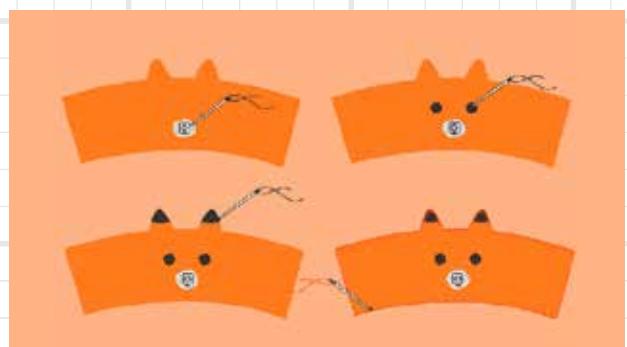
CONNECT THE NEGATIVE SIDES

Finally, we are going to connect the negative side of the LEDboard. Tack the negative pad onto the felt and sew towards the other end of the cozy (away from the first snap). Turn the felt over and sew the other side of the snap on the top side of the cozy. Make sure that when you wrap the cozy around to bring the edges together, the snap can close!

**6**

MAKE THE FACE

You can give him eyes, a nose, or and embellish his ears!

**7**

TEST YOUR CIRCUIT

Wrap the cozy around your favorite mug and pour some hot tea, the LED should turn red. Now try pouring some cold water with ice in the mug, the LED should turn blue!



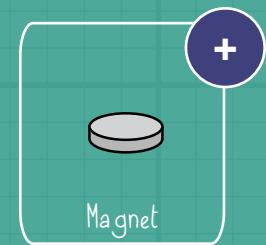
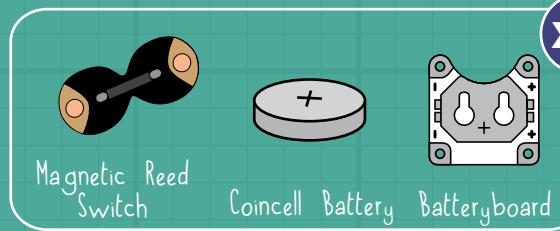
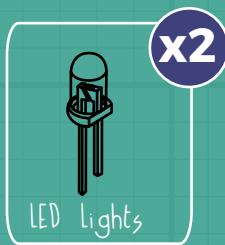
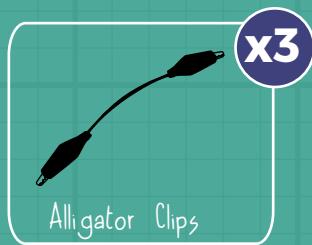
PROJECTS WITH PAPER AND CARDBOARD



Robot

WHAT YOU NEED:

Cardboard should be added to materials

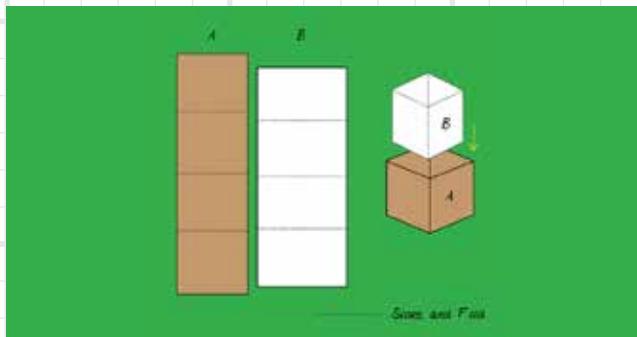


1

PREP

Find a piece of cardboard around 8 inches long to make a two rectangular boxes.

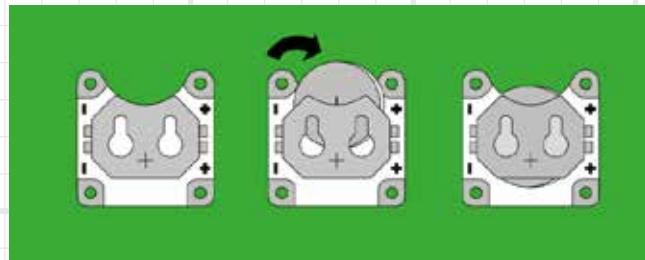
the word “box” is unclear



2

PLACE BATTERY

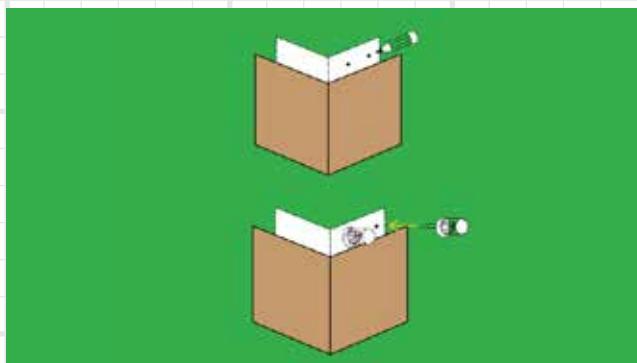
Place the coincell battery into the battery holder.



3

PLACE LEDs

Use a pencil to make holes in the cardboard for the LEDs. Place the LEDs when the holes are made.



4

ATTACH BLUE ALLIGATOR CLIP

Make sure that the legs from the LEDs are not twisted together.

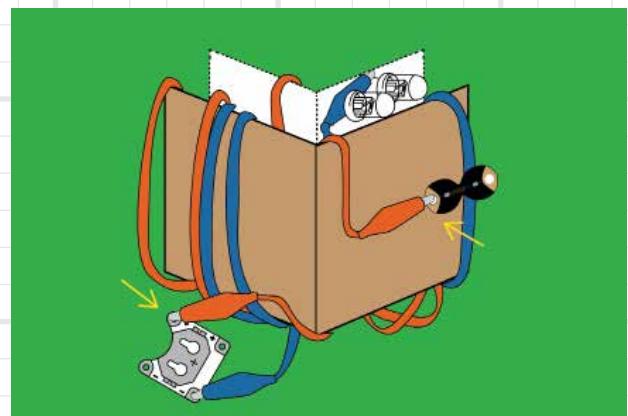
Connect the blue alligator clip to the negative (-) side of the coincell battery and negative (-) side (short leg) of the LED light.



5

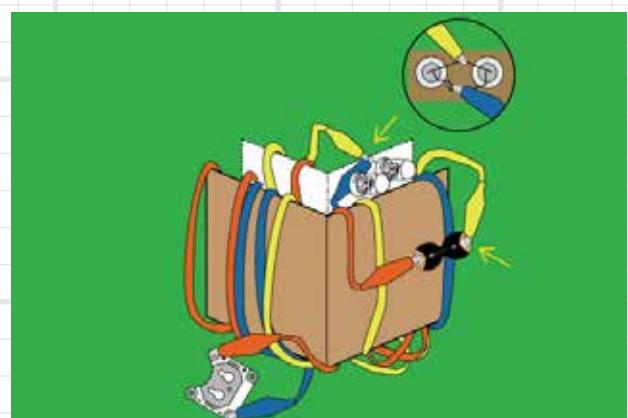
ATTACH THE ORANGE ALLIGATOR CLIP

Connect the orange alligator clip to the positive (+) side of the coin-cell battery and the toggle switch.

**6**

ATTACH THE YELLOW ALLIGATOR CLIP

Connect the yellow alligator clip to the positive (+) side (long leg) of the LED light and toggle switch.

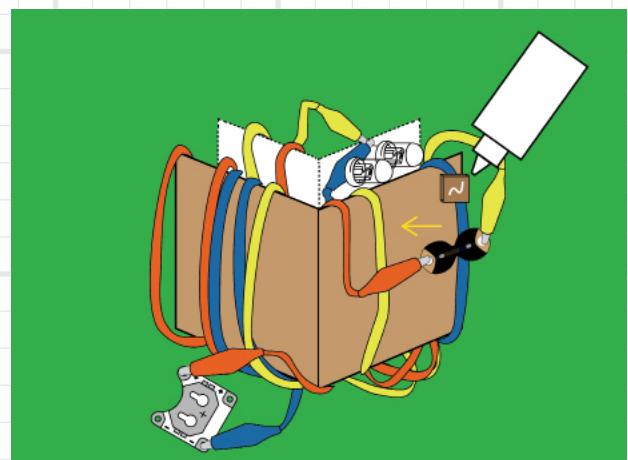


One of the LEDs does not have setup instructions

7

FIX ALLIGATOR CLIPS

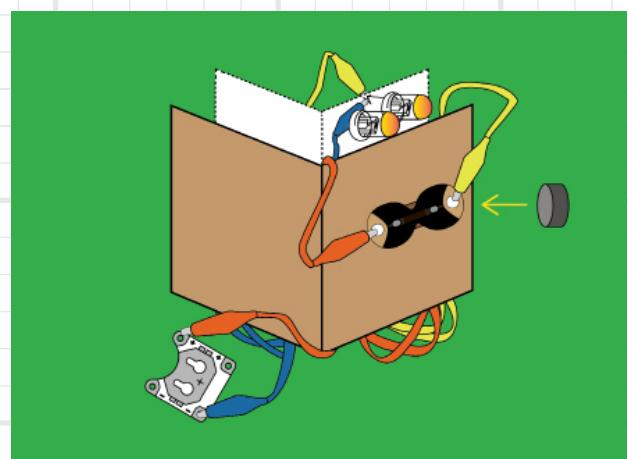
Use smaller cardboard pieces and glue to separate alligator clips and attach them to cardboard boxes.

**8**

TEST YOUR CIRCUIT

Test your robot by activating the switch with a magnet!

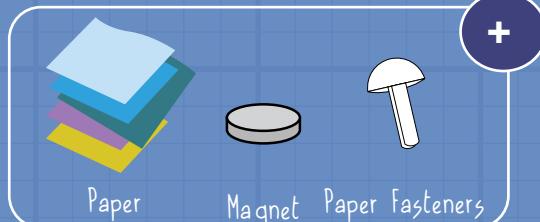
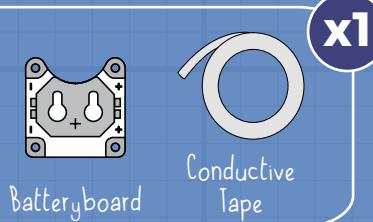
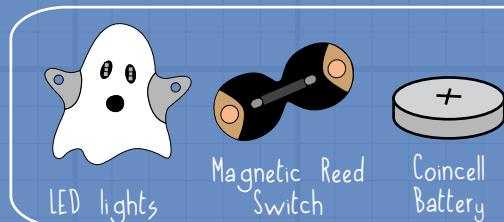
what to do LEDS do not light up, emphasis on making sure alligator clips are secured on the conductive pads





Magic Gems

WHAT YOU NEED:

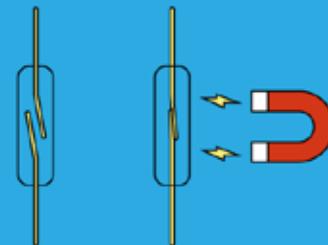


ADDITIONAL MATERIALS:



HOW IT WORKS:

This circuit contains an LED, a battery, and a magnetic reed switch. The reed switch is triggered by magnets. From the outside the switch looks like a plastic box, but inside there are two pieces of metal sitting slightly apart. When a magnet is nearby, the metal pieces move and make contact, completing the circuit.



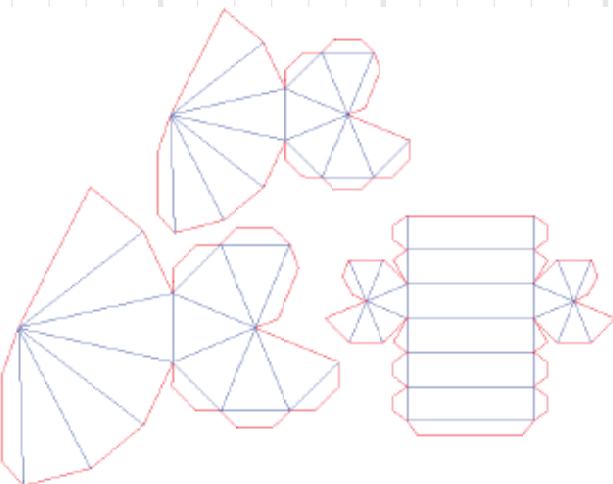
PREP

Print the provided templates onto the paper you would like to use. Cut out one large gem and one small gem along the solid lines only.

Templates: A, B, C, D, & E

Cut conductive fabric tape into 6 pieces each 1 inch long.

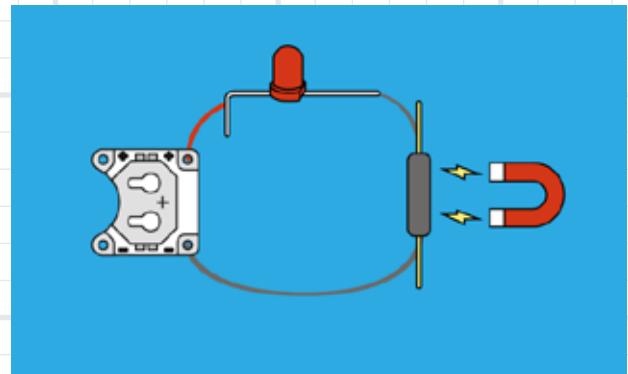
should state specifically where to find the templates



2

PLAN THE CIRCUIT

In the large gem connect the reed switch to an LED and the batteryboard. The small gem will contain a magnet. Touching the gems together will trigger the LED.

**3**

ATTACH THE CONDUCTIVE TAPE

Lay your circuit out on the inside of your large gem. Your conductive tape may lay across the folds indicated by the dotted lines, but do not place components on the dotted lines or your gem will not fold correctly. Attach the first layer of conductive tape by peeling the back and placing it under where the component will go.

