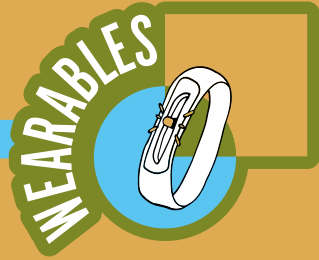


# MAKERKOFFER



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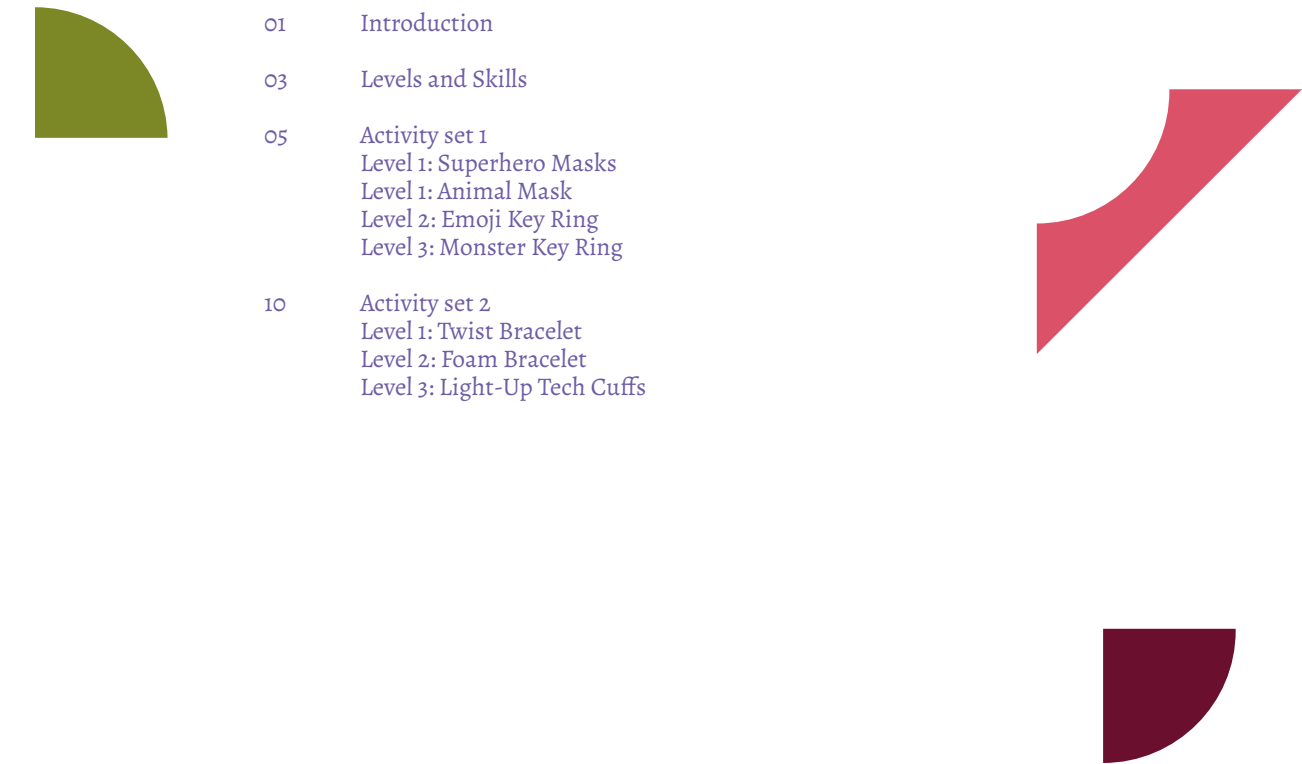


# WEARABLES

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## Content

|    |  |
|----|--|
| 01 | Introduction   |
| 03 | Levels and Skills  |
| 05 | Activity set 1<br>Level 1: Superhero Masks<br>Level 1: Animal Mask<br>Level 2: Emoji Key Ring<br>Level 3: Monster Key Ring |
| 10 | Activity set 2<br>Level 1: Twist Bracelet<br>Level 2: Foam Bracelet<br>Level 3: Light-Up Tech Cuffs                        |



## Introduction

This Makerkoffer contains two sets of activities introducing makers to handling different kinds of fabric, basic hand sewing (in some activities) and ways of integrating electronics in the process – making fashion accessories into trendy wearables.

### Before starting

In order to familiarise yourself and the children with the tools, materials and techniques that will be used, have a look at the description of the tools, the overview of the most common types of fabric and the introduction to hand sewing in this documentation. Have fun discovering the nearly endless variety of possibilities of sewing and fabric!

### The activities

Each of the two activity sets has a focus and contains activities for three levels:

#### Activity set 1 on creating creatures using electronics and fabric:

- Superhero Mask/Animal Mask (Level 1)
- Emoji Key Ring (Level 2)
- Monster Key Ring (Level 3)

#### Activity set 2 on creating bracelets using electronics and fabric:

- Twist Bracelet (Level 1)
- Foam Bracelet (Level 2)
- Light-up Tech Cuffs (Level 3)

Each activity is described on an activity sheet. The sheet contains a list of the materials and tools and detailed instructions for creating the project in question. Each activity (apart from the Twist Bracelet) comes with a printable template. Advanced learners can use the templates for inspiration and develop their own designs.

At each level, learners will develop new skills allowing them to move on to the next one. Level 1 has been developed for absolute beginners, level 2 requires some skill and level 3 is for those who already have previous experience or have mastered the tasks at Level 1 and 2. A detailed description of the skills to be learned at the different levels can be found in the following section.

### Optional

If you want to take it up a notch (and have the possibility), you can also introduce the use of the sewing machine instead of hand sewing.

## Levels and Skills

### Levels in activity set 1

#### Level 1

##### Superhero Masks/Animal Masks

The activity works with big shapes and requires little material, thus making it suitable for beginners and younger kids. Felt fabric is easy to cut and doesn't fringe, so it is an ideal material to introduce the concept of sewing to kids. The templates allow for very easy (cut & glue) crafting projects but can also be mixed and matched to push crafting skills and creativity.

##### Notes:

Use A3 sized felt sheets in different colours: 2-3mm sheets for the base of the mask and 1mm sheets for the decorations. The 3mm sheets are difficult to cut for younger children.

No sewing is required. However, if the focus should be on sewing, the logos and embellishments can also be hand or machine sewn.

A scalpel can be used to cut out the shape for the eyes. The use of a scalpel requires some level of dexterity and experience.

#### Level 2

##### Emoji Key Ring

After learning how to trace and cut fabric with the Mask activity, the Emoji Key Ring activity introduces learners to hand sewing or even embroidering. The smaller pieces push the crafting skills and teach to care for details. This activity gives learners an opportunity to recreate objects and facial shapes they relate to.

There are 3 levels of difficulty for this activity. Based on the ability and experience of the children, choose which template is most appropriate for their level.

- When working with younger children or absolute beginners, try the big emoji template first, the bigger shapes are easier to handle. Instead of a key ring attach a string loop at the top.
- To take things up a notch, use the small emoji template. The smaller facial expressions add difficulty to the activity.
- Level 3: The ghost emoji is the most difficult to trace, cut and sew. Use as much hand embroidery for the facial expression as possible. (In fact, adding embroidery increases the difficulty for every level.)

##### Notes:

You can choose to put the emphasis on the crafting skills or on the sewing skills.

Some of the stitches can be machine sewn instead of hand sewn. Beware of the circles and small details, this is not a beginner's job.

#### Level 2

##### Monster Key Ring

After learning how to cut fabric, use templates, handle sewing tools and easy stitching, this activity combines detailed sewing and an introduction to the electric circuit.

For this project you need the same materials and tools as for the Emoji Key Ring, but you will have to add a few items to integrate the LED push-button. The facial templates are attributed to each figure, but can be mixed and matched.

There are 3 possible levels of difficulty for this activity:

- When working with beginners or younger children, try the big monster template first, the bigger shapes are easier to handle. The facial features can be glued on. Instead of a keyring attach a string loop at the top.
- Make monsters in triangular or oval shapes. Facial features can be sewn on.
- Use the more complicated shapes. Facial features can be sewn on or embroidered. Advanced sewers can design own shapes and designs without using the templates.

##### Notes:

Some of the stitches can be machine sewn instead of hand sewn. Beware of the circles and small details, this is not a beginner's job.

### Levels in activity set 2

#### Level 1

##### Twist Bracelet

This is a very easy activity, with results appealing to young and old. It introduces the concept of upcycling: Collect old neck scarves and jersey garments, like t-shirts and leggings or/and have the children bring old and unwanted clothes from home. They will discover how to reuse old materials in a creative way.

##### Notes:

The bracelets can be made quite quickly, which allows the kids to make more than one - a personalized gift for friends and family.

#### Level 2

##### Foam Bracelet

The project is slightly harder than the Twist Bracelet and takes more time to make. It brings in a tech element: the construction and securing of a battery holder and the possibility to change the battery when it is empty. The project is more or less easy depending on the chosen shapes. However, the construction and securing of the battery holder require some dexterity and basic knowledge about electric circuits.

#### Level 3

##### Light-Up Cuff

This project unites all the crafting, sewing and electronic skills gathered during the other activities in this Makerkoffer. At this level, we add the use of conductive thread and the creation of an on/off switch with a snap button.

### Skills to be learned

- Getting to know the basic sewing tools and existing fabric and materials
- Tracing lines with a ruler
- Using templates
- Measuring body parts and fabric
- Translate measurements to fabric
- Cutting fabric
- Threading needles
- Using pins
- Hand sewing through assembling small pieces
- Basic hand sewing stitches
- Basic embroidery stitches
- Attaching fastenings (elastics, buttons, snaps)
- Understanding the basic electric circuit through the use of battery and LED light
- Understanding the workings of a sewable electric circuit to make an on/off switch

### In case you chose to introduce the sewing machine:

- Threading the sewing machine
- Straight stitch
- Zig Zag stitch
- Back and forth stitch (how to secure a seam)
- Directing the fabric (changing direction while sewing)
- Controlling sewing speed

## Tools and materials

### Tools

#### Paper scissors

#### Fabric scissors

Fabric scissors are heavier and sharper than paper scissors. They have an asymmetrical shape so that you can cut the fabric without having to hold it up. They should not be used to cut paper, as it will make them blunt.

#### Tailoring chalk

Tailoring chalk comes in different shapes: as a block, a wheel or a pencil. It is used to trace the shape of your sewing project on the fabric. The advantage to using a tailoring pen is that it can simply be brushed off when the project is finished – leaving no trace.

#### Sewing needle

Sewing needles come in many sizes: small and thin for cotton thread, long and thin for embroidery floss. For the activities in this Makerkoffer, you might want to have a needle for normal thread and a slightly bigger one for thicker threads.

#### Measuring tape

A sewing tape measure is usually made of flexible material as it is used, for example, to measure waist- or bustlines. For the activities you can also use a sewing tape measure to familiarise yourself with its use, if you do not have one, a normal ruler will do.

#### Sewing pins

Sewing pins are used to attach the templates to the fabric or connect two layers of fabric to keep them in position. For beginners, pins with plastic pearl heads are easier to handle. For some activities you can also use adhesive tape to keep materials in place.

#### Pincushion or magnetic pincushion

A pincushion is used to collect and organise sewing pins. It also makes it easier to get hold of the pins during the process. Making a pincushion is an easy activity to make with kids. Use skills and materials described in Emoji Key Ring activity as a guideline.

#### Printer

You will need a printer to print out the templates for the activities.

#### Optional

- Seam ripper (Découd-vite)
- Hole punch for fabric  
Use to facilitate the hole making for the Superhero Masks or the Monster Key Ring.  
If you wish to offer more wearables activities in the future, you can also get an eyelet setter.
- Sewing Machine

## Materials

#### Sewing thread

Use cotton thread for the activities in this Makerkoffer. Make sure to have a selection of colours ready, including white, black, yellow, blue, red, pink etc.

#### Embroidery floss or wool thread

For some activities, including the Monster Key Ring, different threads can be used. Make sure that the holes in the needles you want to use are big enough for the decorative thread.

#### Fabric

All the activities including fabric can be made with felt fabric. It is sold as sheets (A4 or A3) or on a roll. You will need thin sheets (1mm) and thick sheets (2mm to 3mm). Make sure to have a wide range of colours.

Expert tip: buy in bulk for a bigger selection and better price.

The Twist Bracelet is the only activity introducing fabrics other than felt. You can use this activity to introduce and explain the difference between various fabrics using the introduction to fabrics.

#### Elastic band

#### Buttons

#### Snap buttons

#### Padding

#### Optional

#### Textile glue

Expert tip: Textile glue often doesn't work well and it needs a whole night to dry, bear this in mind if you plan to use it for a workshop.

## Introduction to fabrics

When you introduce the different fabrics to children, you might want to have samples ready that they can relate to and touch. Let them describe and identify differences by themselves. When going over the different fabrics, you can also ask the group, if they can think of what they are used for.

#### Jersey

Used for: pyjamas, t-shirts, baby clothes or leggings...  
Properties: lightweight, breathable, stretch, natural fibre.  
Advantages: comfortable to wear, washable with hot water, doesn't fray.  
Disadvantage: difficult to machine sew.

#### Cotton

Used for: shirts, trousers, bed sheets or tablecloths...  
Properties: lightweight (shirts), heavyweight (trousers, tablecloths), breathable, natural fibre.  
Advantages: comfortable, easy to dye, washable with hot water.  
Disadvantage: frays.

#### Wool

Used for: scarves, jumpers, coats, blankets...  
Properties: soft, warm, fire resistant, natural fibres, made from sheep coat.  
Advantages: keeps warm, easy to dye, natural fibres, easy to sew and knit, doesn't fray.  
Disadvantages: scratches the skin, allergies, cold wash or hand wash.

Expert knowledge: From the 16th century up to the 1980s, a lot of wool was produced in Luxembourg. (patrimoine industriel luxembourgeois: Duchfabrik, Larochette - for example Famille Ginter)

#### Silk

Used for: neck scarves, blouses, dresses...  
Properties: very soft, high resistance to deformation, strongest natural fibre available, made by silkworms.  
Advantages: comfortable to wear, warm in winter and cool in summer, easy to dye, shimmers and shines.  
Disadvantages: very difficult to sew, cold wash or hand wash.

