

E-TEXTILES

The image features the text "E-TEXTILES" in a bold, blocky, sans-serif font. The letters are white with a dashed outline, giving them a stitched or embroidered appearance. This text is centered within a larger, horizontal, rounded rectangular border that also has a dashed, stitched-line pattern, resembling the edge of a piece of fabric or a patch. The entire graphic is set against a plain white background.

## *What is E-Textiles?*

E-Textiles (Electronic Textiles) is the combination of textiles with electrical components.

By embedding electronics into textiles; a product, piece of art or item of clothing can be enhanced.

Smart clothing and wearable technologies are examples of where E-Textiles can be used.

Embedded electronics can include:

- Sensors
- Actuators
- Power supplies
- Smart materials

Recap over Day 1: What is E-Textiles?

*What is a sensor?*

Question to participants

## *What is a sensor?*

A sensor is a device which detects or measures a physical property which can trigger a response.

The sensor takes an INPUT to create an OUTPUT.



Examples of sensors can include:

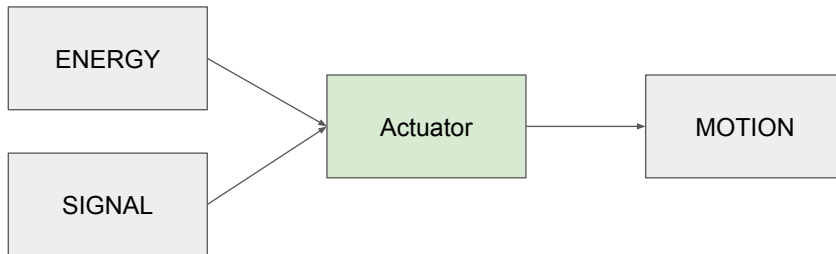
- Temperature sensors
- Acceleration
- Humidity
- Heart rate

*What is an actuator?*

Question to participants

## What is an actuator?

An actuator is a component which produces a motion by converting the energy and signals it receives.



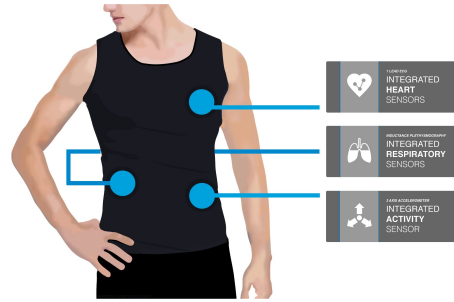
Example of an actuator can include a mechanism in a water system, which open a door and allows the water to flow out of a compartment when the pressure inside gets too much.

# SPORT

## Safety



## Performance

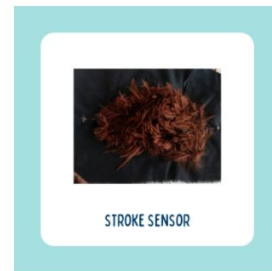
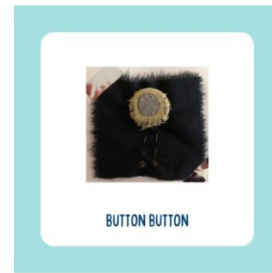
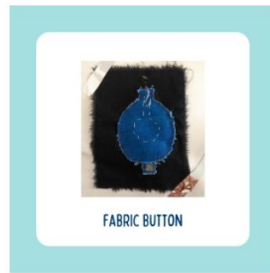


We can see that sensors are used in both of these applications. An actuator is also used in the safety helmet, as the signal from the sensor is used to trigger a motion: the inflation of the helmet around the head of the wearer.

## *Day 1: Building E-textile components*

Today's session focuses on the first activity of building E-Textiles components.





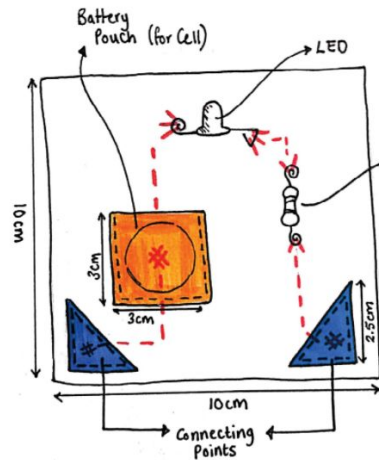
These are the first four components which are all made out of fabric. The test circuit is crucial, as it allows us to test the other components to make sure that they work correctly. The other three components could be described as sensors. The fabric button and button button are both sensing touch - when someone pushes them. Where as the stroke sensor is recognising when it is being stroked.

## *Test Circuit*



We then went to look at the Test circuit in more detail.

## Test Circuit



In the tutorials you will be able to find illustrations which describe how to build the component. These are like the image on the right which use different colours and notations to identify the different components and materials that are used.

Blue: Conductive fabric

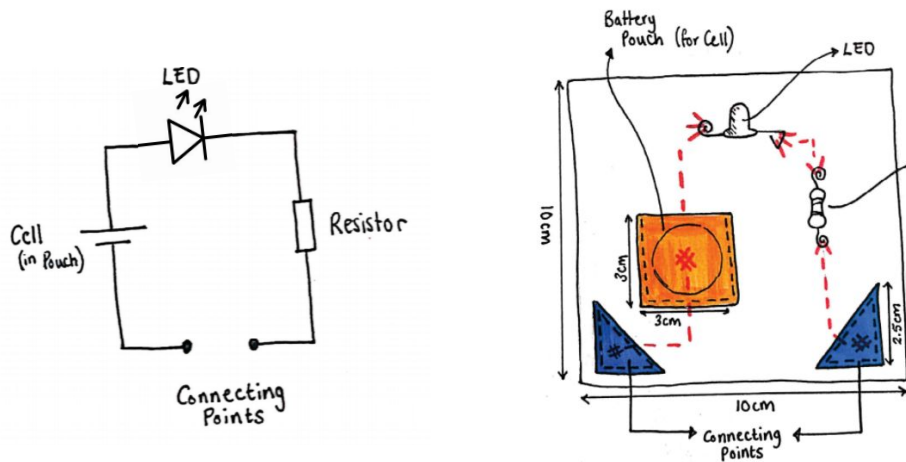
Orange: Normal Fabric

Black dashed line: Normal thread

Red dashed line: Conductive thread.

All the components are also drawn as they appear in real life, so they should be easy to identify.

## Test Circuit



In each tutorial you will also find a schematic diagram of the circuit, where the components are drawn using simple symbols.

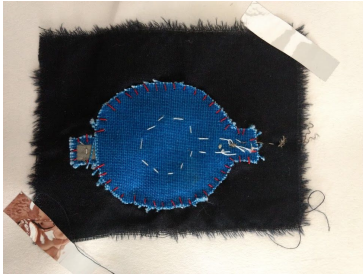
Here you can see the symbols for an LED, a cell and a resistor.

The diagram on the left is the schematic diagram for the test circuit on the right.

Introduction to simple components: How they work

- What is a complete circuit
- What is current
- What is a cell? What is Voltage?
- What is resistance and how does a resistor work
- What is a diode? How does a LED work?

## Buttons



## Stroke Sensor



We then went on to discuss how each of the components can be used with the test circuit. For each of the components they could be represented as a switch in a schematic diagram.