Appendix of Design

Mechanical United

Approximating Water Usage

Considering the water usage of a dishwasher, the following calculations show the approximation the water usage:

An approximation of 2 gallons is made.

g = gallons of water

$$\frac{3.22}{120} \geq \frac{g}{140}$$

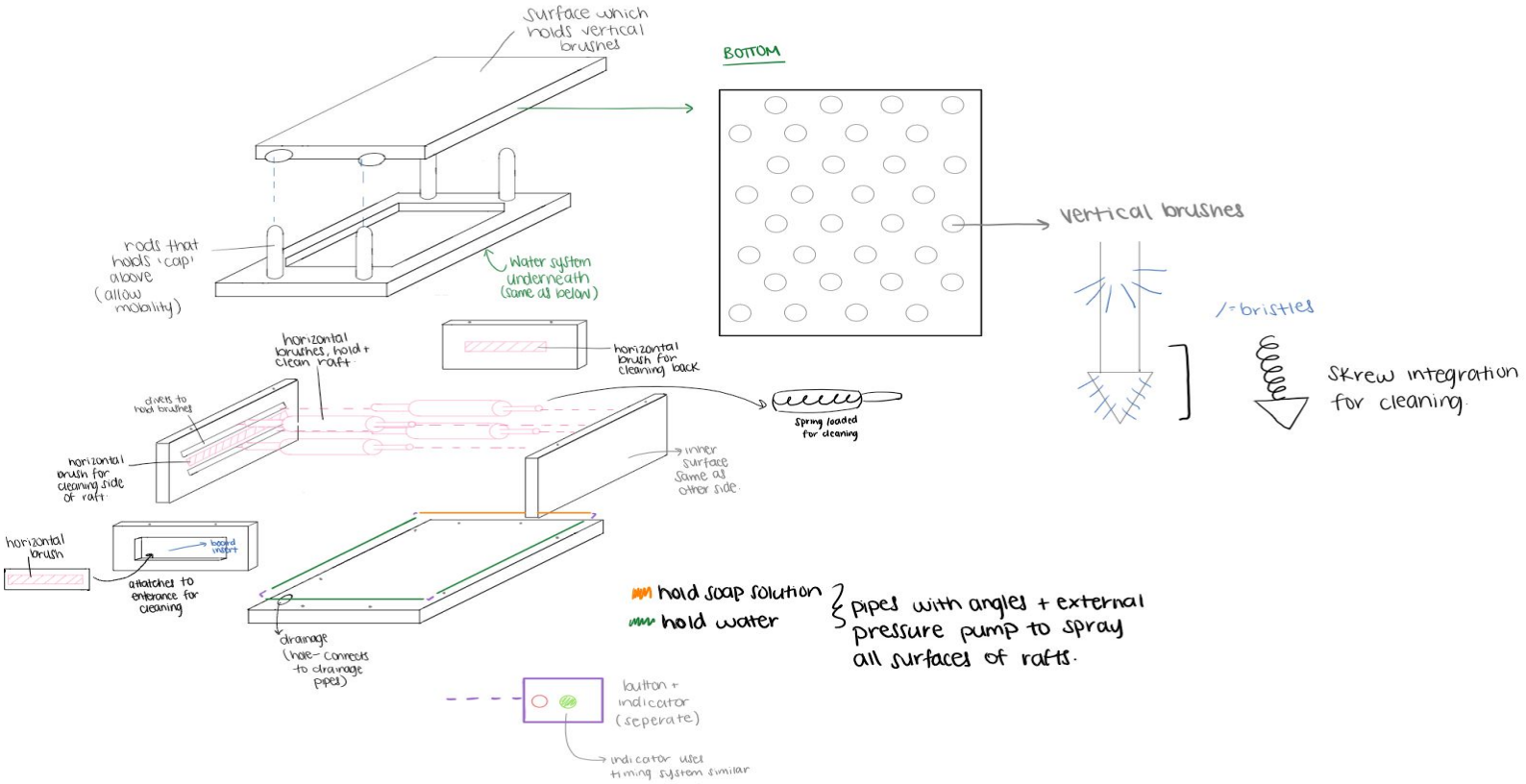
$$0.026833 \geq \frac{g}{140}$$

$$3.75 \geq g$$

From the calculations the approximation is valid.

