

B22
STEM Hands-on Experiments –
SDG 12 Responsible Consumption

Activity/Experiment title:	DIY LED there be Light!
Activity owner: (Name of School/ Institution/University/Organization)	LKC FES D3E
Description of activity/experiment: (objective, content, etc)	<p><u>1. Pencil drawing LED light</u></p> <p>To draw a LED circuit using pencil. <i>Level: Easy</i></p> <p>Team size: 1-3 students / team Materials provided for each group:</p> <ul style="list-style-type: none">- 3 sheets A4 paper- 3 2B pencils- 1 LED- 1 9V battery- 1 pencil sharpener- 1 eraser- 1 roll cellophane tape <p>Procedures:</p> <ol style="list-style-type: none">1. Use pencil to draw any design on the paper (you may start by following the example given below). Draw a simple image where the lines are connected from battery terminal to LED terminal. Create thick bold lines with the pencil. <div data-bbox="837 1310 1173 1545" data-label="Image"></div> <ol style="list-style-type: none">2. In the drawing, leave at least a 1 cm gap on opposite ends of the drawing. Mark the positive and negative lines.3. Take an LED and bend the bottom ends of the wires.4. Tape the wire at the end of the lines across one of the gaps, aligning positive and negative wires. The longer side of the LED is the positive side. The wires should be in contact with the graphite lines.5. Place the battery on the other gap. Align the positive and negative ends with the graphite lines. The LED should light up.6. Try drawing lines of different lengths and thickness to see if it makes a difference to the LED.

2. Potato-powered LED light:

To determine the number of potatoes required to light up different types of LED.

Level: Intermediate

Team size: 1-3 students / team

Materials provided for each group:

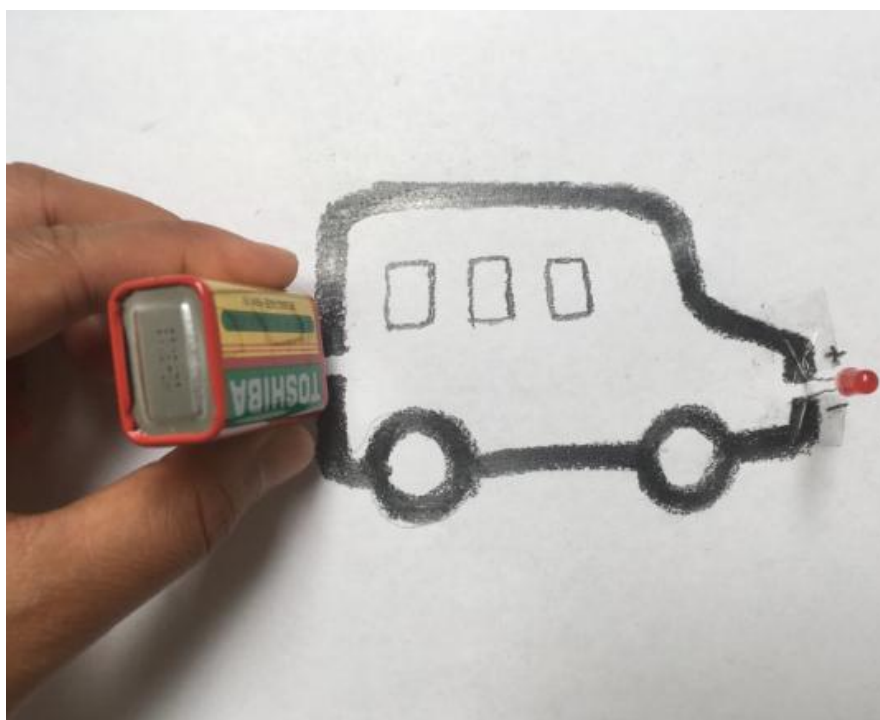
- 6 potatoes
- 1 Red LED
- 1 Green LED
- 1 Yellow LED
- 7 crocodile clip wires (1 red, 1 black, 5 others)
- 6 Zinc nails 1"
- 6 Copper strips 5cm

Procedures:

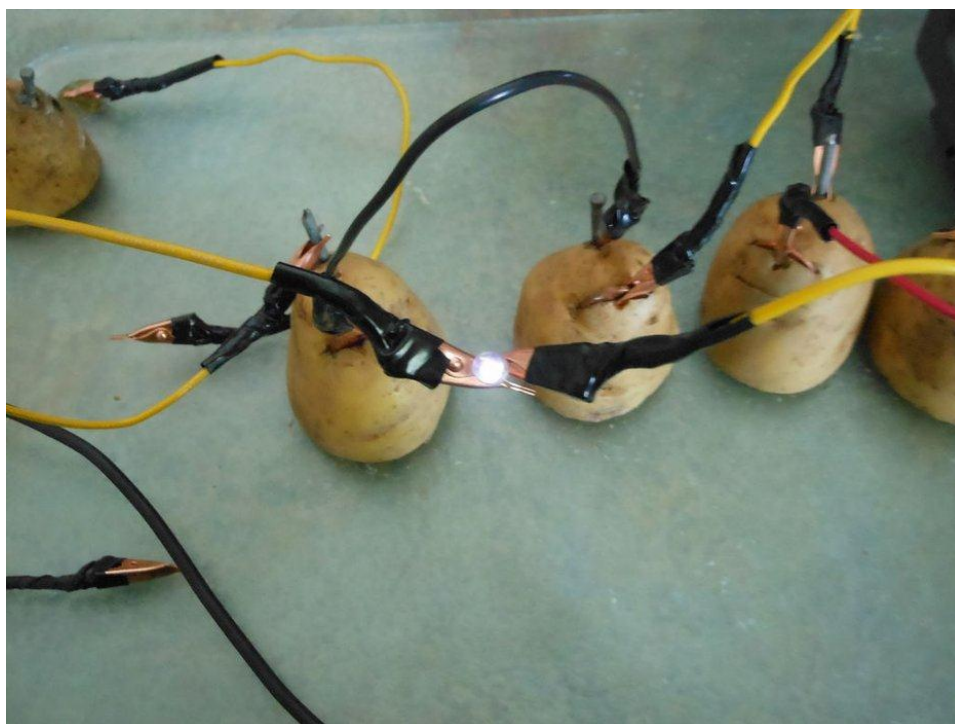
1. Push the copper strip into the potato, leaving a small end to clip the wire. This will be the positive terminal.
2. Next, create the negative terminal. Push one zinc nail into the other side of the potato, about 4 cm away from the copper strip. It is important that the nail and copper strip is separated to prevent shorting.
3. Repeat this process until there are 6 complete potato batteries.
4. Attach a black crocodile clip wire to the nail (negative terminal) of the first potato.
5. Then, attach a crocodile clip wire from the copper strip (positive terminal) of the first potato to the nail (negative terminal) in the second potato.
6. Add the rest of the wires, alternating positive and negative, until all the potatoes are attached.
7. Connect the first wire from the nail to the negative connection on the LED. The negative connection on the LED is the shorter wire nearest the base.
8. Then, clip the wire from the copper strip of the last potato in your chain to the positive connection on the LED.
9. When you complete your circuit, the LED will light up!
10. Experiment with less potatoes to determine what is the fewest number of potatoes required to light up the LED.
11. Repeat experiment with different coloured LEDs.

	<p><u>3. Blinking LED light</u></p> <p>To construct a blinking LED light using electronic components <i>Level: Advanced</i></p> <p>Team size: 1-3 students / team Materials provided for each group:</p> <ul style="list-style-type: none"> - 1 Breadboard - 1 IC NE555 - 6 Resistors (820, 1k, 220k, 360k, 470k, 1M) - 1 Capacitor ceramic 1μF - 1 LED - 10 jumper wires - 1 9V battery with wired holder - 2 crocodile clips (red and black) - 1 Instruction sheet with easy to understand diagram <p>Procedures:</p> <ol style="list-style-type: none"> 1. You will connect an electronic circuit by following the diagram shown on the instruction sheet. 2. Attach the IC to the breadboard as shown in the instruction sheet, taking care of the direction. 3. Attach the other electronic components (resistors, capacitors, LED) to the breadboard. Make sure the LED positive and negative wires are connected correctly. 4. Connect the components together as shown using jumper wires. 5. Connect the circuit to the battery using crocodile clip wires. Make sure the battery positive and negative terminals are connected correctly. 6. The LED will blink for about every half second. 7. Try with different resistors as shown and see the effect.
<p>Time frame:</p>	<p>45 minutes per session</p> <p>8 sessions per day: 9.00 am – 9.45 am 10.00 am – 10.45 am 11.00 am – 11.45 am 1.00 pm – 1.45 pm 2.00 pm – 2.45 pm 3.00 pm – 3.45 pm 4.00 pm – 4.45 pm 5.00 pm – 5.45 pm</p>

Activity 1:



Activity 2:



Activity 3:

