

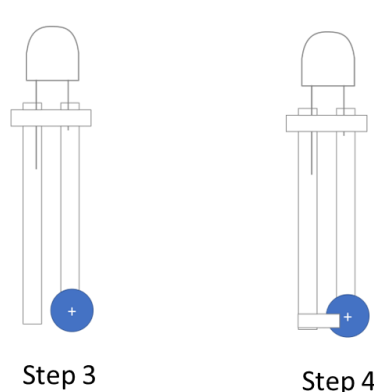
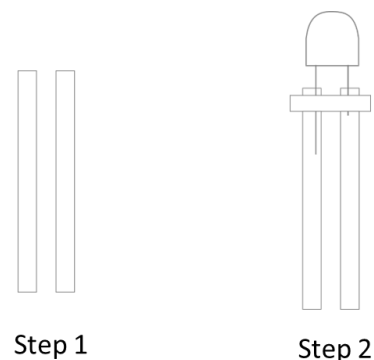
# CoCoElectro Bag - Activity protocols



*This document gives an overview of all of the activities outlined in the CoCoElectro Bag*

## Experiment 1 -Paper circuits

- 1) Cut two short (~ 5cm) lengths of copper tape and stick them next to each other (leaving a gap of about 3cm in between them) to make two tracks of tape
- 2) Take an LED and place the long leg on the left hand side track and the short leg to the right hand side track and secure in place with tape.
- 3) Place a battery coin cell (negative side down) on the right hand side track
- 4) Connect the left hand side track to the top of the coin cell ('+' side) – what happens to the LED?
- 5) Repeat steps 1-4 but use brightly coloured insulating tape



**Risks;** cut fingers (scissors), poisoning (swallowing coin cell)

## Experiment 2 – Fruit and veg battery

- 1) Slice your fruit / veg into thick slices or segments (be careful of your fingers!)
- 2) Put a copper coin and a zinc nail into the fruit / veg segment (make sure they do not touch each other)
- 3) Connect the **copper** coin to the **long leg** of the LED
- 4) Connect the **zinc nail** to the **short leg** of the LED

**Risks;** Cut fingers (knife to cut fruit/veg), Puncture wound (zinc nail)

### **Experiment 3 – Penny Battery experiment**

- 1) Dissolve salt in water
- 2) Place a washer in the middle of a piece of foil
- 3) Dip one piece of kitchen roll in the salt solution and shake off excess water
- 4) Put the copper coins on top of the kitchen roll and then the kitchen roll on top of the coins - this is your first battery cell!
- 5) Take an LED and put one of the legs onto 2p (that is touching the foil) and the other leg on top of the battery stack - does it light up at all?
- 6) Now repeat step 1-4 to more battery cells and experiment with trying to light the LED with more battery cells

#### **Risks**

Slip hazard - Salt solution. Excess liquid could drip onto the floor and someone could slip on it so clear up any spills immediately

### **Experiment 4 - Separating Materials**

- 1) Place glass marbles, plastic bottle caps and metal bottle caps (about 10 of each) into a large bowl
- 2) Use a magnet to pick out the metal bottle caps and place these into a smaller bowl
- 3) Put enough water in the large bowl to allow the plastic bottle tops to float and enough room to scoop them out with the sieve.
- 4) Use a sieve to scoop out the plastic bottle tops and place these in a small bowl
- 5) Pour the water / glass marbles through the sieve and collect the water in a bucket and place the marbles in a small bowl

### **Experiment 5 – Making a solar cell biscuit**

- 1) Make the biscuit dough using your favourite recipe
- 2) Cut out your biscuit using a cookie cutter
- 3) Bake it
- 4) Ice your biscuit

## Risks

Burns – if baking biscuit there will be a risk of burns from the oven. Get an adult to help

Allergic reaction – make sure that ingredients that you are not allergic to are used

### Experiment 6 – Testing the Solar Bug

- 1) Take a solar powered bug toy and a UV torch
- 2) Turn on the UV torch and shine onto the solar panel. The bug will start buzzing
- 3) Place a sheet of material (e.g. piece of paper or coloured cellophane / sweet wrapper) in between the UV torch and the solar panel to see which materials block UV light

## Risks

Eye damage caused by UV torch – use a torch with wavelength no shorter than 395nm, include written warnings not to shine in eyes, make this clear to the responsible adult who signs the child up for the CoCoElectro Bag

### Experiment 7 – Making Hydrogen

- 1) You will need the plastic cup, two drawing pins and a 9V battery.
- 2) Push the pins up through the bottom of the cup, make sure they do not touch each other and make sure that the top of the pins (the flat bit) will touch the terminal of the battery
- 3) Put water in the cup and add some bicarbonate of soda (available at most supermarkets or home baking stores)
- 4) Place your cell onto of the 9V battery – what happens at the sharp ends of the pins?

## Risks

**Puncture wounds** – from the drawing pins. Be careful when pushing the pins in and clear up any pins that are dropped on the floor

**Slip hazard** - Water. If dropped the spilled water will present a slip hazard. Clear up any spills immediately

## **Experiment 8 – Fluid storage**

- 1) Place a sponge inside the square petri dish
- 2) Fill the 20ml measuring cylinder to the '25ml' mark.
- 3) Slowly pour the water onto the sponge until the sponge can absorb no more water (you may need to refill the measuring cylinder to the 25ml mark)
- 4) Take a second sponge and cut it up and repeat steps 1-3 – does a sponge with a larger surfaces area (i.e. one that has been cut up) absorb more water?

### **Risks**

**Slip hazard** - Water. Spilled water will present a slip hazard. Clear up any spills immediately

**Cuts** – if using scissors to cut the sponge take care not to cut your finger – ask an adult to help

## **Experiment 9 – Bake a battery**

- 1) Make your cake mix using your favourite recipe
- 2) Put the batter in a tin
- 3) Bake it
- 4) Decorate and assemble your cake

### **Risks**

Burns – there will be a risk of burns from the oven. Get an adult to help

Allergic reaction – make sure that ingredients that you are not allergic to are used

## **Experiment 10 – battery Jenga**

- 1) Put the stickers onto the Jenga blocks
- 2) Assemble the jenga blocks and remove the blocks as described in the booklet (i.e. quickly or slowly)

## **Risks**

**Slip / trip** hazard – blocks that are scattered on the floor may present a trip hazard- clear them up immediately.