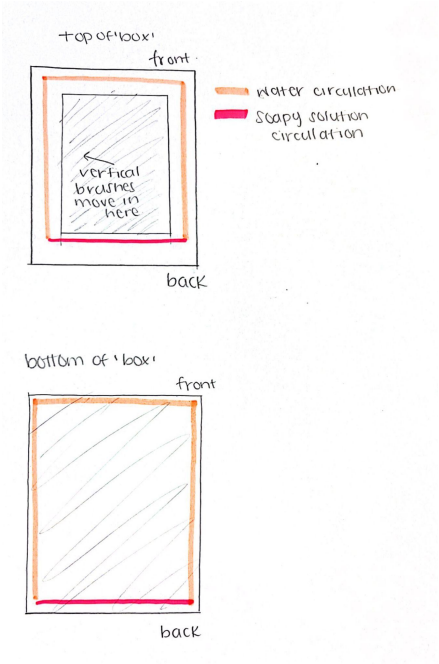
$$\%\ difference = \left|\frac{3.75-2}{3.75}\right| * 100 = 46.8\%$$

The Solution

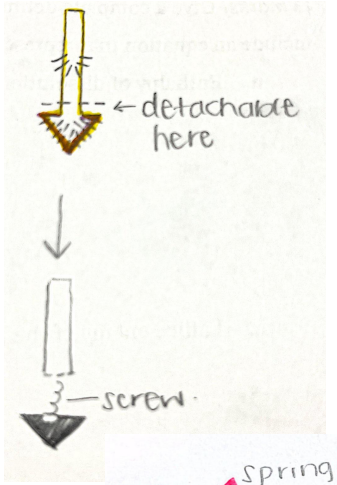


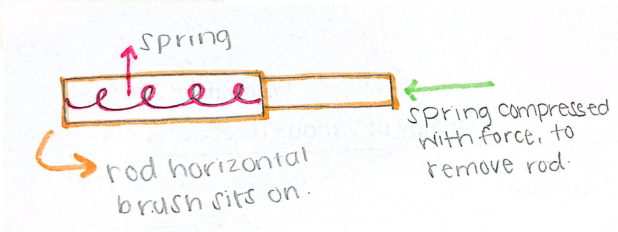
Additional Subsystems

Water Circulation

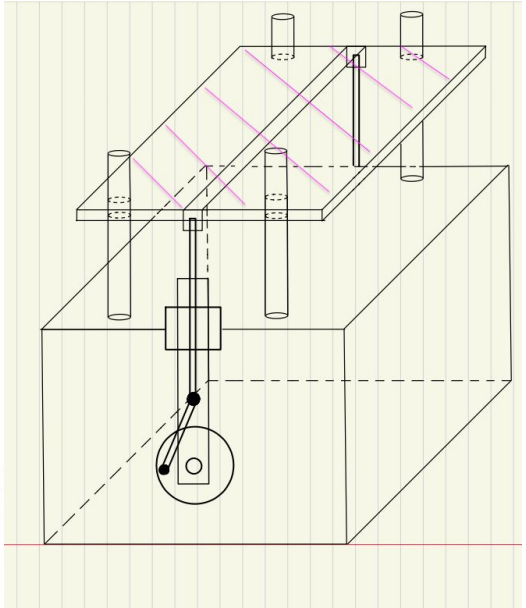


Removable Brushes



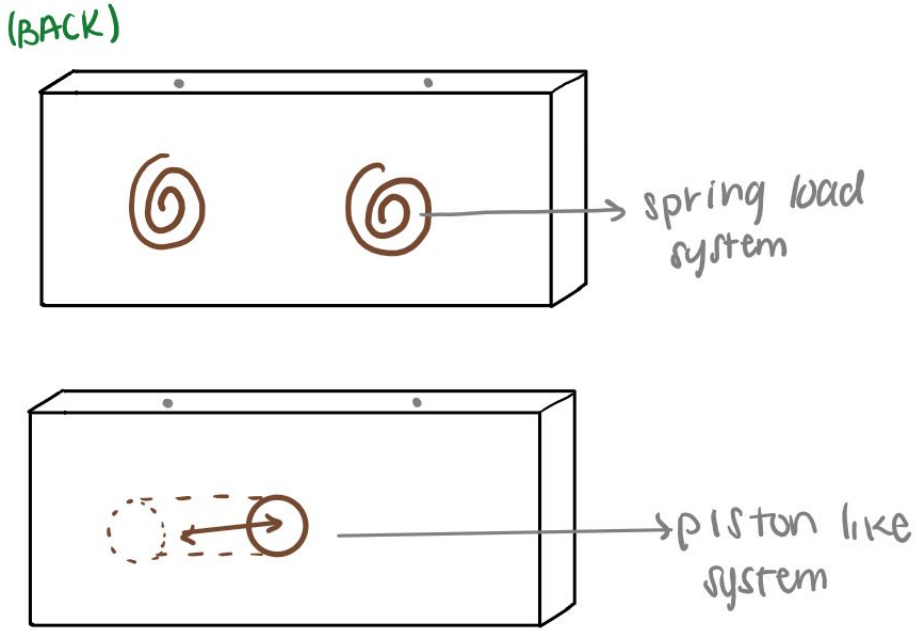


