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Bachelor of Craft & Design - Industrial Design

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Sheridan College

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INTRODUCTION

BACKGROUND

Pottery is an ancient craft that has been continually used within decorative and functional objects seen today. While examining a domestic space, ceramics may be found in the form of tableware, cookware, small furniture pieces, various vessels, as well as lighting.

Regarding lighting, ceramics is commonly used for lamp bases and pendant shades, which are generally durable, opaque, heavy, and chunky. However, fewer products have highlighted and harmonized translucent ceramics and illumination.

1.1 You See a Sheep, series by Yuko Nishi

1.2 Diego Olivero Chamber Table Lamp, sold by West Elm

MOTIVATION

Similarly, lighting and ceramics both provide comforting qualities that positively uplift and set the tone of a space. Combining lighting and ceramics in hopes of producing delightful emotions and useful functionality is the basis of my thesis.

Although I may be a casual ceramist, I wish to continue pursuing the craft, as well as designing objects for the home in the future.

PROPOSAL

I wish to expand on the idea of using ceramics to soften and redirect light, such as the function of a lamp shade, as well as incorporating the notion of adjustability and customizability within the product.

The fabrication of a modular system would allow ceramic shades to be swapped out for those of different thicknesses, sizes, patterns, colours, etc. This not only provides the ability to modify the visual appearance of the product but allows the user to adjust the lighting to their intended needs.

Collectable and adaptable craft.

1.3 Architectural Digest, photo by Tim Hirschmann

1.4 "Wish You Were Here", photo by William Laird

1.5 Architectural Digest, photo by Wichmann + Bendsten

TARGET USER

The product will be used by home owners, with relatively large spaces, who enjoy statement pieces that emanate novelty and whimsical features. Furthermore, individuals who appreciate the beauty of craft and ceramics as a whole.

RESEARCH

METHODS

Quantitative research was conducted by producing test samples of clay bodies, measuring shrinkage, and implementing additives.

Qualitative research transpired through interviews with colleagues and professionals within the ceramic and design industry. Further research was conducted by examining the traditional techniques, processes, and functionality of ceramics throughout history.

CERAMICS

Ceramics are a non-metallic, inorganic material that has been used to create functional, decorative and expressional pieces since approximately 9000 BCE.

Ceramics have traditionally been produced into tableware, cookware, vessels, bricks and tiles. Today, innovative technologies have evolved the use of ceramic to produce unique and fascinating items such as buildings, fibre optics, artificial bones, teeth, heat resistant tiles for the exterior of NASA's space shuttles and more.

2.1 NASA Space Shuttle Tiles - Robert Z Pearlman - Space.com

2.2 Ceramic Teeth - Stephanie Webster 2020

TYPES OF CLAY

STONEWARE

Stoneware clay fires at high temperatures, becoming nonporous once vitrified. Commonly used for products requiring durability, such as cookware and tableware.

EARTHENWARE

Earthenware fires at rather low temperatures, which hardens the clay but still remains porous. Commonly used for planter pots, construction (bricks) and tiles. Furthermore, earthenware was used to create some of the earliest pottery artifacts.

PORCELAIN

Porcelain is notable for producing delicate products such as figurines and dishware, commonly known as fine china. Unlike other clay bodies, porcelain is more plastic-like and silky. Because of these factors, the clay body is more finicky to form than others.

Bone China is another type of porcelain with similar manufacturing processes. The difference is that the clay contains animal bone, usually cow bone. This allows products to be more lightweight and translucent than regular porcelain.

SLIPS CASTING | Ceramic Technique

Slip casting is the process of pouring liquid clay, known as casting slip, into a porous mould to generate a solidified form. Plaster is the most common mould medium used within slip casting.

A boundless amount of casting slip recipes exist. I was able to obtain assistance from ceramic educators, colleagues and online forums that directed myself towards the beginning stages of creating slips.

2.3 Removing greenware from plaster mould - Sporvil Ceramics

The longer the casting slip is within a mould, the more moisture is absorbed by the plaster. This results in a thicker clay wall once the liquid is poured out.

2.4 Toilet Production - Active Minerals International, LLC

Ceramic toilets are a great example of mass production slip casting with products emerging with high quality, fine details, and durability.

PRESS MOULDING | Ceramic Technique

Press Moulding is the process of forcing clay inside a mould to obtain a desired form or to create an embossed design. Once settled and firm, the clay is removed and the desired shape is retained by the clay.

Similar to the process of slip casting, press moulding also requires a porous mould to absorb the moisture of the clay body.

2.5 Rachel Dorn. Press Moulding with plaster mould

2.7 Emre Can. 3D Printed Forms

3D PRINTING | Ceramic Technique

A ceramic printer is essentially a huge extruder where layers slowly stack and build up to generate a complete shape.

Infills produced by 3D printers are known as the pattern and density applied within the volume of a form. Infills play an important role in an object's weight, strength and appearance. The figure above uses an infill-like structure, creating a unique vessel.

HANDBUILDING | Ceramic Technique

Handbuilding, the most archaic technique, allows one to create desired forms by using their hands. The process is grouped into three categories.

COIL POTS

Coil pots are created by rolling out long pieces of clay that are joined together to produce a larger piece. The coils are combined together to solidify the form.

PINCH POTS

Pinch pots initially start with a ball of clay, which are shaped into a desired form by pinching the walls thinner while with the thumb at the centre.

SLAB POTS

Slab pots are formed by joining flat slabs of clay together. One can achieve flat slabs by rolling the clay body out with a rolling pin or a slab roller.

THROWING | Ceramic Technique

Wheel throwing is the process of creating a desired form on a potter's wheel. This is an ancient ceramic method that uses centrifugal forces and applied physical manipulation to produce rotational shapes.

2.8 Throwing Ceramics - Chloe Williams

ADDITIVES

Additives can be any foreign substance that is inserted into a clay body to manipulate the performance or resulting outcome once fired at high temperatures.

Commonly, additives are used for unique textures. This is because the additive materials leave behind a volume of space once disintegrated at high temperatures. Some experiments have consisted of mixing coffee grounds, nut shells, flour, sand, wool, cotton and metal.

2.9 Lisa Belsky. Knitted textiles dipped and soaked in clay slip.

2.10 Jongjin Park's. Paper towel dipped and soaked in slip.

Additives can be mixed into solid clay bodies or liquid casting slips. The figures above both dip foreign materials in liquid casting slip.

Coffee grounds added into porcelain-like stoneware

Cotton dipped in casting slip and drapped across shape, post casting

Direct light as a result from holes being punctured

Variety of translucency as a result of carving away the wall thickness of the shape

SUBTRACTIVE SCULPTURE

Subtracting is referred to any action that pursues the removal of clay within a form. Common techniques are scraping and creating holes with various clay tools such as loop tools, ribbon tools, needle tools, wire clay cutters and ribs.

2.11 Maria Alvarez-Echenique. Light ofThe Earth Sculpture

LIGHTING

Illumination is a physical stimulus that provokes vision to occur. Throughout millennia, humans have developed techniques to control and produce light for essential and aesthetic purposes.

Initially, the burning of woods and other natural materials, known as bonfires, assisted survival and provided light.

Animal fats and oils were used to control smaller flames within lamps and torches. Candles were later developed and are still used for many functions today.

In the 19th century, the kerosene lamp, also known as an oil lamp, was created. The lamps run on a combustable fuel that is derived from petroleum.

Shortly after, incandescent lighting was created, which is still used in many domestic spaces today.

Within the 20th century, other lights have been created to save energy, such as halogen, florescent and LED.

2.12 Lighting elements icon set evolution of light vector image - Vector Stock

Light is the unavoidable experience that all things interact with, as well as directly manipulates immediate and long-term mood within individuals (Illuminated Intergration, 2019). Natural and artificial light play a major role in how we funtion and pursue daily life (McCloughan et al., 1999).

PRIMARY TYPES OF LIGHTING

AMBIENT LIGHTING - general lighting that brightens the entirety of a room. Can also be considered mood lighting, by setting the tone of the space.

TASK LIGHTING - Light that assists the user at completing a specific task, usually a bright, intense light.

ACCENT LIGHTING - Light that highlights and persuades the viewers eyes to a specific feature, such as a paitning on a wall or architecture.

DECORATIVE LIGHTING - Light that creates a visual statement, such as displaying interesting colour, size, and form.

INTERVIEWS

Interviews were conducted to collect information regarding the process of slip casting, press moulding, clay additives, working at large scale and general advice. The feedback gathered from the discussions with interviewees provided lots of insight concerning past works, as well as the limitations of specific processes, methods and techniques.

CATHLEEN NICHOLSON - Educator, Ceramist

Once I stated that I was thinking of creating furniture or lighting pieces, Cathleen was concerned of the the difficulties and challenges that come with working at large scale. Large items tend not to survive during the high firing process, they crack, warp and shatter because the volume of the piece vitrifies respectively. Usually large pieces, such as furniture, are created via coiling processes and tend to be thick to support more than just itself.

WILLIAM LEE - Educator, Ceramist

Together, we have experimented with different slip recipes, mostly aiming for translucent appearances. William suggested that if I slip cast large scale pieces, which are difficult to move due to the weight and bulkiness of the plaster, that I can either round the bottom of the mould to allow it to be tipped over or use a pump to add and remove slip from the mould.

DUNCAN ARID - Educator, Ceramist

I was having difficulties glazing thin test pieces, as the moisture was not being absorbed into the bisqueware. Duncan stated that the reasoning could be that the object was more vitrified, meaning that the test piece would be less porous than the others, or that the thin nature of the clay isn't enough volume to soak up the moisture within the glaze. Duncan suggested that I spray the glaze onto my future pieces for thinner coverage.

