

WATER PURIFIER PROJECT

Presented by: Scott.T, Ethan.B, Steffan.W & Tommy.R



Project Topics



When deciding on a project we had 3 topics to choose from;

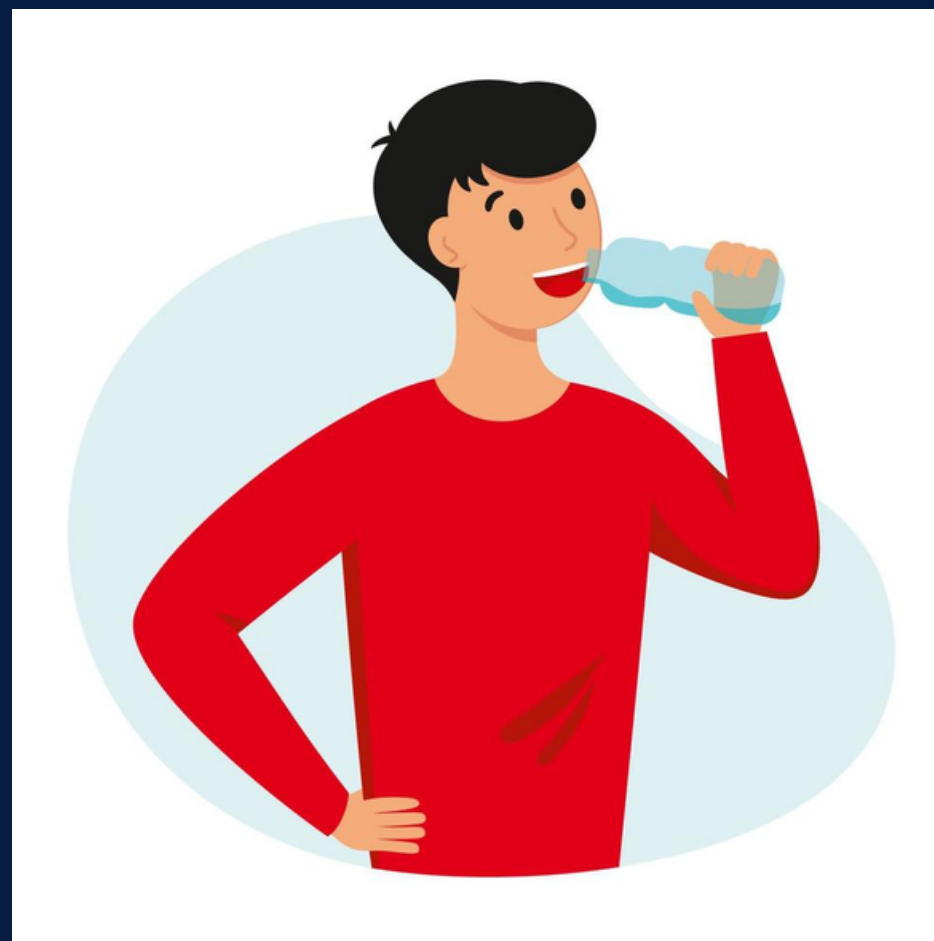
- Design a STEM project for school children in developing countries.
- Design a project that is aimed at helping people to be more eco-friendly at home.
- Design a low-cost assistive device to help people with an impairment or disability.

The project we have chosen is STEM.



What is our Project?

We have chosen to design a water purifier that uses a combination of natural resources and UV light to filter out and eliminate over 99% of bacteria, making water safe to drink.



Why did we choose our project?

We came up with a project idea that we were all happy with and matched it with the topic that made the most sense. In this case, STEM was the best match for our project.

Our target is to provide a fun but useful build for school children aged 10-11 that will show them how engineering can help people that are struggling in developing countries.

A 2018 report carried out by Unicef found that globally, 31% of schools do not have access to clean drinking water, affecting 570 million children.