#### Polyester

Used for: sportswear, raincoats, safety belts, tire reinforcements...  
Properties: synthetic fibre made through chemical process, very resistant, water repellent.

Advantages: wrinkle resistant, hot wash, quick dry.

Disadvantages: not very breathable on the skin, requires more than double the energy of conventional cotton to produce. The production of polyester uses harmful chemicals which, if emitted to water and air untreated, can cause significant environmental damage.

## Techniques

#### Threading the needle

Insert the thread you would like to use through the hole in the needle and make a knot in one end of the thread. Now you're ready to go!

#### Straight Stitch

The straight stitch is the easiest stitch, it looks like a dotted line: - - - -. It is used to join two pieces of fabric together.

#### Instructions:

1. Starting from the underside of the fabric, stick the needle with the tread into the fabric and bring it up. Pull it all the way until the knot tugs.
2. A bit further along push the needle down through the fabric.
3. To secure the stitching, make a double stitch at the beginning (and at the end), where you do one stitch on top of the other.
4. Continue the process, up and down, until all the stitches have been done.
5. Secure the stitching with a double stitch.

#### Blanket Stitch

The blanket stitch is an embroidery stitch used to decorate fabric edges. It works really well with felt. The blanket stitch is easiest to work from left to right (if you are right-handed).

#### Instructions:

1. Insert the needle with the thread through the fabric very near the edge and make a tiny stitch.
2. Imagine a line running parallel to the edge of the fabric (or draw it with tailor's chalk).
3. Bring the thread forward from the back of the fabric and insert it downward into the fabric on the imaginary line.
4. Loop the thread under the needle point, then pull it through completely.
5. Repeat this process along the edge of the fabric. Secure with a knot at the end.

#### Backstitch

The backstitch is used to sew pieces of fabric together. It is stronger than the straight stitch.

#### Instructions:

1. Insert the needle from the back of the fabric and make a small stitch backwards.
2. From the back of the fabric bring the needle out to the front again, in front of your first insertion point.
3. Go back again and insert the needle downward at your first insertion point.
4. Bring the needle forward again in front of the second stitch, making a new gap.
5. Repeat the steps 1 to 4 until you are done. Secure the sewing with a double stitch (no going ahead with the needle here).

#### Overstitch

The overstitch is very easy. It can be used instead of the straight or blanketstitch to join two pieces of fabric together. It is also used to close gaps in stuffed toys or pillows.

#### Instructions:

1. Hide your knot by putting the needle in between the two layers of fabric and bring it out where you want your stitching to start.
2. Loop around the edge and bring the needle in through the two layers of fabric.
3. Bring the needle back out at the same spot. Repeat this for the first stitch.
4. For the next stitch move your needle a bit further along and make another loop.
5. Continue and secure the sewing with a double stitch at the end.

#### Slipstitch

The slipstitch is used to close gaps in stuffed toys or pillows very neatly.

#### Instructions:

1. Start at the edge of the gap and hide your knot by putting the needle in between the two layers of fabric and to the outside.
2. Make a double stitch to start with.
3. Insert the needle from the inside into the other layer of fabric.
4. Move the needle from the outside and bring it in again, from the inside, into the first layer of fabric.
5. Continue this zigzag movement until you are done and secure with a double stitch.

Source: Alison McNicol, My First Hand Sewing Book: Learn To Sew: Kids, CreateSpace Independent Publishing Platform, 2010.





## Activity set 1

### Superhero Masks (Level 1)

#### Description:

Make your own superhero mask with felt fabric! You can either use one of the templates to create your favourite superhero mask (Batman, Spiderman, Wonderwoman,...) or, if you feel creative, invent your own superhero design!

Time: 2 hours

#### Materials:

- Superhero mask templates printed on paper
- Superhero mask deco templates printed on paper
- Felt fabric sheets (2-3mm sheets for the base of the mask and 1mm sheets for the decorations)
- Elastic band (try out the right length on your head before cutting)
- Glue (fabric glue or all-purpose liquid glue)
- Pins (or thin masking tape, if using pins is too difficult)

#### Optional:

Sewing thread. You can either hand sew the elastic band to the mask or punch holes and make knots.

#### Tools:

- Tailoring chalk or pen
- Fabric Scissors
- Paper Scissors
- Printer

#### Optional:

- Sewing needle
- Scalpel (if you have used one before)

#### Instructions

1) Choose the superhero mask base and deco you wish to use and print the corresponding templates.

Optional: You can also use the 'freestyle deco' templates to design your own version of the superhero mask.

2) Cut out the paper templates with paper scissors. Use a scalpel for the eyes, but only if you are comfortable and experienced using one.



3) Choose the colour of the felt fabric for the base of the mask (at least 2mm thick).

4) Tape or pin the paper template of the mask base to the felt fabric and trace around the edges and eyes with the tailor's chalk. Make sure to also mark the side holes, where the elastic band will be attached later.

5) Remove the paper and cut the base out, using fabric scissors. If you are comfortable with a scalpel, you can use it to cut the space for the eyes.

Optional: If you want to attach the elastic band by making a knot, now is the best time to cut or punch a hole on each side of the mask. If you want to sew the elastic band on, do not make holes, but mark the spots with chalk or a pen.)

6) Repeat the process with the deco templates.

7) To make your own name logo, use a letter from the ABC template and 1-2 different sized logo bases. Cut out in felt and superpose. Adapt the size and shape if necessary.

8) If your name design requires more 'deco' than the superhero logo, you can use the freestyle deco template for the eyes or add stars or wings to the sides.

9) Arrange the pieces you have cut out on the mask. Make sure the eye holes are aligned if you use eye decorations, in order to maintain fair sight when wearing the mask.

10) Now glue every piece as neatly as you can and let the glue dry for a few minutes.

11) Attach the elastic band to the sides of the mask. If you made holes earlier, you can pull the elastic band through and make a knot on both ends. (Keep in mind, that if you are making knots, you need a piece of elastic that is a bit longer.)

Ready to save the world!



### Animal Mask (Beginner)

#### Description:

The animal mask is a variation of the superhero mask. It is also done with felt fabric, but you get to become a fox or wolf. Get creative with the colours!

Time: 2 hours

#### Materials:

- Mask templates printed on paper:
  - Narrow straight superhero template (number 1)
  - Outlines of finished mask with numbered and marked layers.
  - Numbered facial patterns
- Felt fabric sheets (different colours, 3 mm for the mask base and 1 mm for the other layers)
- Elastic band (try out the right length on your head before cutting the band)
- Glue (fabric glue or all-purpose liquid glue)
- Thin masking tape

#### Optional:

Sewing thread. You can either hand sew the elastic band to the mask or punch holes and make knots.

#### Tools:

- Tailoring chalk or pen
- Fabric Scissors
- Paper Scissors
- Printer

#### Optional:

- Sewing needle
- Scalpel (if you have used one before)

#### Instructions

1) For the base of the mask, print the narrow straight superhero template (number 1) and the two animal mask templates (completed outlines + face patterns puzzle).

2) Cut out the paper face patterns and check how to superpose them on the base mask using the numbers indicated and the completed outline template as a guide.

3) Choose the colours of your fox or wolf.

4) With the masking tape or pins, attach the templates to the felt sheets you have chosen and trace around with chalk.

5) Remove the paper templates and cut out from felt sheets, using fabric scissors.

6) Assemble the puzzle pieces onto the mask base, making sure they are in the right order.

- 1- Upper face and ears
- 2- Beard x2
- 3- Eyebrows and nose
- 4- Inner ears x2
- 5- Small nose

7) Now carefully glue all the layers together.

8) Sew the elastic band on or pull through the holes and make knots.

Put on your mask and go wild!



## Emoji Key Ring (Level 2)

### Description

Learn basic hand sewing and embroidery by make a real life emoji with felt fabric to accompany your key!

Time: 2 hours

### Materials

- Printing paper
- 1-2mm felt sheets (yellow, black, white, red, pink, blue)
- Yellow and black thread (Cotton, mending or wool thread)
- Glue
- Key ring
- Padding

### Tools

- Printer
- Paper scissors
- Pen or tailor's chalk
- Fabric scissors
- Sewing needle

### Instructions

1) Prepare your tools and materials:

- Print the emoji templates
- Choose the felt sheets you want to use
- If necessary, have the basic hand sewing instructions by your side.

2) Cut out the emoji template you want to use.

3) Lay the template onto a double layer of felt fabric, pin it, trace it and cut it out. Now you should have two identical emoji body shapes. Put one layer aside and carry on working on the other one.

4) Now the facial features: You can use the template with the facial expressions as a guideline or as actual patterns, that is up to you. Trace and cut the facial features out of the felt sheets.

Tip: If you want your emoji to really look like the one on your phone, make sure to respect the emoji colour codes (black eyes, red tongue etc...).

5) Attach the facial features to the body of your emoji. They can be sewn or glued on, depending on what level of difficulty you choose.

Take your time and try out different stitches. For example, some of the facial expressions could be embroidered instead of cut out in felt.

6) When your emoji face on the top layer is done, take the second layer of your emoji body and pin both layers together.

7) Hand sew along the edge, leaving about 3 cm open at the top. Tipp: See our basic hand sewing tutorial section, on getting tips for the different stitches.

8) Fill the emoji body with the padding through the gap at the top, do not fill in too much.

9) Cut out a stripe of felt fabric (1cm x 3cm) and fold it in two, creating a small loop.

10) Place this loop between the two body layers and close the gap with a pin. Now you can sew the last 3 cm of the body.

11) Put the key ring through the loop you attached to the top of the emoji.

Your emoji key ring is finished!



## Monster Key Ring (Level 3)

### Description

The monster keyring introduces you to hand sewing and one of the many uses of LEDs. You can create a little monster to accompany your keys and light in the dark.

Time: 3 hours

### Materials:

- Printing paper
- 1 mm felt sheets (any colours you like, make sure you have black and white, if you wish to use them for the eye(s) and teeth)
- Different types of thread (cotton, mending or wool thread)
- Glue
- Key ring
- Padding
- LED
- Coin battery
- Small square of crafting foam (1,5 cm x 1,5 cm)
- Tape

### Tools:

- Printer
- Paper scissors
- Pen or tailor's chalk
- Fabric scissors
- Sewing needle
- (Hole punch)

### Instructions

1) Prepare your tools and materials:

- Print out the monster templates.
- Choose your felt sheets (Don't forget black and white, if you want to use them for the eyes and teeth).
- Cut out a small square of crafting foam (1,5 cm x 1,5 cm).
- Make sure your LED light is working.

...for the push-button LED

2) Use the scissors to make a hole in the middle of the crafting foam square (or use a hole punch and punch the hole 2 or 3 times).

3) Put the coin battery between the two LED leads (+ on + and - on -).

4) Insert the crafting foam square between one of the LED leads and the coin battery. Push the LED lead down, so that it touches the battery again. Make sure the hole is big enough, so that you don't have to push too hard for the LED to light up.

5) Put a strip of tape around the coin battery to keep the LED leads in place.

6) Pull the LED upwards in a 45 degree angle, bending the leads. Check if your LED lights up when you push the battery.

TADA! The push-button is done!







...for the monster key ring:

7) Choose a monster shape from the template and cut it out.

8) Lay the template onto a double layer of felt fabric. Pin it to the fabric using sewing pins, then trace it with the chalk or a pen and cut it out. You now have two identical monster shapes.

9) Start designing the face of your monster. The template with the facial expressions can be used for inspiration or as actual patterns, that is up to you. Cut out the facial features (eye(s), mouth, teeth, ears etc...) of felt sheets, use different colours for a popping result.

10) Attach those features to one of the monster shapes.

11) Determine where your LED light shall be placed and make a little hole in the fabric, where the LED should go through. To make a neat hole, the best way is to make 2 little cuts, which cross each other with sharp fabric scissors.

Optional: Before inserting the LED light, you may want to hand sew a little cross, indicating where exactly to push the button for the LED to light up.

12) Now you are ready to insert the LED light through the hole, keeping it in place with your fingers.

13) Take the second layer of your monster's body and pin it to the decorated top layer, sandwiching the push-button between the two layers of felt.

14) Hand sew along the edge, leaving about 3 cm open to slide the padding in.

15) Once the padding is inside the monster (helping the push-button to keep in place), pin and sew the remaining open section.

16) With a thick thread, sew the keyring to the top of your little monster.

**DONE!**



## Activity set 2

### Twist bracelet (Level 1)

#### Description

Stylish bracelet made from used fabric. How about making more than one and offering it to your friends or family as a present?

Time: 1 hour

#### Materials:

- Used neck scarves or jersey t-shirts and leggings
- Cotton thread
- Button
- Rubber elastic band

#### Tools:

- Fabric scissors
- Sewing needle
- Clamp (optional)
- Pins (optional)

#### Instructions

1) Cut a long rectangle of fabric, sized about 35cm x 8cm.

2) Attach one end of the fabric rectangle to the table using a clamp or team up with a partner, who holds one end of the fabric firmly in his hands.

3) Hold on to the other end of the fabric and twist it until tight all the way.

4) Without releasing the clamped end, fold the twisted fabric in two. The fabric will braid itself.

5) Hold the two ends of the fabric firmly with one hand and secure the twist by wrapping a rubber elastic band around the edges. By now, one end of the twisted braid should be secured with the rubber band and the other end naturally form a loop. This loop will be the button hole used to fasten the finished bracelet.

6) Hold the twisted fabric around your wrist and measure the length it should have. Mark the right length with a pin or measure it with a ruler or measuring tape.





7) Cut the extra fabric off.  
 Tip: Don't remove or cut the rubber band off, otherwise the twist will release itself and you will have to start again.

8) Thread a sewing needle with cotton thread and make a knot in one end of the thread.

9) Start sewing through the fabric where the button shall be placed later.

10) Make a few stitches to secure the thread, then roll the thread a few times around the bracelet end and secure with a few stitches.

11) Remove the rubber band.

12) Thread your needle again and start sewing the button to the bracelet, where you already secured and rolled the previous thread around the fabric.

13) To sew on the button, make a knot with both ends of your thread and sew 4 to 6 times through the holes of the button and through the fabric. Then roll the thread a couple of times around the thread going in and out of the buttonholes, to allow some space for the bracelet end loop to comfortably sit underneath the button when the bracelet is fastened. Make a few stitches going back and forth on the same spot to secure the thread. Cut off the remaining thread.

Your bracelet is ready to be worn!



