

# 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/Q9Z4QH93S57B> and enter your nickname. If you need a new nickname, please email [visitral@stfc.ac.uk](mailto:visitral@stfc.ac.uk)

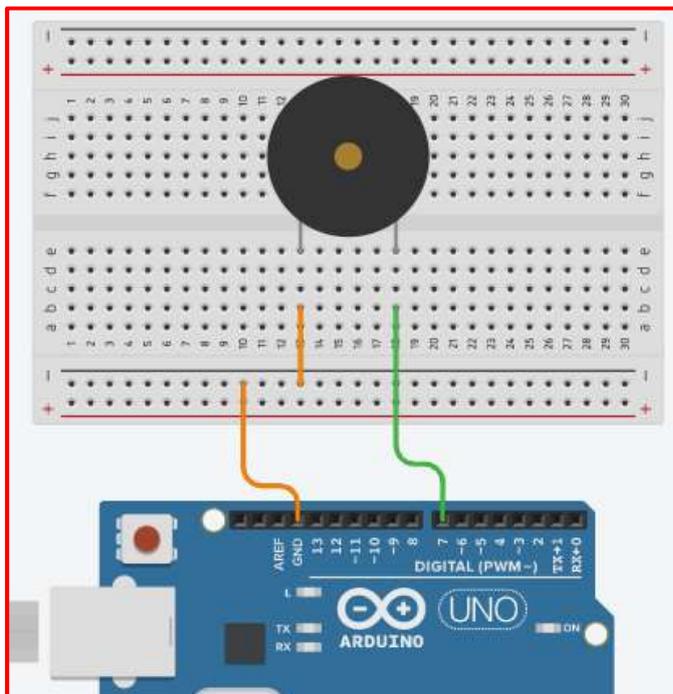
You can remind yourself how to get started, and upload code to your Arduino, using the “GlowYourOwn-HowToSheet”.

## Building a theremin

A theremin is an electronic musical instrument that’s controlled without touching it. It was invented in 1928 by Leon Theremin. To build a simple theremin, you need a **piezo buzzer**, a resistor, some wires and a **photoresistor**. The buzzer will make a noise – and the frequency of the noise depends on how much light the photoresistor detects. You, as the musician, can control the sound by changing how much light the photoresistor sees.

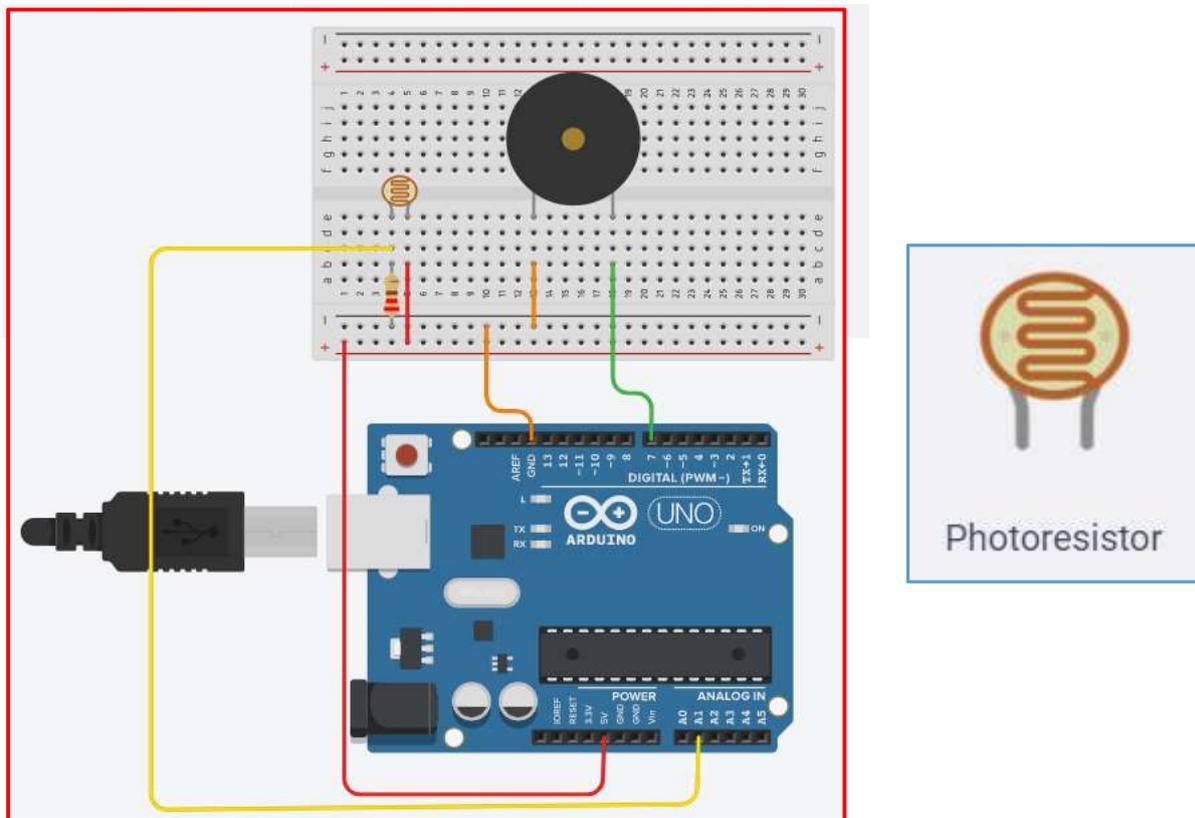
**WARNING!** This can be noisy, so don’t practice when people are asleep around you!