NILOUFAR GHAMEMI - Ceramist

Nilou is a ceramic student at Sheridan College who oversees the ceramic 3D printer. Nilou provided myself with a detailed tutorial on how to set up, use and take apart the printer. Furthermore, Nilou presented what is currently being produced on the printer and explained how to prepare the clay body for it to be printable.

RINO CLAESSENS - Designer, Ceramist

Rino produces large scale ceramic furniture. Since large scale objects are difficult to produce with ceramics, especially by slip casting, Rino has developed his own unique way of press moulding either on top or in a plaster mould.

LAURA KUKKEE - Educator, Ceramist

During the advisor swap day, I had an opportunity to speak with Laura regarding the ideation stage of my work and if it was feasible. At the time I knew that I would be pursuing slip casting and using the forms to produce lighting. Since the ceramic would be thin and fragile, Laura suggested that I include additives such as toilet paper or nylon fibres within the slip to allow the pieces to survive during greenware stages. Next, Laura suggested that I use epoxy putty to apply to the edges of the ceramic pieces that interact with external hardware/materials. This is to prevent chipping and increase the durability of the ceramics during use.

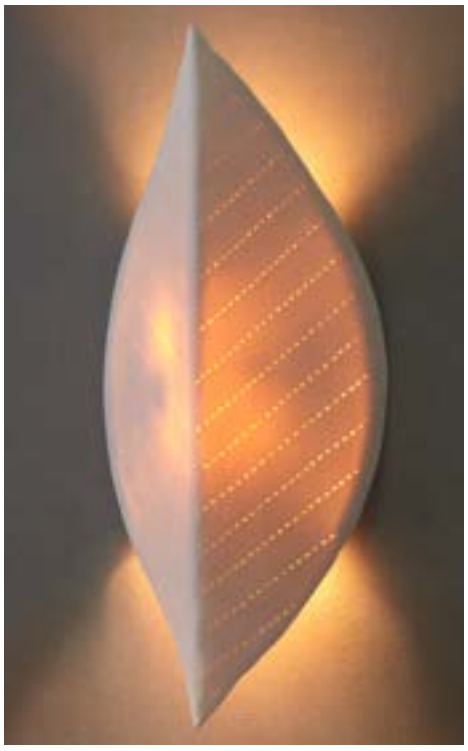
EXISTING PRODUCTS

Most translucent ceramic lighting are created by individual artists, some are mass produced by larger companies. However, all translucent ceramic lighting are similar in regards to appearing sleek, minimalistic and static.
Users would have to commit to one, sole design as they are one-off or non adjustable products.

2.13 Brian Schmitt, 2012. Aspect Pendants - Translucent Porcelain

2.14 Maya Ersan & Jamie Robson. Porcelain Lantern Trio

2.15 Luminary by Andrew DeWitt



2.16 Rachel Nadlers. Leaf Shaped Wall Sconce

The market is abundant with ceramic lighting where the material either acts as a decorative structure or opaque shade.
Non porcelain ceramic will never harmonize with illumination, but will contrast the light.

2.17 Handmade Ceramic Indented Wall Light by Lighting Collective

2.18 Diego Olivero Chamber Table Lamp, sold by West Elm

2.19 Handmade Ceramic Pendant Lamp by Etsy user BaradaxCeramics

SYNTHESIS

• The thinner porcelain is, the more translucent the ceramic becomes. However, this means that the fragility of the ceramics increases and becomes more challenging to handle in greenware (pre firing).

• Inserting additives within the clay body strengthen the form and assist the survival of the greenware ceramics. These additives are paper and nylon fibres.

• Using additives not only provides fun textures, but assist in displaying variations of translucency.

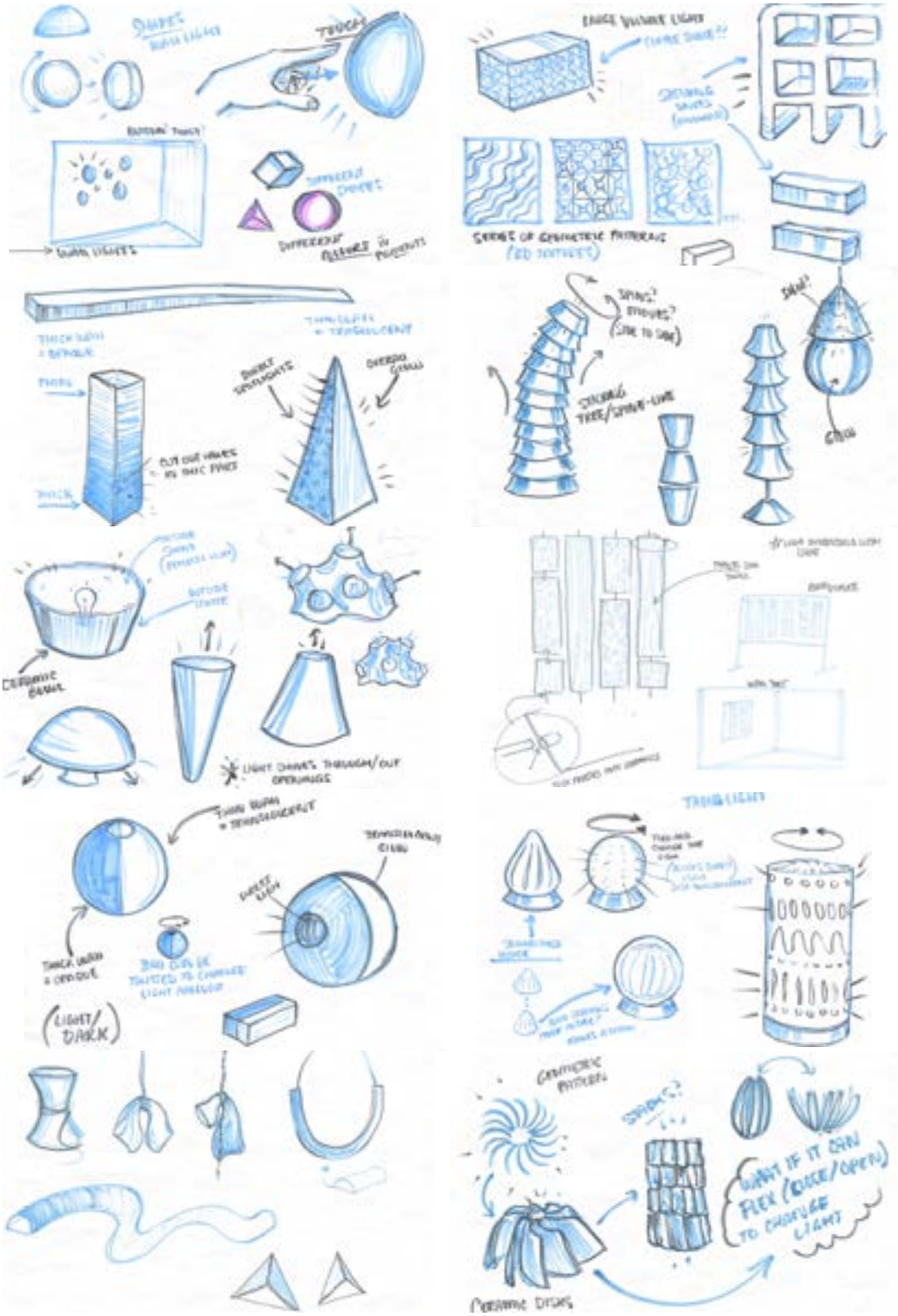
• I believe it would be an interesting approach to incorporate the idea of touch and movement with the ceramics, contradicting its fragility and nature of wanting to protect the material.

• Similarly, lighting and ceramics both provide comforting qualities that positively uplifts and sets the tone of a space.

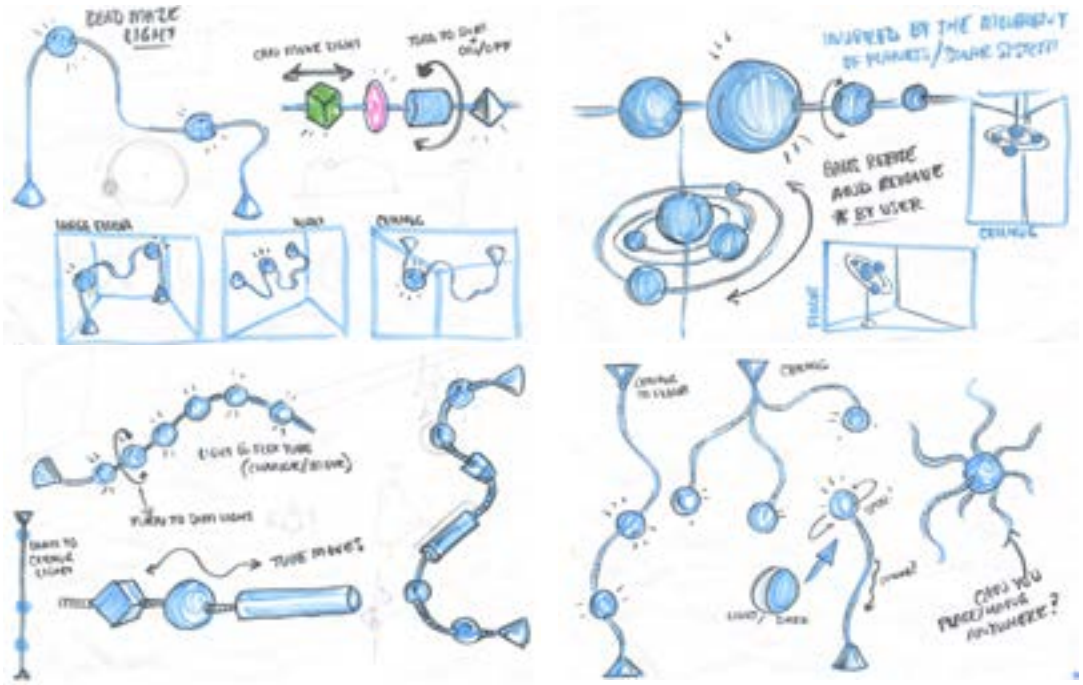
• Slip casting and press moulding are two processes that I will continue to move forward with. The final form will determine which process I use, both create similar results.