- * Make sure these pieces do not touch each other. Do not tape down the components yet.
should have an image here explaining this step,
a visual would help make it easier for users to understand this step

4

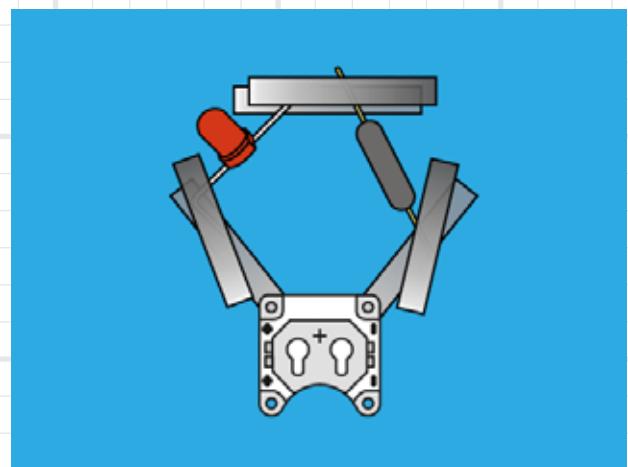
ATTACH YOUR COMPONENTS

Attach your batteryboard to the conductive tape using tape.

Place your LED on top of the conductive tape. Make sure the bent anode of the LED is connected to the side of the battery board marked "+". Attach a new piece of conductive tape so that the bent leg of the LED is sandwiched between conductive tape.

Place your reed switch so that it's on top of the conductive tape and in between the "-" side of the batteryboard and the cathode of the LED. On the side connected to the batteryboard, place a new piece of conductive tape so that the leg of the reed switch is firmly sandwiched in between conductive tape.

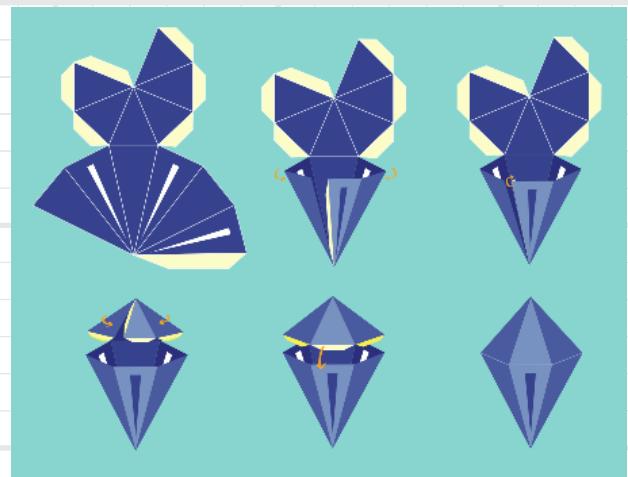
Then place the last piece of conductive tape over the remaining legs of the LED and reed switch.

**5**

FOLD YOUR GEMS

On the template fold along the dotted lines. use glue or tape to hold the gem together. Before closing your gem up, glue your magnet to the inside of the small gem. When the glue is dry, mark an "x" on the outside of the gem so that you'll know where it is once the gem is closed.

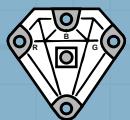
should have a step here on what to do
if gem does not light up





Color Spinner

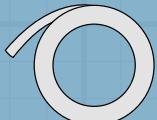
WHAT YOU NEED:



Color Changing
LEDboard



Coincell Battery



Conductive Tape

x1

ADDITIONAL MATERIALS:



Cardboard



Paper Fasteners

1

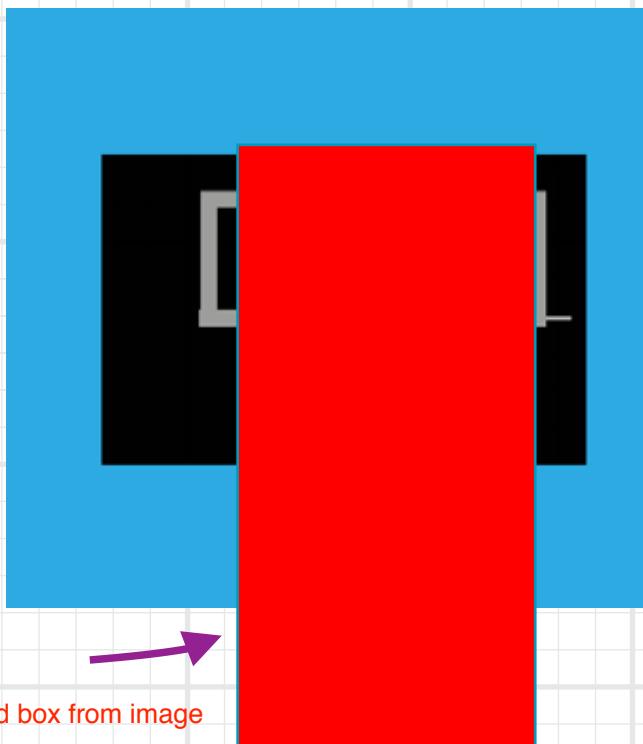
PLACE LED

Bend the legs of your LED so that you can place it flat on your cardboard base, like in the diagram. Orient the legs so that the green is facing up, and positive is facing down.

2

PLACE CONDUCTIVE TAPE

Take your conductive tape and divide it into 6 strips so that you stick it to the board like in the diagram. You are extending each colored leg of the LED. Place the tape over the leg, to secure it onto the cardboard.

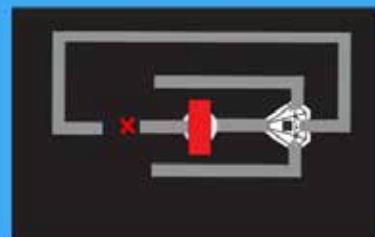


should
remove red box from image

3

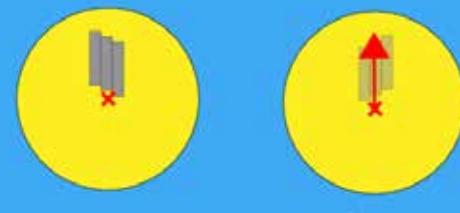
PLACE BATTERY

Take one more piece of tape and place it underneath the battery, to make contact with the negative end. Leave a small gap between that piece and the green leg extension like in the diagram. Then take some electrical or other non-conductive tape and place it over the battery to secure the positive leg of the LED to the positive side of the battery.

**4**

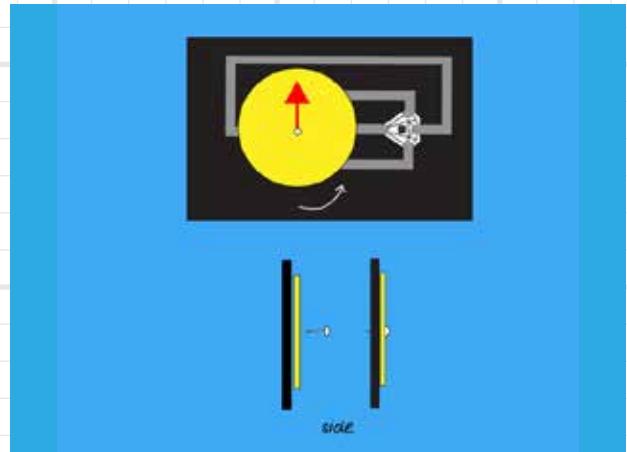
PREP CIRCLE PIECE

Now take the small circular piece of cardboard and draw an "x" in the middle. Take 2-3 pieces of conductive tape and place them next to each other, with one end near the center and the other going out towards the edge of the circle.

**5**

PUT IT TOGETHER

Place the circle over the cardboard so that the x's line up and the conductive tape is facing down. Now take your pushpin and attach the wheel to the cardboard base, so that it can turn.

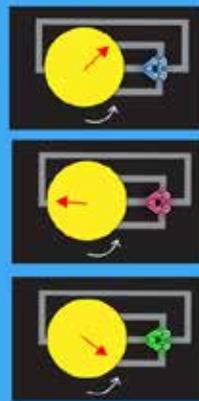
**6**

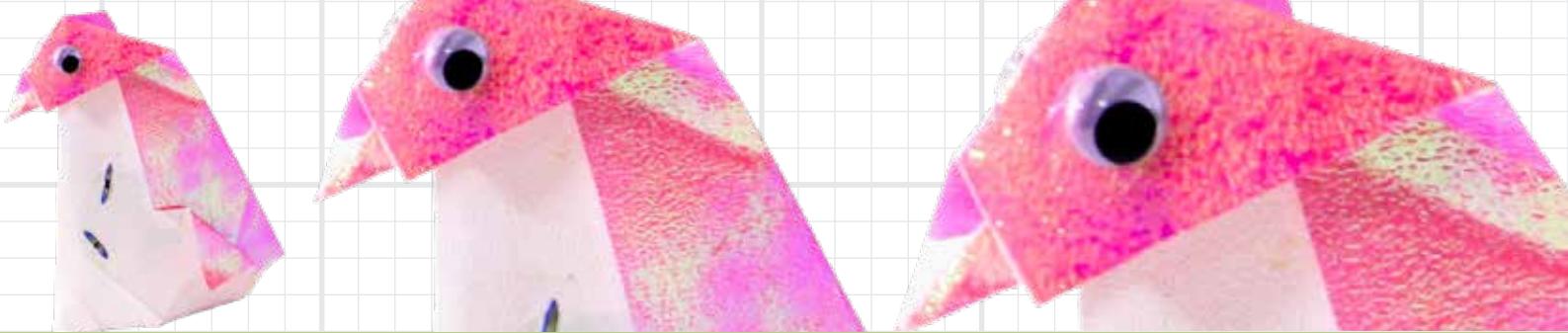
TEST YOUR CIRCUIT

You should see the lights turn on! As you turn the wheel the tape on the bottom of the wheel is closing a switch for the red, blue, or green path, thus changing the color of the LED!

Now enjoy seeing how colors change!

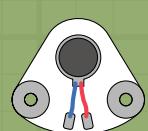
what to do specifically if LEDs do not change color and do not turn on at all, specific things to look out for





Dancing Penguin

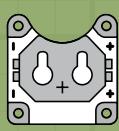
WHAT YOU NEED:



Motionboard



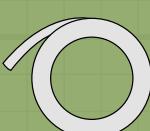
Heart LEDboard



Batteryboard



Coincell Battery



Conductive Tape

x1



Paper



Paper Fasteners

ADDITIONAL MATERIALS:

1

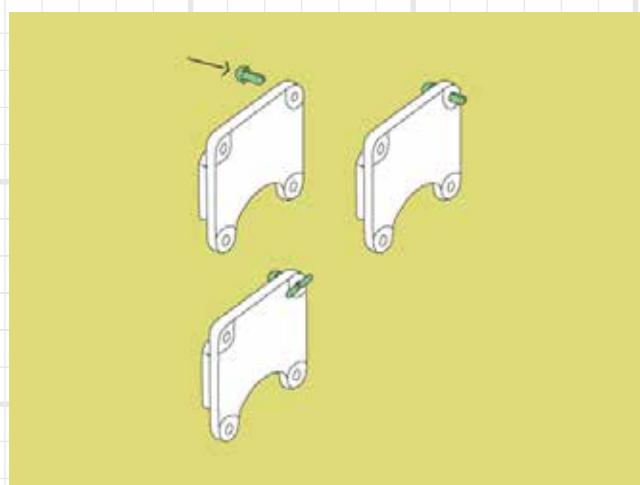
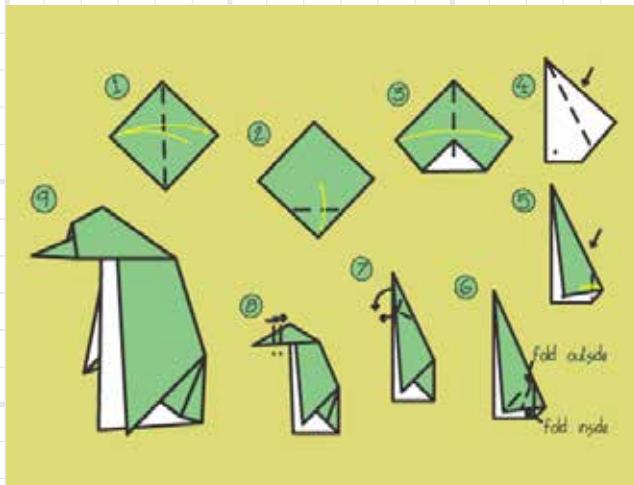
PREP

Fold a piece of paper into the shape you'd like to activate!

2

PREPARE LED LIGHT

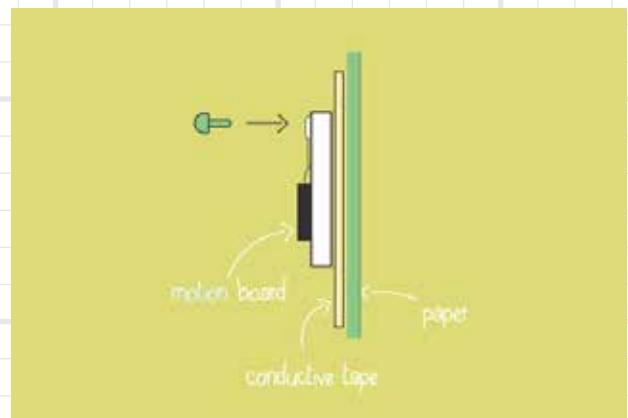
Basic review: an LED is a directional component, meaning the positive (long leg) must connect to the positive of the power source and negative (short leg) to negative



3

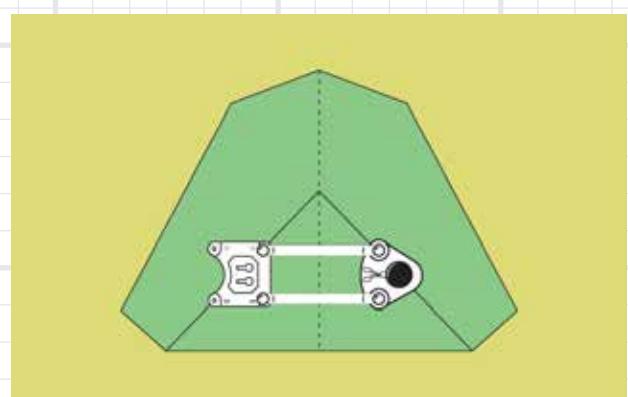
CONNECT MOTIONBOARD

Push 2 pushpins through the holes on the batteryboard, through the tape, and through the paper.

**4**

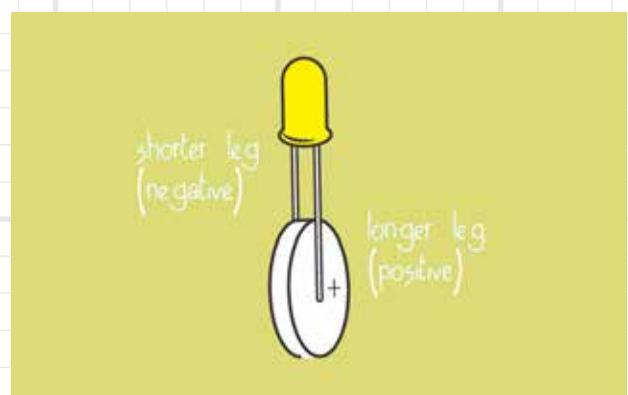
PLACE THE CIRCUIT

After deciding the exact location of your circuit, use conductive tape and push pins to place the circuit in place.

**5**

PLACE LED LIGHT

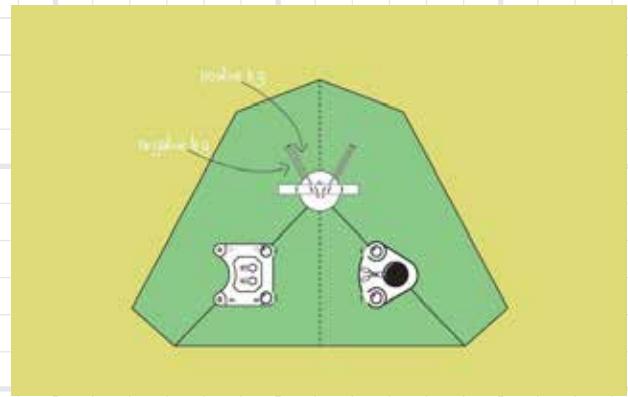
Decide where you want to place the LED(s), and place each leg on the appropriate piece of tape (longer leg on positive tape line, shorter on negative tape line)

**6**

INSERT BATTERY

Place your battery in the batteryboard, with the "+" side facing up. The LED should turn on!

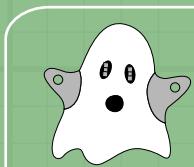
should have a step on what to do if the LED is not working, some of the possible errors



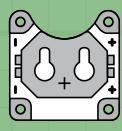


Spy Light

WHAT YOU NEED:



LED lights

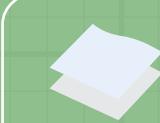


Batteryboard

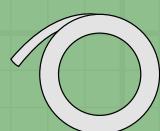


Coincell battery

x1



Paper



Conductive Tape

+

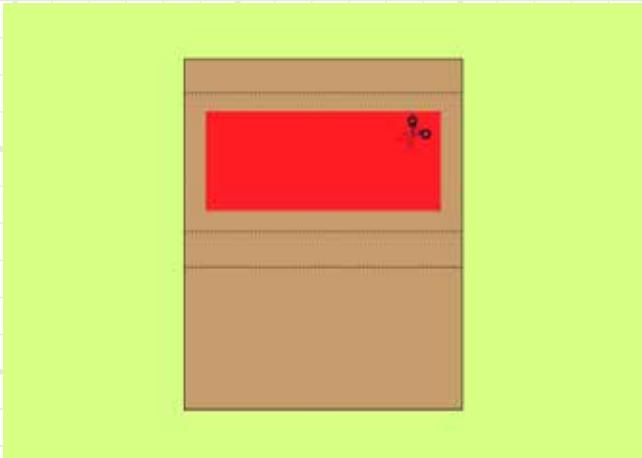
Popsicle
Stick

should add cardboard as additional materials

ADDITIONAL MATERIALS:

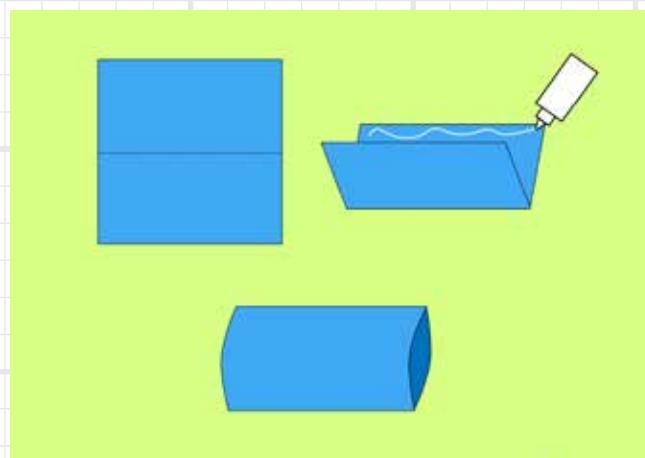
1 CREATE THE FRAME

To make the frame, cut and score the cardboard according to the template in to your preferred size.



2 CREATE THE SCREEN

Cut the copy paper just a little bit bigger than the opening on the frame, then fold in half and glue the long edge. Now you have a little envelope for your secret message.



3 GLUE THE FRAME TOGETHER

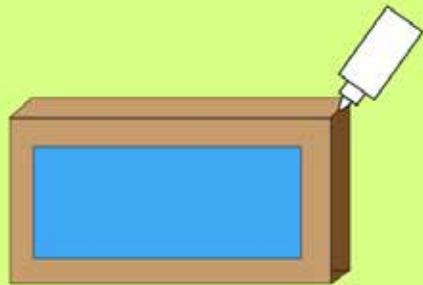
Glue the envelope you just made onto the back of the frame, covering the opening you cut out off the cardboard frame at the beginning.



4

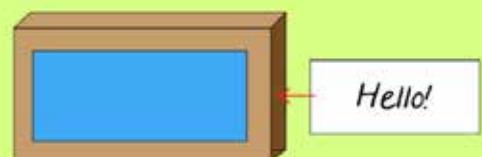
ASSEMBLE THE FRAME

Assemble the frame by folding and gluing the sides, creating a box.

**5**

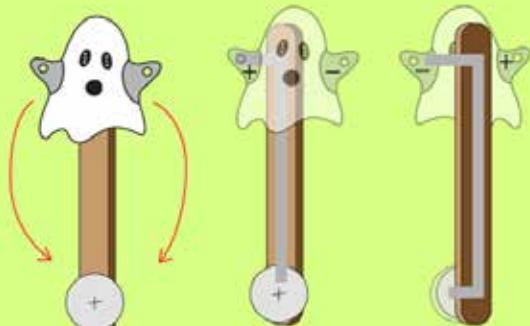
WRITE YOUR SECRET MESSAGE

On paper, write your secret message, preferably with a bold pen/marker.

**6**

CREATE THE LIGHT STICK

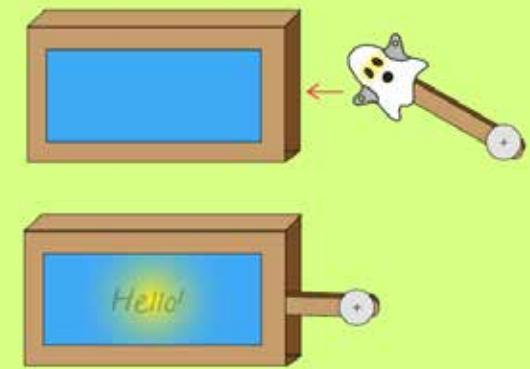
Place the LED and battery onto the opposite end of the popsicle stick. Using conductive tape, you're going to connect the positive pad of the LED onto the positive side of the battery which is marked with a + and the negative pad to the negative side of the battery which is the embossed side. Make sure that the 2 tape pieces don't touch each other. This way your light stick should light up!

**7**

TEST IT OUT

Use the light stick you just created, you can now reveal the secret message you wrote earlier by guiding the lightstick to light up certain area of the screen! Change the messages anytime you want.

Add what to do if light stick does not work,
what are some the errors that cause the light stick to not work





Interactive Pop-Up Card

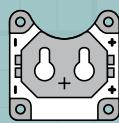
WHAT YOU NEED:



Light Sensor



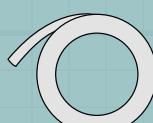
Heart LEDboard



Batteryboard



Coincell Battery



Conductive Tape

x1



Paper



Paper Fasteners

+

ADDITIONAL MATERIALS:

1

PREP

You can print the card template on the colored cardstock. Cut along the solid lines. There are two cards on the template just in case you mess up.

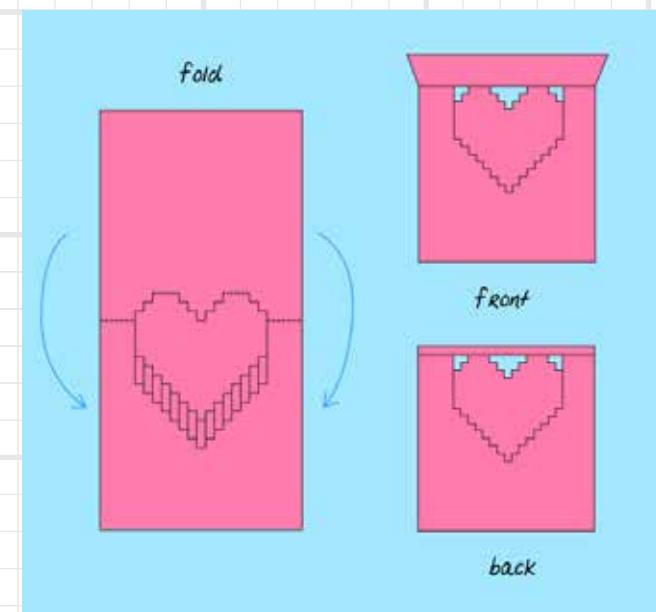
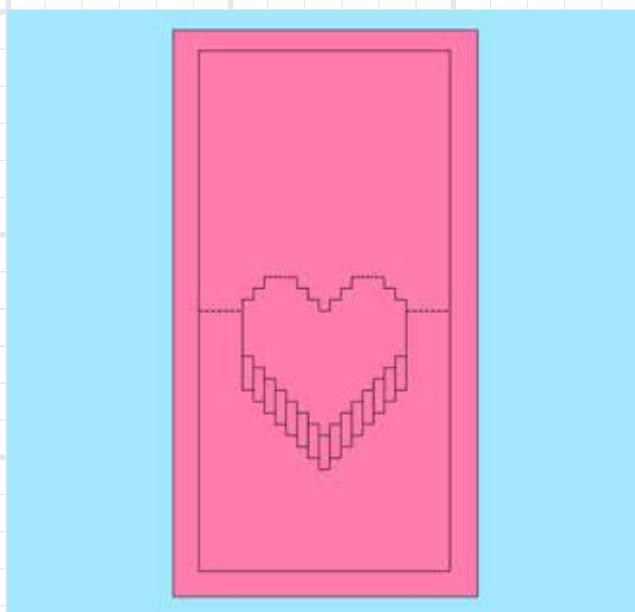
where should users find the template?

A specific location for the template should be here

2

FOLDING THE CARD

Fold along the dotted lines. Be careful to not rip the card in the process of folding. When you're done, the heart on your card should pop up.



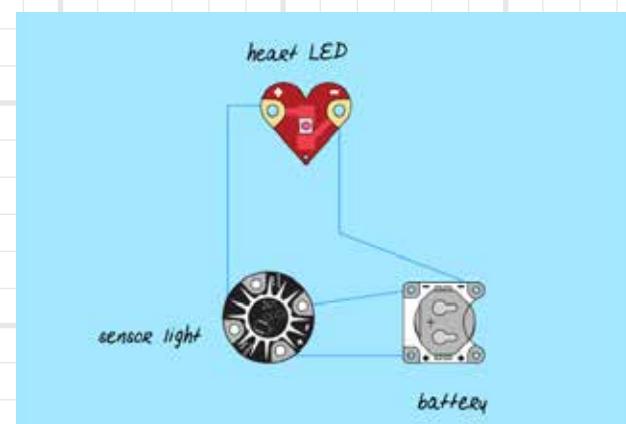
3

PLAN YOUR CIRCUIT

Connect the heart LEDboard to the batteryboard from the negative side and LED's positive side to light sensor. Your batteryboard should have three connections like the picture.

Connect the heart

LEDboard's negative side
to the batteryboard's negative side.



4

ATTACHING THE CONDUCTIVE TAPE

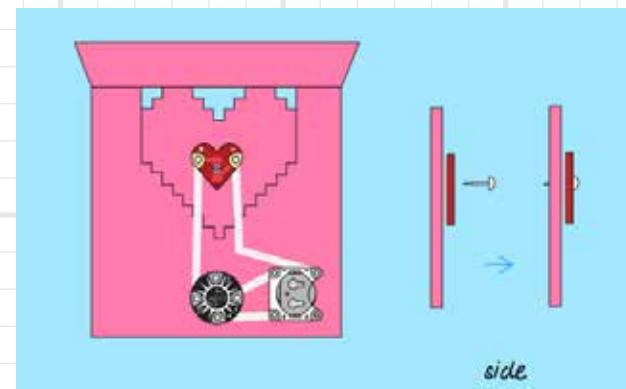
Before attaching all the components, mark down the position of your circuit. In order to do that, cut tape pieces long enough and place those on the card. Make sure that your tape pieces do not touch each other.



5

ATTACH YOUR CIRCUIT

Follow the schema on the photo and use paper fasteners to fix your components.

