**Design Proposal**

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| **Project** | Buzzer System |
| **Designer** | Ryan Mitcham |
| **For** | Colyton Grammar School |

Here is an image of the full buzzer assembly, as I have designed it:

A white table with a red and black button

Description automatically generated

The full assembly stands at 100mm long, 75mm wide, and 77mm tall.

The main decision I made is not to include a large button for the players to press, but instead to just use the button as is. The primary reason for this was cost, as 3D printing as large button (with transparent top) and all the support structures that would be necessary would dramatically increase the quantity of 3D printer filament required. After doing some rough calculations, I realised that the filament costs would be about double what they are now and didn’t think that was something that could be properly justified.

Although there is no big button, the players could still hit it as if there was, because the button is raised and there is plenty of empty space around it. The top plate is also strong enough to withstand considerable pressing force, so there are no real concerns about that failing under the load either.

The light is still incorporated into this design, being separated out into its own enclosure. I prefer this design more, as it means the audience will still be able to see the light from the LED, even if the player has their hand covering the button (something that a large button with integrated LED would prevent).

Of course, if you prefer, it would be possible to design an assembly with a big button on it. However, I think that solution would have a few key disadvantages that this method solves (as well as the added cost of 3D printer filament).

The assembly pictured above contains 5 custom parts:

* The legs
  + These slot into the main top plate, and obviously lift it off the ground (giving enough clearance for the button and its wires).
* A leg brace for the front
  + This is used to hold the front two legs together (as they will try and move apart if the button is pressed with force).
* The main top plate
  + Used to mount the button and LED.
* A custom edge connector for the Micro:bit
  + The Micro:bit slots into the component, which provides easy contacts for connecting to the pins on the board (this is required to connect the button and LED).
  + Although it can’t be seen in the image above, it is fastened to the underside of the main top plate (on the other side to the camera).
* Light diffuser capsule for the LED
  + This component will be transparent.
  + It surrounds the LED and diffuses the light from it, to make it more visible to the audience.

The plan is to 3D print all these custom parts. Black PLA filament (sourced through school) will be used, except for the light diffuser capsule (which will be 3D printed from some transparent filament I have at home).

I have worked out that (with the design in its current state), 3D printing 16 of the buzzer assemblies will require no more than one 1kg spool of black filament, and about 16m of transparent filament.

Please let me know if you would like to make any changes to the design; I’d be happy to make any tweaks necessary.

If you’re happy with the design, would it be possible to get the parts ordered up? Then I should be able to have all the buzzers printed and assembled by the February half-term (hopefully!).