design assignment one: LIGHTING

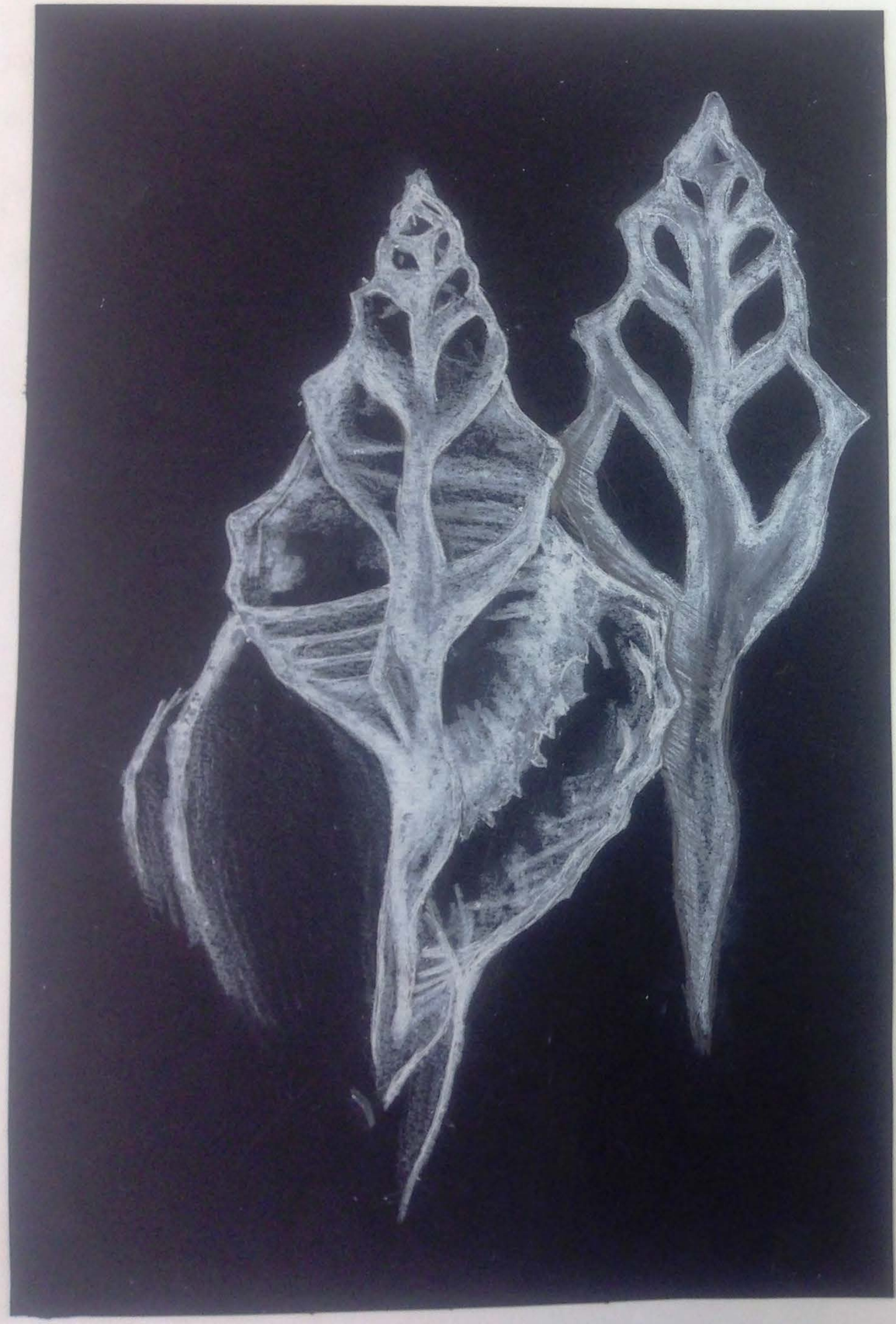
This brief contains evidence for:

Achievement Standard Number: **91627** Title: **Initiate design ideas through exploration**

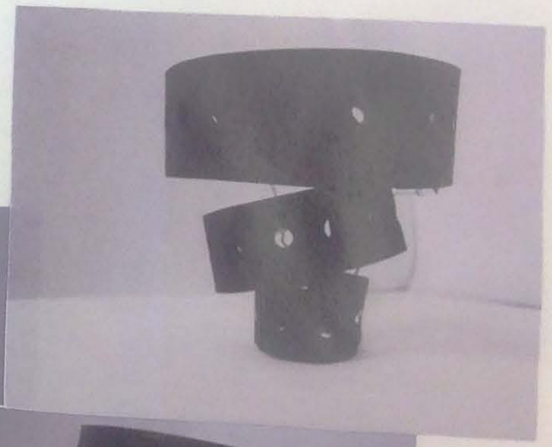
and SCHOLARSHIP

Design situation

Select some inspirational material to explore and generate ideas for lighting. Discover a potential idea and develop your lighting product.



EXPLORATION

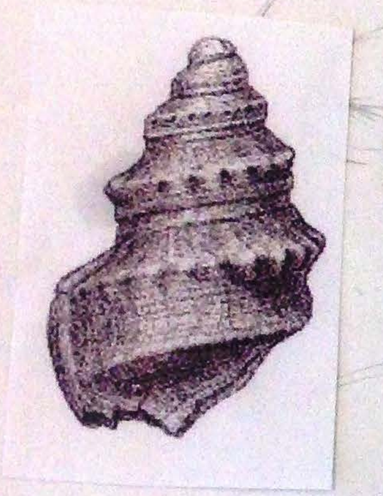


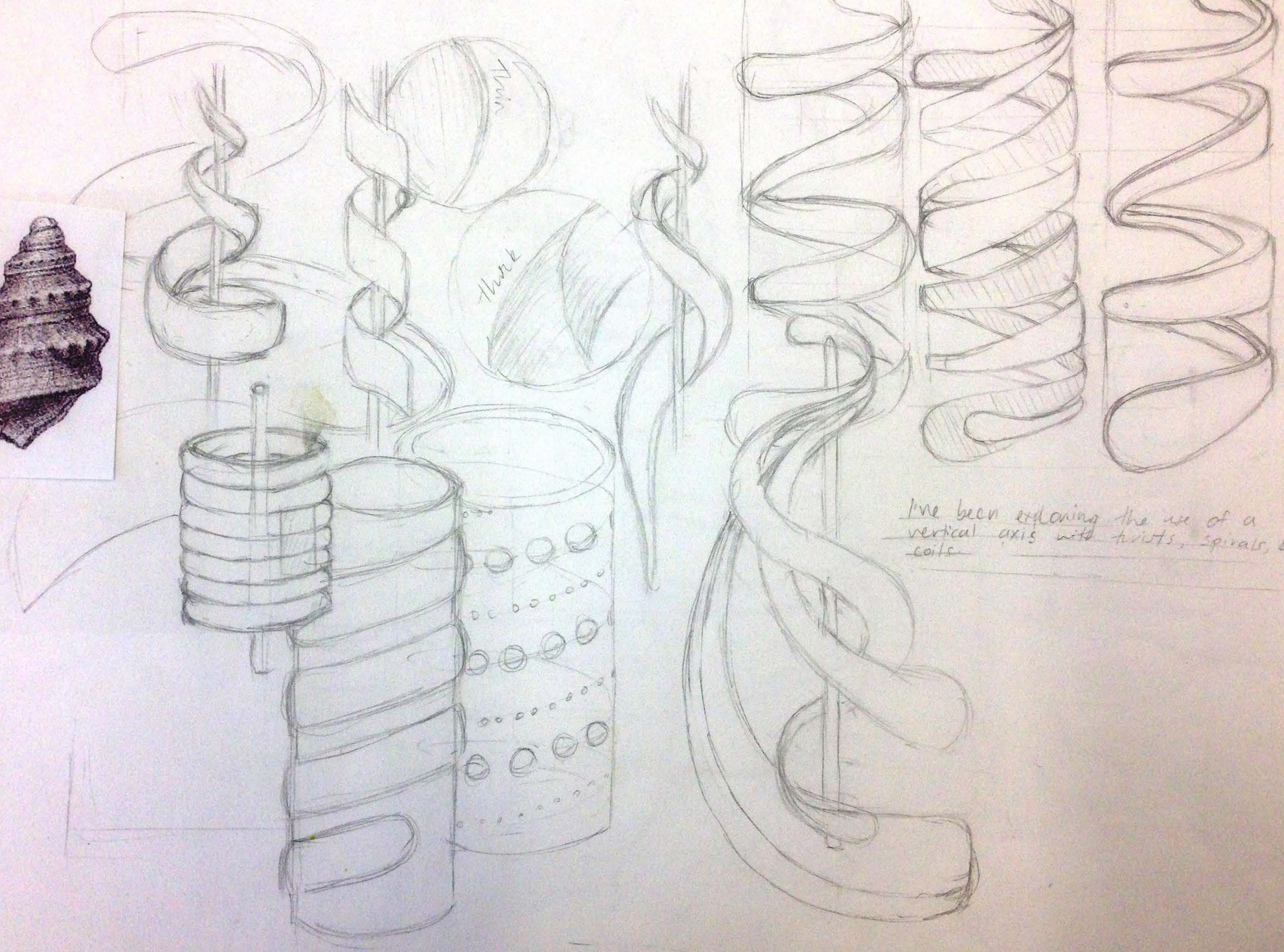
EXPLORATION OF

USING A

vertical

axis





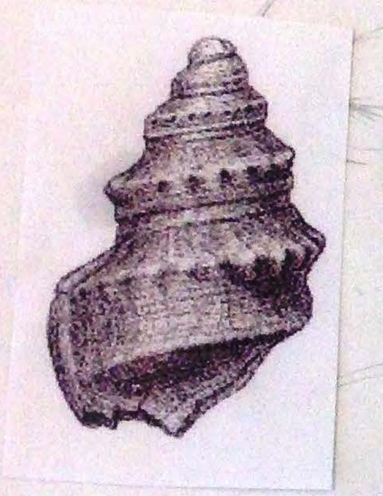
I've been exploring the use of a vertical axis with twists, spirals, & coils