Crank Shaft

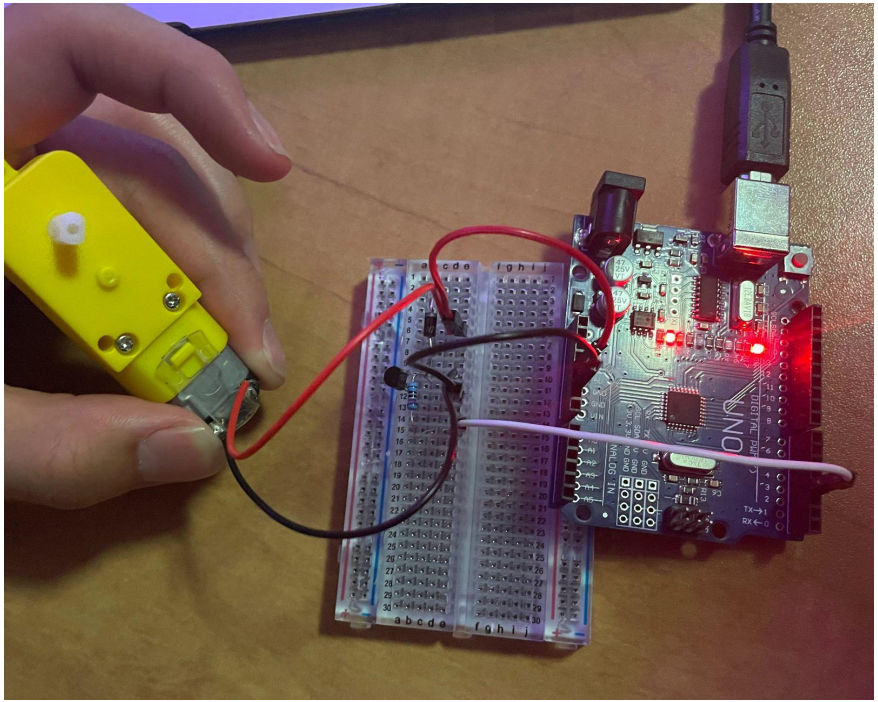


Additional Subsystems Continued

Two Options for Removing the Board



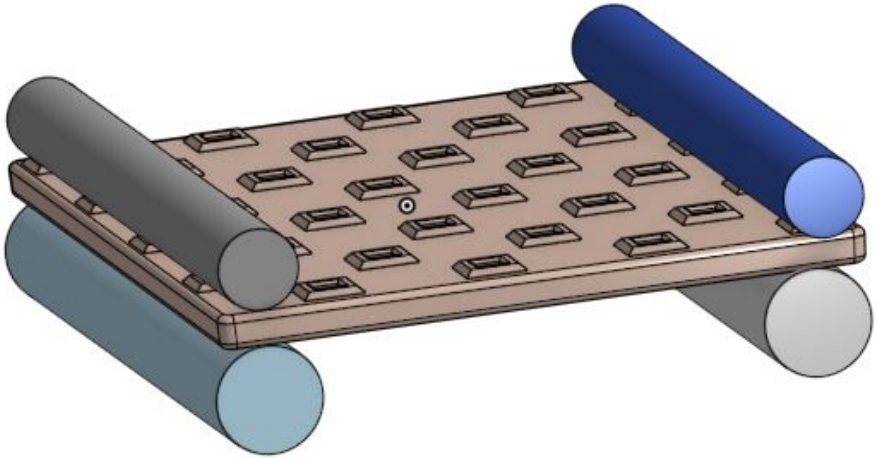
Vertical Brushes Prototype

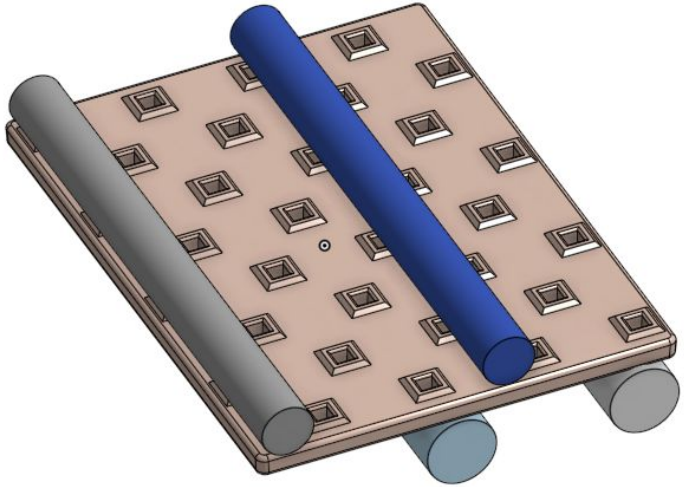


sketch_nov6a.ino

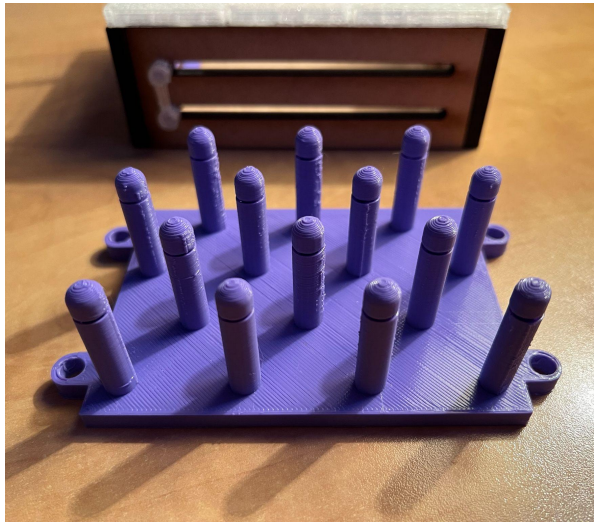
```
1   int motorPin = 9;
2
3   void setup() {
4     pinMode(motorPin, OUTPUT);
5     Serial.begin(9600);
6     while (! Serial);
7     Serial.println("Speed 0 to 255");
8   }
9
10  void loop() {
11    if (Serial.available()) {
12      int speed = Serial.parseInt();
13      if (speed >= 0 && speed <= 255) {
14        analogWrite(motorPin, speed);
15      }
16    }
17  }
18
```

