

Reusing / Repurposing Energy in the Home

Part A: Divergent thinking

Intro to Design Engineering, October 2020

Ciara Bates

Initial Exploration

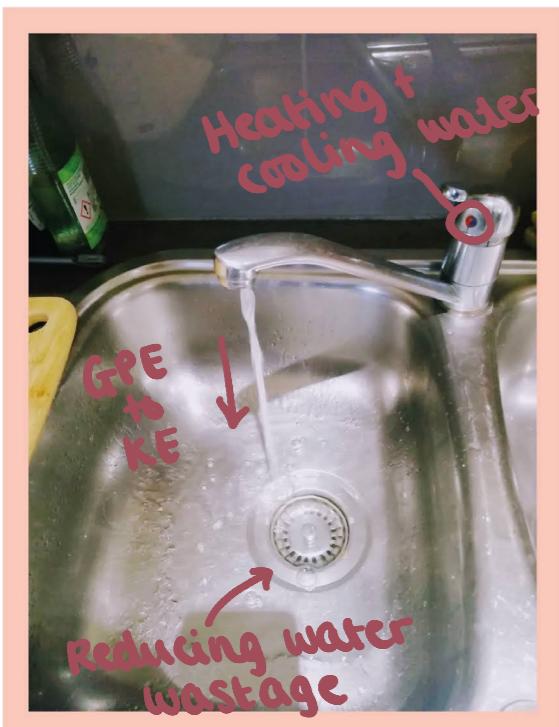
Using primary imagery to explore energy usage/wastage in the home



ELECTRICAL APPLIANCES

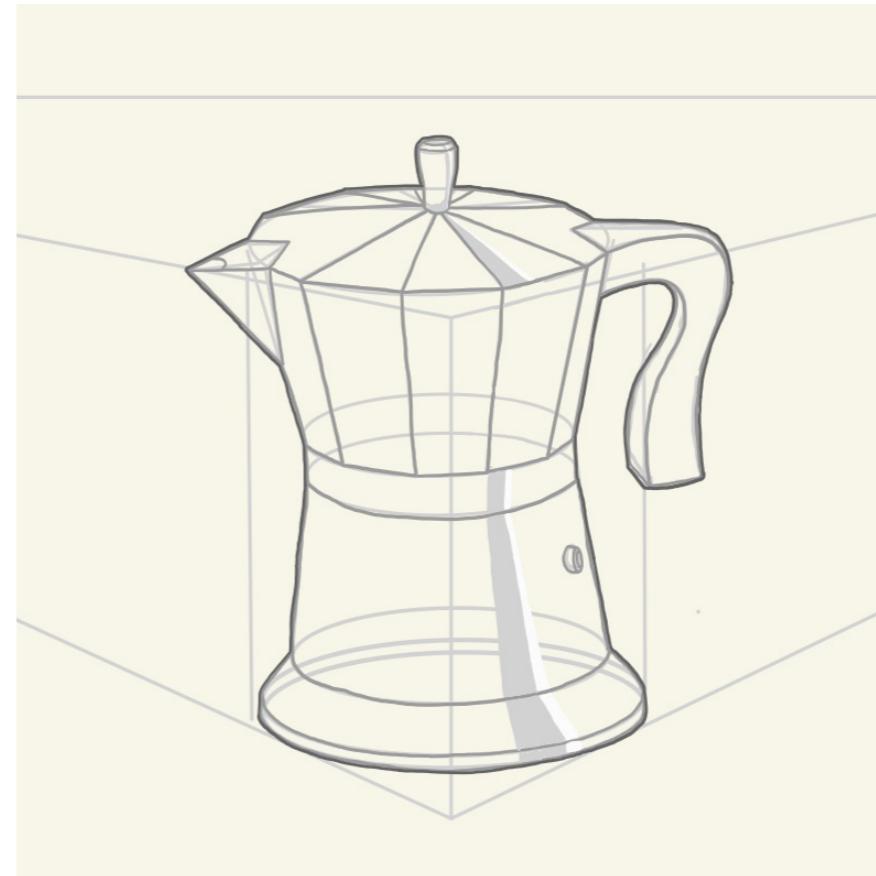


OTHER ELECTRICS



Semiotic Analysis

Moka Coffee Pot - original design by Alfonso Bialetti 1933



Level 1

First instinctive response

- Coffee Maker
- Red colour
- Shiny
- Metal
- Octagonal and cylindrical shape
- Made of three different parts
- Simple design

Level 2

Generally understood meaning

- Heats up coffee on the stove.
- Metal part heats up (conductive Aluminium)
- Lid opens with top handle.
- Side handle used to pour the coffee.
- Top chamber unscrews from the bottom.
- Cheaper and simpler way of making an espresso.

Level 3

Connotations/deeper meaning

- Shiny metal material indicates hygiene and quality.
- Red colour is elegant and sophisticated.
- Octagonal shape (sharp edges) indicates precision as many believe making coffee requires quite a scientific method.
- Ergonomic handle indicates pleasant coffee making experience.

Level 4

What contexts does it connote

- More time and care is put into making coffee compared to using instant coffee. Will result in a better coffee experience.
- Octagonal shape is traditional/iconic for Italian coffee making (the original design is in the MoMA). The coffee made in this product is more 'proper'.

5Ws + 1H and HMW

Who	What	When	Where	Why	How
This product should appeal to homeowners, so, generally, people over the age of 20. If it is to be used widely by the general public, it should be able to easily integrate into family life and be compatible with a busy lifestyle.	The object should be simple, small, compact and aesthetically pleasing. The colours shouldn't be too bright. Buttons and other details should have a brighter/differentiating colour. The materials very much depend on the function.	Should be designed for ongoing/ daily use. Therefore, the material must be very durable and easy to clean. Can be integrated as part of a daily routine, so usage should be quick and simple To be used whilst cooking and/or doing housework in the kitchen.	My domain is the kitchen It can be placed on counters and/or Windowsills, so it should be small enough to not get in the way	Should be used not only to reduce waste and save energy, but to facilitate an aspect of daily life. The product/system should be able to save money as well as energy.	The process of thermoelectric induction to transfer heat energy into an electric current. The heat could be sourced from cooling appliances or decomposition of food waste.

How Might We...

Harness the energy from decomposing food waste?

How Might We...

