

# The Sixth Sensory Space

Professor Zarske GEEN 2400

Team The Sixth Sense: Rachel Sharpe, Sean Wilson, Patrick Marlatt, Kendall McKay, Beatriz Zepeda and Logan Onstott

## Background

Our client, Michelle Grayson, is a teacher in the Intensive Learning Center at Broomfield High School. She needed components to fill a sensory space in her classroom that would facilitate a calming environment for students to relax before or during class.



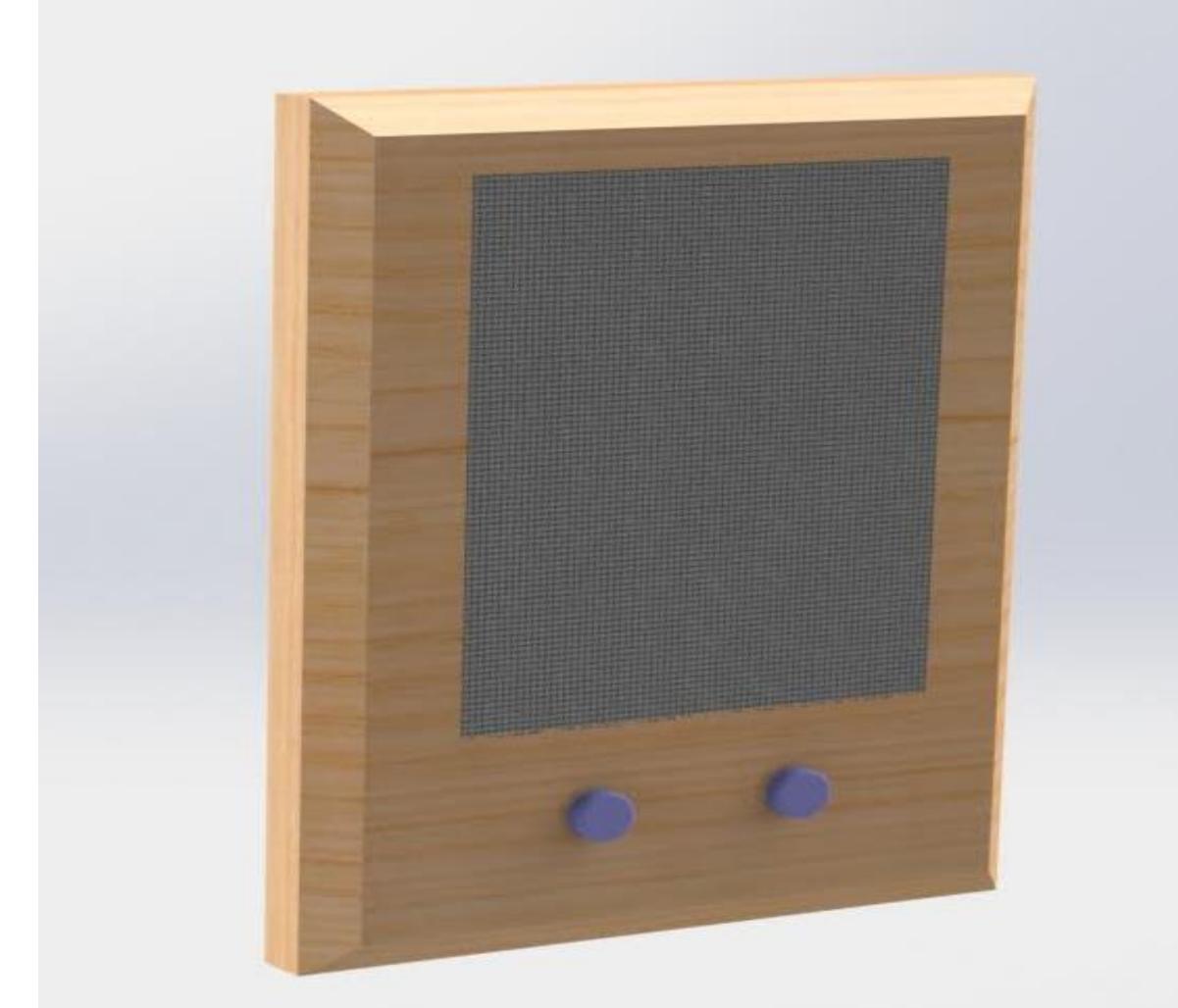
## Design Requirements

- Durable and safe for students.
- Capable of running without wall outlets.
- Fit in an 5ft by 9ft space.
- Easy to remove.
- Relaxing and Interactive components
- Cost Effective

| Item                  | Cost    |
|-----------------------|---------|
| 32x32 RGB LED Matrix  | \$50.00 |
| Arduino Mega          | \$45.00 |
| 3D print material     | \$5.00  |
| Electrical Components | \$5.00  |
| Bubble Tubes          | \$20.00 |
| Wood for Tables       | \$82.00 |
| Batteries             | \$15.00 |
| Water Pumps           | \$30.00 |

## Project Description

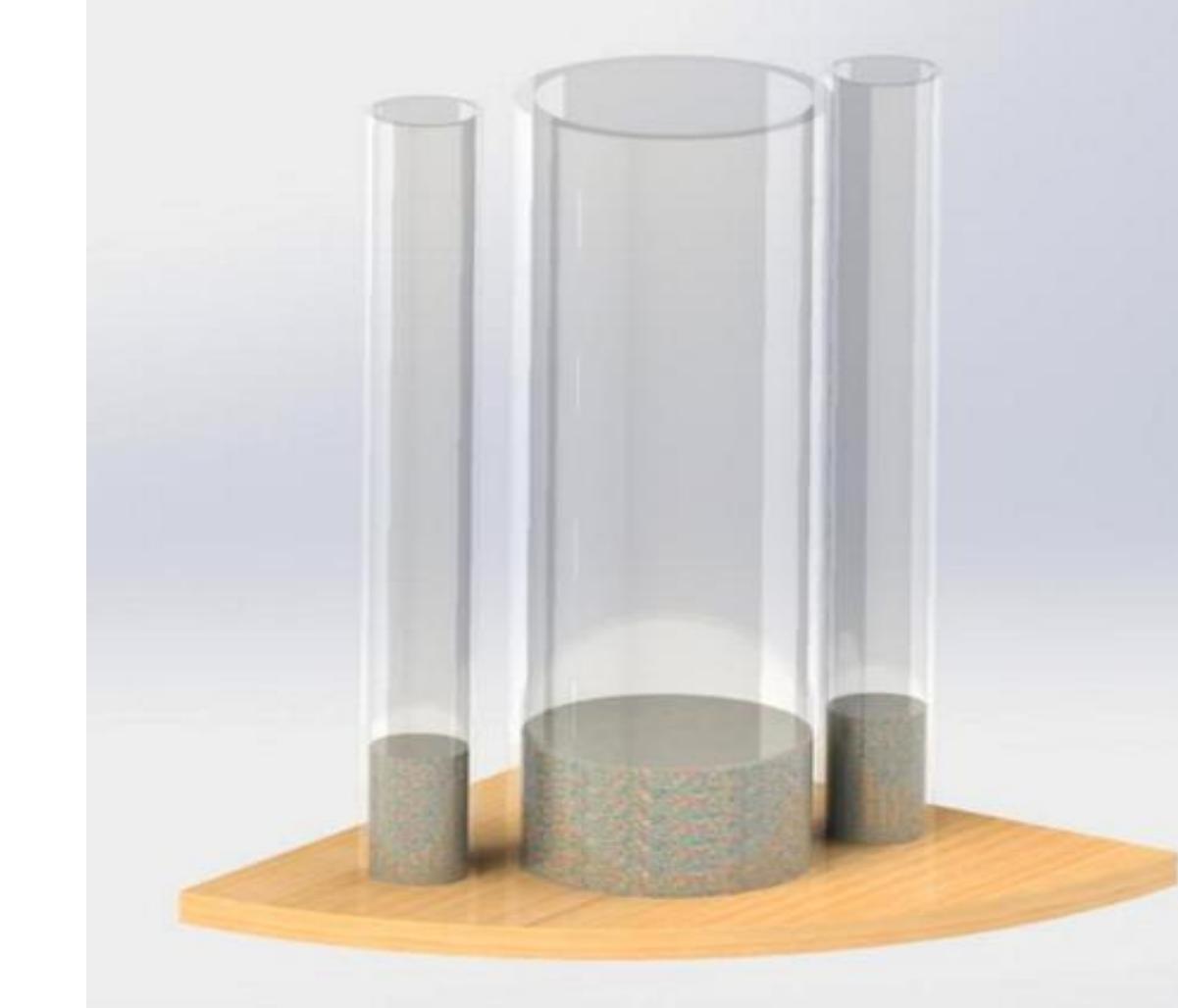
### LED Etch-A-sketch



#### Component Description:

32x32 RGB LED Matrix  
Arduino Mega  
2 potentiometers  
3D printed knobs

### Bubble Tubes



#### Component Description:

One Large and two smaller clear tubes  
2 aquarium air pumps  
Colored rocks and plants  
LED lights

### The Interactive Component

The LED Etch-A-Sketch is a product that allows the students to design and create whatever designs they want in a calm and soothing environment. We've accomplished this through using a 32x32 LED RGB panel with potentiometers that allow the user to move the lights in either the X or Y direction. In addition, a screensaver of a plasma design will allow the user to still enjoy the product even if they don't want to interact directly with it.

### The Soothing Component

The stationary bubble tubes are a product that allow the students to sit back and relax while watching the mesmerizing patterns of the bubbles in the water. In addition, the customizable changing lights provide a soothing yet stimulating ambiance in the sensory space. As part of the design requirement, the bubble tube mount is easily moveable and can transition from one space to another with little effort from the users.

## Future Work

With more time we would add a touch screen potentiometer that would allow all the students to control the color of the LED's on the Etch-A-Sketch. Additionally, we would include a third interactive component that involves magnets.

## Testing and Analysis

| Component        | Required Voltage | Required Amps |
|------------------|------------------|---------------|
| Arduino Mega     | 7-12             | 0.05          |
| 32x32 LED Matrix | 5                | 0.2-2         |

Since both the LED panel and Arduino Mega board need to be run on batteries, testing was done on the amount of average current drawn from the screensaver mode and the Etch-A-Sketch mode of the LED panel as well as the Arduino.

An approximation of the duration of the life of one battery using a general equation.

$$\frac{\text{(Battery Capacity)}}{\text{(Current Draw)}} = \text{Total Hours of Usage per Charge}$$

**For Screensaver:** 30 minutes

**For Etch-A-Sketch:** 2 hours

**For Arduino Mega:** 12 hours