• The goal is to create ceramic lighting that would be considered decorative mood lighting.

IDEATION

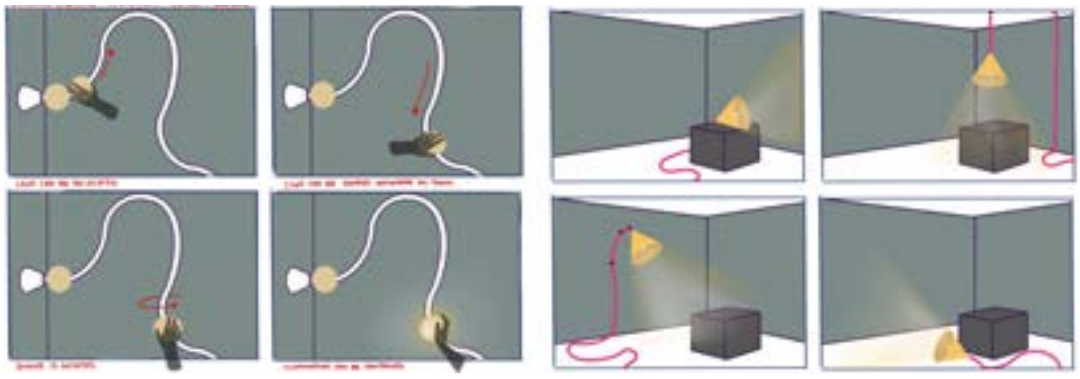


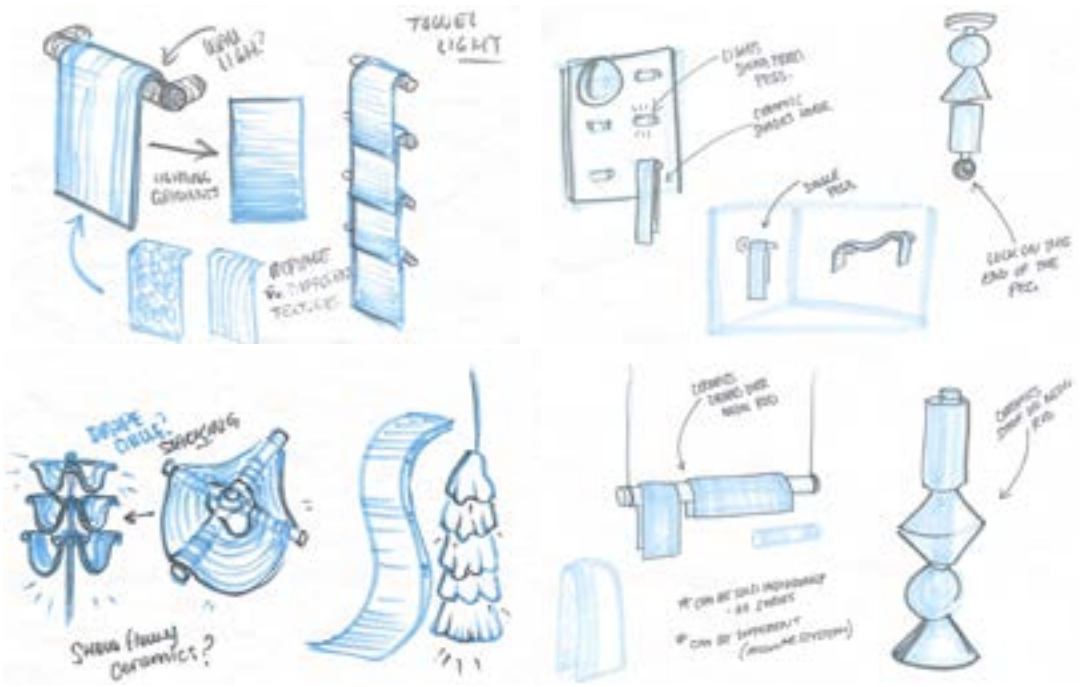
Exploring fun, funky shapes, as well as how to display variations of translucency within the ceramic through form.



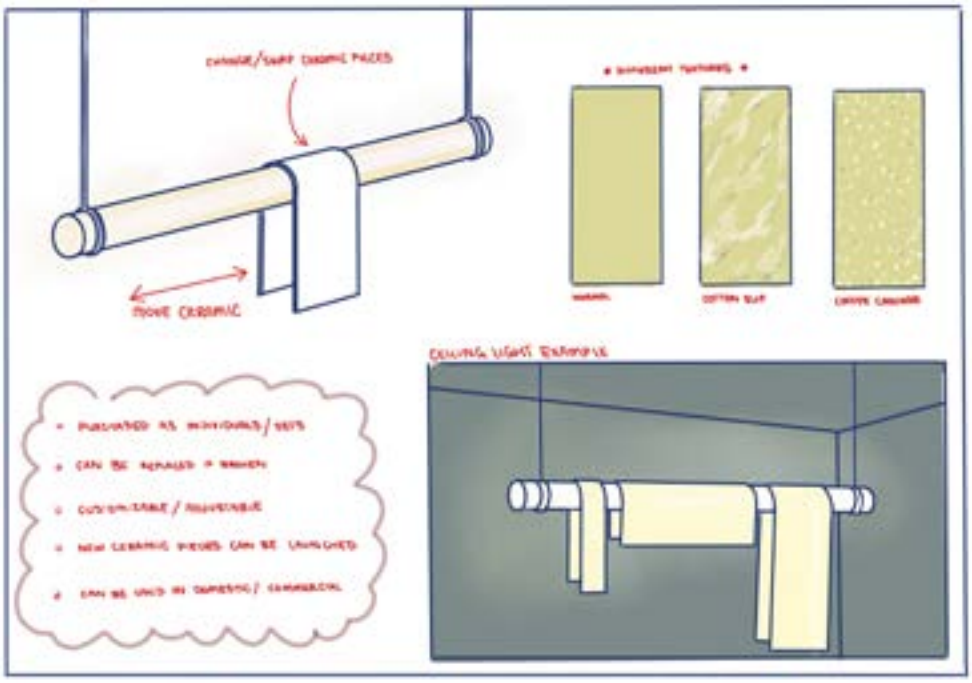
The idea of physical input to contol light. Rotating either the structure or light souce, potentially functioning as a dimmer.

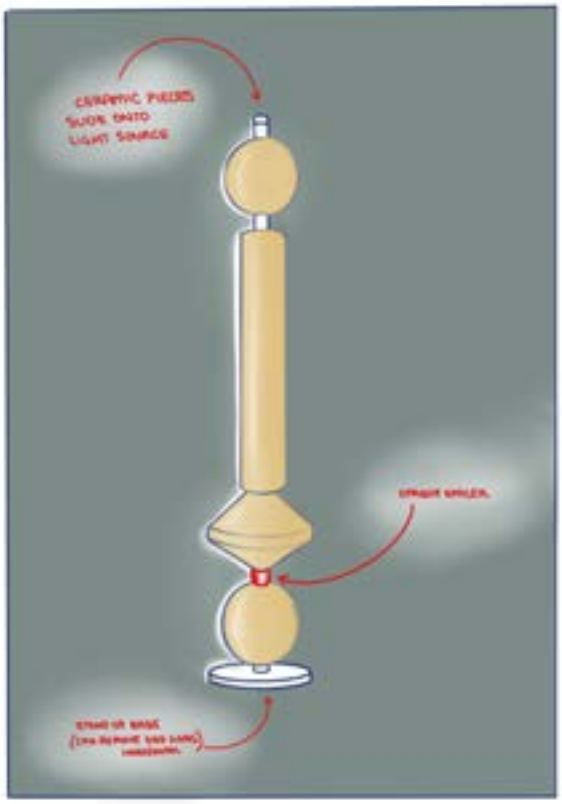
The idea of movement in regards to relocating the light source.





The idea of a modular system. A standardized luminous base followed by ceramic forms that slip or stack onto the light.


MOVE CERAMIC


CERAMIC PIECES
SLIDE INTO
LIGHT SOURCE

DEVELOPMENT

I plan to create a luminous product for the domestic space that is customizable to the aesthetic and functional needs of the user. Using translucent ceramics to manipulate atmosphere, appearance and brightness.