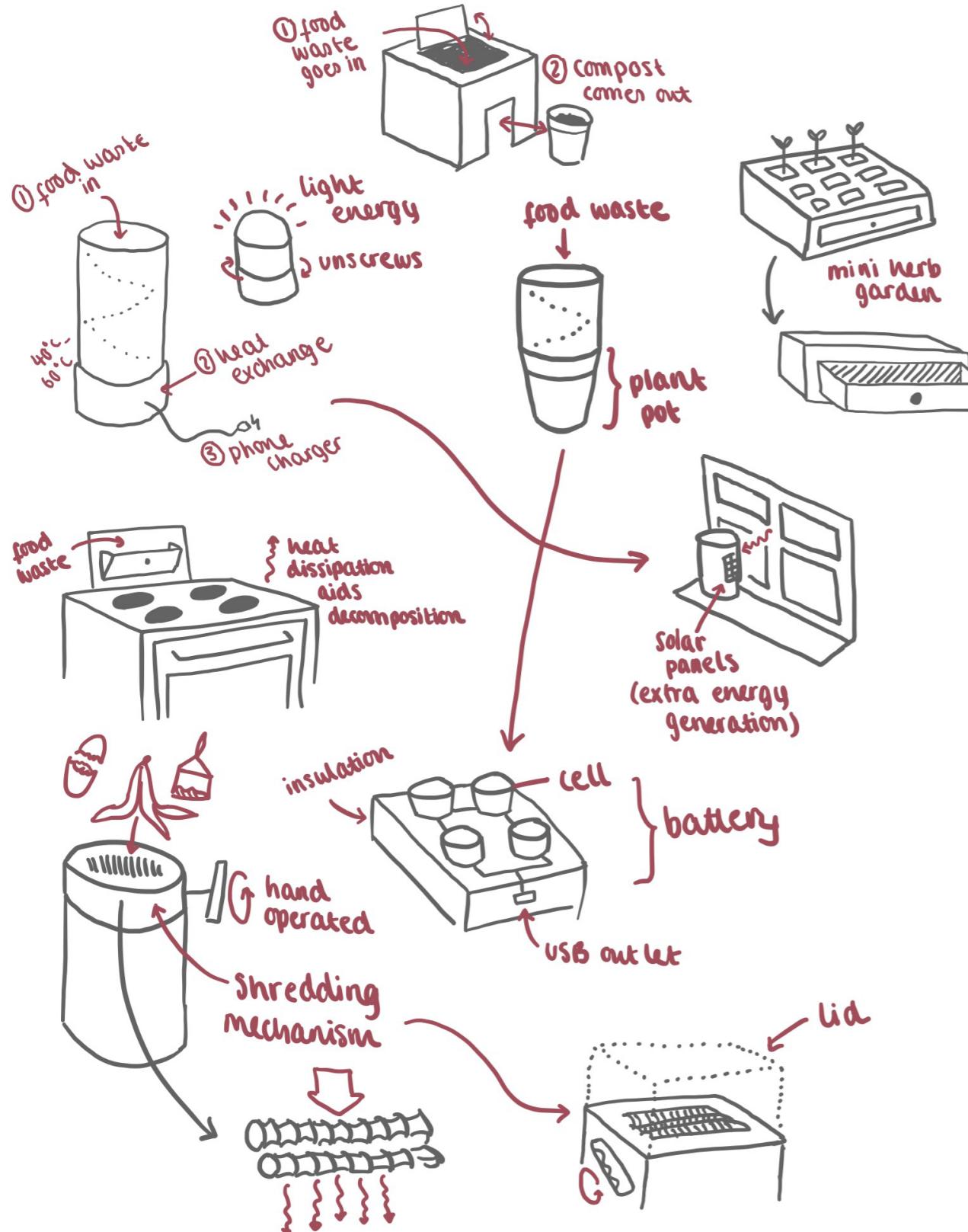
Recycle dishwater more directly in the home?

How Might We...

Recycle the heat from thermal appliances as they cool down?

Initial Ideation

How might we harness the energy from decomposing food waste?



