

Project 3

Decorative lighting design for luxury homes

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What is decorative lighting?

A light fixture that is decorative in nature or design. The term 'decorative lighting' covers all the traditional kinds of light fittings (floor lights, pendants, chandeliers, etc) and differentiates them from technical or architectural lighting

Decorative lighting can provide general illumination for an entire room, focus on a small area for task or hobby lighting, or be used to accent other lighting and provide additional ambiance. Most decorative lighting can be either hardwired or plugged into an outlet and some can run on battery or solar power. We need to choose creative shapes, unusual colors, interesting designs and attractive elements to complement our decor with lighting.

Types of lighting:

There are three basic types of lighting that work together in a home:

- Ambient
- Task
- Accent

A good lighting plan combines all three types to light an area according to function and style.



Ambient lighting

Provides an area with overall illumination. Also known as general lighting, it radiates a comfortable level of brightness without glare and allows you to see and walk about safely. In some spaces such as laundry rooms, the ambient lighting also serves as the primary source of task lighting.

It can be accomplished with chandeliers, ceiling or wall-mounted fixtures, recessed or track lights and with lanterns mounted on the outside of the home. Having a central source of ambient light in all rooms is fundamental to a good lighting plan.

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Task lighting:

Helps you perform specific tasks, such as reading, grooming, preparing and cooking food, doing homework, working on hobbies, playing games and balancing your checkbook. It can be provided by recessed and track lighting, pendant lighting and under cabinet lighting, as well as by portable floor and desk lamps.

Task lighting should be free of distracting glare and shadows and should be bright enough to prevent eye strain.

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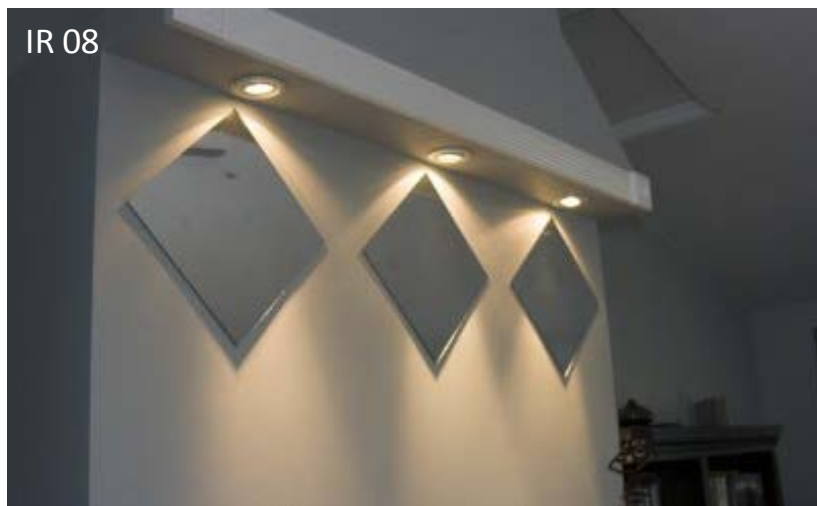


Accent lighting:

Adds drama to a room by creating visual interest. As part of an interior design scheme, it is used to draw the eye to houseplants, paintings, sculptures and other prized possessions. It can also be used to highlight the texture of a brick or stone wall, window treatments or outdoor landscaping.

To be effective, accent lighting requires at least three times as much light on the focal point as the general lighting surrounding it.

Accent lighting is usually provided by recessed and track lighting or wall-mounted picture lights.



Types of Lighting Fixtures:

There are many different styles, sizes and shapes of lighting fixtures that are available to deliver the ambient, task and accent lighting we need. A study on the existing ones has been made to understand the market environment, sellers and buyers both.

The many shapes and forms of lighting fixtures are as follows:

- **Chandeliers**
- **Hall/foyer fixtures**
- **Pendants**
- **Ceiling-Mounted Fixtures**
- **Wall-Mounted Fixtures**
- **Bath/Vanity Fixtures**
- **Portable Lighting**
- **Track Lighting**
- **Rail Lighting**
- **Recessed Lighting**
- **Under-cabinet Lighting**

Chandeliers :

They add style and a decorative focal point to almost any room in the house. Though they have traditionally been used in the dining room, they are now commonly featured in bedrooms, kitchens, family rooms, living rooms, foyers and even bathrooms.

Some chandeliers are designed with down-lights to provide task lighting for homework, table games or to accent table settings. Others are available with fabric or glass shades, which reduce glare and provide an artistic element. Adding a dimmer to your chandelier lets you alter the intensity of the light to suit the mood or activity.

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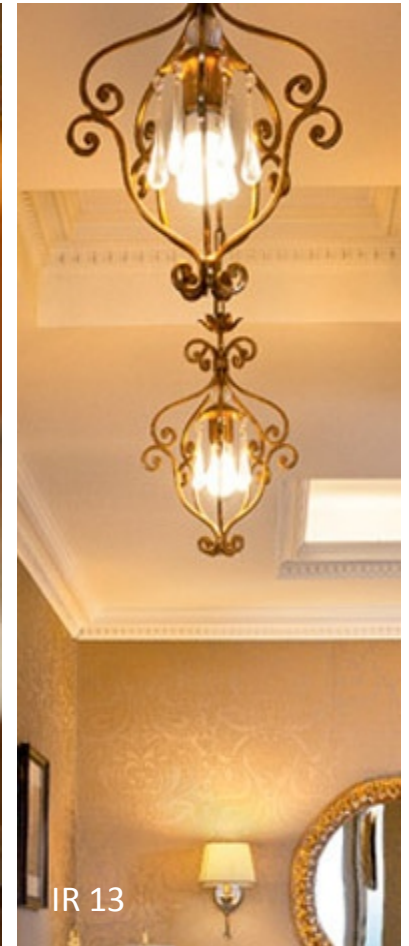
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Hall/foyer fixtures:

Can create a beautiful focal point at the entrance to your home. They can provide the ambient lighting that you need to greet guests and to assure safe passage into other areas of your home.

The ceiling height of the space will determine the type of fixture that you should use. In taller ceilings and over stairways, large chandeliers and chain-hung foyer fixtures are most appropriate. Use surface-mounted and close-to-ceiling fixtures in foyers with lower ceilings and in hallways.



Pendants:

Can provide both task and ambient lighting. They are extremely popular and available in an unlimited range of styles, shapes and colors.

Equipped with shades or globes to avoid glare, they are suspended from the ceiling over kitchen counters, breakfast areas, game tables or other work areas. When used over bedside tables, they provide good task lighting and also free up the space occupied by table lamps. The use of a dimmer provides you with the flexibility to vary the light to suit the occasion.

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Ceiling-mounted fixtures:

Are excellent as a source of ambient lighting and are especially practical in areas with much activity, such as foyers, hallways, bedrooms, kitchens, baths, laundry rooms, playrooms and dens.

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Wall-mounted fixtures:

Can provide a unique sense of elegance and sophistication to any home. They can also furnish ambient, task and accent lighting. Many are designed to match and supplement chandeliers and other fixtures in sets or families.

They are excellent sources of light in foyers, hallways, bedrooms, living rooms, home offices and home theaters. Wall brackets also are often used for task lighting at the sides of bathroom mirrors.



Bath/vanity fixtures:

Supply task lighting, while supplementing the general lighting provided by ceiling fixtures. They are available in a wide range of styles, colors and shapes and are being used much more frequently today than the older bath/vanity lighting strips.

Newer versions of bath/vanity fixtures are available with either glass or fabric shades, which provide glare control as well as excellent task lighting for grooming, applying makeup or shaving.



Portable lighting:

Can deliver ambient, task and accent lighting while giving you the flexibility to move the light wherever you want. Table lamps, floor lamps and torchieres (floor lamps with an up-light component) are available in a variety of styles to complement your interior design. Small specialty lamps, such as clip-on-lights, adjustable task lights and desk and accent lamps, fill a variety of task, ambient and accent lighting needs.



Track lighting :

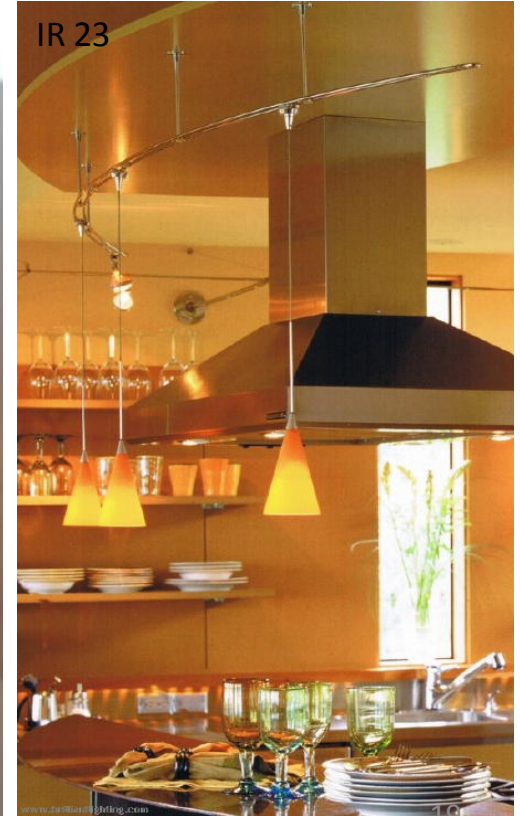
Has undergone many changes in recent years. The trend in track lighting has been toward smaller fixtures, which are much less noticeable in the space. Track lighting is excellent for its flexibility and can provide ambient, task or accent lighting.

You can move, swivel, rotate and aim the individual fixtures in any direction along the track, giving you the versatility to change the lighting scheme when the need arises. With special attachments, you also can hang chandeliers and pendants from the track.

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Rail lighting:

Is increasing in popularity. As the demand grows for bendable, flexible rail lighting systems, rail lighting has been rejuvenated not only for function, but to add an additional decorative element to the space.

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Recessed lighting:

Can provide general, task and ambient lighting in a very subtle manner.

Installed in the ceiling with only the trim showing, recessed fixtures can be used anywhere in the home, including outdoors, under eaves and on porches. They are ideal for any type of ceiling, including tall ceilings, shorter ceilings and sloped ceilings.

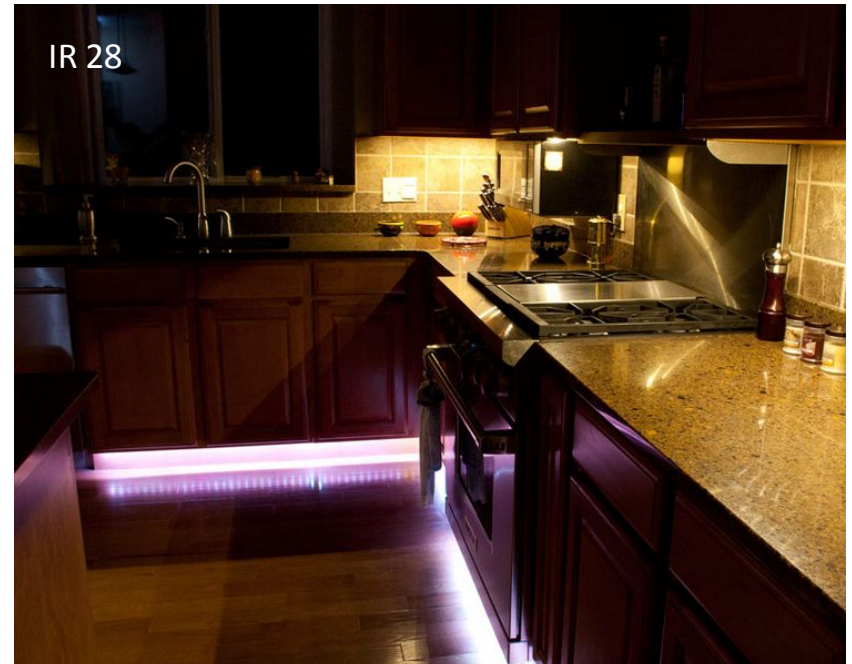
They are available as down-lights for ambient and track lighting, and as adjustable accent lights or wall washers for accent lighting.



Under-cabinet fixtures:

Offer both task and accent lighting. Mounted under kitchen wall cabinets, they provide excellent task lighting at the countertop. Used in display cabinets, they provide accent lighting for three-dimensional art and sculpture. In workshops or laundry rooms, they are an ideal source of task and ambient lighting.

They include slim, energy-efficient fluorescents, miniature linear lighting and strips of line or low-voltage xenon, halogen mini-lights or LEDs.



Types of Light Sources and Light Bulbs:

The performance of any light fixture depends very much on the light source (bulb) used. Different bulbs produce different lighting effects, and many bulbs have widely varying performance. To save energy, we have to select the most efficient light bulb that will provide the type of lighting we need.

Lighting Measurement Terminology:

Wattage: The amount of electricity consumed by a light source. The electric power required by an appliance or device. The amount of power, especially electric power, is expressed in watts or kilowatts.

Lumens: A measure of luminous flux, the total amount of visible light emitted by a source. The amount of light that a light source produces.

Efficacy: Measure of lumens per watt.

Lux: Measurement of lumen per square meter.

Candela: Unit of luminous intensity, that is, power emitted by a light source in a particular direction

Foot candles: The amount of light reaching a subject.

While watt measurements are familiar to consumers and have been featured on light bulb packages for decades, watts are a measurement of energy use and not brightness. As a result, reliance on watt measurements alone make it difficult for consumers to compare traditional incandescent bulbs to more efficient bulbs, such as compact fluorescents. Hence, lumens would at times be a better way for comparison.

Types of Light Sources:

Incandescent bulb: The common bulb used in daily life. General service and reflectorized are the different types.

Parabolic Reflector bulb: Used in recessed and track lighting. Also suitable for outdoor spot and flood fixtures.

Tungsten-halogen bulb: Have a longer life and provide more light per watt than standard incandescent bulbs, making them a more efficient choice.

Xenon bulb: These miniature bulbs are popular for strip, under-cabinet and cove lighting applications.

Fluorescent bulbs: They use 1/5 to 1/3 as much electricity as incandescent and last up to 20 times longer. Compact types are used in smaller, trimmer fixtures such as recessed down-lights, wall sconces, close-to-ceiling fixtures, and track lights.

Compact Fluorescent Lamps (CFLs): Small fluorescent bulbs that can be used in most types of lighting fixtures.

T8 bulbs: They are commonly used in commercial projects and are now being widely used in residential applications.

High-Intensity Discharge (HID): Do not produce pleasing light colors. In residential settings, HIDs are most often used for outdoor security and area lighting. Metal Halide, High-Pressure Sodium, Low-Pressure Sodium and Mercury Vapor are the different types

Current Trend in lighting and light sources :

Illuminating the places where we stay all day and night is not just a necessity, it's the way we conduct ourselves in life. The style, the aesthetics, the functionality and other such aspects of lighting all tell about our imagination, creativity and practicality.

Rising power bills and awareness about environment, lighting trends have favorably shifted towards compact fluorescent lamps (CFL), LED based lights & T5 which is the highly energy efficient version of fluorescent tube. Green lighting, as they are called, are durable and use less power.

In fact the new green lighting system has acquired a new meaning where it enables maximum utilization of building design, materials, colors, light sources and electronics etc. in order to make lighting effective and energy conservative.

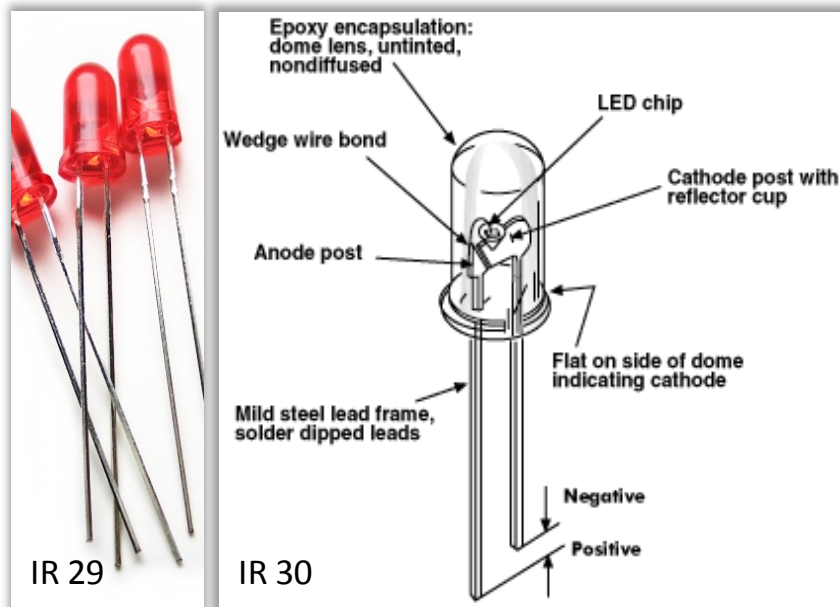
Dynamic Lighting: As people are getting more natural, they are preferring advanced lighting solutions that can bring in the dynamics of daylight indoors promoting the feeling of well being. In dynamic lighting system, different lamps are used whose color, temperature and intensity can be controlled to create the desired atmosphere

Recessed lights will continue to be in demand with more options to explore. Apart from the rows of halogen and LED recessed lights with their twinkling glow, concealed lighting is one more current trend that will not only illuminate living rooms but bedrooms too.

With retro looks gaining popularity, track lighting systems fitted with CFL and LED lights would also be in vogue. Sculptural pendant lights, chandeliers, floor lamps on tripod stands and arm table lamps, both in classic as well as modern designs

LED lighting: The innumerable LED lighting solutions can create a number of effects, moods and ambiances. And not only this, LED lights are highly energy efficient which is yet another lighting trend seen recently.

The projects lighting focuses mainly on the usage of LEDs for attaining the desired effect and ambience. The fixture too will hence be designed in compatibility with LEDs as the light source.



Light Emitting Diodes (LEDs):

LEDs produce light when voltage is applied to negatively charged semiconductors, causing electrons to combine and create a unit of light (photon). In simpler terms, an LED is a chemical chip embedded in a plastic capsule. Because they are small, several LEDs are sometimes combined to produce a single light bulb.

LED lighting in general is more efficient and longer lasting than any other type of light source, and it is being developed for more and more applications within the home. LEDs are currently popular in under-cabinet strips and some types of down-lights.

It is speculated that these very same sources will one day light our homes and everyday spaces. That is because they're highly efficient, long lasting, environmentally friendly and inherently controllable - enabling both new and traditional applications of light. Promising future aside, LED lighting systems already illuminate famous buildings, bridges, retail shops, television studios, theater stages, hotels, casinos, hospitals, restaurants and celebrity-filled nightclubs around the world.

LED lights have a variety of advantages over other light sources:

- High-levels of brightness and intensity
- High-efficiency
- Low-voltage and current requirements
- Low radiated heat
- High reliability (resistant to shock and vibration)
- No UV Rays
- Long source life
- Can be easily controlled and programmed

Lighting Controls:

Lighting controls give you the flexibility to design a lighting plan with multiple uses and decorative effects. With the touch of a button, today's sophisticated dimming systems enable you to:

- Lower light levels to conserve energy and increase bulb life
- Vary the mood of a room
- Alter the intensity of the light to suit the activity
- Create and save a number of different lighting schemes in one room

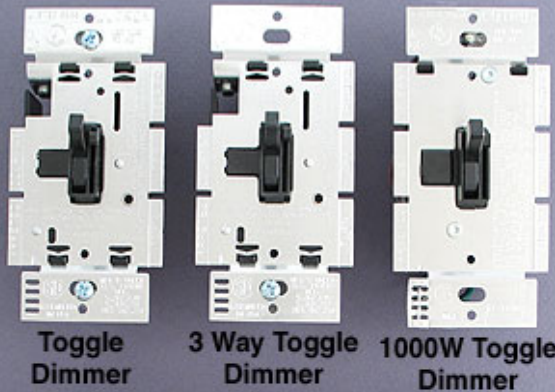
Types of Controls

Toggle dimmers allow you to vary the intensity of the lighting by a small slider that is next to the toggle switch. The toggle allows you to turn the lights on and off, while the slider allows you to alter the intensity of the light. These are preset-type dimmers, which means you can set them at a favorite setting that will remain at the preset intensity each time you turn the switch on.



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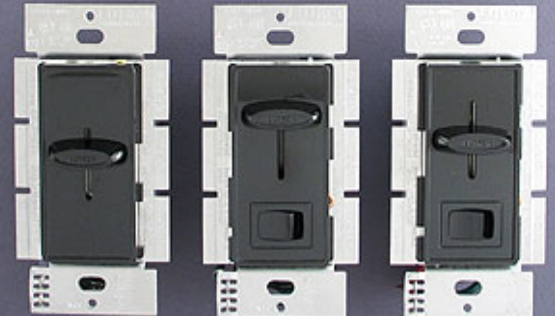
Dimmer Section



Toggle
Dimmer

3 Way Toggle
Dimmer

1000W Toggle
Dimmer



Slide Dimmer
S-600-BL

Slide Dimmer
S-600P-BL

3 Way Slide Dimmer
S-603P-BL

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Slide dimmers:

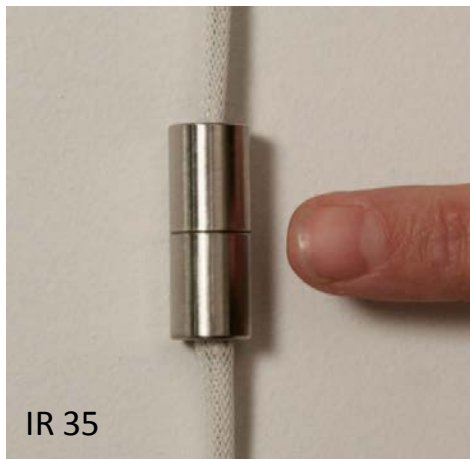
Provide full-range, manual dimming control. Some are equipped with a touch-button that allows you to return to the previous lighting level when the lights are turned on. Others have an indicator light that glows in the dark for easy location.

Touch dimmers:

Allow you to vary the intensity of the lighting while depressing a button. These systems permit one-touch recall of the previous lighting level. Some are equipped with indicator lights that provide a continual readout of the lighting intensity and delay features that allow the operator time to exit a room before the lights turn off.

Integrated dimming systems:

Allow you to create multiple preset lighting scenes within a room. Scenes can be recalled with the touch of a button from a single wall-box or with hand-held wireless remote controls. Some manufacturers have even started offering systems that can be programmed via mobile devices such as the Apple iPhone.



Colors , moods and emotions:

There are four psychological primary colors - red, blue, yellow and green. They relate respectively to the body and the mind. The psychological properties of a few basic colors are as follows:

RED. Physical

Positive: Physical courage, strength, warmth, energy, basic survival, 'fight or flight', stimulation, masculinity, excitement.

Negative: Defiance, aggression, visual impact, strain.

BLUE. Intellectual.

Positive: Intelligence, communication, trust, efficiency, serenity, duty, logic, coolness, reflection, calm.

Negative: Coldness, aloofness, lack of emotion, unfriendliness.

YELLOW. Emotional

Positive: Optimism, confidence, self-esteem, extraversion, emotional strength, friendliness, creativity.

Negative: Irrationality, fear, emotional fragility, depression, anxiety, suicide.

GREEN. Balance

Positive: Harmony, balance, refreshment, universal love, rest, restoration, reassurance, environmental awareness, equilibrium, peace.

Negative: Boredom, stagnation, blandness, enervation.

VIOLET. Spiritual

Positive: Spiritual awareness, containment, vision, luxury, authenticity, truth, quality.

Negative: Introversion, decadence, suppression, inferiority.

ORANGE.

Positive: Physical comfort, food, warmth, security, sensuality, passion, abundance, fun.

Negative: Deprivation, frustration, frivolity, immaturity.

PINK.

Positive: Physical tranquillity, nurture, warmth, femininity, love, sexuality, survival of the species.

Negative: Inhibition, emotional claustrophobia, emasculation, physical weakness.

GREY.

Positive: Psychological neutrality.

Negative: Lack of confidence, dampness, depression, hibernation, lack of energy.

BLACK.

Positive: Sophistication, glamour, security, emotional safety, efficiency, substance.

Negative: Oppression, coldness, menace, heaviness.

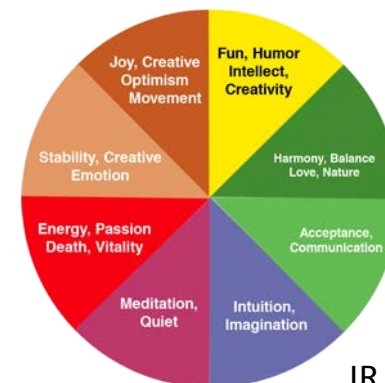
Positive: Hygiene, sterility, clarity, purity, cleanness, simplicity, sophistication, efficiency.

Negative: Sterility, coldness, barriers, unfriendliness, elitism.

BROWN.

Positive: Seriousness, warmth, Nature, earthiness, reliability, support.

Negative: Lack of humor, heaviness, lack of sophistication.



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Definition of Lighting Terms:

Absorption - Refers to a measure of the amount of light absorbed by an object, instead of being reflected. Dark colored and matte surfaces are least likely to reflect light.

Accent Lighting - Lighting directed at a particular object in order to focus attention upon it.

ADA (Americans with Disabilities Act) - ADA-compliant fixtures cannot extend more than 4" from the wall.

Ambient (General) Lighting - The soft indirect light that fills the volume of a room with illumination. It softens shadows on people's faces and creates an inviting glow in the room.

Amperage - The amount of electrical current through a conductive source.

Angle of Reflectance - The angle at which a light source hits a reflective surface equals the angle at which the resulting glare is reflected back.

ARM - A decorative-shaped tube or casting that is used to support a socket. An arm usually has socket wires running through it.

Back Plate - The part of a fixture that mounts to a wall or vertical surface.

Ballast - Device that Provides the proper starting and operating electrical condition to power one or more fluorescent or HID lamps. There are two types of ballasts available, magnetic and electronic.

Bulb – What everyone calls it except the lighting industry which calls it a 'Lamp'.

Canopy - The decorative plate that attaches to the ceiling to cover the junction box.

Chandelier - A multi-arm, decorative, often ornate ceiling light fixture that holds a number of bulbs.

Collection – A group of matching fixtures and/or lamps that together can bring a unified look to a home or room.

Color Temperature – The appearance of white light, in terms of warmth or coolness. Warm color corresponds to lower color temperatures and cool colors to warm color temperatures.

CRI (Color Rendering Index) – A measure of how light sources render colors. The higher (to 100) the CRI, the better the color rendering, given the color temperature of the lamp.

Diffuser – A covering or shade over a light or lamp that generally softens or scatters the light and is usually used to eliminate hot spots and glare. Can be made from a variety of materials (glass, plastic, fabric, etc.) and in a variety of colors.

Dimmer - A control that regulates light levels.

Dimming Ballast - a ballast designed to allow the use of dimmers.

Efficacy - Measurement of the efficiency of a light source.

Extension (EXT.) - The depth of a wall light fixture (sconce or bath). The measurement from the wall to the farthest point away from the wall.

Family – Same as Collection - A group of matching fixtures and/or lamps that together can bring a unified look to a home or room.

Filters - Glass or metal accessory used to alter beam patterns or introduce/change colors.

Finial - A small finishing ornament at the crown or bottom of a fixture.

Fixture – A light that is permanently attached or wired directly into a junction box. Chandeliers, bath lights and wall sconces are examples of ‘ fixtures’.

Flush-Mount - Attach directly to the ceiling with no gap between the light and ceiling.

Foot Candle - A measurement of the intensity of light reaching a surface. One uniformly distributed lumen falling on one square foot of surface produces the illumination of one foot candle.

Halogen - An incandescent lamp containing halogen gas which recycles the tungsten.

Hard Wire - Method of luminaire installation using a junction box.

HCWO (Height from Center of Wall Opening) - The measurement from the top of the fixture to the center of the outlet box when installed.

High Intensity Discharge (H.I.D.) Lamp - A category of lamp that emits light through electricity activating pressurized gas in a bulb. Mercury vapor, metal halide, and high pressure sodium lamps are all H.I.D. sources. They are bright and energy-efficient light sources used mainly in exterior environments.

Housing - Enclosure for recessed sockets and trim above the ceiling.

Incandescent Lamp - The traditional type of light bulb that produces light through electricity causing a filament to glow. It is not a very efficient source of illumination.

Inverted pendant - An ornamental hanging fixture with no multiple arms where the glass or diffuser opening is facing the ceiling.

Junction Box - an enclosure that houses electric wires or cables that are joined together and protects the connections. Junction boxes are also sometimes called 'Gang boxes' or 'Splitter boxes'.

Kelvin - The common unit of measure for the color temperature of a light source.

Lamp - What the lighting industry technically calls a light bulb. A glass envelope with gas, coating, or filament that glows when electricity is applied. What everyone else calls a table or floor lamp.

Line-Voltage - The 110-120-volt household current, generally standard in North America.

Low-Voltage Lighting - System that uses less than 50-volt current (commonly 12-volt), instead of 110-120-volt, the standard household current. A transformer is used to convert the electrical power to the appropriate voltage.

Lumen - It is the measure of the "perceived power" of light.

PAR Lamps - Lamps (bulbs) with parabolic aluminized reflectors that give exacting beam control. There are a number of beam patterns to choose from, ranging from wide flood to very narrow spot.

Pendant -An ornamental hanging fixture with no multiple arms where the glass or diffuser opening faces down.

Portable – A light or lamp that is simply plugged into an outlet and can easily be picked up and moved. Ex: Table lamps

Sconce – A decorative lighting fixture with a flat side to be hung on a wall, that holds candles or lights.

Semi Flush – A light fixture which attaches to the ceiling with a stem or part that creates a gap between the fixture and ceiling.

Switches - Controls for electrical devices.

Task Lighting - Illumination designed for a work surface to provide good light, free of shadows and glare.

Timers - Control devices to activate luminaires at set timed intervals.

Torchiere - A tall floor lamp with a bowl-shaped glass that diffuses the light or directs it upward.

Transformer - A device which can raise or lower electrical voltage, generally used for low voltage lights.

Tungsten-Halogen - A tungsten incandescent lamp (bulb) which contains gas and burns hotter and brighter than standard bulbs.

Veiling Reflection - A mirror like reflection of a bright source on a shiny surface.

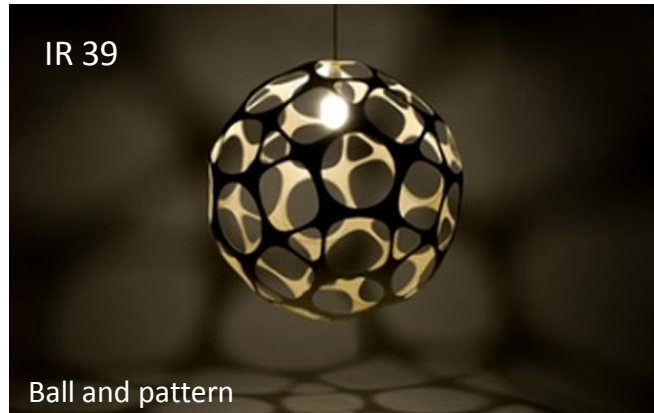
Voltage - A measurement of the pressure of electricity going through a wire.

Voltage Drop - The decrease in voltage between the source and the load due to resistance in the wire(s).

Watt – Unit of electrical power.

Xenon - An inert gas used as a component in certain lamps to produce a cooler color temperature than standard incandescent. It is often used in applications where halogen may normally be specified, because of a longer lamp life and lower pressure.

Market Study (Existing products from other parts of the globe): A brief look at what is in the international market



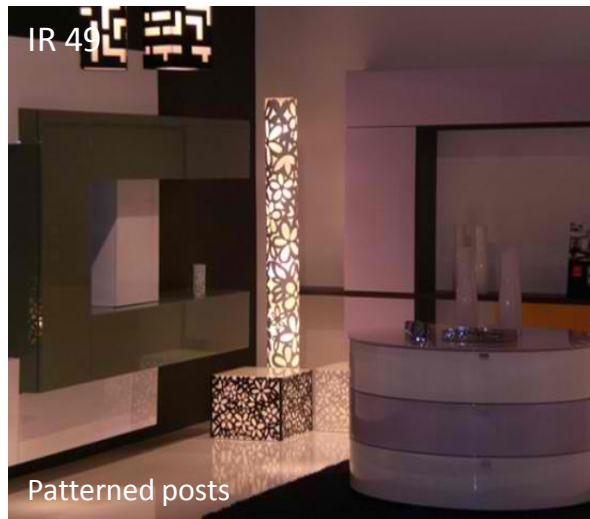
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Strong patterns on wall

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Patterned posts

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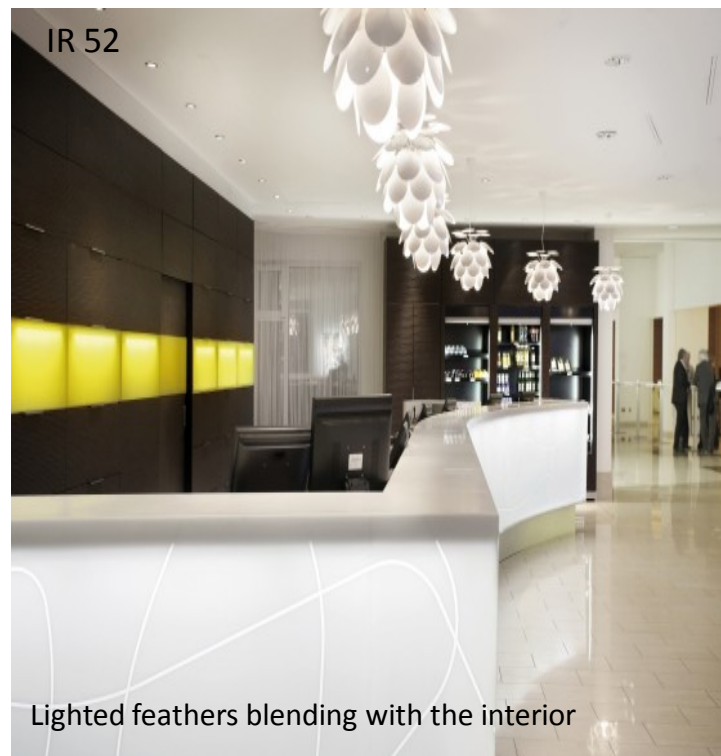
Lighted gong design

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Simple but beautiful

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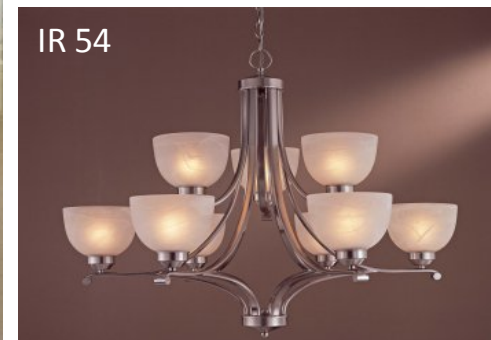


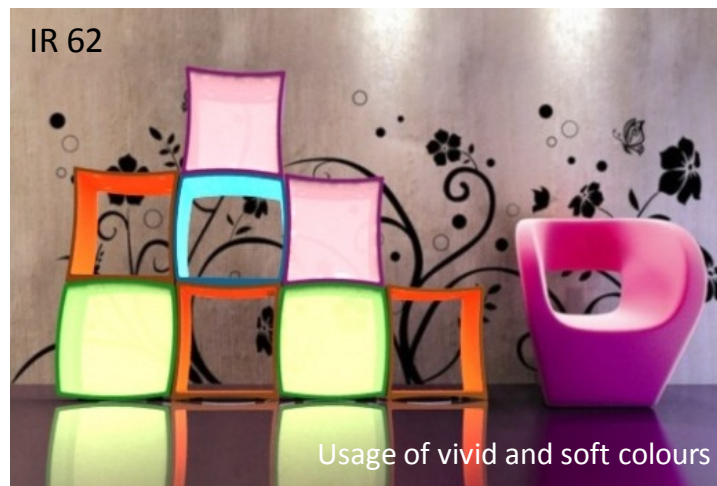
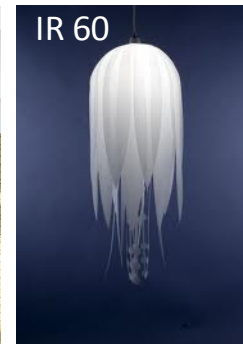
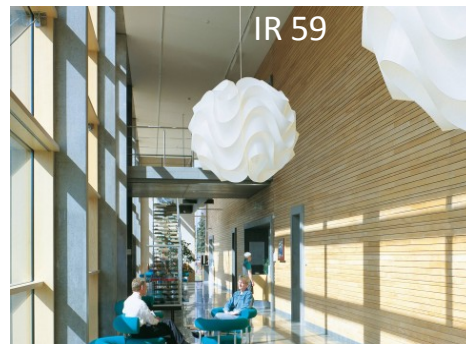
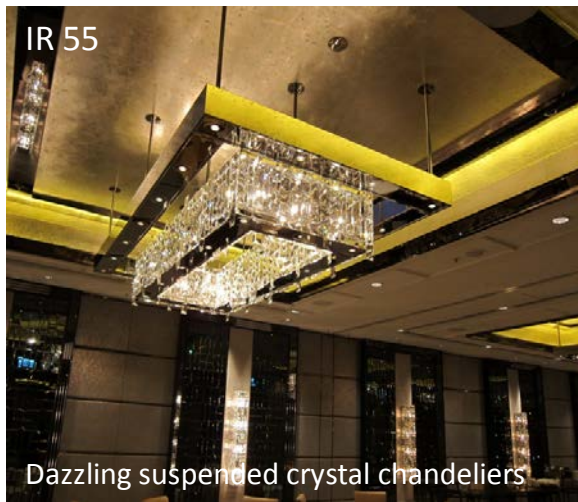
Lighted feathers blending with the interior

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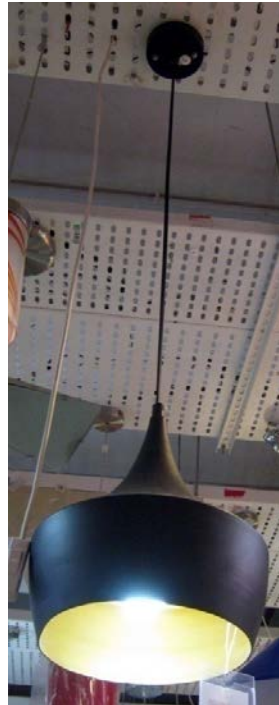
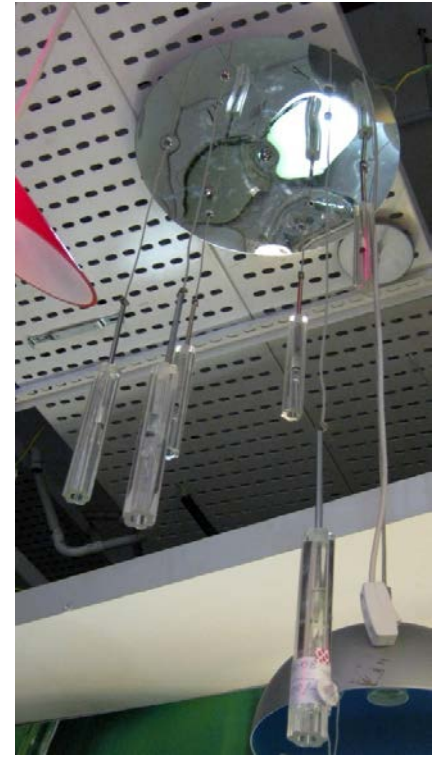
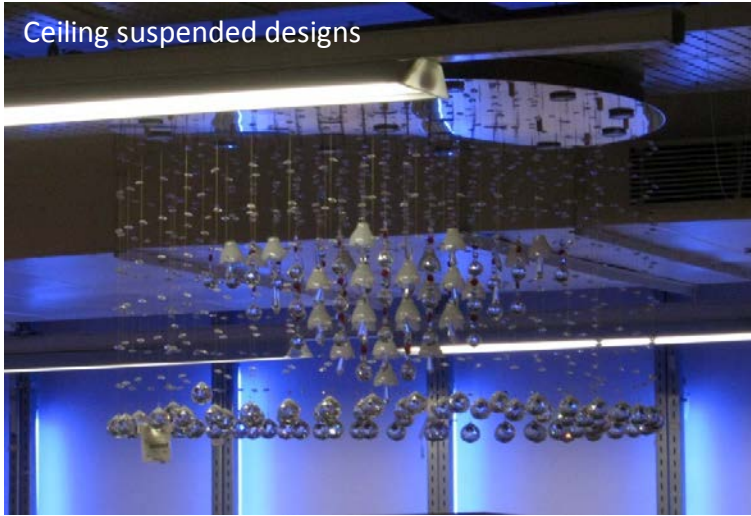
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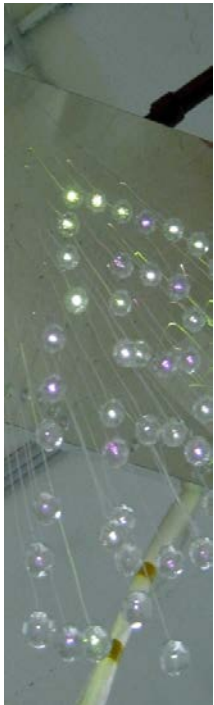


Market Study (Existing products in Indian market and outlets): A look at what was on offer in Mumbai's showrooms.

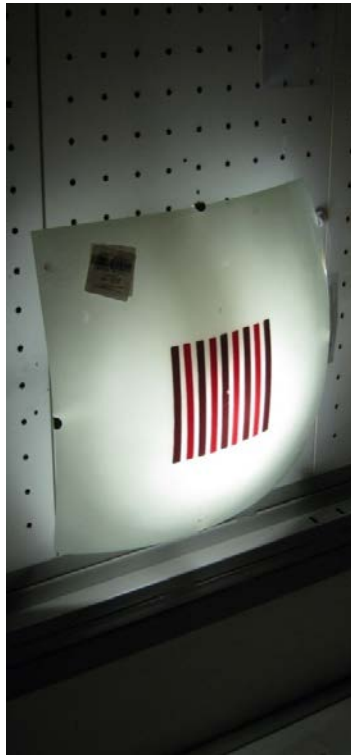
Ceiling suspended designs



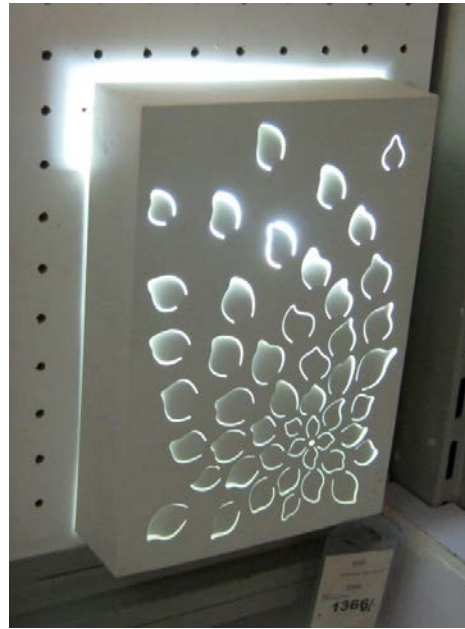
Ceiling suspended designs



Wall mounted designs



Wall mounted designs



Portable/table lamp designs





Evaluations from the market study:

A study on the Indian lighting fixtures market shows that the most common design categories are:

- **Ceiling fixed/suspended:** Ex. Pendants, chandeliers etc.,
- **Wall mounted/suspended:** Ex. Scones, torchieres, etc.,
- **Portable:** Ex. table lamps, bed-side lamps, etc.,

Observations from market study:

- The designs as a collection do not seem to be targeting a definite user group
- Not much variety offered to the buyers
- Most of the products seem outdated/ been on the shelf for a long time
- Randomly designed products. No particular theme or purpose attached to them
- Decorative lighting section in home décor outlets either not doing well or neglected or removed entirely

User group:

With regard to the prime purpose and need for decorative lighting, the end users would be people who:

- have a good taste for lighting designs and style
- have an understanding of various moods and occasions
- are smart/luxury home occupants
- are open to innovative and new ideas
- would invest a little more than others for ambience and feel.

Considering the above traits, the product will be best designed aimed at the upper-middle and the upper sections of Indian society.

Targeted age group would be around newly married to middle aged families (25-50 years)

User profile and user study:

Users belonging to this user group have been interviewed and their view, opinions and needs have been documented accordingly. This helps in having a better understanding of user needs, hence resulting in a good design

Name	Age	Sex	Occupation	Prime user need	Room
Rakanjana Sen	25	F	IT	Need something to lighten up the mood after a hard days work and stress	Living, Drawing
Ashish Deb	24	M	IT	The drawing room must be transformable into a relax/party/romantic zone by the help of lighting alone	Drawing
Nikhil Autade	26	M	Design	A theme based lighting fixture that can be installed throughout the house	Entrance hall
Suman Rooj	27	M	IT	Modular lighting setup which can be used and installed at free will, wherever and whenever	Living
Arjun Mandal	32	M	Business	Innovative way of lighting up a space, by means of a simple and long lasting design	Living
Pooja	28	F	Student	A design free of wires, as wires tend to cut down the feel that needs to prevail in a bedroom	Bedroom
Shailaditya Sarkar	22	M	Software	A programmable lighting setup that allows him to set different modes at different times of the day or occasions	Living
Jaya	30	F	Housewife	A lighting source/fixture that makes you feel warmer, at the same time not too harsh on the eyes	Living, Drawing

Name	Age	Sex	Occupation	Prime user need	Interior space
Sushovam Das	25	M	Service	Lighting system with smart lighting controls that allow you to dictate the light levels and intensity	Living
Saurav Barua	26	M	Advertising	Light fixture which can be put up or taken down at will with ease	Living
Akvil Sakhare	22	M	Student	Simple design which goes with almost any kind of modern interior and colour theme	Hall
Madhumati	32	F	Research	The source of light must be totally concealed, while still giving off sufficient ambient and task light	Dining, Living
Koustav Biswas	30	M	Engineer	A light that can be self made by just buying a few components that are readily available in the market	Living
Shishir	27	M	Software	Fixture for all occasion, and a one that can be used all throughout the day	Main hall
Vineetha Rath	27	F	Designer	An innovative solution that can be used as task accent as well as ambient lighting all at the same time	Entrance room
Swarnendu	33	M	Architect	Wire management, by making the wires as part of the design	Drawing, Living
Ginia Banerjee	25	F	Housewife	Mood lighting to cheer oneself up after a days household work	Living
Prithvi Tarafdar	26	M	IT	Light source must not be too harsh, and a trance like feel must be induced by just looking at it	Living
Naveen	24	M	Engineer	Employ dimmers and controls for efficient lighting	Hall
Anupam	27	M	Sales	Modular fixtures that cover an entire portion of a ceiling, like a carpet	Living

User needs:

After interviewing the users, the following have been outlined as the prime user needs requirements. This will be used later to frame the design brief.

- Fixtures to suit the mood associated with the room
- Lighting design has to transform the setting of the room
- Simple and elegant designs preferred over antique, bulky or complex ones
- Theme based fixtures required for each interior space
- Innovative visual or interactive experience needed
- Light sources should not be too harsh on the eyes
- Smart lighting controls to be incorporated
- Power consumed and heat dissipated to be kept low
- Wiring visibility management to be improved
- Easy assembly and installation

Design Directions:

- Designing a new experience of ambient lighting and fixtures for luxury homes
- Designing a functional and task oriented lighting for the various tasks of daily domestic life
- Designing portable lighting fixtures

Design Brief:

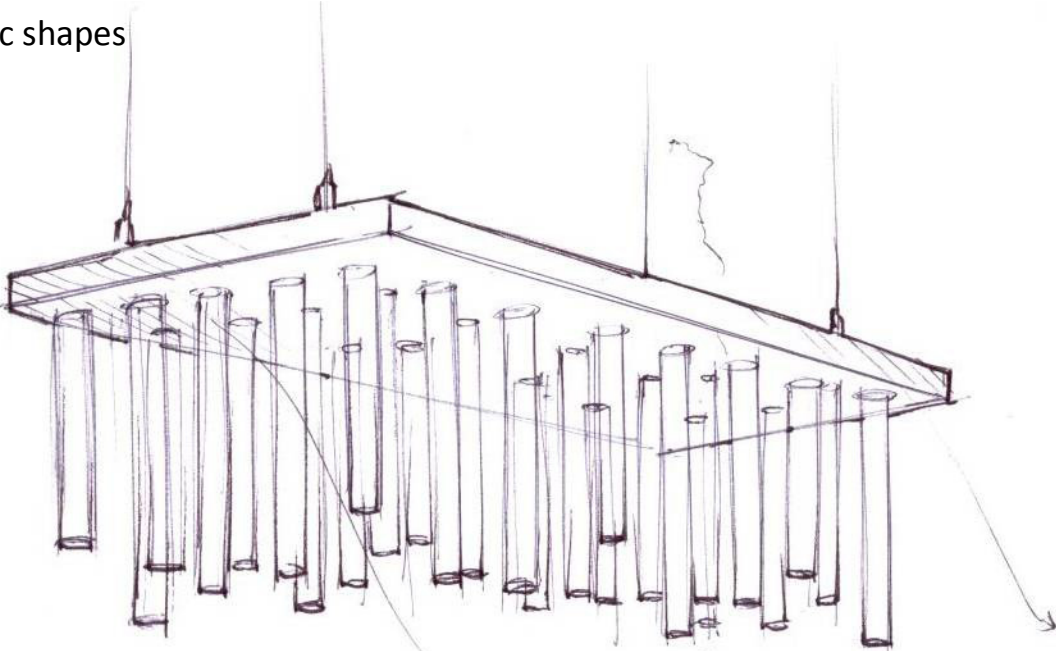
Designing a new, unique, visual and/or functional ambient lighting fixture for an upper class home interior where,

- the fixture will be suspended from the ceiling
- pleasant lighting, lighting control and wire management are provided
- easy assembly and installation

The design will be an end product of contemporary manufacturing processes.

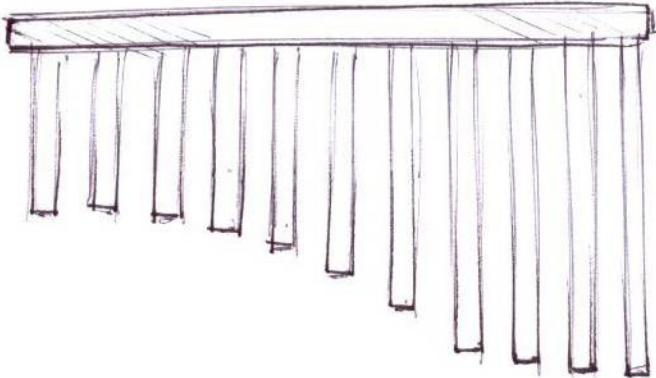
Ideations

Basic shapes



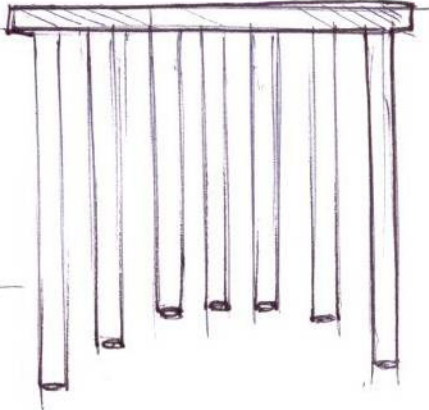
WOODEN TOP PLANE

LED DOWNLIGHTS

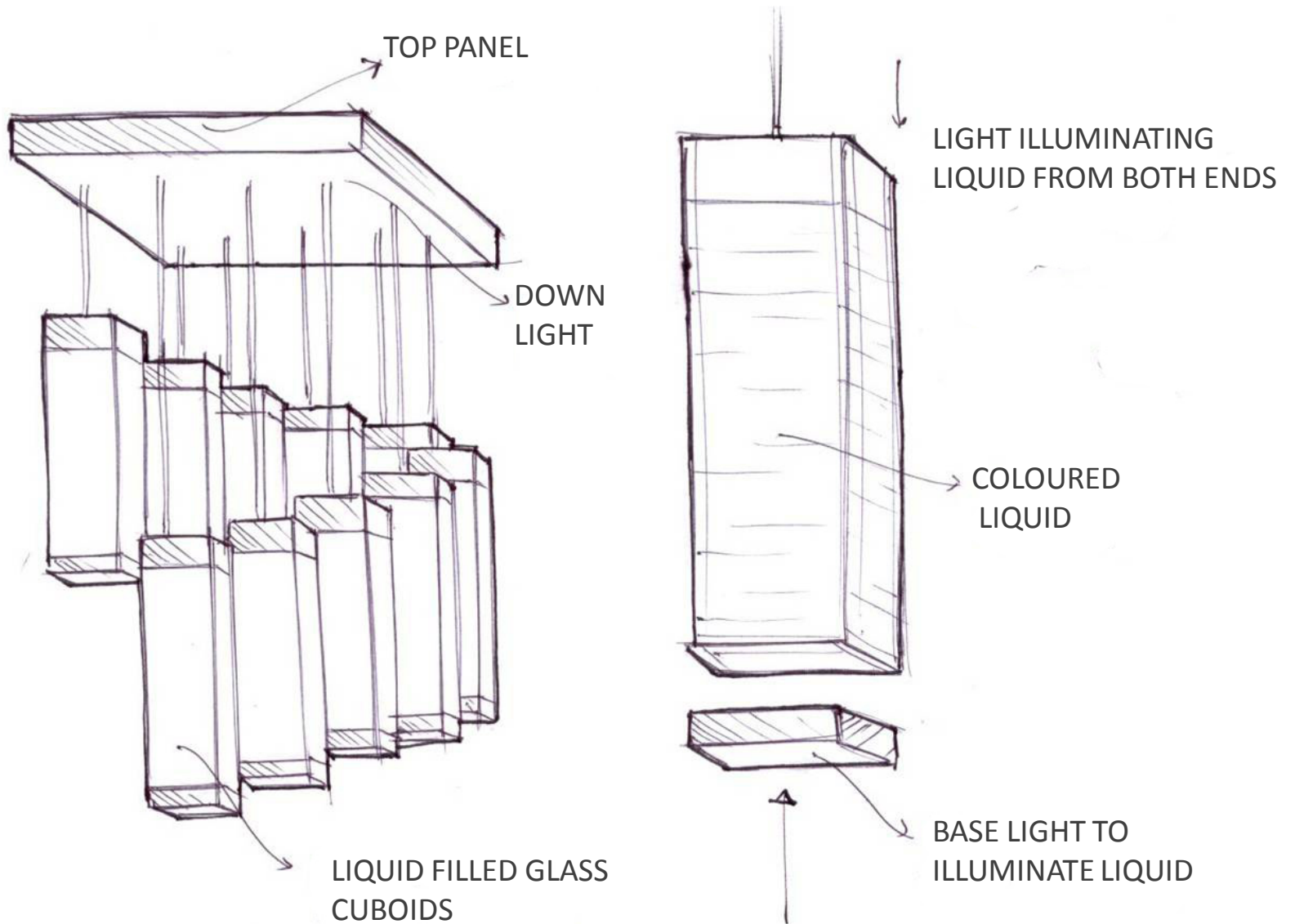


ACRYLIC PIPES

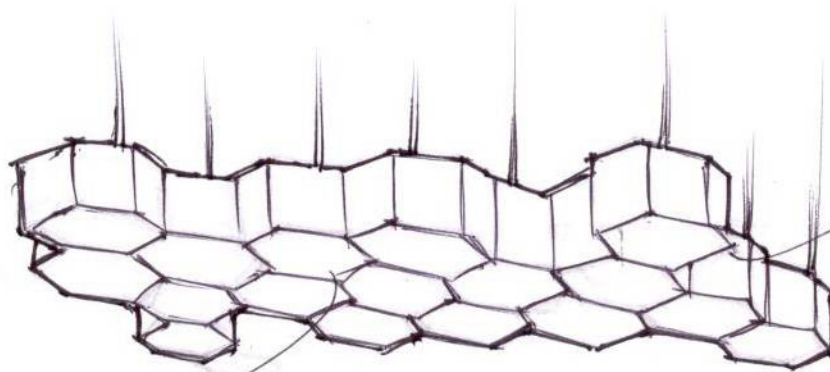
PATTERNS



Basic shapes



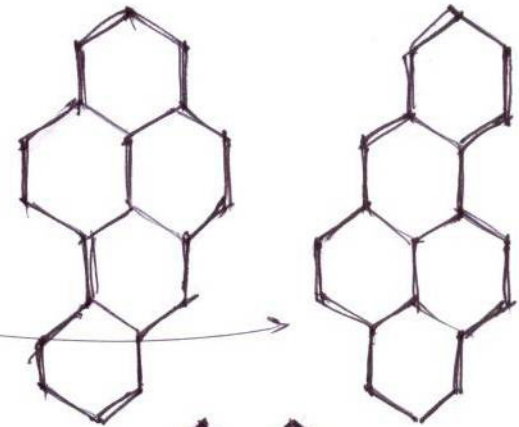
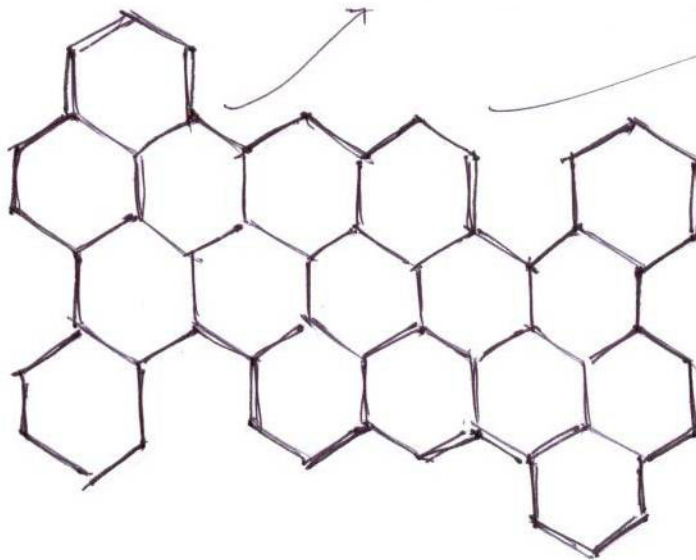
Basic shapes



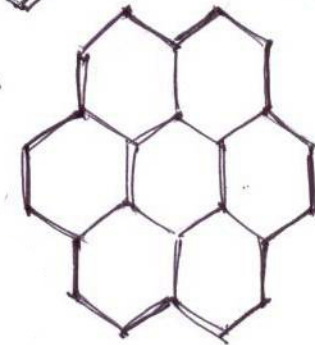
WOODEN HEXAGONAL
BEE HIVE STRUCTURE

PLAIN VIEW OF THE MODULES

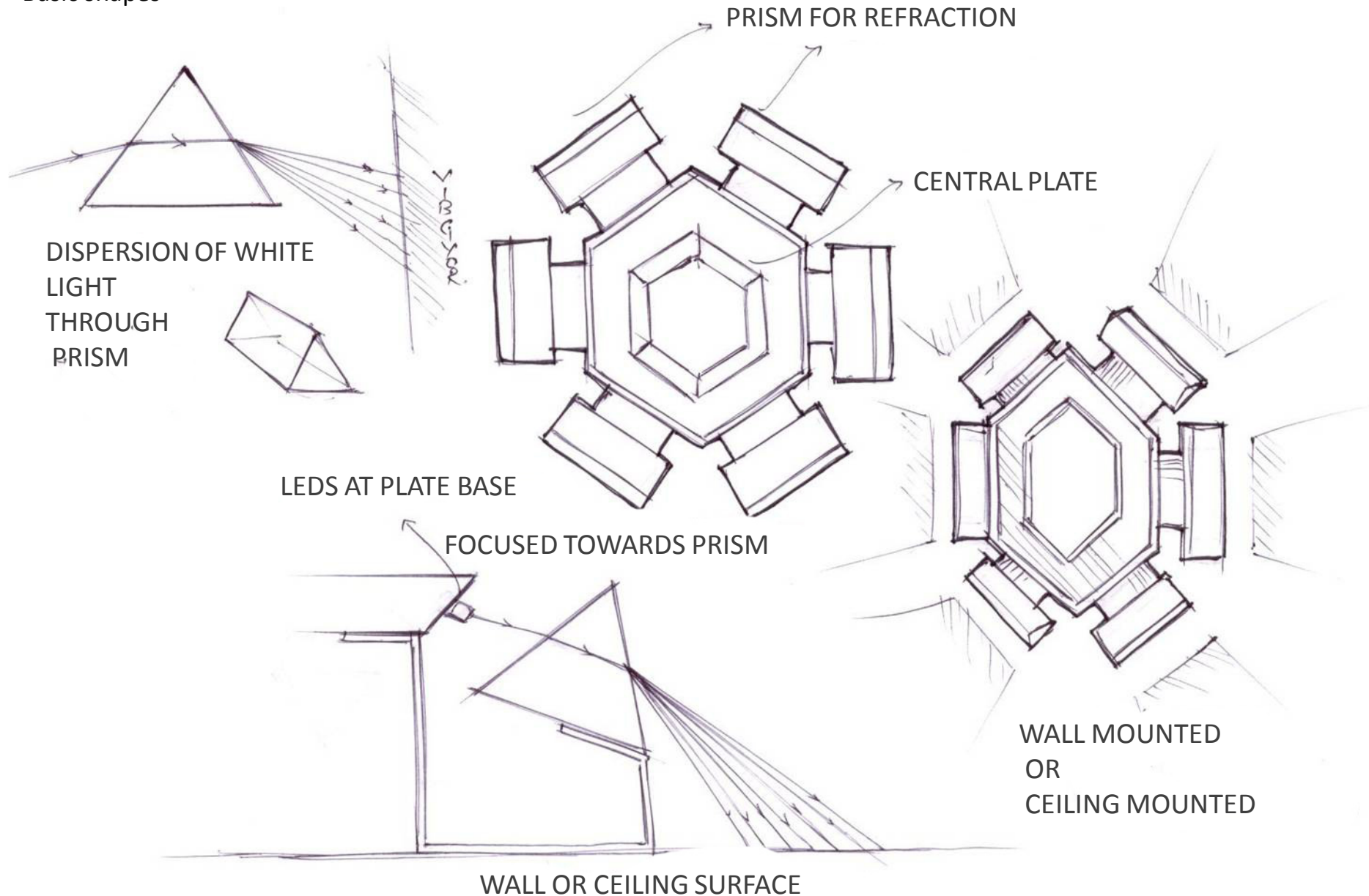
LIGHTS AT THE CENTER OF EACH HEXAGON



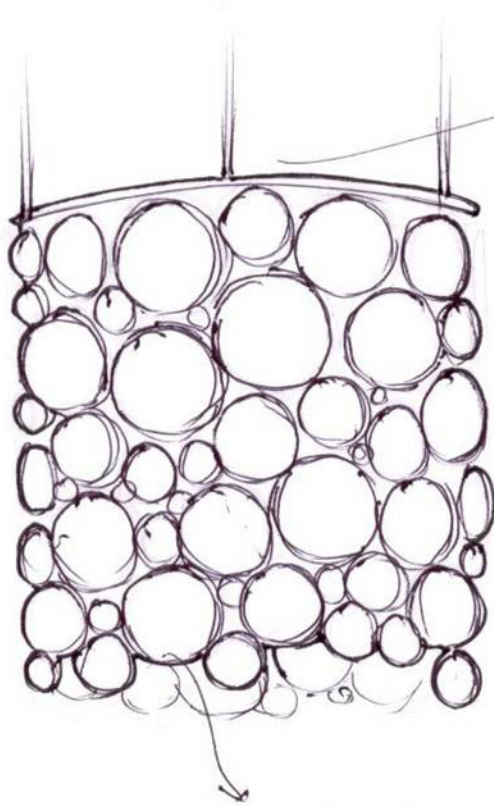
CAN BE SPLIT
INTO THREE
INDIVIDUAL
COMPONENTS



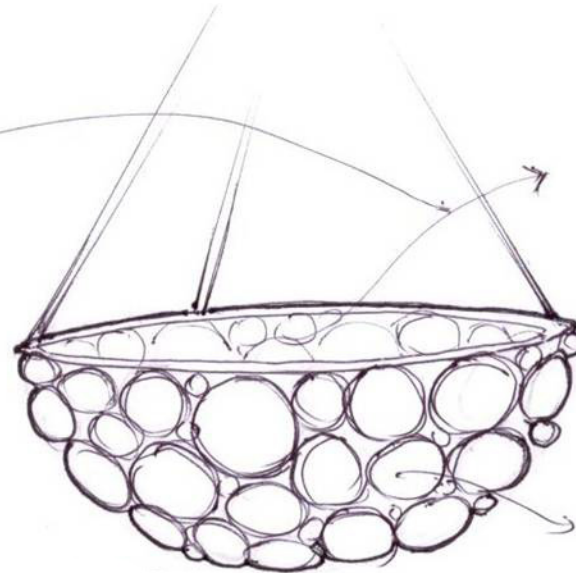
Basic shapes



Basic shapes



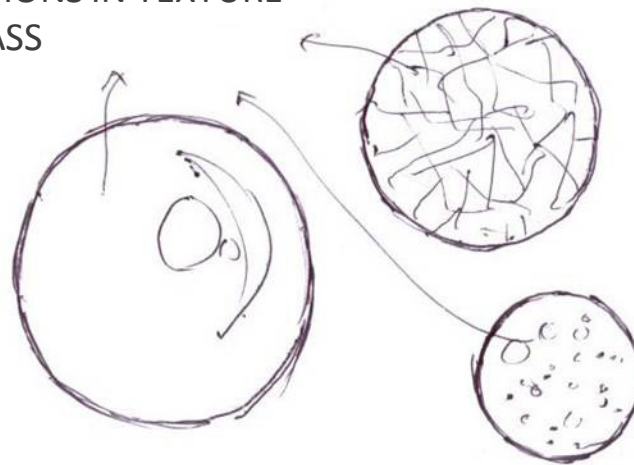
CIRCLES OF RANDOM SIZES
PLACED ALONG A CYLINDER



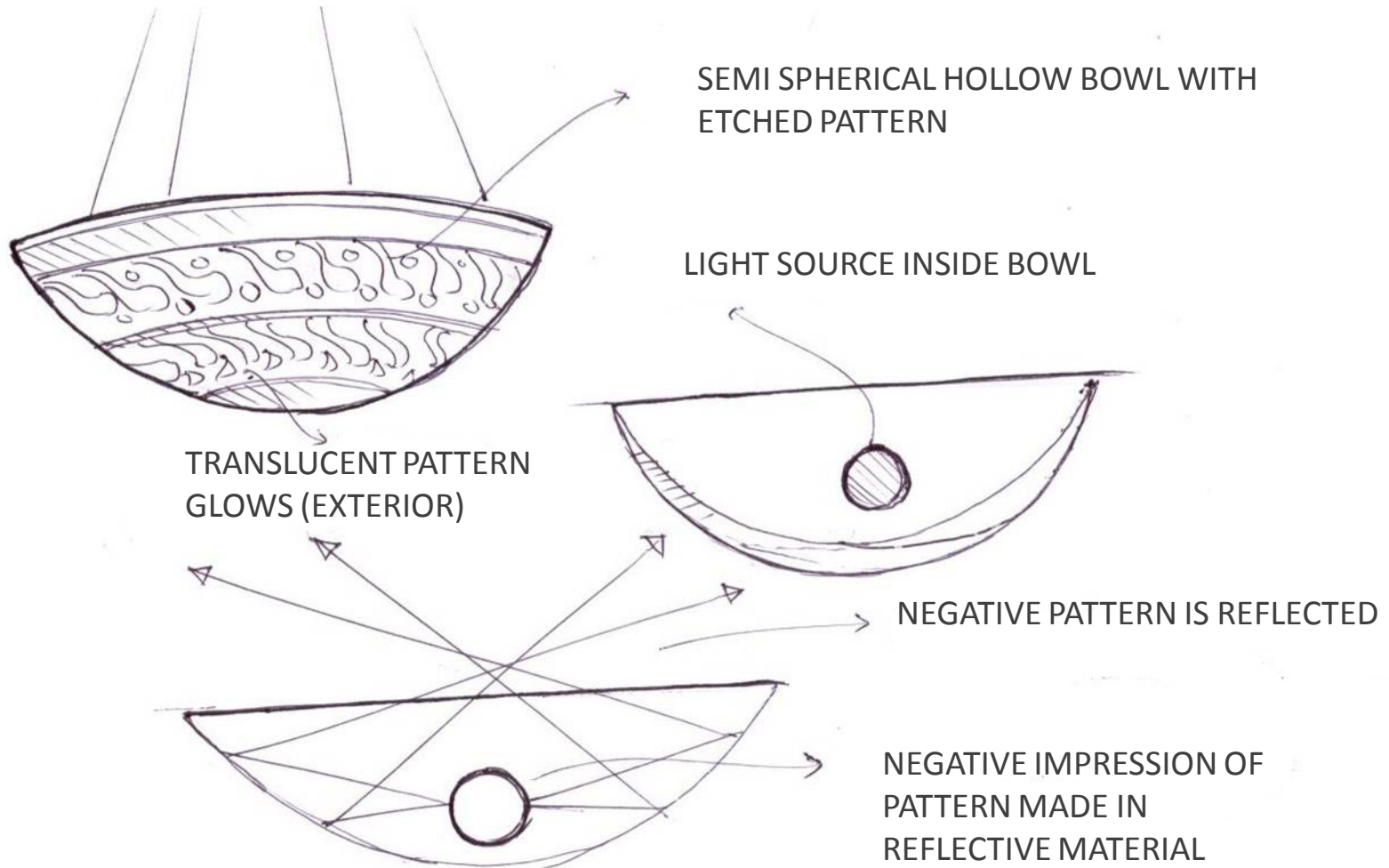
LIGHT SOURCE
AT CENTRE

RANDOMLY SIZED CIRCLES
GLASS OR ACRYLIC IN A
BOWL PATTERN

VARIATIONS IN TEXTURE
OF GLASS

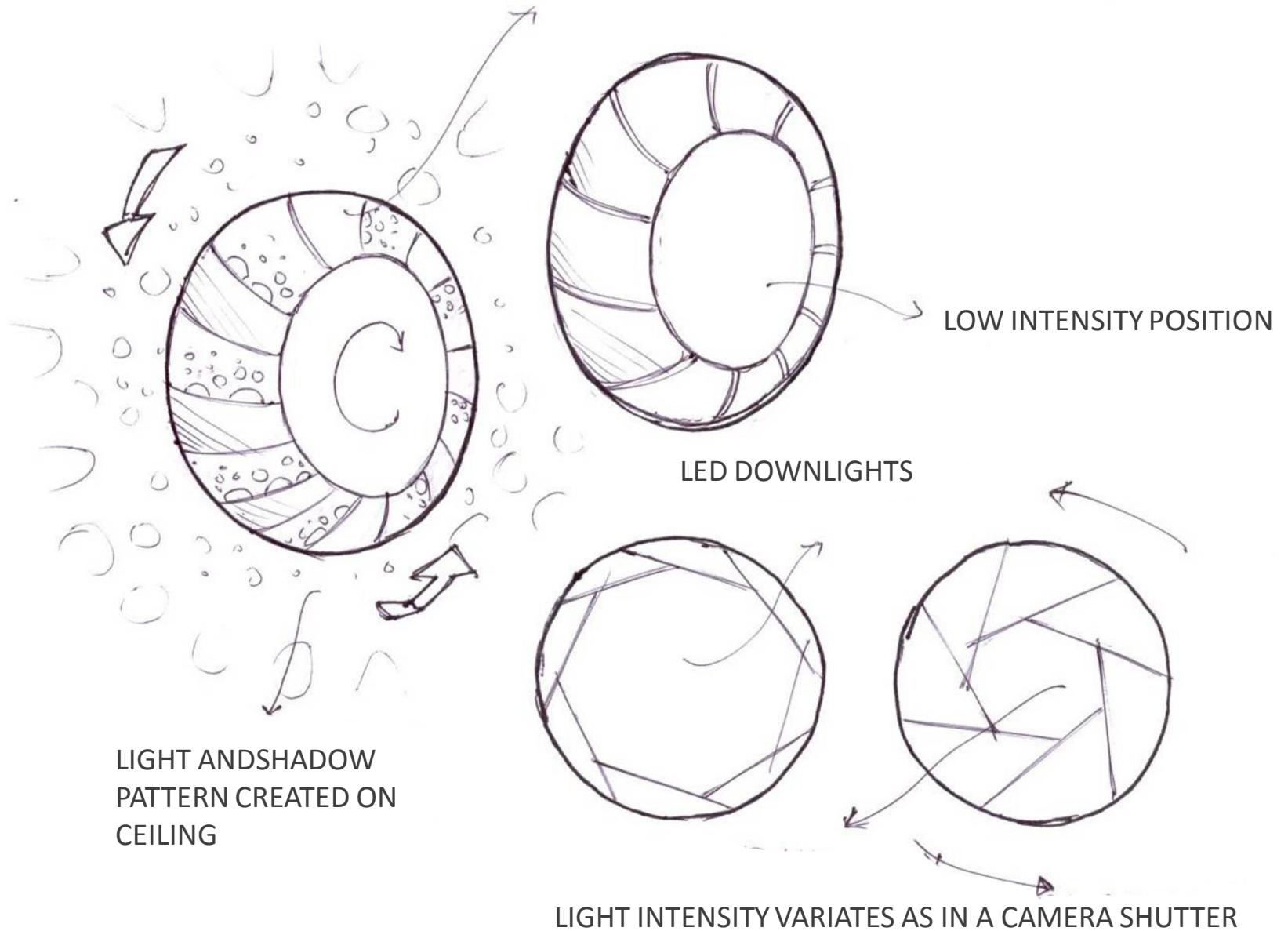


Patterned light and shadow



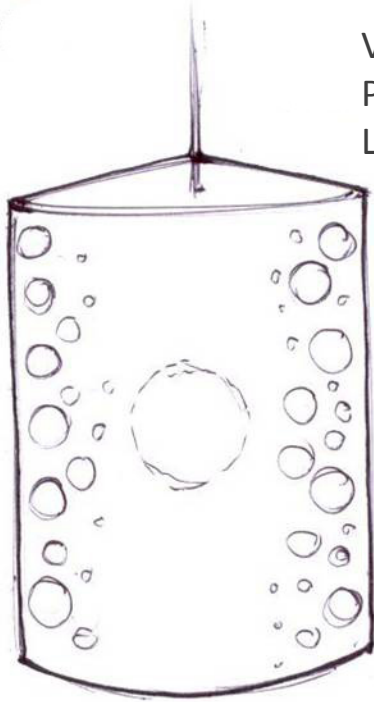
Patterned light and shadow

BASE TWIST REVEALS HIDDEN PATTERN

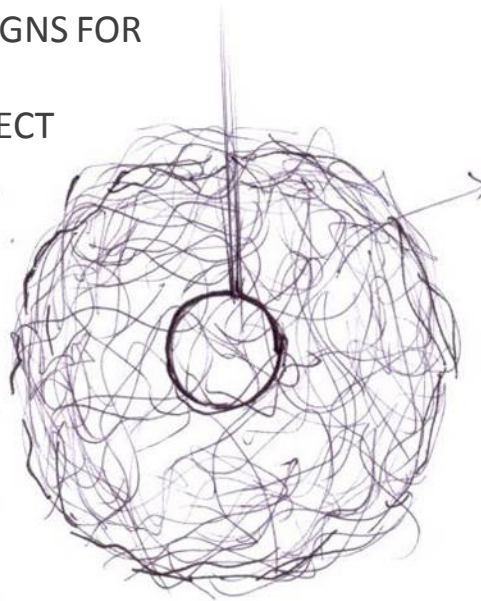


Patterned light and shadow

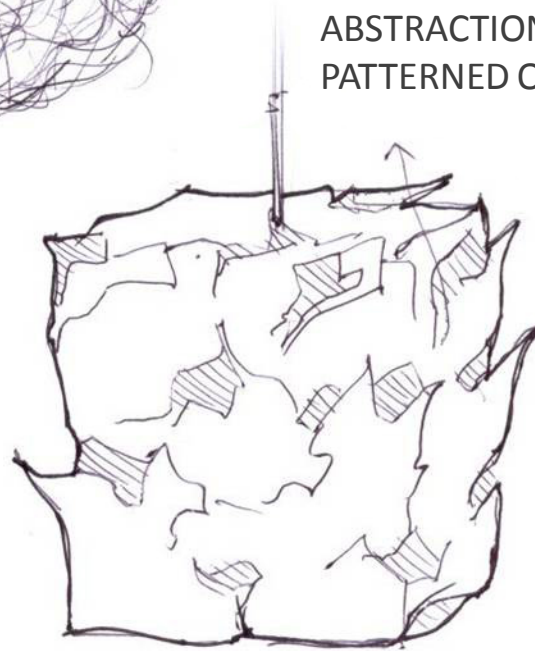
VARIOUS DESIGNS FOR
PATTERNED
LIGHTING EFFECT



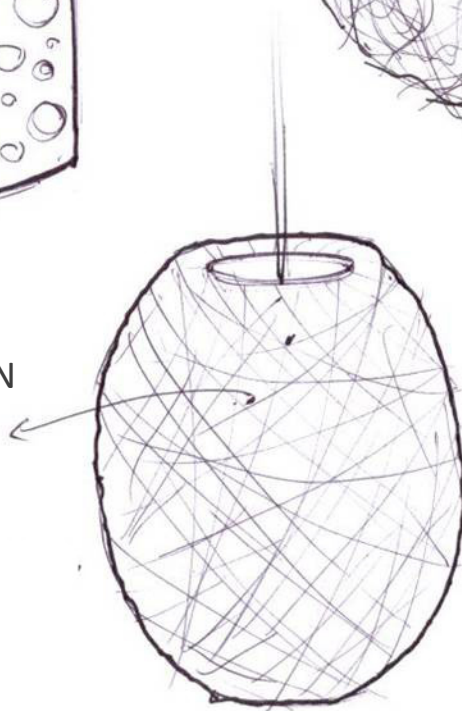
THREAD OR WIRE BALL
AROUND LIGHT SOURCE



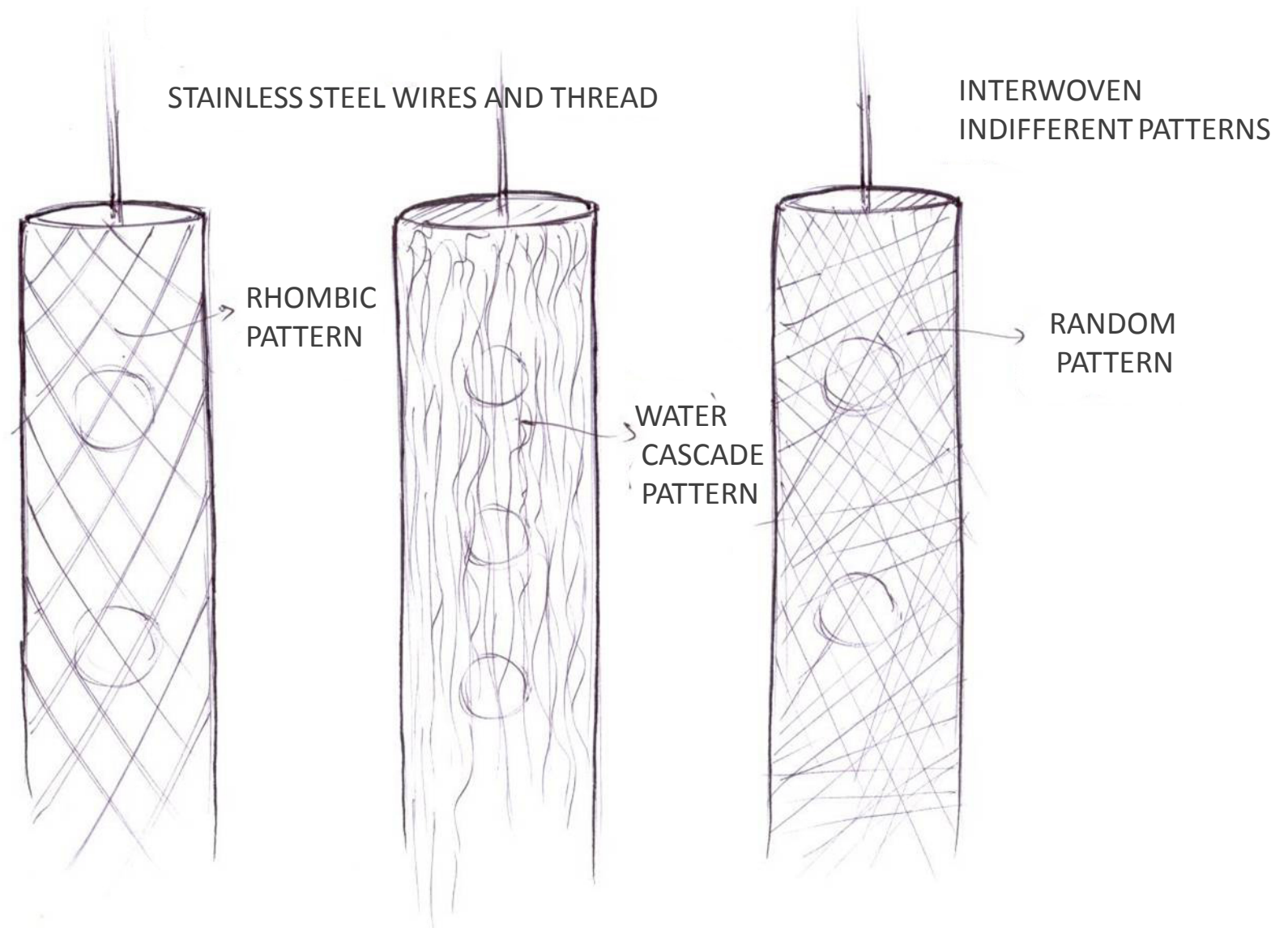
ABSTRACTION OF FIRE WITH
PATTERNED OPENINGS



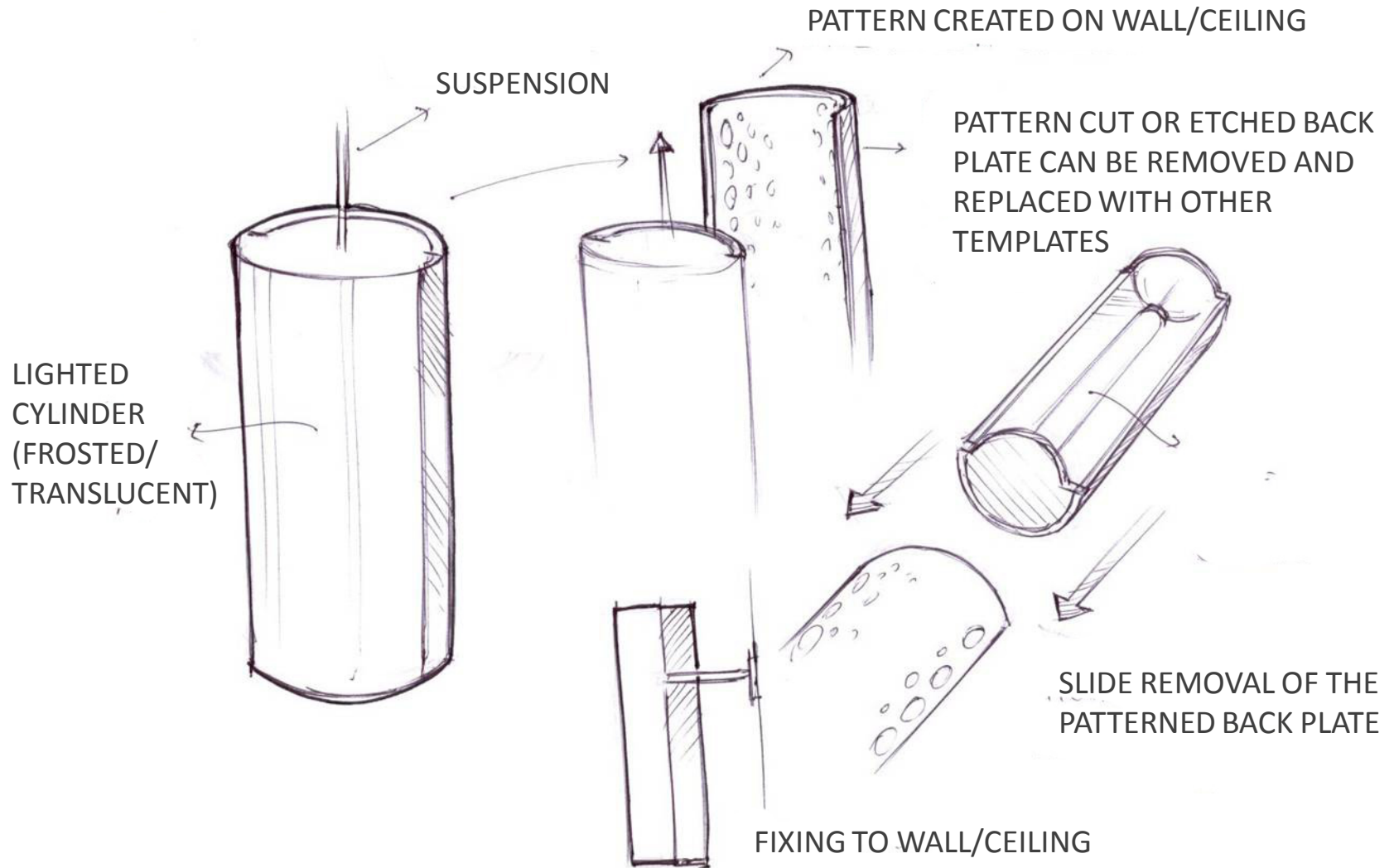
THREAD YARN WOVEN
IN THE FORM
OF A BASKET