Display variations of translucency within the ceramics

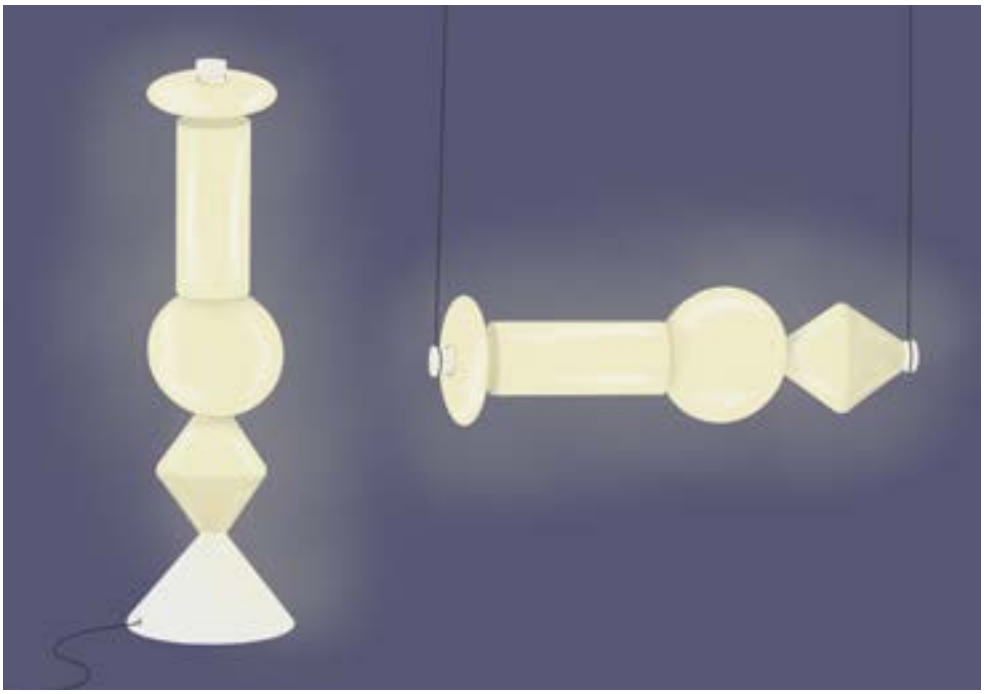
Function within a modular system

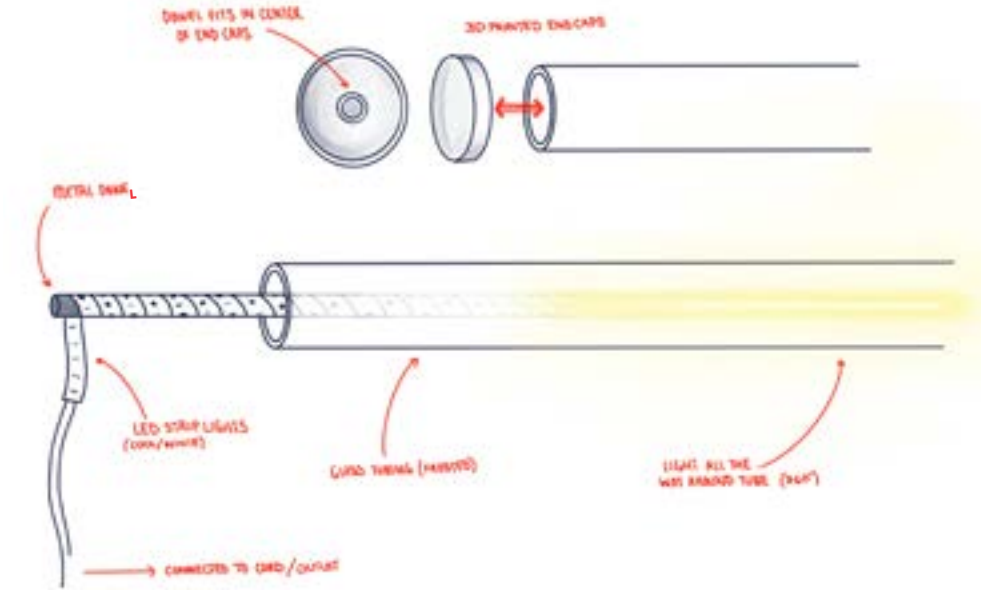
Function can be customized and adjustable to user needs

Design suitable for batch/ mass production

MODULAR SYSTEM | Final Concept

A modular system would allow ceramic shades to be swapped out for those of different thicknesses, sizes, patterns, colours, etc. This not only affects the appearance of the product but allows the user to adjust the lighting to their intended needs.





Initial design and form concept. Rotational forms that slide over a tube light made with LED strips.

EXISTING PRODUCTS | Form Analysis

Although the silhouettes of the lamps are similar, the Pila Lamp differentiates by focusing on the texture and translucency of porcelain. Typical floor lamps are usually produced with glass and metal.

3.1 Stacking Floor- Rockwell Group (2007)

Rockwell group produces a customizable stacking lamp similar to the functionality of the Pila Lamp. Providing cylinders of different heights, colours and opacities that the users can swap.

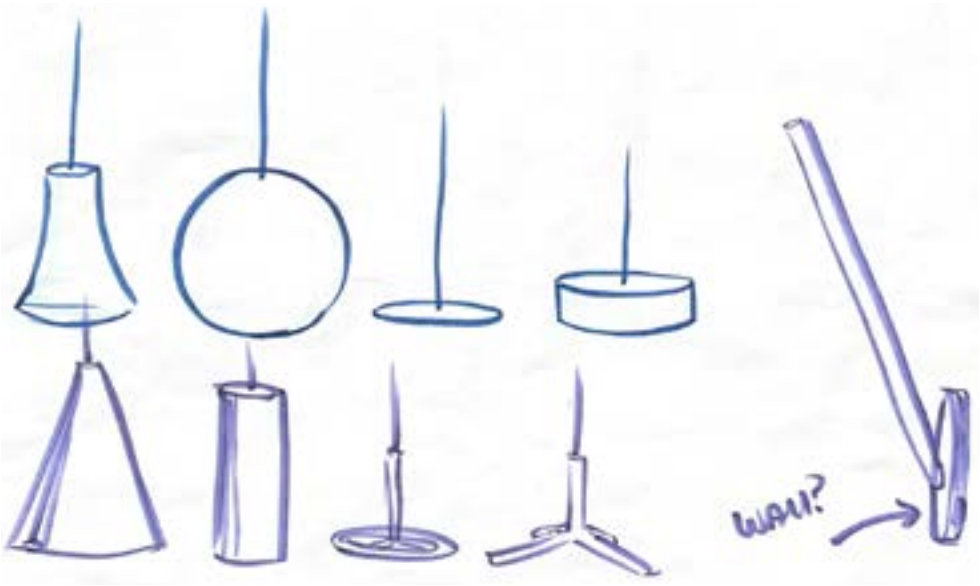
Both lamps below are static, unadjustable products.

3.2 Vintae Creative Gourd String Glass LED Standing Floor Lamp - BulbSquare

3.3 Glowblues Beads Floor Lamp - Adam Nathaniel Furman & Esther Patterson

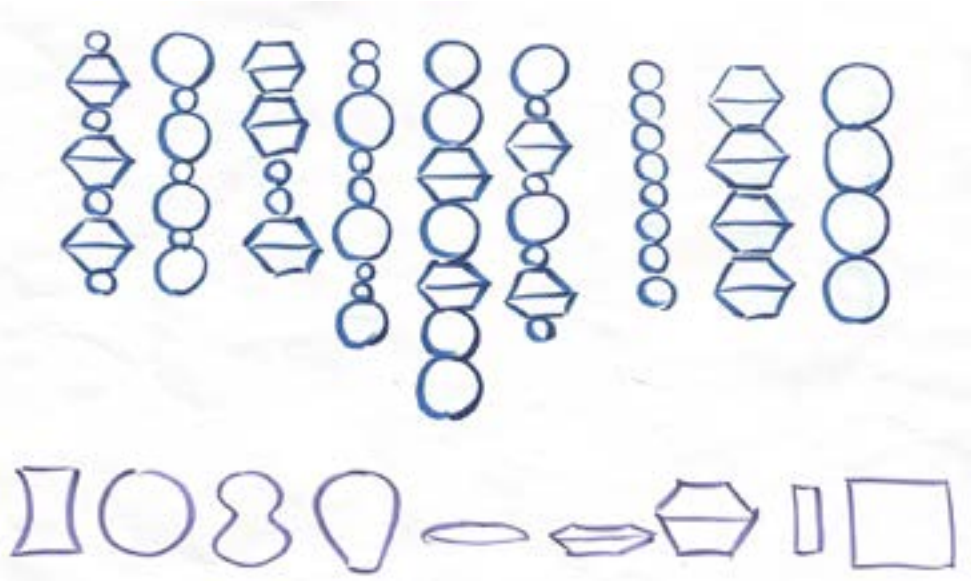
INITAL FORM

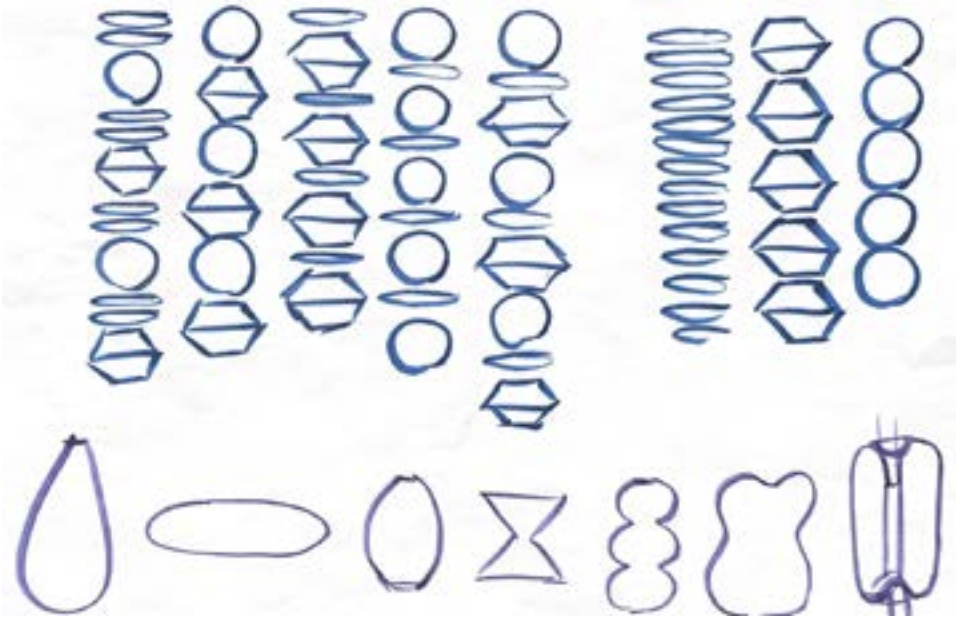
Initial ideation of base form.