JOB ROLES

Coding

Steffan Weaver

**Sourcing
Parts**

Scott Tavner

**Bread-
boarding**

Ethan Byrne

**CAD
Design**

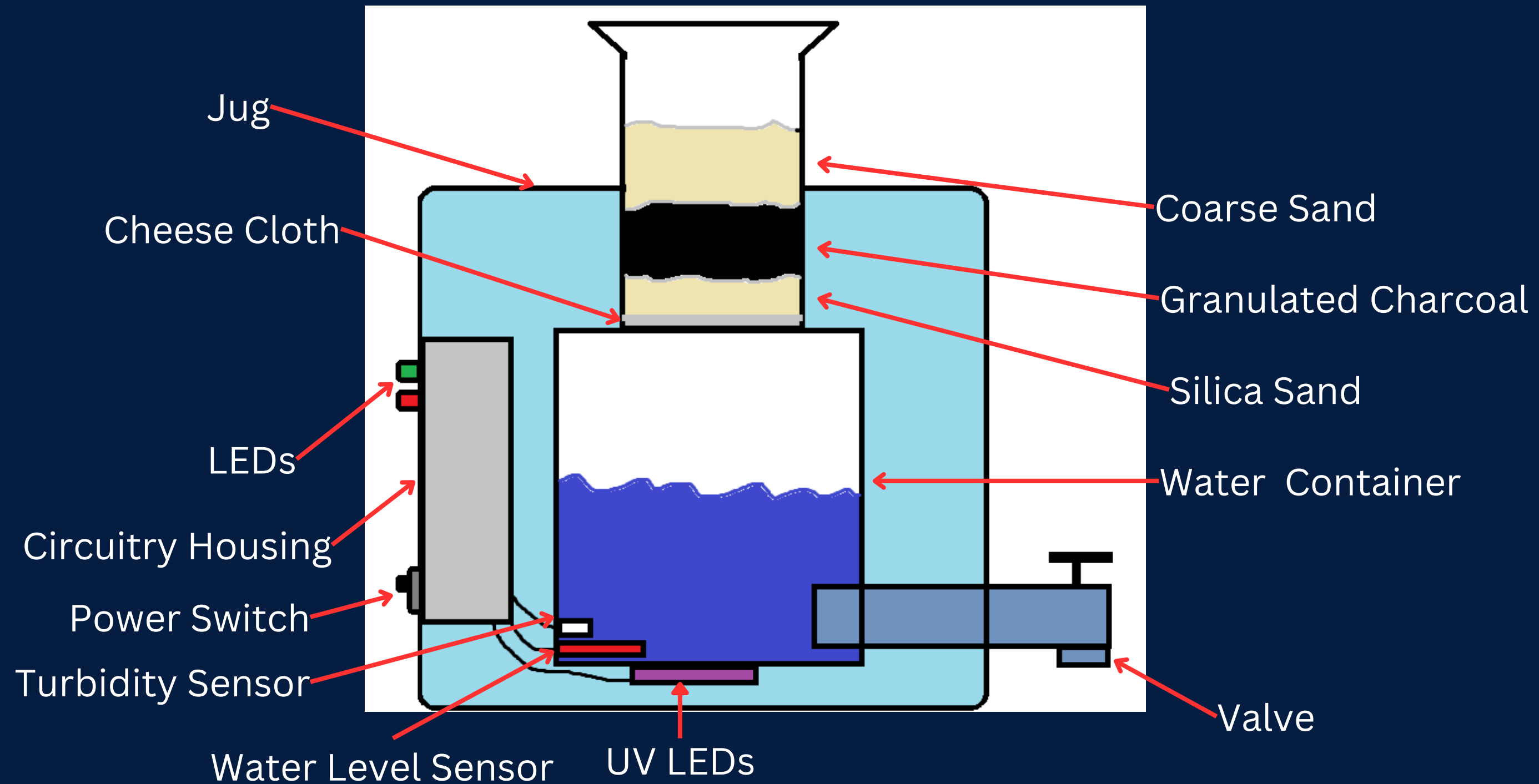
Tommy Rosser

**PCB
Design**

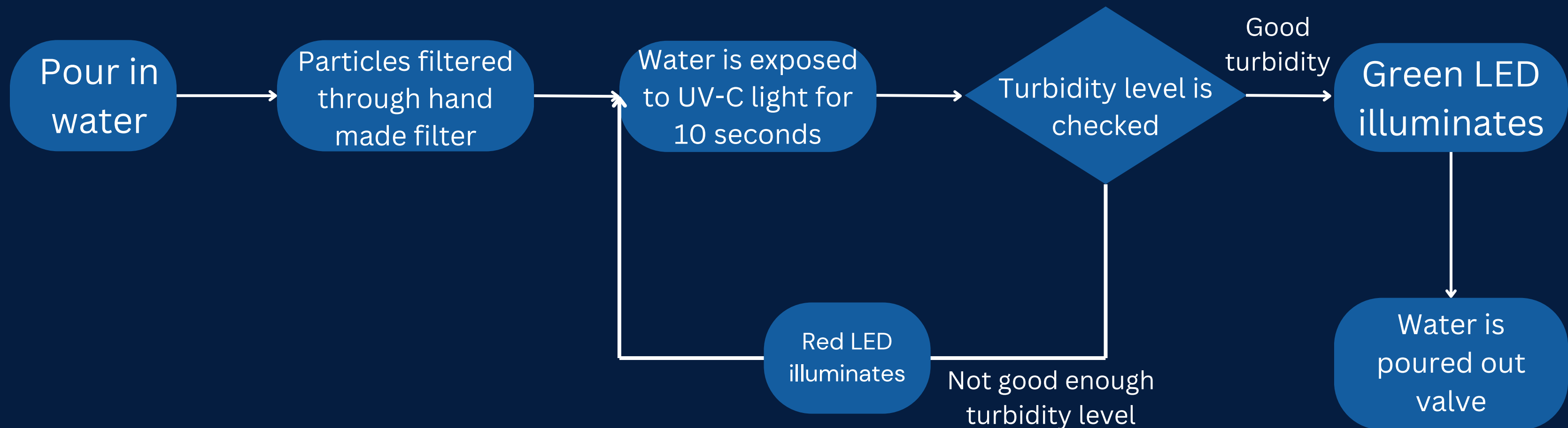
Scott Tavner



Labeled Diagram



How does it work?





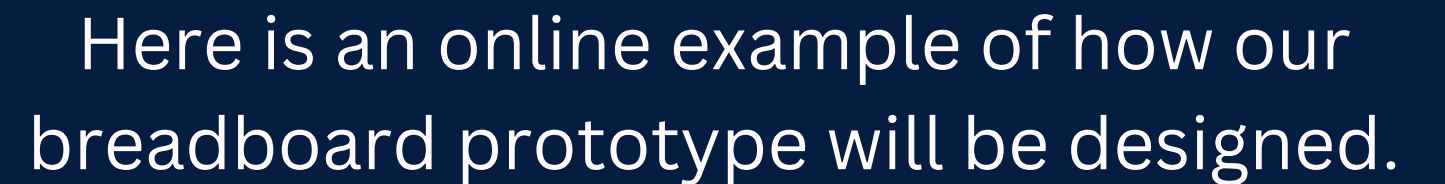
Coding



For the coding software we'll be using C++ code on the Arduino program as this is the code we are most familiar with and find the easiest to implement into the project. The code will be used to program an Arduino UNO which will control all electronic components in the design. If we find that we need more pins for more components, we will upgrade to an Arduino Mega.

Component	Input/Output
Transistor	Output
Green LED	Output
Red LED	Output
Water Level Sensor	Input
Turbidity Sensor	Input

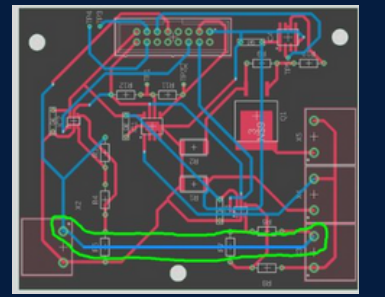
A rustic loaf of bread, dusted with flour, sits on a dark wooden cutting board. Two slices are cut and placed next to the loaf. A green cloth and a black container are visible in the background.



Our UV LED is surface mounted, therefore we will solder wires to the anode and cathode to connect it to the breadboard.