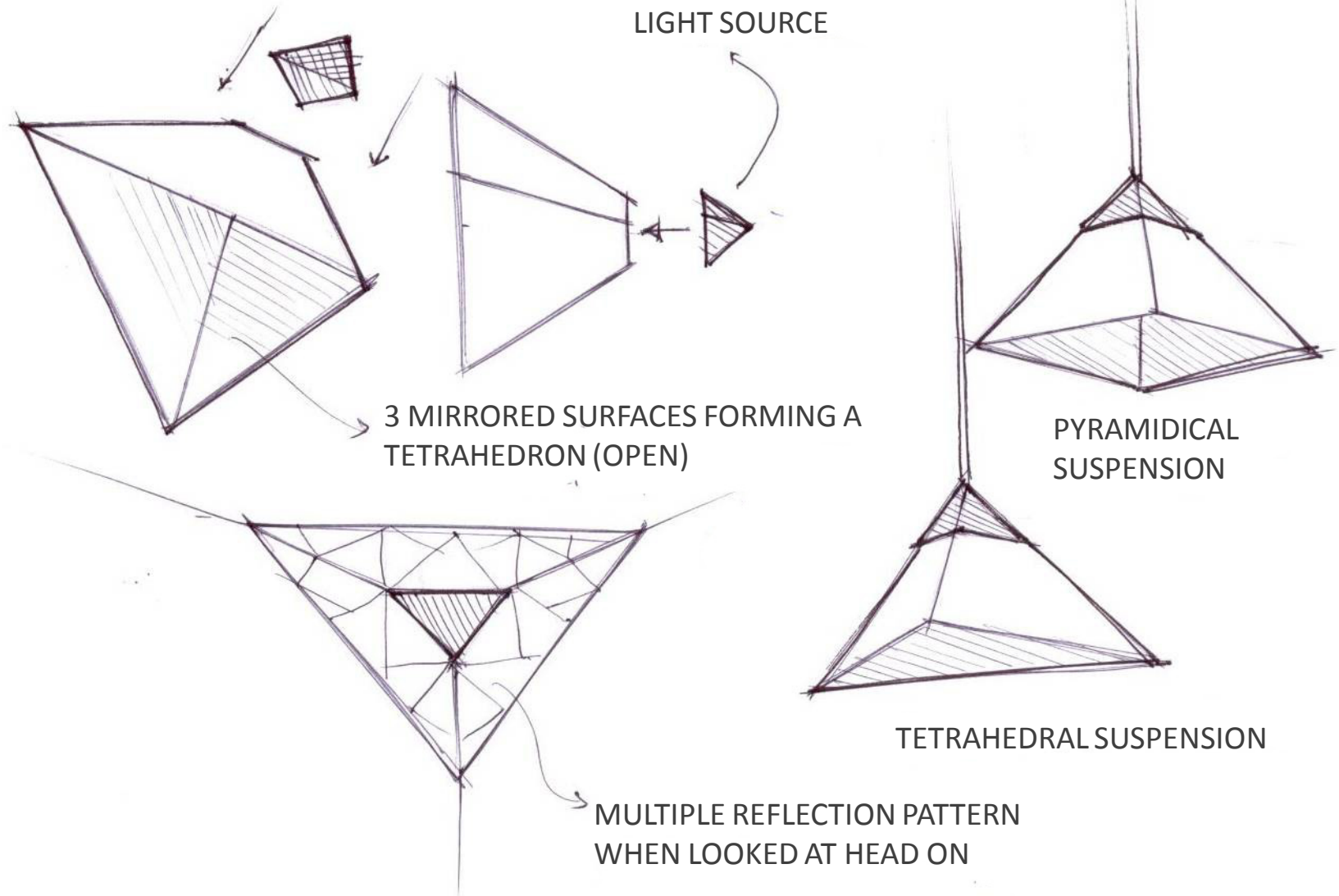
Patterned light and shadow



Patterned light and shadow

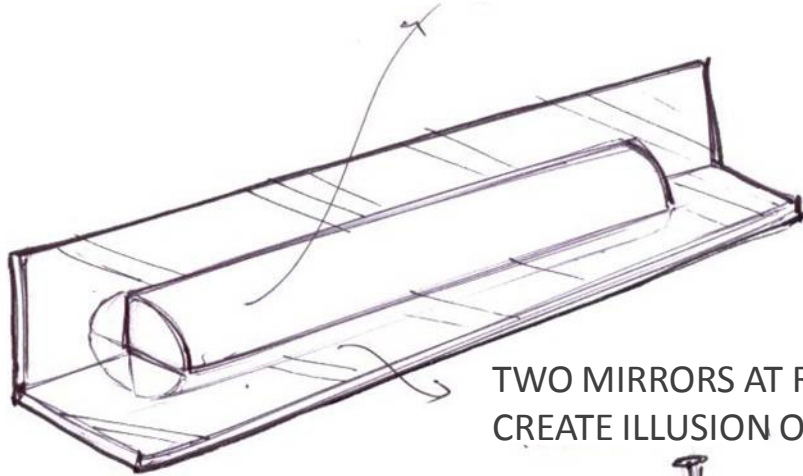


Mirrors and reflective surfaces

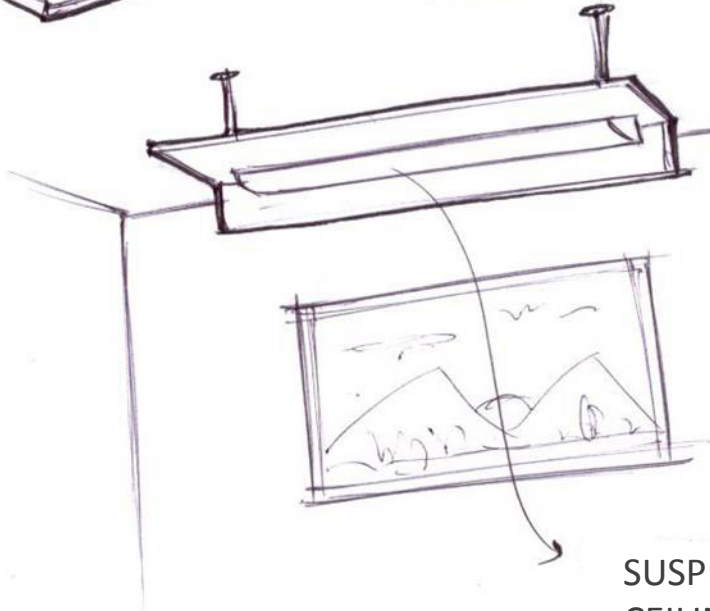


Mirrors and reflective surfaces

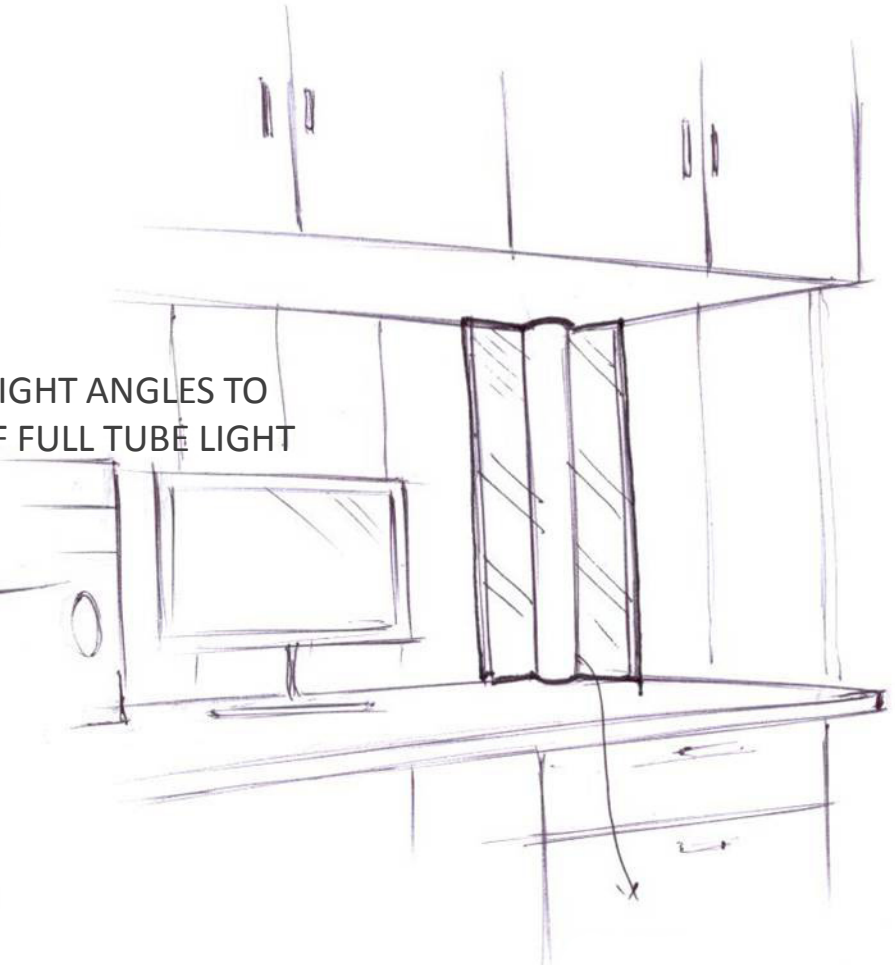
QUARTER VOLUME TUBE LIGHT LIKE FIXTURE



TWO MIRRORS AT RIGHT ANGLES TO
CREATE ILLUSION OF FULL TUBE LIGHT

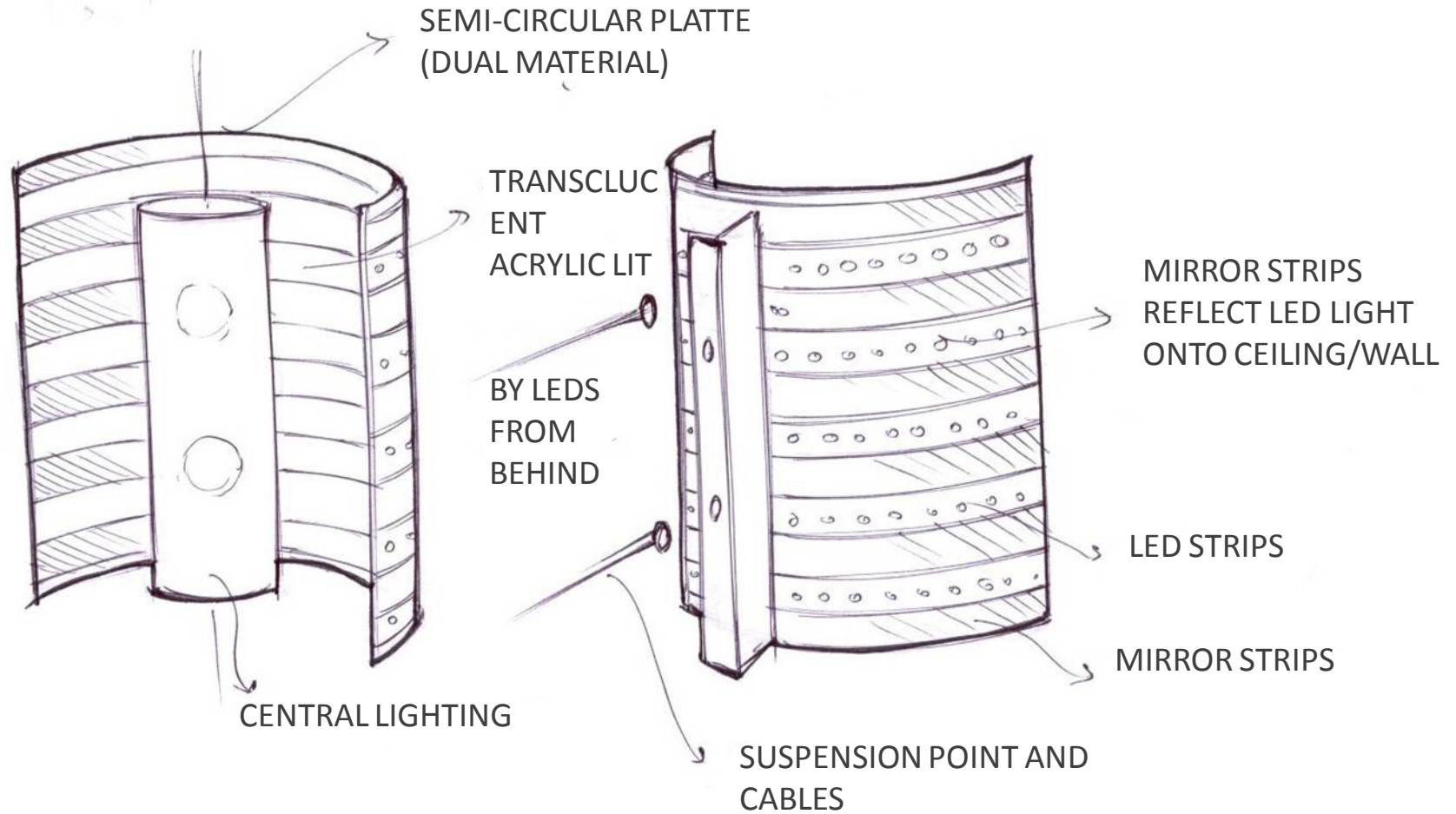


SUSPENDED FROM
CEILING

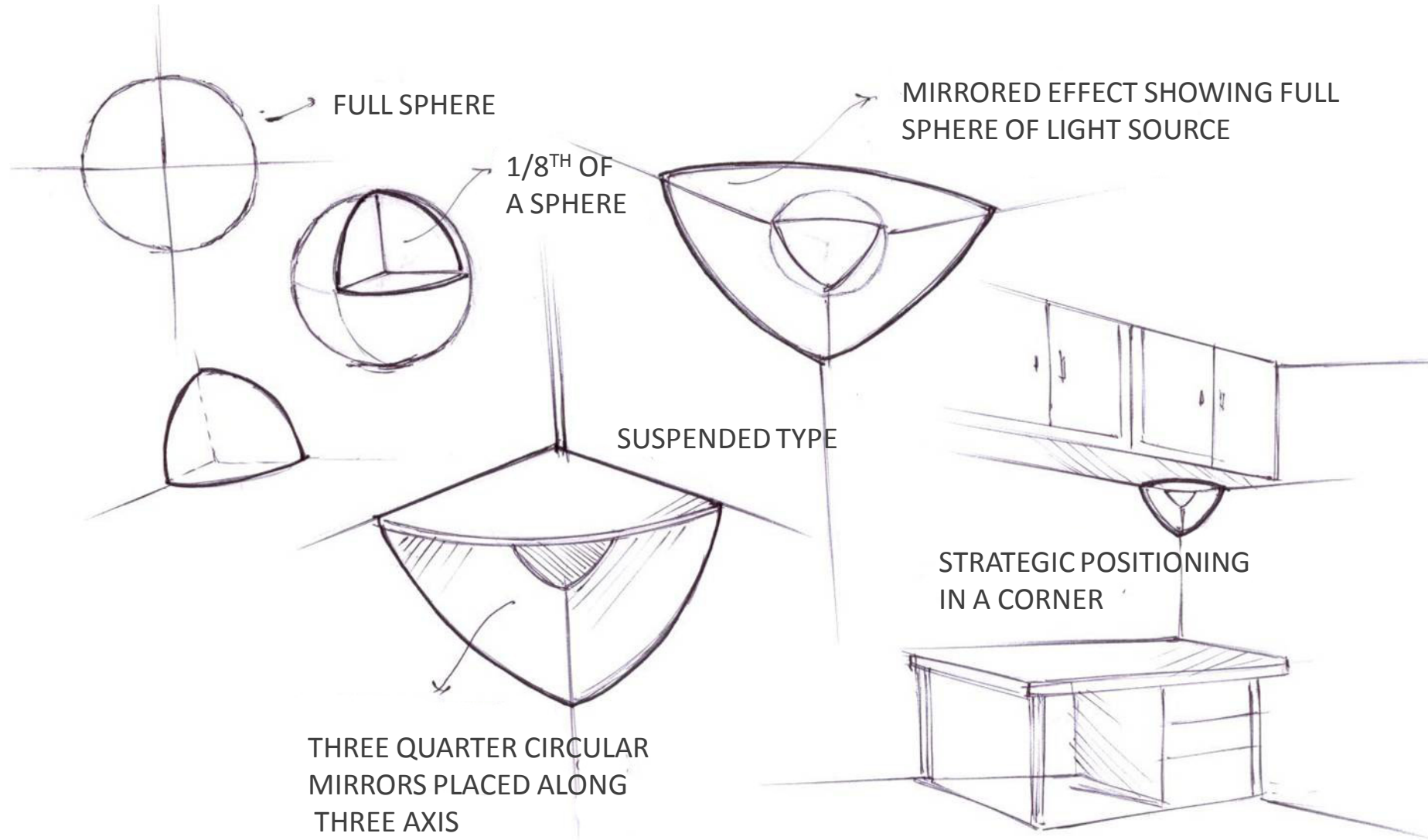


STRATEGIC POSITIONING
OF FIXTURE ALONG WALL
PANELS TO CREATING THE
BEST EFFECT

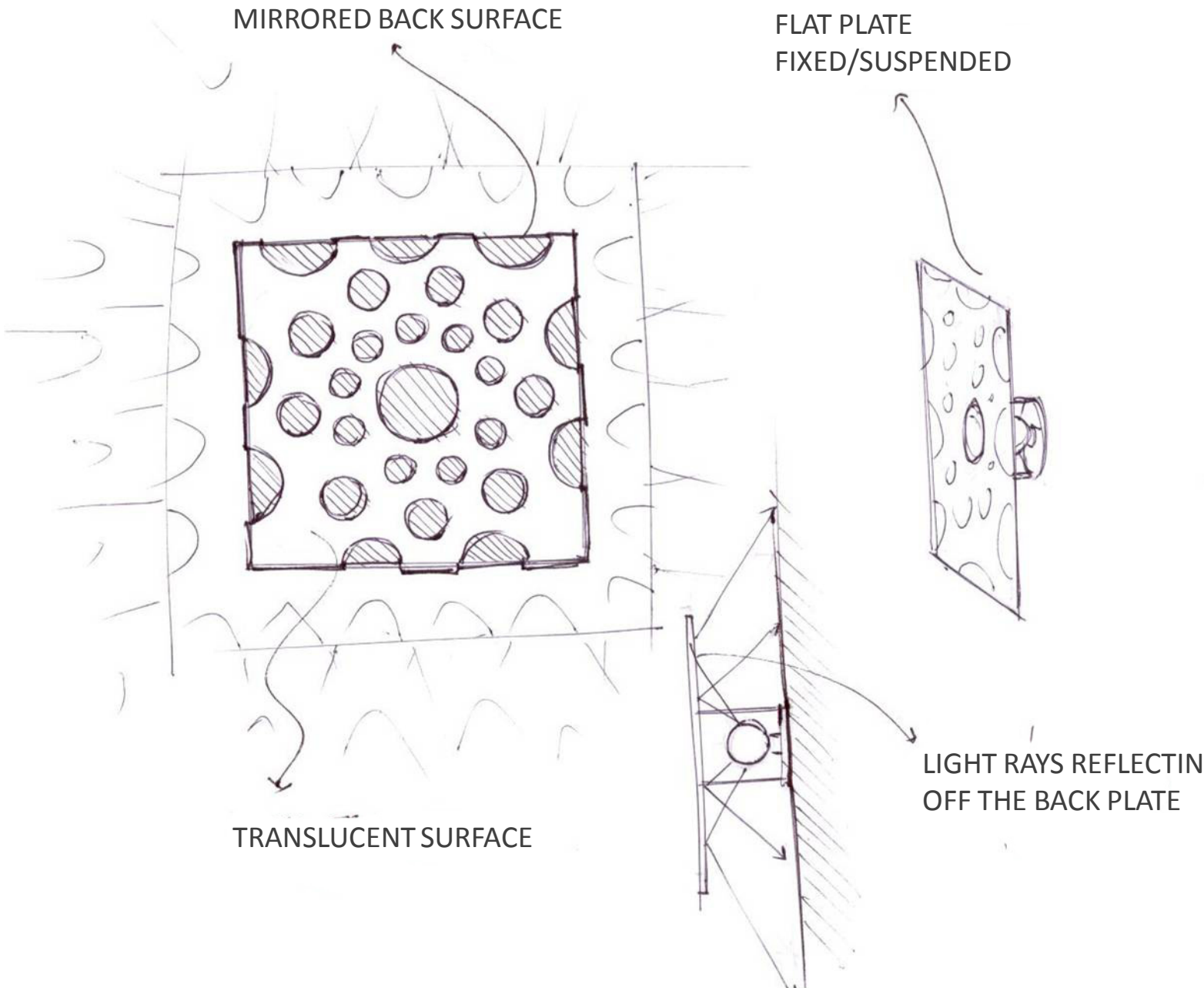
Mirrors and reflective surfaces



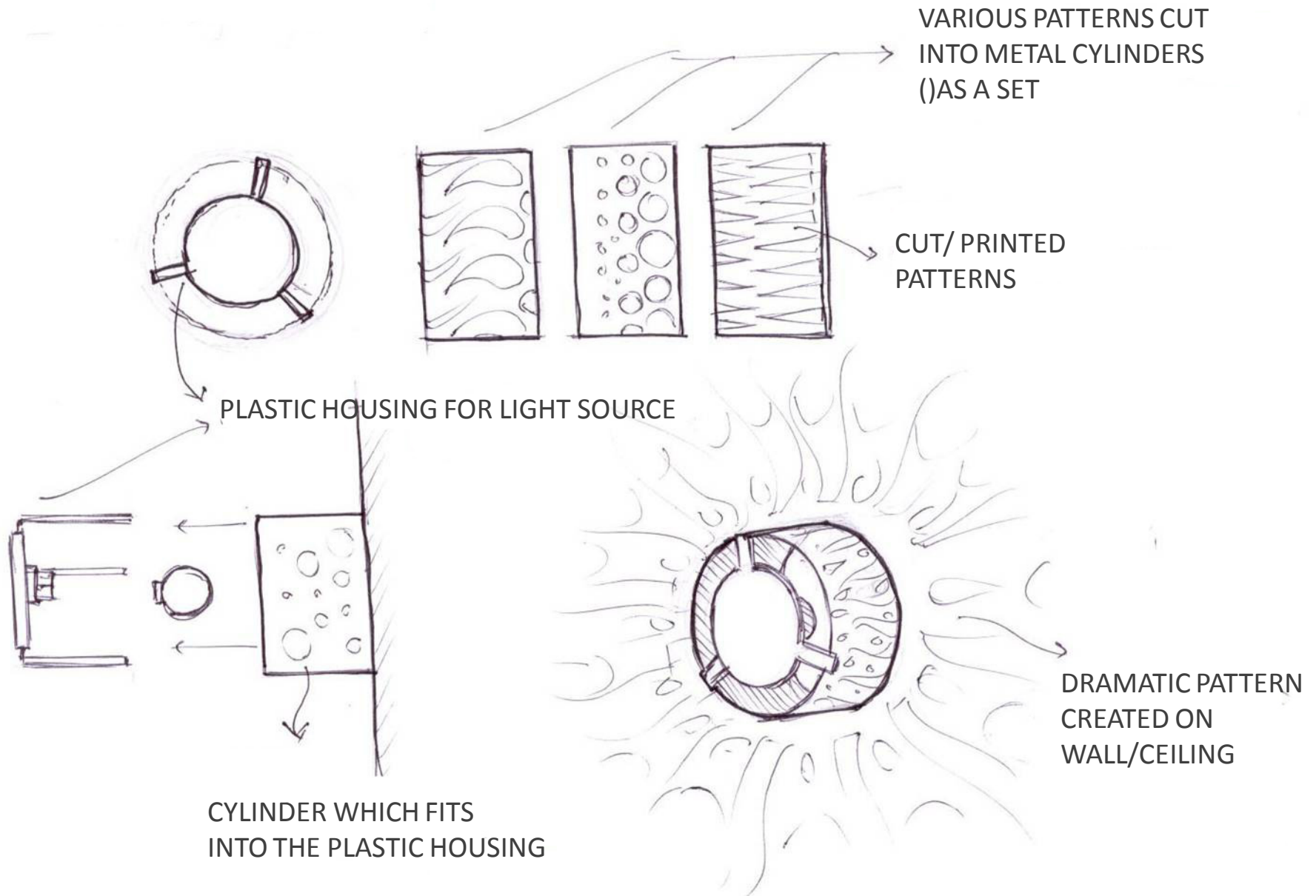
Mirrors and reflective surfaces



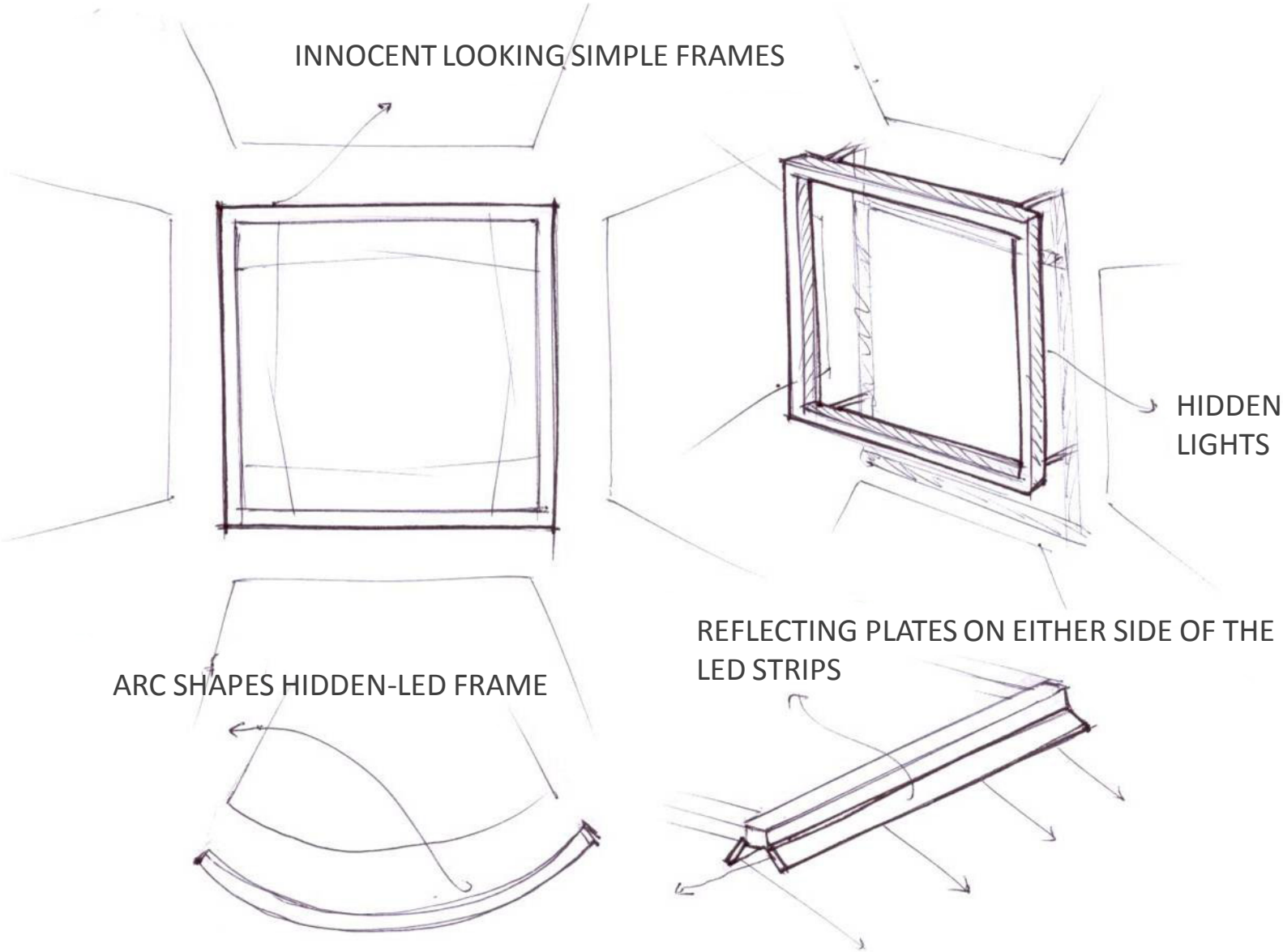
Mirrors and reflective surfaces



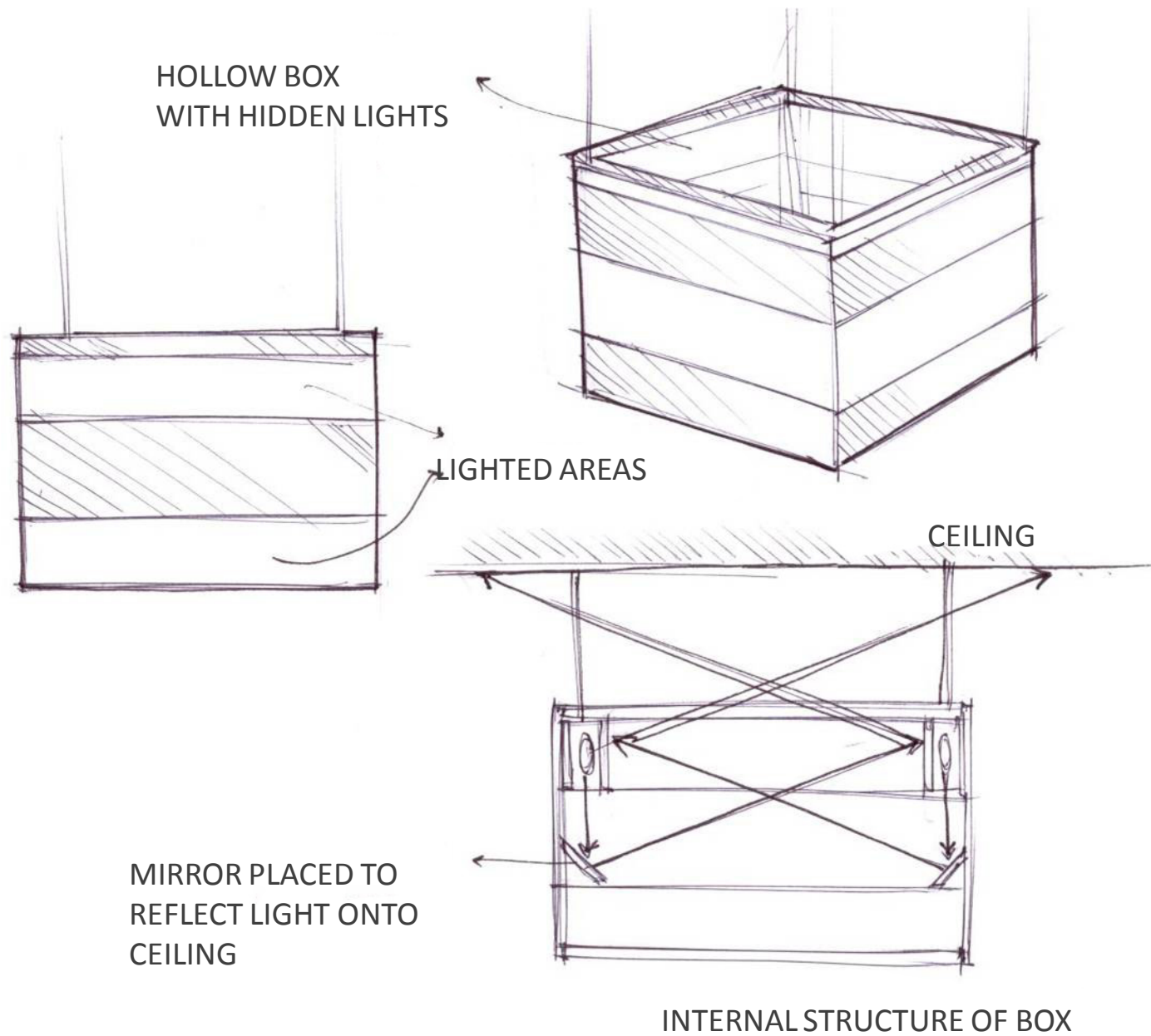
Patterned light and shadow



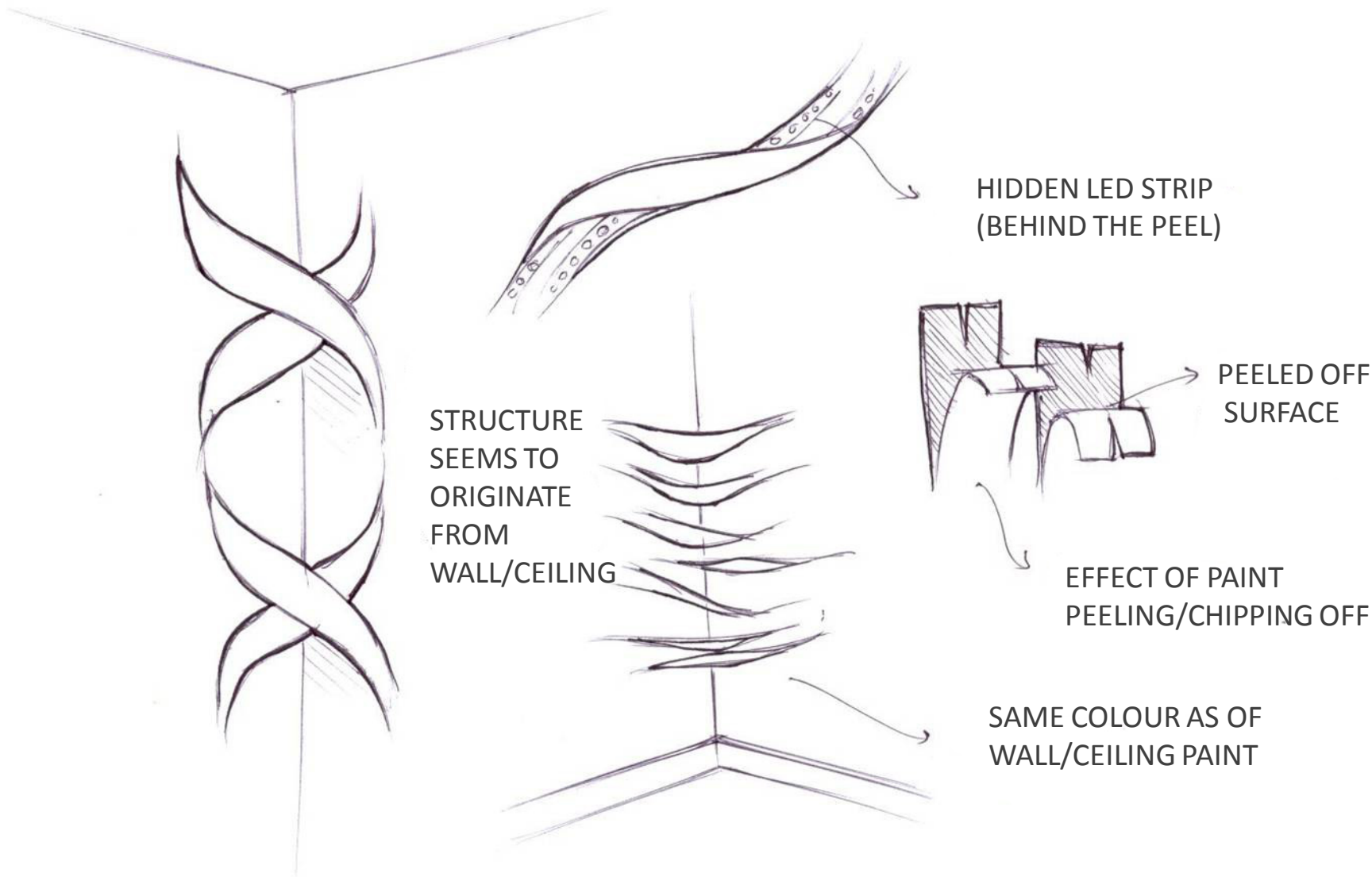
Concealed lighting



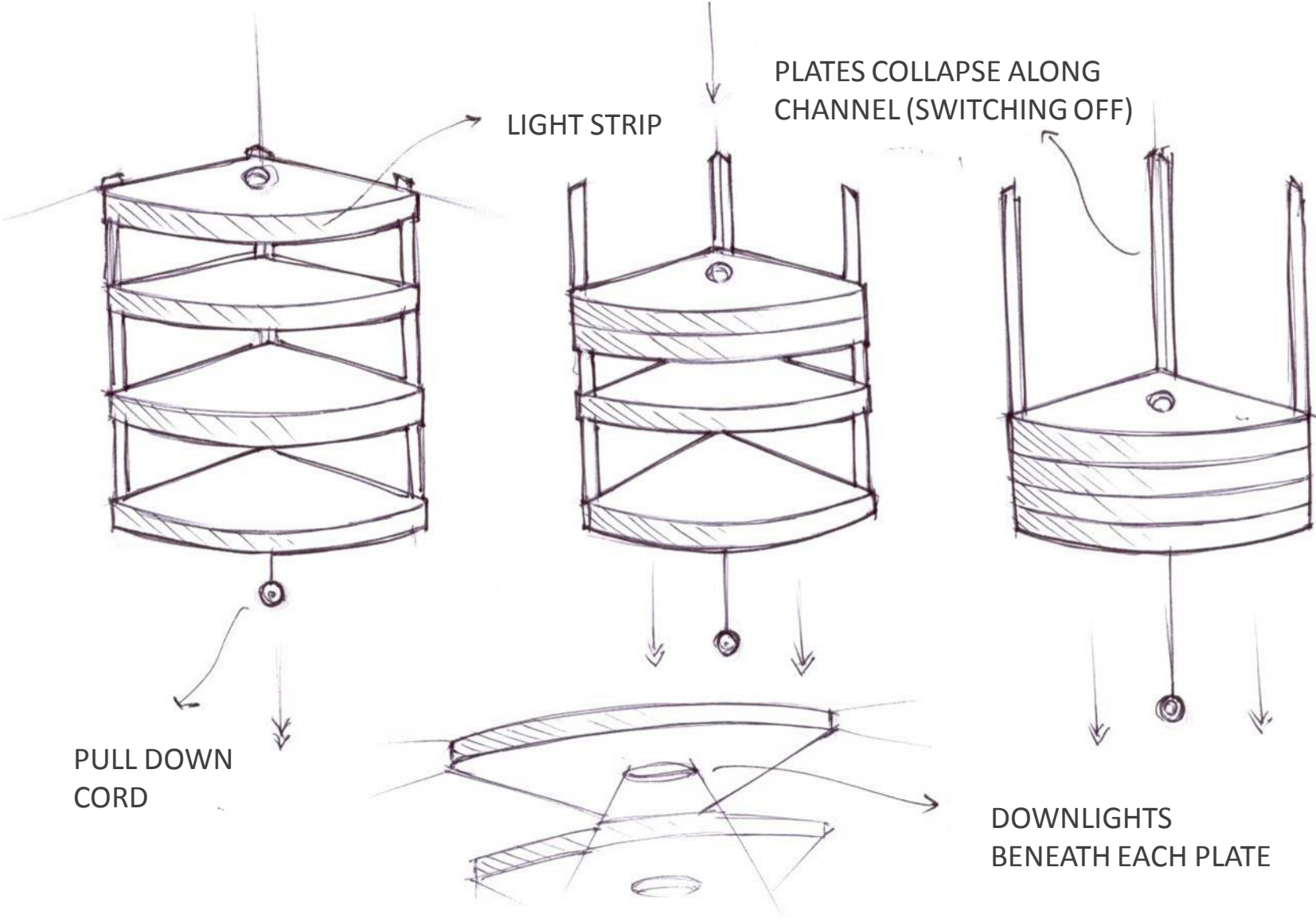
Concealed lighting



Concealed lighting

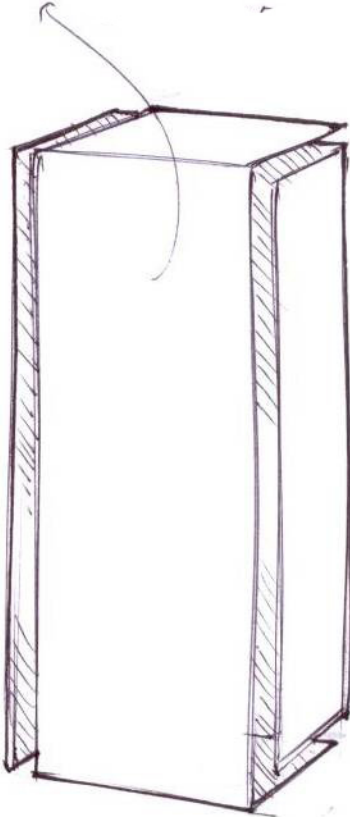


Flat plates and light

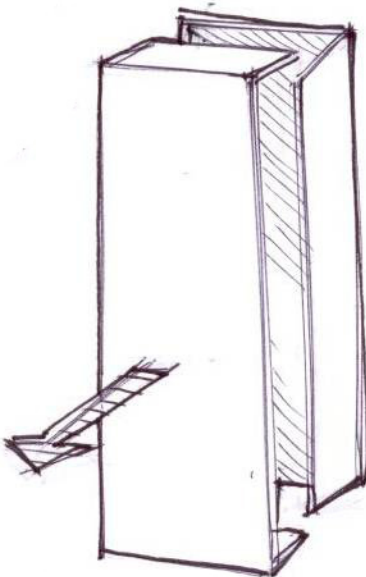


Flat plates and light

TWO FLAT PLATE
ELEMENTS PLACED INTO
EACH OTHER

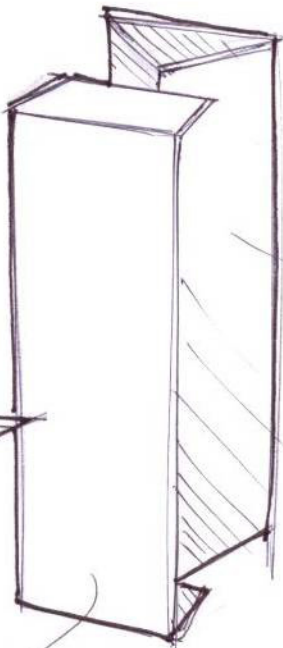
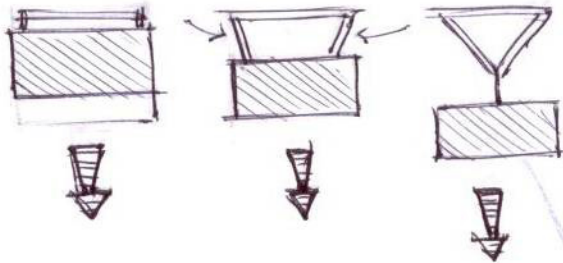


FIXED OR SUSPENDED



PULL OUT ONE OF
THEM

MECHANISM

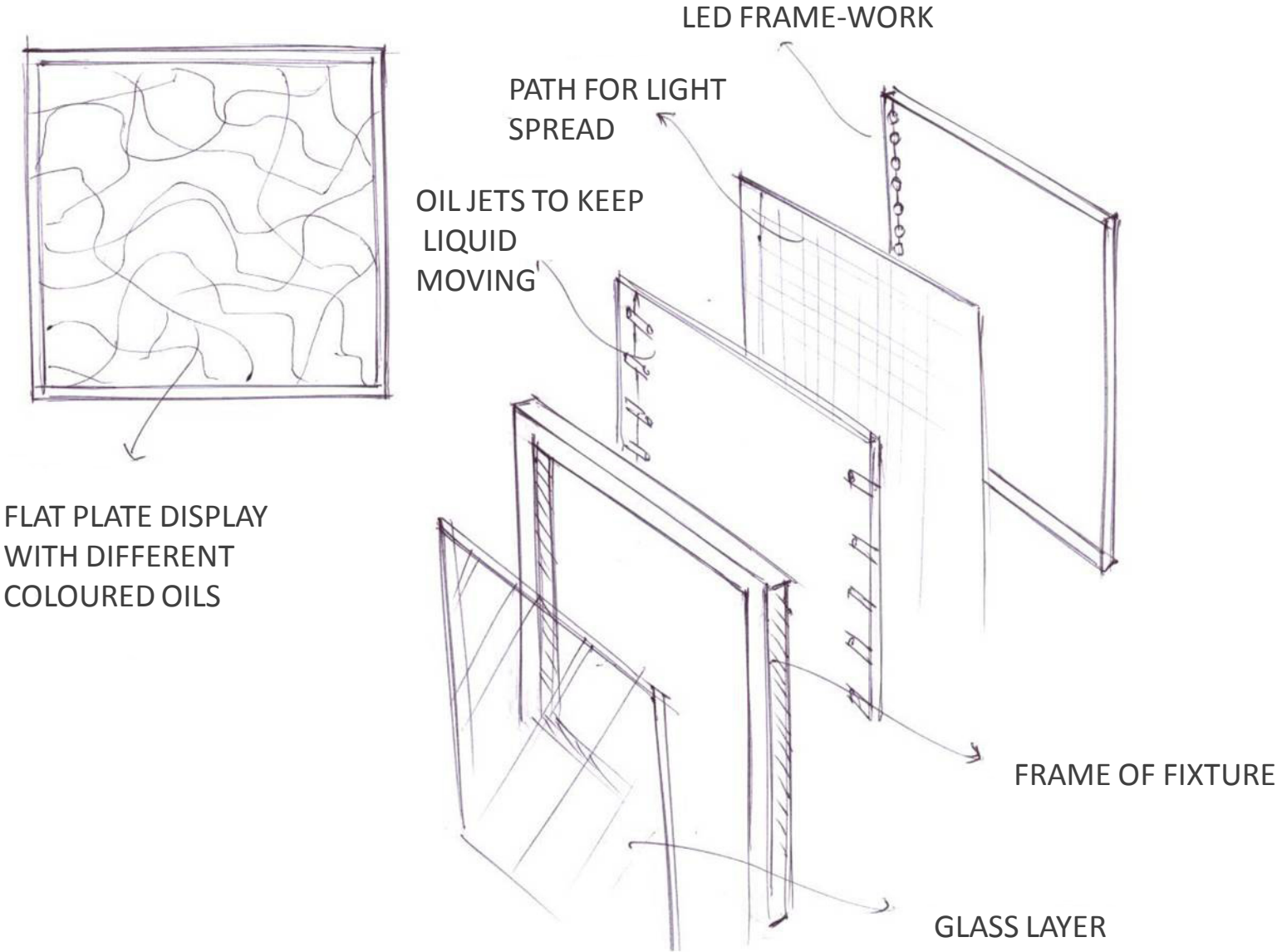


BECOMES A DOME

3

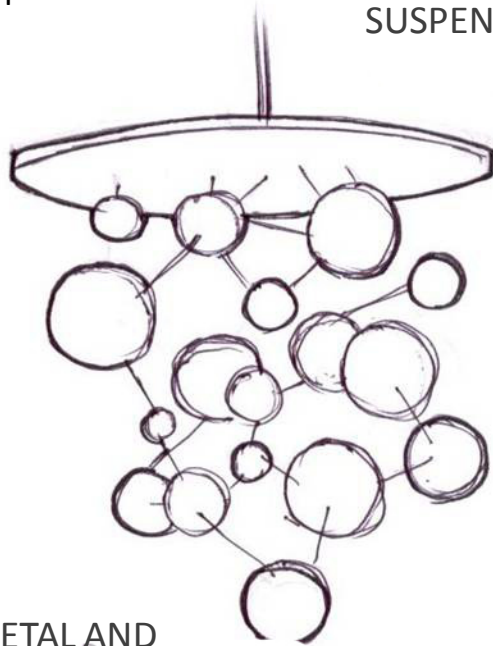
COLOSES TO FORM
A SEPARATE
LIGHT BOX

Flat plates and light



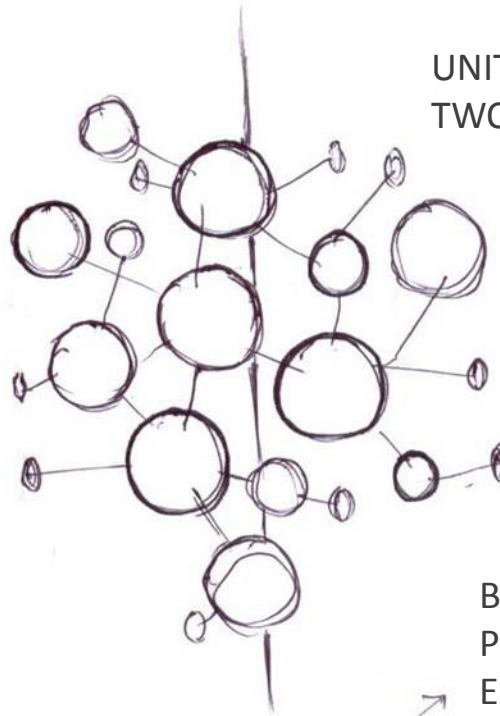
Explosion

SUSPENDED UNIT

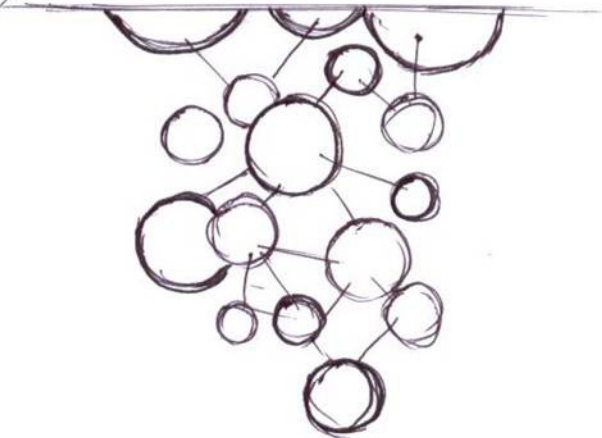
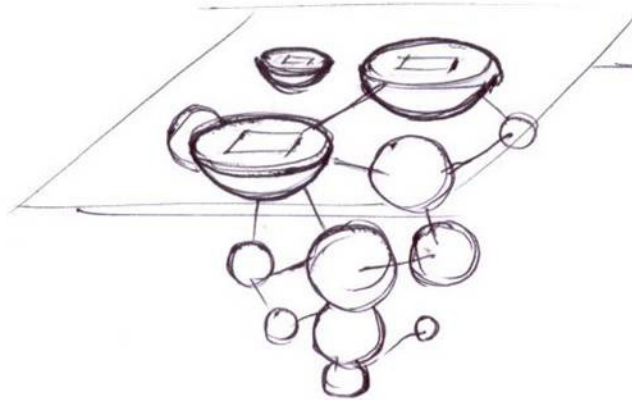