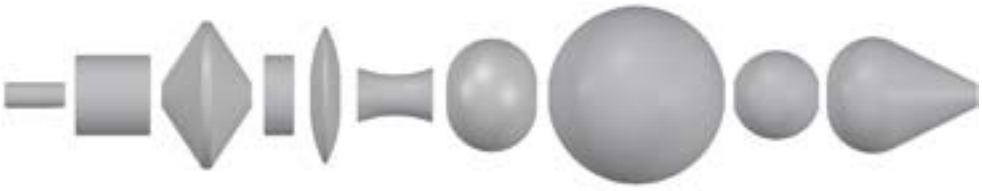


Ideation of forms for lamp base with concrete as the chosen material. The bases act a plinth and support for the ceramic shades that stack on top, within the constraints of the tube light.

Exploring rotational forms and patterns that are aesthetically pleasing while stacked.







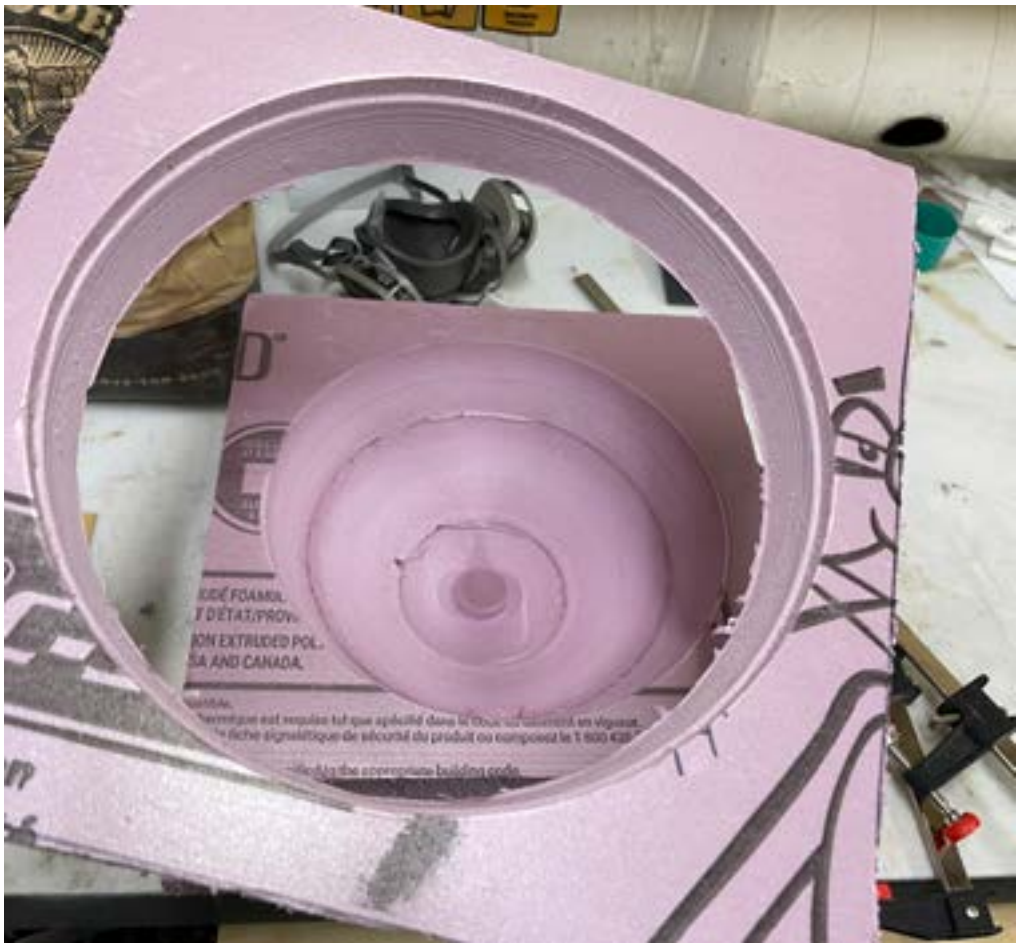
Since the Pila Lamp follows a modular system, there can be an immense variety of ceramic shade forms as long as their assembling function is standardized. However, primitive, simple shapes were selected so that the form does not distract from the unique textures of the additive materials.

Low fidelity pink foam model was created to understand the overall form and experience. This model assisted the determination of size and height.

LAMP BASE

Pink foam model finalized the base form and was tested with ceramic shade mock ups.

A dome mould was made to form the concrete. The pieces were cut on the CNC machine and assembled together with epoxy.



A plastic insert was casted into the concrete to support the LED light.

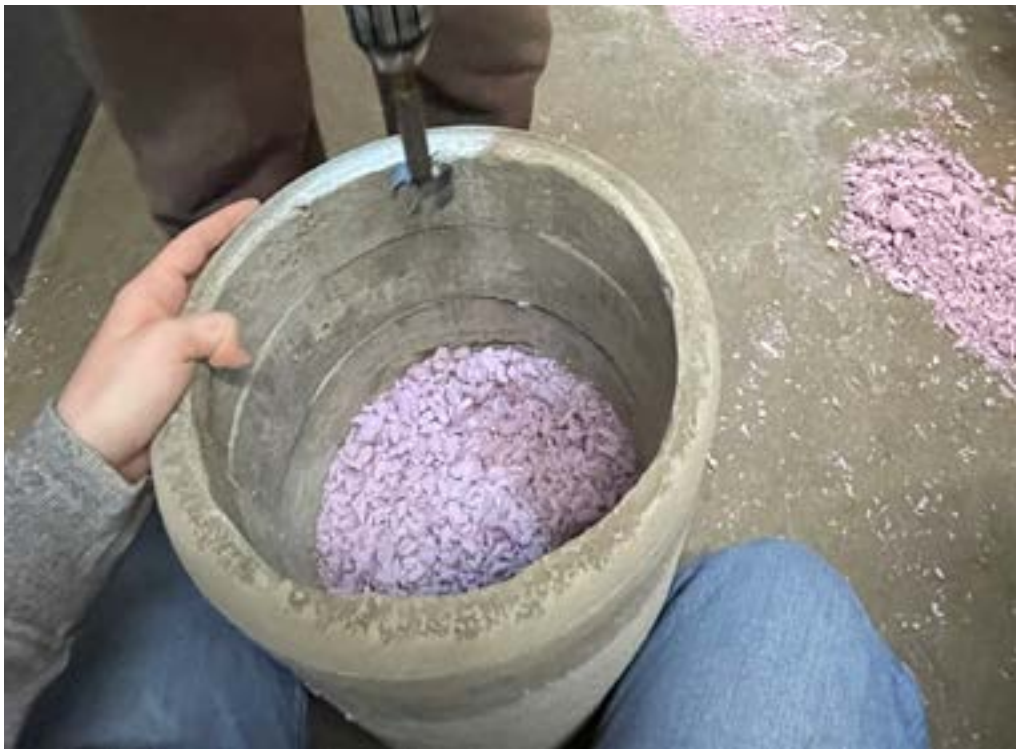
The crevasses were filled with wax and the concrete forming tube was placed inside the groove of the pink foam mould.

Large aggregate concrete was used for an industrial appearance.

The glass tube for the LED light and initial ceramic bead were loosely assembled in the attempt to comprehend the overall experience of the lamp.

The intent of this test was to create contrast between the industrial concrete and the delicate, white porcelain-like beads.

The new, final concrete base was casted within a mould solely made from CNC machine cut pink foam. This change was made as the initial concrete forming tube swelled from moisture, causing imperfections where it attached to the pink foam dome.



Once the concrete base was disassembled from its mould and sanded smooth, a new base foot as well as a tube insert were 3D printed and attached.

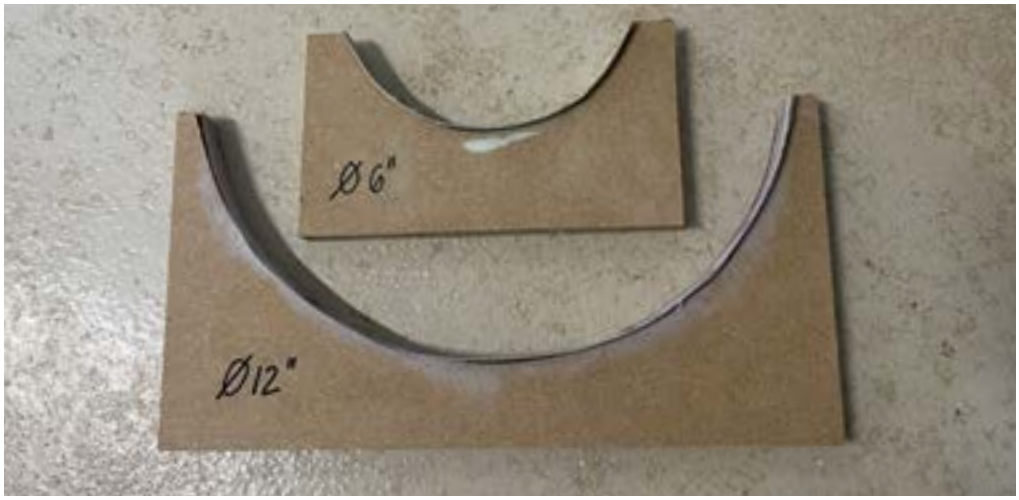
Sand aggregate was used, which resulted in a smoother finishing.