## Foam bracelet (Level 2)

### Description

This project shows how to craft a fashionable bracelet made of crafting foam. The integrated LED light powered by a battery (in a specially made battery holder) makes it into a luminous accessory.

Time: 2 hours

### Materials:

- Printing paper
- Template
- Crafting foam
- Double-sided tape
- Liquid glue
- Copper tape (optional)
- Self-adhesive velcro tabs
- Adhesive tape
- Coin battery
- LED light

(All materials should be available for purchase at your local hardware store, except LED lights which can easily be found online.)

### Tools:

- Printer
- Scissors
- Pen
- Ruler or measuring tape

### Instructions for ... the bracelet:

- 1) Prepare your materials and tools:
  - Print the templates for the bracelet and the ornamental shapes
  - Cut 2 strips of double-sided tape:
    - 1) 1,5cm x 2 cm and
    - 2) 2,5cm x 2cm
  - Cut out 2 extra pieces of foam for the battery holder:
    - 1) 2 cm x 6 cm
    - 2) 2,5 cm x 6 cm
  - Make sure your LED light works before starting to craft the bracelet.
  - Choose the colour of foam you would like to use. You might want to use different colours, to get a more popping effect.
- 2) Choose your size among the bracelet templates and cut it out. The same goes for the ornamental shapes: select 1 or 2 that you would like to use for your bracelet and cut them out.







- 3) Put the templates on the foam and copy their shape by drawing around them with a pen.
- 4) Cut out the shapes you've drawn and glue them one on top of the other.
- 5) Take the LED light, place it in the middle of the ornament and push it through the 2 (or 3) layers of foam.
- 6) Fold out the leads to each side on the back of the foam strip and mark where + and - is, so you will remember where they are later. Place a strip of double-sided tape (1,5cm x 2cm) over the leads (but leave the top layer of the tape covered).

...the battery holder:

- 7) Place the pre-cut rectangular foam piece (2 cm x 6 cm) vertically on the double-sided tape strip that you just attached, fold the minus-lead (-) over and push it down flat.
- 8) Cut 2 cm of copper tape and place it on the folded lead (optional), then fold over the other lead (+).

- 9) Place the - side of the battery on the - lead and fold the + lead over the + side of the battery. Push down flat.
- 10) Check if the LED is working. If it does, fold the foam piece over the battery, so as to create a battery holder.
- 11) To keep the battery holder in place, use the remaining tape strip (2,5cm x 2 cm) and put it next to the battery holder, where you have marked the plus sign earlier.
- 12) Glue the Velcro tabs to the other side of the battery holder (-).
- 13) Place the second pre-cut rectangular foam piece (2,5 cm x 6 cm) horizontally over the battery holder. Fixate one end on the tape and the other with the second part of the Velcro tab. The Velcro tab allows you to easily change the battery when it is empty or to take the battery out, if you wish the LED light to turn off.

Light away!



## Light-Up Tech Cuffs (Level 3)

### Description

Take a step further in the making of tech wearables. With this activity you get to use one or more LEDs to light up your bracelet and you can integrate an on/off switch to the snap button. Your cuff will light up when the snap is closed and go out when it is open. To make it even more of a challenge, you will learn how to use conductive thread or wire to learn about the sewable circuit.

Once you know how it works, try a design of your own, mixing and matching more colours and layers.

### Materials:

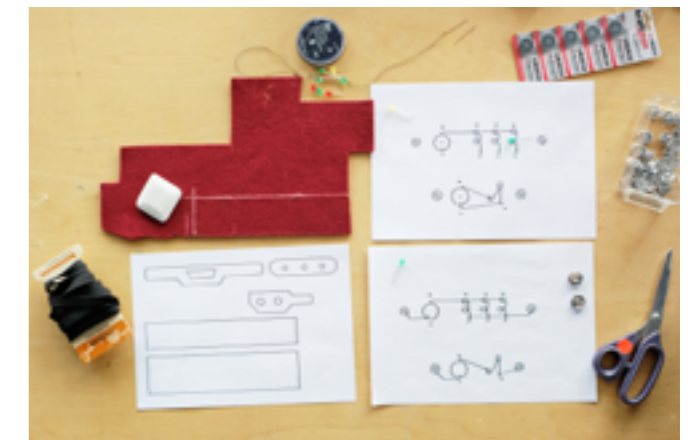
- Felt fabric (A4 or A3 sheets) 2mm - 3mm
- Felt fabric (A4 or A3 sheets) 1mm
- Printing paper (for template)
- Circuit diagram (simple closed circuit diagram or snap button as on/off switch circuit diagram)
- Conductive thread (or very thin Copper Wire)
- Sewing thread
- Mending or wool thread
- LEDs
- Coin Battery
- Metal snap button
- Tape
- Elastic band (1cm width)
- Pins (optional)

### Tools

- Printer
- Pliers
- Paper scissors
- Fabric scissors
- Sewing needles (1 thin needle for sewing thread & 1 thick needle for deco wool thread)
- Tailor's chalk or pen
- Ruler
- Measuring tape
- Scalpel (optional)

### Instructions for ... ... the bracelet:

- 1) Prepare your tools and materials
- 2) Measure your wrist and add 2,5 cm to that value. (f. ex: 18 cm + 2,5 cm = 20,5 cm). This will be the length of your bracelet.
- 3) Choose the width of your bracelet. Tipp: 5 cm is a good width, as it allows for enough space to sew the + and - circuit without the threads touching or crossing. This would result in a short-circuit.
- 4) Trace the length and width of the bracelet on a felt sheet (2-3mm, colour of your choosing), using tailor's chalk and a ruler. The obtained rectangle will be the base of your bracelet.





5) Think about how many LEDs you wish to install on your bracelet and where they should be. Mark the emplacements with tailor's chalk.

6) Optional: If you want to add decorations to the bracelet to cover the conductive thread, choose a template or design your own decoration.

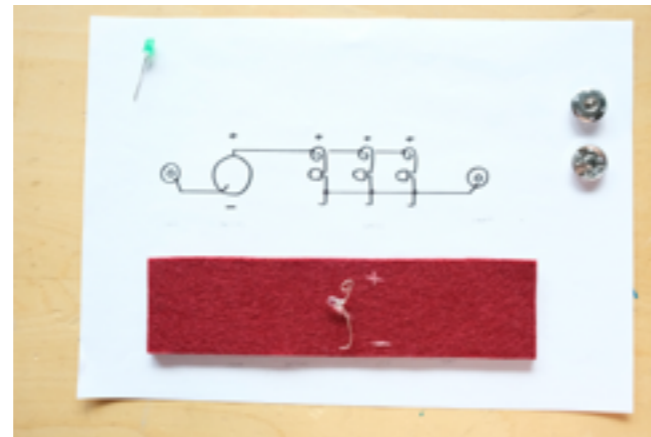
- If you choose to decorate the bracelet, cut out the paper template using paper scissors or a scalpel.
- Pin or tape the paper template to a felt sheet (1mm, colour of your choosing) trace around the edges using tailor's chalk and cut out using fabric scissors. If you are comfortable using a scalpel, cut the inside opening with it for a neat finish.
- Make sure the felt deco piece opening matches with where you decided to place the LEDs on the bracelet.



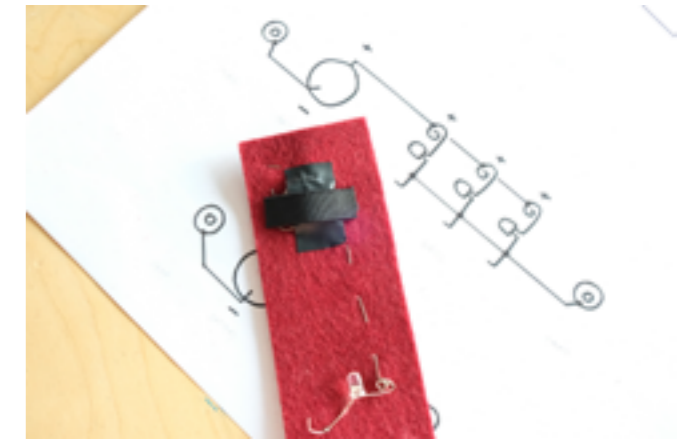
... the sewable circuit:

7) Make sure all your LEDs and battery are functioning, before starting to work with them.

8) Before sewing the LEDs, use pliers to bend the legs of the LEDs out to each side and twist them into spirals. Make sure to mark or remember the - and + legs. You can for example curl them in different ways, so that you recognize easily which are positive and which are negative.



9) Place your LEDs onto the bracelet and connect + legs with + legs and - legs with - legs using conductive thread. The thread must also touch the battery on both sides, connecting the - chain to the - side of the battery and the + chain to the + side of the battery. Tipp: See simple closed-circuit diagram.



10) To attach the battery, sew a small piece of elastic band over the start of your circuit.

12) Secure the snap button with cotton thread.

11) If you are making a bracelet with a simple closed circuit, simply make a thick knot at the end of your conductive thread, place it on the top side of the battery and use tape to secure the connection.

13) Close the snap and see if your circuit works.

... decorating the bracelet:

If you wish to use the snap button as an on/off switch, use the corresponding circuit diagram as a guide. Snapping the snaps together closes the circuit and lights the LEDs.

14) Once your bracelet lights up and your sewable circuit is in place, add your pre-cut felt decoration by sewing it to the bracelet with decorative mending or wool thread using a thick needle.

Your Light-up Cuff is finished!

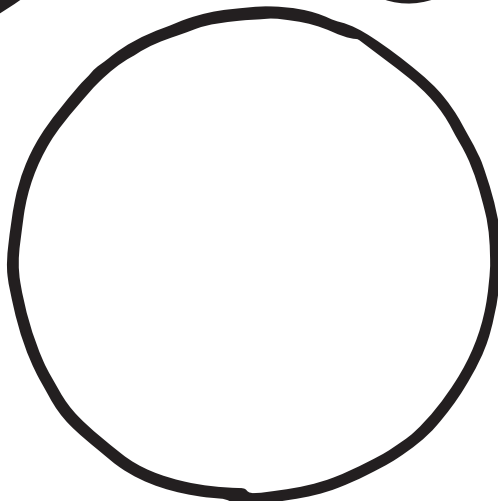
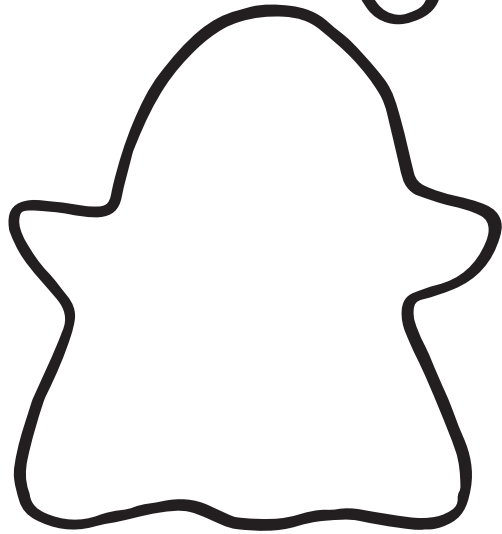
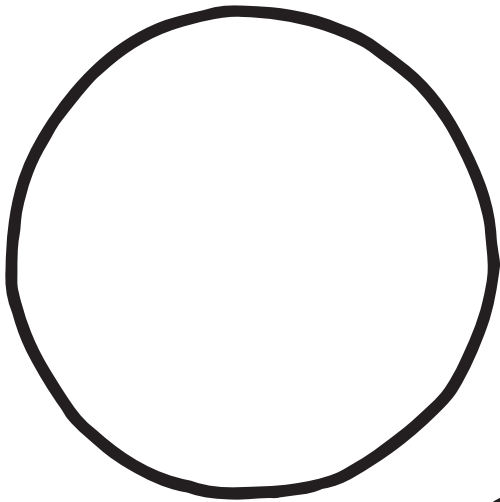
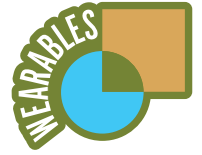
Tipp: Be careful not to cross the + and - lines, as this will "short" the circuit, providing an easier way for the electricity to travel, and your LEDs will not light up.



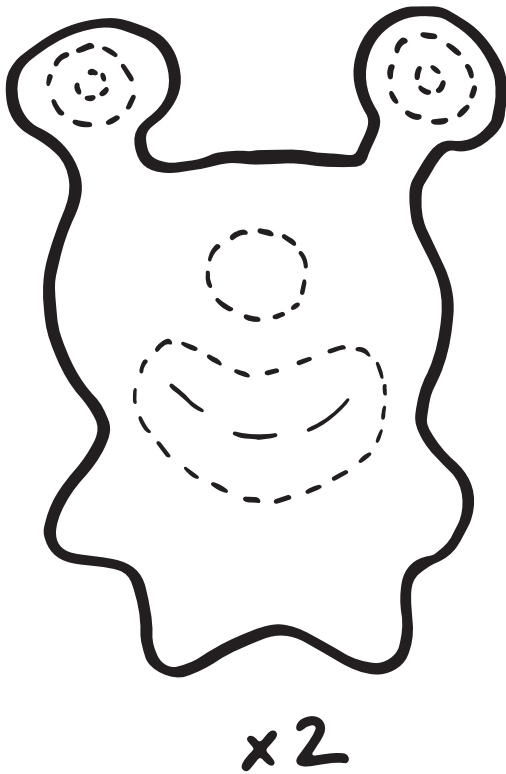
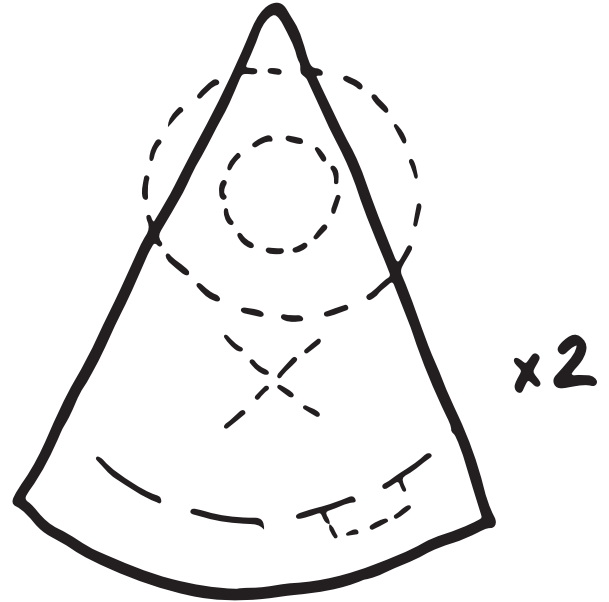
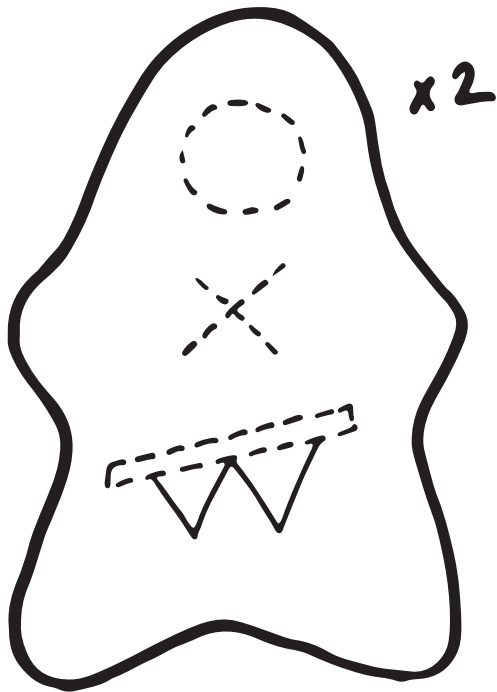