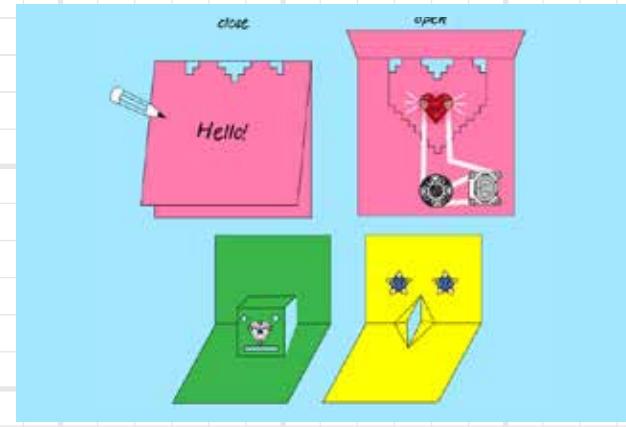


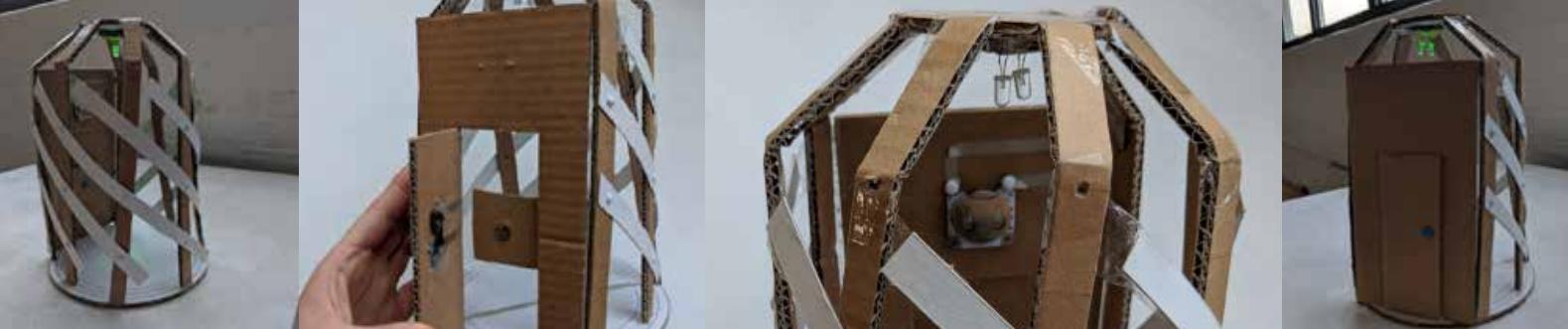
6

TEST IT OUT

Try out how your card works and create more with different shapes!

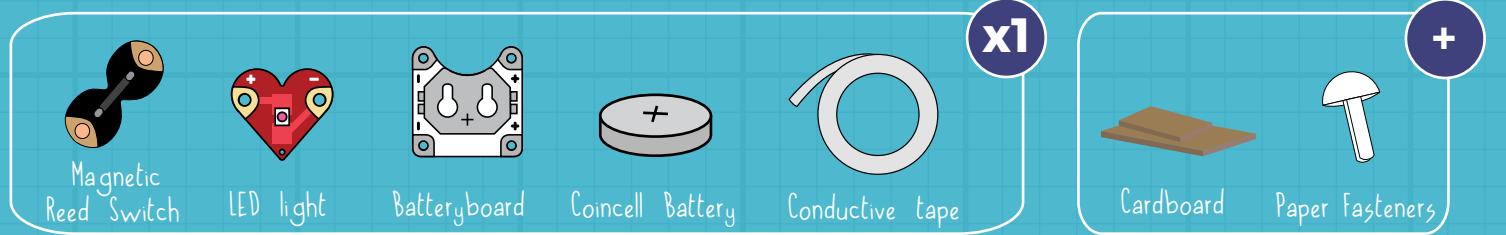
step on what to do if LED does not turn on





Electric Yurt

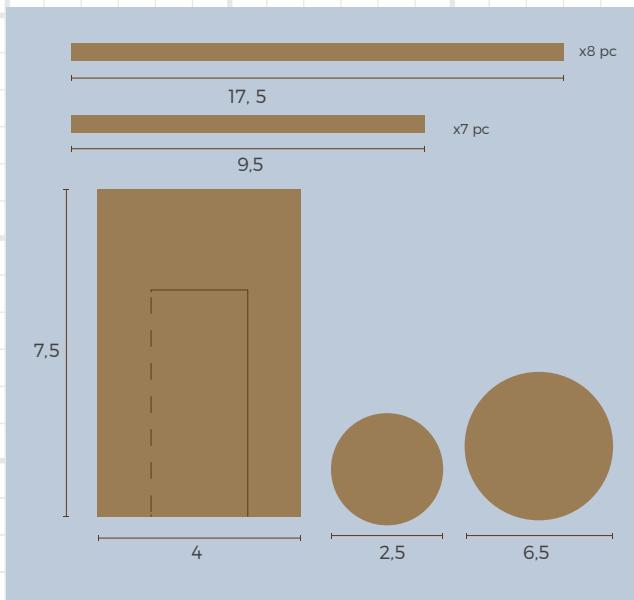
WHAT YOU NEED:



1

PREP

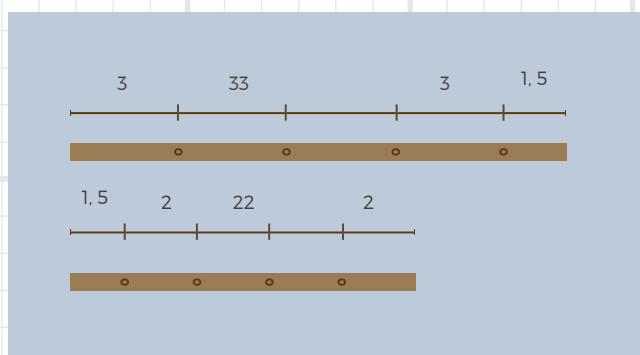
Cut out the cardboard pieces for your yurt house based on the picture below.



2

MARK THE HOLES

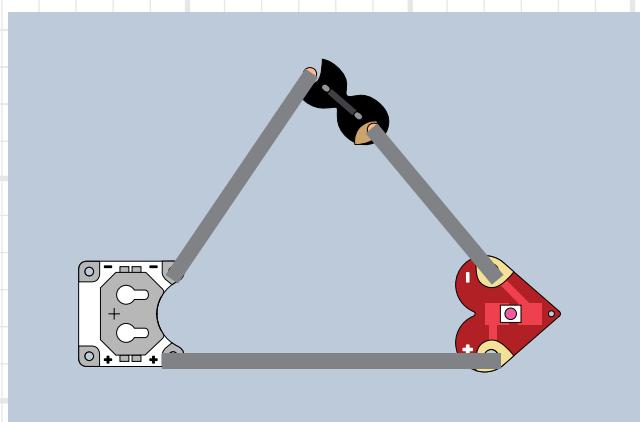
Measure and mark out the distances on the wall pieces of the yurt. These points mark the connections of the wall structure.



3

PLAN YOUR CIRCUIT

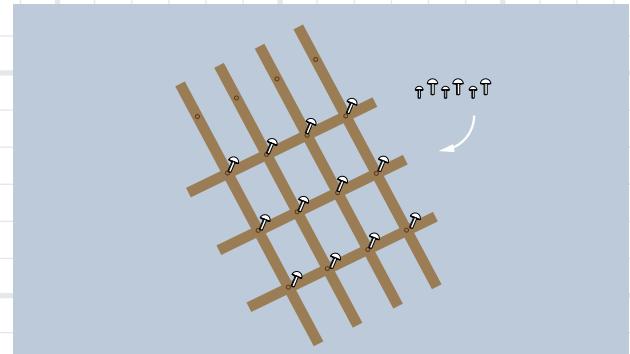
Connect the magnetic switch to the negative side of the batteryboard. Then connect the positive batteryboard to the heart LEDboard. Complete the circuit by connecting the negative side of the LEDboard to the magnetic switch.



4

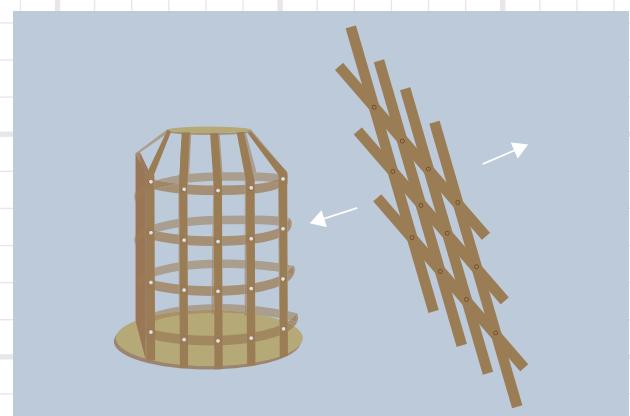
BUILD YOUR WALL

Use paper fasteners to pin together your wall pieces into a grid pattern. Adding connections will make your wall structure expandable.

**5**

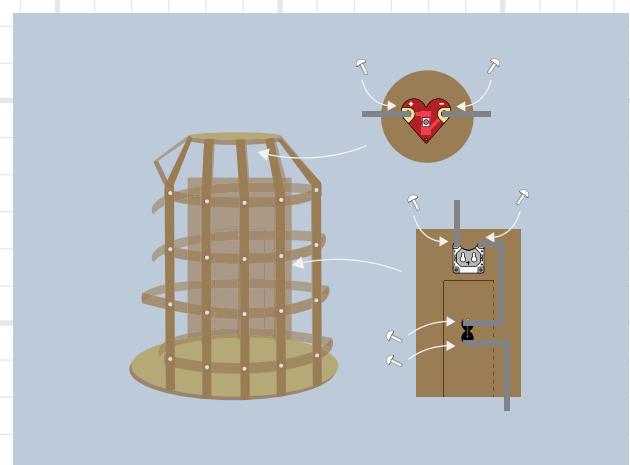
ASSEMBLE PIECES

Connect your door piece to the base and add the wall structure. You can use tape, pins or paper fasteners secure everything.

**6**

PLACE YOUR CIRCUIT

Attach the heart LEDboard to the ceiling piece, the batteryboard above the door and magnetic switch on the actual door piece. Connect them all with paper fasteners and conductive tape.

**7**

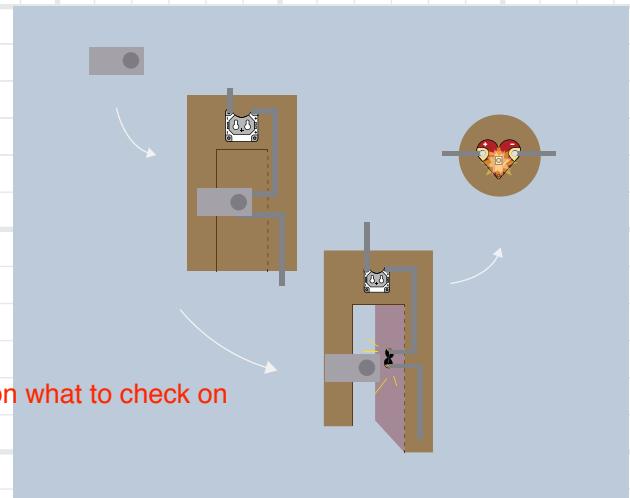
ADD MAGNET AND TEST IT OUT

Take an extra cardboard piece, where you can add a small magnet. Attach that to your structure.

Now test your circuit - when the door closes and magnet meets the magnetic switch, your LED should light up!

should state a specific
location to the structure
if it is necessary

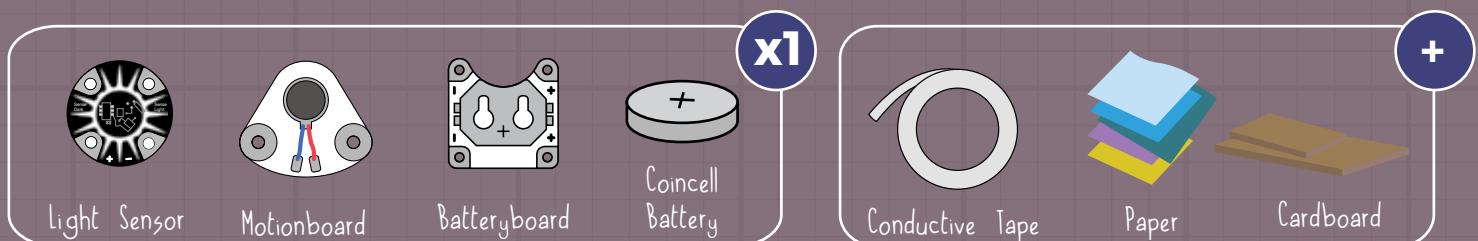
if LED does not work, steps on what to check on





Surprise Box

WHAT YOU NEED:



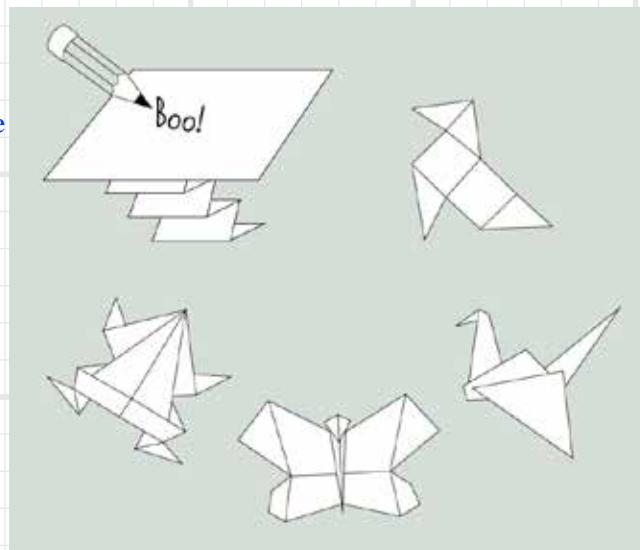
ADDITIONAL MATERIALS:

How many faces on box/what is it supposed to look like

1

PREP

Use an existing cardboard box or build your own. Inside the box you can create anything you want as long as it's made out of paper. We suggest you create an origami creature or you can also make a pop-out note.

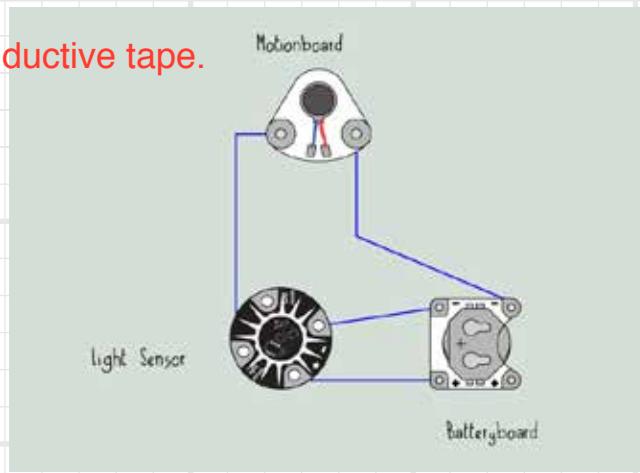


-should state that users are going to be using conductive tape.