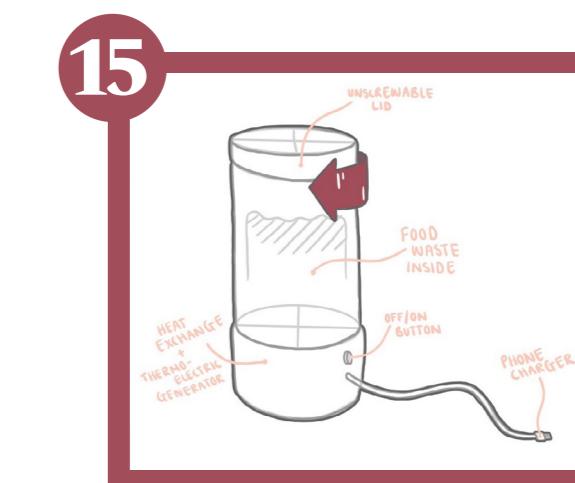
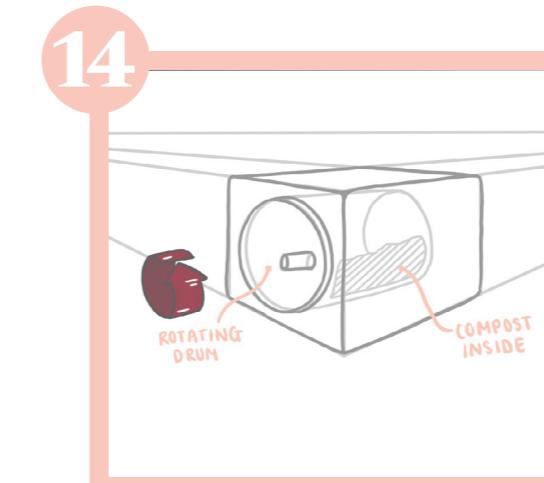
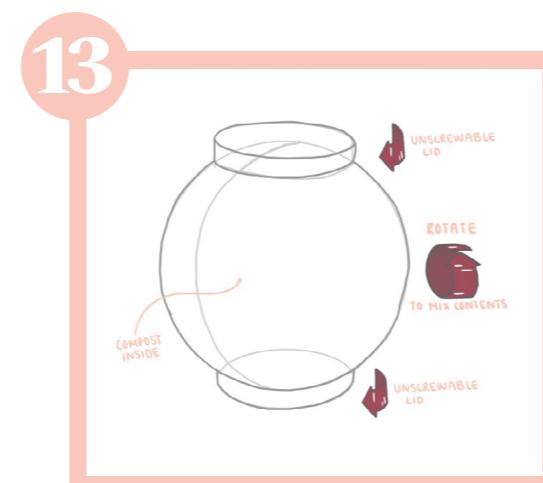
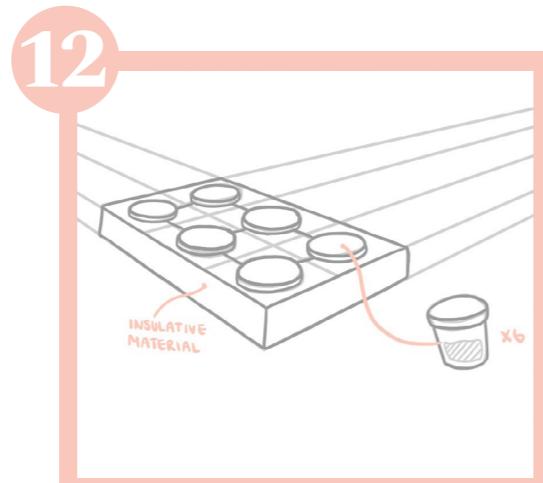
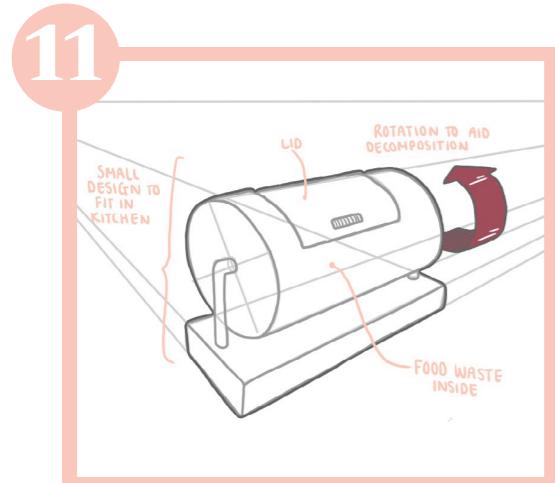
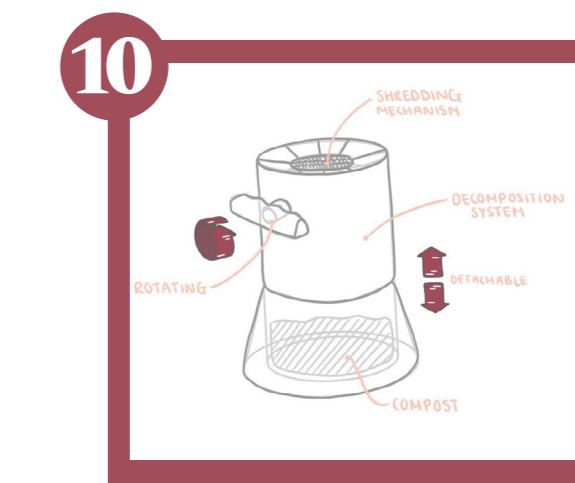
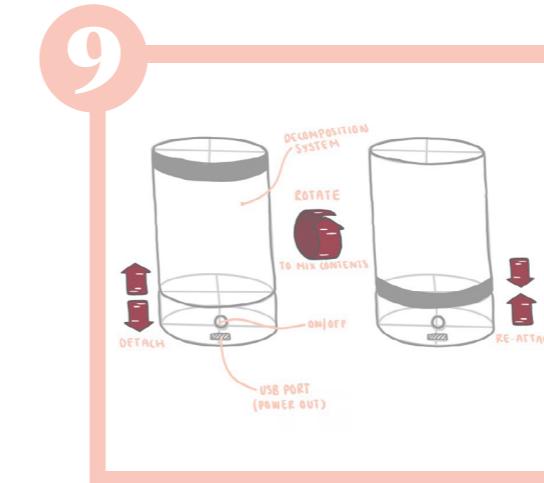
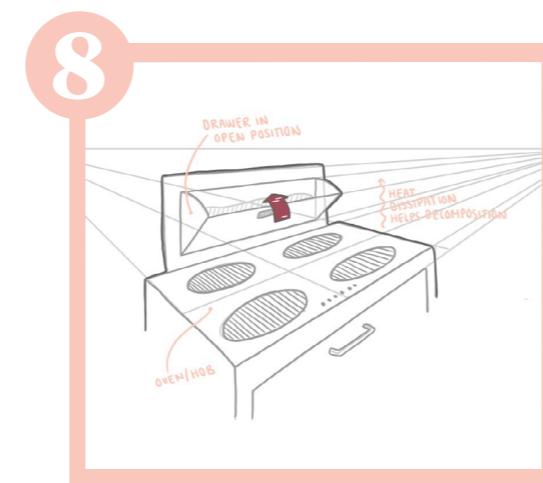
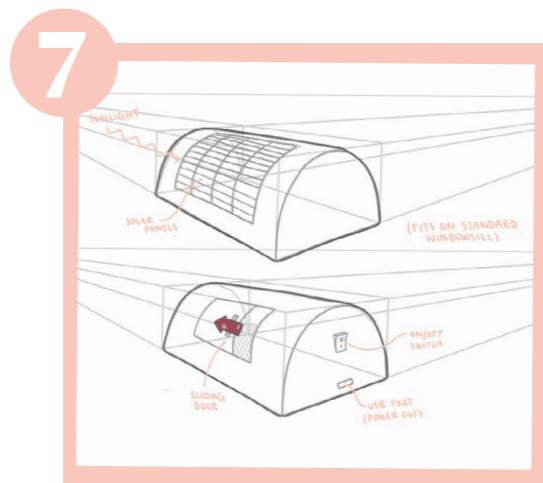
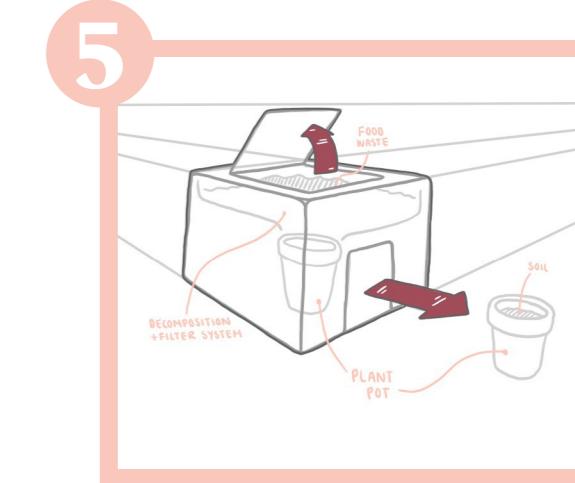
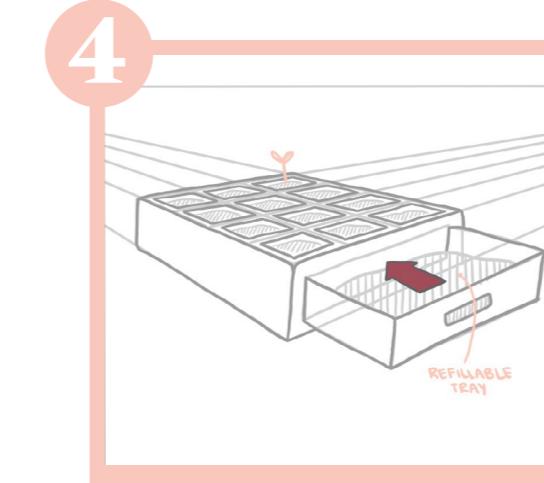
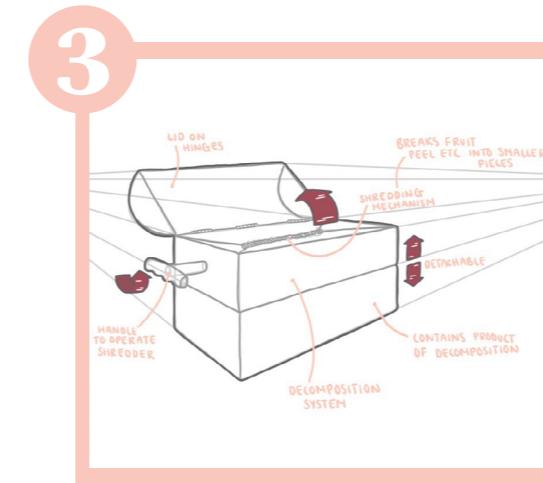
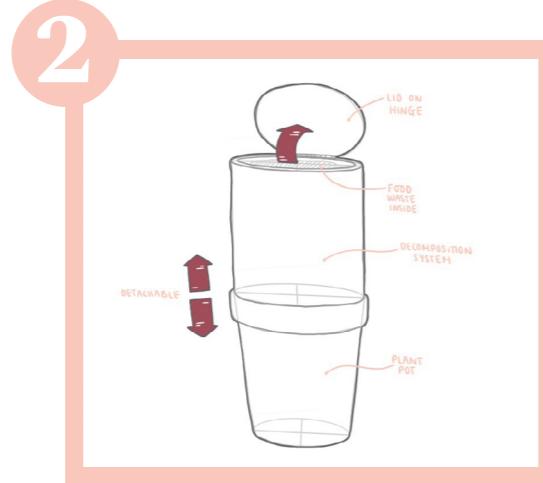
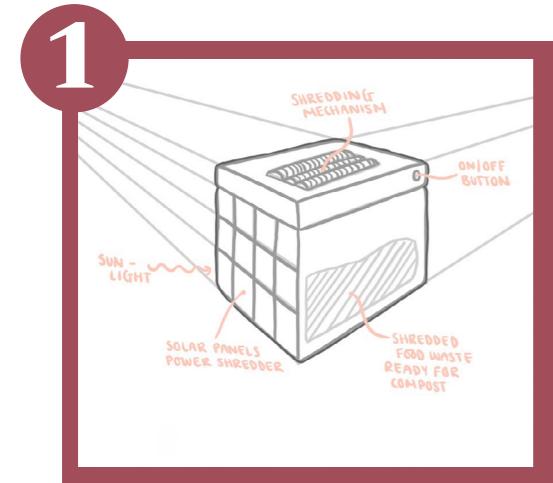
Quick Sketches