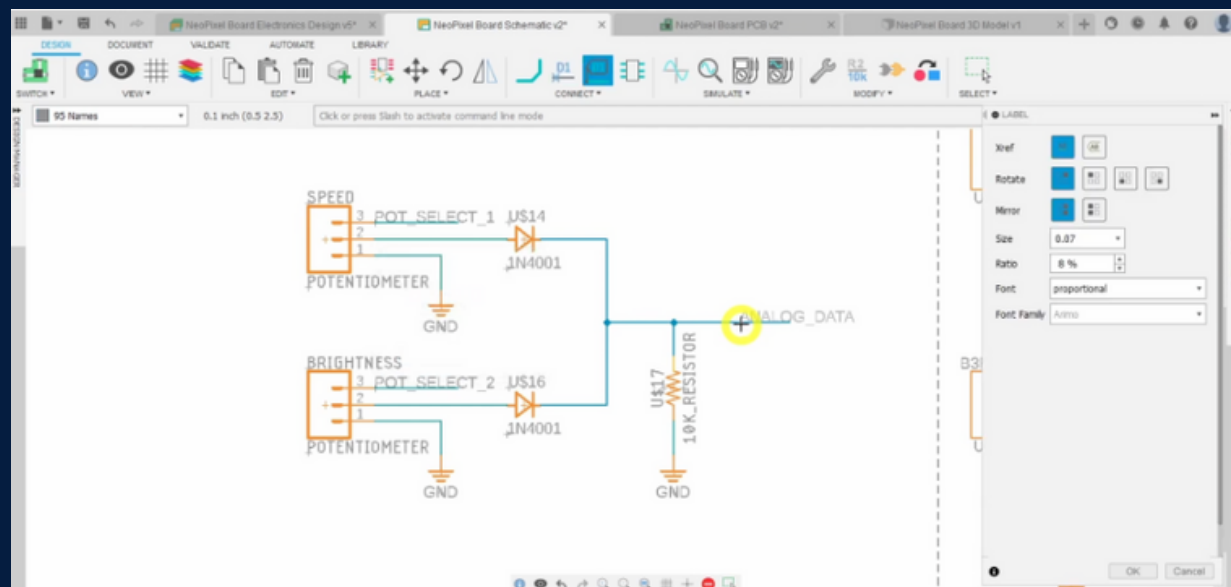
PCB Design



Software used

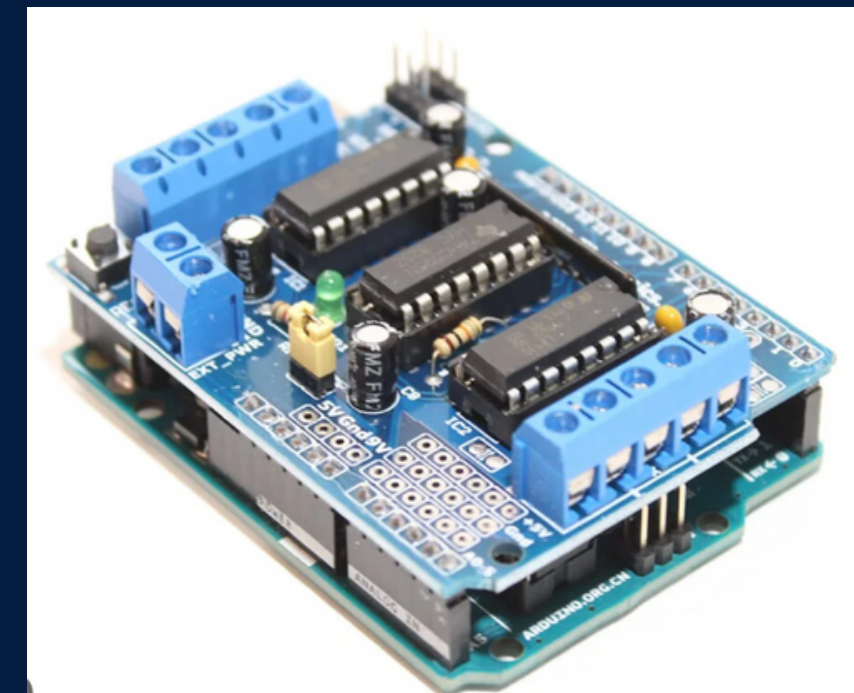
For the PCB design we are going to use Autodesk Fusion as it is the software we are most familiar with.

