A flourishing place to do cool stuff

Grade Seven - Furniture Design and Build - October 2023

Our two week intensive that we planned for our grade seven students was in support of the Roof Garden and their drive to improve the top floor space and it's suitability to be used increasingly as a learning space.
So we agreed to plan the intensive two week learning experiences around the application of Design Thinking and Engineering when developing rooftop furniture.

We aimed to have the student groups design and build multiple prototypes in order for the final design to be effective for the space.




More photos HERE

LEARNER OUTCOMES

Planning directed the learning towards developing Design Thinking, Engineering Cycle awareness, Sustainability application, collaborative/resilient mindsets and constructional skill.
After introducing the overarching goal to better the Grove's roof, we had the students realize an Empathy to what might be wanted by our community. We had teachers and operational staff come and speak to their ideas/needs.

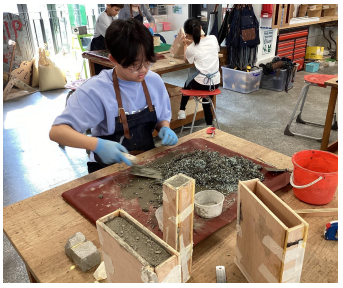
FOUNDRY REQUIREMENTS

The Foundry required students to use Hard wood and Concrete. We also required a sustainable focus on the usage of the products.
We wanted the students to experiment with a variety of Concrete aggregates, including recycled plastic.

CONCRETE TESTING

Both groups constructed a common sized wooden box within which they would place a variety of concrete mixes. Fifteen concrete bricks would be left to cure for 36 hours and then be tested for the comparable strength.






Yes, once the bricks were cured, we took the concrete from the boxes and conducted strength tests. The testing process included drop tests and hammer smashing tests. Results depetermined the concrete mix we would use to






More photos HERE

IDEATION / DESIGN

Each week's class consisted of five table groups.

We planned for the students to ideate, design and prototype 5 designs.




With the requirement to expect a sustainable mindset and action, we required initial prototypes to be built at a 2:1 scale - Half size from plans. We spoke about why we needed to do this.

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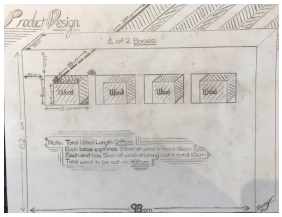
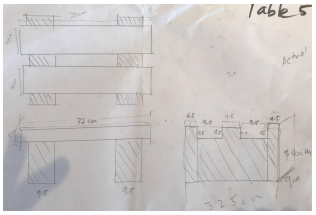
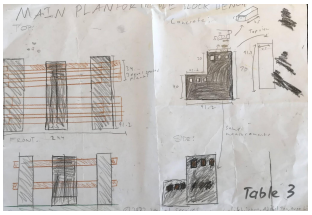
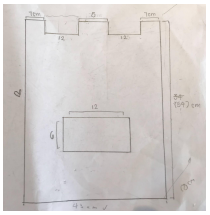
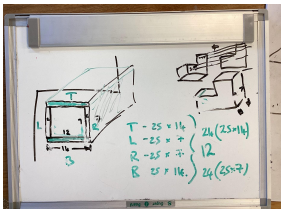
Each table group ideated and designed their furniture product.
More photos HERE

Once students had designed, collected/prepared materials and constructed their 50 % sized wooden molds.
It was time to introduce plastic and Concrete.

AUTHENTIC

It was rewarding for us all to keep this learning experience as authentic and 'real' as possible. The reality that products iterate to become quality and appropriate was something we wanted to have the students live.

PLASTIC, CONCRETE & SUSTAINABILITY

Focusing on educating students about Plastic concerns and Concrete construction led to us build and test collections of Concrete aggregate bricks. The strength test results influenced the concrete mixed for the initial prototypes.
Students mixed a six part concrete: **2 cement / 1 sand / 3 plastic**

THE CONCRETE IS FIFTY PERCENT PLASTIC




Click to visit the Foundry Dock

PROTOTYPE ONE (week one)

The molds were constructed. The Concrete mixed and placed. The cure process began. Curing continues for 24 days... the Concrete gets harder and harder

The next step was for the students to remove the molds from the concrete and check their design quality.





More photos HERE

The groups reflected on design quality, prototype strength, Concrete mix, and constructional concerns. From here the table groups created a document to pass onto the upcoming team - Week Two. Their task is to iterate the design to a full scaled prototype.

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WEEK TWO GROUP ITERATIONS

The second week students digested presentations, information, communications, advice and expectations and set to redesigning design details.

In most cases design dimensions were increased in order to strengthen iterated prototypes.

Concrete mixtures were adjusted in order to strengthen iterated prototypes.

Then FULL SIZE molds were very carefully built.





More photos HERE

We are impressed at the students ability to reside semi-comfortably with: large scale, extremely physical, quality/accuracy demanding, persistently messy and relentlessly tiring expectations.

We all worked tirelessly, mixing Concrete pile after pile after pile for hours trying to fill all of the full sized molds.

Regardless of ALL HANDS on deck - we only filled 5 of 10 molds with Concrete.

The filled molds contain:

🔨 Four 40 KG bags of cement,

🔨 35 large bags of sand
🔨 70 KG of recycled plastic from Baguio,
🔨 Approximately 60 recycled plastic bottles from the Foundry plastic recycling program
🔨 An incredible amount of resilience and power from our grade seven.

Grade seven rocked.

The Foundry will continue to construct the student designs, and will invite the grade seven students to help us when they can.





More photos HERE

This project has lived an authentic design and engineering cycle for all involved.
We are thrilled.

Well done Grade seven.