Secondary Source Images for Inspiration

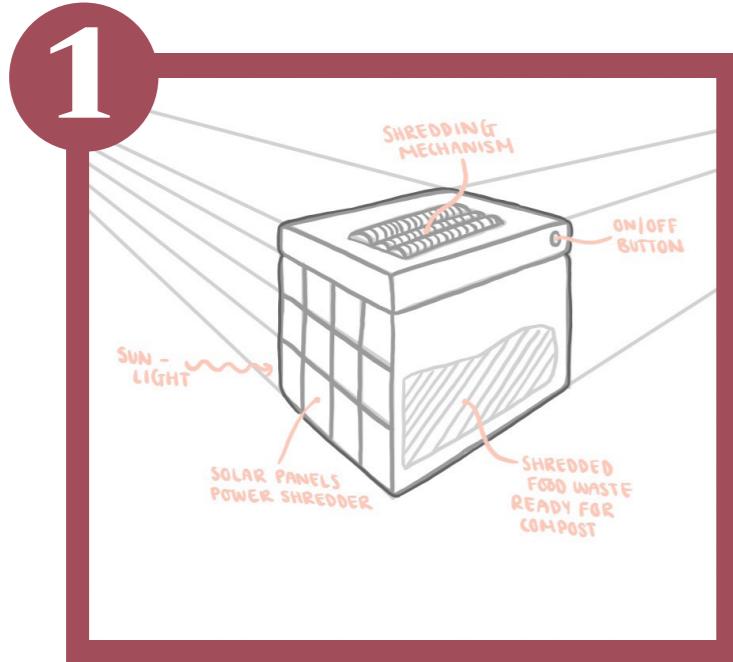
HMW Harness the Energy from Decomposing Food Waste?

Sketches of 15 initial ideas

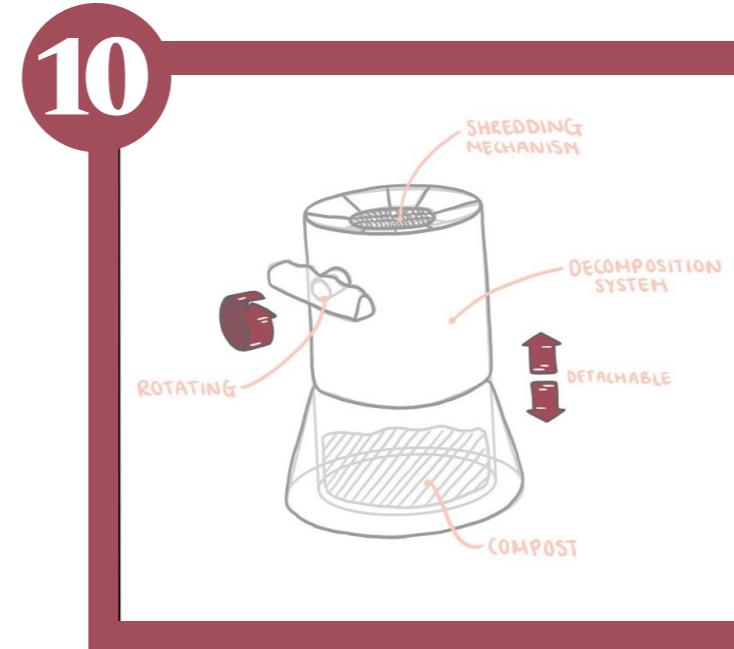


HMW Harness the Energy from Decomposing Food Waste?