Furthermore, the weight of the concrete base was decreased by moulding the walls thinner. Ultimately using less material and becoming easier to relocate.

CERAMIC BEADS

The ceramic beads are produced by slip casting, which require a porous, plaster mould.
Spherical shapes were constructed with the lathe and standardized by makeshift MDF ribs with sandpaper.
These shapes were used to produce the plaster mould.

The high density foam shapes were painted with primer to eliminate imperfections and provide a smooth finish.


Ø6"
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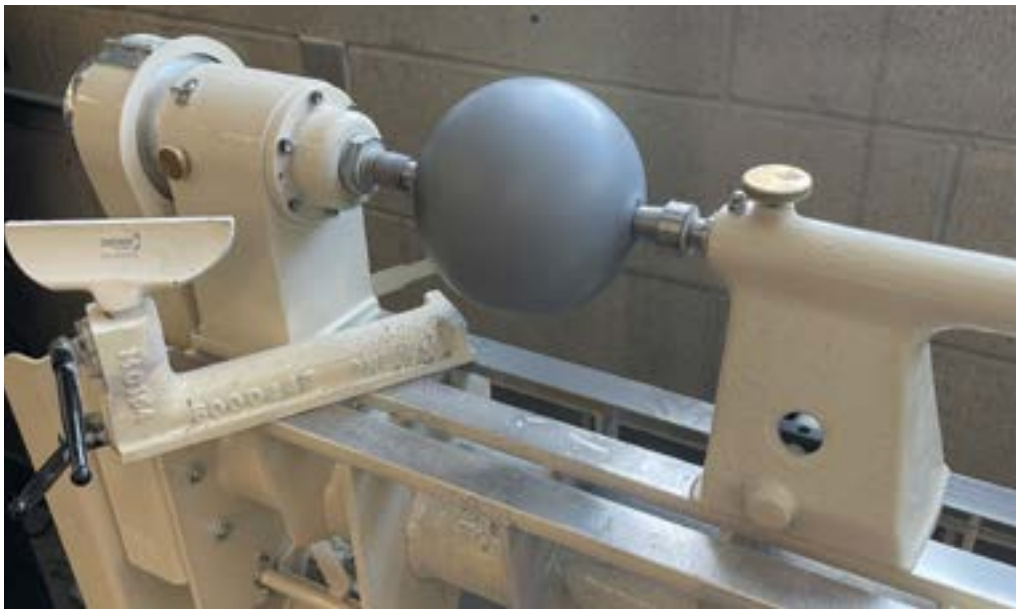
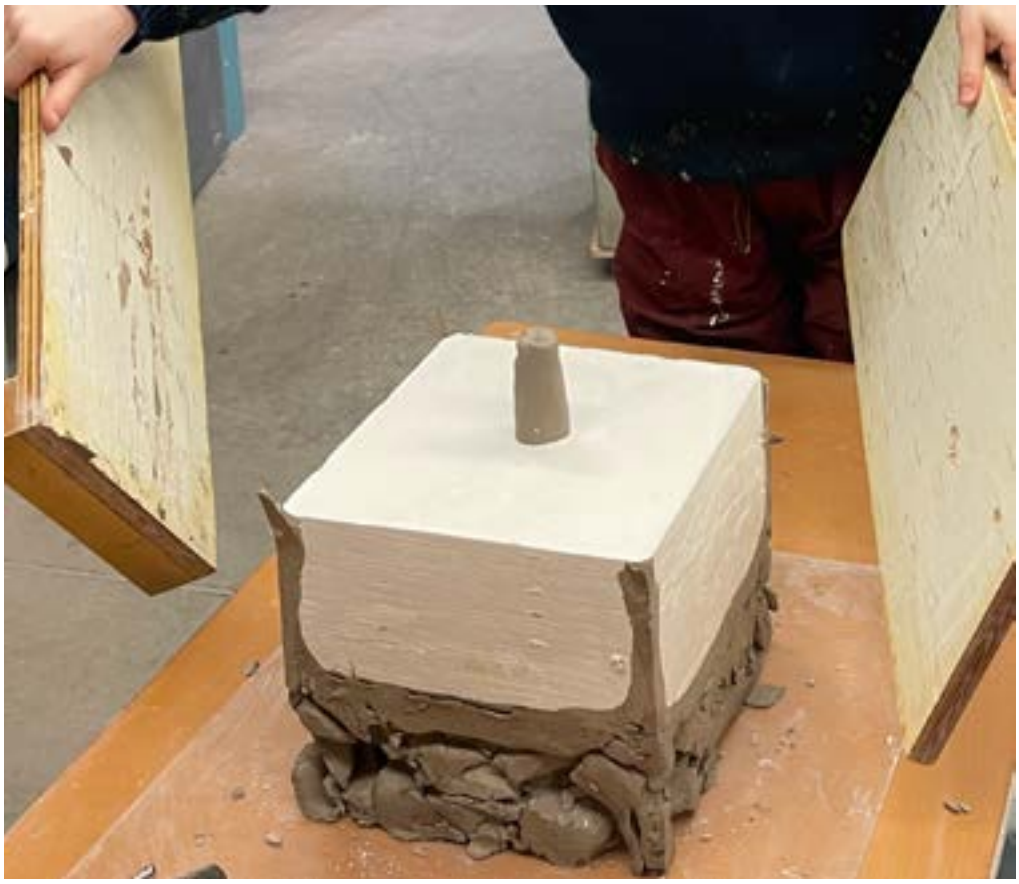


A two part plaster mould was created. The bottom half was covered and levelled at the symmetrical line with clay. Surrounding was a wooden box that holds the plaster, made with four cottle boards that are tightened together with clamps.

The plaster is measured and mixed. Once the correct constancy is reached, the liquid plaster is poured into/onto the form.

The sprue is left uncovered, resulting in a channel which is used to pour the casting slip.



Once the plaster has set, the mould is disassembled and the process is repeated on the other half.

Complete mould for 6″ bead.

Complete mould for 12″ bead.

Both halves of the plaster mould are assembled and secured by bands. The casting slip is poured, filling to the top of the sprue.

Once the allotted time has passed, the remaining slip is poured back into the bucket. Leaving behind a thin wall of clay along the inside of the negative plaster shape.

102	10000g	103	10000g	104	10000g
Water	40.00%	Water	40.00%	Water	40.00%
Darvan 7	0.40%	Darvan 7	0.40%	Darvan 7	0.40%
Grolleg	50.00%	Grolleg	45.00%	Grolleg	55.00%
Nepheline Syenite	22.00%	Nepheline Syenite	23.00%	Nepheline Syenite	18.00%
Silica 400m	28.00%	Silica 400m	32.00%	Silica 400m	27.00%
Hectabrite	0.30%	Hectabrite	0.30%	Hectabrite	0.30%
	100.30%		100.30%		100.30%

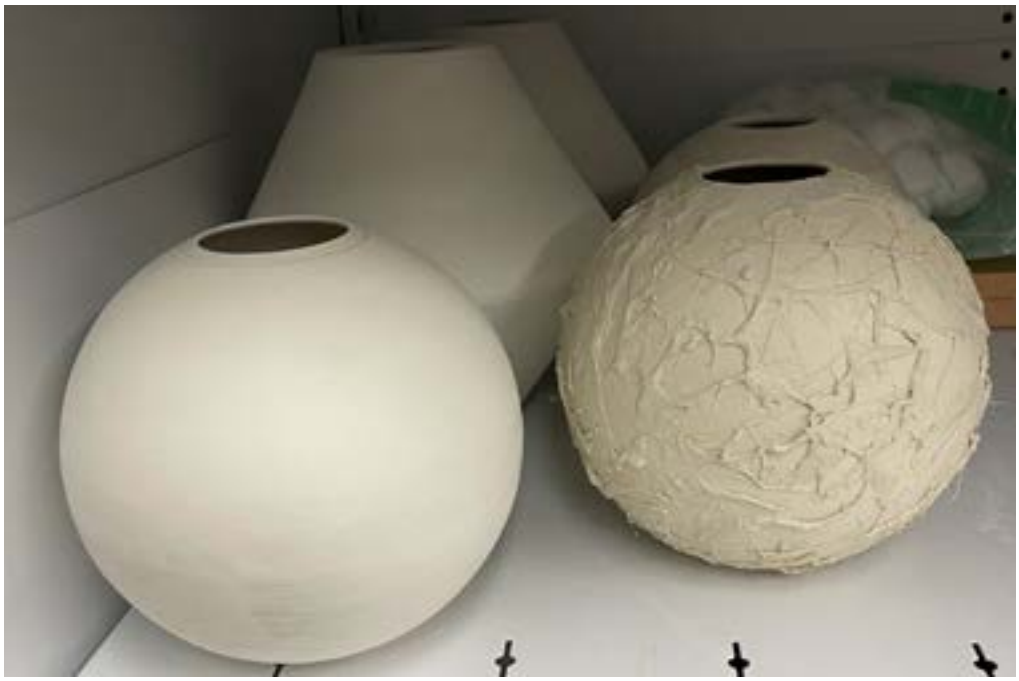
#21 nicolette	20000g
Water	40.00%
Darvan 7	0.40%
Grolleg	50.00%
Custer Feldspar	18.00%
3124	6.00%
Silica 400m	26.00%
Hectabrite	0.20%

Multiple slip casting recipes were tested throughout the semesters. The slip “Nicolette”, named after colleague Nicolette Keaney, was selected for the final ceramic lamp shades. The clay body is mostly stable and has bright translucency when illuminated.