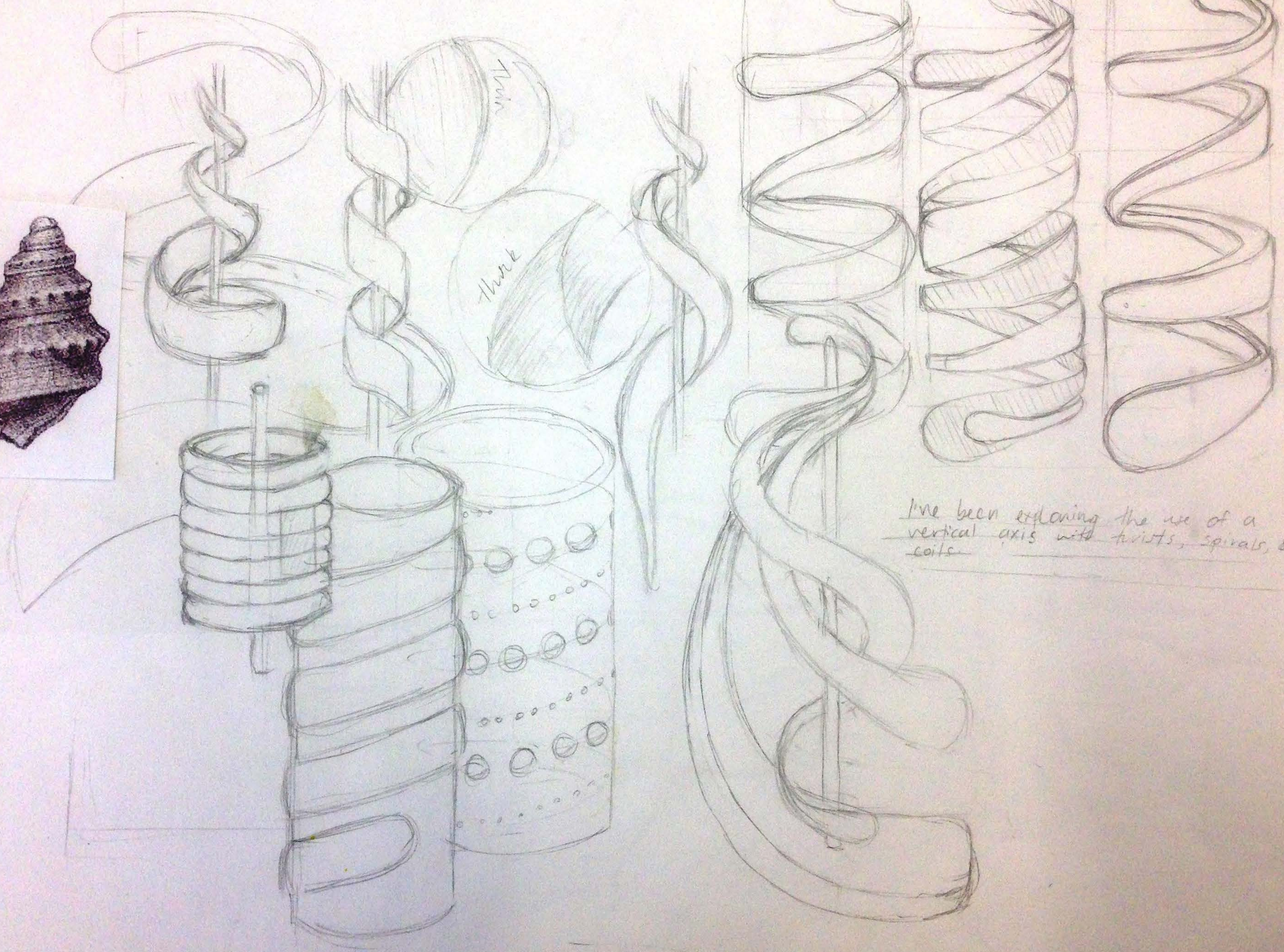
EXPLORATION OF

USING A

vertical

axis



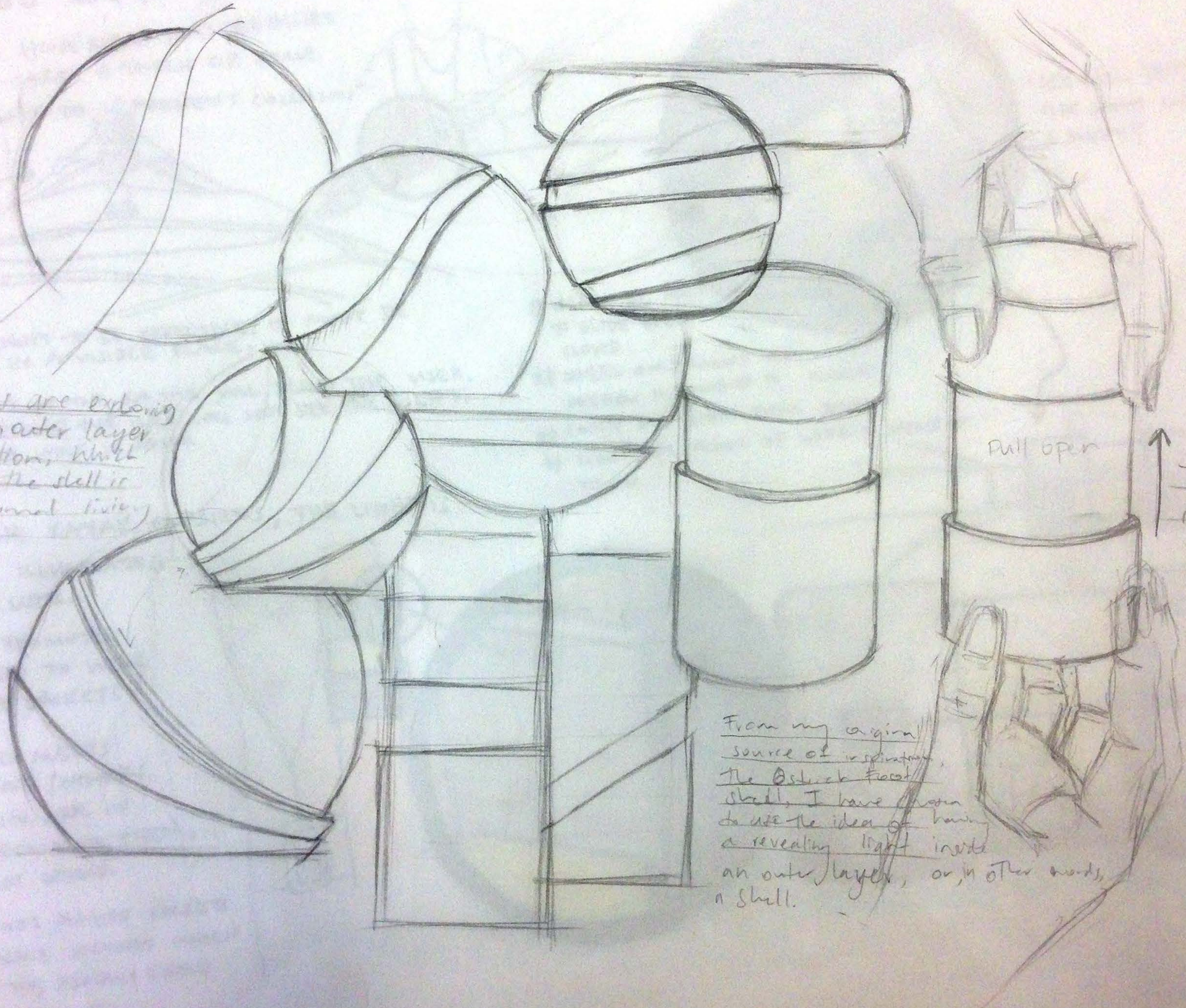


I've been exploring the use of a vertical axis with twists, spirals, & coils

EXPLORATION OF SHAPE

sections

CONCEPTS



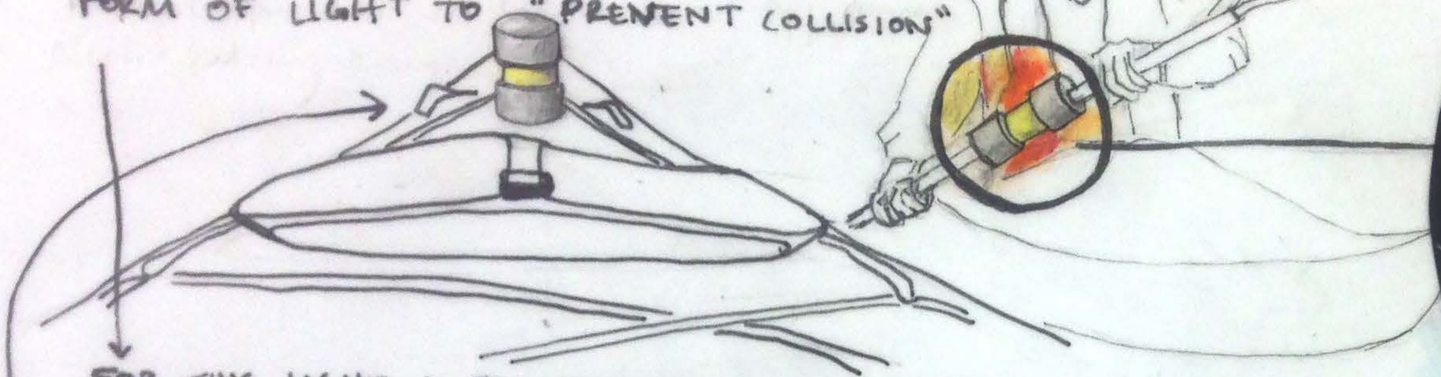
These designs are exploring having an outer layer of protection, whilst also showing the shell is to the animal living inside.

I'VE CHOSEN THIS DESIGN AS IT HAS THE MOST POTENTIAL FOR THIS PROJECT IDEA.

From my original source of inspiration, The Ostrich Egg Shell, I have chosen to use the idea of having a revealing light inside an outer layer, or, in other words, a shell.

How & where does it attach?

MARITIME NZ HAVE RULES THAT REQUIRE KAYAKERS TO CARRY A TORCH OR SOME FORM OF LIGHT TO "PREVENT COLLISION"



FOR THIS LIGHT TO BE EFFECTIVE, IT MUST BE ATTACHED IN A VISIBLE PLACE.

1) THE FRONT OF THE KAYAK WILL BLIND THE USER.
2) PEOPLE BEHIND THE USER WILL NOT SEE THE LIGHT.
3) CAN'T REACH WHILE IN KAYAK

- ARE ALL SHAFTS THE SAME WIDTH & SHAPE?

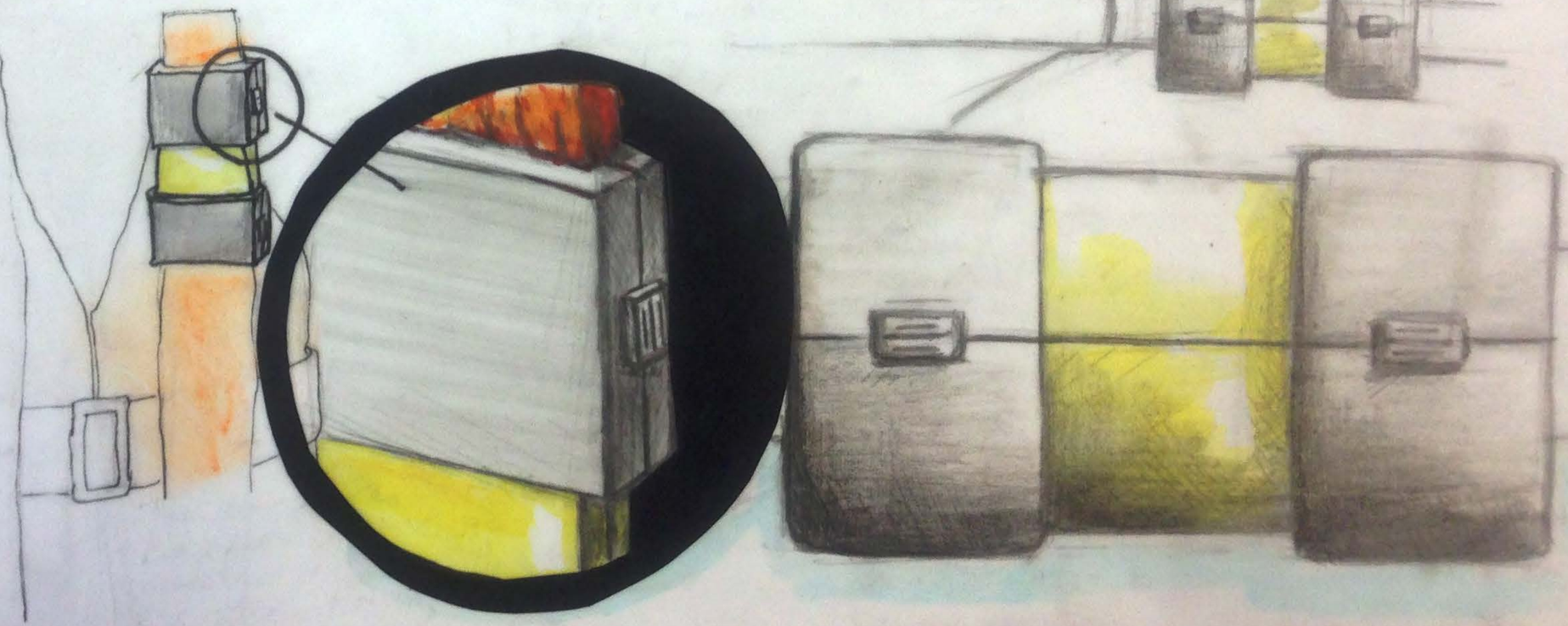
1) WON'T BE ABLE TO SLIDE OPEN / CLOSED.
2) UNLESS ONLY LIGHT SECTION IS SECURED TO PADDLE
3) CAN'T SEE LIGHT FROM BEHIND
4) LIGHT IN FRONT OF USER = IMPAIRED VISION

1) IF THE KAYAK CAPSIZES, THE LIGHT IS STILL ILLUMINATING THE USER.

2) IT PROMOTES USERS TO WEAR LIFE JACKETS

3) ONLY ALERTS BOATS / OTHERS WHO ARE IN FRONT OF THEM, NOT BEHIND.

4) NOT ALL LIFE JACKETS HAVE SECTIONS WHICH THIS PRODUCT COULD ATTACH TO.



RESOLVE

EXPLORING & REFINING MY PRODUCT IN TERMS OF OPPORTUNITIES, CONSTRAINTS AND MY BRIEF'S SPECIFICATIONS

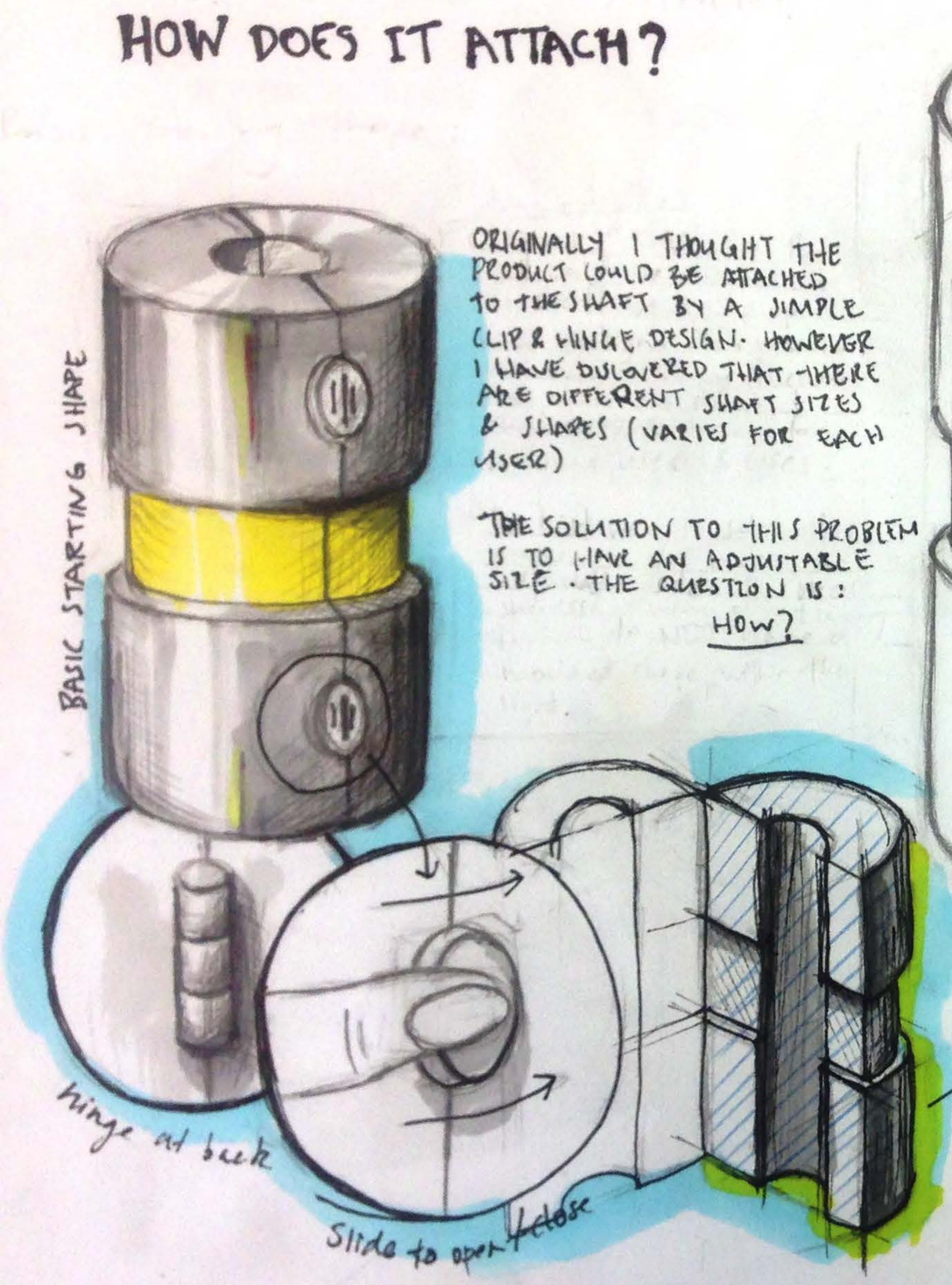
HOW DOES IT ATTACH?