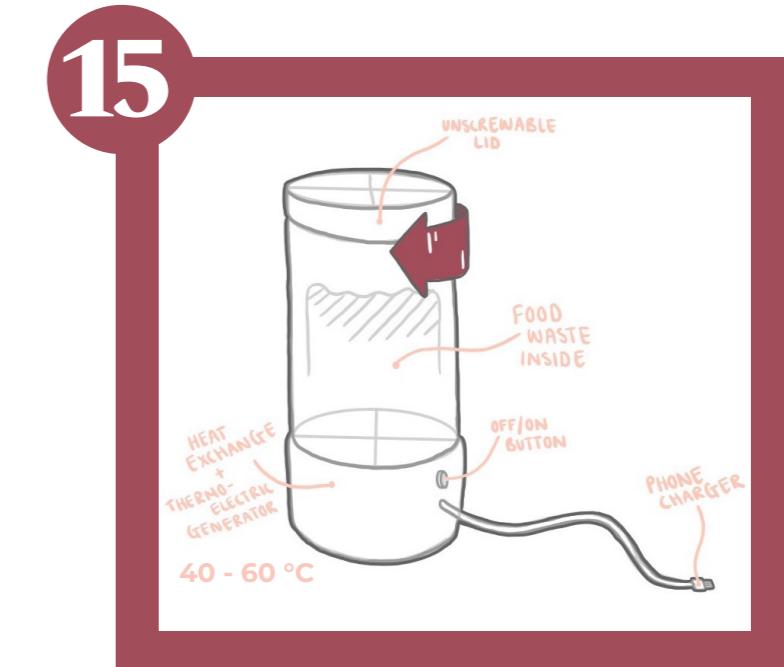
Further sketches of my three most feasible/useful ideas