2

PREPARE YOUR CIRCUIT

This diagram shows you how to lay out the circuit. Make sure to connect one of the conductive pads of the motionboard to the light sensor, this activates the board when it is exposed to the light. Also, don't forget to insert the coincell battery to the batteryboard.

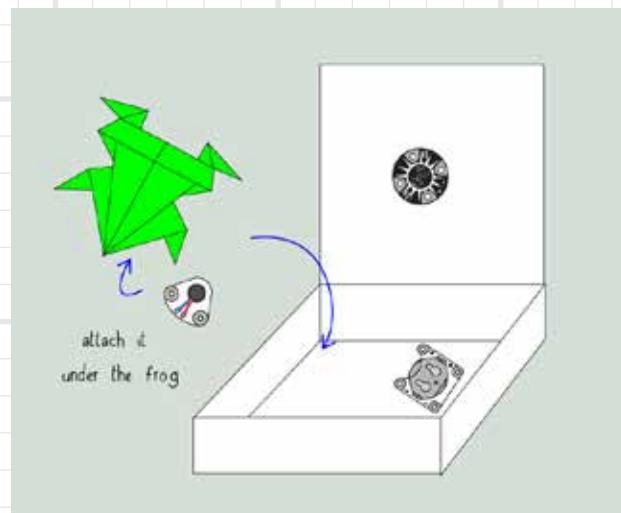


Connect batteryboard's negative side to the negative side of the light sensor. Then, connect the batteryboard's positive side to the light sensor's positive side.

3

PLACE YOUR COMPONENTS

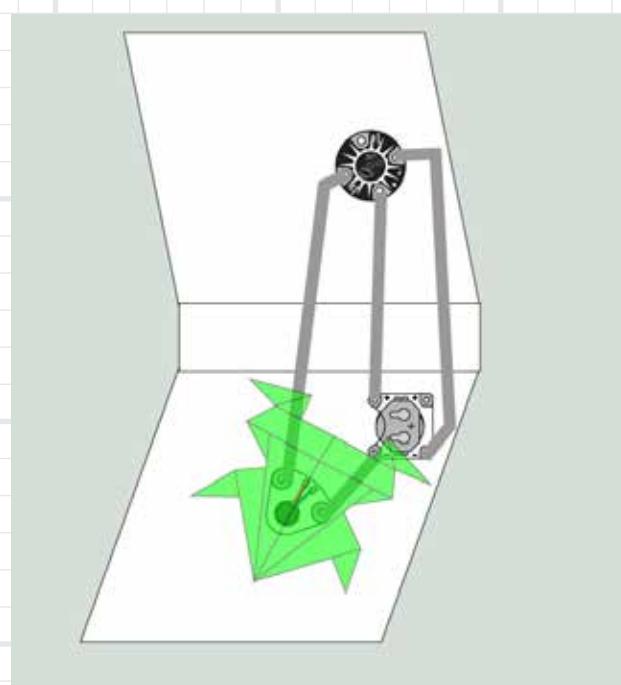
Attach the motionboard directly to your origami frog and lay out the rest of the circuit as previously planned. Make sure there will be nothing covering the light sensor, this can interrupt its reaction to light.



4

CONNECT YOUR CIRCUIT

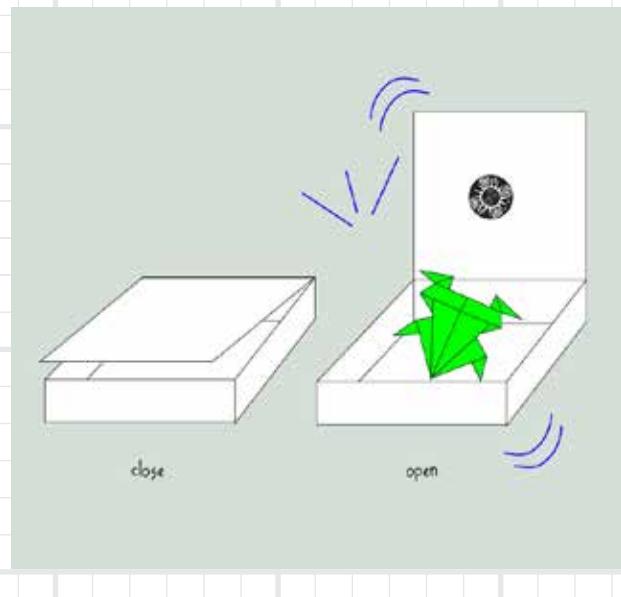
Apply the conductive tape to connect the circuits. Use glue or glue dots to fix each component to the side of the box so that they are secured and allow the origami frog to be loose.



5

MAKE YOUR BOX MOVE

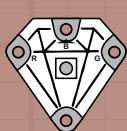
Test out your project! It should move/vibrate when you open the box. Give it to your friends and see their reaction when they open your box!





RGB Pictureframe

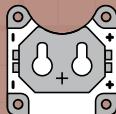
WHAT YOU NEED:



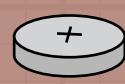
LED light



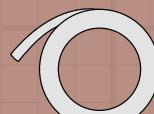
Alligator clips



Batteryboard

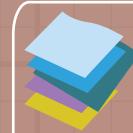


Coincell battery



Conductive tape

x1



Folding paper

+



Cardboard

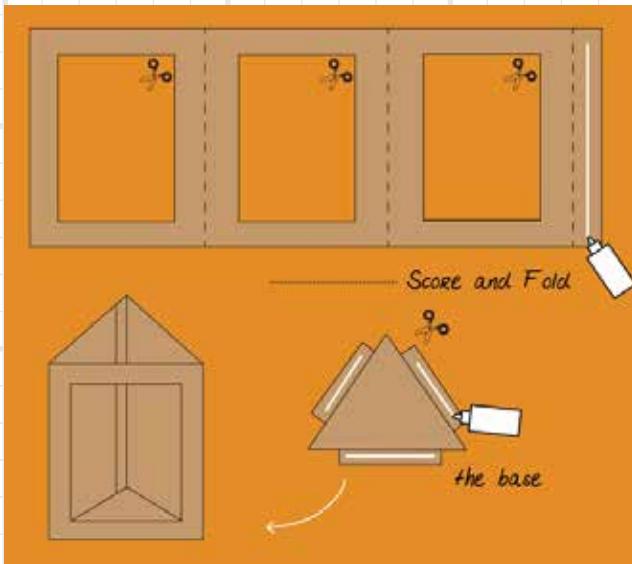
ADDITIONAL MATERIALS:

1

MAKE THE FRAME

can be any size that the user wants

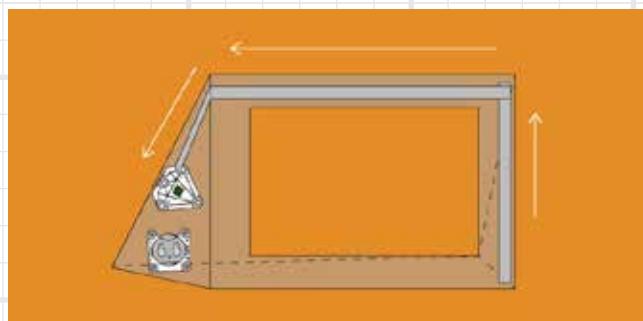
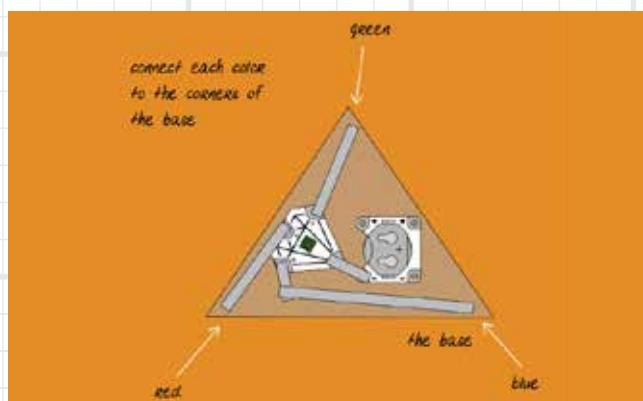
Split the cardboard into 3 even panels. Cut out the middle of each panel to create a frame. Now fold those frames into triangle shape. Next, cut a triangle with glueable folds for the base of the frame.



2

PLAN YOUR CIRCUIT

Position the LED and batteryboard on the base like on the image, then secure them with gluedots. Then connect the negative side of diamond LED with the batteryboard using conductive tape. Next, connect each color on the LED to 3 different corners of the triangle. Make sure the tape pieces do not touch one another!



3

CONNECT RGB TO THE FRAME

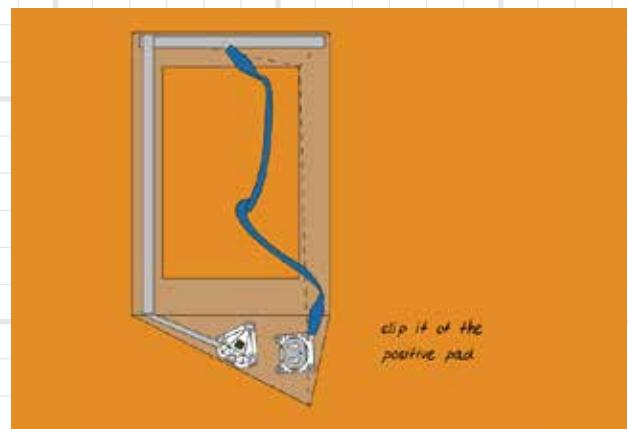
Continue laying out tape from each corner of the frame. Repeat it on all 3 frames. Now you have each panel connected to a different LED color.

should say RGB LED in case user does not understand what RGB stands for

4

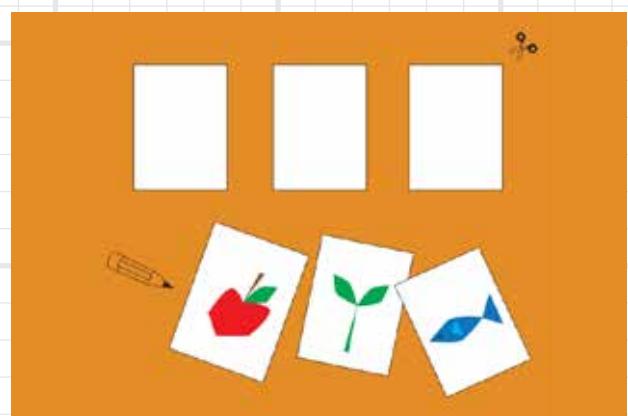
ADD ALLIGATOR CLIPS

Next, clip one end of the alligator clip to the positive side of the batteryboard. This will be your switch for the circuit.

**5**

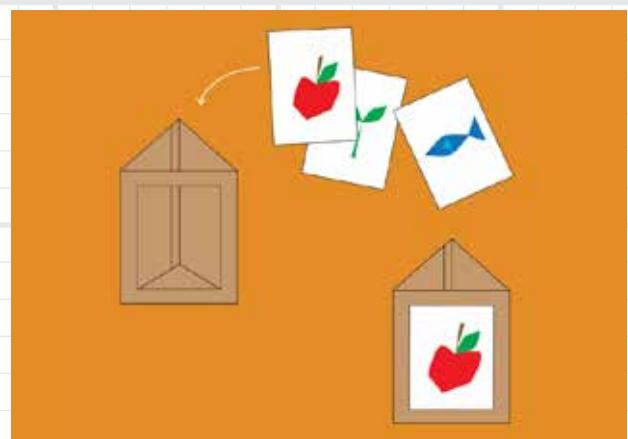
CREATE DRAWINGS TO FRAME

Cut the plain paper into a slightly bigger size from the frame. Then draw and decorate them anyway you like! Another option is to print pictures or photos out.

**6**

PLACE YOUR IMAGE

Place the images you just made into the 3 different panels. These can be changed anytime you want.

**7**

TEST YOUR CIRCUIT

Clip your Alligator clip on top of the frame, so that it is connected between two pieces of conductive tape. This will make the LED light up! Each frame will have a different colored light depending on which frame you clip! You can decorate your frame further. Be creative and have fun!

should have a step on specific things to look out for if the LED light does not turn on

* Excited to create more? Go to: www.teknikio.com to find more projects inspirations!



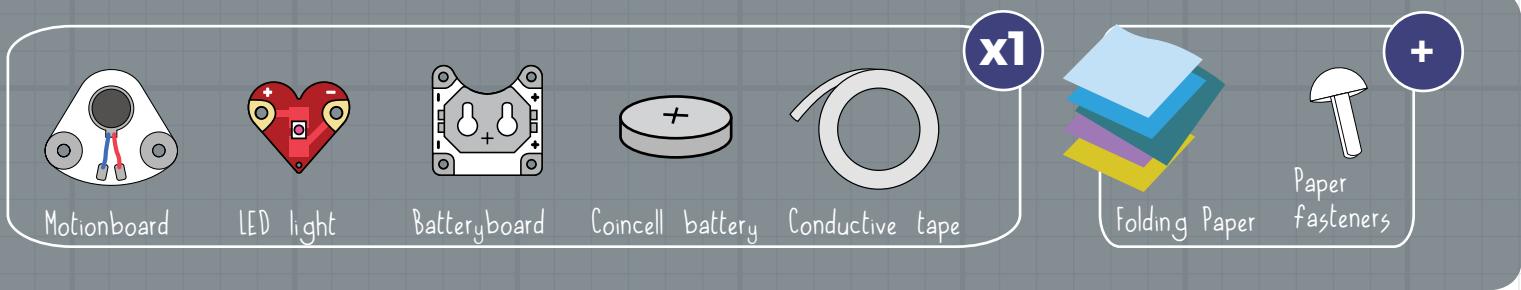


Beaded bracelet

WHAT YOU NEED:

capitalized title

ADDITIONAL MATERIALS:

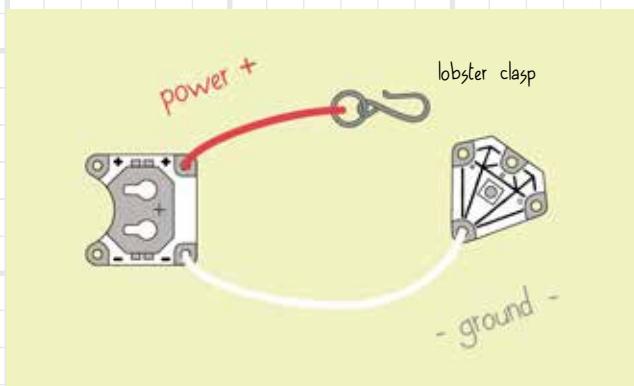


1

PLAN YOUR CIRCUIT

This circuit contains a RGB LEDboard, a batteryboard, and a lobster clasp. The clasp is made of conductive metal, meaning electricity can flow through it. In the circuit, the clasp acts as a switch to turn the light off and on.