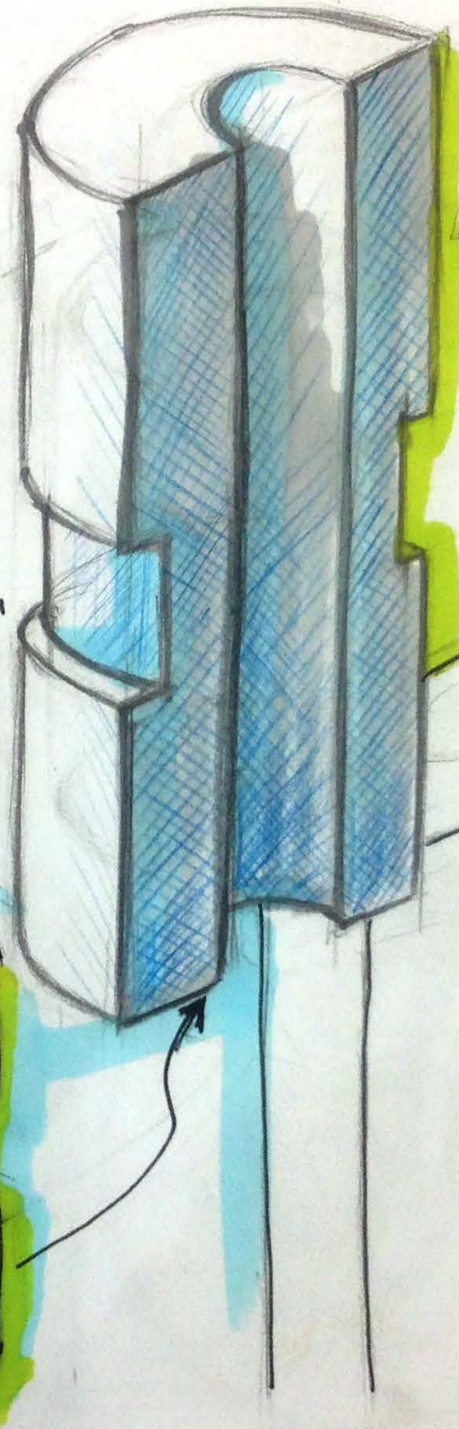
BASIC STARTING SHAPE

ORIGINALLY I THOUGHT THE PRODUCT COULD BE ATTACHED TO THE SHAFT BY A SIMPLE CLIP & HINGE DESIGN. HOWEVER I HAVE DISCOVERED THAT THERE ARE DIFFERENT SHAFT SIZES & SHAPES (VARIES FOR EACH USER)

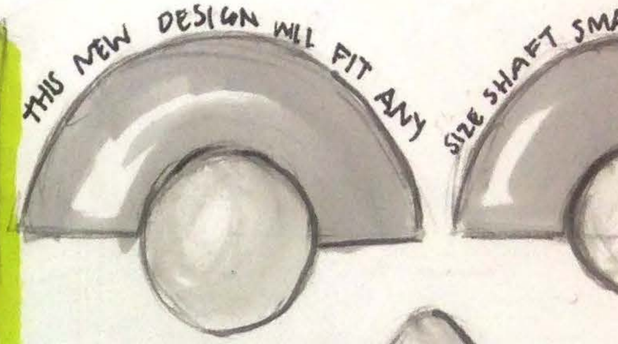
THE SOLUTION TO THIS PROBLEM IS TO HAVE AN ADJUSTABLE SIZE. THE QUESTION IS:

HOW?

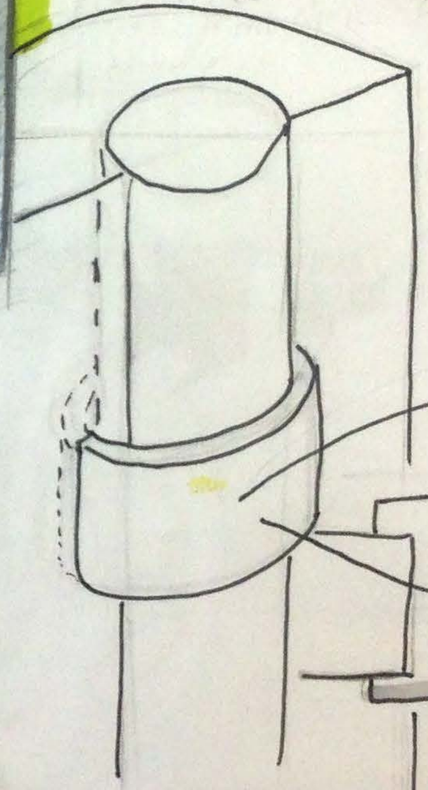


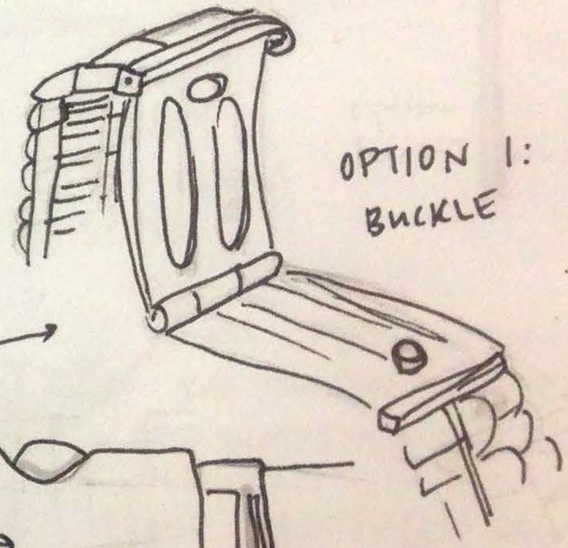


THIS NEW DESIGN WILL FIT ANY SIZE SHAFT SMALLER THAN THE DIAMETER OF THE MOLDED CURVE.



EVEN IF THE SHAPE OF THE SHAFT ISN'T CIRCULAR, AS IT WILL STILL FIT THE MOLD.



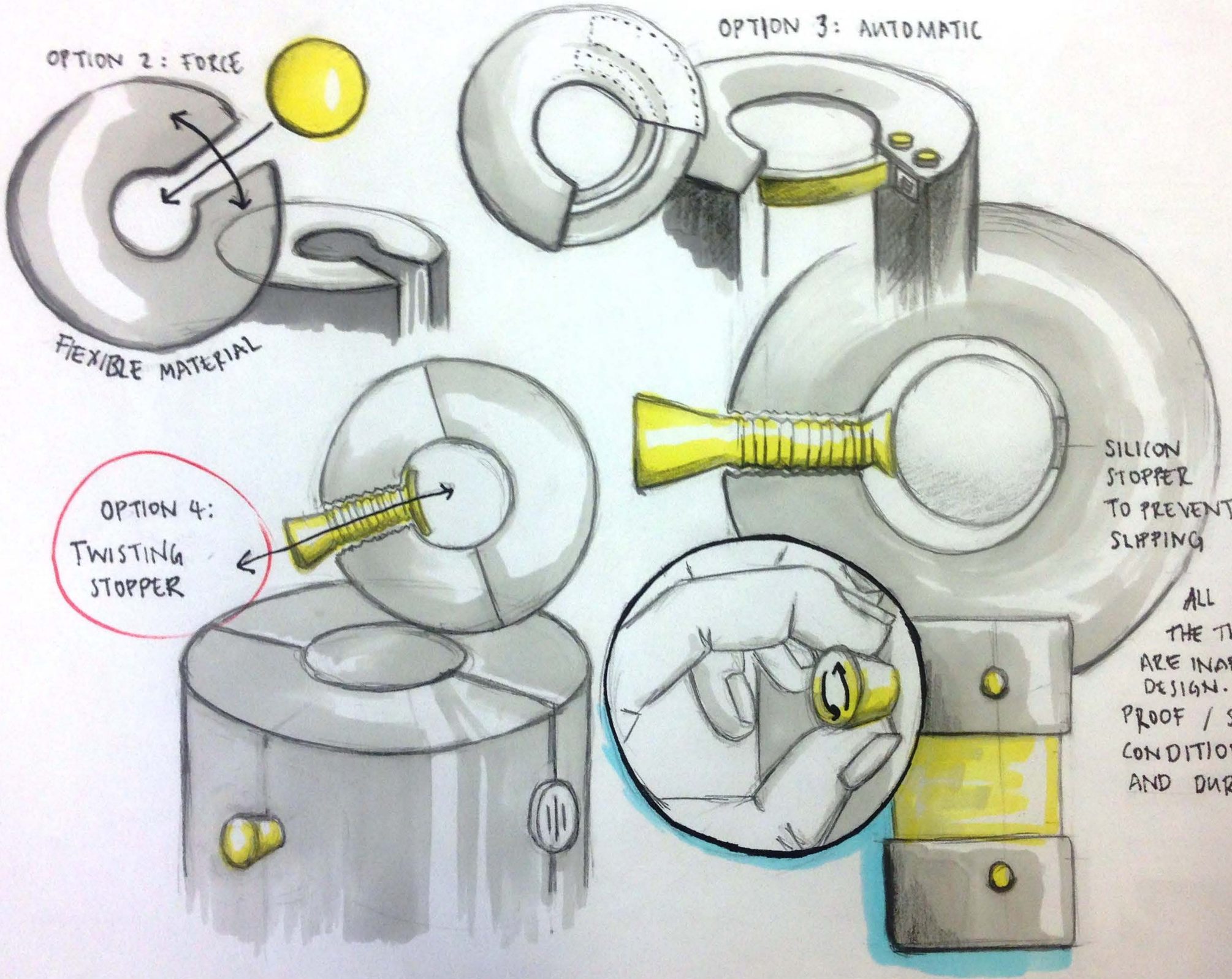


OPTION 1: BUCKLE

CLIP WORKS WELL BUT ISN'T AESTHETICALLY PLEASI

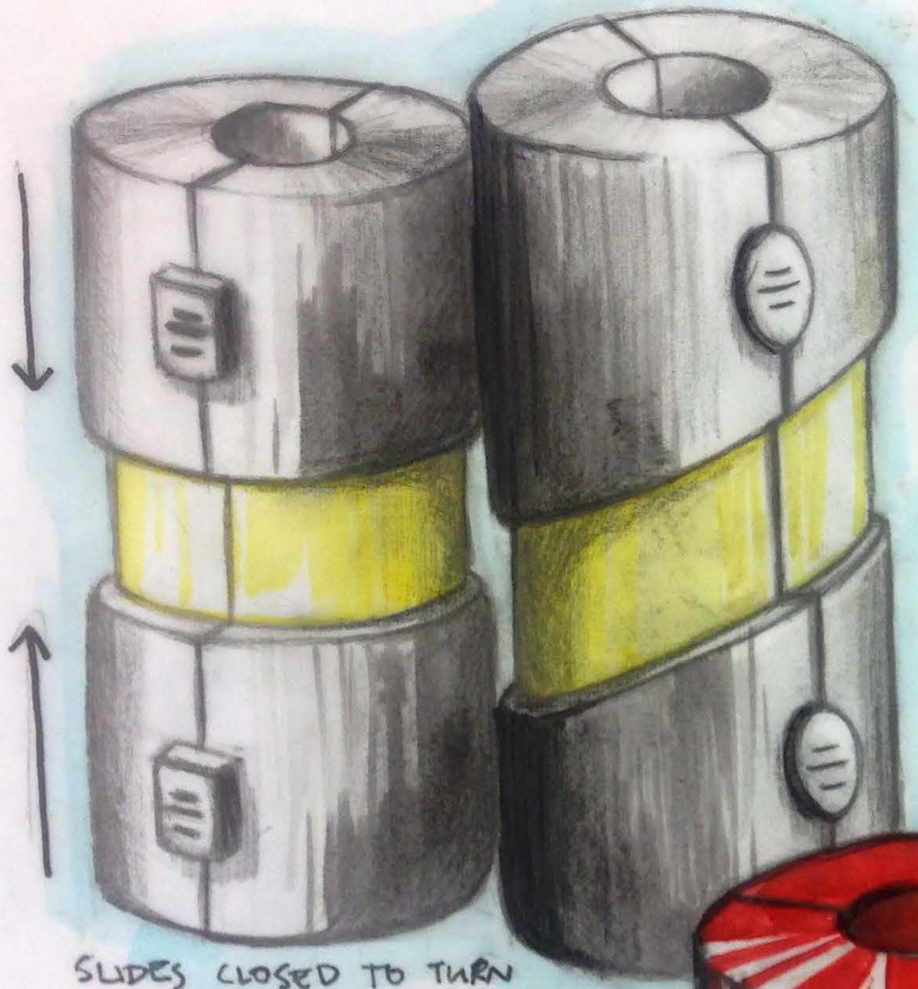
I DON'T LIKE THE IDEA OF HAVING A HALF SHAPE PRODUCT/ SEMI CIRCLE AS NOT ONLY DOES IT LOOK UNFINISHED, IT WOULD ALSO NOT BE WATERDYNAMIC THEREFORE WOULD NOT BE SUITABLE FOR THE CULTURE.