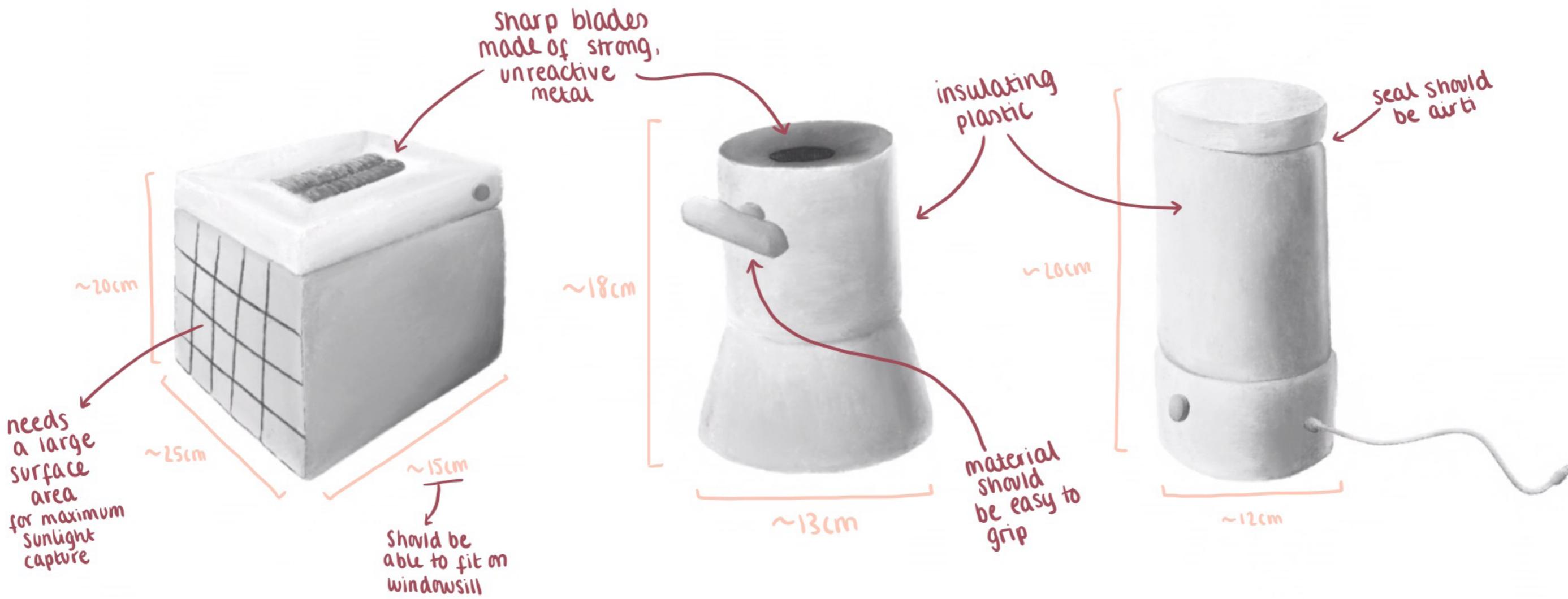
Sunlight-powered waste shredder



Hand-operated compost maker

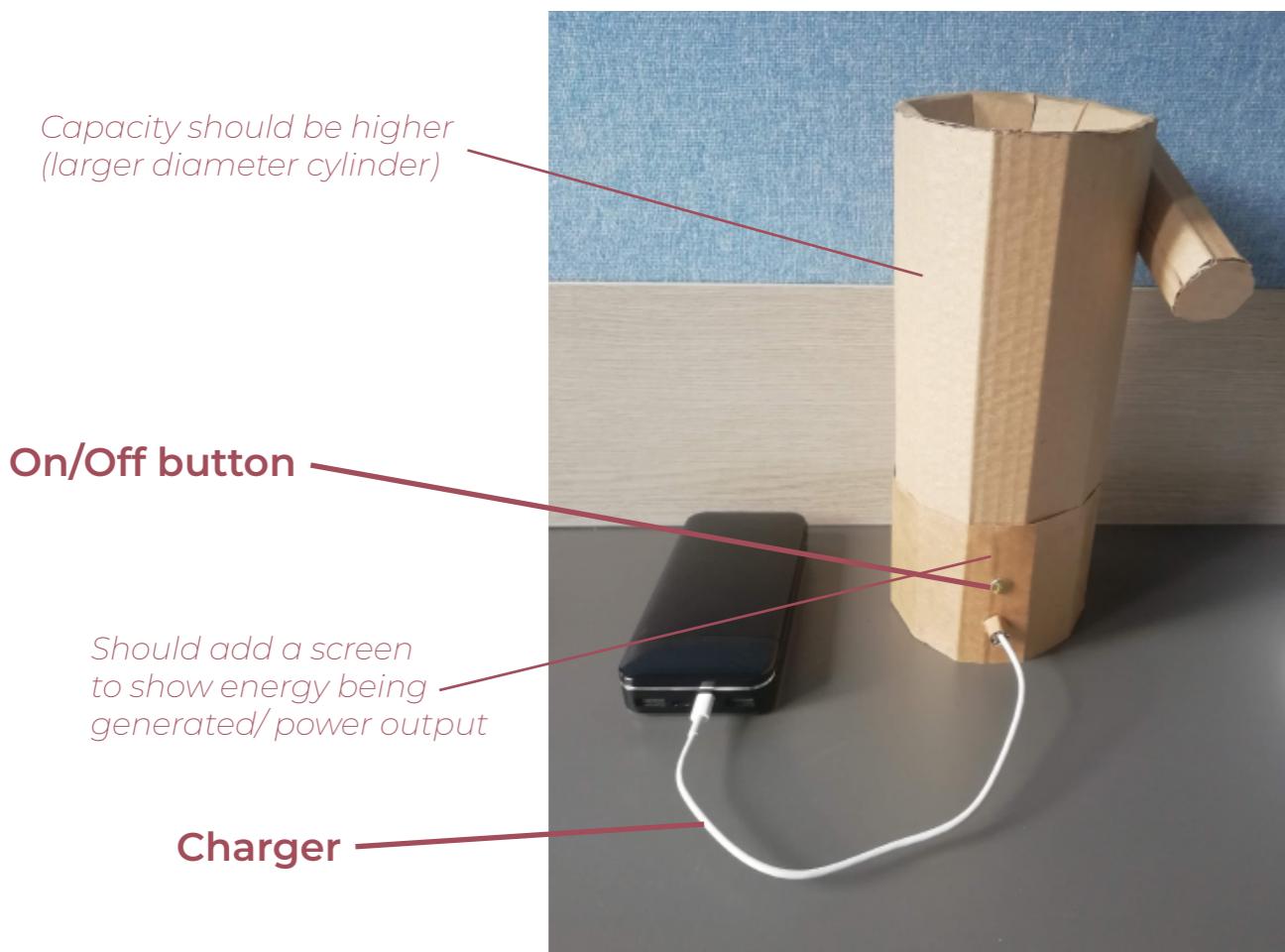


Food waste processor & phone charger



Lo-Fi Prototyping

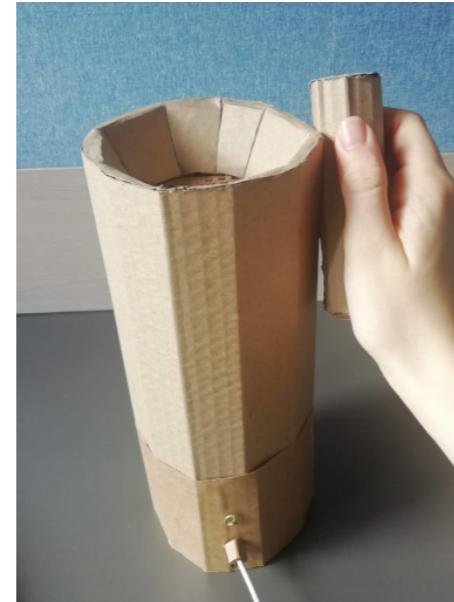
Exploring the real life size and shape in a combined prototype of ideas 10 + 15



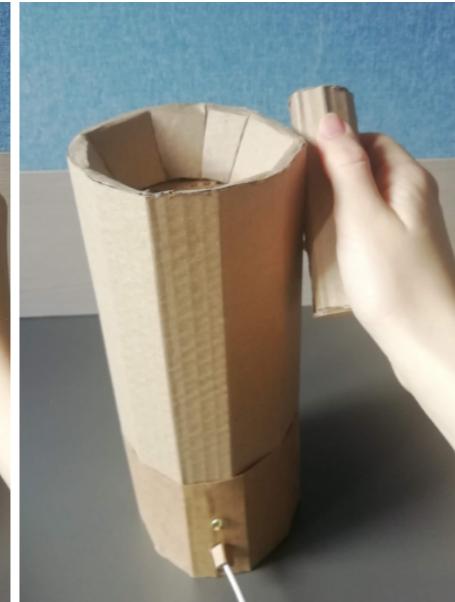
Interactions



Putting fruit peel in the shredder



Rotating the handle



Taking apart

Image Credits —

1

Photo by Milada Vigerova on Unsplash

2

Logan, I., 2020. Cantor Paper Shredder. [image] Available at: <https://media.newyorker.com/photos/59096e94ebe912338a376bdc/master/w_2560%2Cc_limit/Cantor-Paper-Shredder1.jpg> [Accessed 6 November 2020]

3

Photo by Hello I'm Nik on Unsplash

4

Hozelock, 2020. Bokashi Composter. [image] Available at: <<https://www.hozelock.com/wp-content/uploads/2018/11/4193.jpg>> [Accessed 6 November 2020].

5

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Reusing / Repurposing Energy in the Home