The thinner the clay wall thickness is, the more translucent the material is. Slip casts were pursued from 30 seconds to 2 minute durations. The thicker shades were used for subtractive methods and thinner shades either had additives mixed into or onto of the forms.

After the slip has solidified and slightly offset from the plaster, the mould can be opened and the form can be removed.

A 1.75″ hole was cut on both sides of all shades. This is to allow the forms to slide onto the 1.5″ LED light tube. The extra 1/4″ is for when the ceramic undergoes shrinkage during the firing processes.

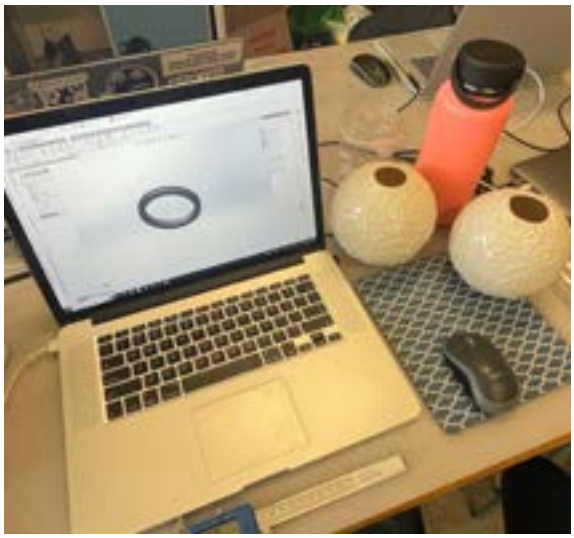


Ceramic shades were placed into a kiln and bisqued to cone 06.

Ceramic shades were sanded smooth and clear glaze was applied through a spray gun.

Ceramic shades were placed into a glaze kiln which fired to cone 6.

Some of the spheres warped in the kiln, which misaligned the holes. The solution was to grind the holes back to shape.

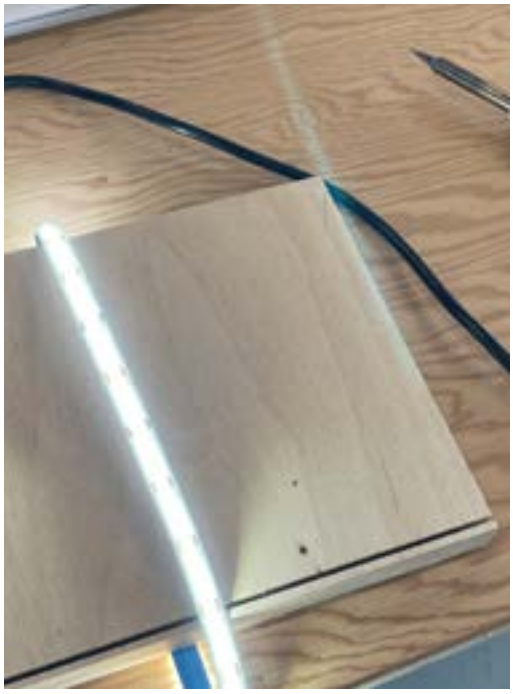


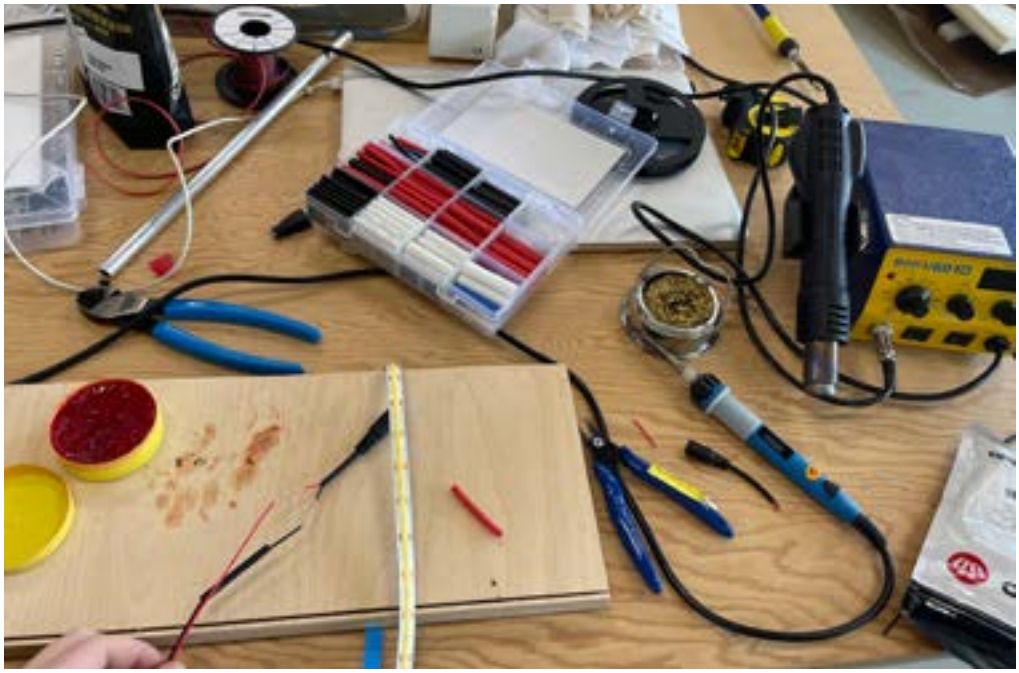
The edges of the ceramic shades need to be protected by the tube light. Therefore, TPU edge guards were designed and 3D printed.

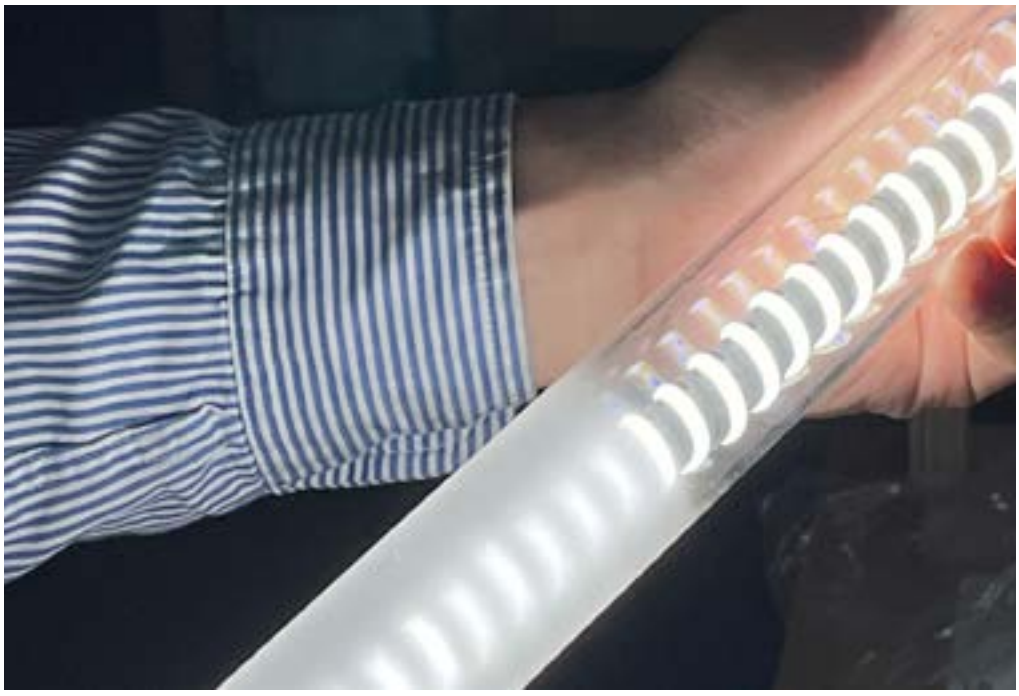
Ceramic shades were fitted onto base and tube for testing and measurements.

LED TUBE LIGHT

The touch sensor was wired to the top of the pole, while the LED strip light spiralled down the aluminum rod.