EMOJI TEMPLATE

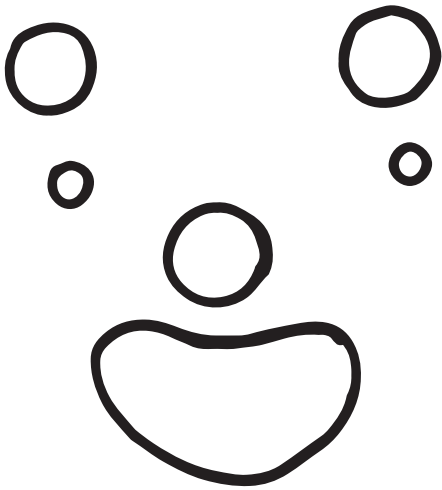
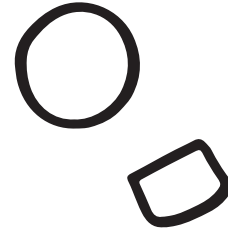
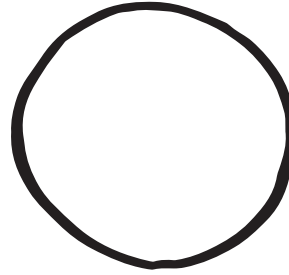
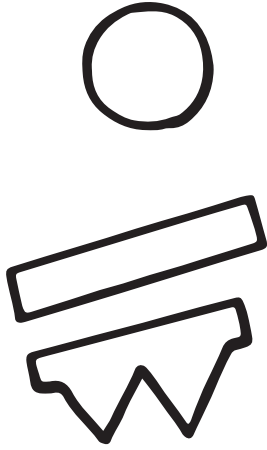
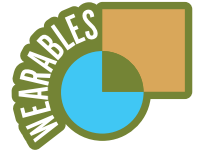








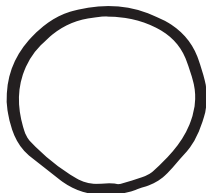
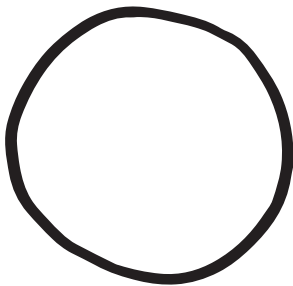
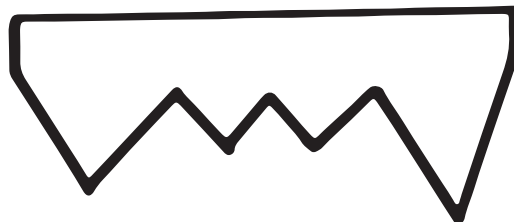
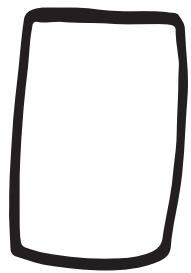
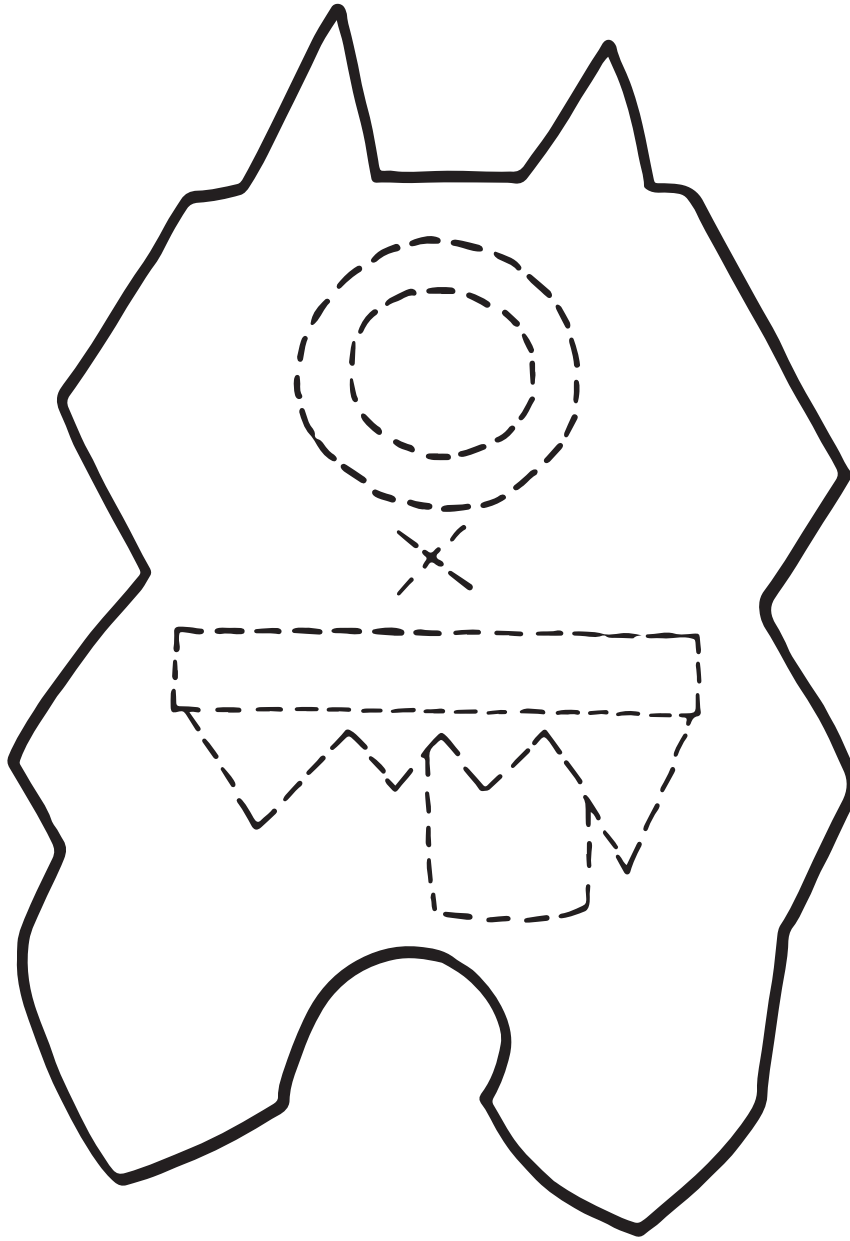
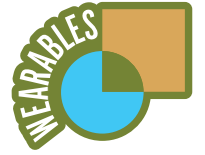
MONSTERS FACES SMALL 2 TEMPLATE





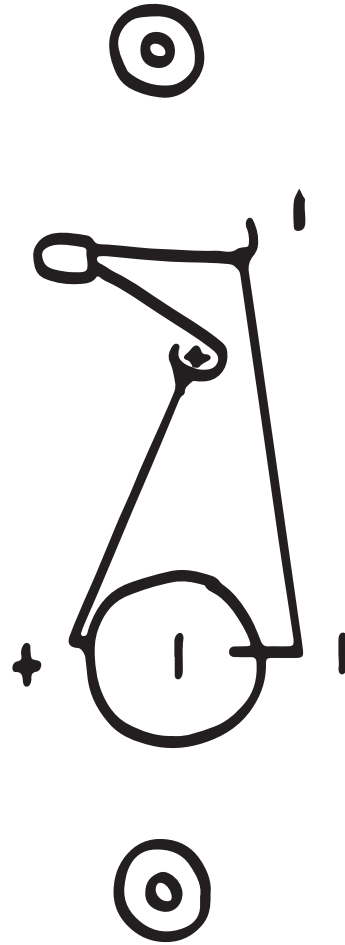
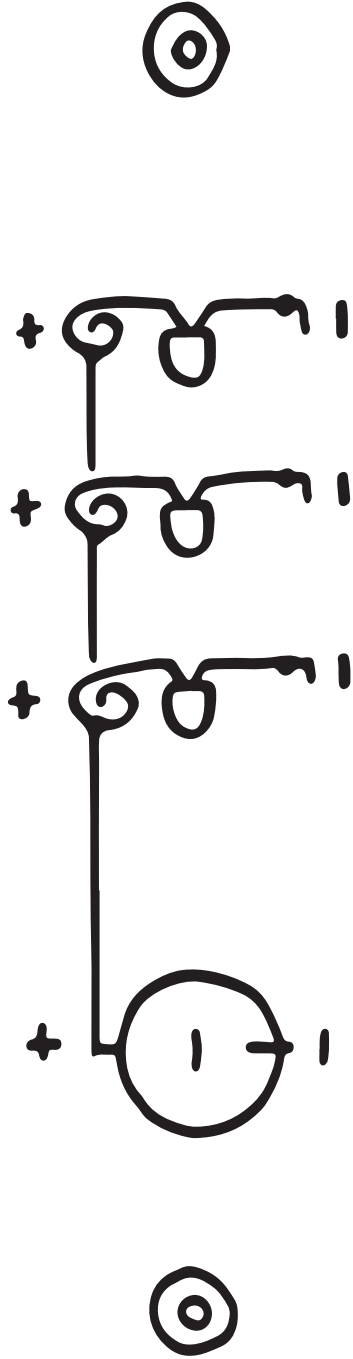
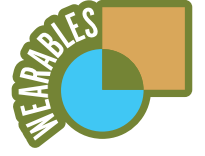


MONSTER BIG TEMPLATE

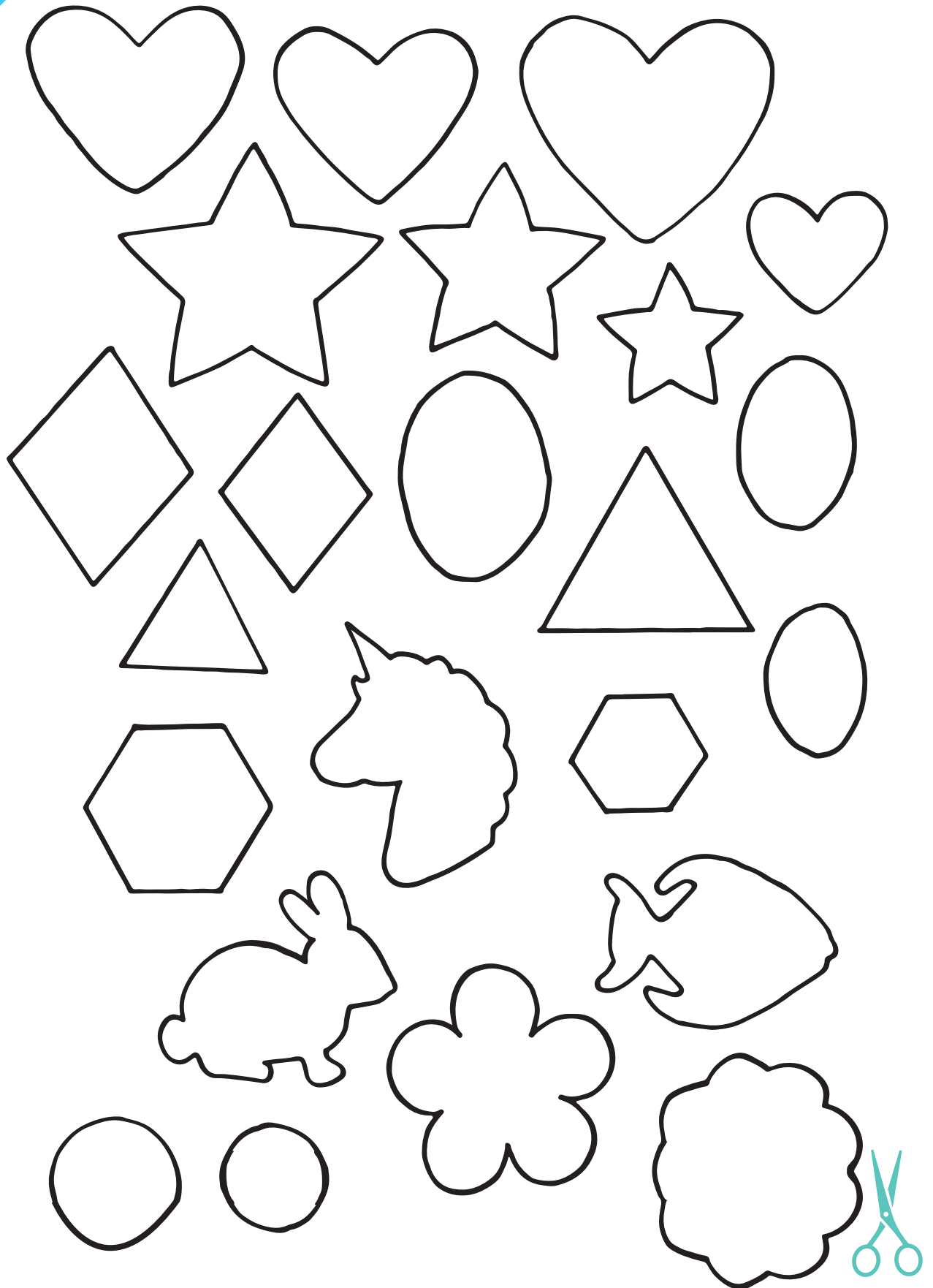




SEWABLE CIRCUIT SIMPLE

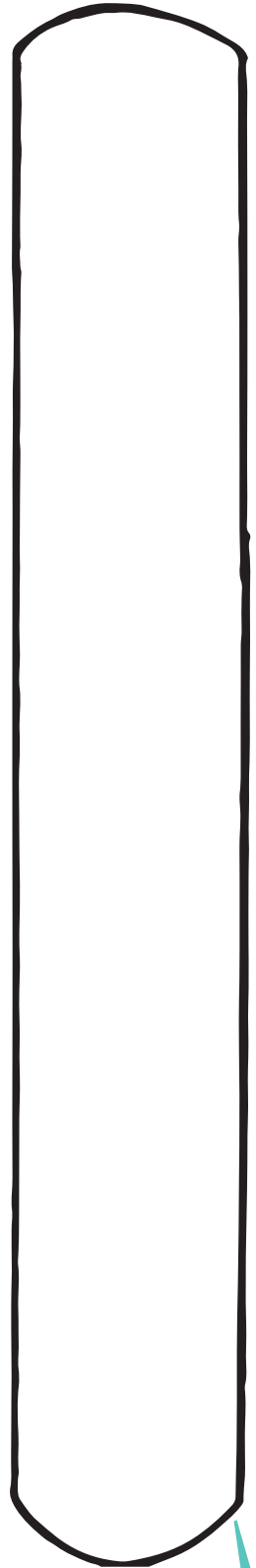
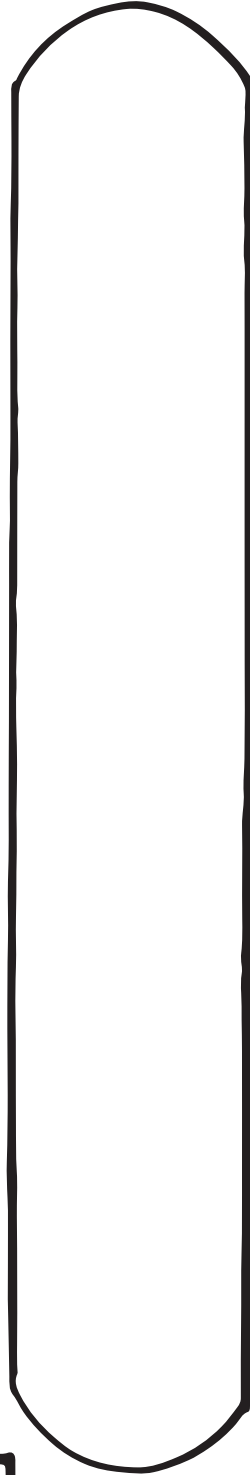
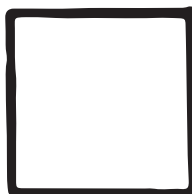
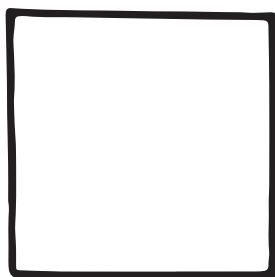
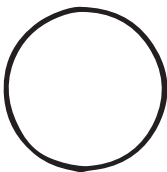
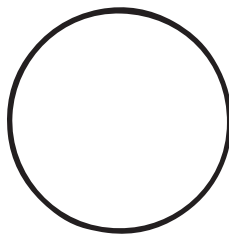
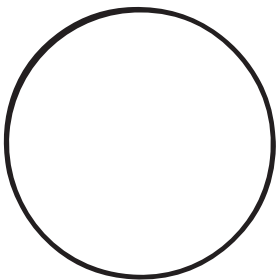
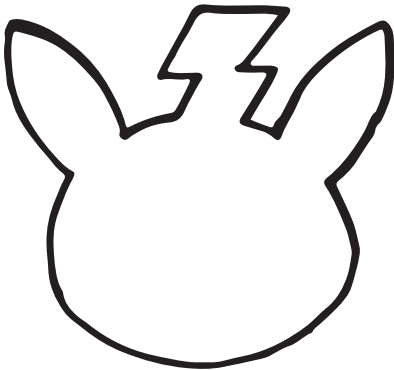
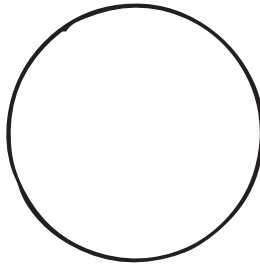
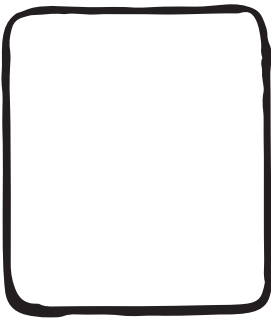
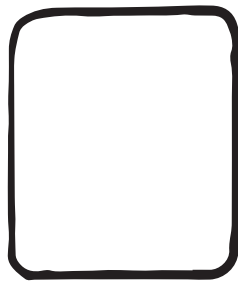
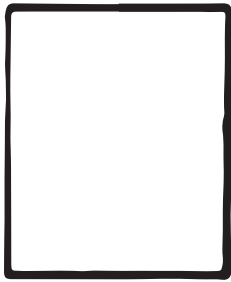
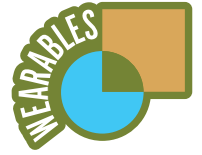






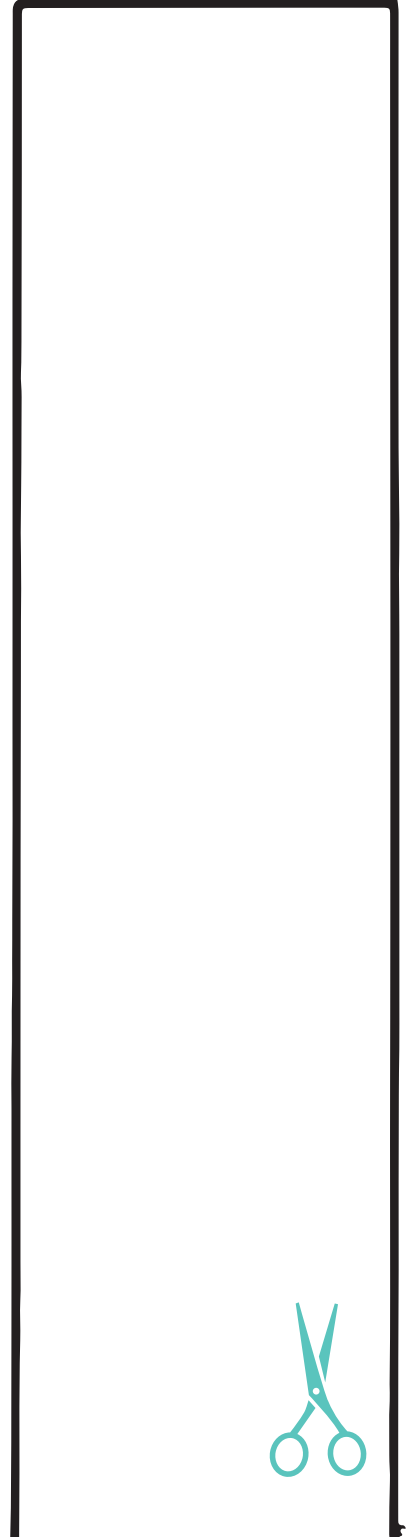
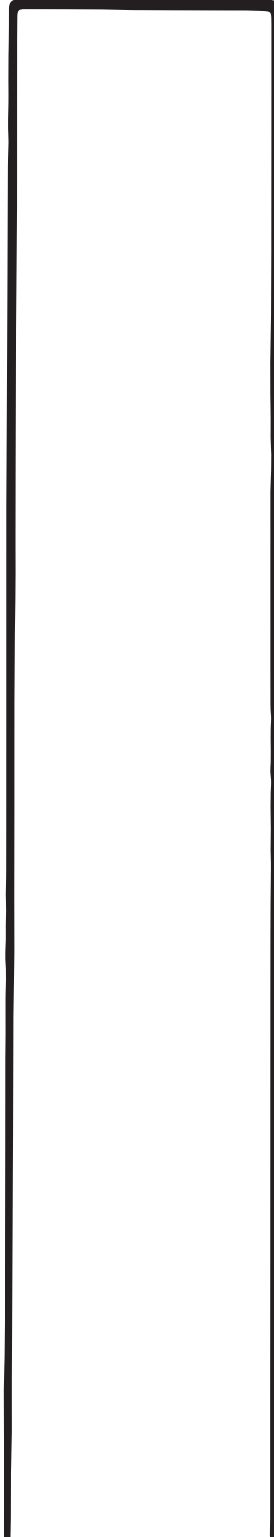
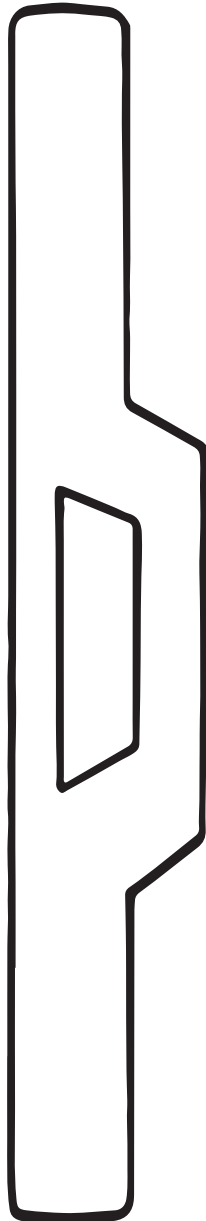
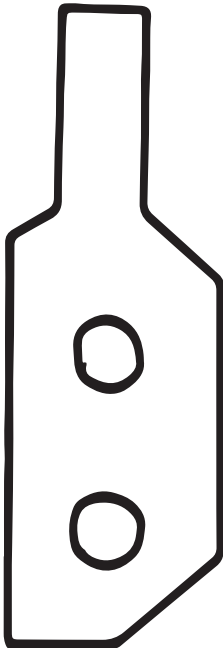
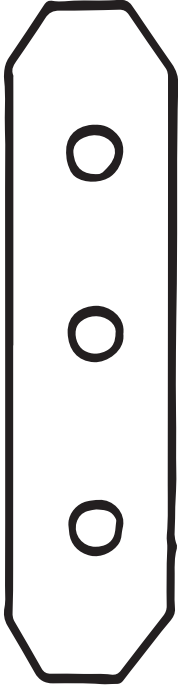
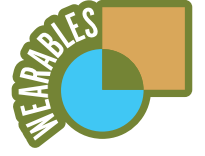


# OUTLINE FOR FOAM BRACELETS 2





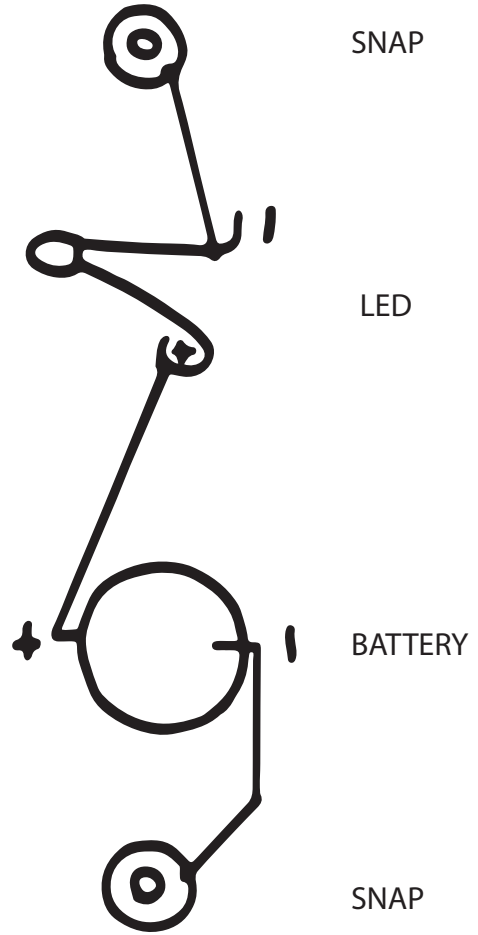
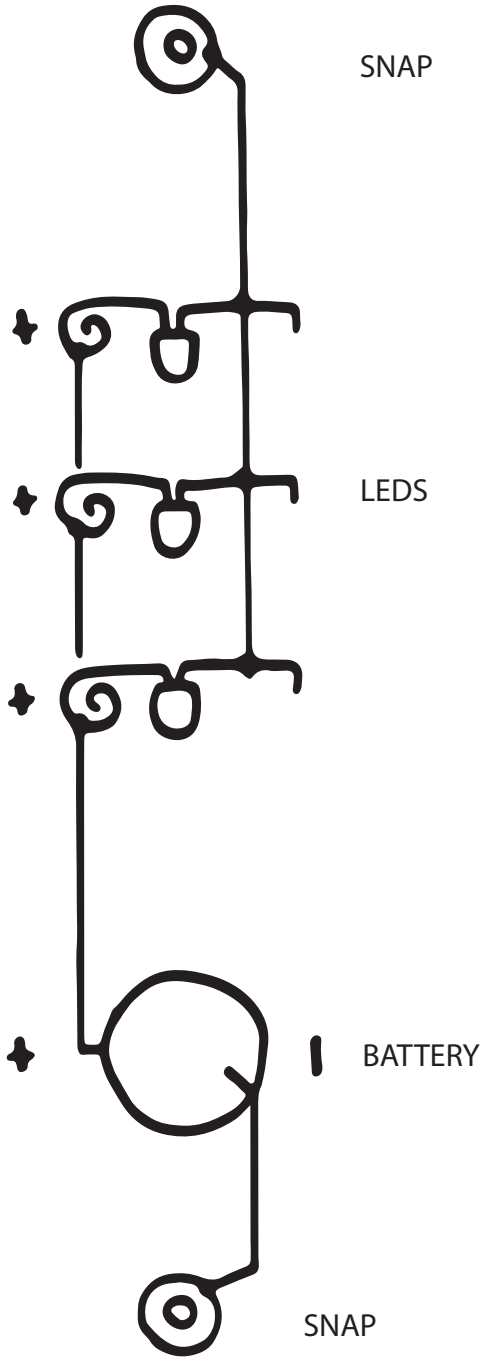
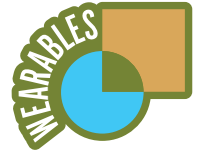
LIGHT-UP CUFF TEMPLATE





