

## Bearables Fox Kit /PIM318



A complete Bearables Fox Kit with coloured LED badge, light sensor, thread, needles, and battery. Sewable, hackable, wearable, adorable!

Bearables is a range of woodland-themed wearable LED badges and sensors. Wear the badges on their own, or connect them to one of the sensors with conductive thread to bring them to life. Designed for kids\* (suggested age 8+) and grown-up kids alike!

Attach the flower light sensor to the Fox badge and when you cover the sensor or when it's dark your badge's LEDs will light up.

In their five star review, The MagPi said that Bearables were *"excellent value for money"* and that *"the badge kit has everything you need to sew your interactive badge and sensor to clothes"*.

*\*Contains small parts. Not suitable for children 3 years or younger. This is not a toy. Keep battery out of reach of children. If ingested, seek medical help immediately.*

### **Kit contains**

- Fox badge with 12 LEDs (multi-coloured)
- Flower light sensor
- 3m stainless steel conductive thread
- 3 sewing needles
- CR2032 3V coin cell battery
- 2x sticker sheets
- Instructions
- Reusable box

### **Features**

- 12 coloured LEDs (blue, green, yellow, orange, red, pink)
- 12 light patterns
- Multi-functional button (mode change, sleep, trigger mode)
- PIC16F1503 microcontroller
- Sewable hooks
- Light sensor with two phototransistors
- Battery life of 3-4 days with a CR2032 coin cell battery

### **Using your Bearables badge**

Press the multi-functional button on your badge briefly to cycle through the light patterns. Each of the LEDs will light to indicate which of the 12 patterns is currently selected. Press and hold the button to put your badge into sleep mode.

The nifty design of the badges and sensors means that it's super-simple to connect them. It doesn't matter which way round they're connected. Just connect one hook on the badge to one hook on the sensor with conductive thread, then do the same with the other two hooks.

Once a sensor is connected, press and hold the multi-functional button to put your badge into trigger mode. Now when you trigger the sensor, the LED lights on your badge will light up.

## Notes

- **Bearables badges and sensors are not waterproof or washable**
- **Be aware that conductive thread is sharp!**
- Ensure that the two pieces of conductive thread connecting your Bearables badge and sensor do not touch, bearing (pun intended) in mind that they may touch when the fabric is creased or folded. Nothing bad will happen, the sensor just won't work as it should.
- The hooks on the back can be shorted without any damage to the badge, although it may trigger the LEDs similar to triggering them with a sensor. A painted or coated safety pin will work better than a bare metal one.
- A dab of clear nail varnish on the conductive thread around the hook can help to give a better, more reliable connection
- Badge dimensions: 47x35x5mm (LxWxH)
- Sensor dimensions: 17x17x5mm (LxWxH)



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In this short tutorial, we'll go through how to use your Bearables badge, how to wear it or attach it, and how to connect and use the sensors. There's a handy little quick start guide to using your Bearables badge below, that you can print out and keep.

# Bearables



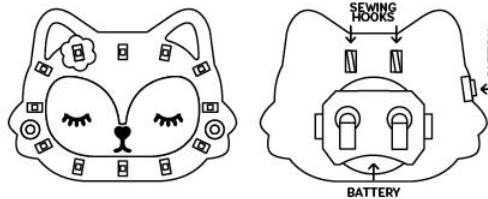
## Sewing

**Sew this badge onto your coat or bag. If you connect the sensor to the badge with conductive thread, it will trigger the badge lights.**

Electronics and washing machines do not mix. You'll want to sew this onto something you don't wash very often, or maybe use some metal poppers?

It's always handy to have a grown up on hand to help out. Make sure that the two runs of thread don't touch and short circuit. You can use a little dab of clear nail varnish to secure the thread to the hooks once wound around.

## Using Your Badge



### Step 1

Slide the coin battery into the battery holder on the back of the badge with the + on the battery facing upwards.

### Step 2

If a sensor is connected, press and hold the button to put your badge into trigger mode. If no sensor is attached then this will put the badge to sleep.

### Step 3

Press the button briefly to cycle through the 12 light patterns.



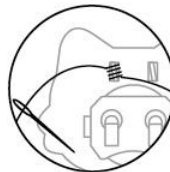
### Step 1

Knot the thread at one end and pull the other end through the needle.