EXPLORING HOW IT ATTACHS:

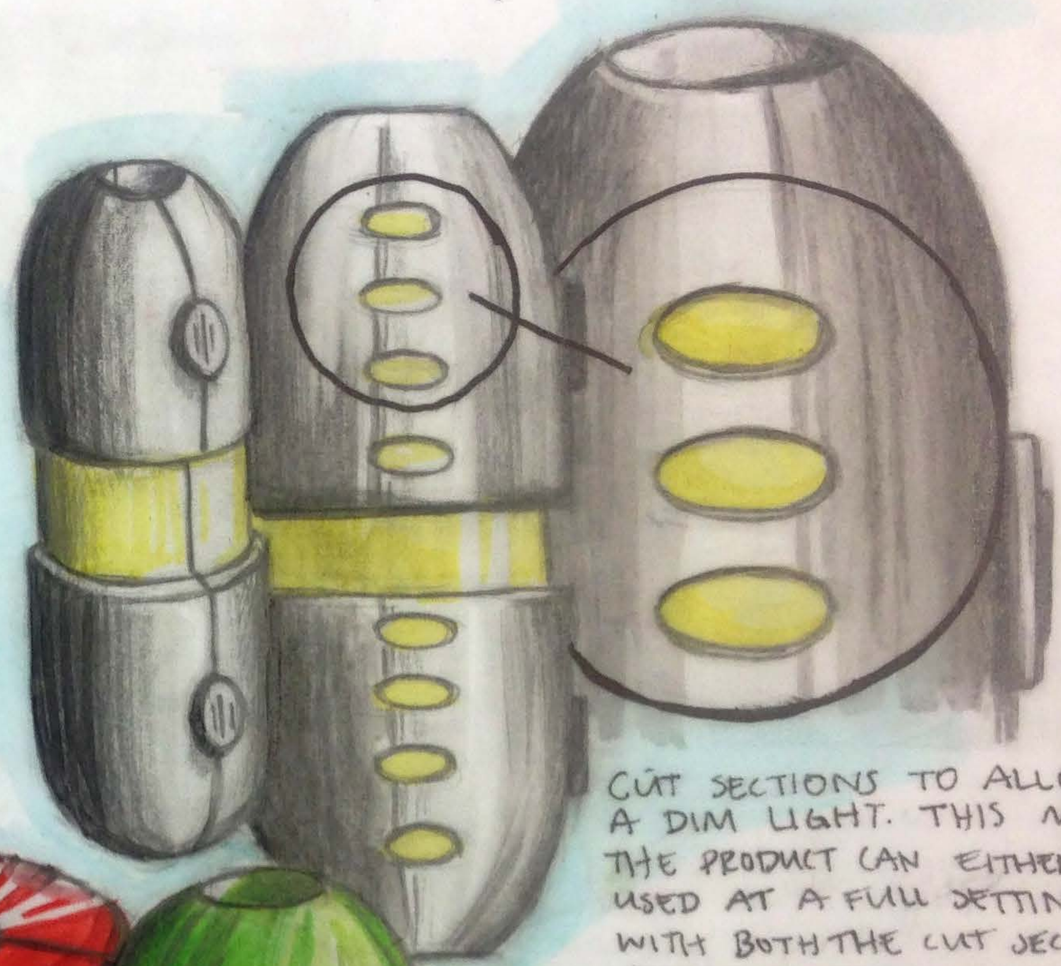


ALL OPTIONS EXCEPT THE TWISTING STOPPER ARE INAPPRIATE FOR THIS DESIGN. OPTION 4 IS WATER PROOF / SUITABLE FOR CONDITIONS, EASY TO USE, AND DURABLE.

HOW DOES THIS PRODUCT CONTROL & RELEASE LIGHT?



SLIDES CLOSED TO TURN OFF LIGHT



CUT SECTIONS TO ALLOW A DIM LIGHT. THIS MEANS THE PRODUCT CAN EITHER BE USED AT A FULL SETTING WITH BOTH THE CUT SECTIONS AND SLID OPEN, OR CAN BE A NIGHT LIGHT (SLID CLOSED WITH JUST CUT OUT SECTIONS)
-Button to turn off/on

THIS PRODUCT COULD ATTRACT MORE ATTENTION BY BEING A VIBRANT COLOUR →

"BE SAFE; BE SEEN"

SAFETY LIGHT

FOR KAYAKERS

IS THIS DESIGN WATER DYNAMIC?
IS IT VISUALLY APPEALING?

ORIGINAL DESIGN

NO LONGER EXPLORE A LIGHT THAT SLIDES OPEN TO RELEASE LIGHT,
WILL STILL EXPLORE THE IDEA OF HAVING AN OUTER PROTECTIVE LAYER.

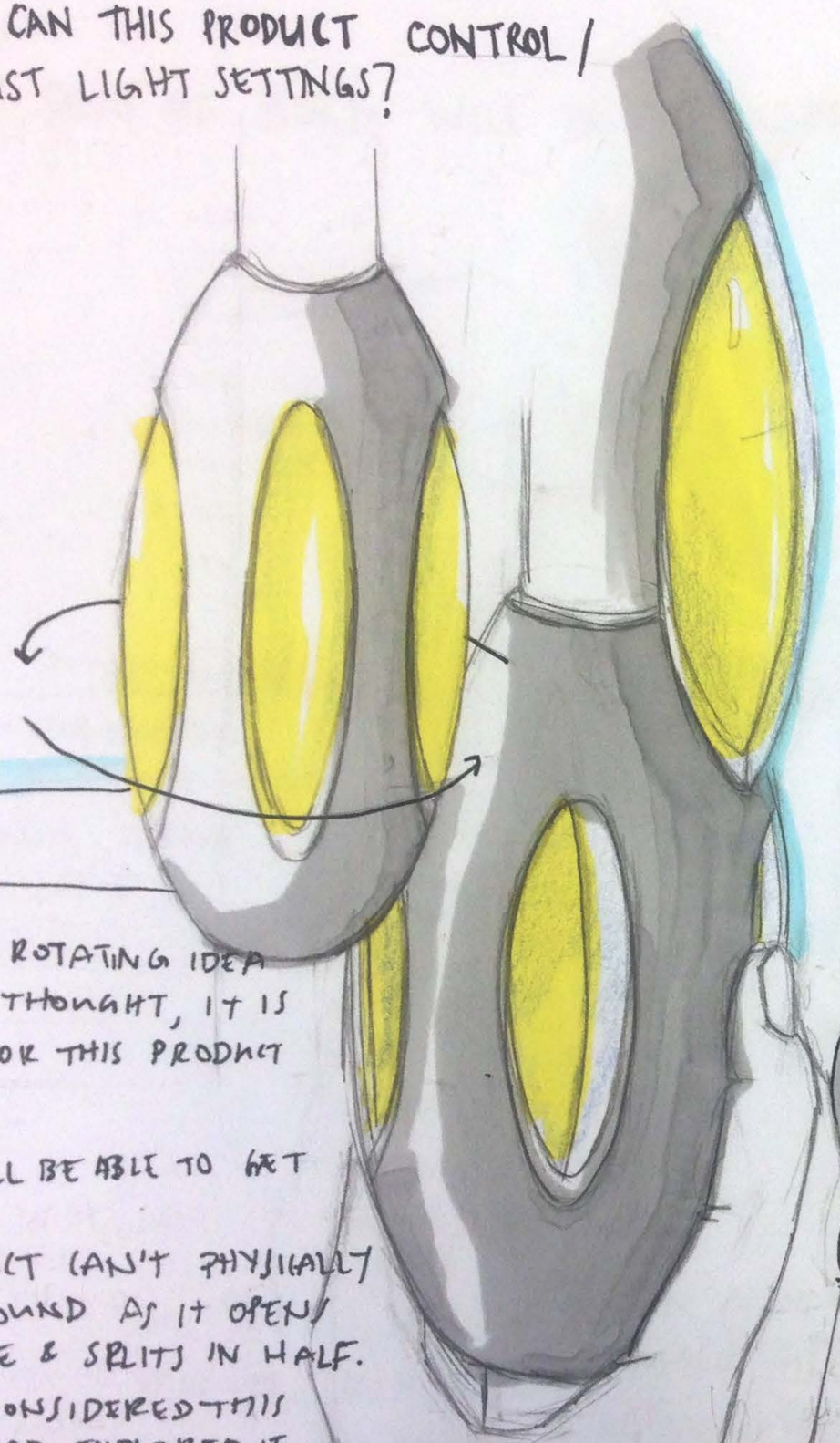
Too square

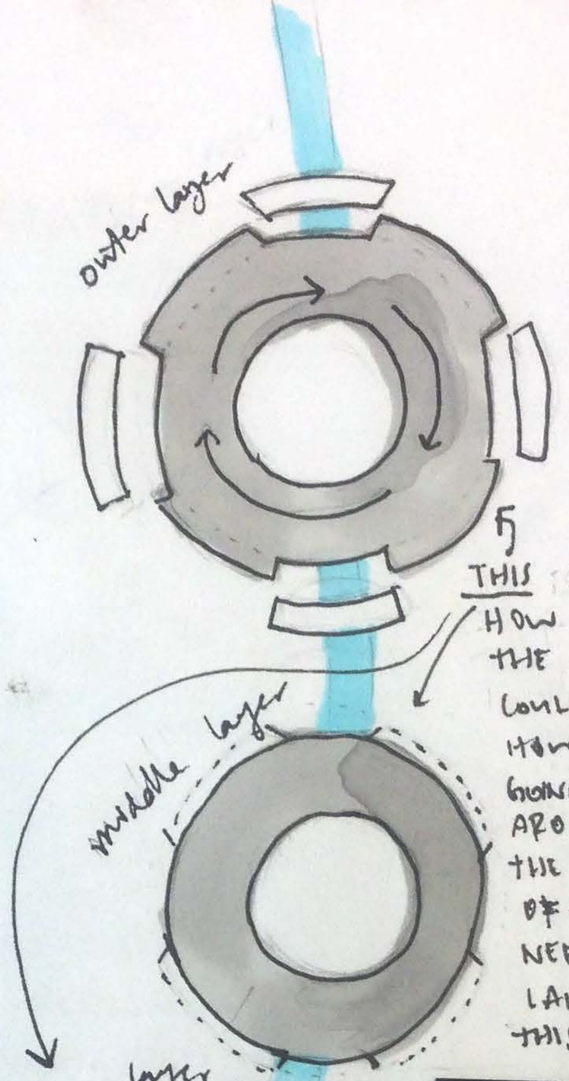
Round design is most water dynamic

THIS OVOID SHAPE IS THE MOST WATER DYNAMIC AS THE WATER WILL SLIDE SMOOTHLY OVER THE PRODUCT. TH IS USER FRIENDLY AS IT DOES NOT IMPACT TH PADDLING MOTION, THEREFORE WILL NOT CAUSE PROBLEMS FOR MY USER/EFFECT THE USE OF THIS LIGHT.

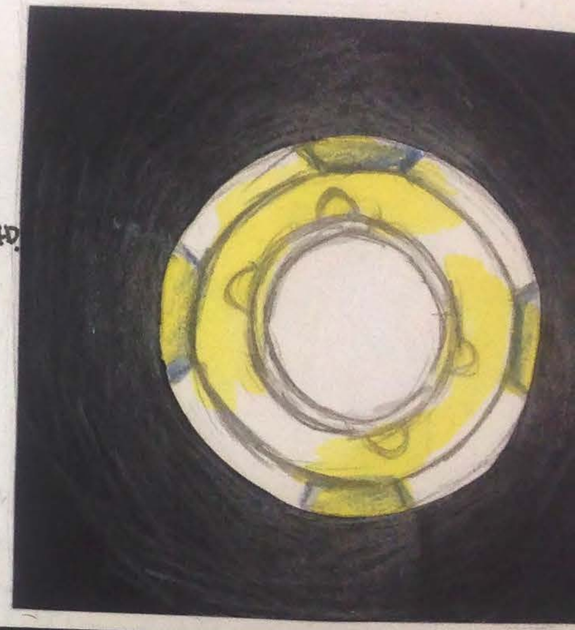
THE REPETITION RELATES BACK TO MY ORIGINAL INSPIRATION OF THE SH AS REPETITION/PATTERN IMPORTANT IN BOTH FUNCTION AND LO OF A SHELL. IT W IMPORTANT TO B THE LOOK AND IN MY PRODU

HOW CAN THIS PRODUCT CONTROL / ADJUST LIGHT SETTINGS?