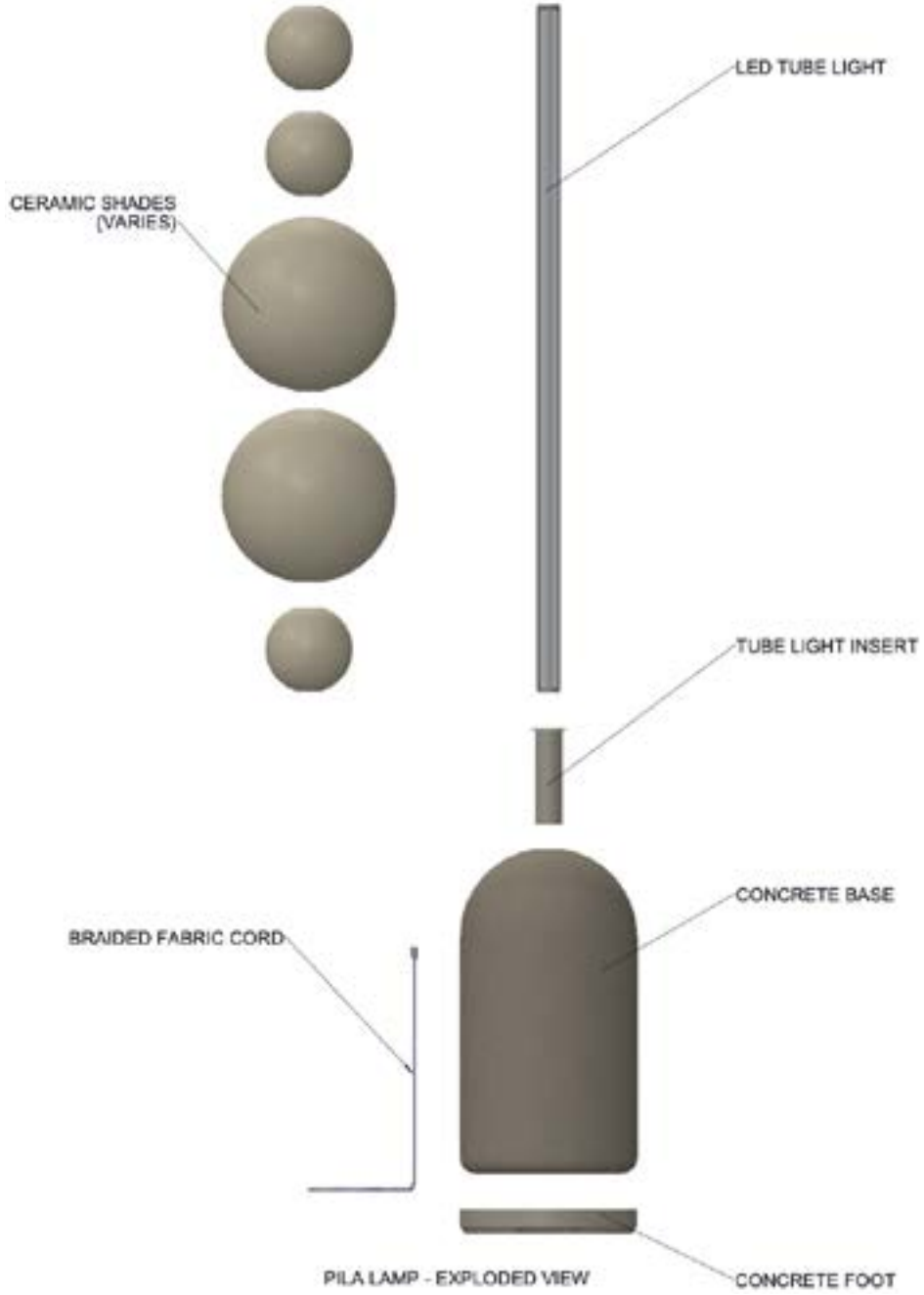


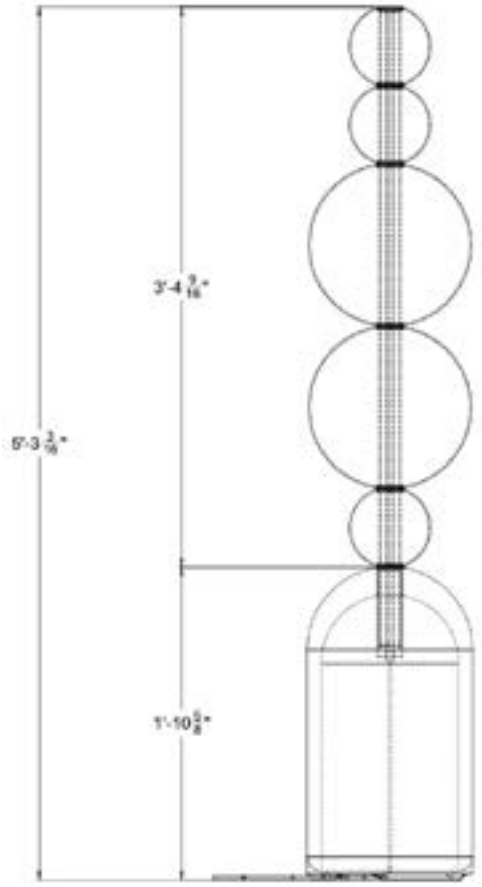




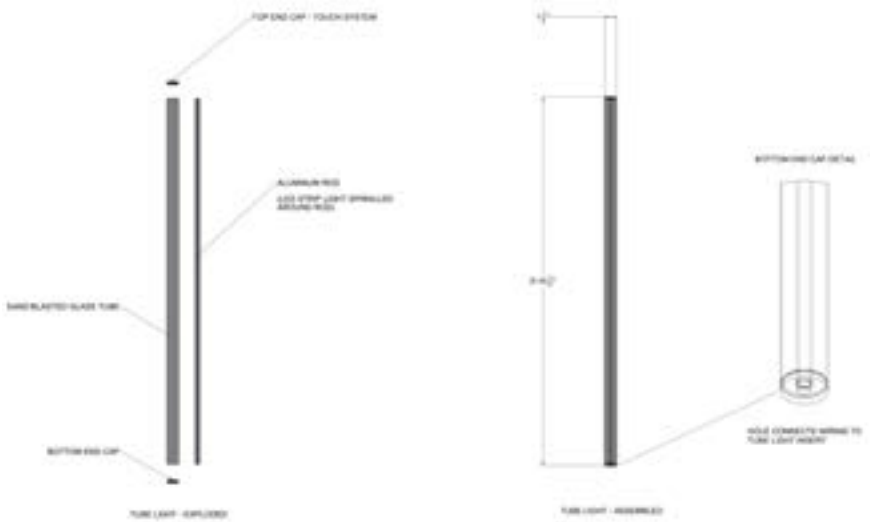
The tube light end caps were 3D printed out of PLA plastic. Both caps secured the aluminum rod. However, the top cap holds the touch sensor and the bottom cap supports the cable that connects to the power supply within the concrete base.

PILA LAMP DETAILS

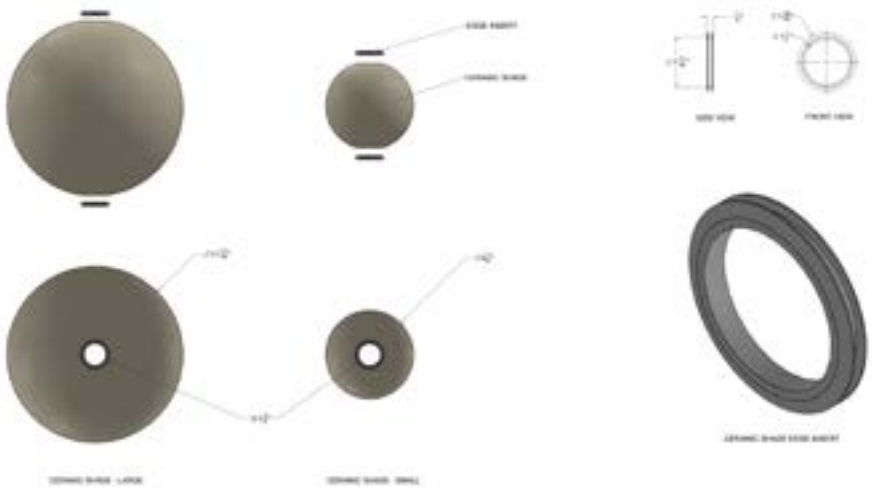




PILA LAMP - ASSEMBLED



The LED tube light can be removed to for easier access to concrete base and for relocation.

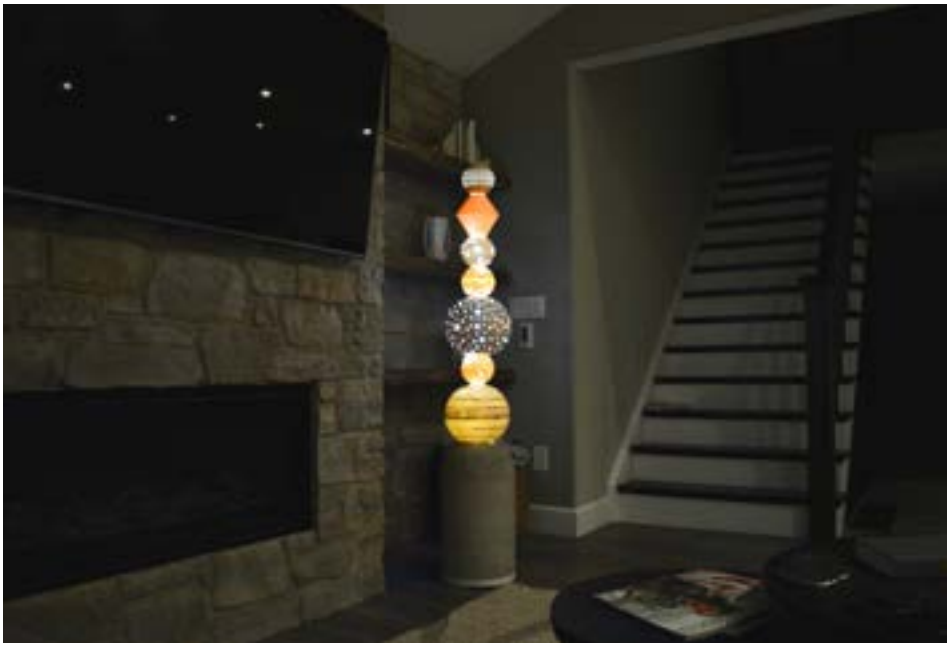


TPU plastic edge guards.

The light is activated by a touch switch, presented as the brass point located on the top tube cap.

Adding and removing ceramic shade beads.

FINAL DESIGN



RECOGNITION

Great appreciation goes out to my family, friends, colleagues and professors for the tremendous support during the years at Sheridan College.













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