### Step 2

Put the needle through the fabric and do 2-3 stitches on top of each other to anchor the thread.



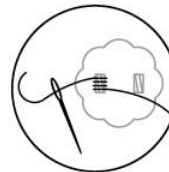
### Step 3

Loop the thread around one of the hooks on the back of the badge, repeat this 4-5 times, as tightly as you can.



### Step 4

Anchor the thread again, as you did in step 2, then run a stitch to where you'd like the sensor to be.



### Step 5

Repeat steps 2-4 to attach the first hook on the sensor to the fabric.



### Step 6

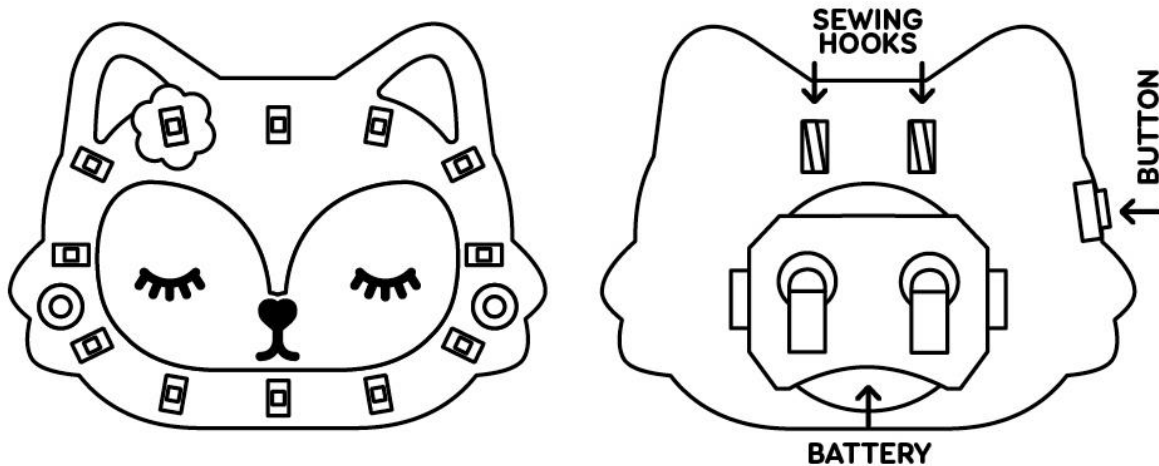
Repeat steps 1-5 to attach the second hook on the badge and the second hook on the sensor.

For more tips visit [pimoroni.com/bearables](http://pimoroni.com/bearables)

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# Using your badge

Your Bearables badge has 12 differently-coloured LEDs, a multi-functional button, a coin cell battery holder, and two metal hooks to attach your badge and to connect Bearables sensors to it.



If the battery is already in your badge, then pull out the paper or plastic tab and your badge should come on. If the battery isn't already in, then push it all the way in to the battery holder, with the + side facing upwards (matching the + on the battery holder).

Pressing the button briefly will cycle through the 12 different light patterns, and the LEDs will light when you press the button to show which mode is selected.

Pressing and holding the button for a few seconds will put the badge to sleep, or put the badge into trigger mode when you have a sensor connected (more on that later).

If you leave your Bearables badge switched on, then it will go into sleep mode automatically after about 60 minutes to save the battery from draining too quickly. Your badge should run for 3-4 days if lit continuously (using a 3V CR2032 coin cell battery).

# Wearing your badge

You can use a safety pin, a small disc magnet, a piece of double-sided sticky tape, or of course thread, to attach your Bearables badge to your coat, bag, or whatever you wish.

If you're using a safety pin, then unfasten the pin and pass the pin through one hook, then through the fabric, and then through the second hook, before fastening the safety pin again.

You can also use a small disc magnet of about 20mm in diameter to attach your badge. Pop the magnet underneath the fabric and it'll be attracted to the battery on the badge on top of the fabric and hold it in place.

**Bear (!!)** in mind that small magnets and safety pins are unsuitable for small children.

## Sensors

Bearables sensors have two metal hooks just like the badges. To connect a sensor to your badge, you just connect each of the hooks on your badge to the hooks on the sensor, and it doesn't matter which hook you connect to which, either way will work.

You can test your sensors with a couple of crocodile clips clipped to the hooks.