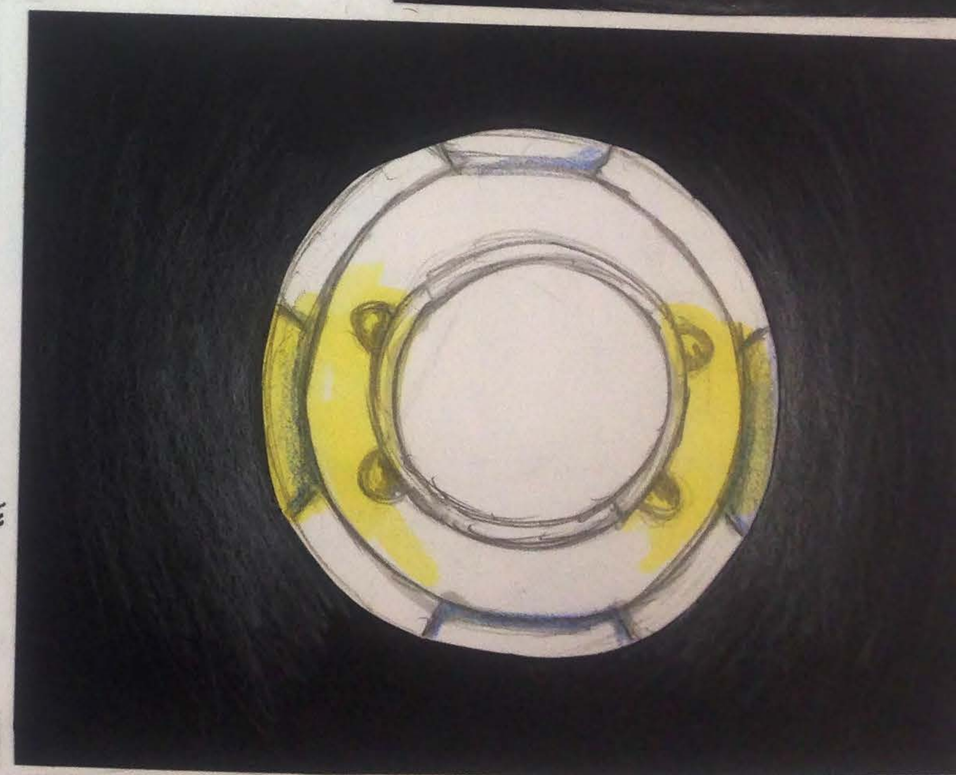


THIS IS ORIGINALLY HOW I THOUGHT THE LIGHTS INSIDE COULD BE ARRANGED. HOWEVER IF IT IS GOING TO ROTATE AROUND TO DIM, THE LAYOUT OF THE LEDS NEED TO BE LAIDOUT LIKE THIS



IF I TOOK THESE LEDS OUT WOULD IT ALLOW ME TO SEQUENCE THE PLACEMENT OF THE CUT OUTS WITH THE LED OUTLETS? ...

NO, BUT I CAN LAYOUT THE LEDS LIKE THIS ...



SUMMARY:

ALTHOUGH THE ROTATING IDEA WAS GOOD IN THOUGHT, IT IS IMPRACTICAL FOR THIS PRODUCT BECAUSE:

- WATER WILL BE ABLE TO GET IN
- THIS PRODUCT CAN'T PHYSICALLY ROTATE AROUND AS IT OPENS ON A HINGE & SPLITS IN HALF. I HAD NOT CONSIDERED THIS UNTIL I HAD EXPLORED IT.

I WILL INSTEAD USE A SWITCH TO DIM / TURN OFF THIS LIGHT.

WHAT SORT OF BULB WILL BE APPROPRIATE?

FLUORESCENT

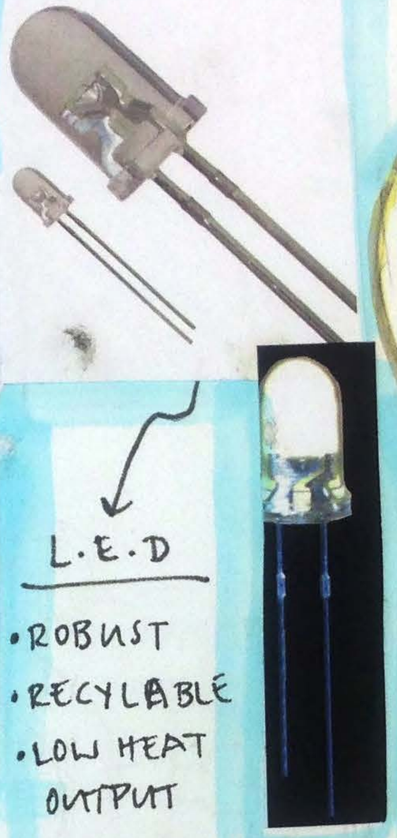
- SENSITIVE
- HIGH HEAT OUTPUT
- NON RECYCLABLE
- LARGE

INCANDESCENT

- VERY SENSITIVE
- HIGH HEAT OUTPUT
- LIFE : 750 hrs
- LARGE

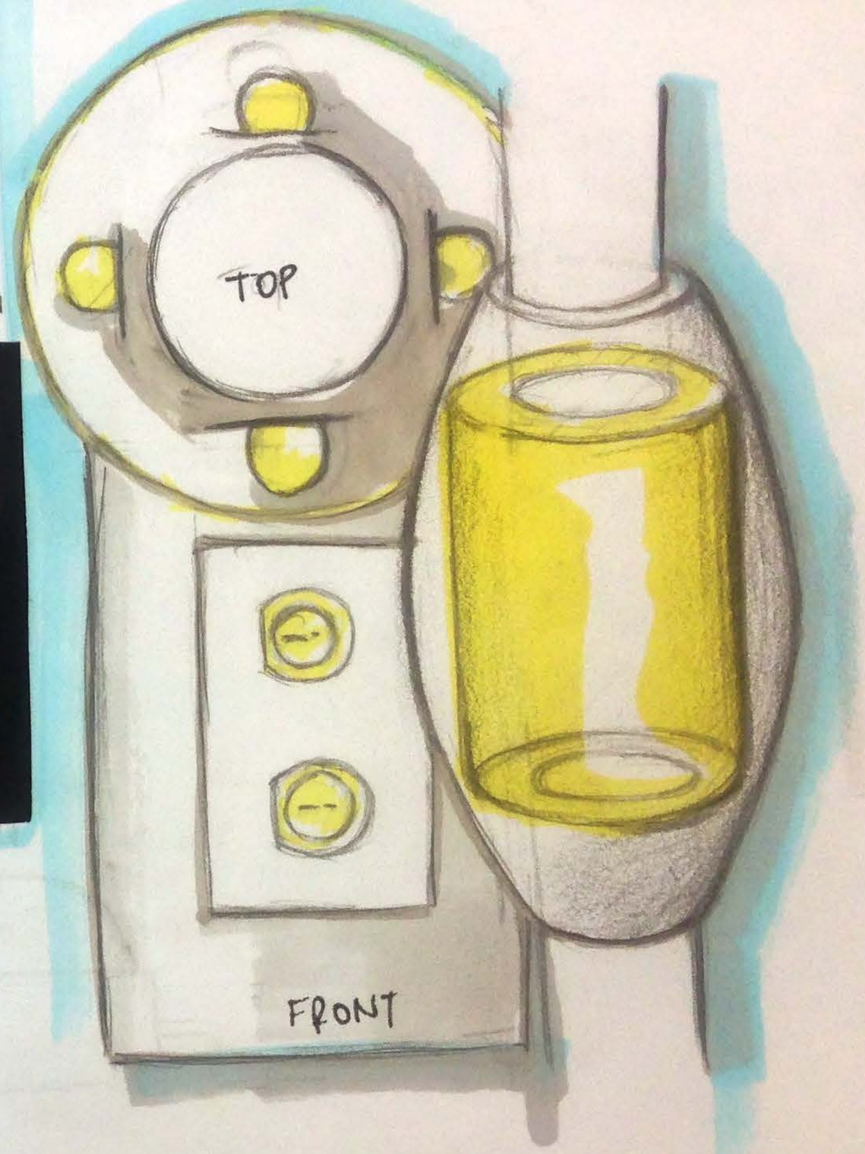
HALOGEN

- SENSITIVE
- HIGH HEAT OUTPUT
- NON RECYCLEABLE
- LIFE : 2000 hrs
- SMALL / MEDIUM
  -too big for this product



L.E.D

- ROBUST
- RECYLABLE
- LOW HEAT OUTPUT
- LIFE : 50,000 hrs
- SMALL
- 90% ENERGY EFFICIENT



THE LED IS THE BEST OPTION AS IT IS MOST SUITED TO THE PURPOSE OF MY PRODUCT. IT IS ROBUST, WHICH IS IMPORTANT SINCE IT WILL BE USED PHYSICALLY IT ROUGH CONDITIONS. IT ALSO HAS A LOW HEAT OUTPUT SO IT WON'T HARM THE USER'S HAND WHICH IS DESIGNED TO SIT NEAR IT. THE LED WILL OUTLAST THE LIFETIME OF THE PRODUCT SINCE THEY HAVE A LONG LIFE SPAN. THEY ARE SMALL / COMPACT (GOOD FOR MY SMALL PRODUCT) AND BOTH RECYCLABLE AND 90% ENERGY EFFILIENT WHICH RELATES POSITIVELY TO THE CULTURE OF KAYAKING,

HOW IS IT POWERED?

AS THIS PRODUCT IS PROMOTING SAFETY IT MUST BE ABLE TO PROVIDE LIGHT AT ALL TIMES IE. IT MUST BE SELF CHARGING.

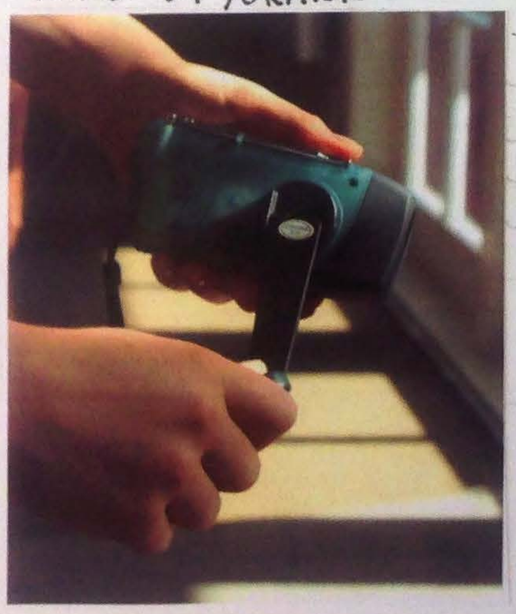
The Wind Up Battery

The Wind up battery is the endless independent source of power. It is the only tool you will need to charge your mobile phone batteries, notebook batteries, GPS or any other modern gadget which is in this information-packed world essential life companion. The use of **wind up battery** charger is easy and being that it is totally portable and independent power supply, it is a valuable part of accessory of every trekker's, backpacker's, traveler's adventures journey. It is also an essential back up power supply for any critical emergency events when there is no power supply available nearby.

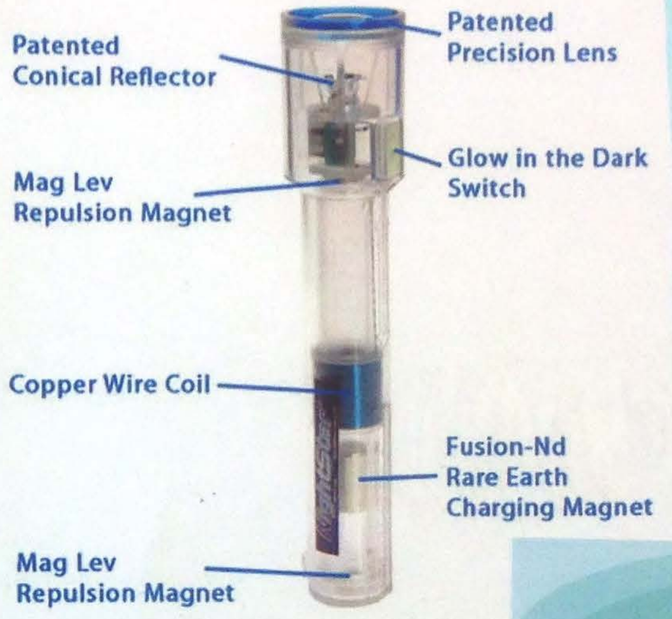
How does it work?

The wind up battery mechanism uses internal generator, which is usually hand-powered by spinning the handle on the device. The hand motion, in which AC alternator is driven by a crank converts human mechanical energy and generates the electrical power, by spinning magnets past a coil of wire, which is stored in battery. To charge the device, utilizing the wind up mechanism the hand crank needs to be pulled out of the folded position, and spun in clockwise/counterclockwise direction. After some time of cranking, when the device is charged the handle is folded into position and the device is available to use.

WIND UP /CRANK

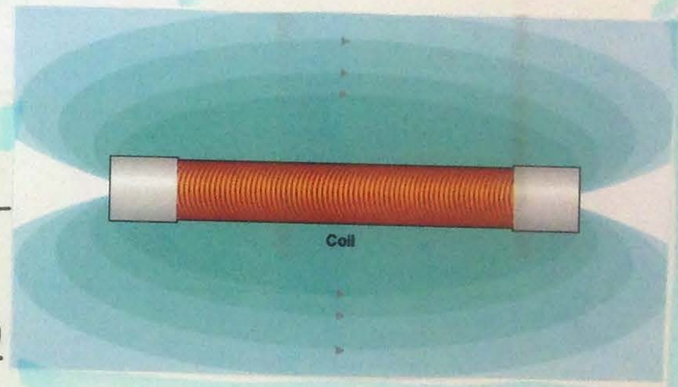


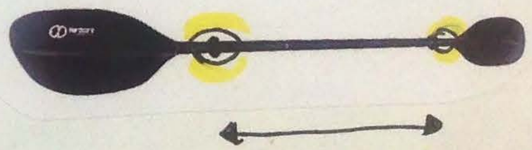
SHAKE



AS THE MAGNET SLIDES UP AND DOWN THE METAL COIL (BY SHAKING) ENERGY IS TRANSFORMED TO BE USED AS POWER FOR THE ELECTRICAL CIRCUIT INSIDE A PRODUCT.

THE MOTION ← OF THE MAGNET INSIDE THE COIL GENERATES ENERGY.



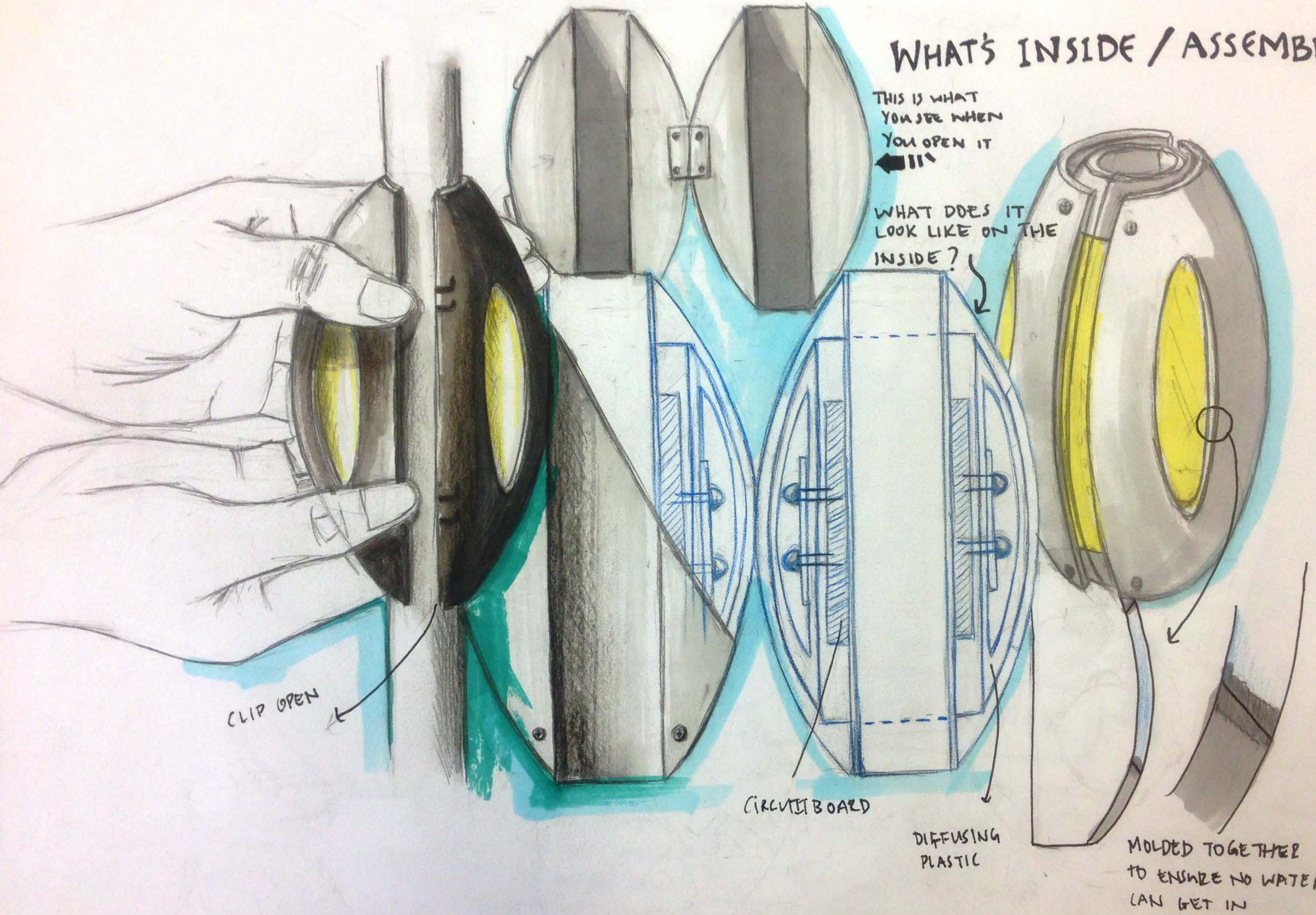


THE USER CAN CHARGE THE LIGHT ON OR OFF THE PADDLE. ALL THEY DO IS HOLD UP THE PADDLE AND SHAKE IT.

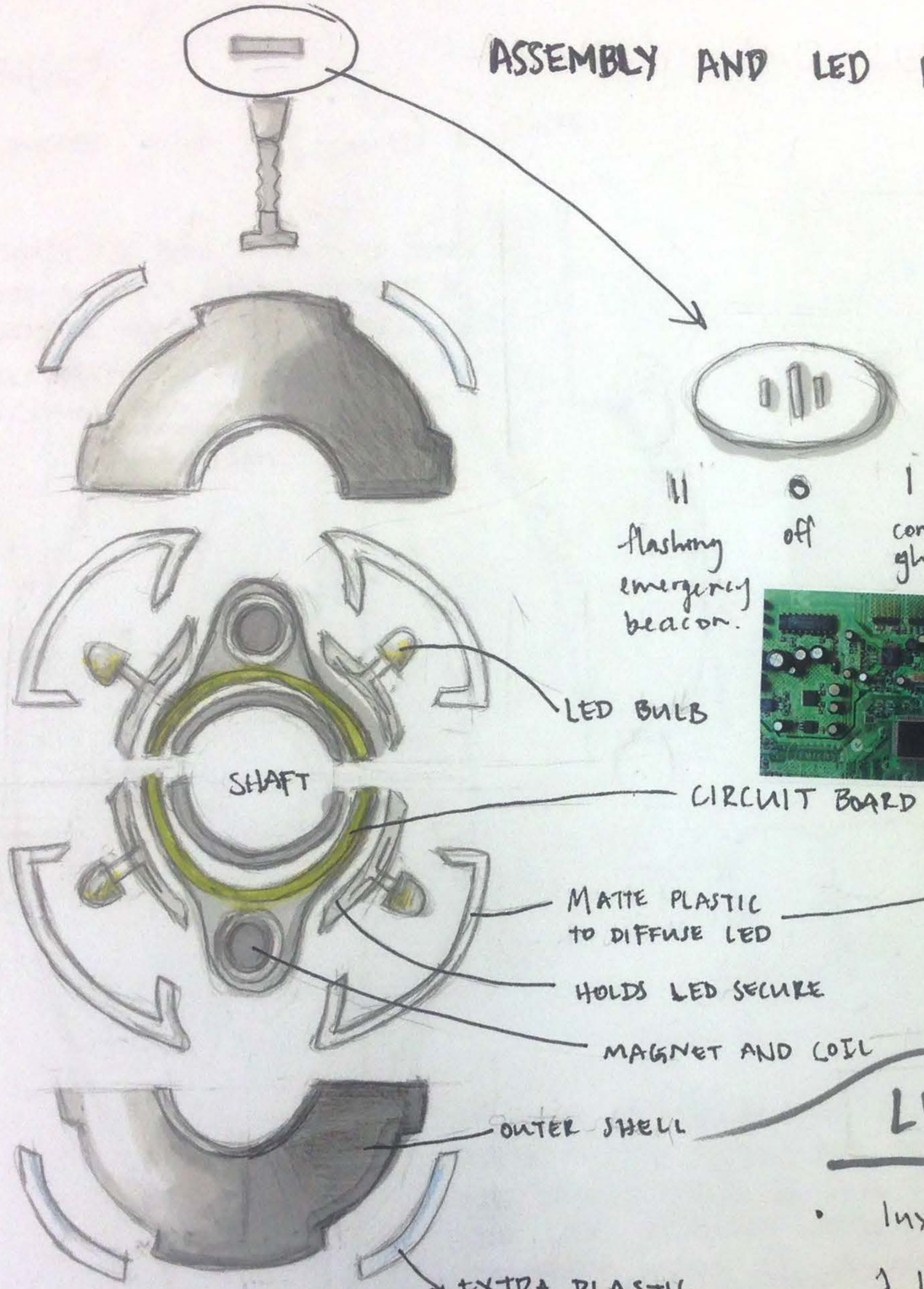
HOWEVER, IT SHOULDN'T NEED EXTRA CHARGING BECAUSE:

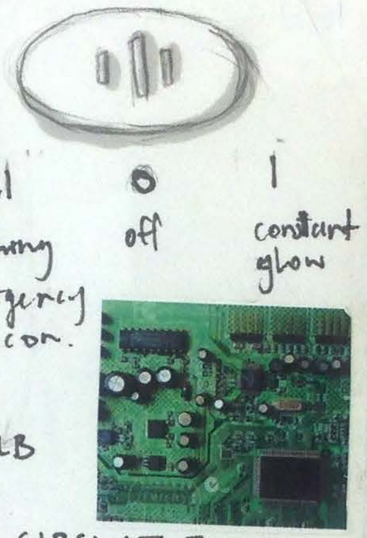
AS THE USER PADDLES, THE COIL (and magnet) WILL USE GRAVITY TO CHARGE

WHAT'S INSIDE / ASSEMBLY



ASSEMBLY AND LED INFORMATION





DIFFUSED LIGHT. VS. BEAM.
THE GLOW IS EASIER TO SEE THAN THE BEAM, SO MY LIGHT HAS A PIECE OF DIFFUSING MATTE PLASTIC OVER ALL THE L.E.Ds.

LUX & LUMEN

- lux is one lumen per square metre
  1 lux = 1 lumen²
- 3.4 lux is how much light is emitted during a clear night. (11.56 lumen)
- 50 lux for a family living room

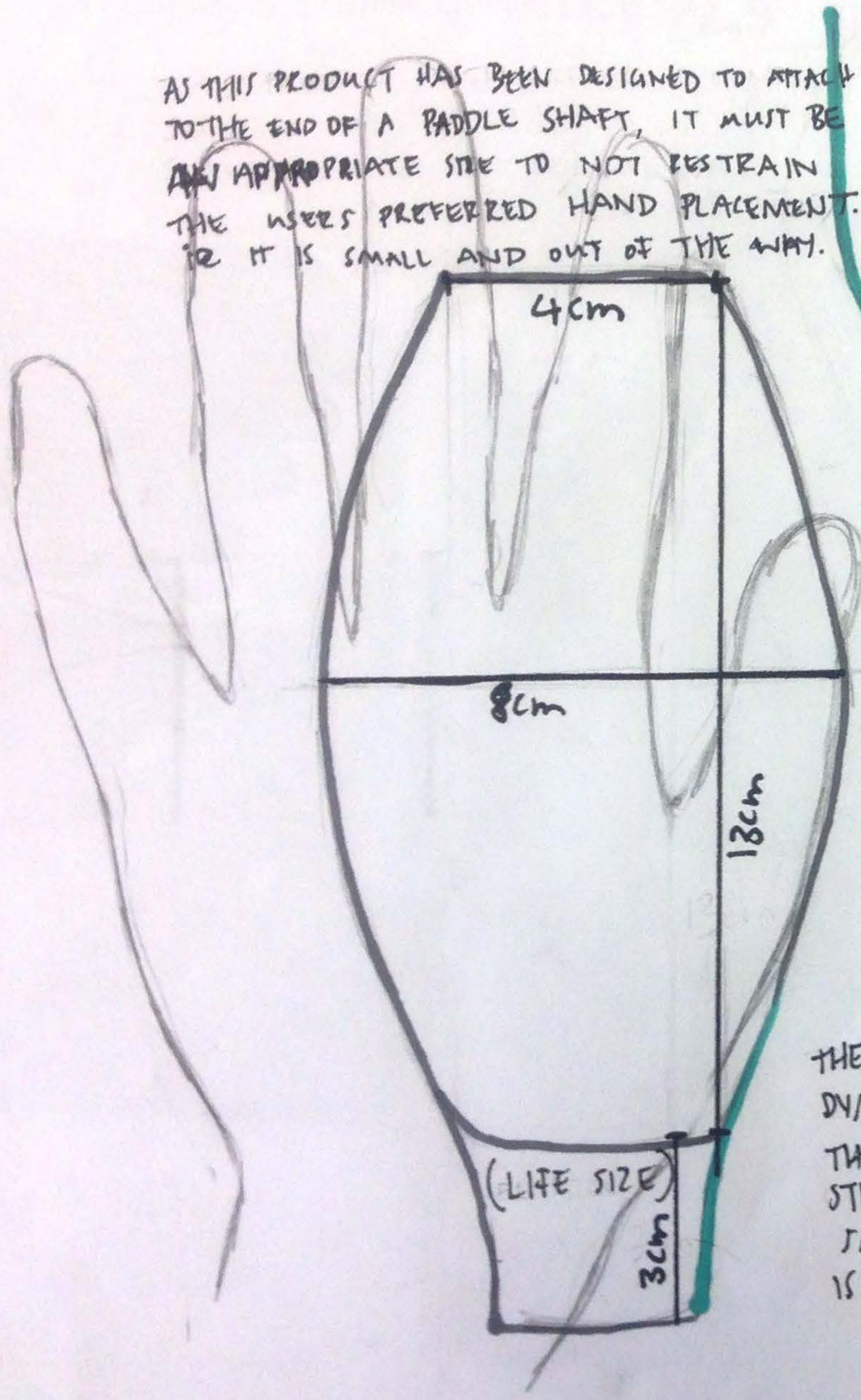
FROM THIS INFORMATION & AFTER READING INFORMATION ON BICYCLE LIGHTS, I HAVE DECIDED THAT MY LIGHT

