# Calculating LDR formulas

## Apparatus:

* Portable light source (I used my phone’s torch)
* 30cm ruler

## Setup:

* wait until midnight, so all other sources of light are negligible.
* only preformed the experiment on 1 LDR at a time.
* Measure the gap between the 0cm mark on the ruler and the LDR (for my setup it was 1.2cm (on MDF) + 0.5cm (on ruler) = 1.8cm)
* Upload the LDR formula code and open the Arduino IDE's serial monitor to collect data from the experiment.
* Remove all inserted pieces
* Turn off all lights including the portable light source. The computer’s screen should provide sufficient light to navigate in the dark

## Method:

* clear the serial monitor output
* position the 30cm ruler perpendicular to the front panel of the toy
* place the light at the 5cm mark on the ruler and point it directly at the LDR
* turn on the light
* wait 30 seconds
* turn off the light
* copy all the serial output to Notepad and delete any readings that weren't during the thirty second interval (if unsure about any readings, delete them as it’s better to have less readings that to have inaccurate ones)
* Save the file as “[piece colour][slot number]\_[distance]cm.csv” (e.g., “none6\_5cm.csv”)
* Repeat this experiment for distances of 5cm, 10cm, 15cm, 20cm, 25cm and 30cm
* then repeat for different slots and different piece colours
* used the python program attached to collate all the data together into a new “all\_results.csv” file.
* Finally open this final in Excel and analyse the data to find the correct formula for converting from LDR resistance to light intensity. An example of this being done has also been uploaded – all\_results.xlsx