METAL AND
PLASTIC SPHERES PLACED AND
CONNECTED AT RANDOM

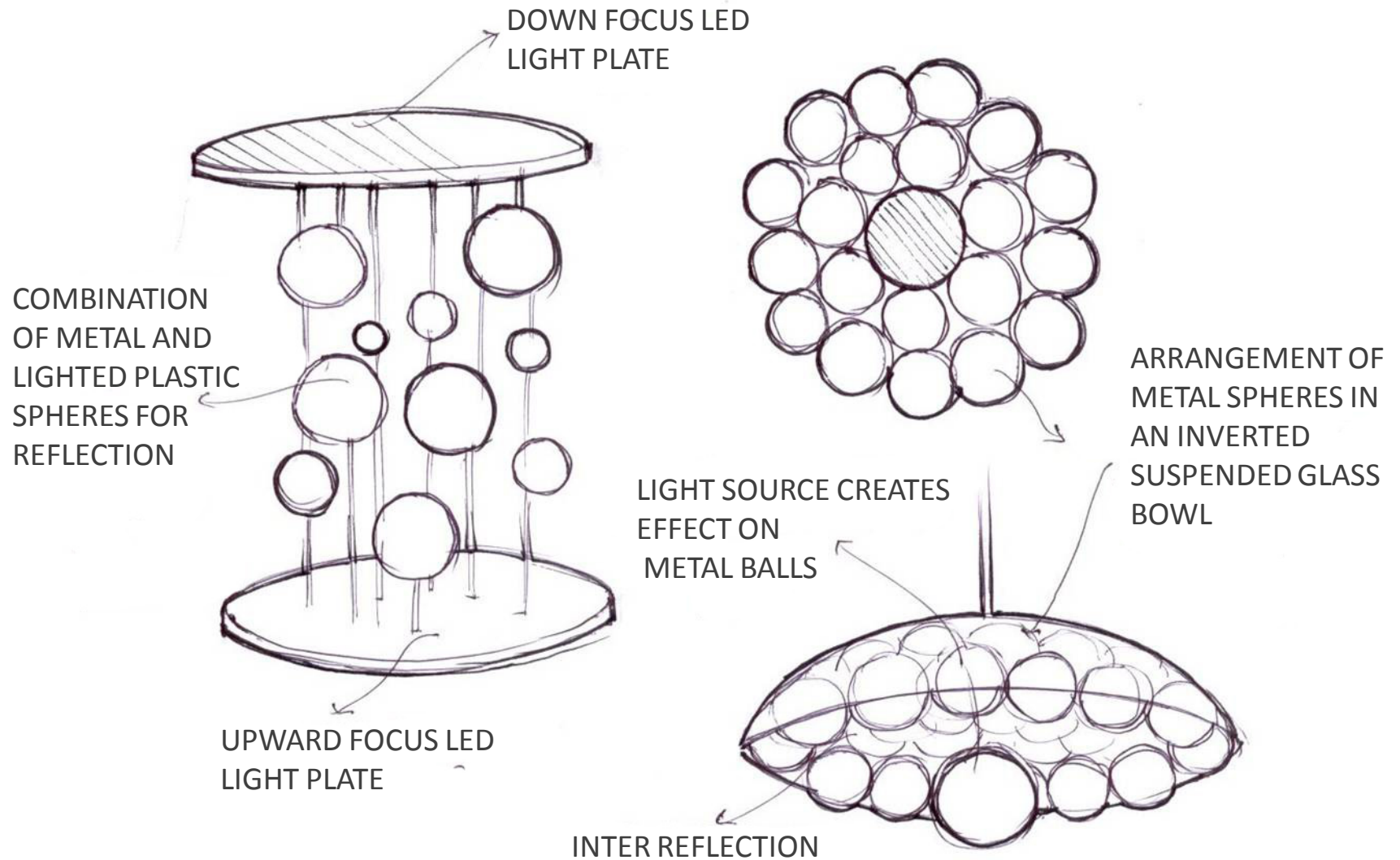
UNIT PLACED BETWEEN
TWO WALLS



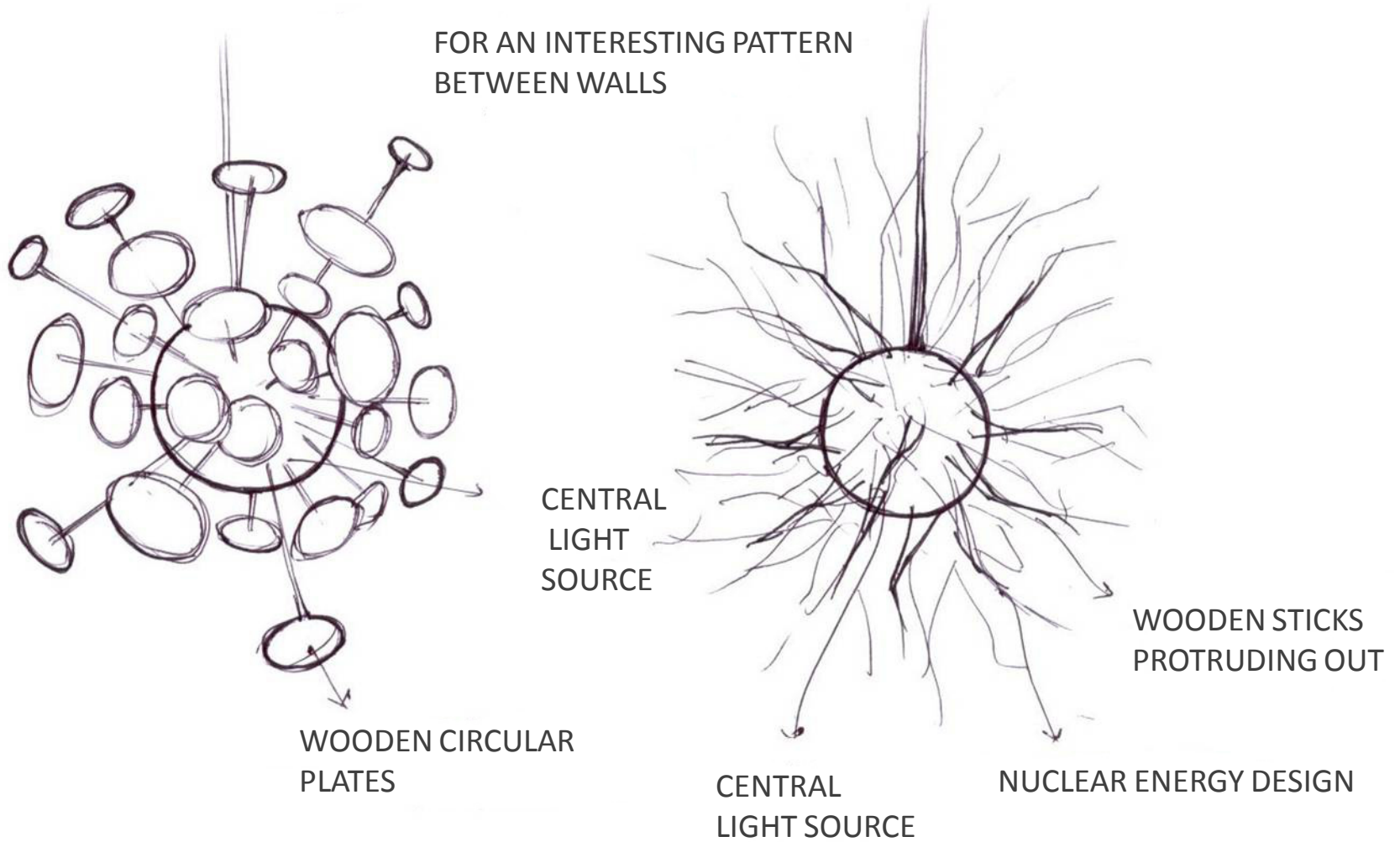
BALLS CUT OFF TO AVOID TOP
PLATE AND ADD TO THE
EFFECT



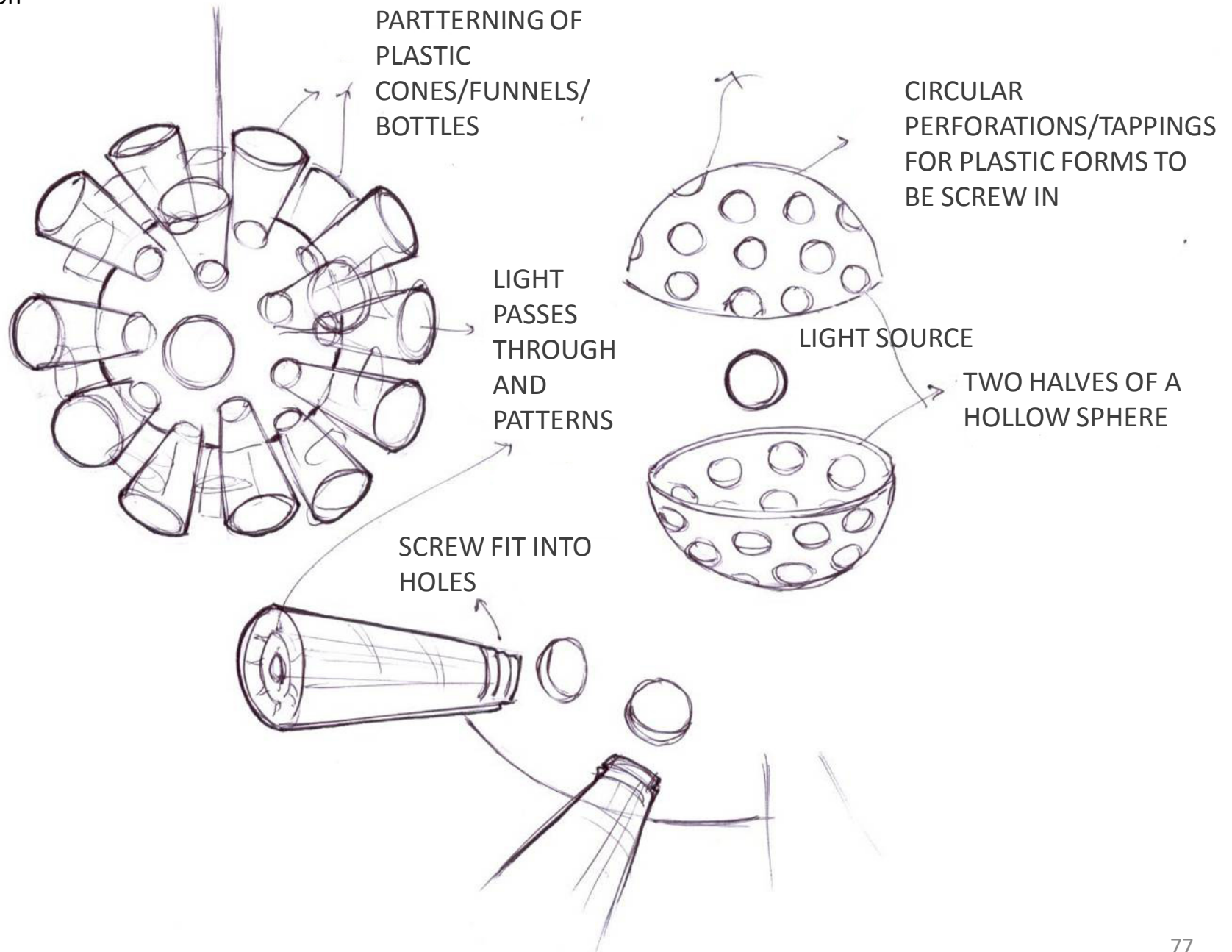
Explosion



Explosion

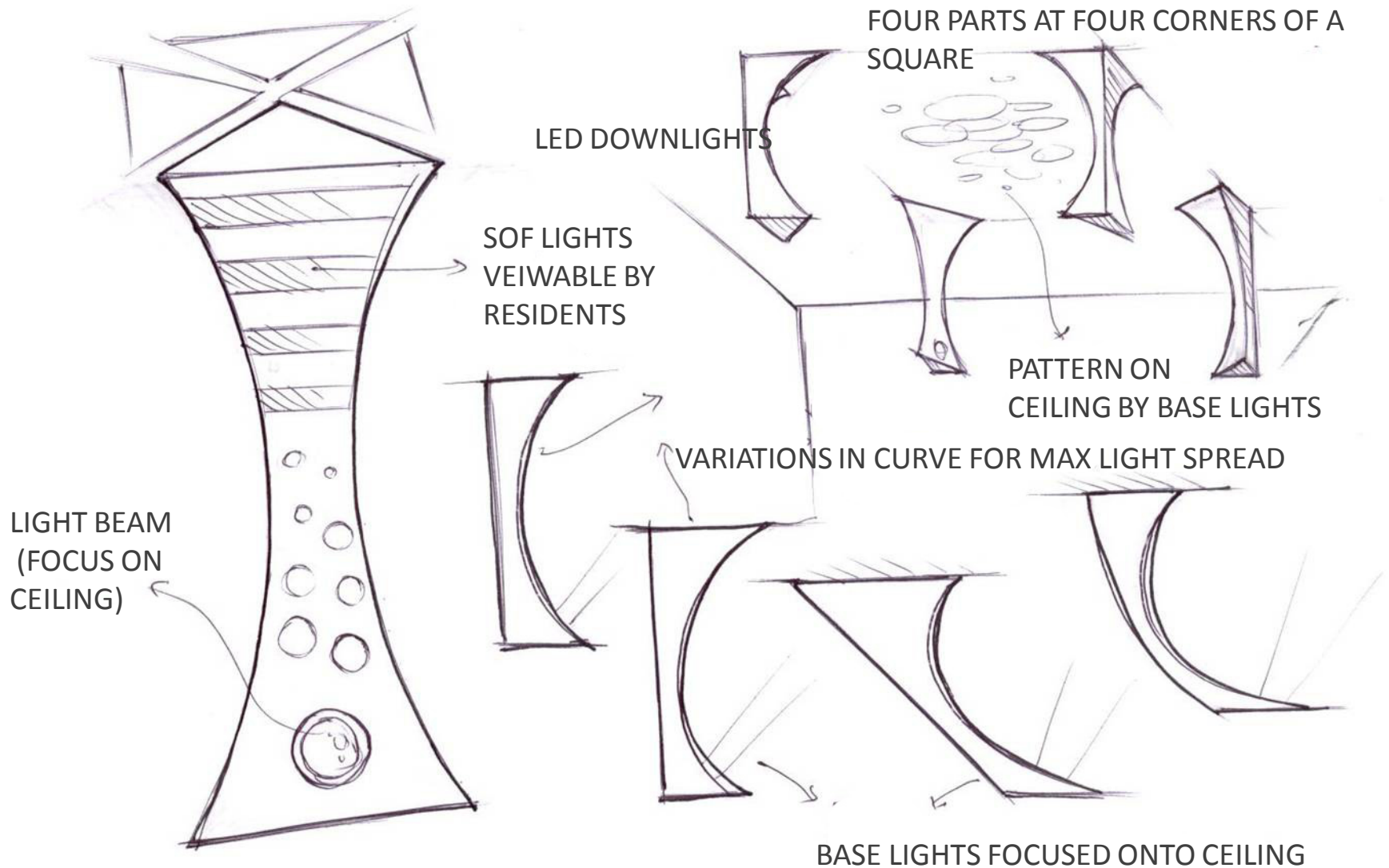


Explosion

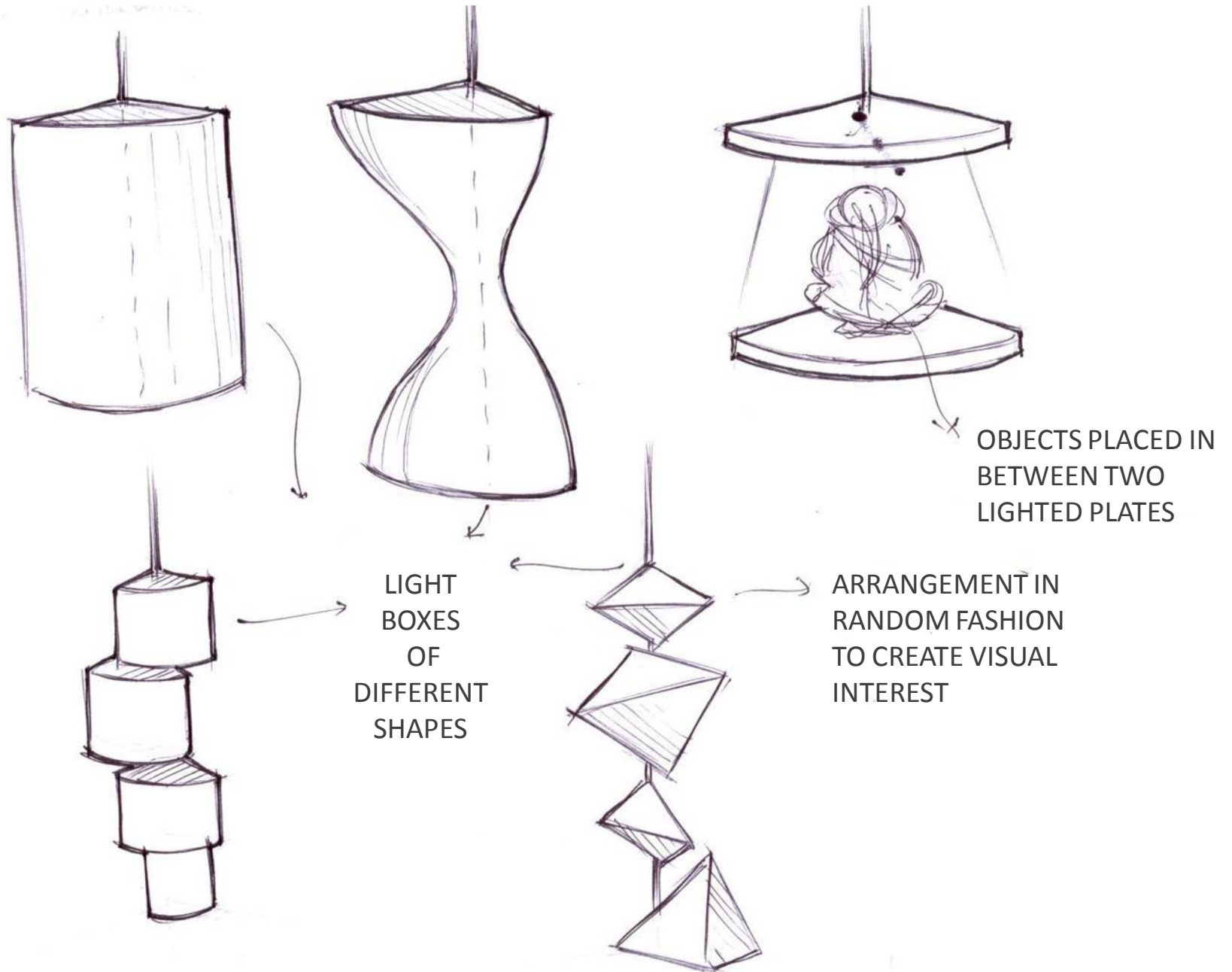


Explosion

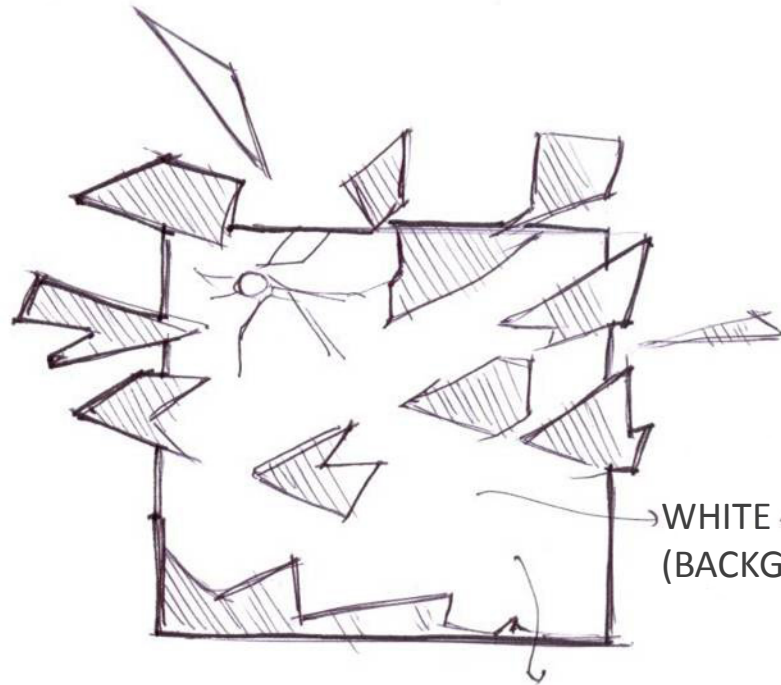
EXPLODED CHANDELIER



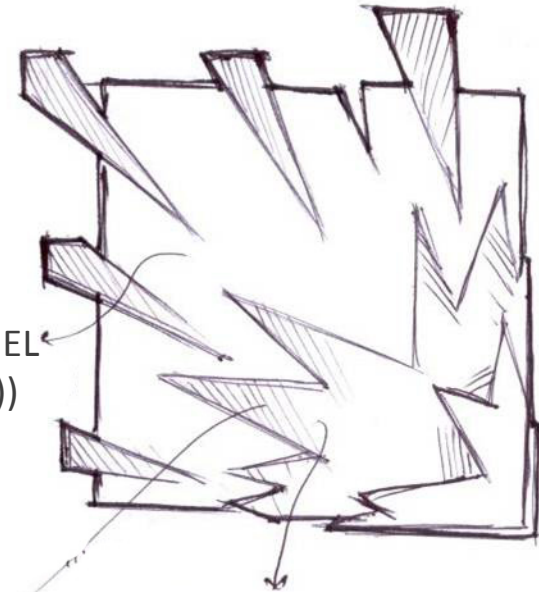
Explosion



Explosion



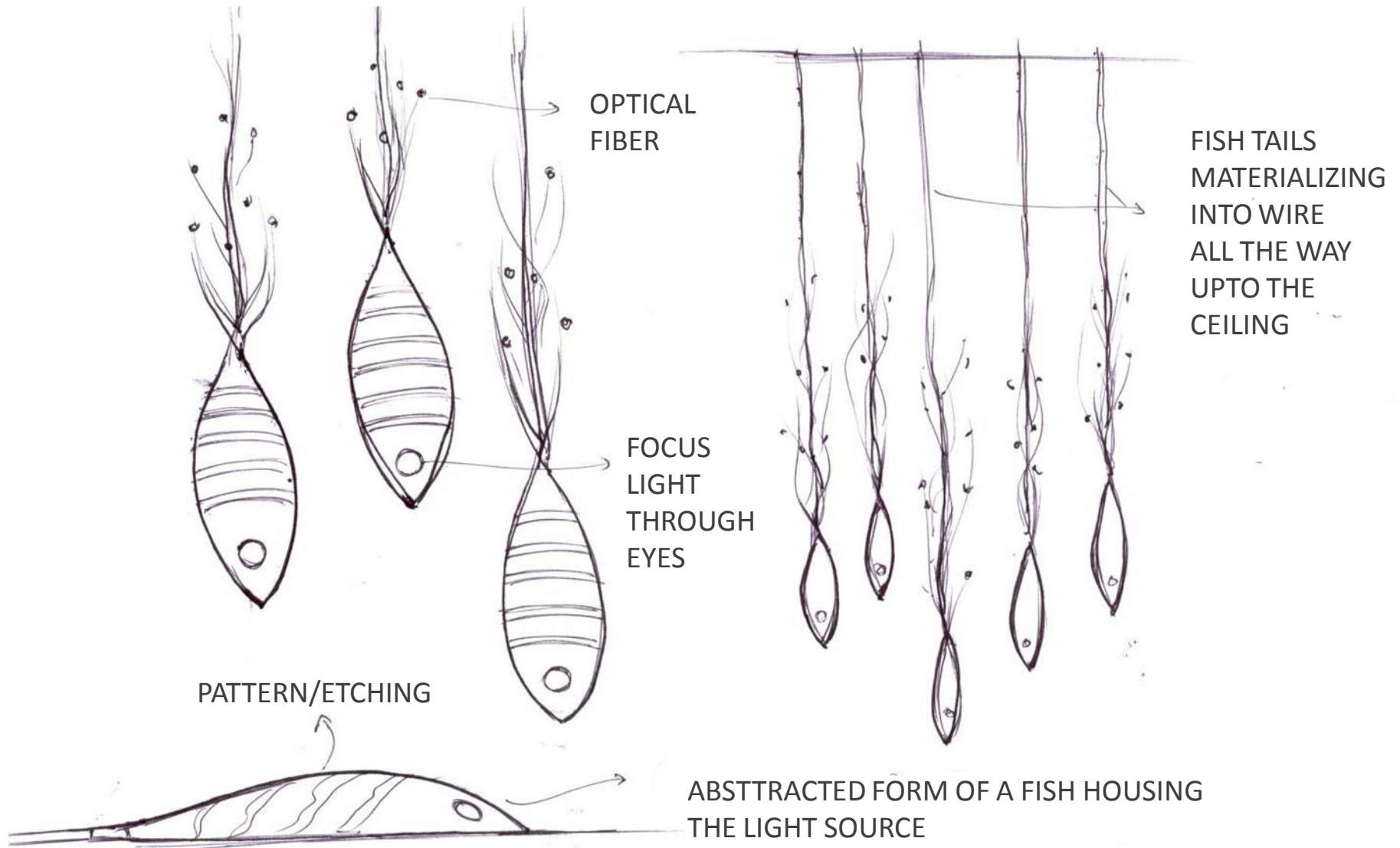
FREEZE FRAMES DEPICTING SHATTERING
OF GLASS



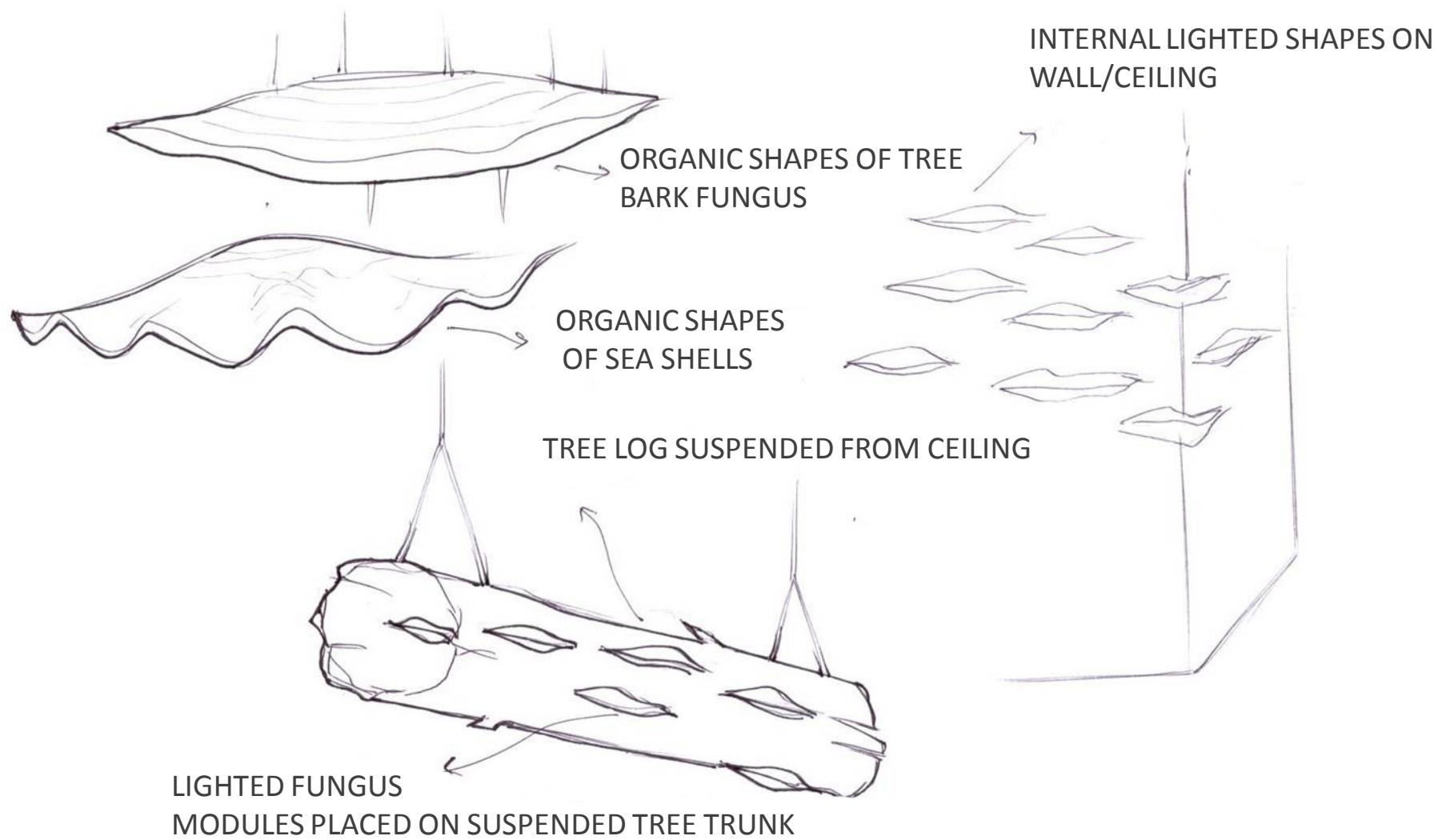
ABSTRACTION OF AN EXPLOSION

EACH LAYER LIGHTED UP IN DIFFERENT
LIGHT LEVELS

Organic shapes

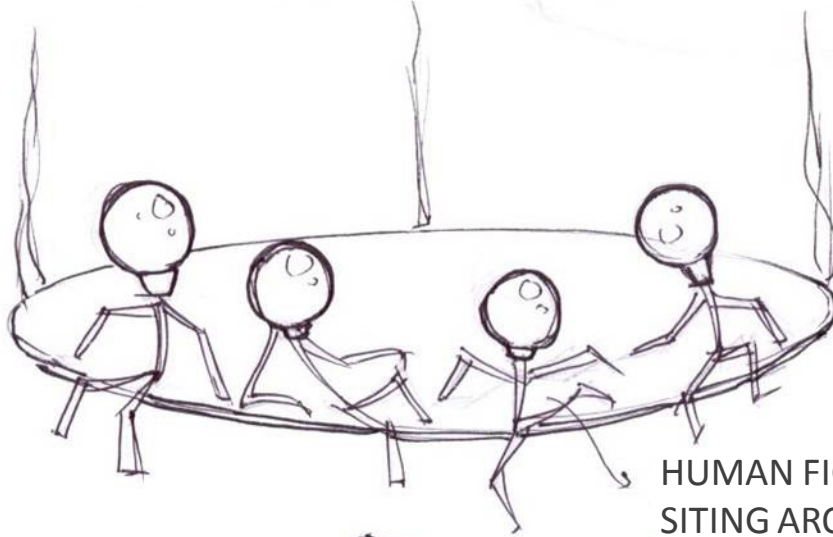


Organic shapes

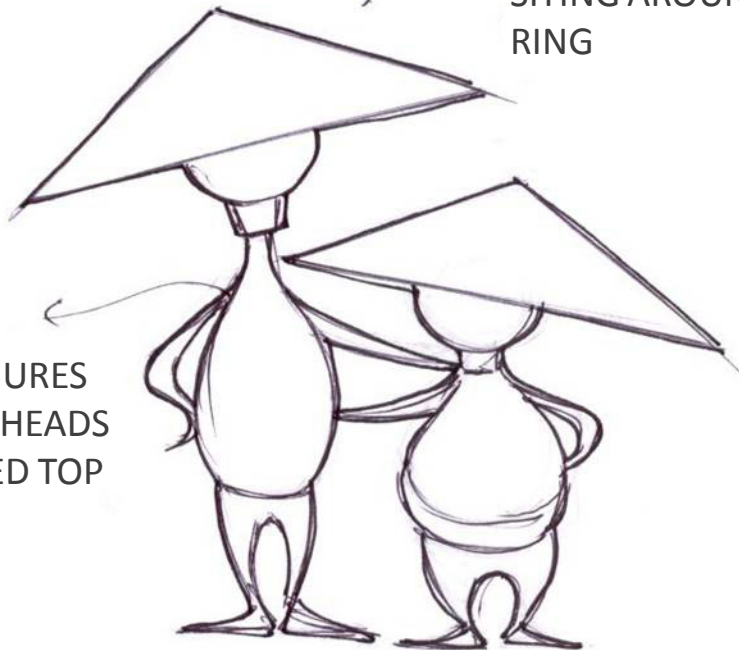


Organic shapes

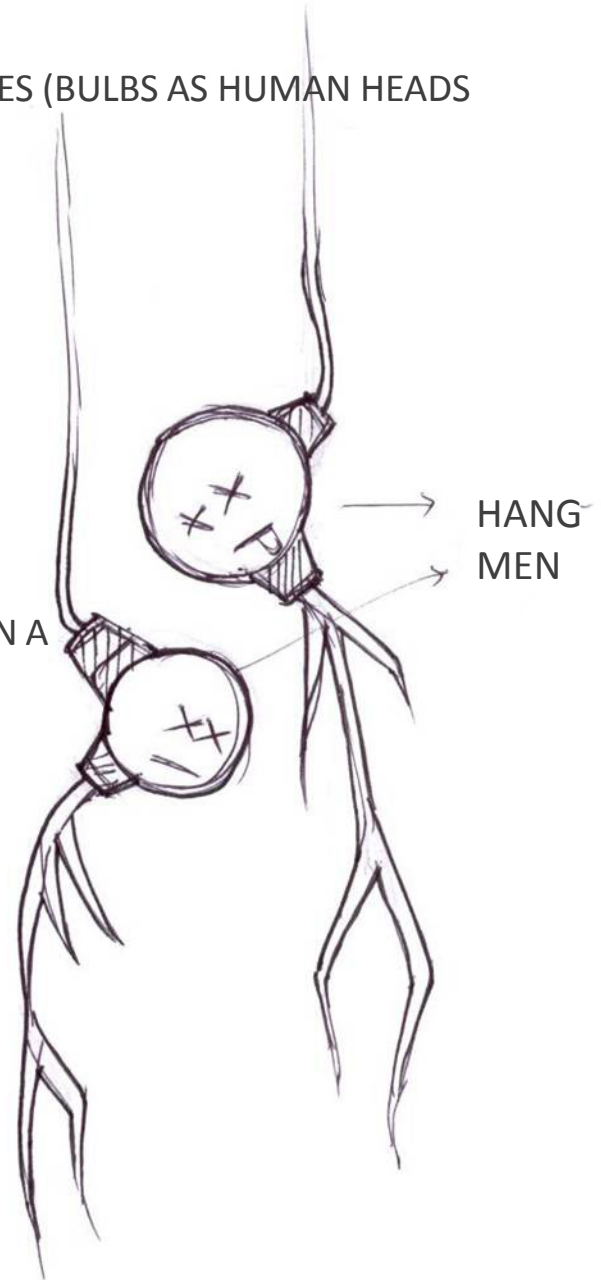
ABSTRACTION OF HUMAN FIGURES AS STICK FIGURES (BULBS AS HUMAN HEADS)



HUMAN FIGURES
SITING AROUND ON A
RING

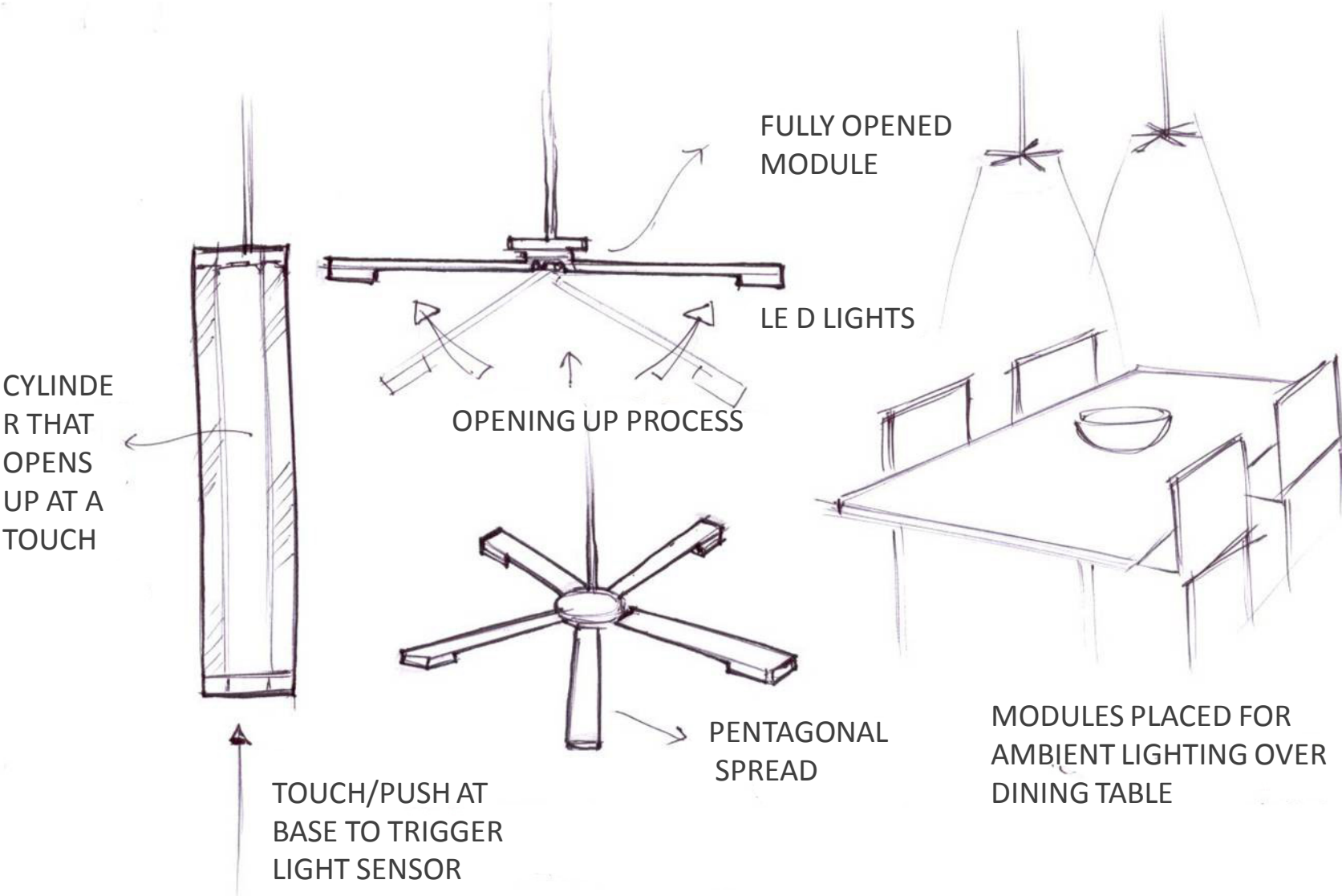


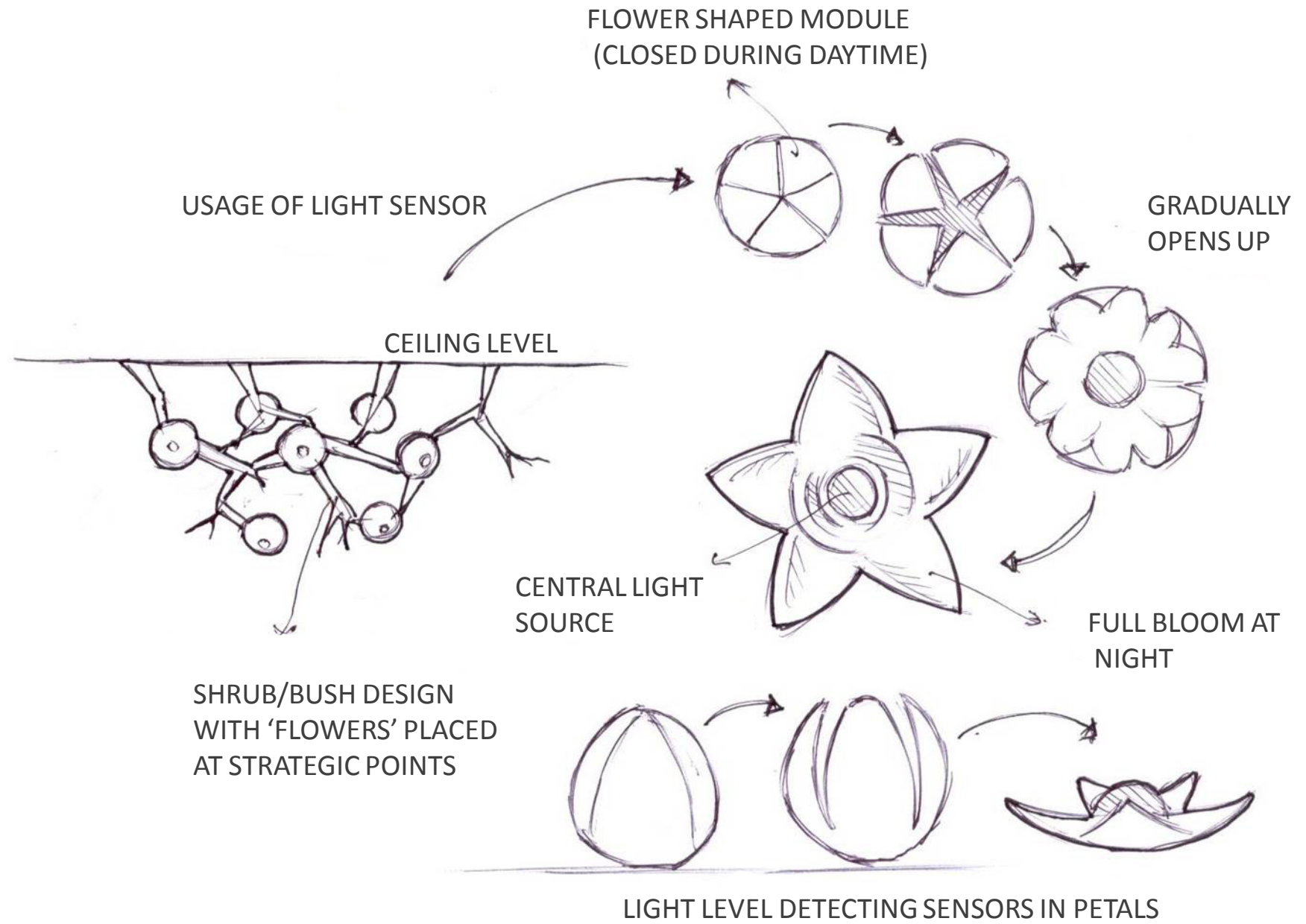
HUMAN FIGURES
WITH BULB HEADS
AND LIGHTED TOP
HATS



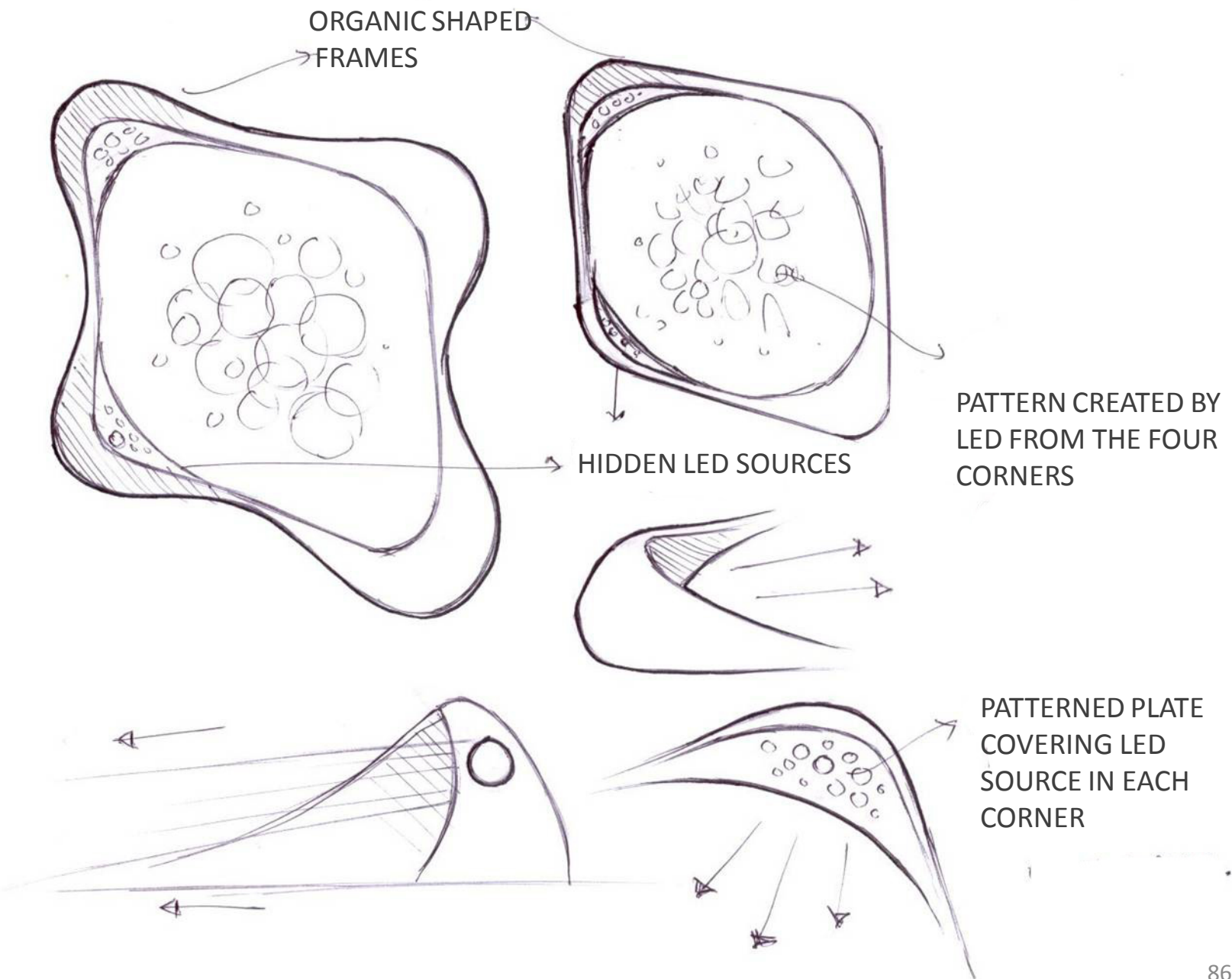
HANG
MEN

Sensor based

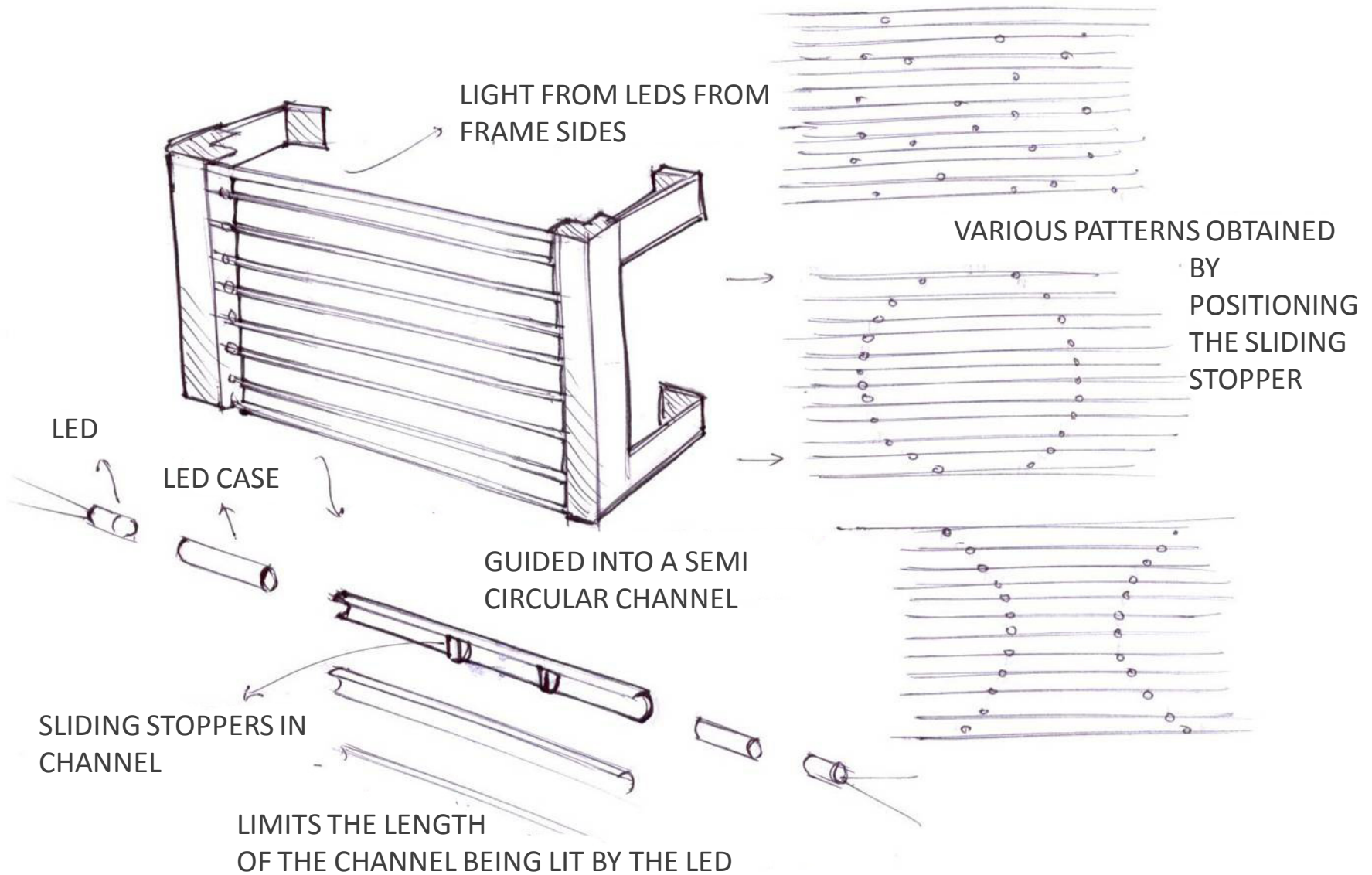




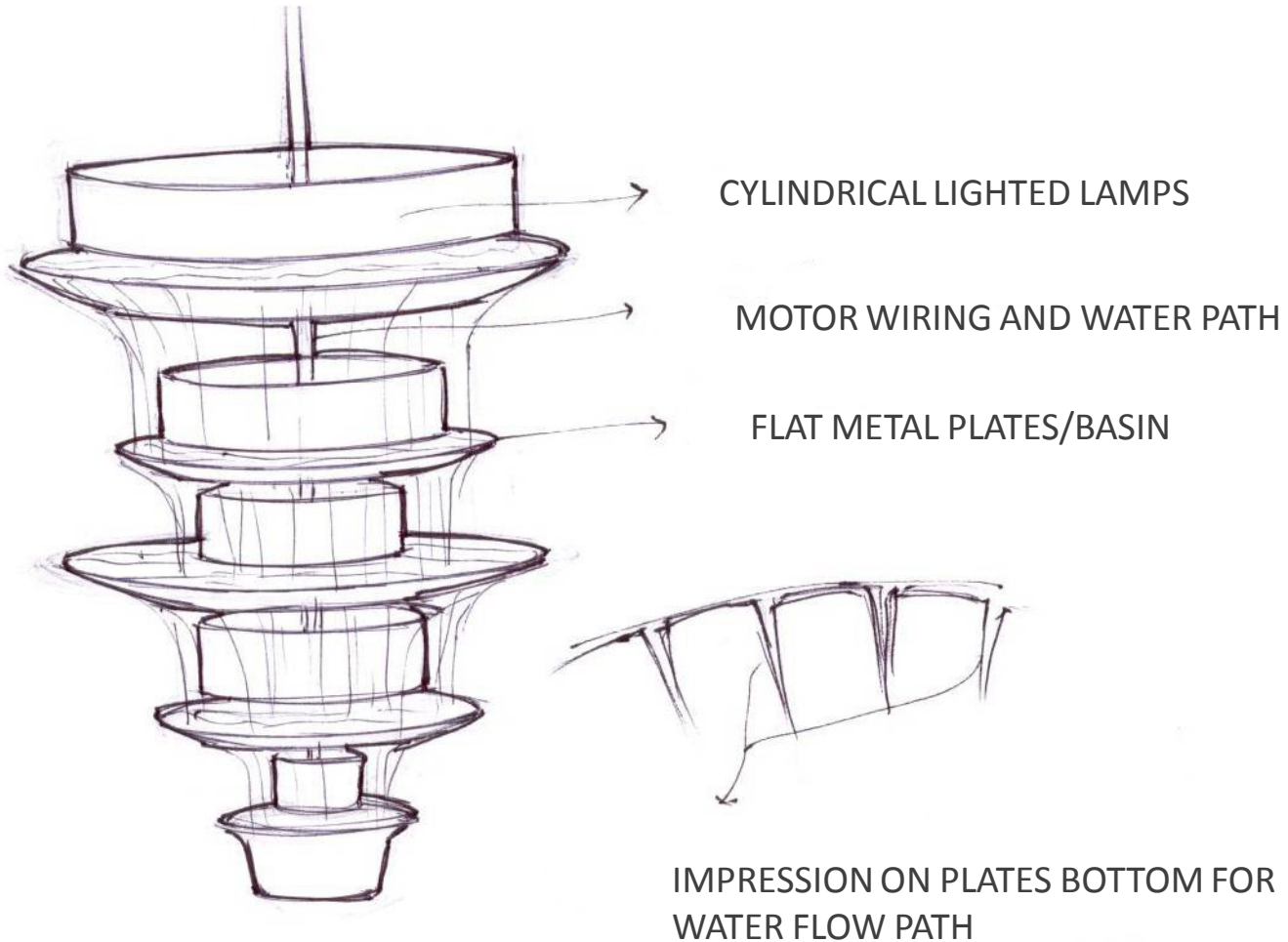
Pattern formed by multiple sources



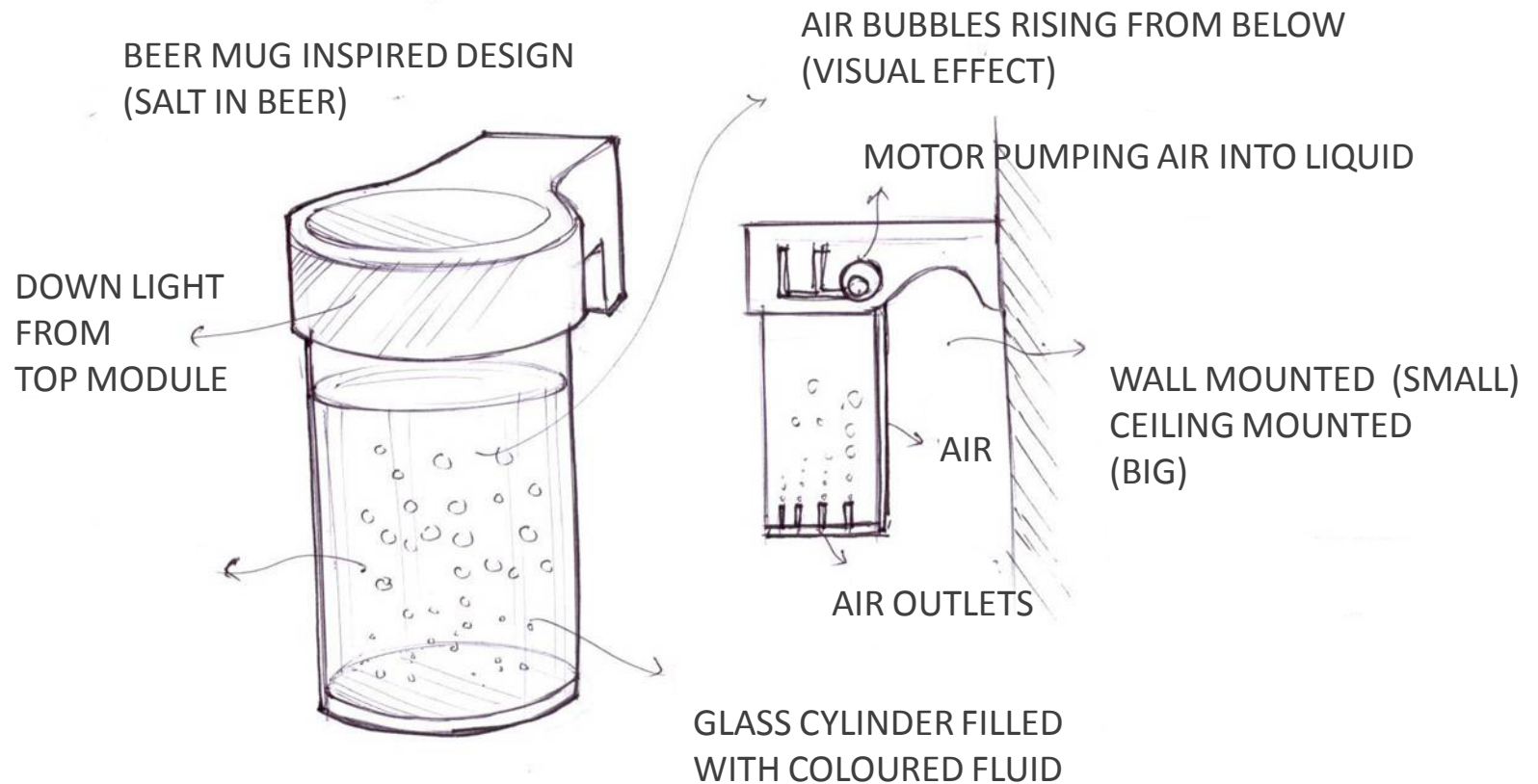
Pattern formed by multiple sources



Water and fluid based



Water and fluid based



Experimenting with light and shadow effects:

Light source placed inside a hollow structure made out of bamboo with gaps left for creating a play of light and shadow



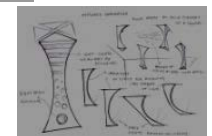
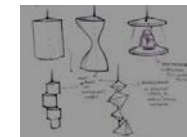
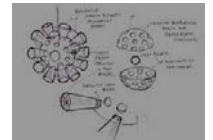
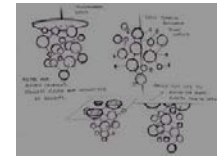
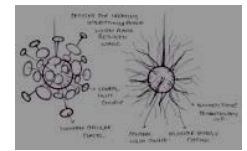
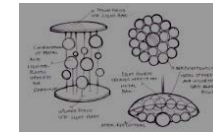
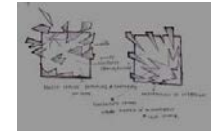
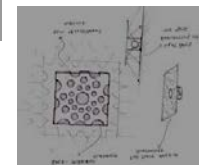
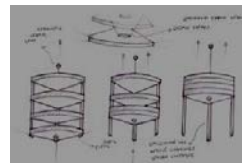
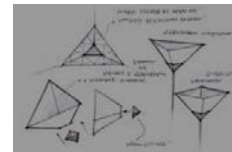
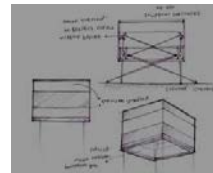
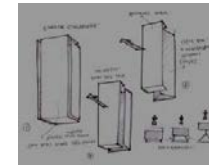
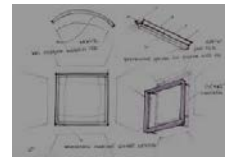
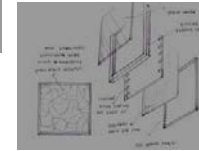
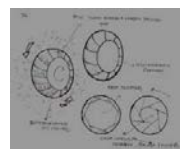
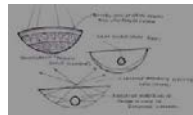
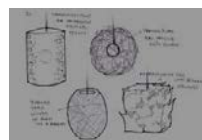
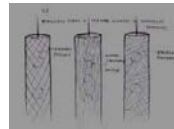
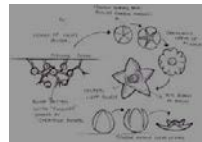
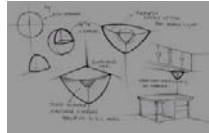
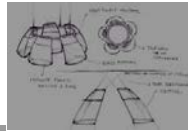
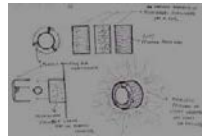
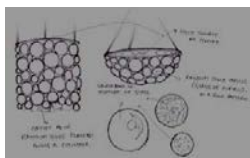
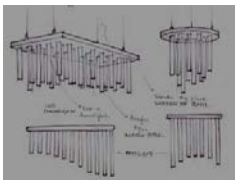
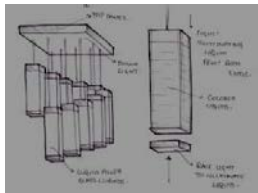
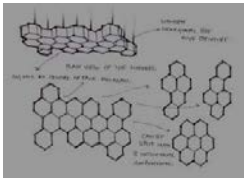
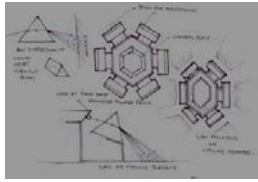
Acrylic cylinder and the various effects and patterns it creates when white LED light passes through it at various angles



Cylindrical mesh created using bamboo and gaps left in a way that a light source from inside creates interesting patterns on the outside



Grouping of ideas:



Cluster 1
Basic shapes

Cluster 2
Dome lighting

Cluster 3
Flat plates

Cluster 4
Explosion/Random

Concepts

Concept 1

FITTINGS FOR LOCKING
MODULES INTO EACH
OTHER

MEDIUM INTENSITY
BULBS

MILKY WHITE ACRYLIC
SHEETS

STEP 1

STEP 2

STEP 3

STEP 4

STEP 5

STEP 6

STEP 7

PATH FOR
WIRING/LED

GAPS LEFT IN BETWEEN MODULES
FOR LIGHTING
EFFECT

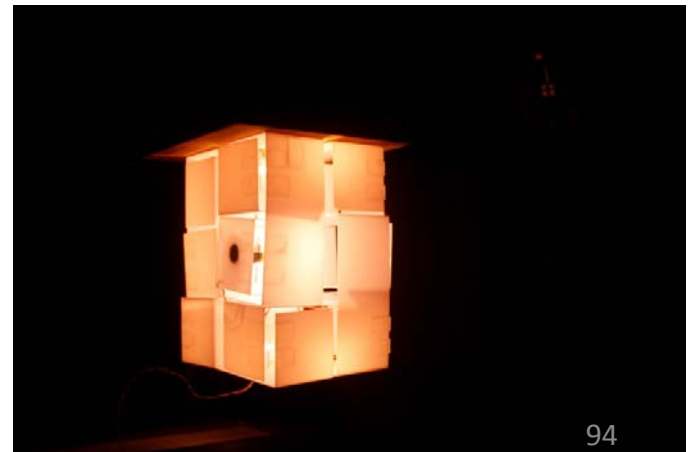
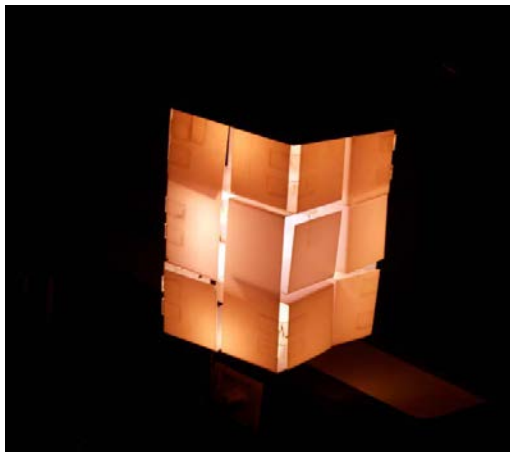
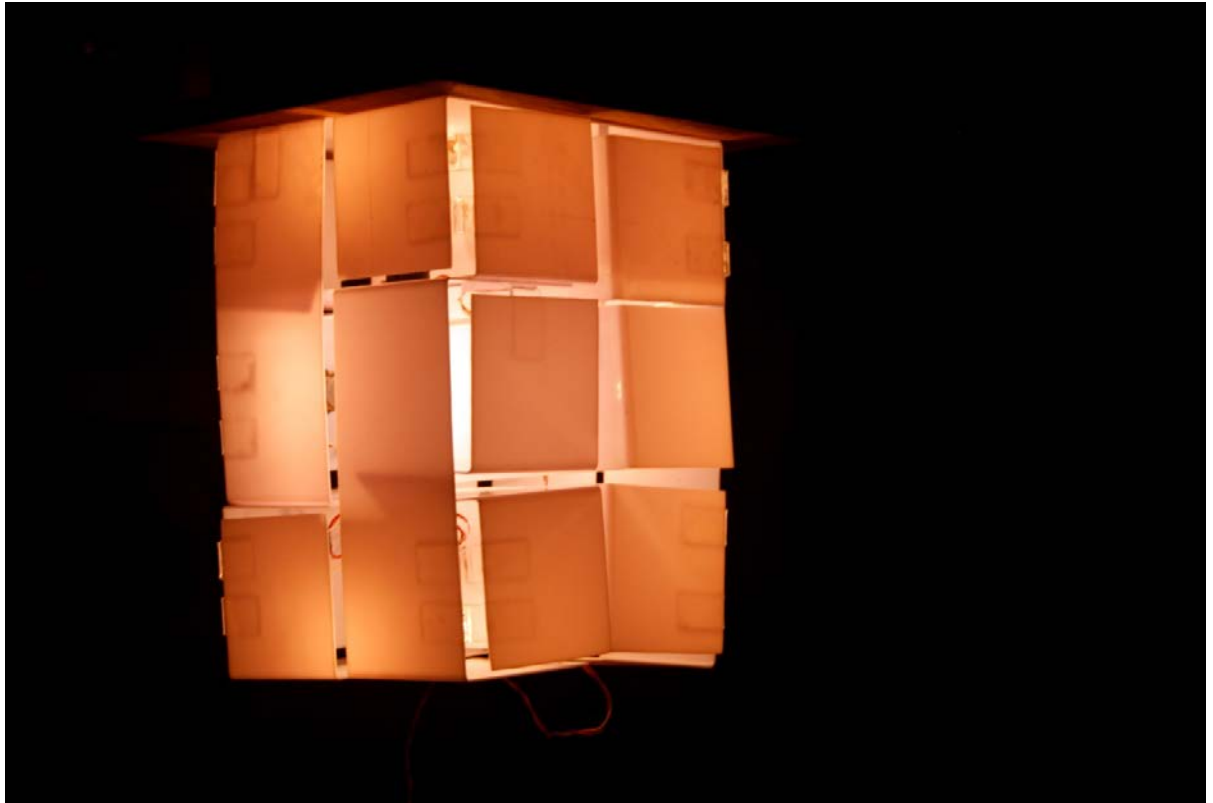
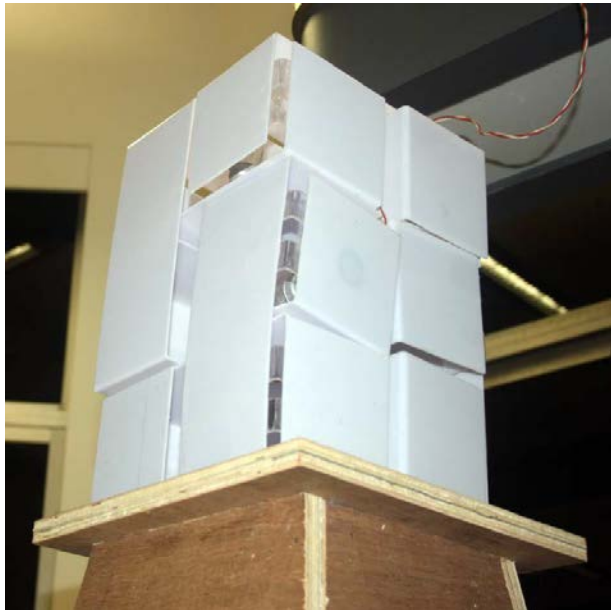
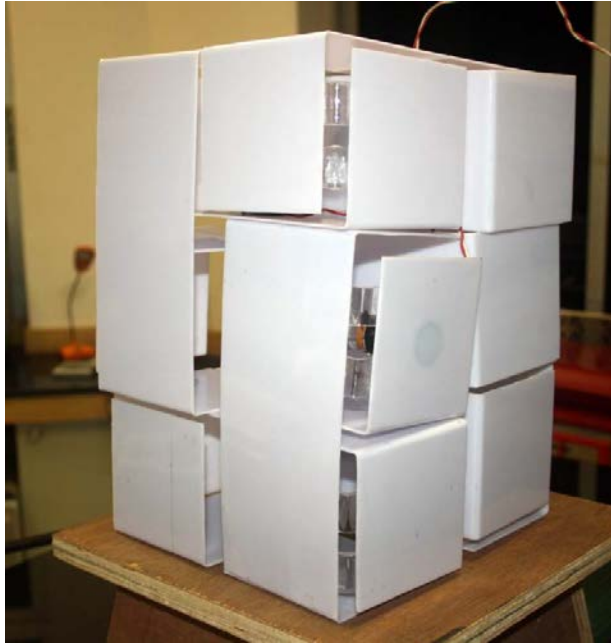
SUSPENSORS
FROM CEILING

ASSEMBLED
STRUCTURE

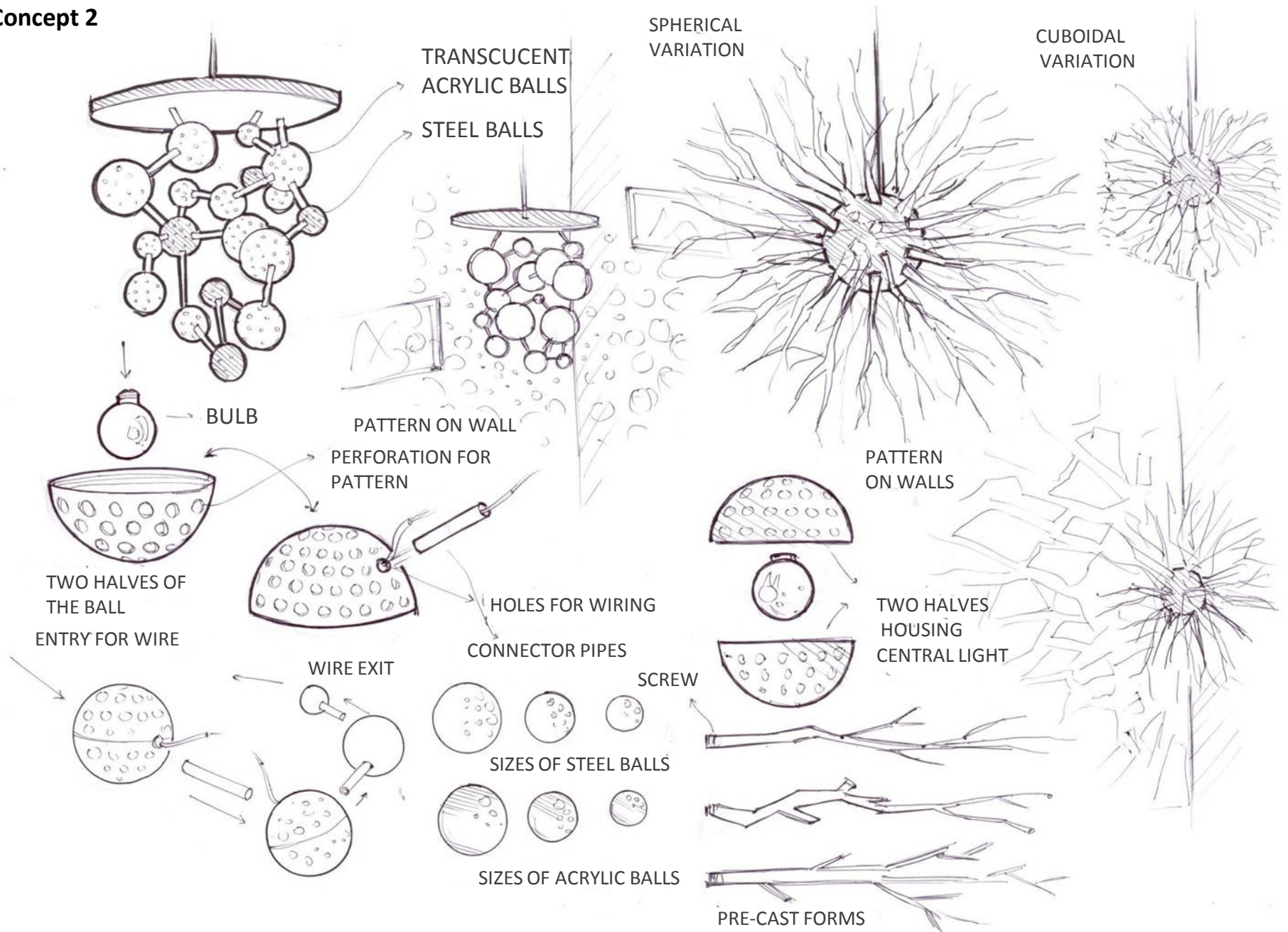
ELEVATION

PLAN

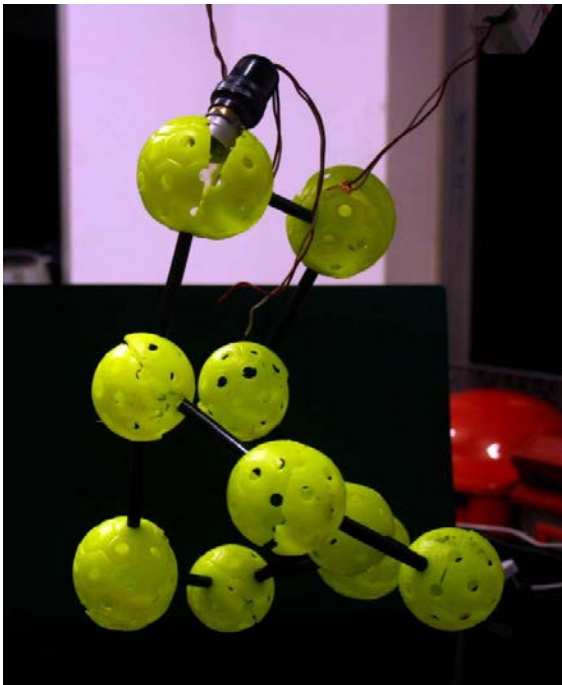
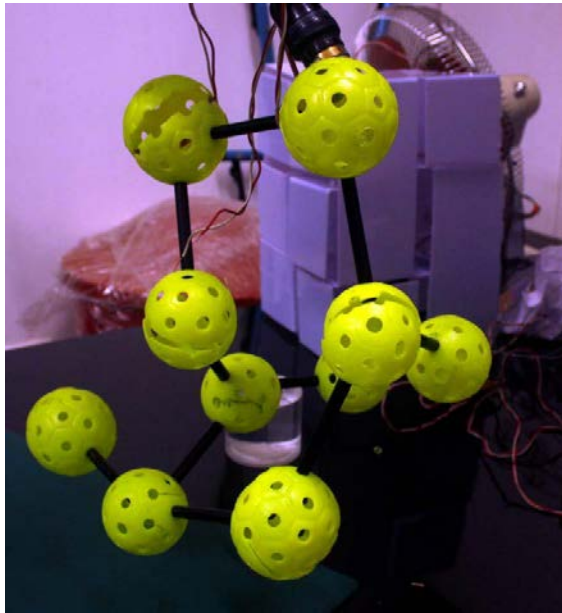
Concept 1 mock up model:



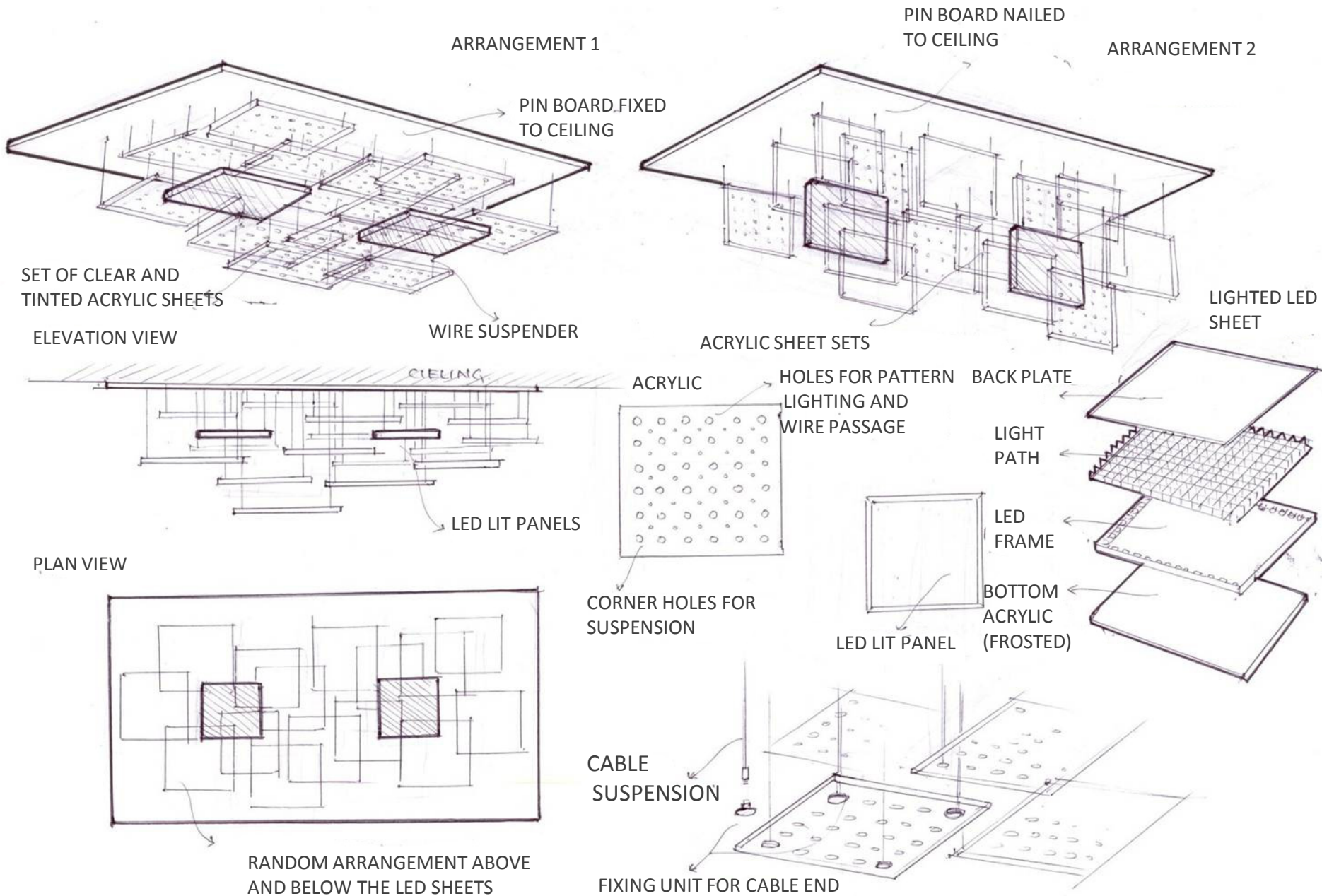
Concept 2



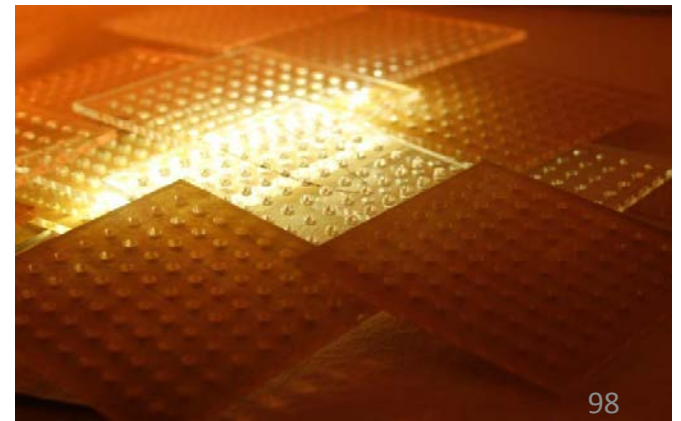
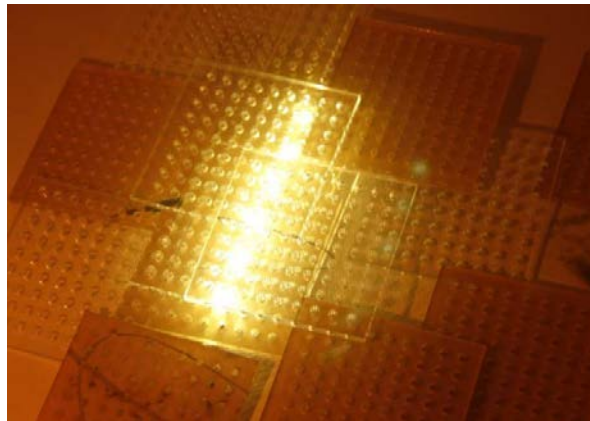
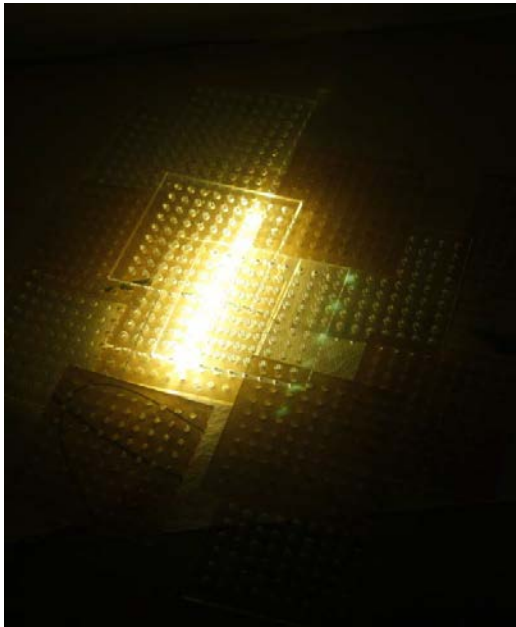
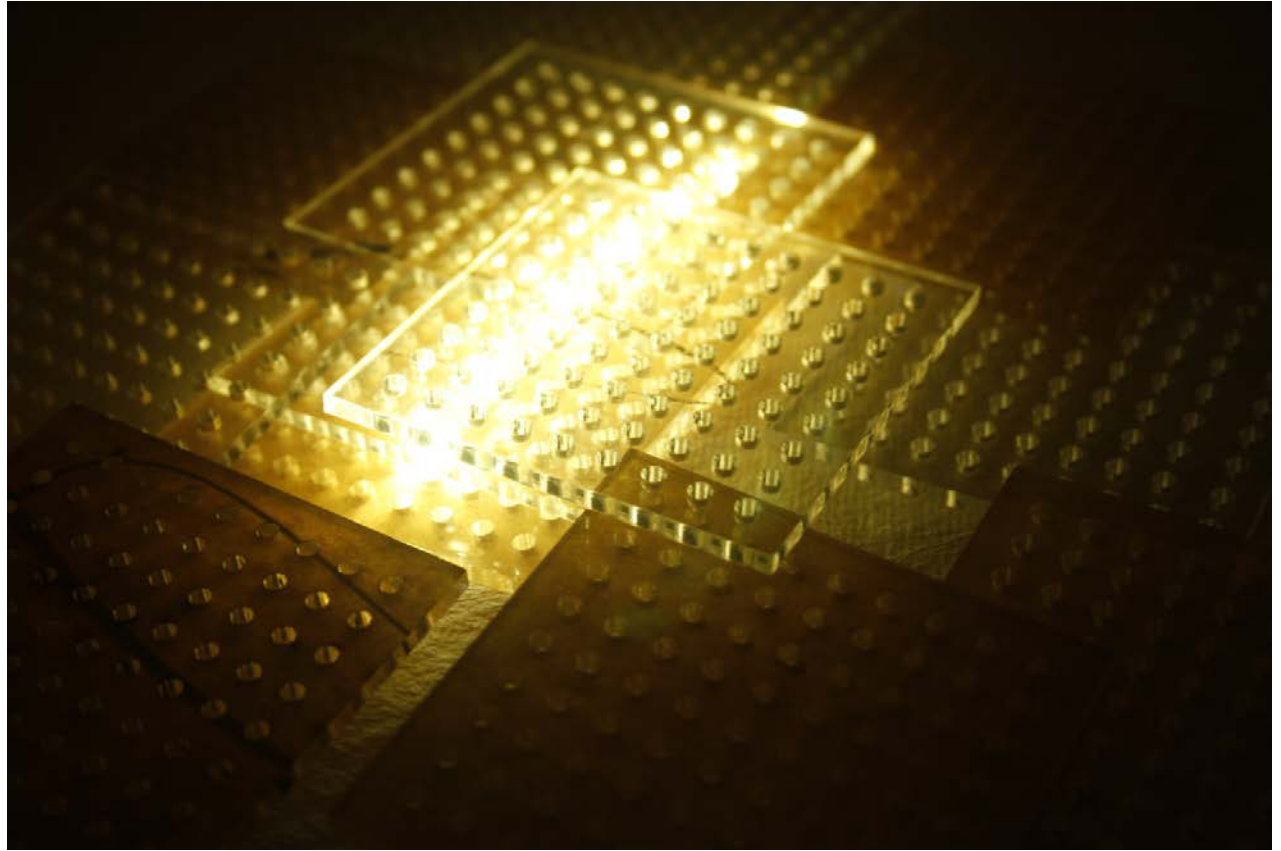
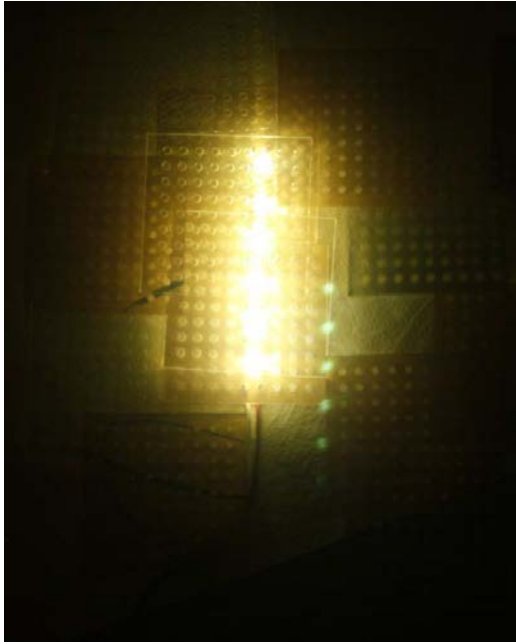
Concept 2 mock up model:



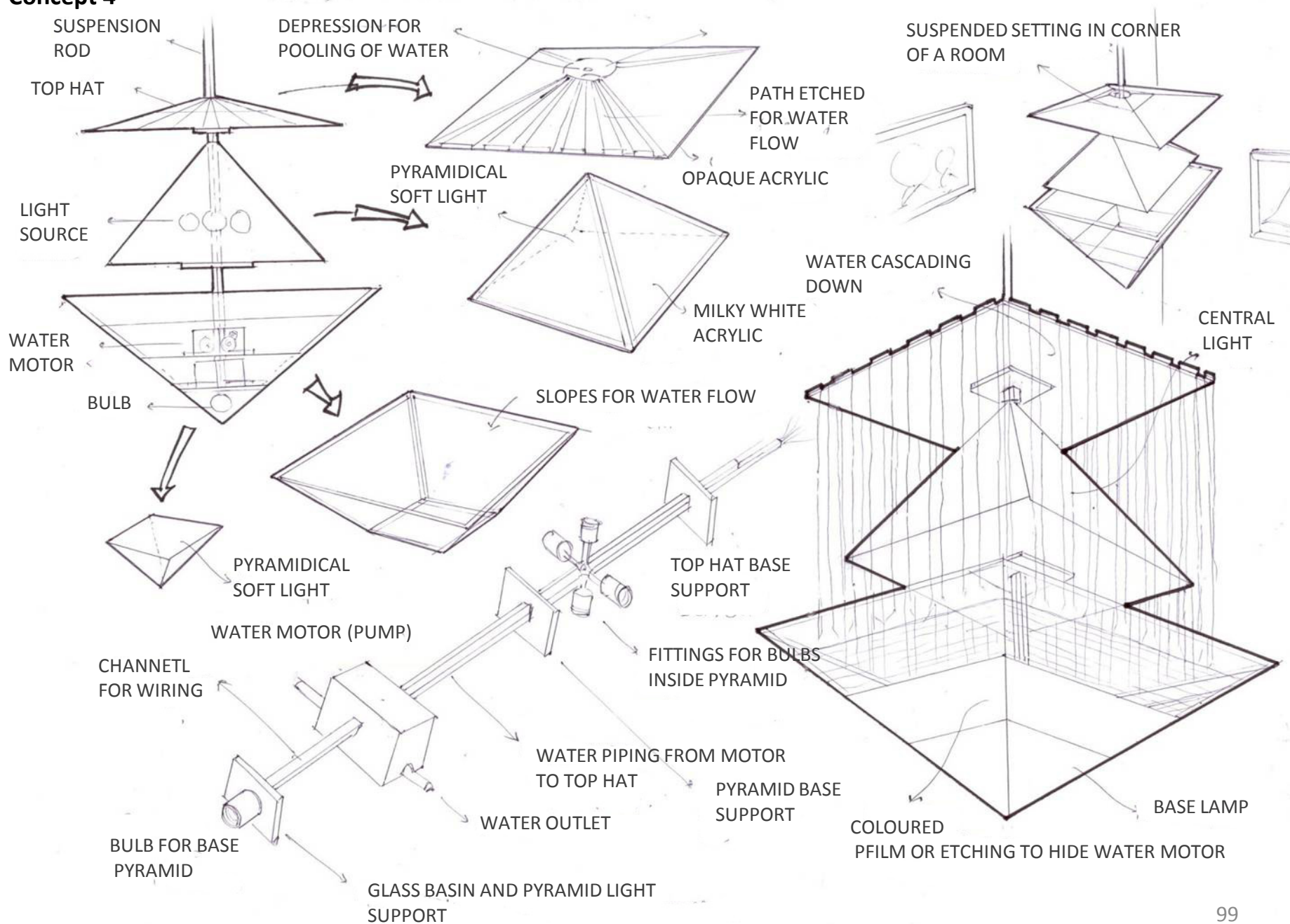
Concept 3



Concept 3 mock up model:



Concept 4



Concept Evaluation:

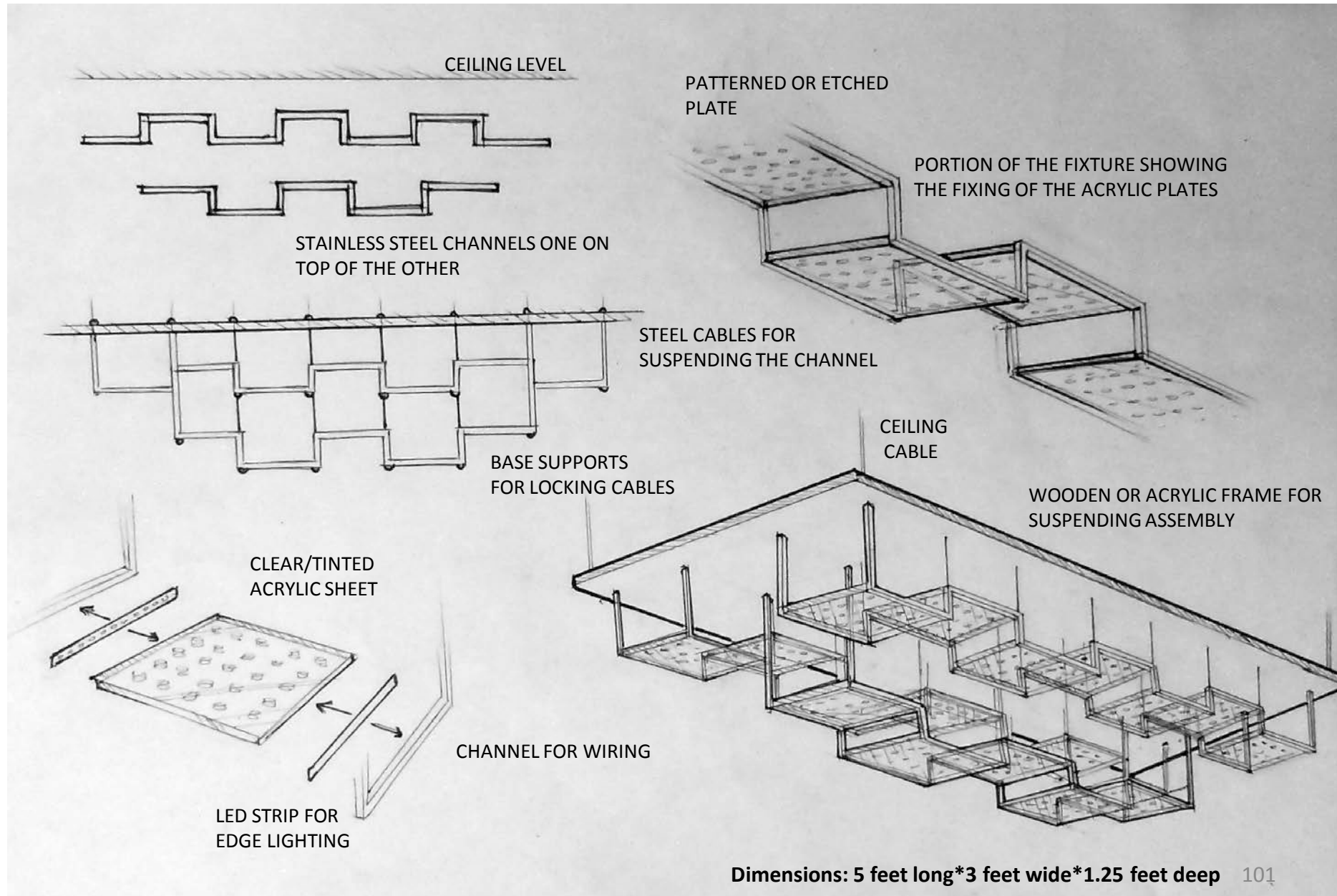
The four concepts are now evaluated by users and subsequently rated on a scale of 10 against each of the issues Given in the first column of the table shown below

	Concept 1	Concept 2	Concept 3	Concept 4
Aesthetic quality	7	8	8	7
Lighting ambience	7	7	7	6
Non-complex design	5	6	7	7
Newness of design	6	8	8	8
Scope for LED	5	4	8	6
Ease of assembly	7	5	9	6
Batch manufacture	6	6	7	7
Modularity	8	8	8	6
Maintenance	5	6	8	4
Cable management	8	8	9	8
	64/100	66/100	79/100	65/100

Hence concept 3 will be taken ahead, variations tried out and the final design decided upon