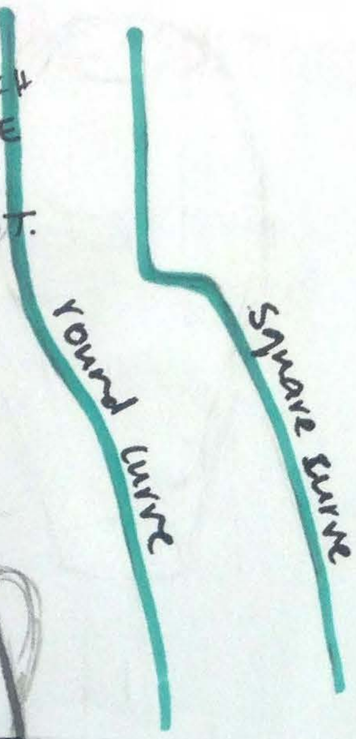
MY LIGHT WILL LIGHT UP 100 LUMEN AND WILL

ERGONOMICS

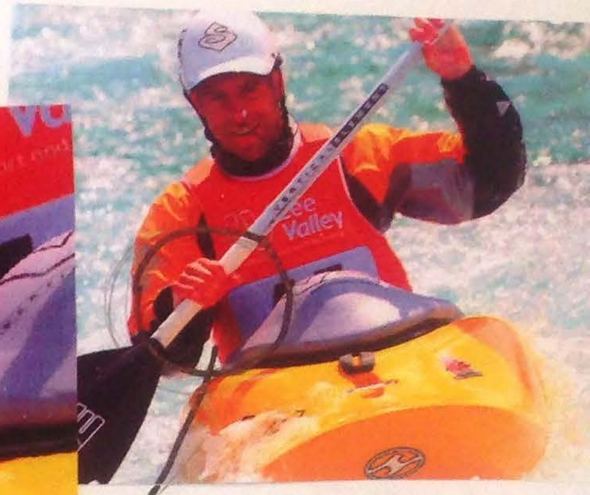
THINGS TO CONSIDER: SIZE, FIT (GROOVES) & SHAPE

AS THIS PRODUCT HAS BEEN DESIGNED TO ATTACH TO THE END OF A PADDLE SHAFT, IT MUST BE AN APPROPRIATE SIZE TO NOT RESTRAIN THE USERS PREFERRED HAND PLACEMENT. OR IT IS SMALL AND OUT OF THE WAY.





THIS AN EXAMPLE OF HOW CLOSE TO THE END OF THE SHAFT SOME PEOPLE MAY HOLD THEIR PADDLE (this is not my typical user, just an example)



MY PRODUCT WOULD BE M
MORE COMFORTABLE AND E
IF IT WAS DESIGNED TO ALL
USER TO SLIDE THEIR HAND
UP THE PRODUCT, FOR TH
THAT THEY WANT TO.

THE SHAPE OF THIS PRODUCT IS WATER DYNAMIC, SO BY FURTHER DEVELOPING THE SHAPE I MUST BE SURE THAT IT IS STILL GOING TO ALLOW WATER TO GLIDE SMOOTHLY ACROSS IT. A CURVED DESIGN IS BEST.

GROOVES FOR GRIP. INDENT WILL BE MORE COMFORTABLE.

WHAT MATERIALS ARE SUITABLE?


GLASS


PLASTIC


SMOOTH THERMOSET PLASTIC


MATTE PLASTIC


STAINLESS STEEL


SILICON / RUBBER

KAYAKERS USE BRIGHT, EASY TO SPOT COLOURS FOR THEIR EQUIPMENT TO MAXIMISE THEIR VISIBILITY DURING THE DAY. ALTHOUGH THIS LIGHT IS DESIGNED TO BE USED IN DARK CIRCUMSTAN THE COLOUR IS STILL SIGNIFICANT FOR IN LOW LIGHT SUCH AS A FOGGY DAY.

ANY OF THESE COLOUR WILL BE SUITABLE FO A PRODUCT TO BE USED FOR THE PURPOS OF SAFETY, HOWEVER LIME GREEN IS ONE OF THE BETTER OPTION AS IT IS EASY TO SEE THE IF THE USER ACCIDENTA DROPS THER PADDLE IN TH WATER SINCE IT IS THE UNNATURAL COLOUR FOUN IN THAT ENVIRONMENT.

THE MATERIALS USED NEEDTO BE LIGHT AS NOT TO WEIGH DOWN THE PADDLE. I'LL USE PLASTIC FOR THE CLEAR ~~COATING~~ COATING, SILICON RUBBER FOR THE GRIP, AND THERMOSET PLASTIC FOR THE SHELL. THERMOSET PLASTIC IS VERY STRONG SO WILL BE DURABLE BUT WILL NOT BREAK OR DENT.
THE MATERIALS I HAVE CHOSEN ARE DURABLE, WATER PROOF AND APPROPRIATE FOR THIS PRODUCT'S USE.

RESOLVED ISSUES AND MAIN FEATURES

Culture:

Appropriate colour (lime green) to stand out in mid-dark conditions

Water dynamic design and materials

Waterproof

Ergonomic:

Secures to different sized shafts by a twisting stopper

Grooves for grip

Appropriate materials (silicon for grip hand rest and smooth thermoset plastic for body)

Altered shape for comfort of user

Sustainability:

Powered by internal generator (magnetic and coil)

LED lighting system – 90% energy efficient, long lasting life and recyclable

Safety (Maximum visibility):

Bright colour

Multiple light settings (emergency flashing beacon and constant glow)

High movement

RESOLVED PRODUCT DESIGN

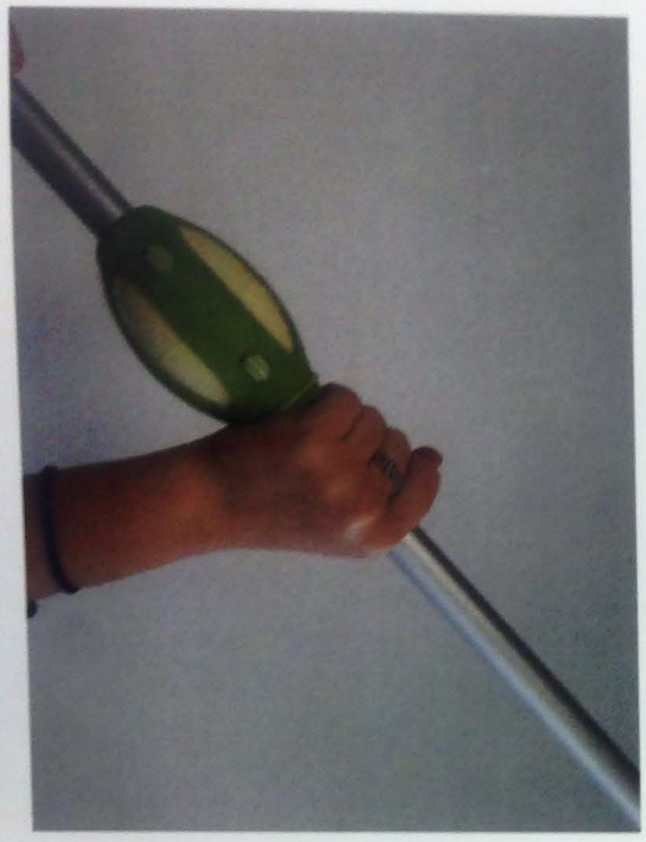
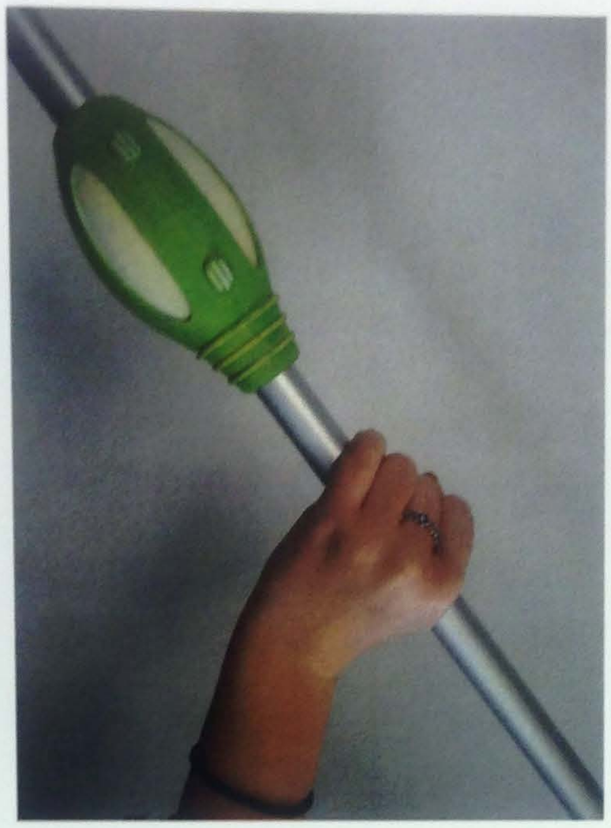
BRIEF

Design a safety light for kayakers for when visibility on the water is low

SPECIFICATIONS

This light should:

- Be safe for use around water
- Be portable/easy to carry
- Provide a diffused but noticeable light
- Self-charging/able to charge without other power source
- Suit the culture of kayaking:
    - Water dynamic if need be
    - Not heavy
    - Aesthetically suited to water environment
    - Suitable colours/materials
    - Waterproof
- Be seen from a distance (ie beacon or flashing, high lux/lumen)
- Be adjustable to suit individual users
- Be hands free
- Be sustainable/durable for rough conditions

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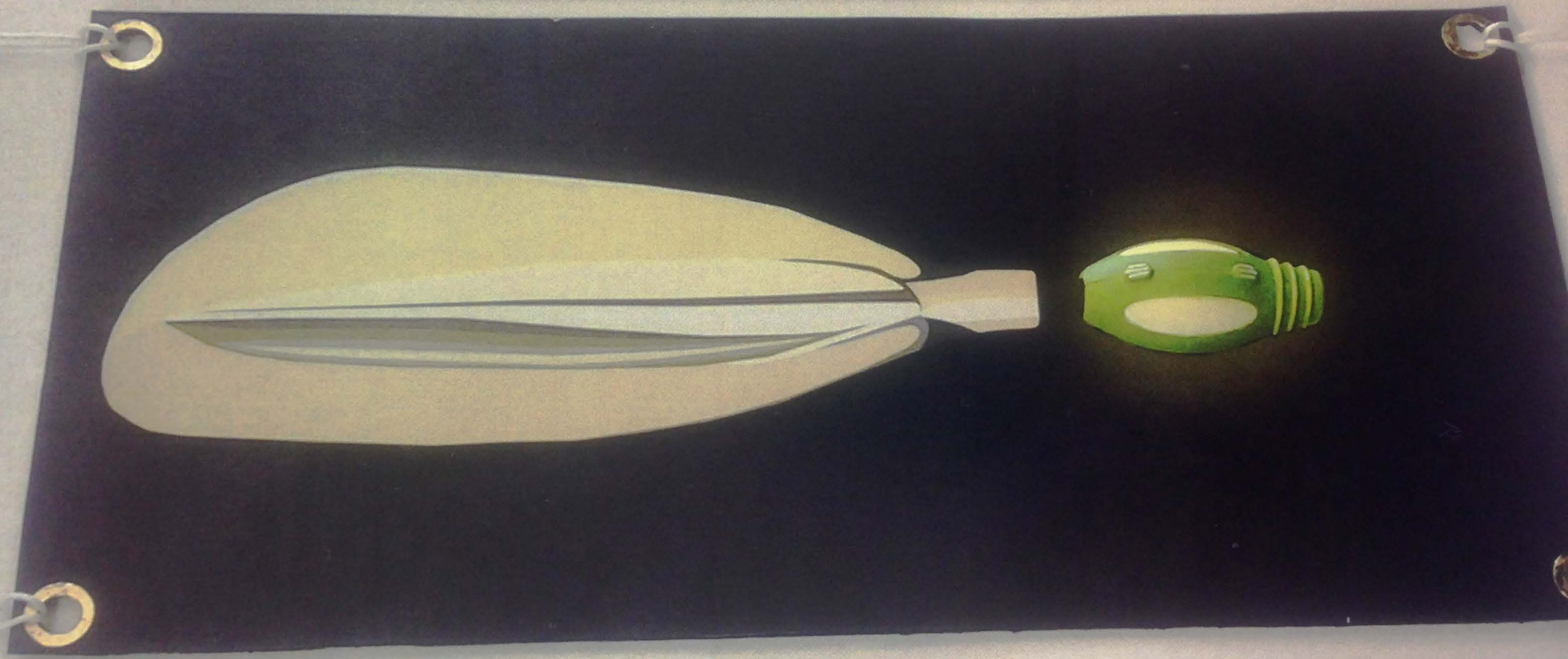