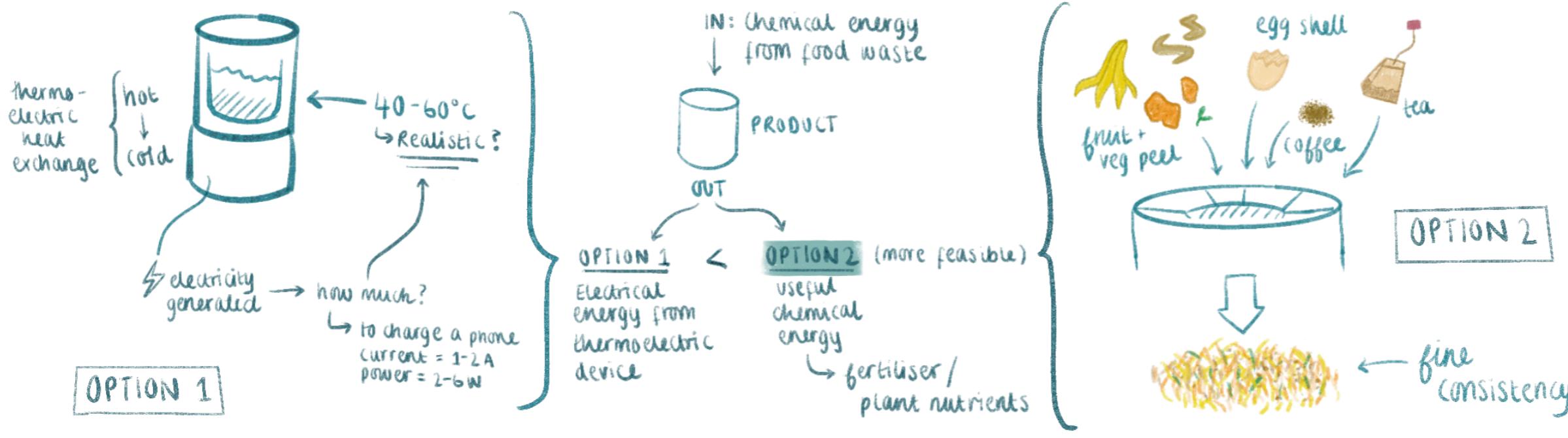
Part B : Convergent thinking

Intro to Design Engineering, November 2020

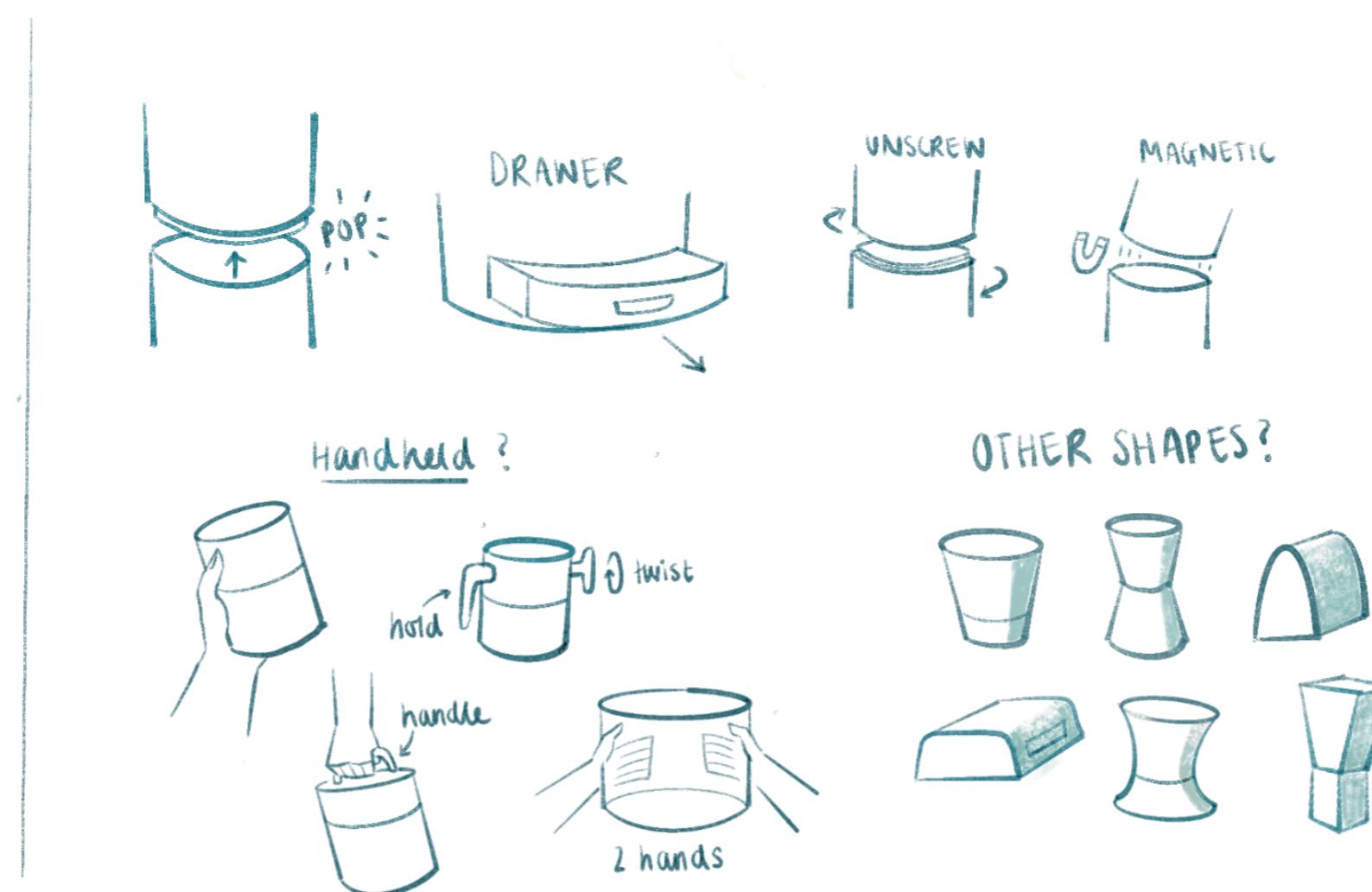
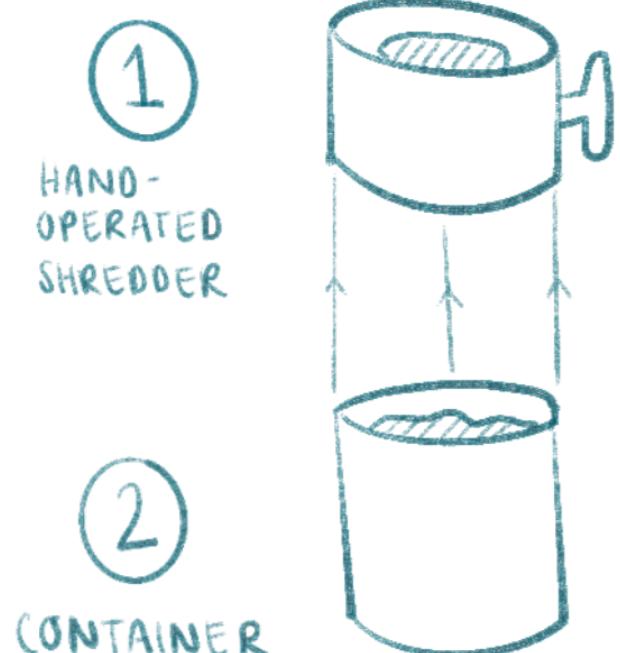
Ciara Bates

Sketch Analysis of Concept Elements

Analysing my final ideas from the divergent thinking phase through digital sketching