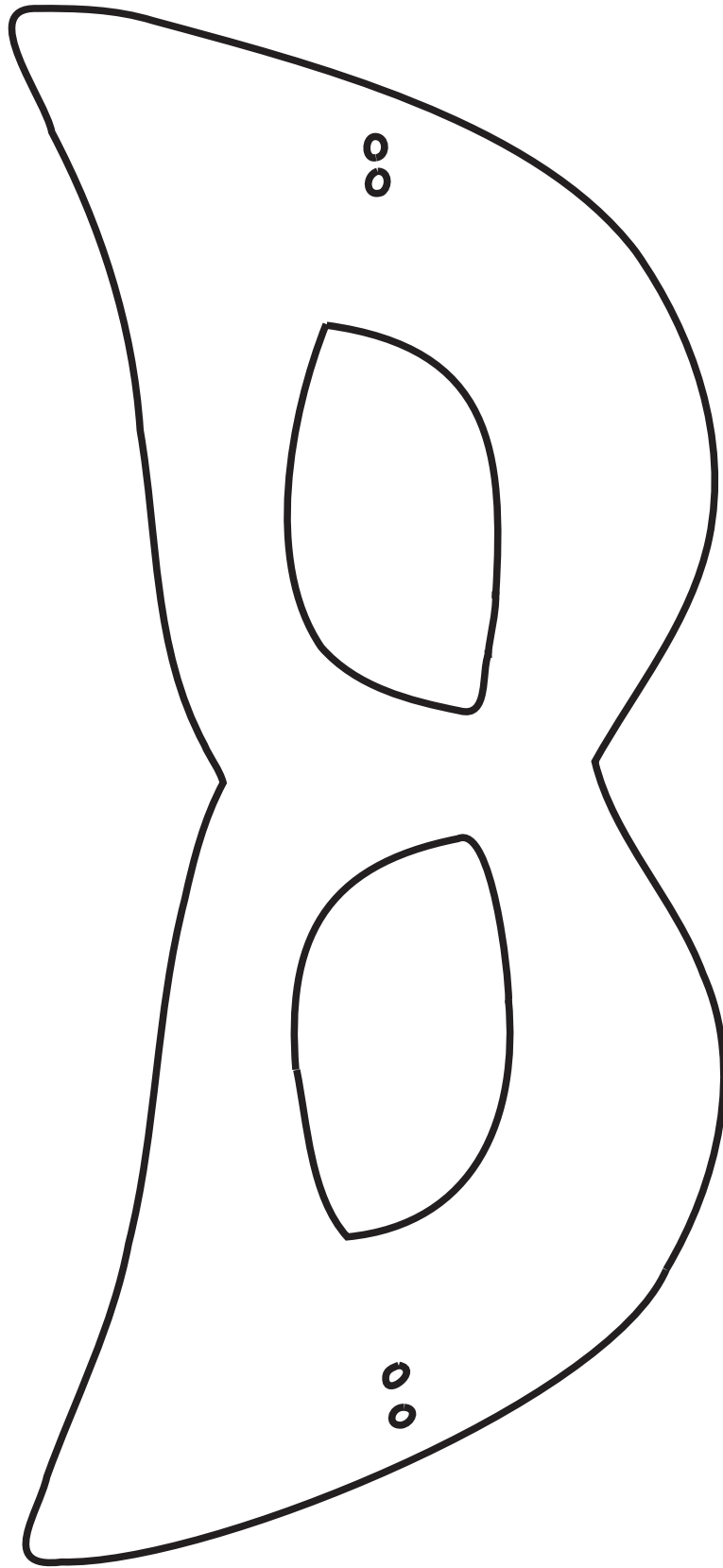
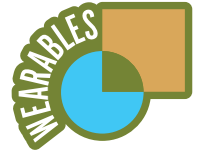


# SEWABLE CIRCUIT SNAP SWITCH



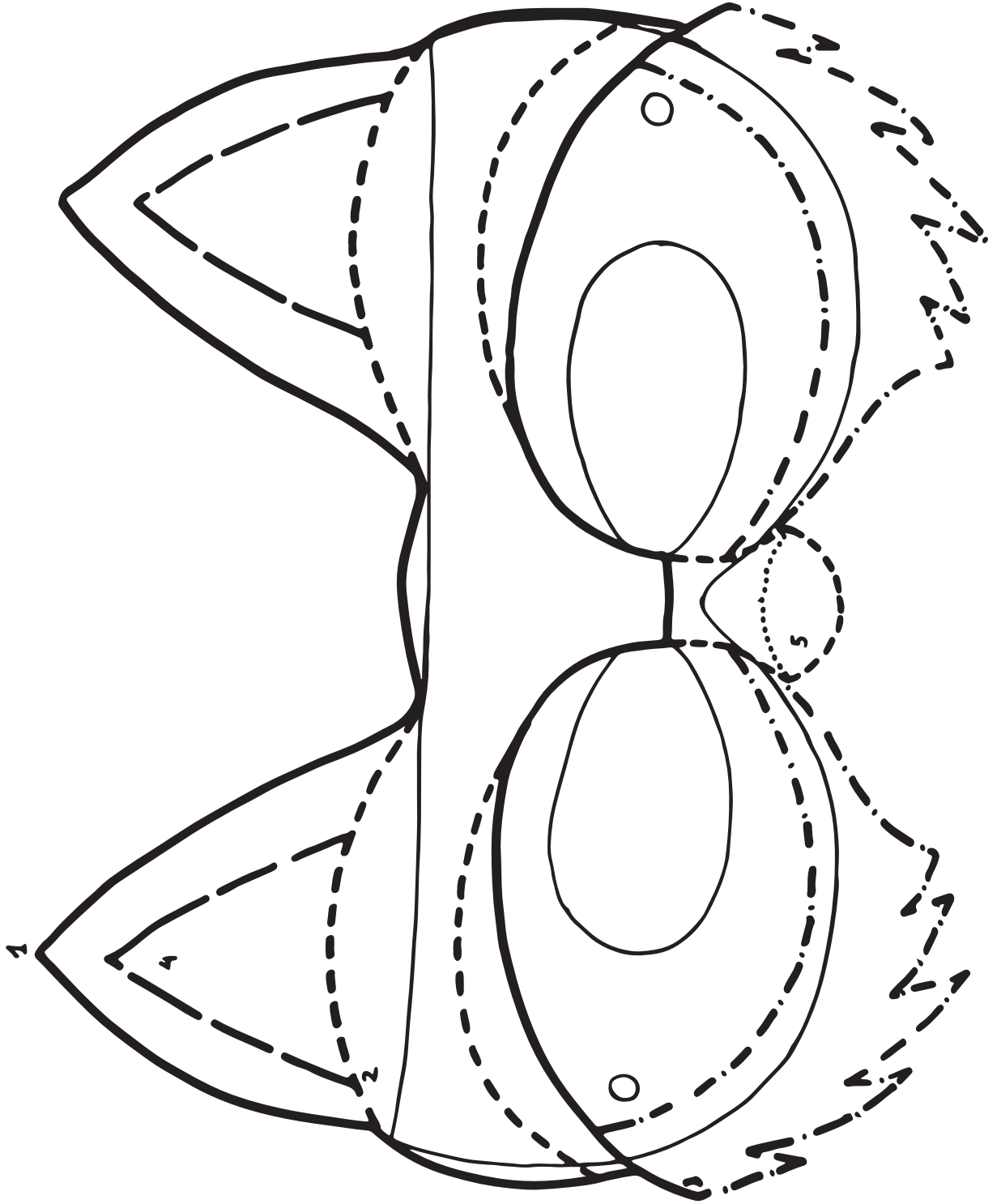
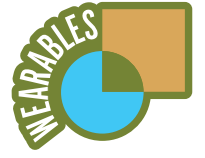


## SUPERHERO MASK TEMPLATE 2



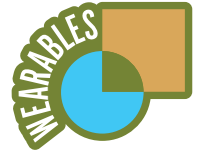


FOX TEMPLATE COMPLETE





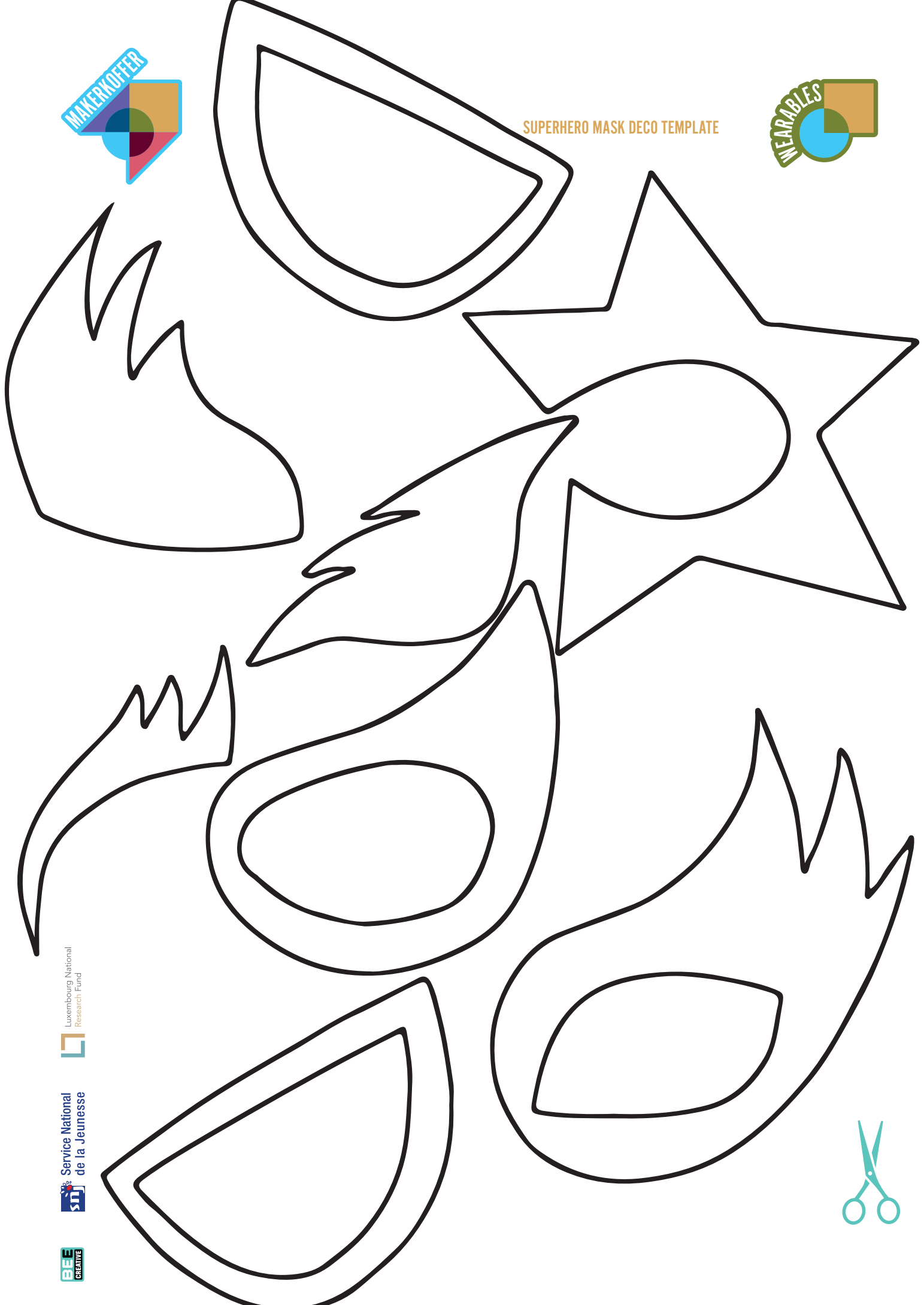
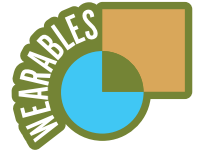
FOX TEMPLATES





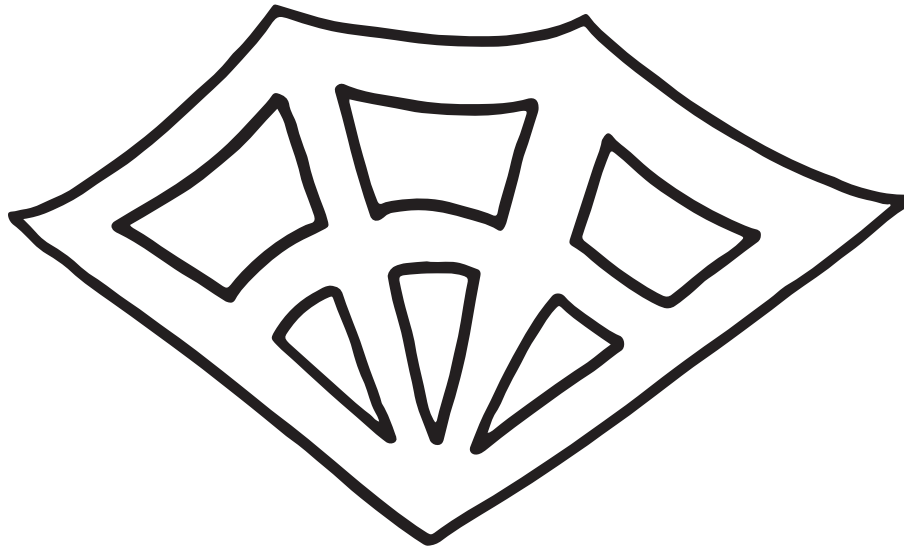
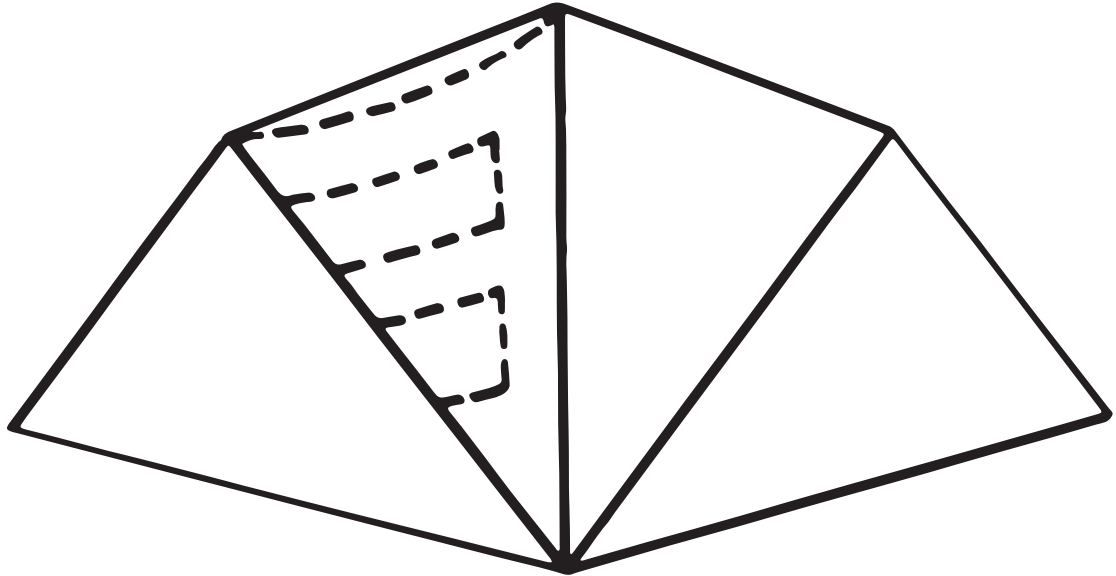
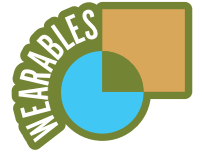