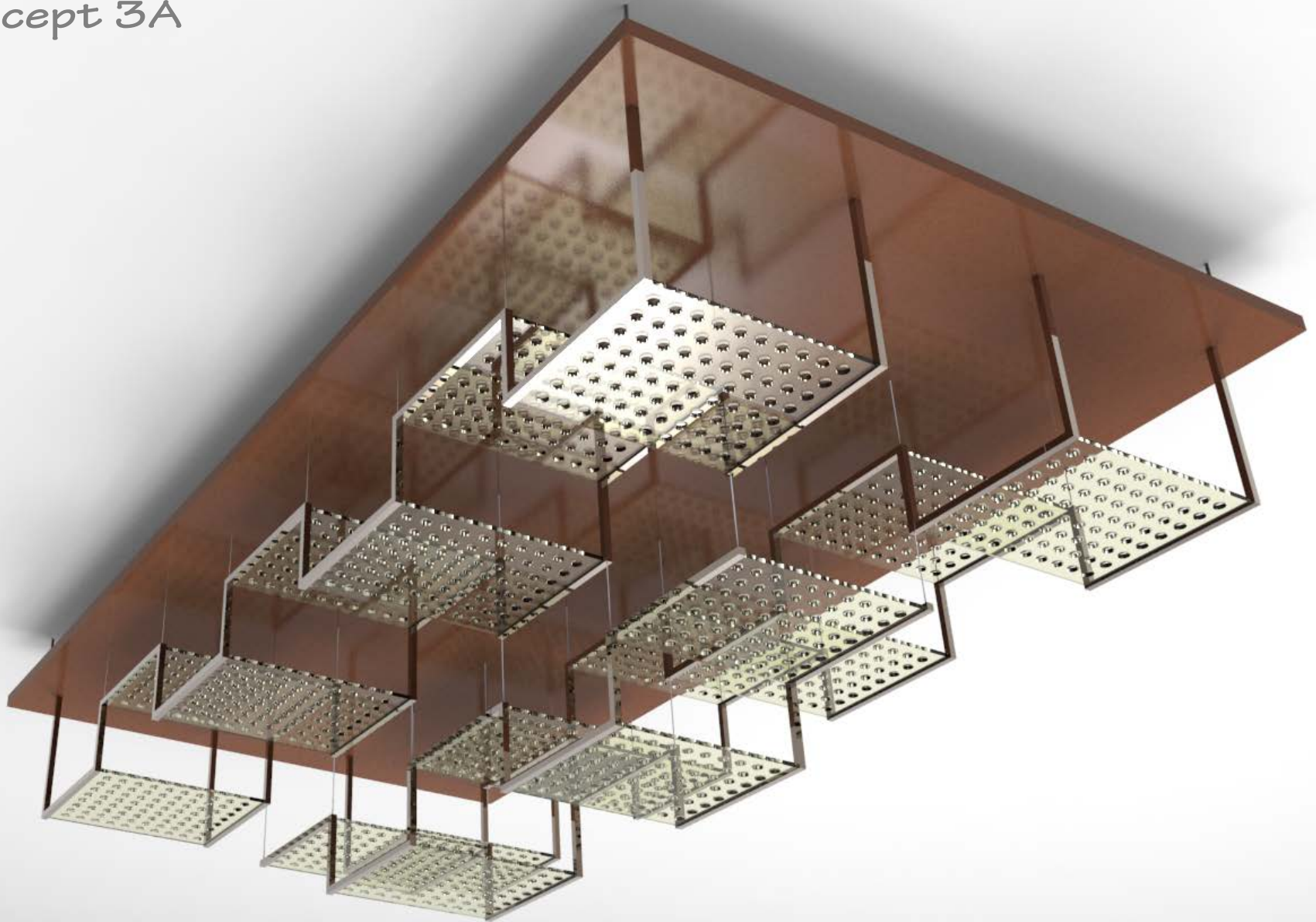
Variations in Concept 3: The concept is taken forward using edge lit LED panels (clear/frosted) as the light source

Concept 3A:

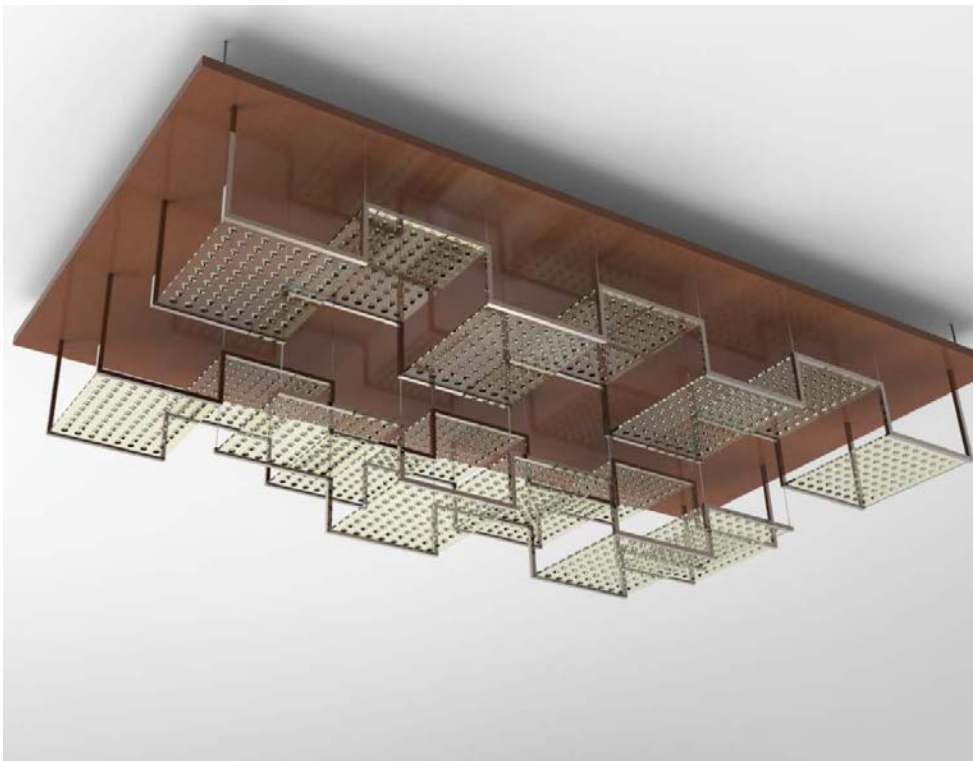


Digital 3D render

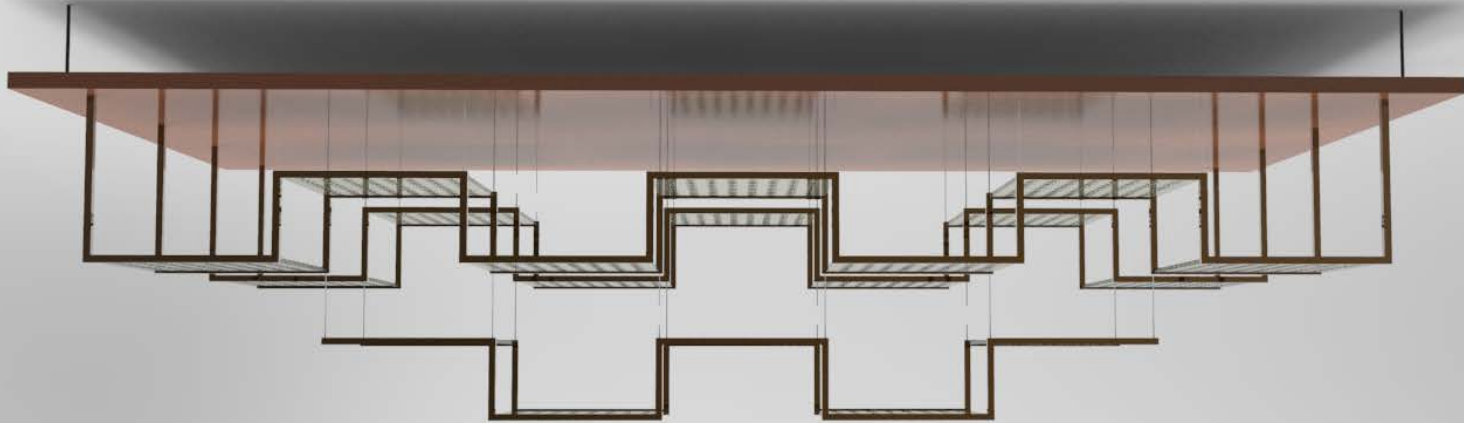
Concept 3A



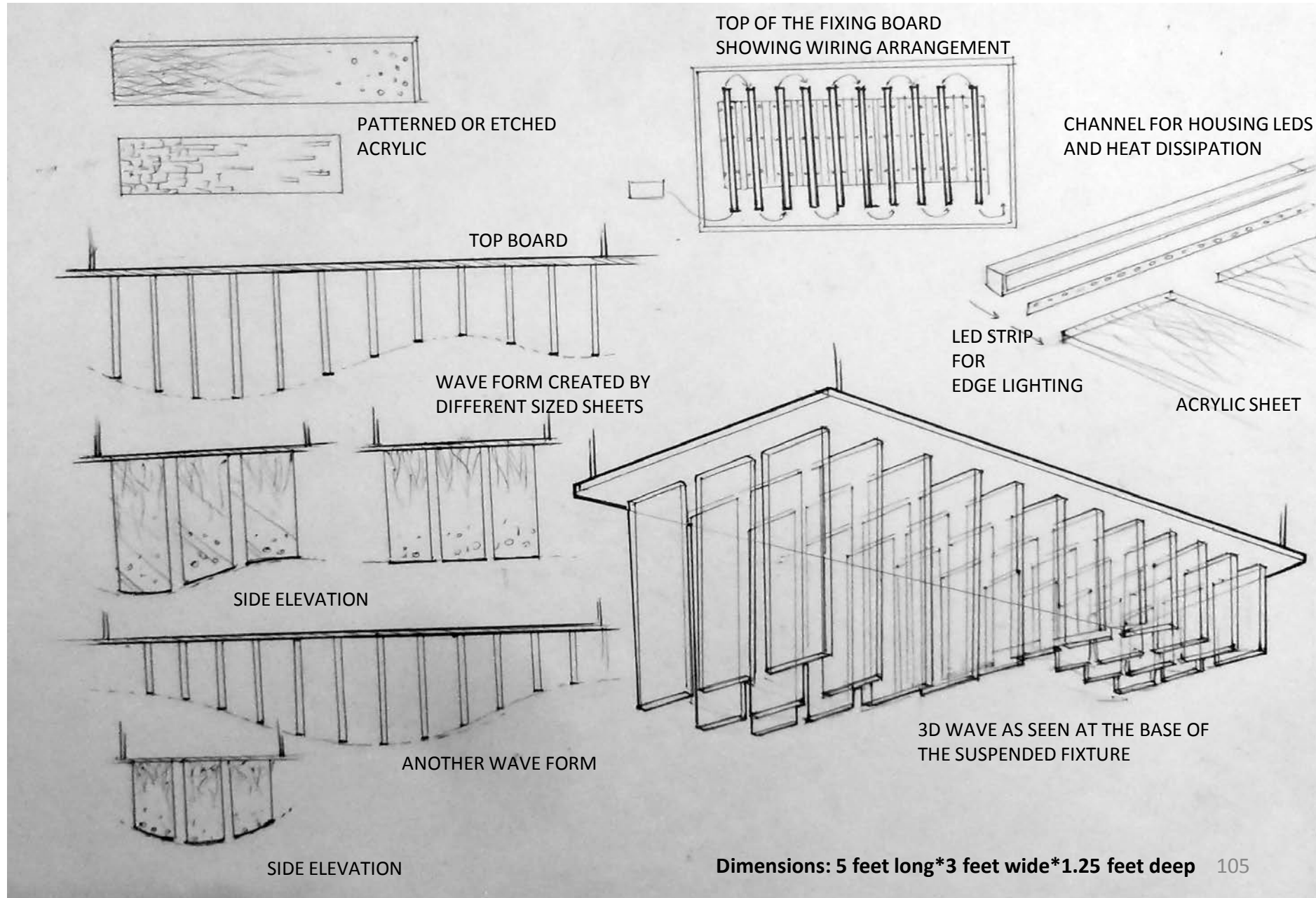
Digital 3D render views



Digital 3D render views

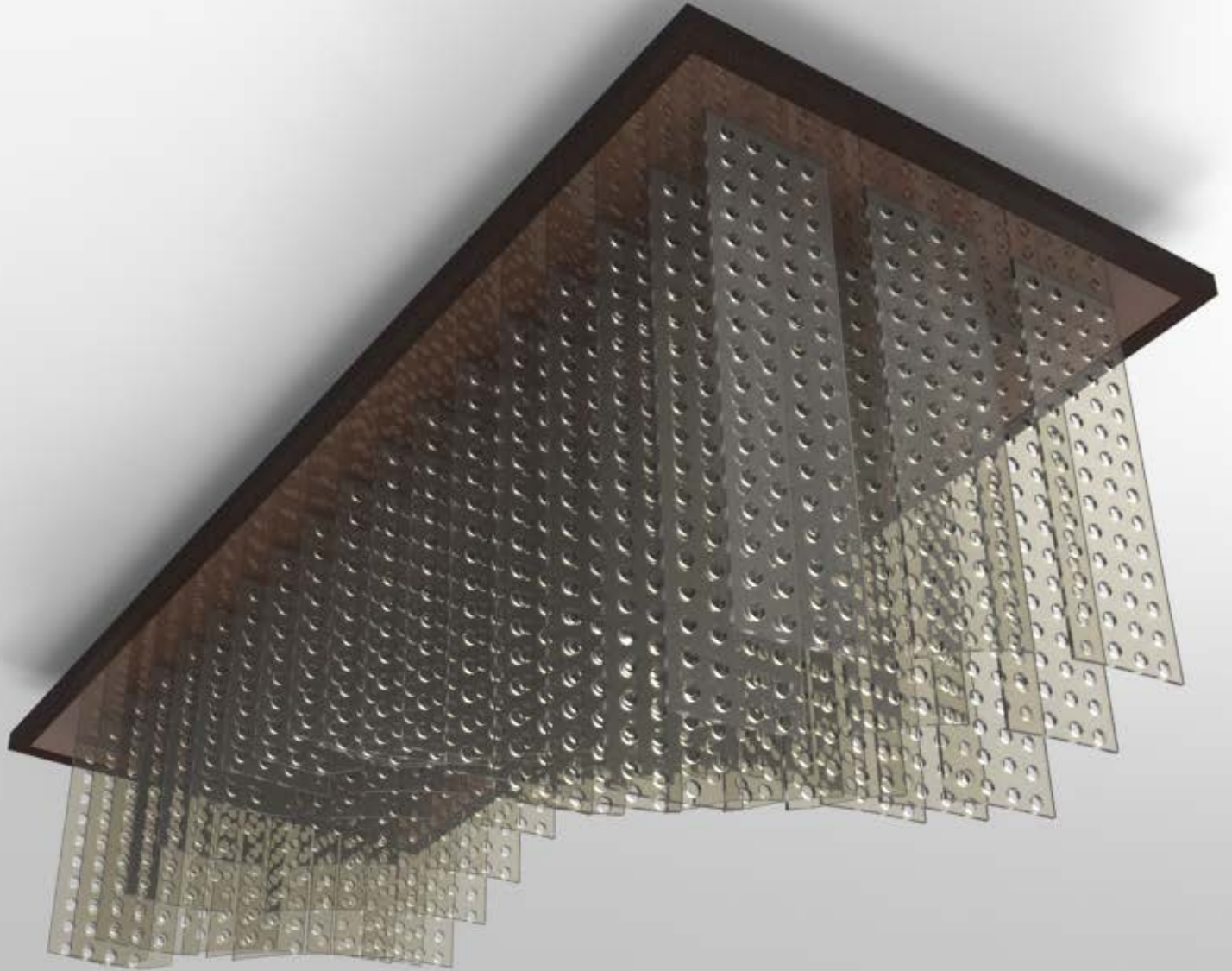


Concept 3B:

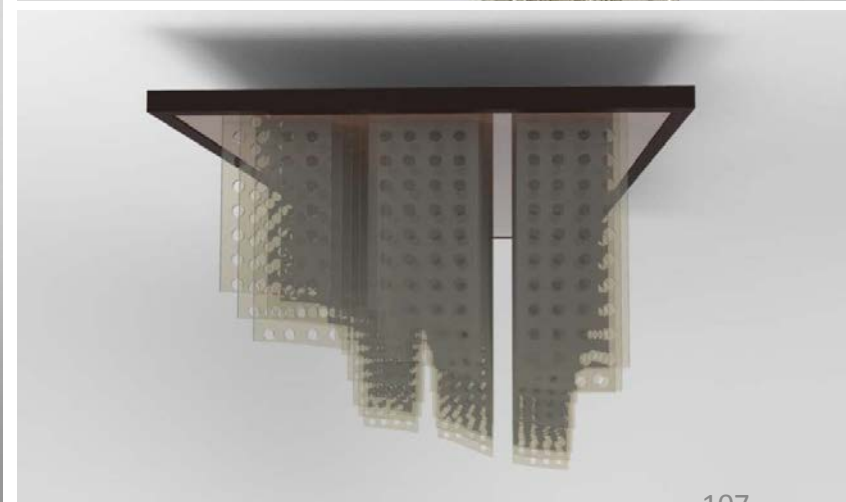
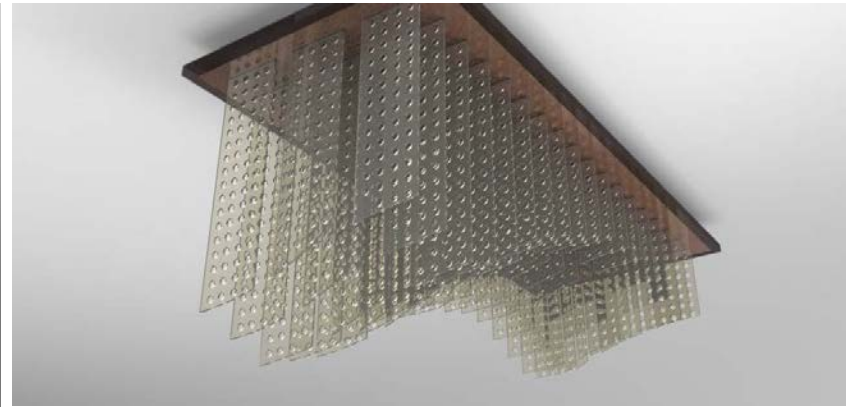


Digital 3D render

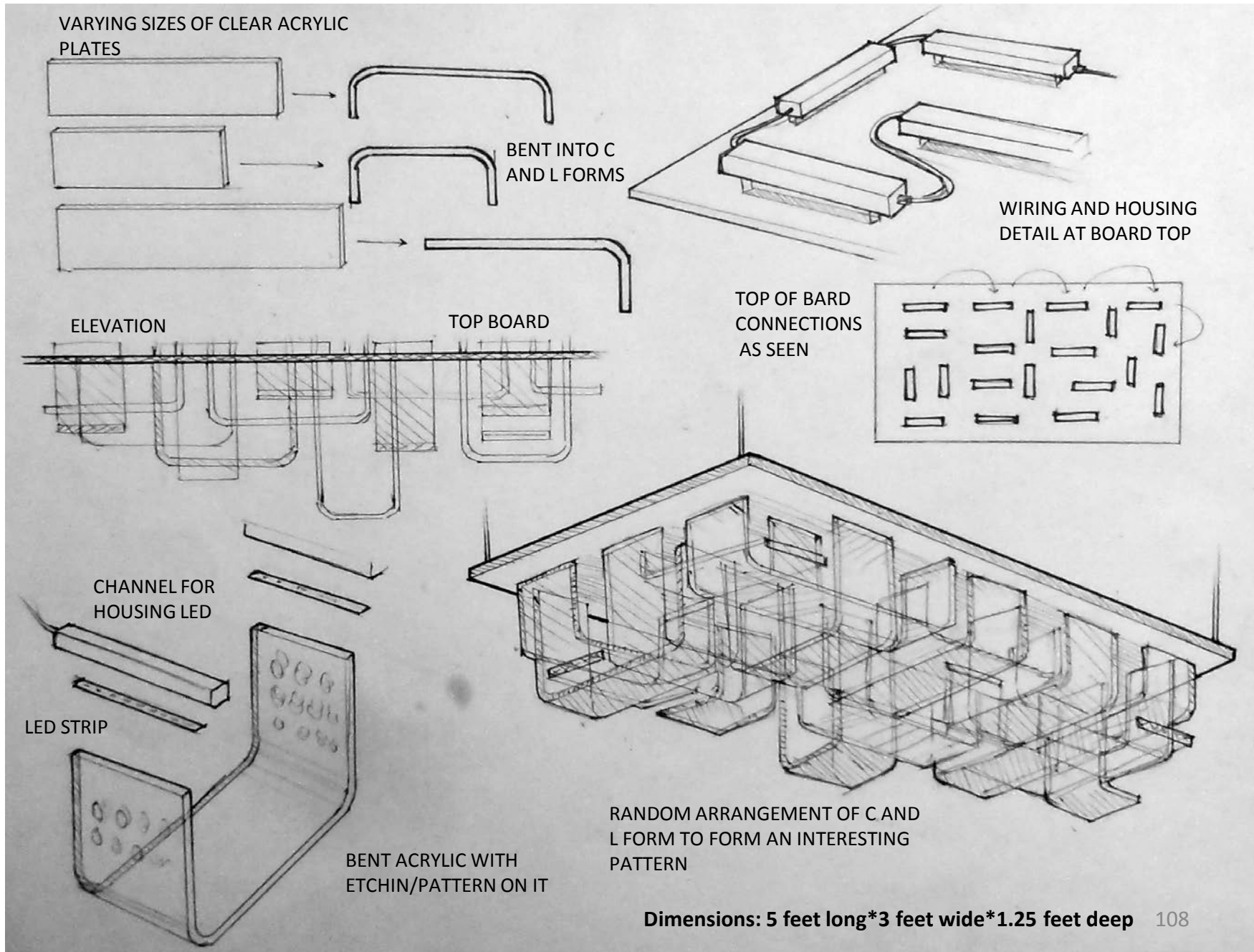
Concept 3B

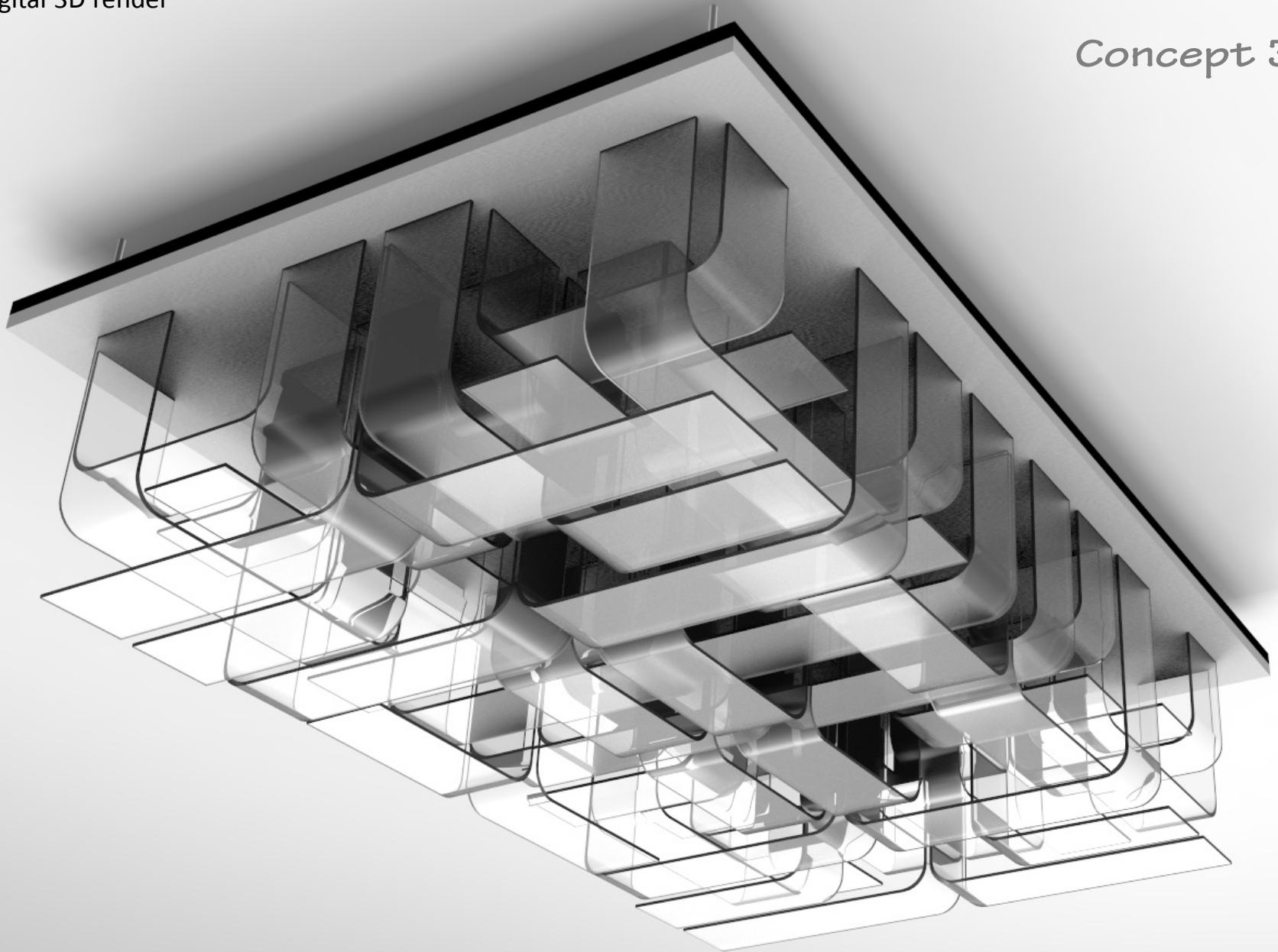


Digital 3D render views

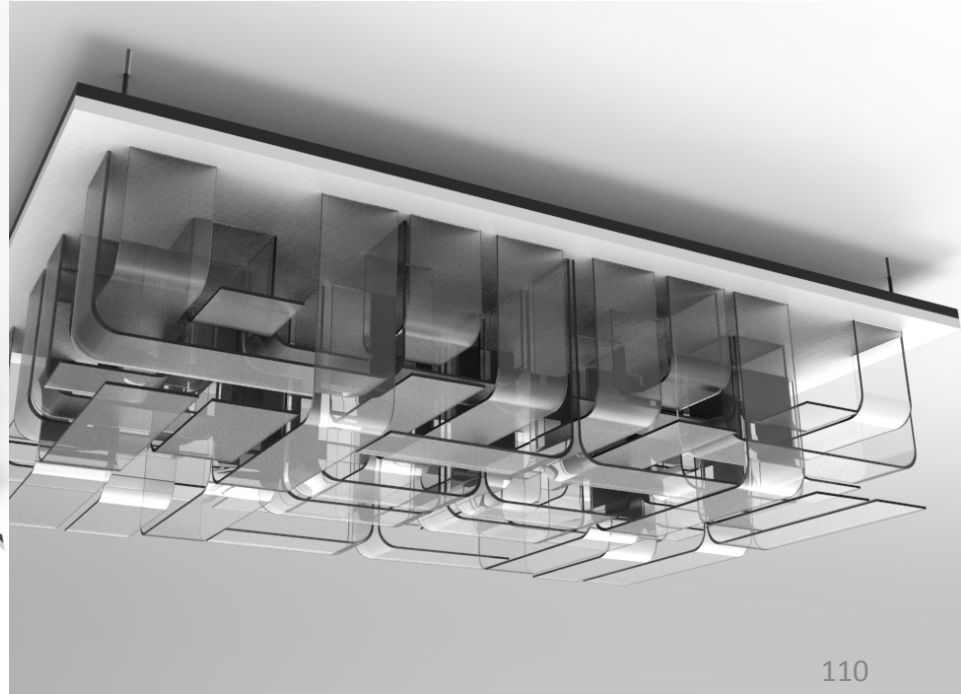
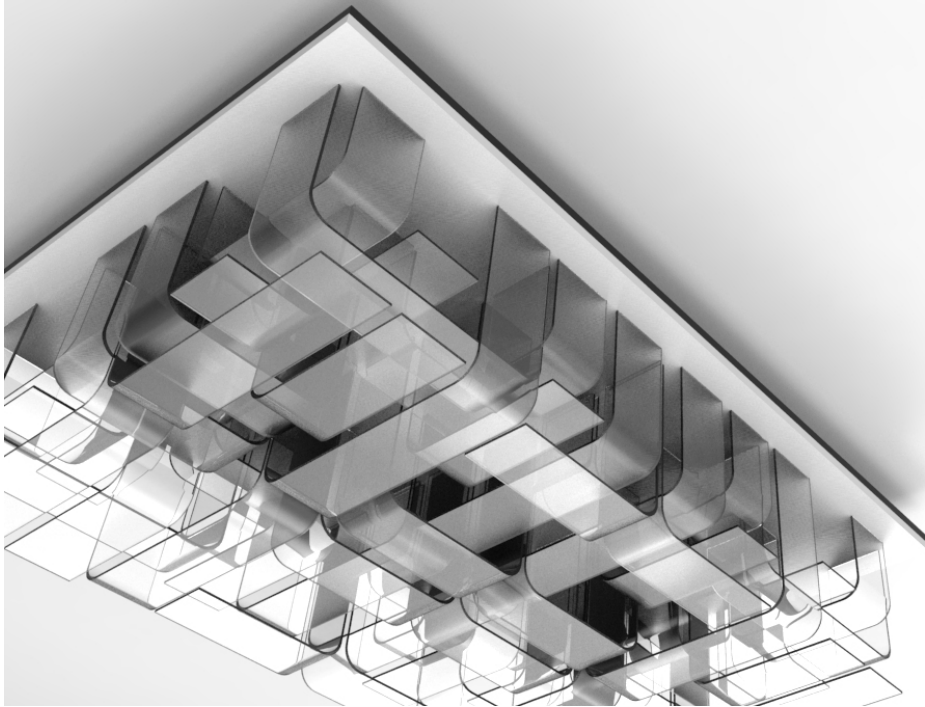
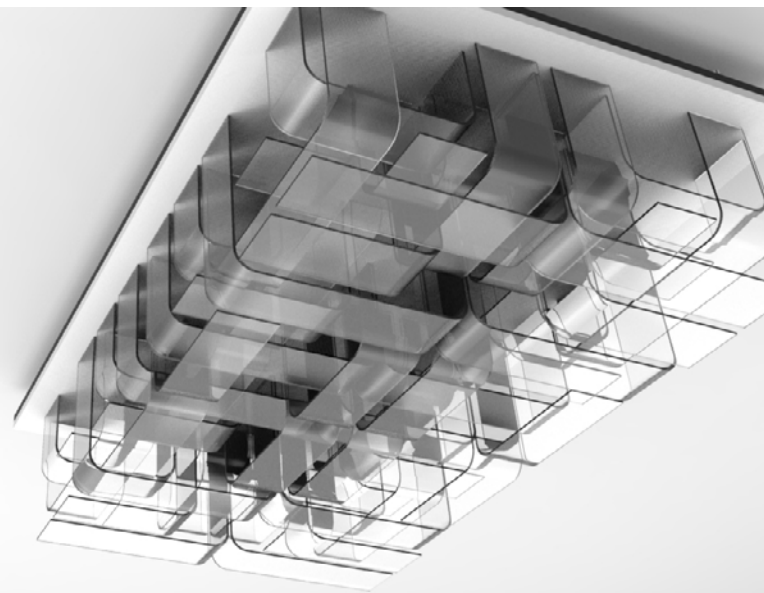
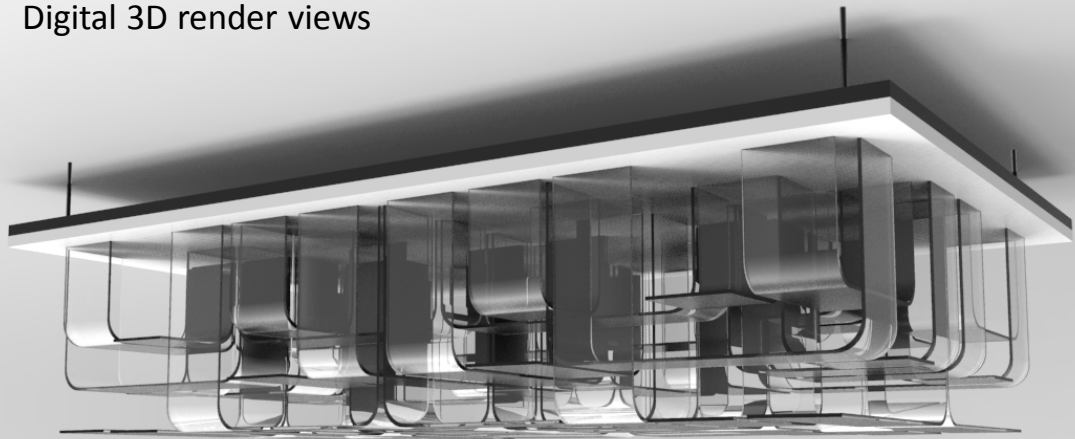


Concept 3C:



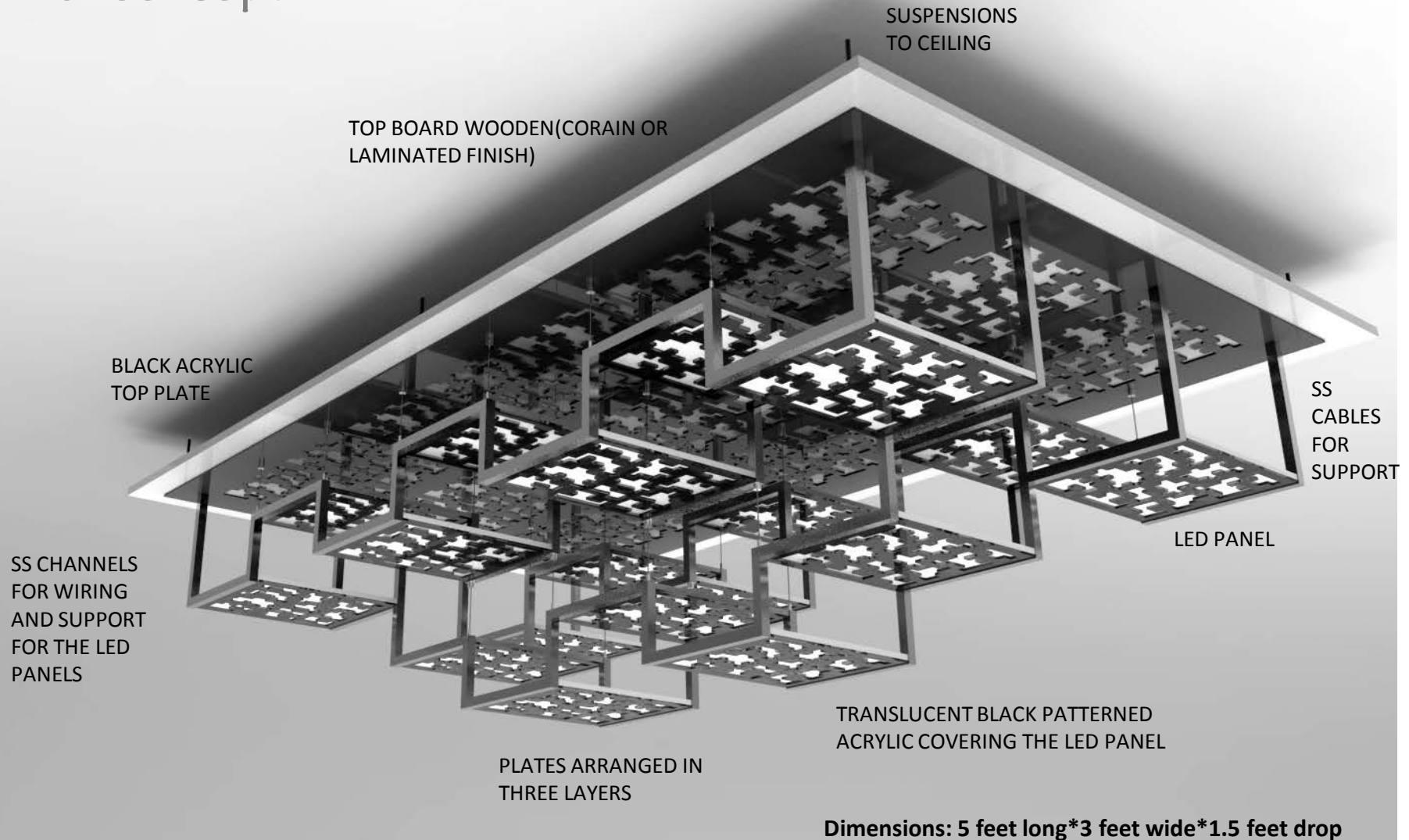


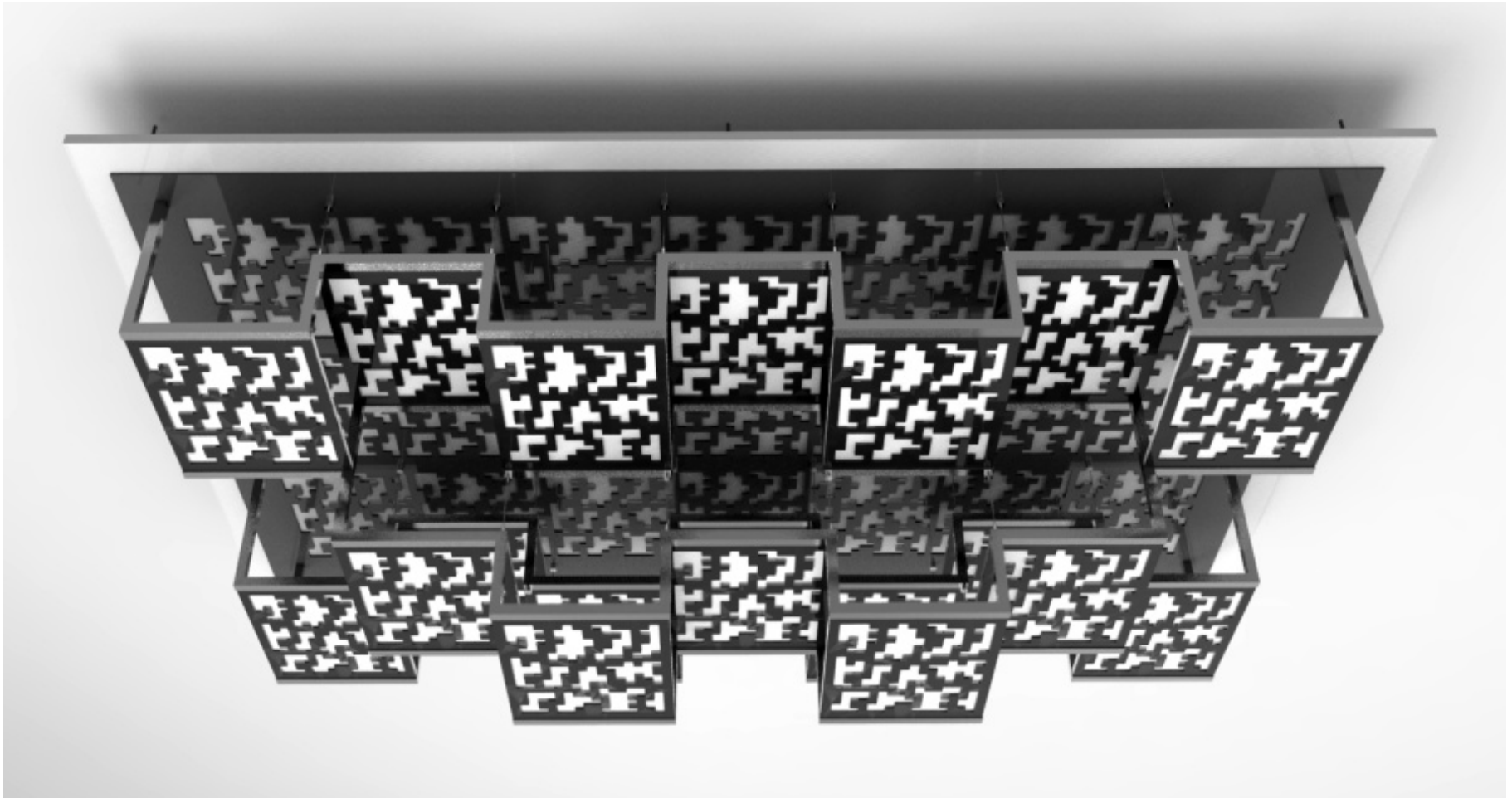
Digital 3D render views



Final Concept

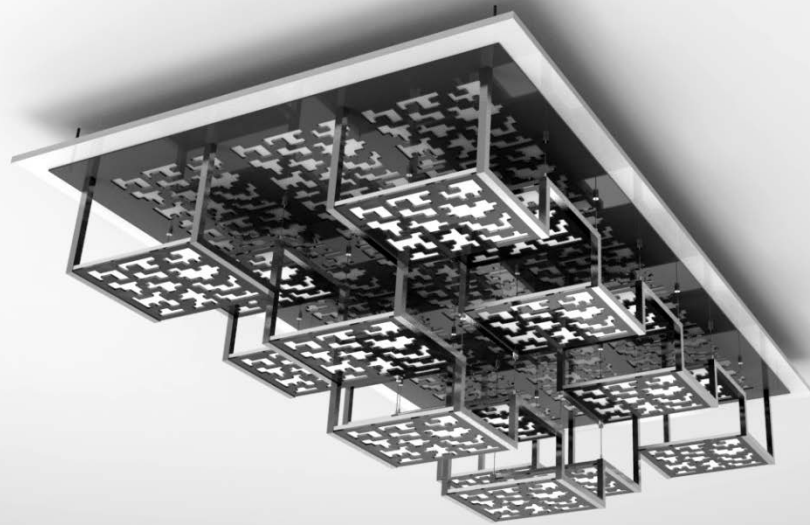
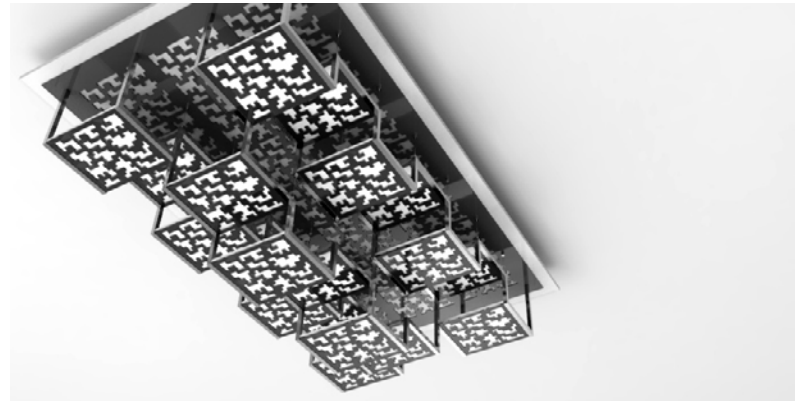
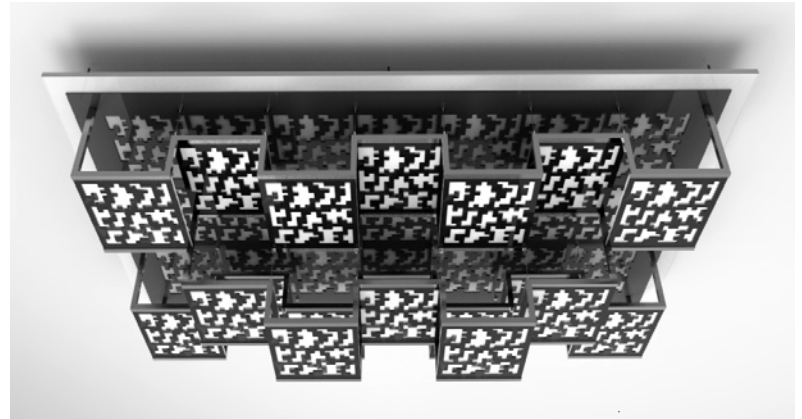
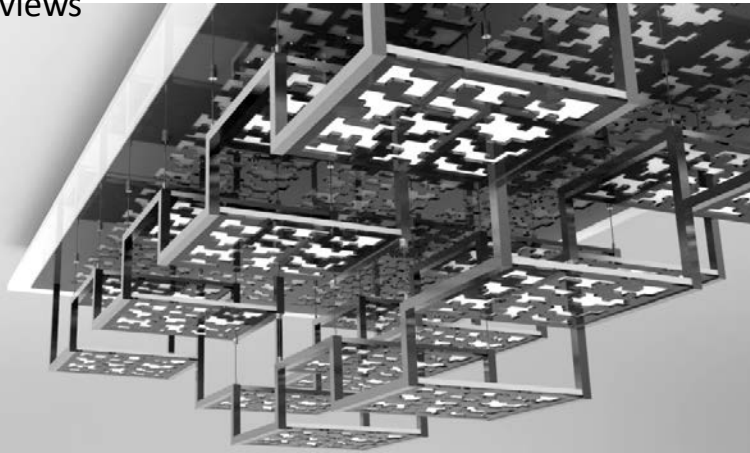
Final Concept