To put your badge into trigger mode, press and hold the button on your badge for a couple of seconds while your badge is connected up to a sensor. The bottom middle LED on your badge should flash to indicate that it's in trigger mode, and when you cover the light sensor, or move the motion sensor, then your badge's LEDs should light.

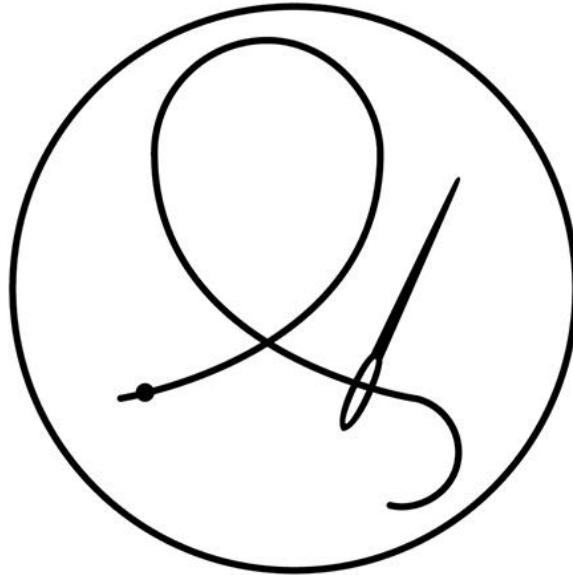
## Sewing your badge

Conductive thread, like the thread included in the Bearables kits, is made of metal and conducts electricity just like normal wires. You can sew with it as you would with regular thread.

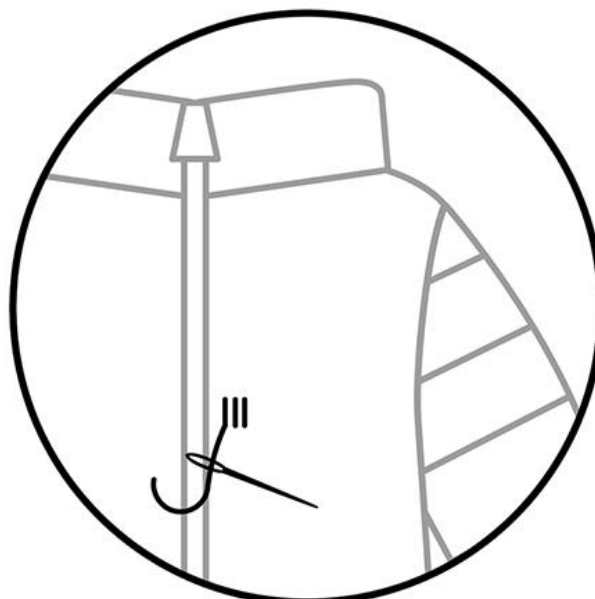
We'll go through how to sew your badge and sensor now.

Cut a length of conductive thread long enough to stretch from where you want your badge to be to where you want to place your sensor, plus some extra to account for looping the thread around the hooks.

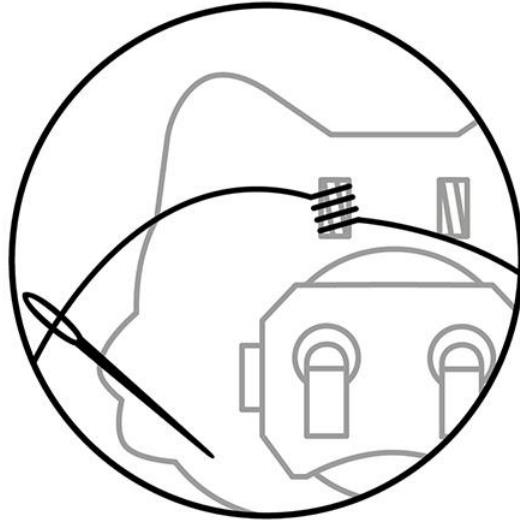
Tie a knot in one end of your thread. Conductive thread is a bit harder to knot than regular thread, so you might have to tie a couple of knots on top of each other to stop it from untying.