SUPERHERO MASK DECO TEMPLATE



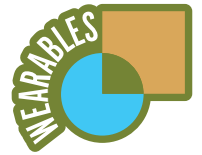


SPIDERMAN WEB TEMPLATE





SUPERHERO MASK ABC TEMPLATE

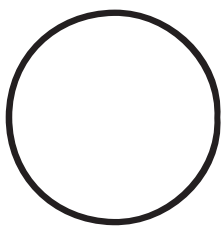
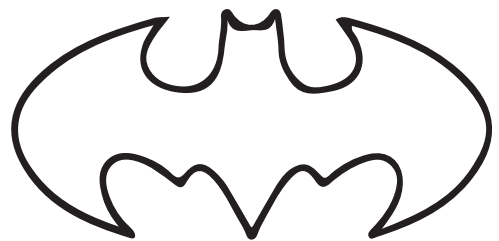
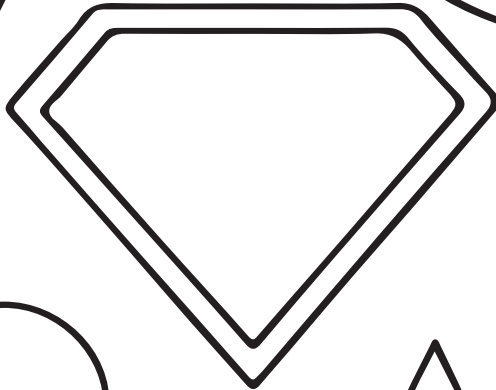
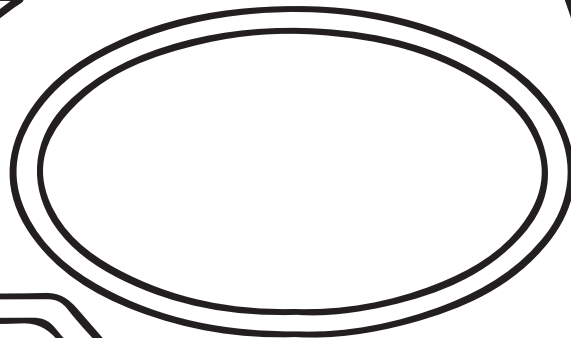
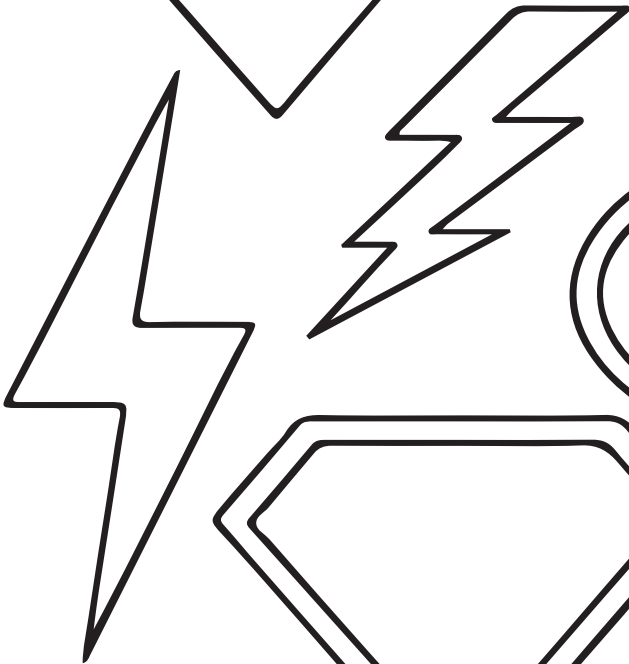
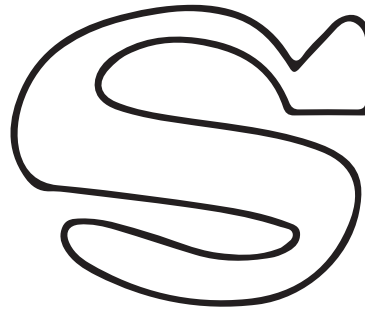
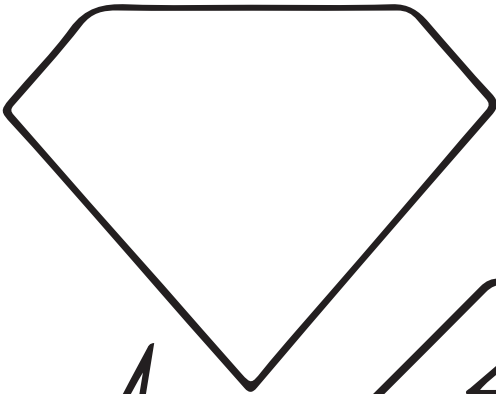
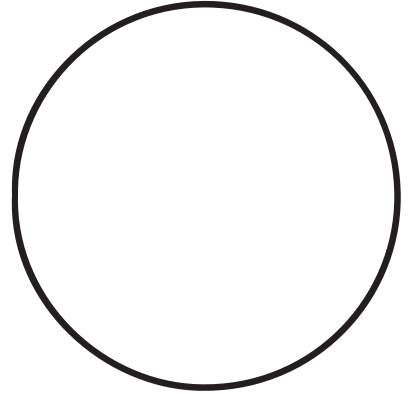
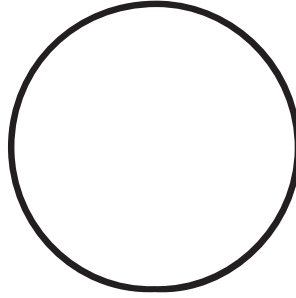
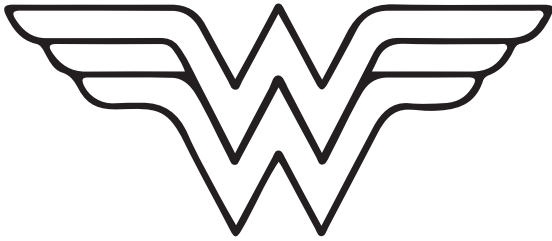
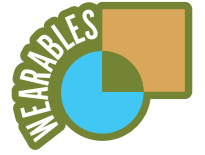


A B C D E  
F G H I J K  
L M N O P  
Q R S T U  
V W X Y  
Z





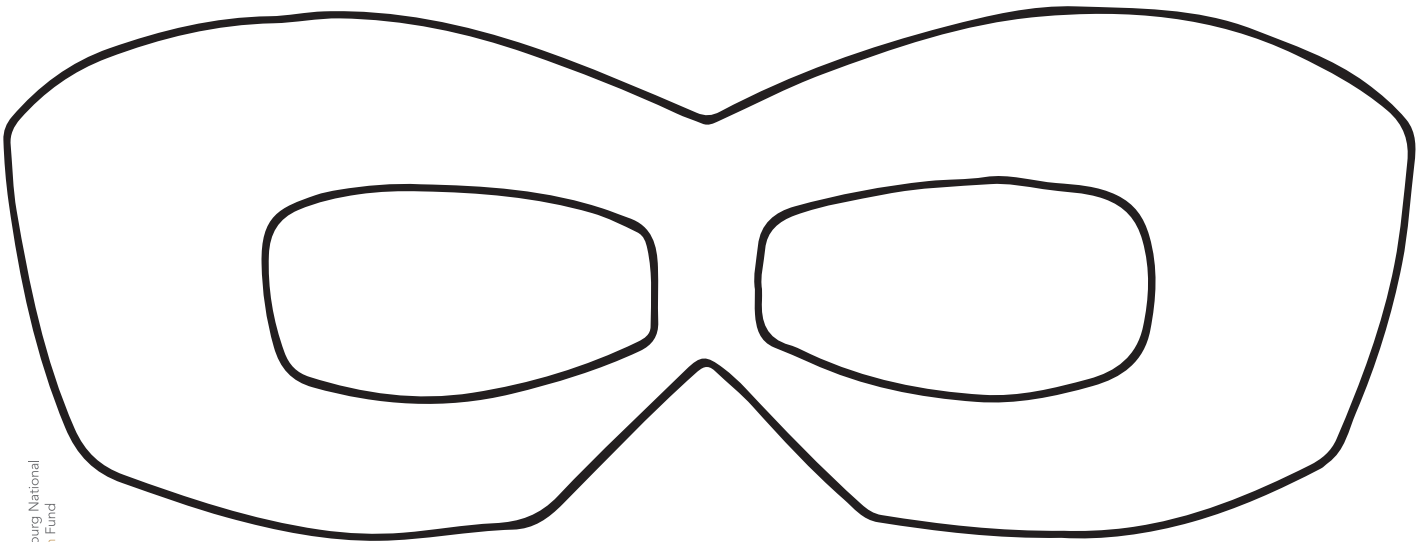
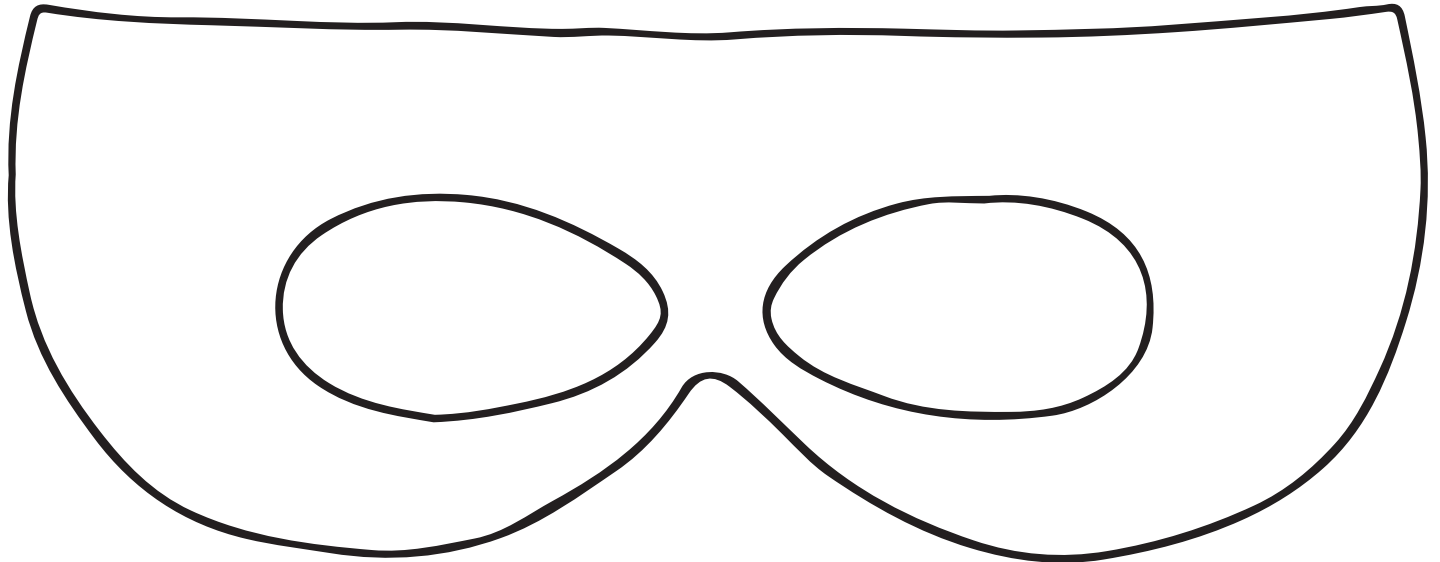
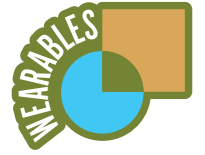
SUPERHERO MASK DECO TEMPLATE