Firstly, we’ll build the circuit that connects the piezo buzzer to the Arduino. This is a simple circuit, going from one of the Arduino pins to the piezo buzzer and then back to ground.



When you’re making the physical circuit, make sure the wires are connected to the same breadboard columns as the buzzer legs – it can be hard to see under the buzzer!

Next, we need to add another circuit for the photoresistor – which can send information to the Arduino about how bright it is. We've used this circuit before, when we turned an LED on when it got dark. Add the photoresistor circuit below to your breadboard.



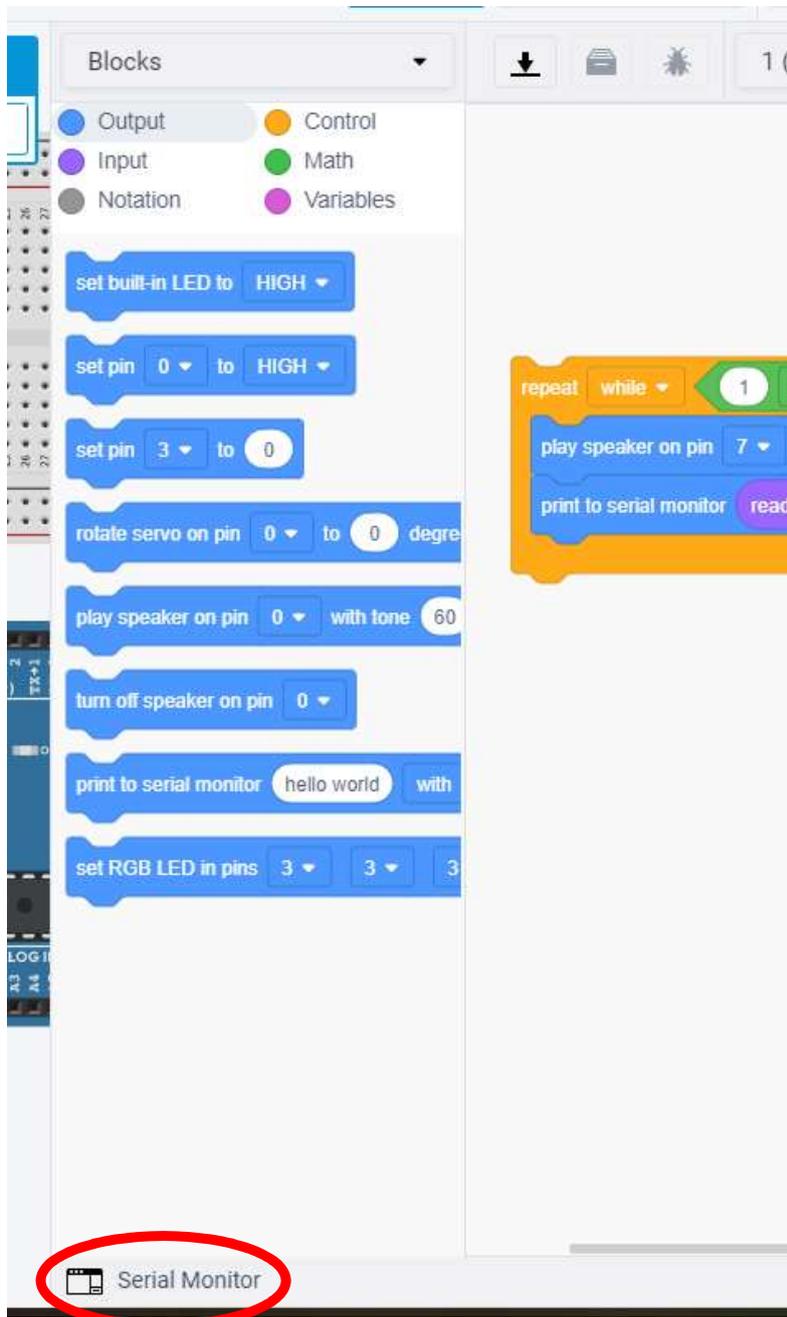
(The best value to use for your resistor is 1 kΩ.)

To code the piezo buzzer to make a noise that depends on the light seen by the photoresistor, use the following code:



This tells the Arduino to play the speaker connected to pin 7 with a sound that's controlled by the value the photoresistor is sending to pin A1. You can then test your code by clicking "Start Simulation" on Tinkercad.

The block **“print to serial monitor”** means we can tell what value the photoresistor is telling the Arduino, as it will print that value to the screen. If you’re using Tinkercad, you can see the Serial Monitor at the bottom of the screen:



If you’re using a physical Arduino, you can see the Serial Monitor by clicking on the **“Tools”** menu and choosing **“Serial Monitor”**.

When you’re simulating your circuit in Tinkercad, click on the photoresistor and you can change the light level the photoresistor sees.

Does your buzzer make a noise? Try moving your hand up and down over the photoresistor – does the sound change?