Connect the clasp to one of the holes marked "R" (red), "G" (green) or "B" (blue) to turn on the LED. Switching the clasp to different holes will change the color of the LED.



2

MEASURE YOUR WRIST

Start by determining how big your bracelet will be. Measure your wrist using a soft tape measure or using the provided cord and a ruler.

To use the cord, wrap the provided cord around your wrist snugly, like a bracelet. Mark the spot of the cord where it begins to overlap by holding the spot between your finger and thumb. Lay the string out flat against a ruler to measure the length.

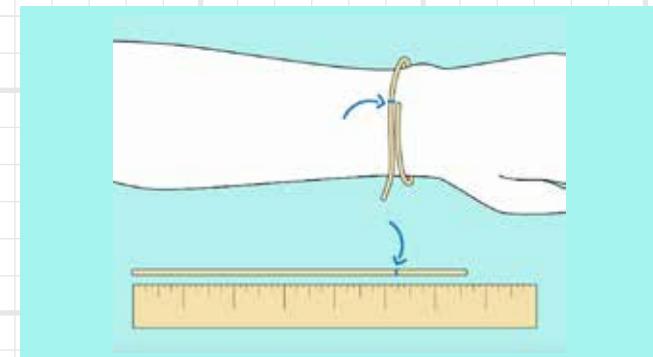
Example lengths:

Small: 6.5 inches

Medium: 7 inches

Large: 8 inches

* Small fits most kids 12 and under.

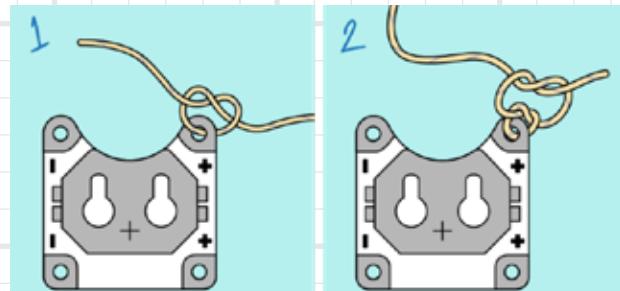
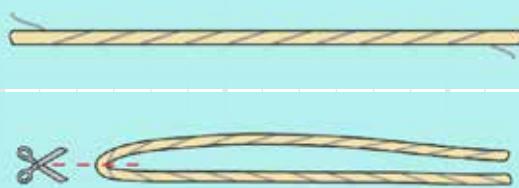


3**PREP CORD**

Cut equal-sized pieces of cord and yarn. For the bracelet cut 12 inches of each, and for the necklace cut 20 inches of each.

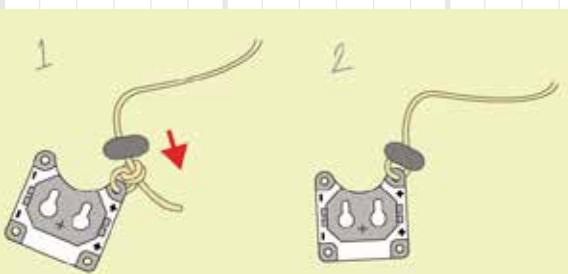
Twist the conductive yarn and cord together so that they are wrapped tightly around each other. The wax on the cord should keep the conductive yarn in place. If they start to come apart, just twist them together more. You may also add a drop of glue to the end.

Fold the twisted cord in half and cut the cord so you end up with two pieces that are the same length.

**4****ATTACH THE CORD ON BATTERYBOARD**

Take one of your twisted cord pieces and tie a double knot to the batteryboard through one of the holes marked with "+".

Slide the metallic bead over the knot, this gives the knot a cleaner look.

**5****BEAD POSITIVE "+" SIDE OF BATTERYBOARD**

Attach the metal clasp in the same way, covering knot with a metallic bead.

**6****BEAD NEGATIVE "-" SIDE OF BATTERYBOARD**

Now add beads to the other side and attach the LEDboard and clasp!

**7****TEST OUT YOUR BRACELET!**

If your LED does not light up:

Check that your battery has enough charge to power the LED! If you have a voltmeter you can make sure the battery is above 2.5 volts.

Check that your positive and negative connections are not swapped or touching.

Check that your cord is tight around all the conductive holes.

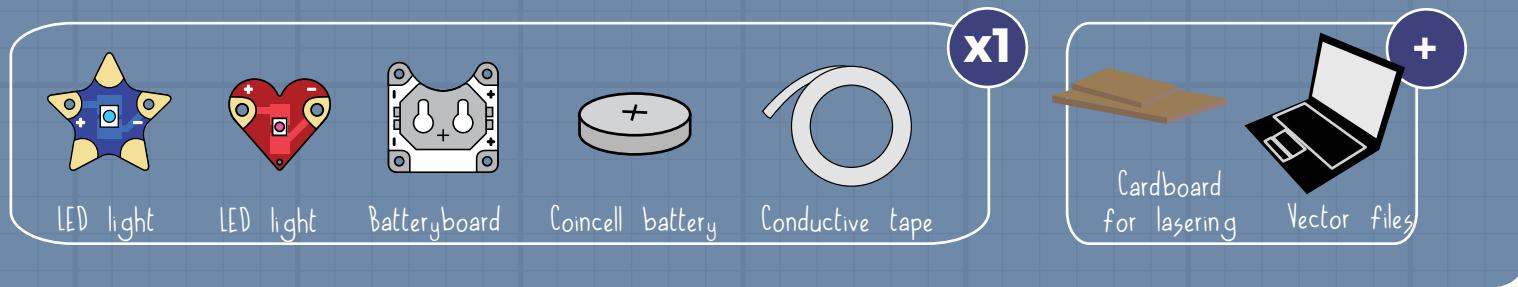
You may need to re-tie your connections or re-make your circuit.





Lasercutted Spaceship

WHAT YOU NEED:



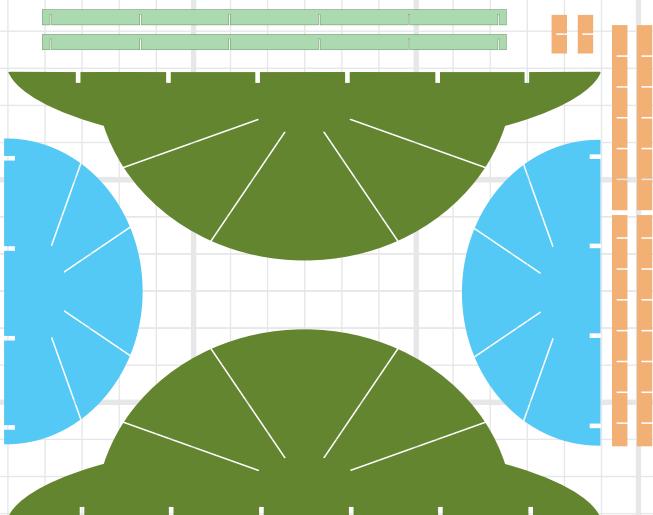
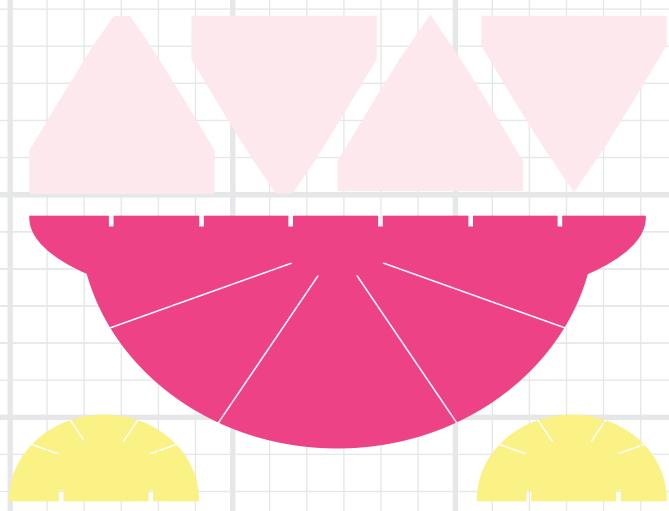
ADDITIONAL MATERIALS:

1 PREP

Plan your spaceship by creating your own lasercutting design or a downloading template from here: xxx?
spelling error+ should there be a link here?

2 ADJUST THE FILE

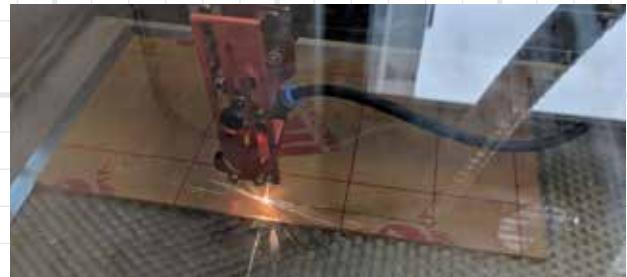
Go over the lasercutting file and adjust the areas of the connection points according to the thickness of your material. The dimensions of those cuts should match the thickness of the material you are using for lasercutting.



3

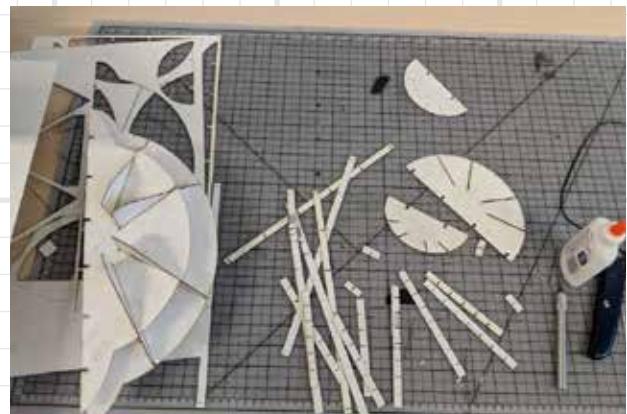
LASERCUT YOUR PIECES & ASSEMBLE

Lasercut out all of the parts and assemble them!

**4**

DECORATE YOUR SPACESHIP

You can use paint, pencil, and other materials to make your spaceship more exciting.

**5**

ATTACH A CIRCUIT

Plan the circuit for your spaceship and use conductive tape to attach it to your spaceship or on the background.

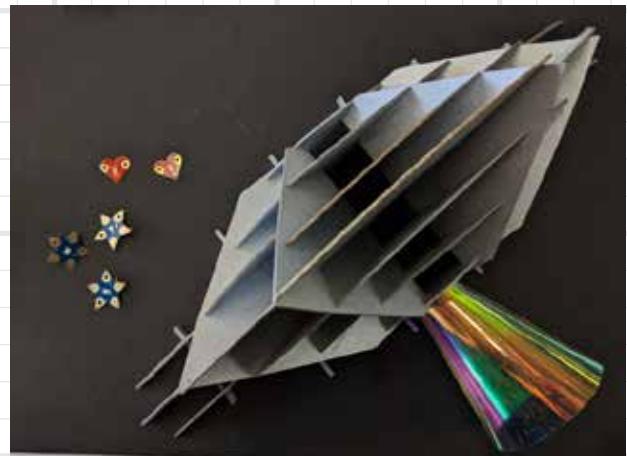
should perhaps give an example of how to attack the circuit to the spaceship incase user feels confused

**6**

TEST YOUR CIRCUIT

Place your spaceship to a base or on your wall and watch your spaceship light up!

should have a step describing the process of how to connect the heartLED and starLED to the spaceship



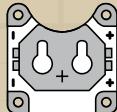


Puppet with 3D Parts

WHAT YOU NEED:



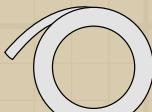
LED light



Batteryboard

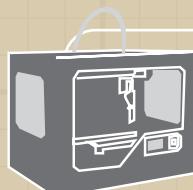


Coincell battery

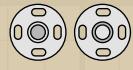


Conductive tape

x1



3D printer



Sewable Metal Snaps



Paper Fasteners

+

ADDITIONAL MATERIALS:

1

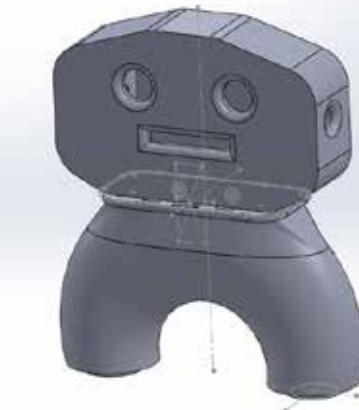
PLAN YOUR DESIGN

Create a sketch of your 3D puppet and plan where you will place your circuit. For this example, we will create a circuit where the heart LED will connect to the circuit using snaps.

2

MAKE YOUR MODEL

Start off by creating a 3D shape of the puppet, don't forget to plan out where to place the batteryboard and LED.



3

PRINT YOUR MODEL OUT

Using a 3D printer create the model. When it is done, place your circuit inside the model. Make sure the snaps stick out.

should state the process of the circuit was put together inside the model so user can get an idea of what to do



4

ATTACH ALL THE COMPONENTS

Place the head of the puppet on the body. When you attach the heart LED to the snaps, it should light up!



5

TEST YOUR CIRCUIT

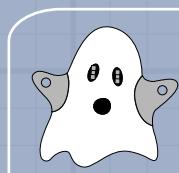
Test out your circuit and play around with your new puppet.