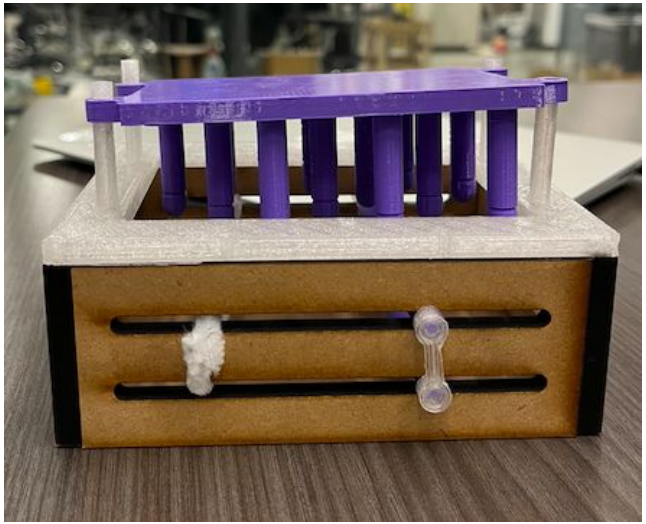
Horizontal Brushes Prototype

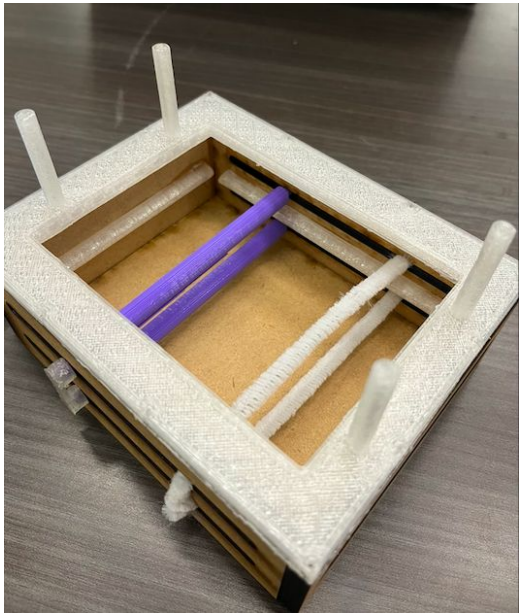




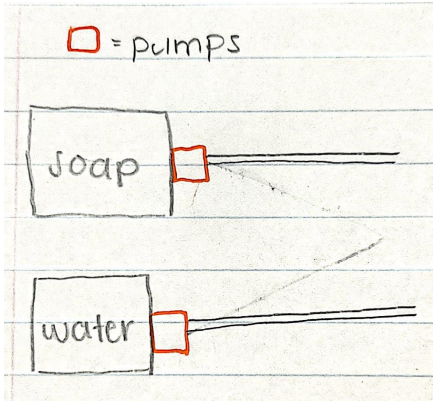
Final Proof of Concept Prototype

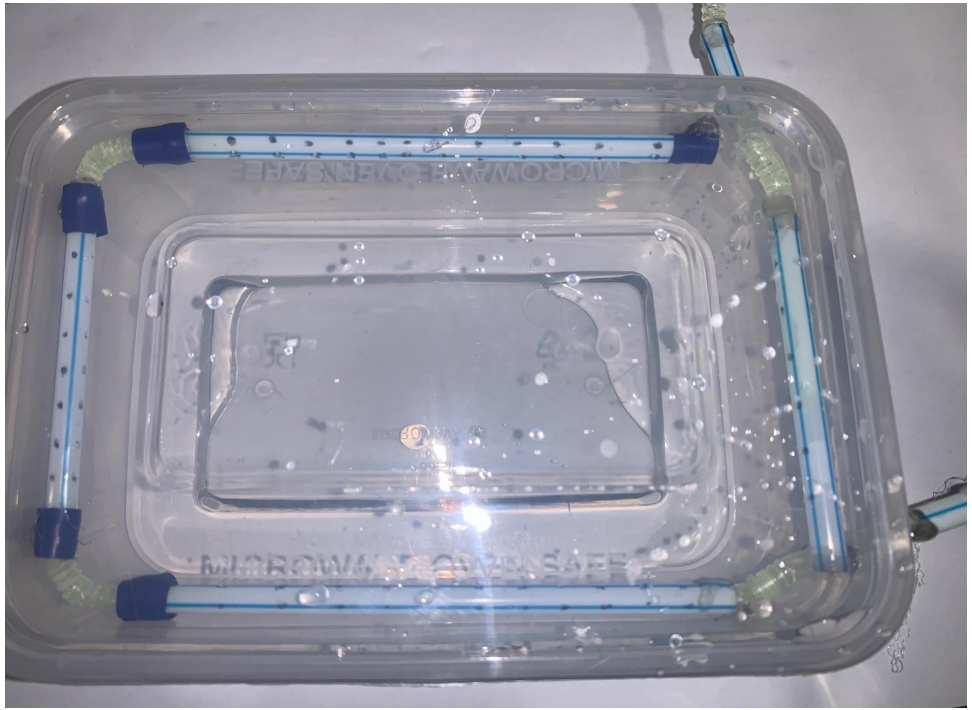


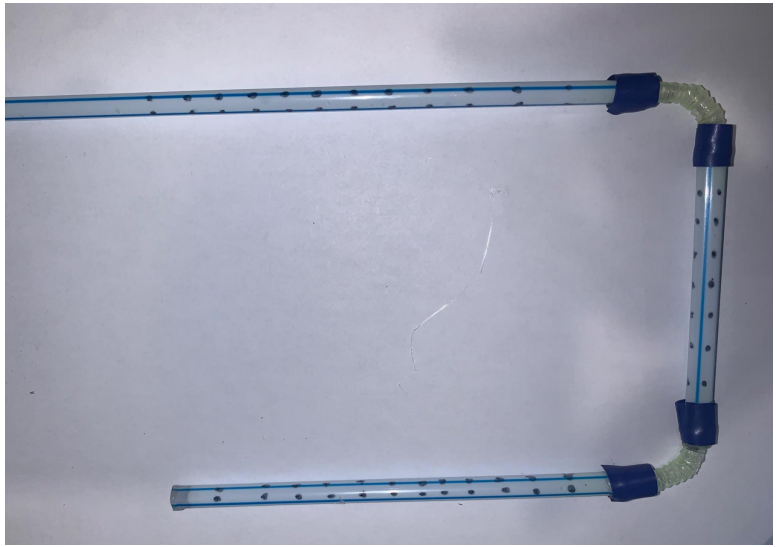




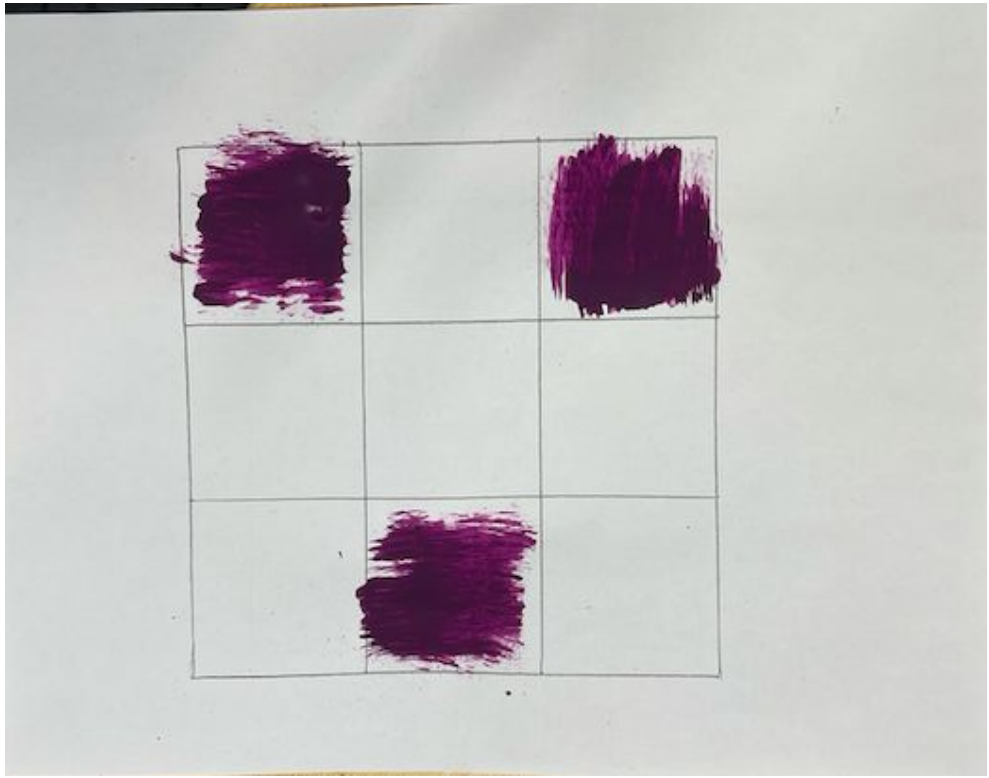
Water Circulation Prototype







Metrics Testing



Metrics Results

Average cleaning of around 71%

cluster	pixels	name	HEX	RGB	HSV	LCH	Lab	tags
	70.73%	111,91,108 bloom ΔE=3.0	#69566B	105 86 107	294 19 42	39 15 323	39 12 -9	bloom fedora
	29.27%	205,201,201 snow ΔE=1.6	#C8C6C9	200 198 201	277 2 79	80 2 313	80 1 -1	pale slate alto athens half rakaia snow spray surf triple grey
	68.10%	111,91,108 bloom ΔE=3.8	#66576D	102 87 109	282 20 43	39 15 316	39 11 -10	aurora bloom box covert dolphin fedora salt smoky
	31.90%	191,189,193 french grey ΔE=1.2	#C0BEC4	192 190 196	251 3 77	77 3 298	77 1 -3	pale slate chateau french ghost greywacke half spray surf grey
	76.08%	90,77,96 aurora ΔE=3.0	#635266	99 82 102	290 20 40	37 14 321	37 11 -9	and aurora bloom chapta fedora verse
	23.92%	195,191,193 pale slate ΔE=0.6	#C3BFC3	195 191 195	299 2 76	78 2 324	78 2 -1	pale slate french ghost silver spray surf grey