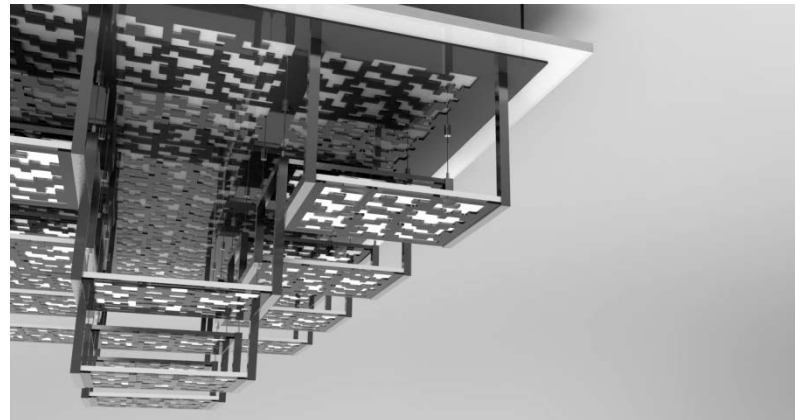


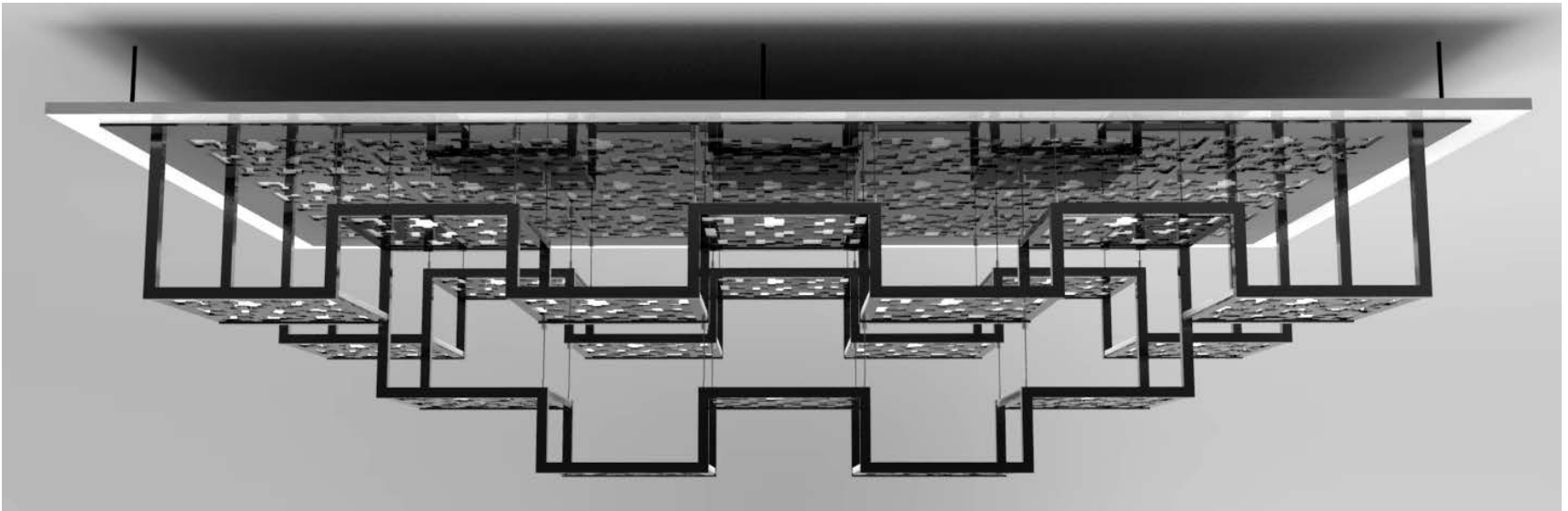
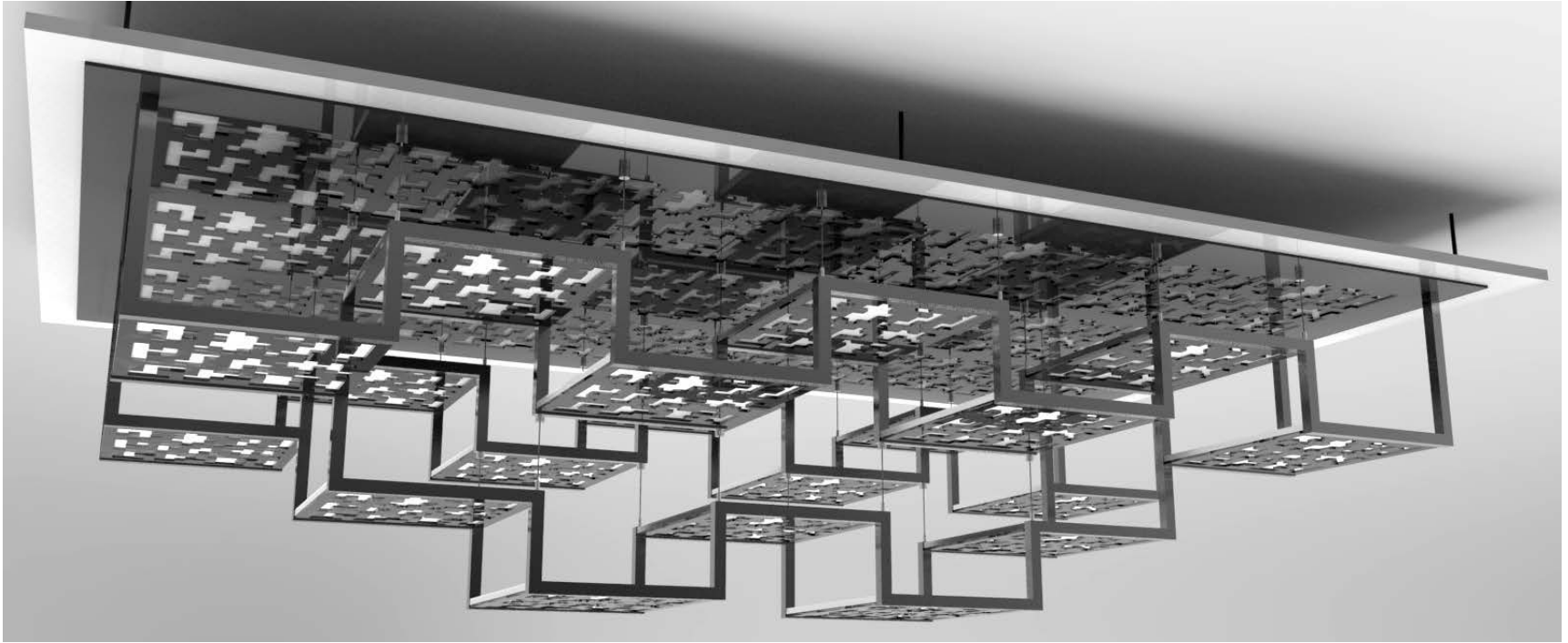
This concept has been chosen since it addresses all the problems pertaining to maintenance, power consumption, light intensity, modularity, wire and cable management and modularity, hence adding to its aesthetic and functional value.

Digital 3D render views



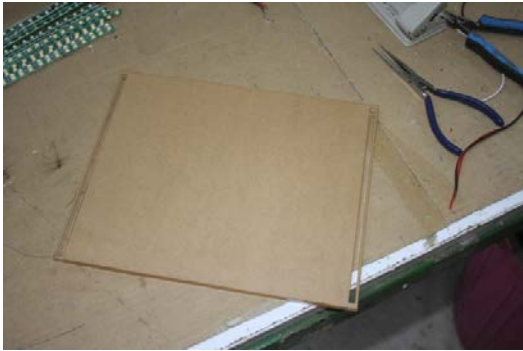
Dimensions: 5 feet long*3 feet wide*1.25 feet deep



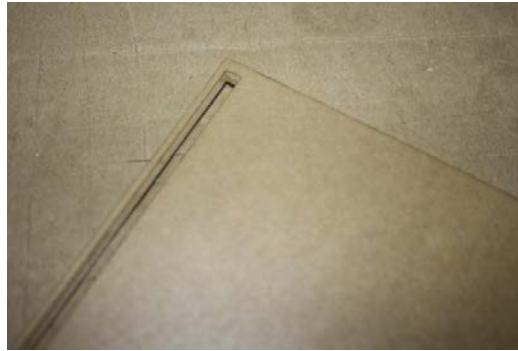


Full scale prototyping process

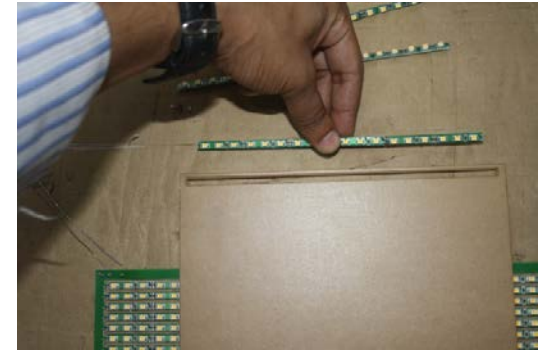
Full scale prototyping process: LED lit panels



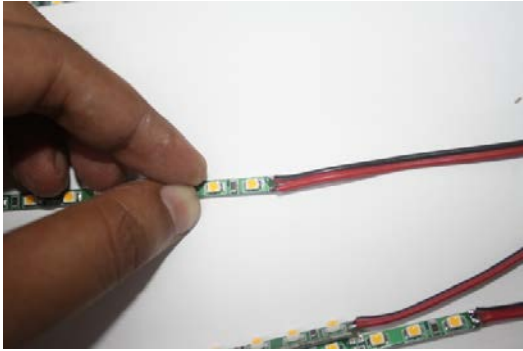
One side frosted 5mm acrylic cut at 10in*8in



Groove laser cut towards edges of the smaller side to house the LED PCB strip



LED strip cut into pieces to fit into groove leaving gaps for wiring



Wires soldered to both ends of the strip



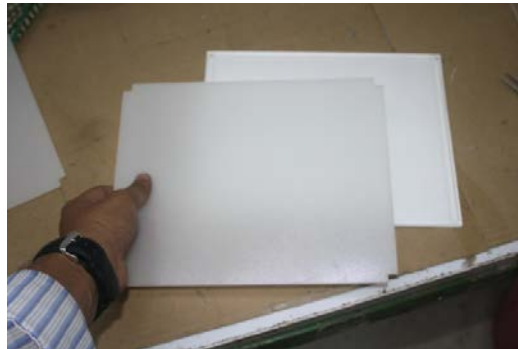
Strips fitted in place in the grooves on either side of the place



LED strip lighted up on one side for testing. Light spread still uneven



Whit laminated sheet pasted on one face blocking out light in that direction



1mm frosted acrylic with slots cut in the corners for wiring placed over it



Light spreads out uniformly because of the frosted sheet

Full scale prototyping process: Clear dark grey, patterned acrylic sheets



3mm clear grey acrylic sheet placed in the laser cutting machine



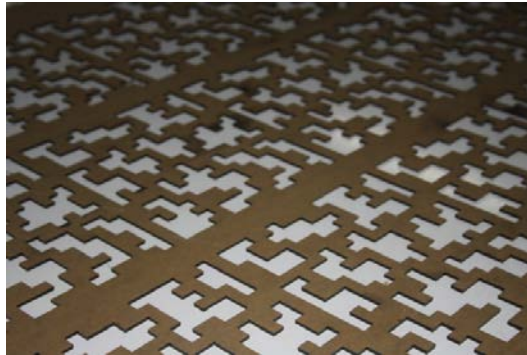
Patterned plates of 10in*8in (19 numbers) laser cut



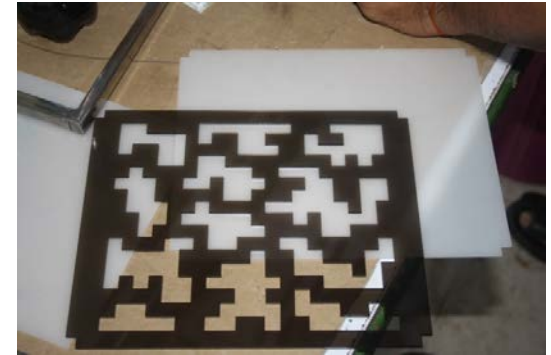
19 plates laser cut and the edges buffed for attaining good lighting later



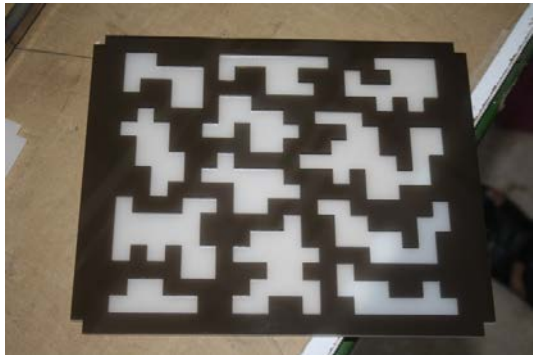
Approx 4.5ft*2.5ft panel of the same material laser cut for placing on top



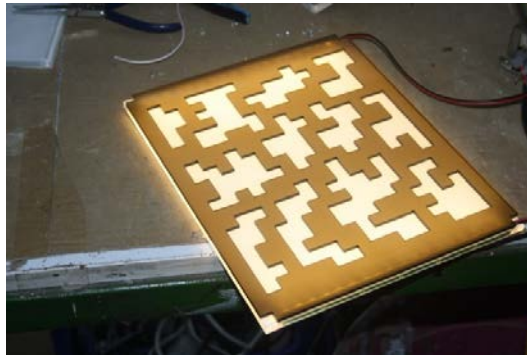
Pattern on the big plate



Patterned plate placed on top of the LED panel



Patterned plate fit and stuck to the panel using industrial dual side tape



The lighting effect and intensity when switched on is tested out



Total thickness of the panel is measured and maintained at 10mm

Full scale prototyping process: SS channel fabrication



Half inch sided C-channels and square extruded SS cut out in required size



Open ends of C-channel packed and welded and polished (to house panels)



Square tubes and c-channels welded together forming a path for wiring



Total length fabricated and weld spots removed



Lower fitment of steel cable to be welded on channel nodes for extra support



Upper fitment of steel cable to be screwed and fixed onto the top board



Required length cut from steel cables for fixing later giving extra support



2mm thick SS plate with screw taps welded on both ends for fixing on board



Channels welded together and buffed as per the given design

Full scale prototyping process: Top board and support frame



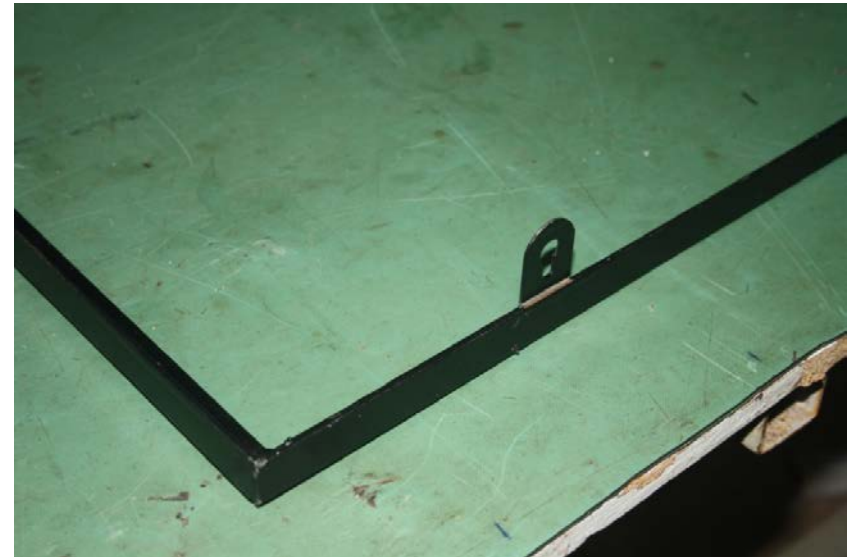
5 feet by 3 feet, half inch ply cut and finished to form the top board of the fixture



Corian laminate of same size pasted on all visible sides of the board



4 feet * 2 feet, one inch L-angle MS frame fabricated for fixing on top of the board, providing it extra strength and support



Plates for placing hooks from the ceiling welding on the four corners of the frame

Full scale prototyping process: Final fitting and assembly



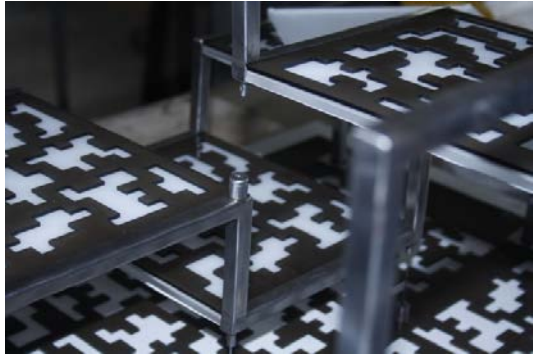
Acrylic plate and channels placed and screwed onto the board



Light panels with patterns wired and fit in the C-channel slots



Testing done after placing each panel to ensure proper wiring throughout



Fitments for attaching steel cables fixed onto the channel nodes



Four channels placed as per the design



A total of 19 plates fixed into the slots, completing the assembly



Hooks bolted into the ceiling at the site for suspending entire assembly



Hook strength tested by pulling at the suspender chains



Suspender chains attached and ready for ceiling suspension

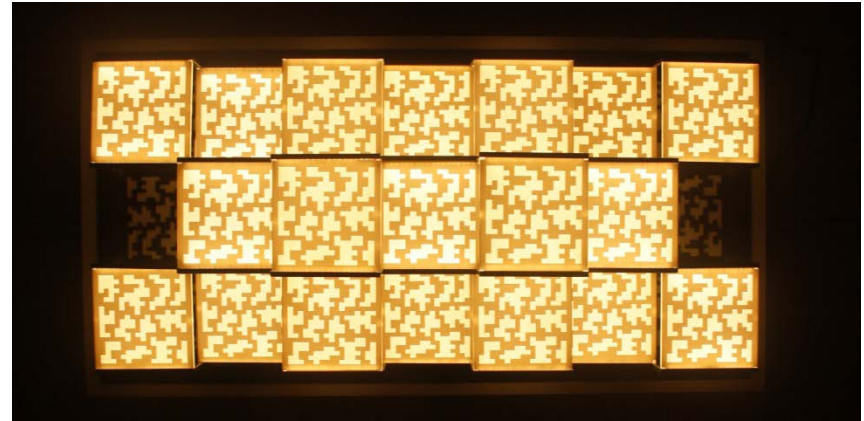
Prototype installed at the site:



Prototype after switching on lights:



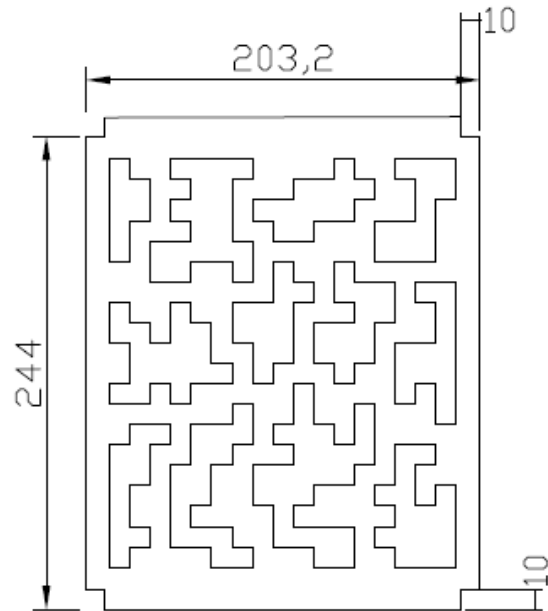
Prototype views after switching on lights:



Dimensional details:

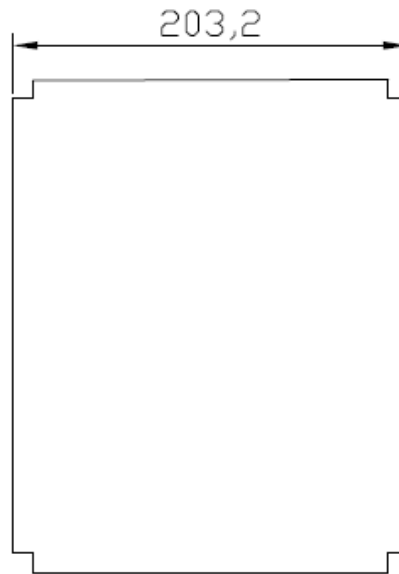
LED light panels (3 layers)

BLACK TRANSLUCENT
3MM ACRYLIC



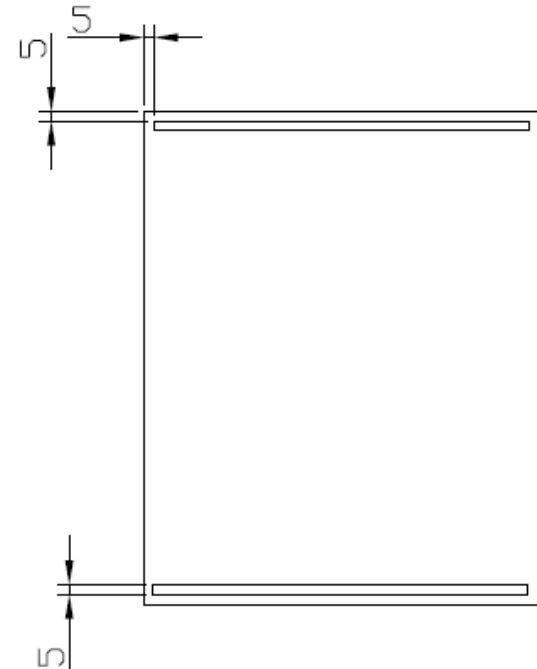
LAYER 1 (PLAN VIEW)
QTY 19 NOS

FROSTED 1MM ACRYLIC

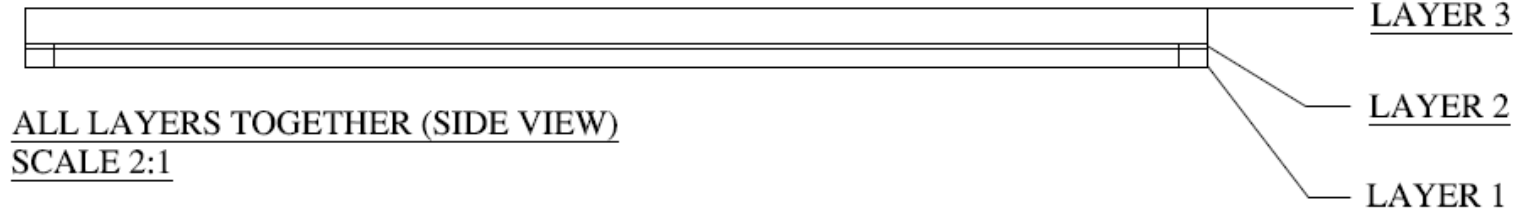


LAYER 2 (PLAN VIEW)
QTY 19 NOS

ONE SIDE FROSTED ONE
SIDE CLEAR 6MM ACRYLIC



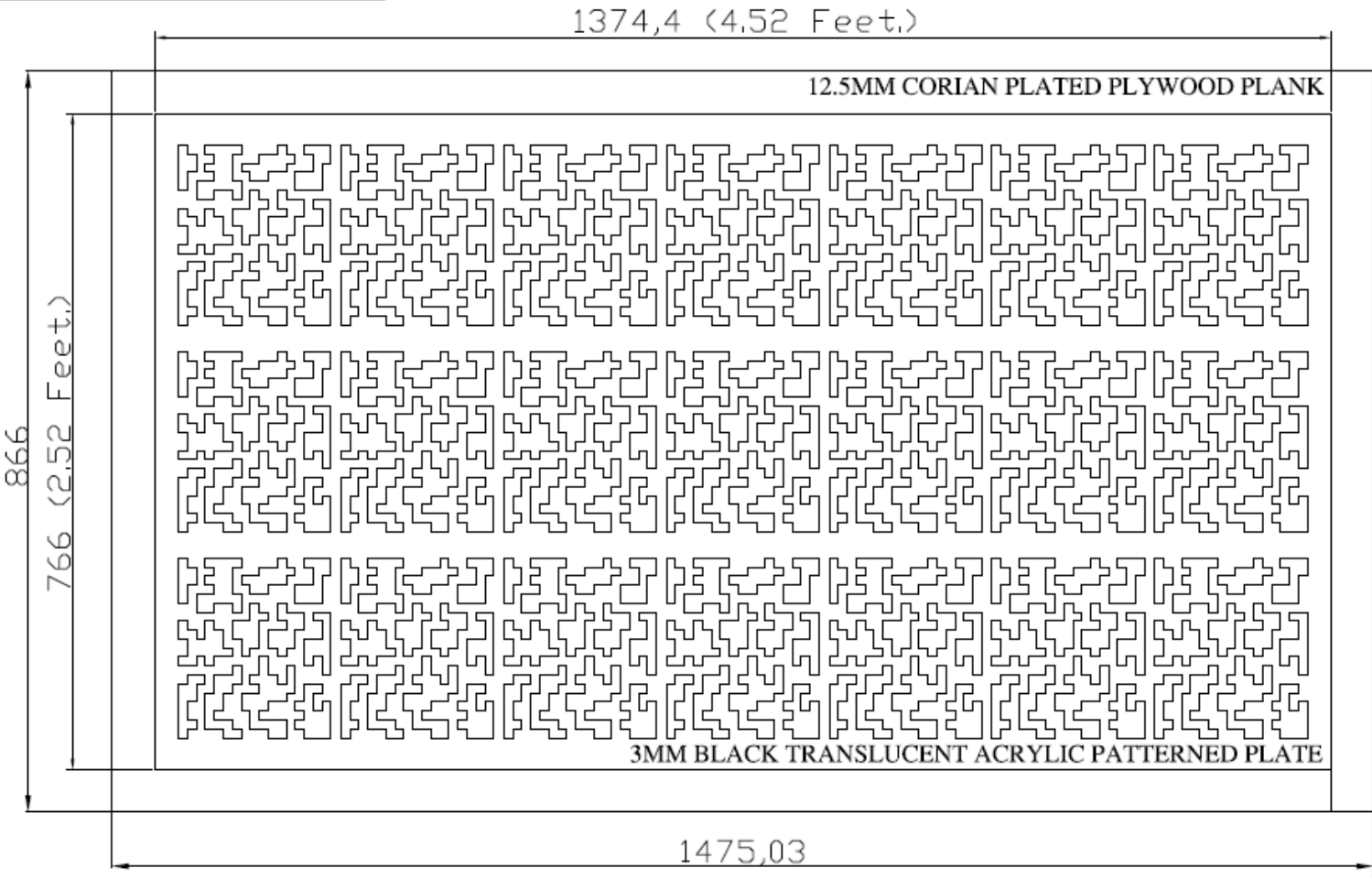
LAYER 3 (PLAN VIEW)
QTY 19 NOS



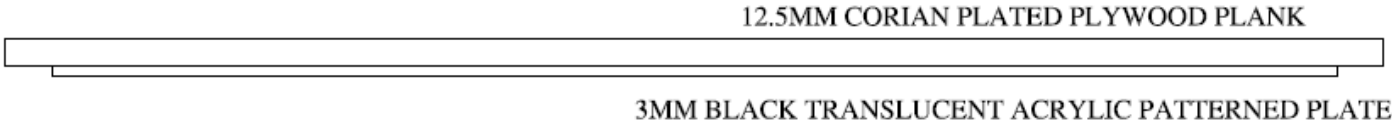
ALL LAYERS TOGETHER (SIDE VIEW)
SCALE 2:1

Top board and patterned acrylic:

TOP BOARD (PLAN VIEW)

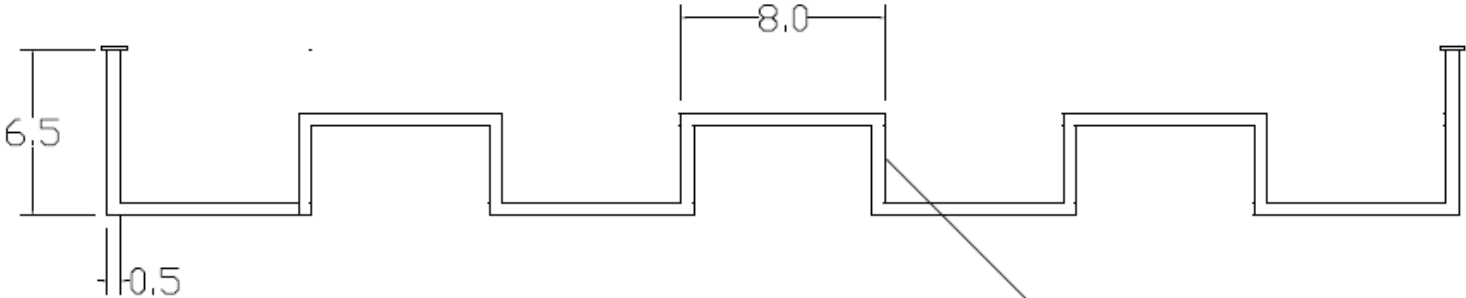


TOP BOARD (SIDE ELEVATION)

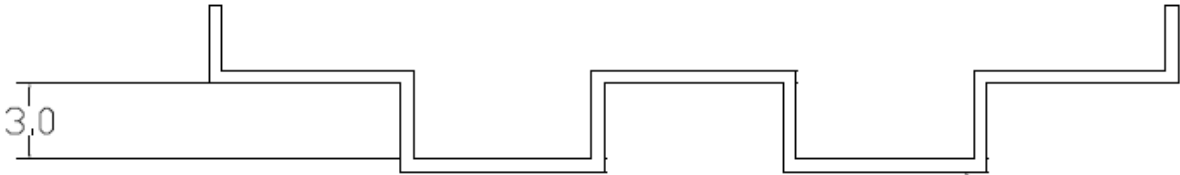


SS square tube fabrication details:

SS FABRICATION (4 NOS)

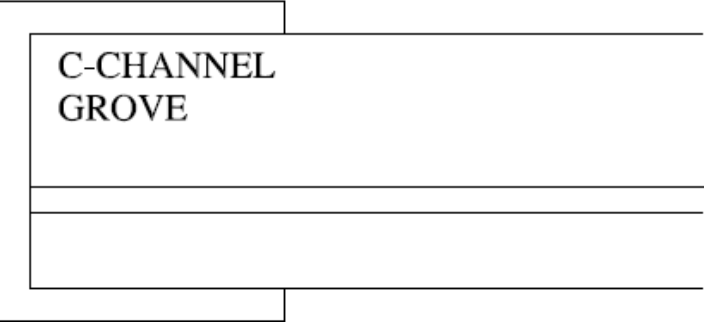


SS FABRICATION (2 NOS)



SS SQUARE TUBE (VERTICAL)

CLOSE UP SIDE VIEW OF THREE PLATES IN THE C CHANNEL



LAYER 3

LAYER 2

LAYER 1

SS SQUARE C-SECTION
(HORIZONTAL)

DIMENSION IN INCHES

Conclusion:

The chandelier has been designed and prototyped keeping the target user in mind at all times. i.e. the upper middle and the upper class. The design has been found to suit their lifestyle and desires.

However, this does not mean that the highest level has been achieved. The design could be made more dynamic by introducing more features to it. For instance, the LED plated could be made easily removable and then placed back in the slots in any desired arrangement. The pattern used on the acrylic could also be played with, or multiple templates could be provided along with the fixture, so as to give the user multiple choices.

Looking ahead, the same design could also be made for different users and different contexts, It need not necessarily be a luxury product meant only for the elite. The manufacturing process, the detailing of the product, the method of fabrication and the materials used can be varied for each context while still maintaining a similar output in terms of aesthetic value.

References:

Image references:

IR 01 http://exp.cdn-hotels.com/hotels/1000000/30000/23500/23487/23487_109_b.jpg
IR 02 <http://www.valleydjay.com/photos>
IR 03 <http://fruitimage.com/wp-content/uploads/HLIC/51018667727ad9dc904b070795b76510.jpg>
IR 04 <http://www.homeartblog.com/wp-content/uploads/2013/04/task-lamps-597.jpg>
IR 05 <http://blog.pegasuslighting.com/wp-content/uploads/2013/05/Motion-Sensor-Under-Cabinet-Lights.jpg>
IR 06 <http://certified-lighting.com/images/lights/track-lighting-4.jpg>
IR 07 <http://zepino.com/wp-content/uploads/2012/10/halogen-track-lighting-photo-collections-5-1.jpg>
IR 08 <http://www.marvindyck.com/lightingdefinitions/Graphics/AccentLighting.jpg>
IR 09 <http://www.fotomage.com/img/fun/interesting-way-to-light-up-your-home/interesting-way-to-light-up-your-home11.jpg>
IR 10 <http://img.alibaba.com/wsphoto/v0/339097966/pendant-lighting-crystal-chandelier-mini-pendant-pendant-light-crystal-lamp.jpg>
IR 11 <http://www.lighting-fixtures-tips-and-designs.com/images/foyerlightingsmallflushmount.jpg>
IR 12 http://3.bp.blogspot.com/_Cvhg_wNdOrc/SeyRwBnEQ1I/AAAAAAAAAQ/_4Ch7j4nza4/S1600-R/Foyer+Lighting.jpg
IR 13 <http://www.decor4all.com/wp-content/uploads/2011/10/hall-lighting-fixture-crystal-chandelier-interior-decorating.jpg>
IR 14 <http://img.more-explore.com/medium/9/kitchen%20remodel%20austin.jpg>
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IR 33 http://static---kyledesign.app-hosted.com/media/img/kyledesign/W432-H432-Bffffff-V1/black/black_slide_toggle_dimmers.jpg
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All images taken on 24/09/2013