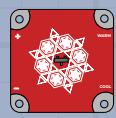


Ghost Ship in a Jar

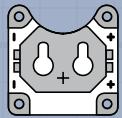
WHAT YOU NEED:



LED light



Temperature sensor



Battery board



Coincell battery

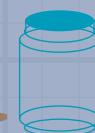


Conductive tape



Folding Paper

Cardboard



Glass jar



Strip of fabric

ADDITIONAL MATERIALS:

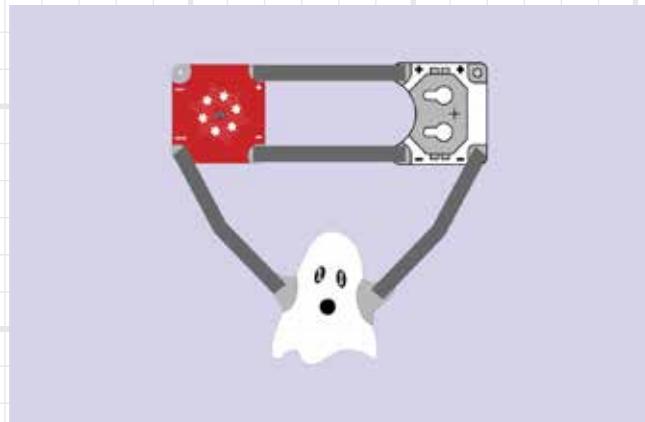
1 PREP

Cut the cardboard into the shape of a boat. You can refer to the image on the right for a design. Assemble your ghost ship. Make sure you create a pocket in the boat for your ghost LED.

can give user options to either laser cut or just cut with scissors.

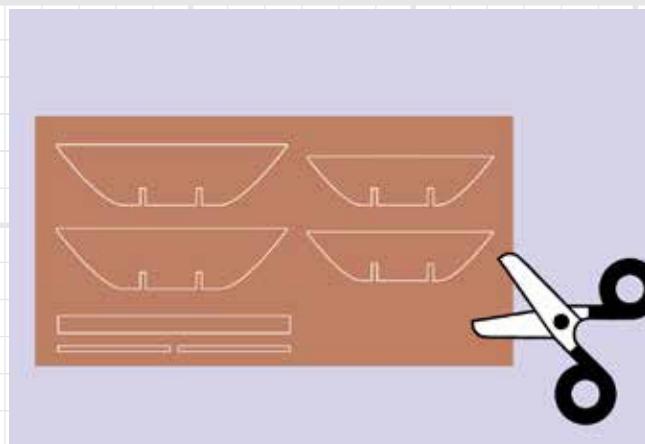
You can also come up with your own design and lasercut the shapes, just make sure there is a spot for the ghost LED.

these two
images are
switched



2 PLAN YOUR CIRCUIT

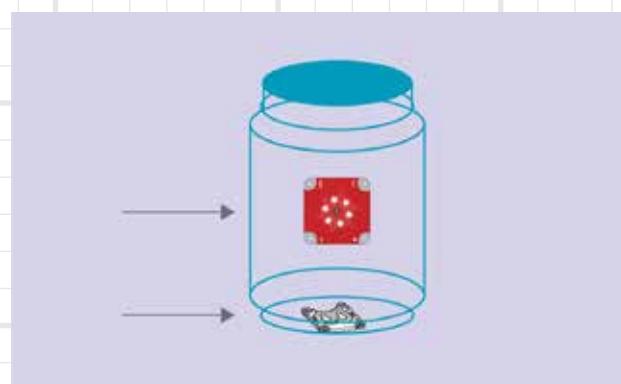
This circuit contains a LED, a battery and temperature sensor. Conductive tape will be used to create the connections. In the circuit the temperature sensor reacts as a switch to turn the LED on and off. Connecting the circuit using the pad labelled 'warm' will trigger the light to turn on after you blow warm air on it.



3

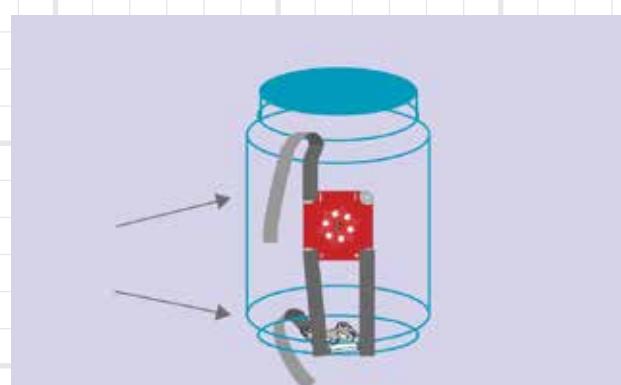
ATTACH COMPONENTS TO THE JAR

Place the batteryboard outside of the glass jar on the bottom, use transparent tape for fixing it. Place temperature sensor on the side of the jar. Follow the circuit scheme and make sure that none of the connections will cross later.

**4**

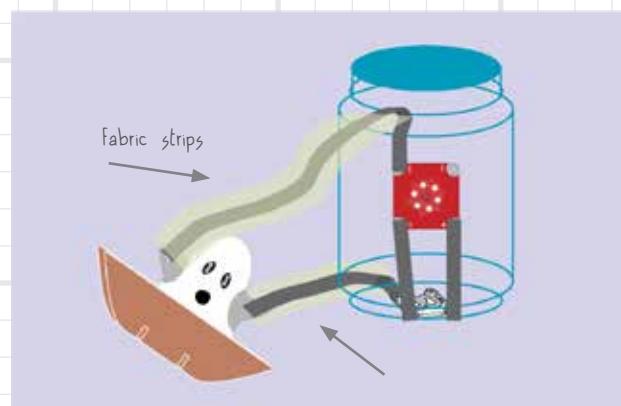
ADD CONDUCTIVE TAPE

Now use conductive tape to connect the batteryboard to the temperature sensor. Use conductive tape to attach the circuit to the jar.

**5**

COMPLETE THE CIRCUIT LOOP

Continue by connecting the loose ends of the conductive tape to the fabric strips (yellow on the image). Using fabric strips gives conductive tape a stronger surface and the flexibility to move the ghost LED around. Make sure conductive tape ends with a connection to the pads of the ghost LED.

**6**

DECORATE YOUR JAR

Place your ghost inside the boat and add some colorful paper to add water for the boat to sit on. Place the boat inside the jar.

**7**

TEST OUT YOUR PROJECT

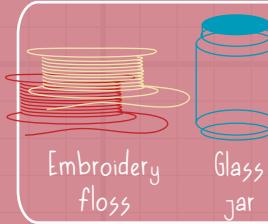
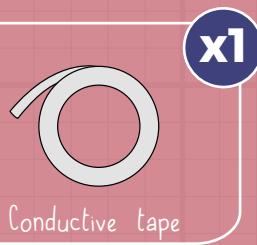
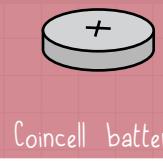
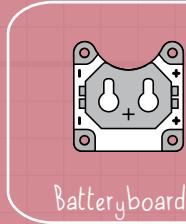
Now play around with your project: the ghost LED will light up after blowing hot air on the temperature sensor.

specific things to look out for if LED does not light up



Embroidery Light Up Jar

WHAT YOU NEED:



ADDITIONAL MATERIALS:

1

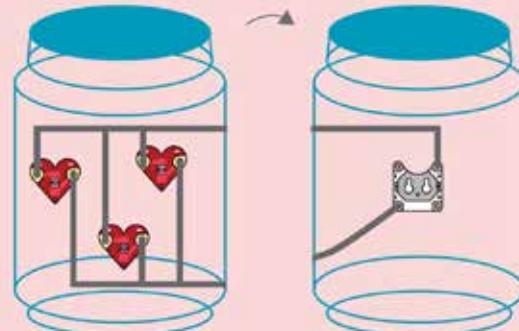
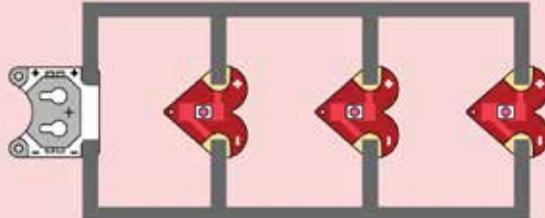
PREP

Plan out your circuit. Make sure that all the positive pads will be connected and all the negative pads will be connected.

2

ADD CIRCUIT TO GLASS JAR

Build the circuit on the mason jar in the configuration you like (see "set up" for an example). Use conductive tape to connect the components.



3

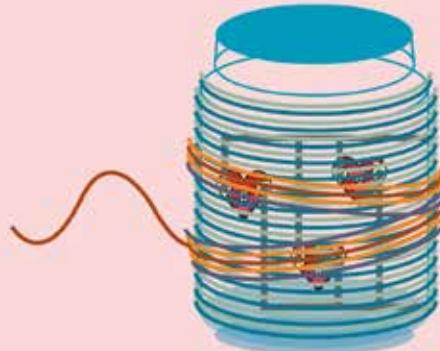
DECORATE YOUR JAR

Decorate the jar with embroidery floss by wrapping the embroidery floss around the jar or knitting a cozy around the jar. Make sure to leave the lights and the battery slot exposed.

**4**

MAKE THE WRAPPING TIGHTER

Continue making embroidery floss tighter and as decorative as you wish.

**5**

TEST OUT YOUR PROJECT

Insert the battery and see the jar light up!

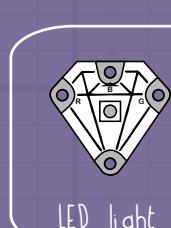
what to do if star LEDS do not light up





Temperature Sensing Coaster

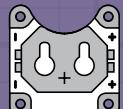
WHAT YOU NEED:



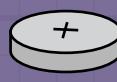
LED light



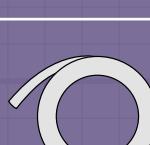
Temperature sensor



Batteryboard



Coincell battery



Conductive tape



ADDITIONAL MATERIALS:

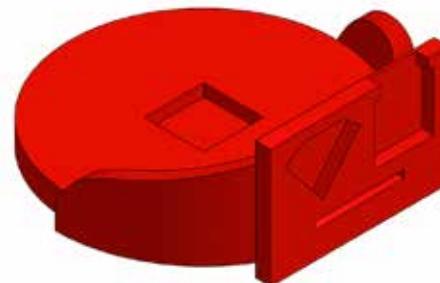


3D printer

1

PREP

Design and 3D print your coaster. Also don't forget to plan out and add designated places for the circuit elements.

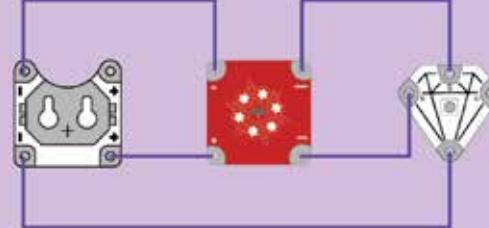


2

TEST YOUR CIRCUIT

Build the circuit with alligator clips and test that the temperature sensor and circuit works properly.

should label the process of connecting the batteryboard, the temperature sensor and the RGB LED



3

PLACE YOUR COMPONENTS

Place the three main components into their respective compartments on the coaster. The components may need to be glued or taped into the compartments.

**4**

CONNECT EVERYTHING

Connect the components using the conductive tape. Use the slit at the bottom of the coaster to connect the temperature sensor to the remaining components.

can also add that the conductive tape should not overlap if they are in different paths.

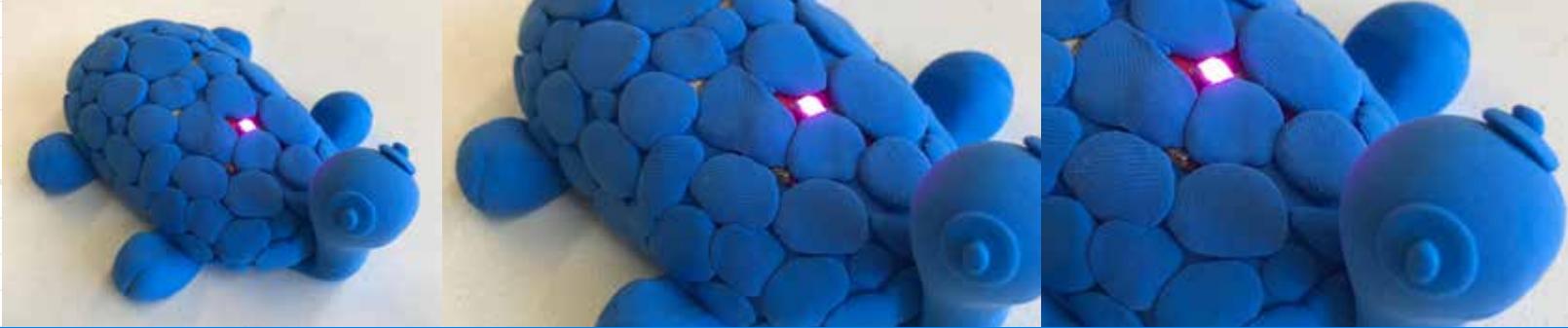
**5**

TEST OUT YOUR PROJECT

Plug in a battery and place something warm on the coaster. You can use a mug with a hot drink like in the photo to the right. The temperature sensor reacts as a switch, which means if you cover the sensor with something warm the diamond LED will light up red! But try out your sensor with something cold as well. In this case diamond LED will light up blue.

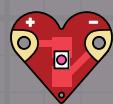
specific things to look out for if LED does not turn on or if it does not turn on when the user wants to



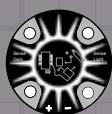


Model Magic Turtle

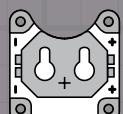
WHAT YOU NEED:



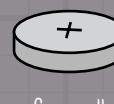
LED light



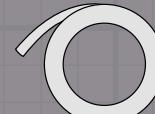
Light Sensor



Batteryboard



Coincell
battery



Conductive tape

x1



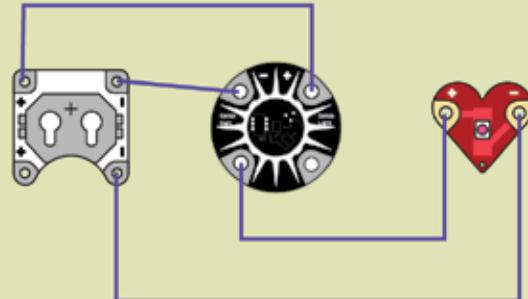
Model magic

ADDITIONAL MATERIALS:

1

PLAN YOUR CIRCUIT

Plan out your circuit using alligator clips. Connect the negative pad of the heart LEDboard to the batteryboard and the positive side of the Heart LEDboard to light sensor. Your batteryboard should have three connections like the picture.



