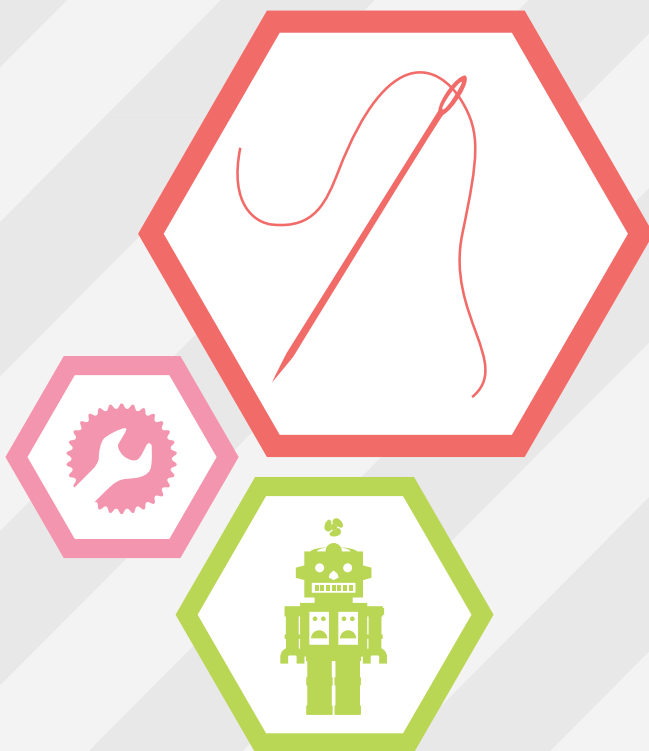# BLINKING BADGES

Over 45 minutes, participants will use soft circuit techniques to create an LED badge.

AGE GROUP
14+

METHOD
Small Groups
(7:1 participant to facilitator ratio recommended)

LEVEL
Introductory

DURATION
45 minutes

KEY LEARNINGS
Basic Electrical Circuits
Basic Hand Sewing

Version 1.0
22 May 2015

SL The Edge
MA**KEIT**
WORKSHOP PLAN

BLINKING BADGES

INCLUDED IN THIS WORKSHOP PLAN

> Materials and equipment list

> Preparation suggestions

> Recommendations: General advice, electrical circuit troubleshooting, post workshop suggestions and opportunities for further learning

> Full 45 minute workshop outline

APPENDIX

> Circuit Diagram

📋 MATERIALS AND EQUIPMENT

- ☐ Whiteboard and markers
- ☐ Flashing and/or standard LEDs in a range of colours
  (1-2 per participant)
- ☐ CR2032 3V coin cell batteries (one per participant)
- ☐ Coin cell battery holder (one per participant)
- ☐ Badge back (one per participant)
- ☐ Conductive thread (at least half a metre per participant)
- ☐ Needles with a suitably sized eye for the conductive thread
  (a needle threader could be useful for this)
- ☐ Regular thread
- ☐ Hot glue guns (one between three)
- ☐ Pointy nose pliers
- ☐ Craft glue
- ☐ Scissors (sharp enough to cut fabric)
- ☐ Single hole punch
- ☐ A selection of felt and fabric scraps, haberdashery and cardboard
- ☐ Press studs (optional / one per participant)
- ☐ Working example/s of soft circuits
- ☐ CIRCUIT DIAGRAM (appendix)

📝 PREPARATION

In preparation for this workshop the facilitator should:

> Experiment with the simple circuits used in this project
> Familiarise themselves with basic hand sewing techniques (eg.
  threading a needle, running stitch, starting and finishing off securely)

✓ RECOMMENDATIONS

GENERAL ADVICE

> Keep the pace up… but don't rush too much. The point of the
  workshop is not to create a masterpiece, it is to create something fun
  and creative in 45 minutes, and to explore the creative horizons of a
  simple activity like this.

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> It can be helpful to use faults or small failures as a learning opportunity for the rest of the group. But, be careful not to make anyone feel uncomfortable. Through this teaching method, participants learn the valuable skills of fault finding and how to approach solving problems.