Once the PCB has been designed it can be sent off for printing on the LPKF machine.

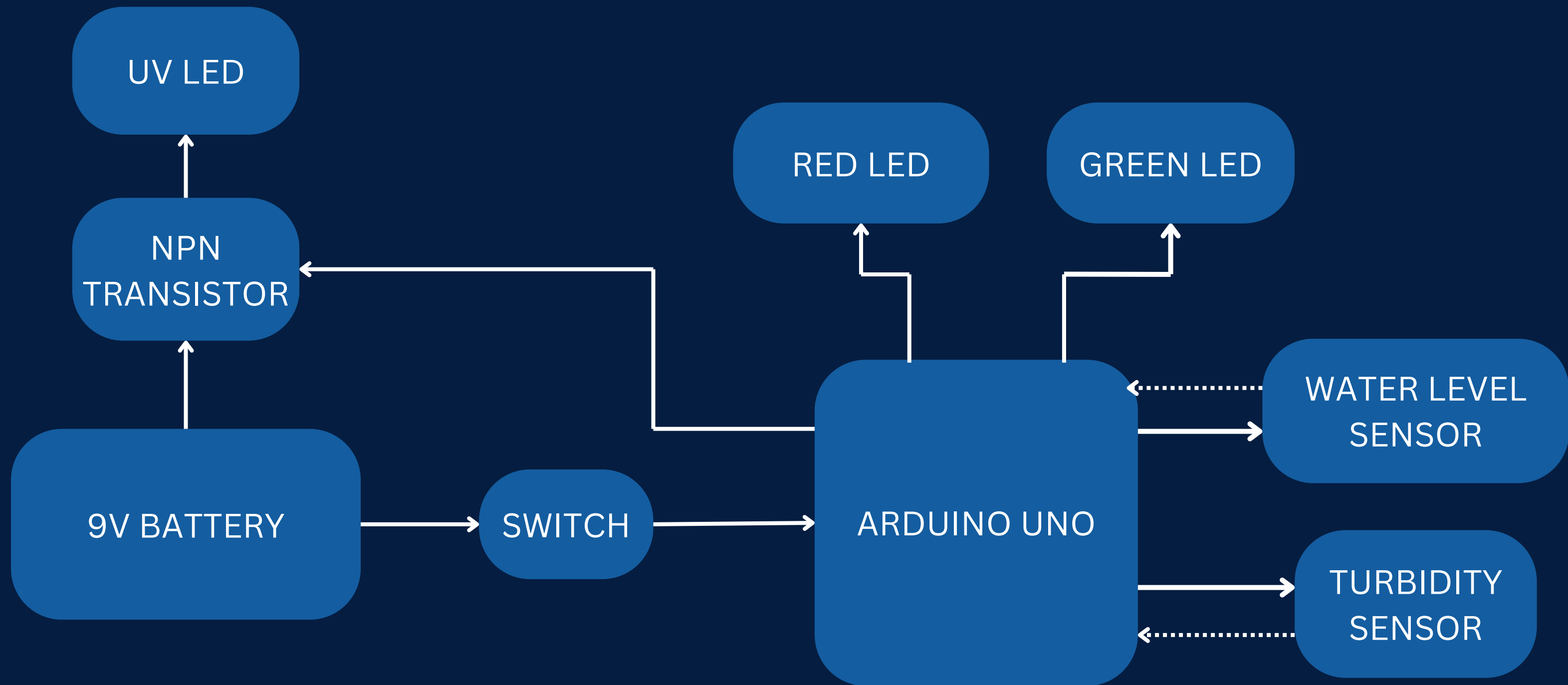


Design Layout

The PCB will be designed so that it can be plugged directly into the pin heads on top of the Arduino with the green/red LEDs and power switch protruding through the circuitry housing.