2

BUILD THE BASE

Build a round base of your turtle or another animal of our choosing. Attach the components onto the base of your turtle (or another animal of our choosing). Make sure to place the light sensor face down on the underside of the turtle.



3

CONNECT YOUR CIRCUIT

Connect the circuit using conductive tape.

can state the detailed process of connecting the light sensor with the batteryboard

**4**

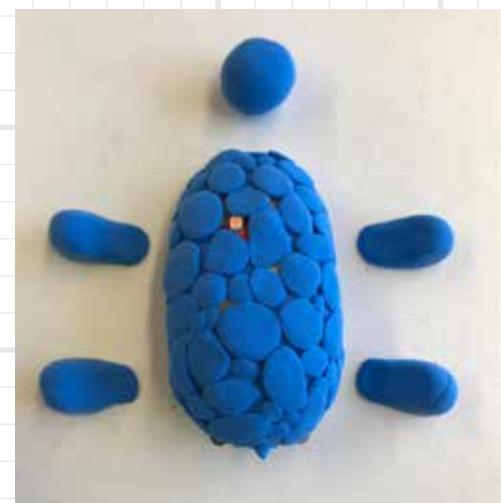
ADD LAYERS

Cover the conductive tape with the shell of the turtle.

**5**

BUILD YOUR ANIMAL

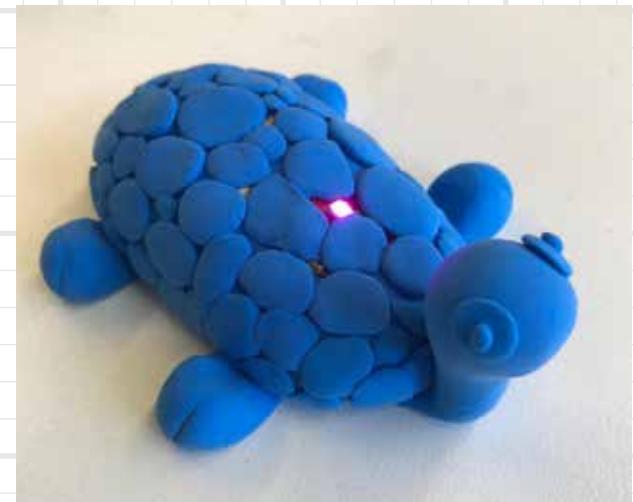
Add the legs, head and tail to the turtle to make it complete.

**6**

TEST OUT YOUR PROJECT

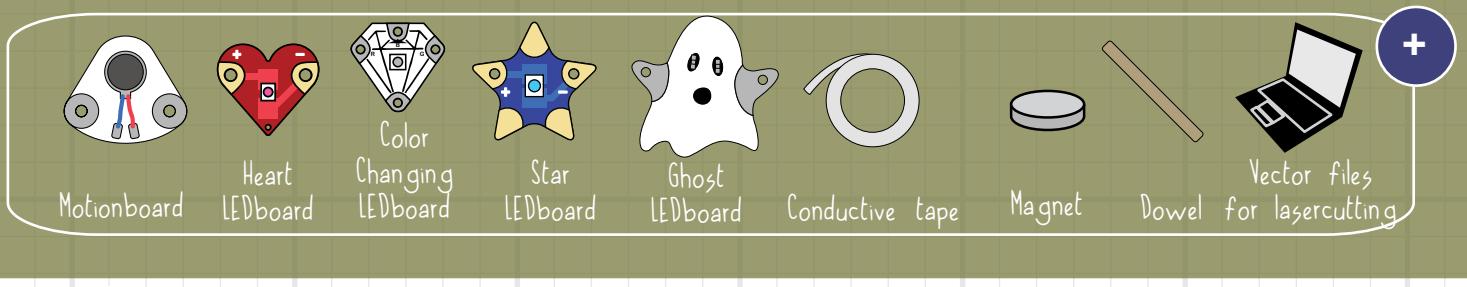
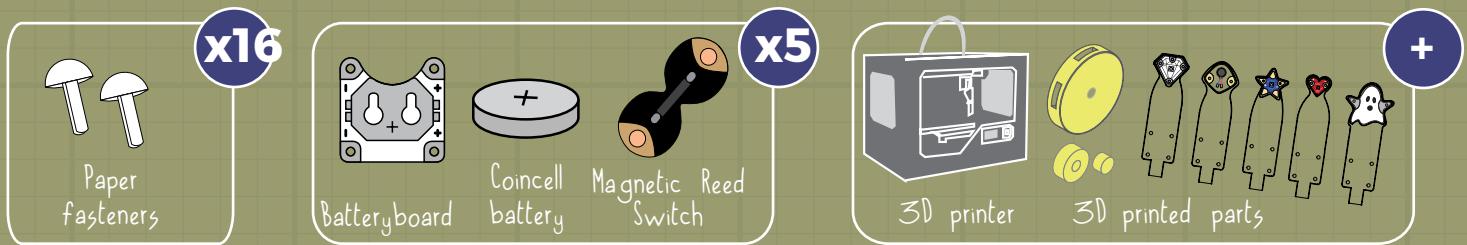
Plug in a battery and place the turtle on the table. The light sensor reacts as a switch, which means if you cover the sensor so it senses dark, the heart LED will light up!

specific things to look out for if heartLED does not turn on



Wheel of LEDs

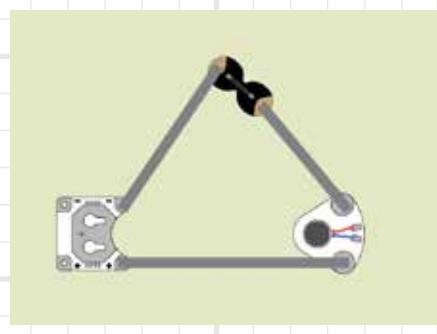
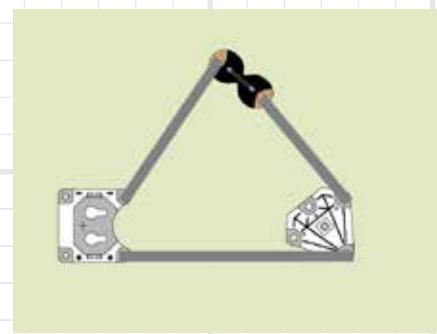
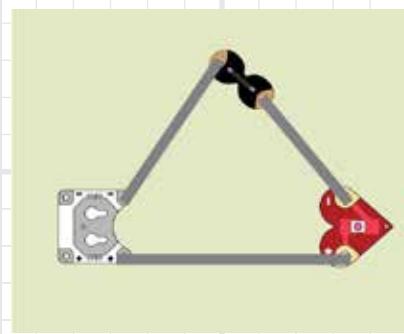
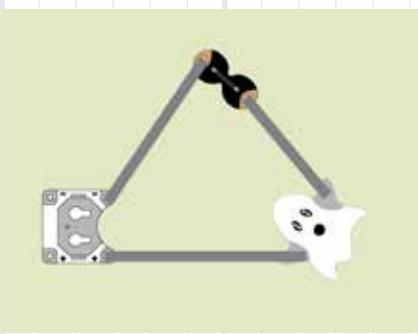
WHAT YOU NEED:



1

PLAN YOUR CIRCUITS

Plan out your circuits using alligator clips. Make sure to connect the negative pads to negative sides of the batteryboard and the positive sides to positive sides of the batteryboard. The sides on magnetic switch are the same.

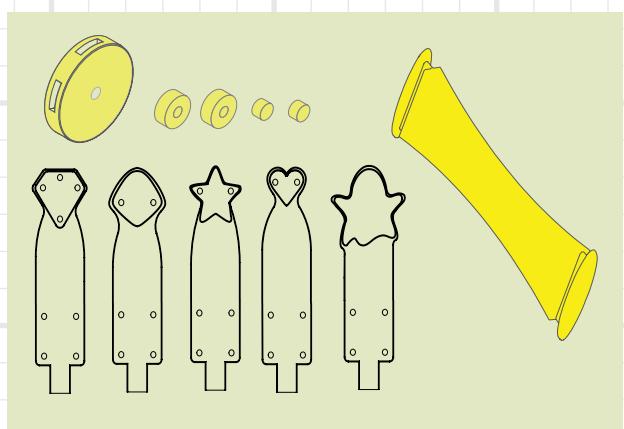


2

3D PRINT THE PARTS

3D print the component holders, wheel holders, the center piece and fixing holders for the stand. You will find all of the files here:

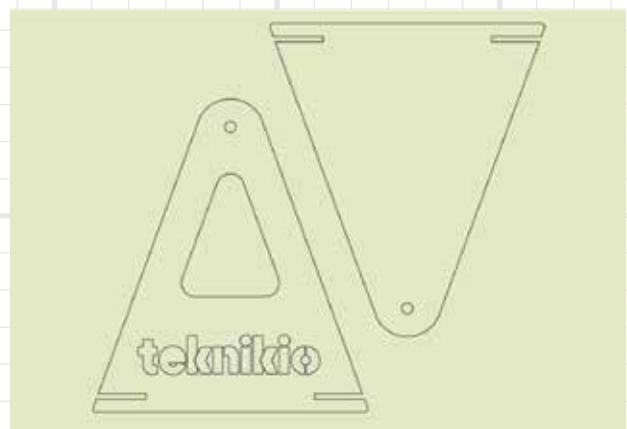
need to put the link here

**3**

LASER CUT THE STAND

Laser cut the stand for the wheel. You can use plexiglass, stronger cardboard or plywood for that. You will find the files here:

need to label the link here

**4**

ATTACH THE CIRCUITS

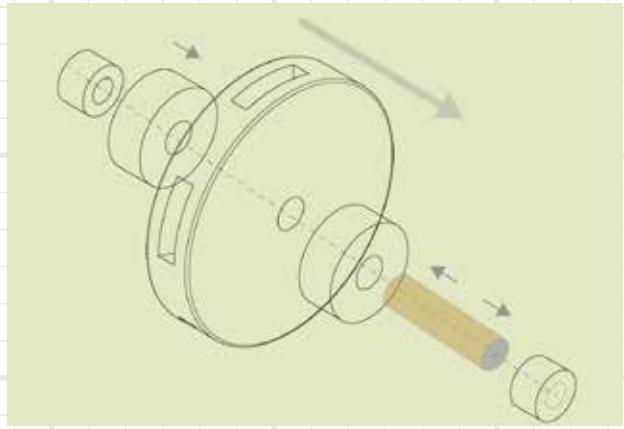
Attach the teknikio boards to each holder and attach the circuits using conductive tape. Make sure to place the magnetic switches at the same spot on each holder.

can have specific steps on
to apply the conductive tape

**5**

ATTACH THE CENTER

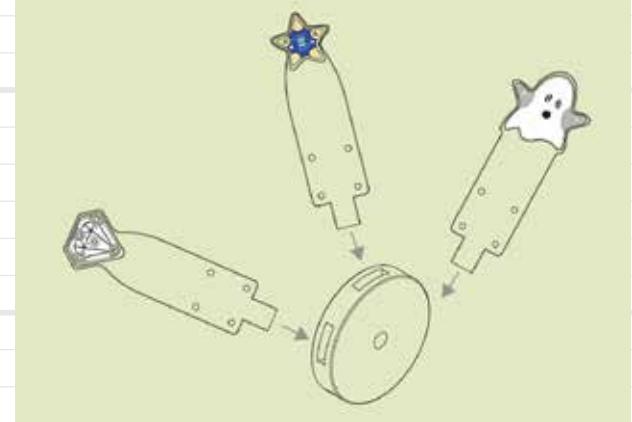
Attach the holder to the centerpiece and push the dowel through the centerpiece hole.



6

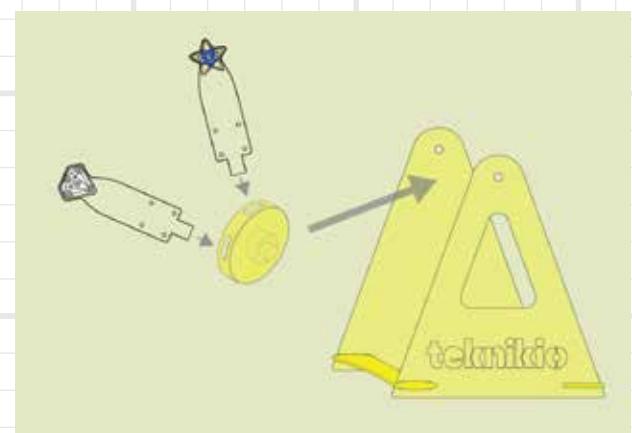
INSERT COMPONENT PIECES

Add the parts with circuits and components to the center piece.

**7**

BUILD YOUR STAND

Place the 3D printed fixing support parts in between the stand pieces and centerpiece wheel onto the holder and put the caps on so that it stays put.

**8**

ATTACH MAGNET

Attach the magnet to the holder in an orientation that will allow each magnetic switch to pass it. Now test out your project.

need an image of attaching the magnet

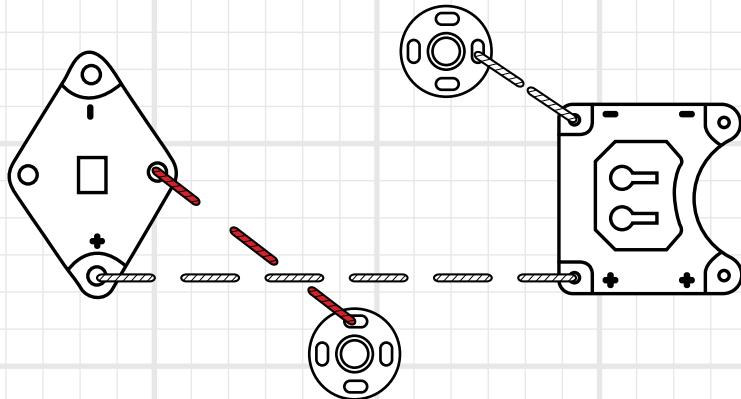


image needs to be attached to a step