> In preparation for the workshop you may like to research soft circuits and e-textiles/etextiles on the internet. There are plenty of examples of both simple and sophisticated projects that are instructive and inspiring. If you have time at the end of the workshop you may like to show participants some of the more interesting projects to inspire them to continue experimenting at home.

ELECTRICAL CIRCUIT ISSUES

The most common reasons this circuit doesn't work are:

> You have a weak or broken connection somewhere in your circuit. Trace the circuit and check all the connections thoroughly.

> The polarity (electrical direction) of one or more of the LEDs is wrong. Check you have them wired in the right way.

> There's a short circuit (the electricity is taking a shortcut through a conductor that is making a connection somewhere in your circuit). Check everything is secured and that nothing in the circuit is touching anything (conductive) that it shouldn't (such as the badge back).

POST WORKSHOP

> Don't underestimate the joy participants can draw from making the LEDs light up.

> If you have correct permissions don't forget to get photos of the participants with their finished postcards and share these through your organisation's social media.

> Be sure to credit all involved when sharing or showcasing their work.

FURTHER LEARNING

This workshop can be expanded to any length required by creating physically larger projects, introducing more sophisticated electronics, experimenting with more complex soft construction techniques or any combination of these factors.

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WORKSHOP OUTLINE

00:00   **INTRODUCTION**

Welcome participants to the workshop.

Introduce yourself.

Share any relevant health and safety information such as the location of toilets, emergency exits and procedures to be followed.

Ask participants to share their names and previous electronics and/or sewing experience (ask them to keep it short).

Explain to participants that they will be making an LED badge (or if you/they like, some other small wearable item) using soft circuit electronics techniques.

Show them some pre-prepared examples of soft circuit wearables.

00:05   **INTRODUCTION TO CIRCUITS AND SOFT CIRCUIT TECHNIQUES**

Use the whiteboard to draw a basic circuit schematic. See CIRCUIT DIAGRAM attached. Identify the symbols for each component and explain their function.

Hand out components:
> Battery
> Battery holder
> LED
> Conductive thread

Now, alter the schematic on the whiteboard to show how the components can be used to create a complete circuit.

Continued...

Discuss polarity and the importance of getting it right for the circuit to work. The LED only works when the long (positive) pin touches the positive side of the battery. Participants can test this themselves by touching the pins of the LED to the battery. The long pin to the positive (+) side and the short pin to the negative (-) side.

Now put the battery in the battery holder and get them to work out which metal tab is the positive connector. Get them to mark this with a pen so it is easy to remember later. They will need to keep polarity in mind when laying out their circuit.

Brainstorm ideas for LED soft circuit wearables.

Show participants how to prepare their LEDs for sewing – use pointy nose pliers to bend the positive pin into a square loop and the negative pin into a round loop.

00:15 BRAINSTORMING AND PLANNING

Give participants five minutes to explore the provided materials (fabric, paper, cardboard etc) and come up with a plan for their badge.

Simple alternatives could be a ring, collar or wristband/cuff.

00:20 CONSTRUCTION

Participants have 20 minutes to construct their project.

The instructions for the basic badge are as follows:
> Cut out a disk of fabric and a disk of cardboard (both around 5cm diameter) and glue together.
> Punch a small hole so you can just poke the LED through to the front, leaving the pins/loops flattened against the backside of the badge.

Continued...

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> Glue the badge back and the battery holder onto the cardboard side using hot glue – make sure the badge back is positioned so it does not interfere with the circuit.
> Using the conductive thread, stitch between the positive terminal of the battery holder and the positive LED pin.
> Secure the positive LED loop down onto the badge with a few stitches and tie off.
> Now use the conductive thread to stitch between the negative terminal of the battery holder and the negative LED pin.
> Secure the negative LED loop down onto the badge with a few stitches and tie off.
> Trim and glue down the ends of the conductive thread so that they don't create any shorts in the circuit – dust off any of the trimmings as these can also create short circuits.
> Put in the battery - all being well the LED should light up.

