Glow Your Own

Building and coding your circuit
You can build, test and code your circuits virtually on Tinkercad: [www.tinkercad.com](http://www.tinkercad.com)
If you would like to join the Glow Your Own class on Tinkercad, please log on to [https://www.tinkercad.com/joinclass/T57CPM3BFZGP](https://www.tinkercad.com/joinclass/T57CPM3BFZGP) and enter your nickname, which will be sent to your email address and look like: 2021-GYO-000 (number, number, number)
If you need a new nickname, please email visitral@stfc.ac.uk

Getting started
- Once you’ve signed into Tinkercad, click on the ‘Circuits’ option in the menu on the left hand side

![Circuit creation in Tinkercad](image)
- Click on ‘Create new circuit’
- First – name your circuit! You can do this by clicking in the box at the top left of the screen – here we’ve named the circuit “Red Alert – Task 1”

![Named circuit in Tinkercad](image)
• You can see the electronic components you can use on the right hand side of the screen. To choose a component, simply click on it and drag it to the working area on the left hand side. You can find out more about each component by changing the view, using the button below.

• You can code your Arduino by clicking on the ‘Code’ button and dragging the code blocks you need to the right.

Circuits to build and code

Turning on a light
The simplest circuit to build and code is one that turns on a light – which we call an LED (Light Emitting Diode). It uses an LED, two wires and a resistor.
(The best value to use for your resistor is 220 Ω.)

To turn your light on, you can use the following piece of code:

```
repeat [while] 1 = 1
  set pin 4 to HIGH
```

This tells the Arduino to send a message saying “turn on” to pin number 4. You can then test your code by clicking “Start Simulation” on Tinkercad. Does your LED turn on?

You can also get your light to flash in beautiful patterns by changing your code as follows:

```
repeat [while] 1 = 1
  set pin 4 to HIGH
  wait 1 secs
  set pin 4 to LOW
  wait 1 secs
```

**Sending your code to the physical Arduino**

To send (or “upload”) your code to your physical Arduino, the easiest option is to install the Arduino program on your computer. You can install it from here:

https://www.arduino.cc/en/software
Once you’ve built your circuit, use the USB cable to connect your Arduino to your computer. If you need to change your electrical components, always remember to unplug your Arduino from your computer first! Then in Tinkercad, in the Code section, change “Blocks” to “Blocks + Text”.

Copy and paste from the Text section of Tinkercad into the Arduino program, save your code and then click the right-pointing arrow to send (or “upload”) your code to your Arduino.

If the code uploads correctly, it should say “Done uploading” at the bottom of the screen:
One common error to watch out for is when the computer doesn’t know which USB port the Arduino is connected to – if this happens you will see an error message at the bottom of the window:

To fix this problem, open the “Tools” menu, and check that the “Port” option has (Arduino Uno) in brackets, as below.
Your Arduino and LED kit

Your Arduino and LED kit can be ordered from a range of online retailers. It is not needed for the first session and all other sessions can be enjoyed without the kit.

Run by IF Oxford and forming part of the Oxford Christmas Light Festival 19—21 November, the festival charity has a small grant to support the inclusion of families on low incomes who might find the cost of the Glow Your Own equipment prohibitive.

Most of the components that are needed (with a few extra items that we won’t be using) are contained in a ELEGOO UNO R3 Project Super Starter Kit Arduino activity pack containing:

- ELEGOO UNO R3 Board compatible with Arduino
- Servo Motor
- Photo Resistor / Light Dependent Resistor
- Light Emitting Diodes
- Jumper Wires
- 100 Ω ohm 1K Ω ohm resistors

Activity packs are available to buy online, including on Amazon retailing (correct 1 October 2021) at £36.99:

https://smile.amazon.co.uk/gp/product/B01D8KOZF4/ref=ewc_pr_img_1?smid=AZF7WYXU5ZANW&psc=1

IF Oxford receives no commission for this purchase but if you select Oxfordshire Science Festival as your chosen charity, Amazon will make a donation to the Festival at no cost to you using their Amazon Smile charity option.