Block Diagram





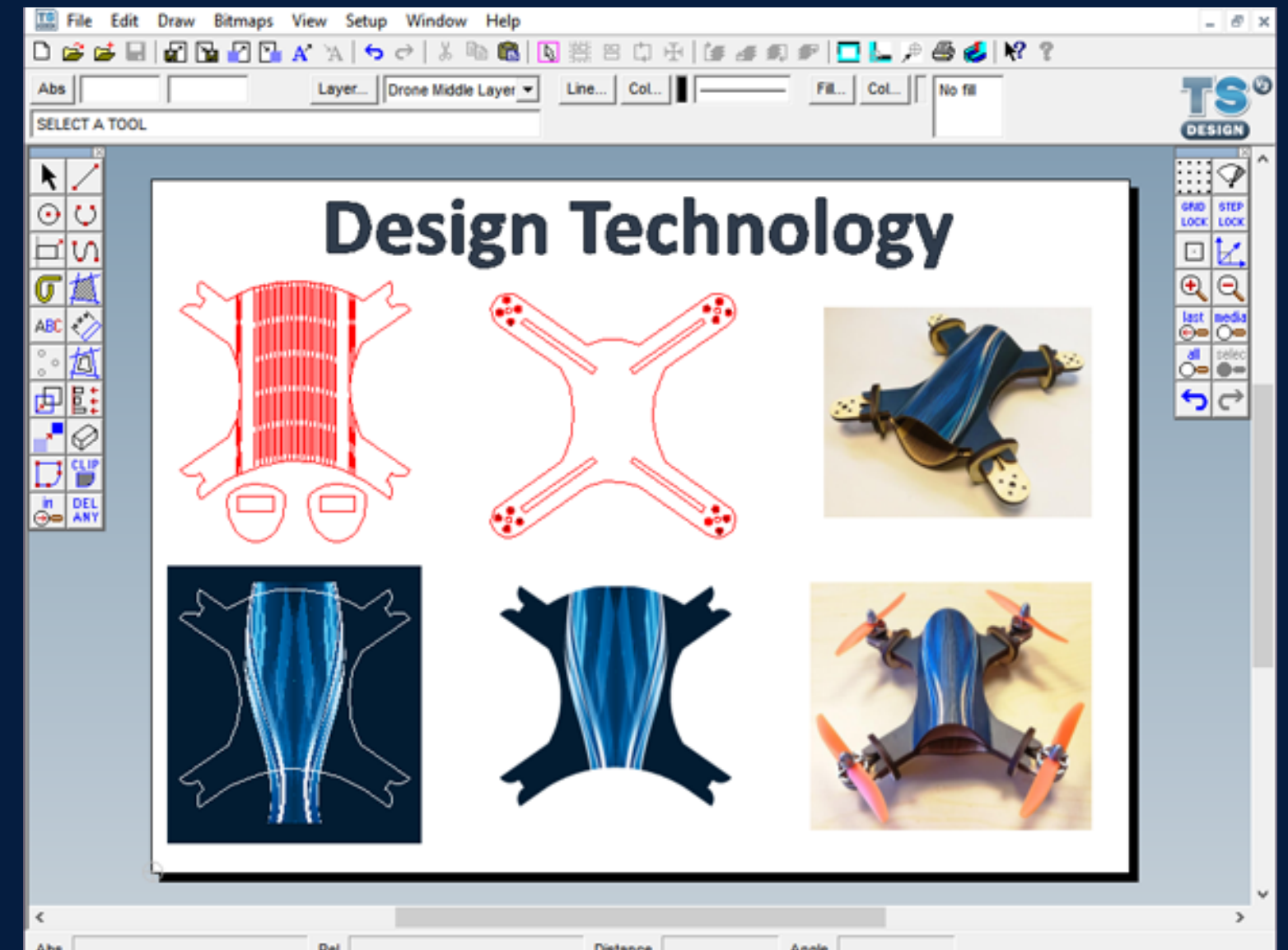
CAD Design

The CAD software we have decided to use is Techsoft Design V3. We want to use Techsoft because we believe with all of our skills and experience combined, Techsoft will be the easiest software to successfully design the entire purifier. If we are unsuccessful in using Techsoft, there are a few other options for CAD software such as; Autodesk Inventor and Fusion.