SAFE BE SEEN BE SAFE BE SEEN BE SAFE BE SEEN BE SAFE

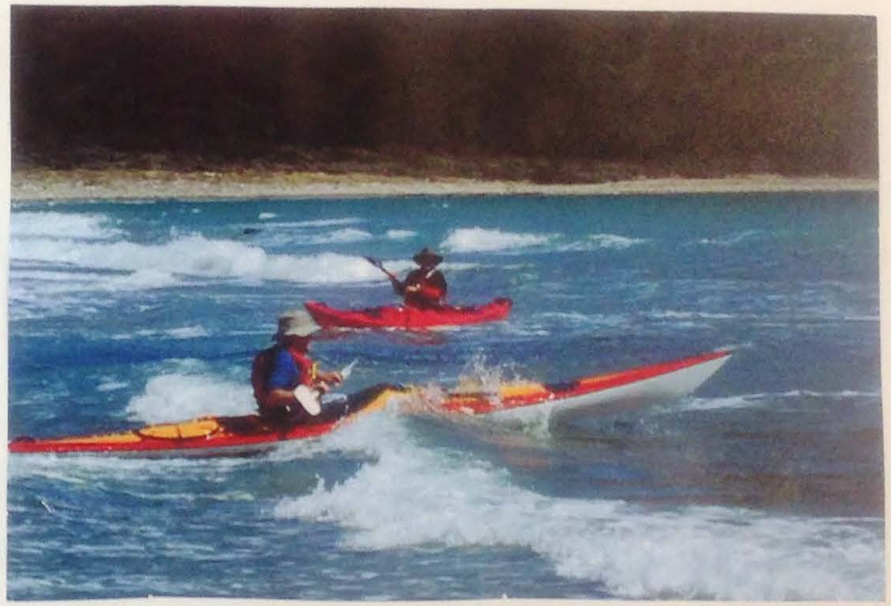
CONTEXT STUDY

What is the purpose of this product?

VISUAL ANALYSIS OF MY DESIGN CONTEXT:

← from the perspective of my user.

Looking at the culture: It is a relaxed & environmentally friendly atmosphere. Not sleek or elegant, more practical. →



← This product must be w proof / suitab conditions su shown in T photo.

Example of my typical user
- he is obviously concerned for his safety (bright colours, hat, glasses, life jacket) →

← considering size of the lots of room a small lig lots of brig colours.

WHAT THE USER WANTS AND NEEDS:

If you are paddling a canoe or kayak at dusk or at night, then it is essential, and a legal requirement, to carry and utilize suitable lights. This includes a 360o white light, visible from 2 nautical miles, and/or a wide lens torch capable of signalling an approaching vessel in time to prevent a collision.

From <http://www.boaties.co.nz/useful-info/kayaking.html>

"A combination of colour, contrast and movement will maximise your visibility"
- Maritime NZ

All non-powered boats under 7 metres in length, such as a rowing dinghy, canoe, kayak or sailboat must show a white light or torch to indicate its presence.

From <http://www.boaties.co.nz/useful-info/navigational-lights.html>

"You don't want to be blinded by a light directly in front of you because it really affects your vision."
- Miss Gerrard (Often uses torches in the bush at night)

As a minimum maritime rules require you to carry a torch to prevent collision. However, holding a torch may prevent you from paddling effectively.

"Wearing a head torch allows your arms to be free to paddle. In addition, mounting an all-round white light (or a red, green and white sector light) on your rear deck above head-height means you will be visible from all directions."

From <http://www.maritimenz.govt.nz/Recreational-Boating/Skipper-responsibilities/Boat-types-and-water-activities/Kayak-safety-and-staying-bright-on-top.asp>

"You want to be seen at night so you don't have any collisions."
- Greer Carmine (typical evening kayaker) *Interview.*

Point beam light effect people's vision so I will use a diffused light.

Your blades are in constant motion while paddling. Increase your visibility by using reflective tape on your paddle's blades or shaft."
- Maritime NZ

An adjustable light source would be useful for different circumstances
Ie emergency strobe light, dimmed light, constant light

"Your head is your highest point, so make it as bright as is possible. Day glow orange or yellow hats are highly visible."

From <http://www.maritimenz.govt.nz/Recreational-Boating/Skipper-responsibilities/Boat-types-and-water-activities/Kayak-safety-and-staying-bright-on-top.asp>

Flashing beacon vs constant beam:

"Research by the Lighting Research Center at Rensselaer Polytechnic Institute has shown that while the color of a signal light can make a small difference in visibility when the signal is very difficult to see, the flashing and strobe lights found on emergency and hazard vehicles are designed to be very visible and stand out from their background, no matter what color they are. At these levels, color no longer makes an important difference. It simply is a tool to help us distinguish among different kinds of emergency or hazard vehicles."

From <http://www.lrc.rpi.edu/resources/news/pressReleases/emergencyVehicleLighting.asp>

WHO?

THIS PRODUCT IS FOR THE USERS OF SMALL WATER VESSELS; IN PARTICULAR, KAYAKERS.

WHAT?

THIS IS A SAFETY LIGHT. THE PURPOSE OF IT IS TO CREATE AWARENESS OF THE KAYAKER / TO ALERT OTHER WATER VESSELS OF THEIR PRESENSE, AND SIGNAL FOR HELP IN EMERGENCIES.

WHEN?

VISIBILITY IS LOWEST ON FOGGY OR RAINY DAYS, DAWN, DUSK, AND AT NIGHTTIME. IT IS TIMES LIKE THESE WHEN SMALL WATER VESSELS NEED TO TAKE SAFETY PRECAUTIONS.

WHY?

THERE HAVE RECENTLY BEEN SERIOUS ACCIDENTS INVOLVING KAYAKERS OCCURING AS A RESULT OF LOW VISIBILITY / LACK OF LIGHT. A PRODUCT SUCH AS A SAFETY LIGHT FOR KAYAKERS WILL PROMOTE SAFETY AND HELP PREVENT FURTHER INJURIES AND DEATHS.

SUMMARY:

THIS LIGHT IS PURELY FOR SAFETY PURPOSES (RATHER THAN TO PROVIDE A LIGHT TO SEE) FOR KAYAKERS ON THE OPEN WATER WHEN VISIBILITY IS LOW.

INITIAL EXPLORATION

- hollow
- stacked
- layers
- something inside/ outer & inner layer
- vertical axis
- shape
- spiral & twist
- contrast
- negative space

Spiral & coils

Shape

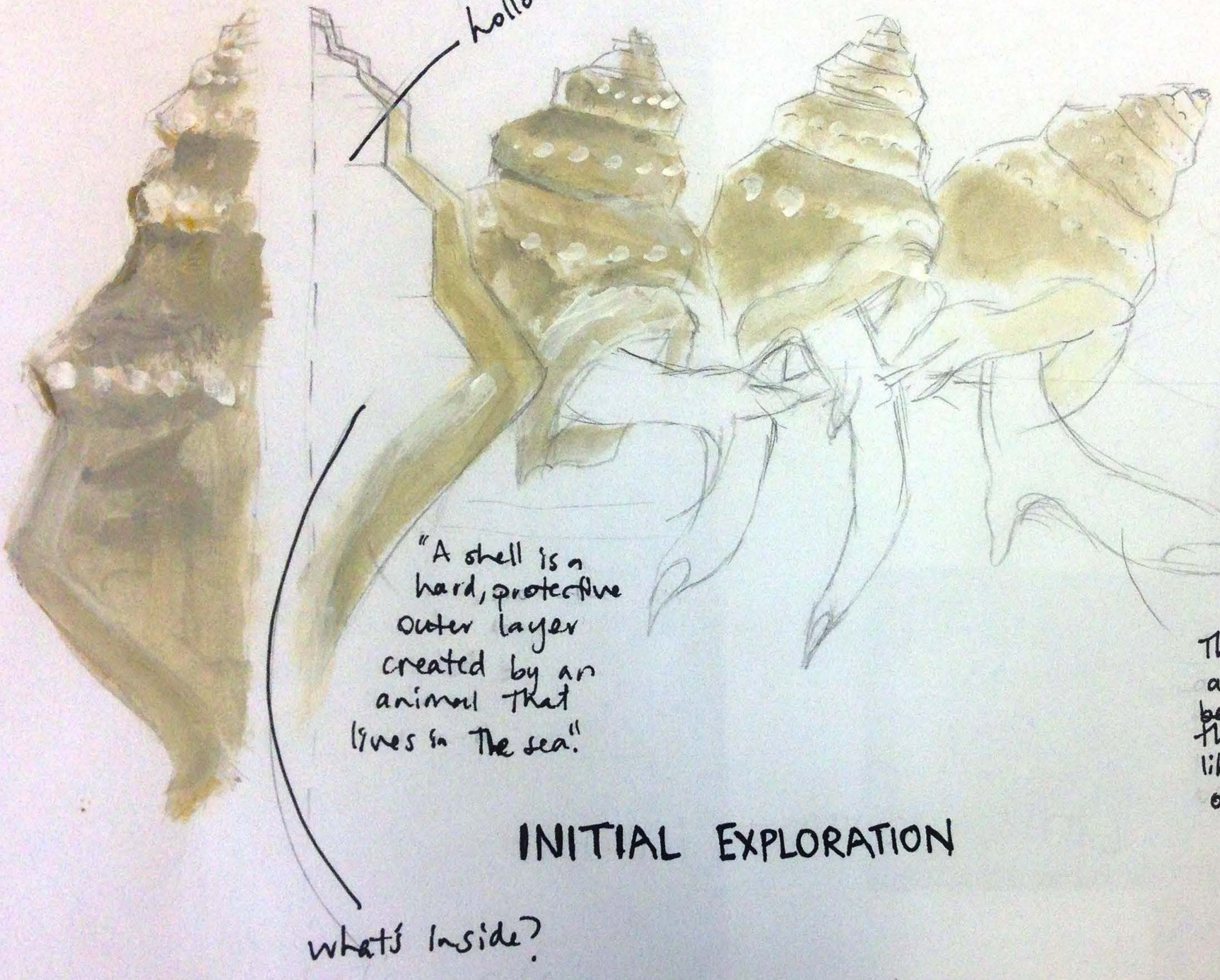
vertical axis

What's the chemical structure of the layers?
What are those layers made up of?
How are those layers made?

negative space/ contrast

stacking

layering



Seashells are commonly found in beach drift, which is natural d deposited along standlines

This shell is called an ostrich Foot shell because the animal that lives in it looks like the foot of an ostrich.

INITIAL EXPLORATION

Level 3 Design and Visual Communication (DVC) Commentary 2013 submission

AS 91627 (3.30): Initiate design ideas through exploration (4 credits)

Achievement	Achievement with Merit	Achievement with Excellence
Initiate design ideas through exploration	Initiate design ideas through insightful exploration	Initiate design ideas through extensive exploration

Use visual communication strategies to show alternatives and variations for the purpose of **exploring and re-generating** ideas.	Use visual communication strategies to show **considered** alternatives and variations for the purpose of **analysing and re-interpreting** ideas.	Use visual communication strategies to show **divergent and perceptive** alternatives and variations for the purpose of **extending and transforming** ideas.
Origin ideas use starting experiences to generate ideas and **lead towards** design ideas.	Origin ideas identify an **emerging train of thought** that **informs** design ideas.	Origin ideas **challenge thinking** that **informs and enhances** design ideas.

Excellence
In this submission, the student has used the starting experience of observations of sea shells and simple paper modelling. The strength in this submission comes from the observational and interpretive sketches. There are a range of sketches that explore and analyse the shell shapes from different angles and are quickly re-interpreted. The submission includes lists of possible strategies in different stages; and although the written list is not assessed in this standard, it is a reminder to the potential exploration and analysis that could take place.

The student has considered the concept of rotation around an axis to re-analyse and re-interpret forms as spirals or helices describing a strong train of thought. These forms are linked to another train of thought, a range of layered forms that are further re-generated as symmetrical and asymmetrical forms. These forms give rise to divergent and perceptive alternatives morphing into spherical and cylindrical forms that are grooved linking back to the sea shell spiral. Although the sliding / adjustable cylinder that emerges appears simple, the student begins another stage of extending and transforming this form into a “slippery” hydrodynamic form that challenges thinking and informs and enhances the idea.

Despite the organisation of the design work, it is also worth appreciating that the ideation stage of this project occurs before establishment of the brief, the potential in the initial idea determines what the brief will be. This allows for a highly creative and analytical approach which encourages the student to ask “What if?” questions.