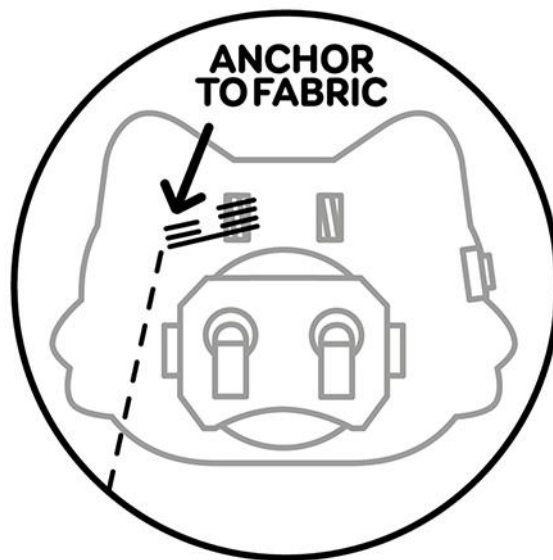
Thread your needle, and then anchor your thread by sewing two or three stitches on top of each other next to where you'd like the first hook of your badge to be.



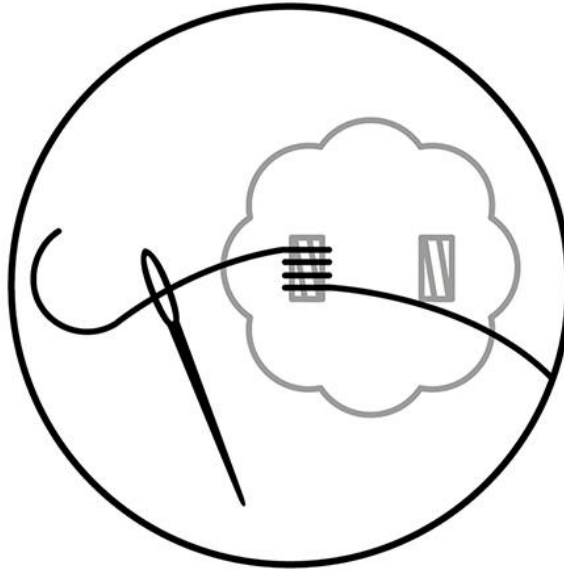
Using your needle, loop the thread around the first hook four or 5 times, pulling it tight against the fabric and making sure that it's tightly wound round the hook to make a good electrical contact.



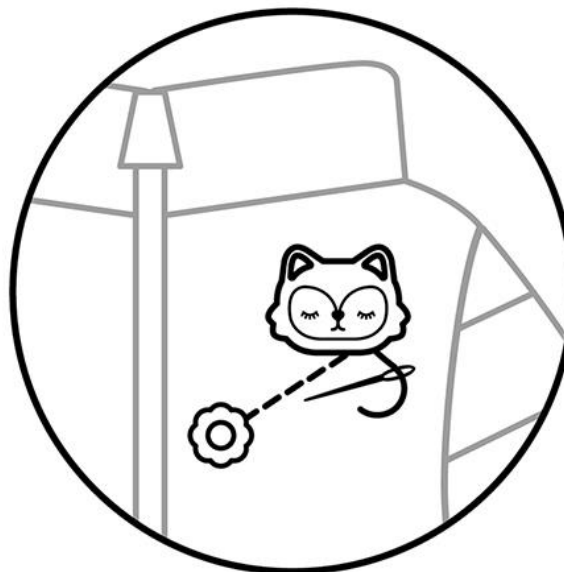
Anchor the thread again next to the hook to hold it tight, then run a stitch to where you'd like the sensor to be positioned.



Go through the same steps that you did for the first badge hook with the first of the sensor's hooks: anchor the thread, wrap it four or five times around the hook, then anchor again.



Repeat the steps above for the second badge hook and the second sensor hook.



**It's really important that the two pieces of thread don't touch each other; nothing bad will happen, it'll just mean that the sensor won't work as expected and your badge will be permanently triggered.**

## **Handy hints**

A little dab of clear nail varnish on the hooks can help to hold the thread nice and tight and give a solid electrical contact.

Unlike real bears, Bearables bears (and indeed foxes, flowers, and acorns) **do not like water**, so please don't wash them, take them out in the rain, or otherwise get them wet (or feed them after midnight).

If you're a more experienced stitcher, you could attach your badge and sensor to a small piece of fabric and attach pop fasteners to them and to your garment, allowing you to remove them before washing.

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