After the design process is complete, in order for it to be 3D printed we will have to splice it in the flash print software, this is because it is the software that comes with the printers we have access to. "PP is one of the better options for printing waterproof parts. It is less prone to swelling than PLA or PETG and it is chemical resistant".

We will need to design:

- Circuitry housing
- Water container
- Funnel
- UV LED holder

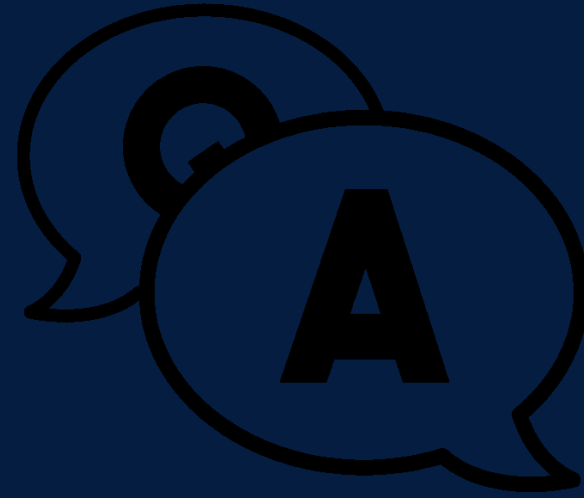


Bill of Materials

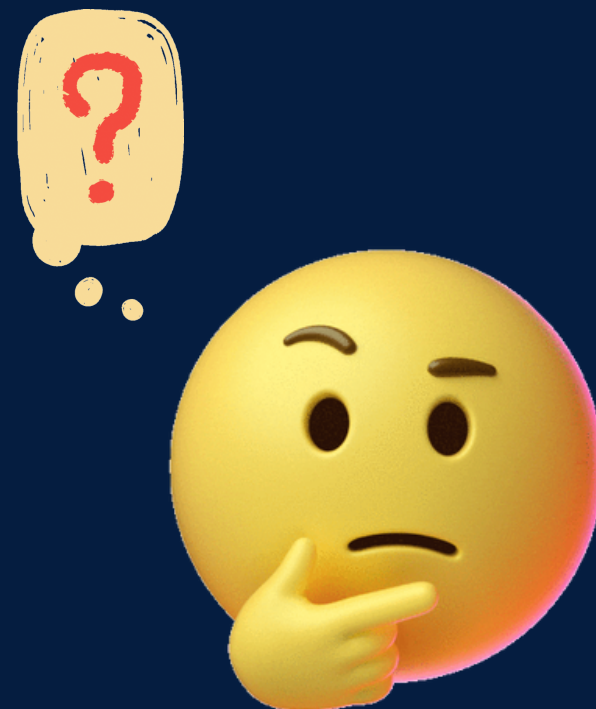
Item	cost (£)	quantity	total (£)		
UV LED	6.13	3	18.39		
Water level sensor	6.99	2	13.98		
Turbidity sensor	9.5	2	19		
Green led	0.199	3	0.597		
red led	0.362	3	1.086		
2K2 resistor	0.11	3	0.33		
10R resistor	0.09	3	0.27		
220R resistor	0.169	6	1.014		
Silica Sand	2.56	1	2.56		
Granulated Charcoal	4.99	1	4.99		
Cheese cloth	2.89	1	2.89		
arduino Uno	15.84	1	15.84		
Jug	15.99	1	15.99		
2N2222 NPN Transistor	0.11	3	0.33		Total cost of every item (£)
					96.337

Gantt Chart

[illegible]



Any Questions?



Bibliography

WaterAid. (2018, August 24). Young children most at risk from lack of water, sanitation and hygiene in schools. Retrieved from WaterAid:
<https://www.wateraid.org/uk/media/young-children-most-at-risk-from-lack-of-water-sanitation-and-hygiene-in-schools>

UltiMaker. (2023). How to 3D print waterproof parts. Retrieved from UltiMaker:
<https://ultimaker.com/learn/how-to-3d-print-waterproof-parts/#:~:text=PP%20is%20one%20of%20the,not%20break%20after%20repeated%20bending.&text=ABS%20is%20a%20decent%20option%20for%20printing%20waterproof%20parts.>