Give participants 'five minutes to go' warning.
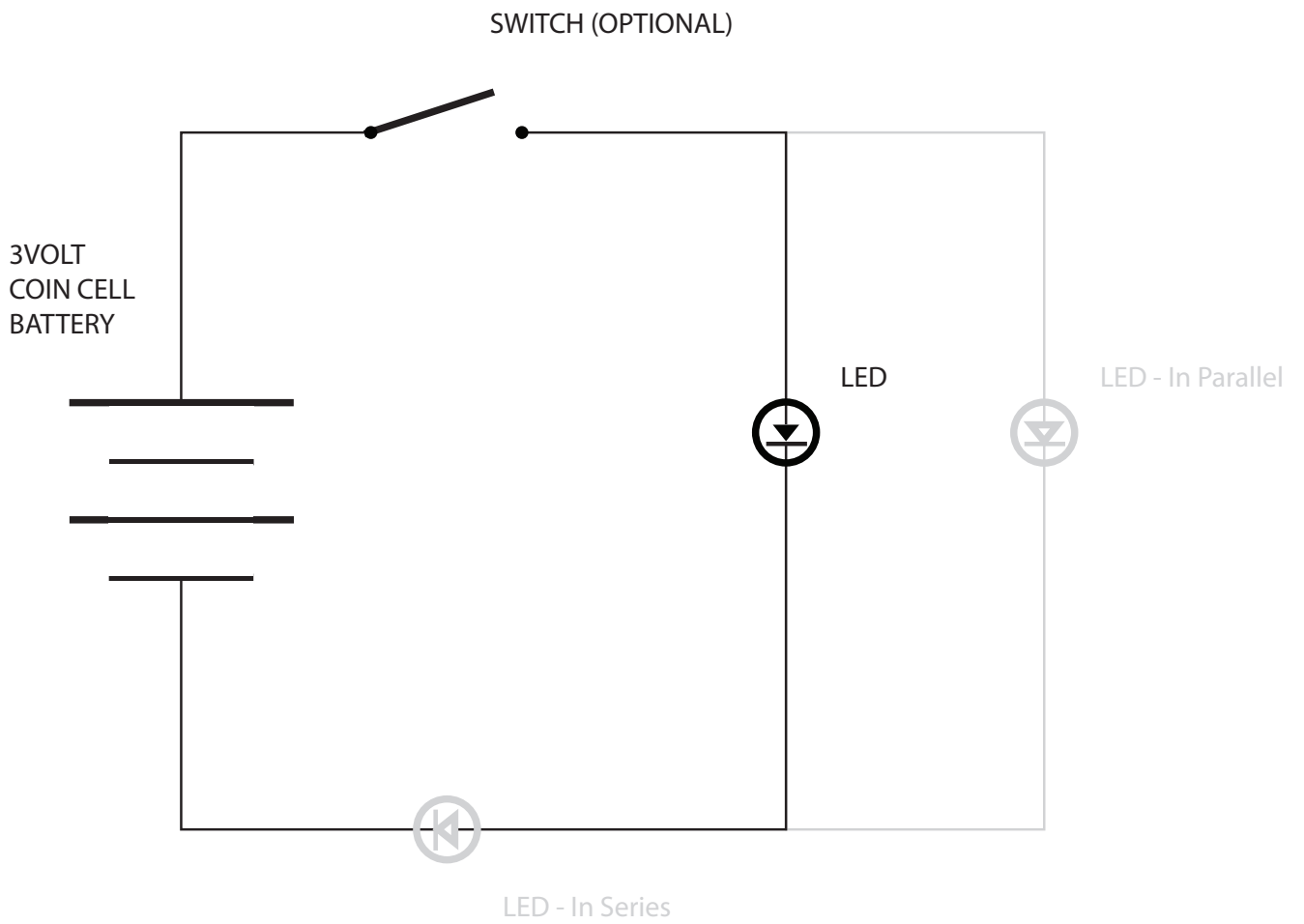
Call tools down.

00:40   SHARE

Participants present their finished pieces to the rest of the group and applaud.

If you have permission, photograph the participants with their work as they present.

00:45   THE END

APPENDIX

CIRCUIT DIAGRAM

SWITCH (OPTIONAL)

3VOLT
COIN CELL
BATTERY

LED

LED - In Parallel

LED - In Series

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