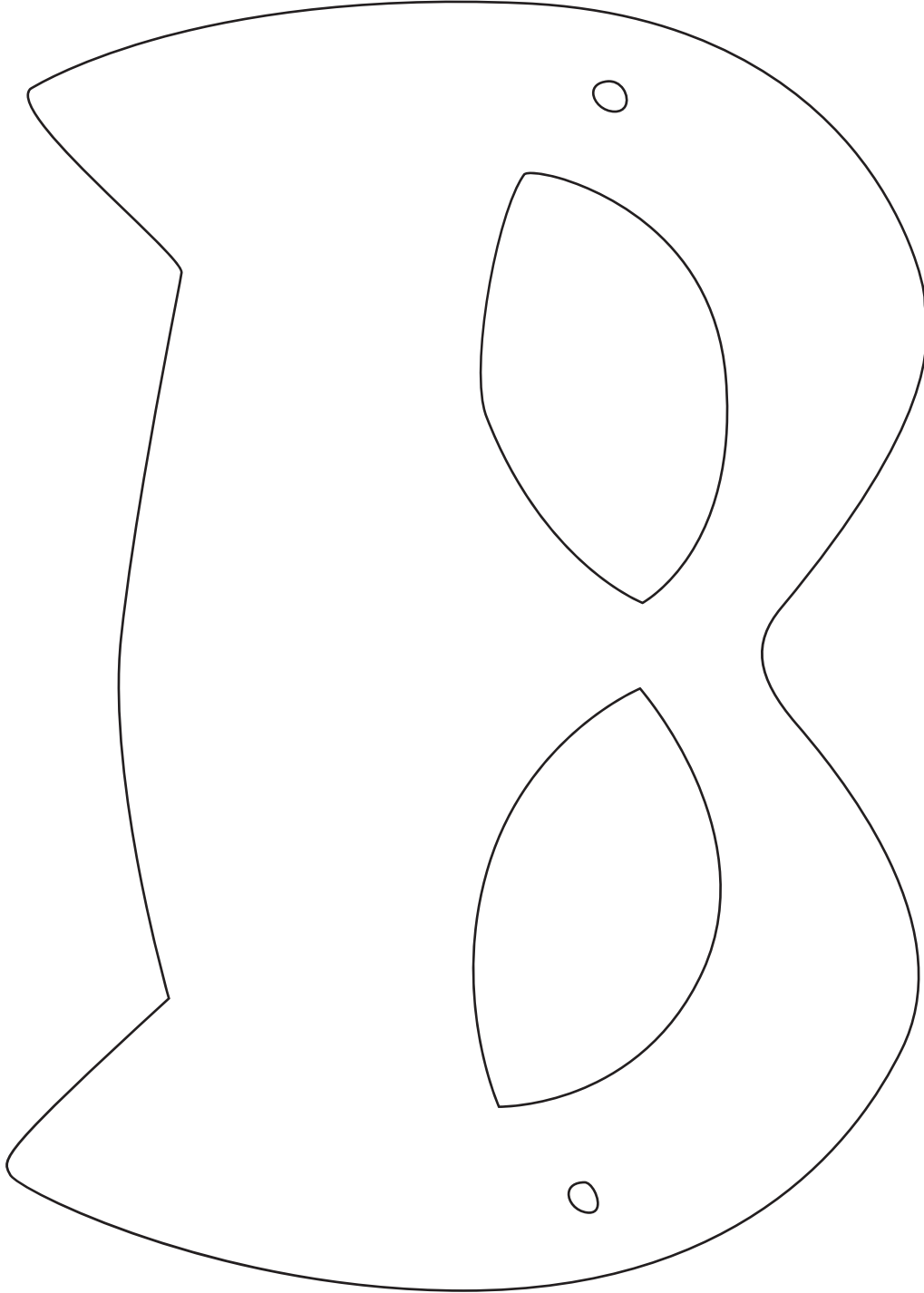
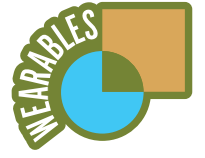


SUPERHERO MASK TEMPLATE 1



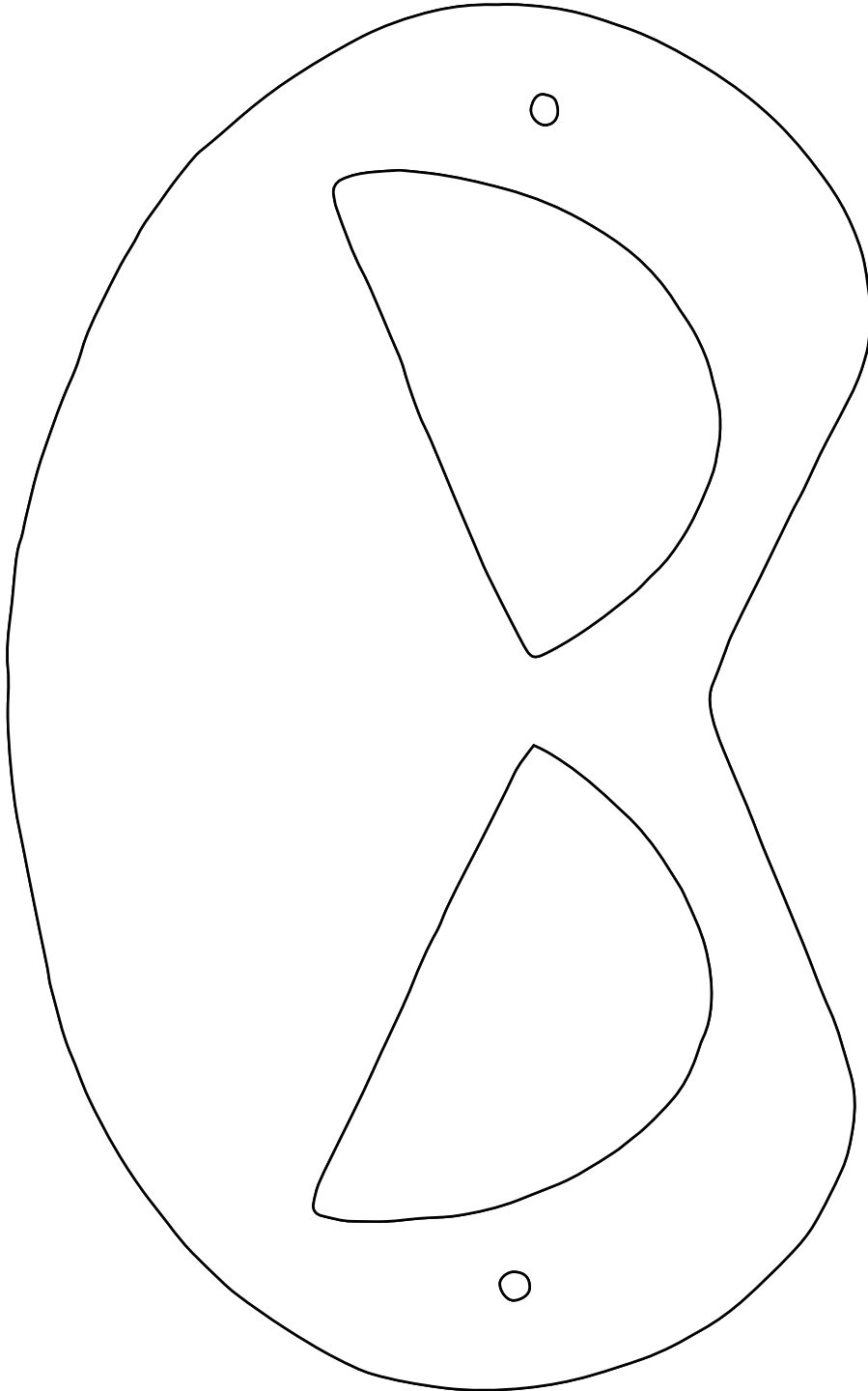
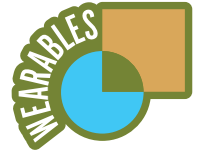


SUPERHERO MASK TEMPLATE 4



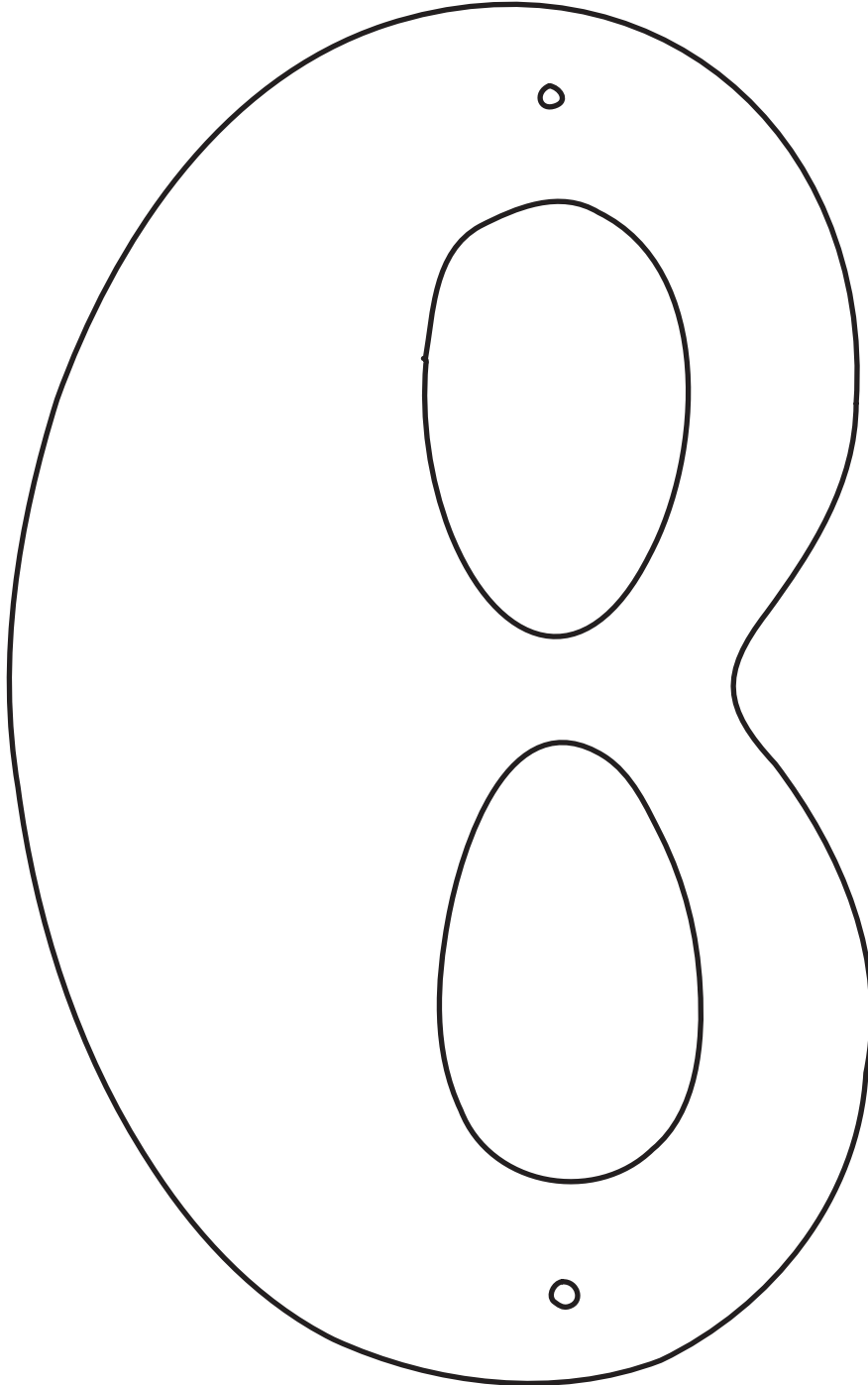
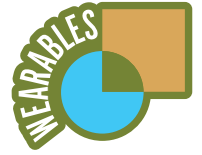


## SUPERHERO MASK TEMPLATE 5





SUPERHERO MASK TEMPLATE 3







## Feedback MAKERKOFFER - Supervisor

We would be very pleased to receive your feedback! You can fill out the form below and send it by e-mail to [info@base1.lu](mailto:info@base1.lu).

|   |   |                            |                            |                             |
|---|---|----------------------------|----------------------------|-----------------------------|
| Date of the activity                                  |   |                            |                            |                             |
| Age   |   |                            |                            |                             |
| Gender  | M   | W                          |                            |                             |
| Institution   | <input type="checkbox"/> Maison relais / Foyer scolaire<br><input type="checkbox"/> Primary school<br><input type="checkbox"/> Secondary school<br><input type="checkbox"/> Youth centre<br><input type="checkbox"/> Other: |                            |                            |                             |
| Role  | <input type="checkbox"/> Educator<br><input type="checkbox"/> Teacher<br><input type="checkbox"/> Coach, Expert<br><input type="checkbox"/> Other :   |                            |                            |                             |
| Makerkoffer   | <input type="checkbox"/> Coding<br><input type="checkbox"/> Wearables<br><input type="checkbox"/> Electronics   |                            |                            |                             |
| Level   | <input type="checkbox"/> 1<br><input type="checkbox"/> 2<br><input type="checkbox"/> 3  |                            |                            |                             |
| Why did you choose the activities of the Makerkoffer? |   |                            |                            |                             |
| Did the Makerkoffer meet your expectations?           | <input type="checkbox"/> 😊😊   | <input type="checkbox"/> 😊 | <input type="checkbox"/> 😐 | <input type="checkbox"/> ☹️ |
| What did you like about the activities?               |   |                            |                            |                             |
| What was not so interesting?                          |   |                            |                            |                             |
| What has been difficult to understand?                |   |                            |                            |                             |



|  |    |   |   |   |
|--|----|---|---|---|
| Did you learn anything new?                                    | 😊😊 | 😊 | 😐 | 😞 |
| Did the activity help you to understand the Makerworld better? | 😊😊 | 😊 | 😐 | 😞 |
| Are you interested in researching/making further?              | 😊😊 | 😊 | 😐 | 😞 |
| Would you do the Makerkoffer activities again?                 | 😊😊 | 😊 | 😐 | 😞 |
| Would you recommend the Makerkoffer to others?                 | 😊😊 | 😊 | 😐 | 😞 |
| Further comments / proposals:                                  |    |   |   |   |



## Feedback MAKERKOFFER - Participant

We would be very pleased to receive your feedback! You can fill out the form below and send it by e-mail to [info@base1.lu](mailto:info@base1.lu).

|  |   |  |  |  |
|--|---|--|--|--|
| Date   |   |  |  |  |
| Age  | <input type="checkbox"/> 8-10<br><input type="checkbox"/> 11-13<br><input type="checkbox"/> 14-16<br><input type="checkbox"/> 17-18<br><input type="checkbox"/> >18   |  |  |  |
| Gender   |   |  |  |  |
| Institution  | <input type="checkbox"/> Maison relais / Foyer scolaire<br><input type="checkbox"/> Primary school<br><input type="checkbox"/> Secondary school<br><input type="checkbox"/> Youth centre<br><input type="checkbox"/> Other: |  |  |  |
| Cycle/Group  |   |  |  |  |
| Makerkoffer  | <input type="checkbox"/> Coding<br><input type="checkbox"/> Wearables<br><input type="checkbox"/> Electronics   |  |  |  |
| Level  | <input type="checkbox"/> 1<br><input type="checkbox"/> 2<br><input type="checkbox"/> 3  |  |  |  |
| Did you like the Makerkoffer?                        |   |  |  |  |
| Did you learn anything new?                          |   |  |  |  |
| Did you understand the tasks?                        |   |  |  |  |
| Are you interested in learning more about the theme? |   |  |  |  |
| Would you do the Makerkoffer activities again?       |   |  |  |  |
| What else would you like to share with us?           |   |  |  |  |