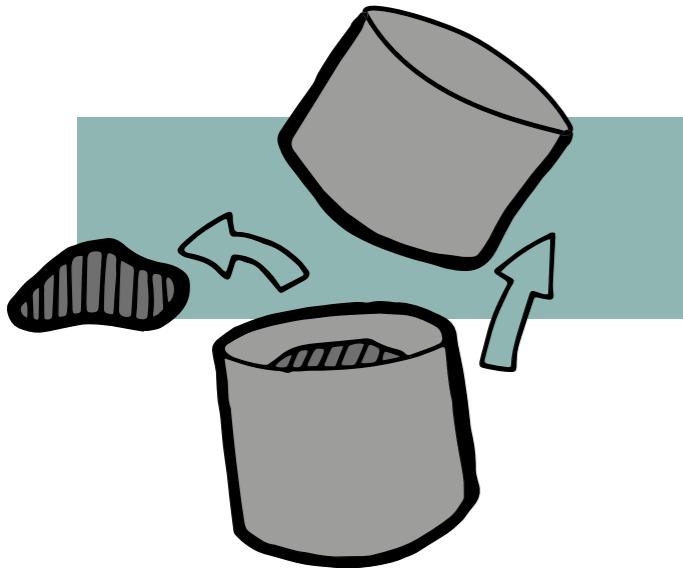
2 BASIC COMPONENTS



I generated further ideas both individually, and using group feedback (documented on supplementary page two). Visual exploration of my ideas helped me to refine and simplify purpose.

Requirements Analysis

Using Illustrator Elements



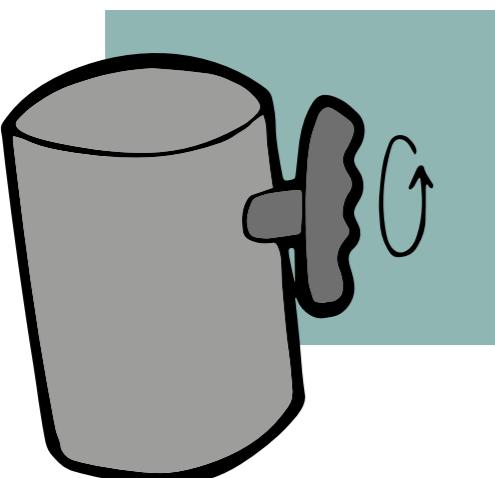
Requirement One

Easy to open and empty contents



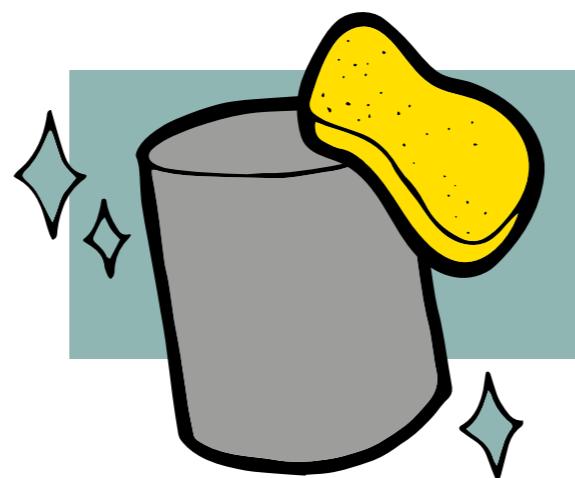
Requirement Two

Has sufficient capacity / capability



Requirement Three

Easily manually operated



Requirement Four

Has a hygienic design

Analysis of 4 initial requirements...

Requirement 1: Easy to open and empty contents

The opening mechanism should be quick and intuitive. The user should be able to empty the contents into plant soil (for small houseplants in pots and/or garden vegetable patch/allotments - therefore, it should be portable).

Requirement 2: Has sufficient capacity / capability

The blades of the shredder should be able to cut through thick fruit peel and hard egg shells. The container must be able to contain the waste produced by a normal household in a day so it doesn't have to be emptied more than once a day.

Requirement 3: Easily manually operated

The user should be able to easily operate the shredder and take apart the container. Inclusive design should be considered. Using the shredder mechanism can be made pleasant/ satisfying so as to encourage regular use.

Requirement 4: Has a hygienic design

The materials used should be stain-proof, non-reactive, and be perceived as hygienic. Easy, quick and simple cleaning through ability to disassemble and put in the dishwasher.

Brief and Specifications

Outlining the purpose and goal of my product

Product title : *Eco-cycler*

The convenient food waste processor

Many homes in the UK don't have sufficient means to process and use food waste directly. In order to encourage home gardening and self-reliance, the Eco-cycler will aim to provide a quick and easy way to shred up fruit and vegetable peels, offcuts and other compostable food waste such as teabags.

The practise of growing your own food has become increasingly popular, especially over the COVID-19 pandemic, and having extra nutrients to mix into soil will ensure that produce grown is of high quality.

The product should...

- Shred and store food waste
- Be moderately affordable
- Be manually operated so as the not waste any energy
- Be designed so it can be used by a wide range of people (inclusive design)
- Have a high enough capacity to temporarily store the food waste from a normal household in a day
- Be compact enough to be stored easily in the kitchen
- Be portable (lightweight, perhaps with a handle)
- Be hygienic and easily cleaned

Rank	Requirement	Specification
1	Easily manually operated (so no energy input is non-renewable)	Must have a handle that can transfer sufficient force (as a pushing force or torque) to operate the shredding mechanism.
2	Has sufficient capacity / capability	The blades of the shredder must be sharp and be made of a hard material so it doesn't get blunt easily (e.g.. steel). Not too big, not too small (10-13cm diameter, 15-17cm height)
3	Easy to open and empty contents	Must have an opening mechanism.
4	Has a hygienic design	Made of non-corrodable material that is dishwasher safe (casing made of polymer, shredding mechanism made of stainless steel). The seal between the various parts must be airtight

Initial Storyboards

Trying out some first storyboard ideas / layouts using quick digital sketches

Storyboard 1 - everyday use



Storyboard 2 - further application (restaurant kitchen)



For my final storyboard, I will develop storyboard 1 as it shows the product in use in an everyday setting so it will be more universally relatable. It's also a simpler, clearer concept. I will change the layout to fit better into an A4 landscape format, and maybe add call-outs similar to the one I did in storyboard 2. I will keep the idea of having two accent colours, as it keeps the design from becoming overcomplicated. Doing these storyboards has demonstrated to me that I need to think a bit more about the specifics of operating the shredder, opening the product and emptying the contents.

Benchmarking

Product Comparisons

Garlic Press



Vegetable slicer



Paper Shredder



Compost Bin



- Cuts up the garlic by pushing it through the holes in the press.
- Safer due to lack of blades (more suitable for families with young children).
- Cleaning mechanism (red part releases any excess from the press).

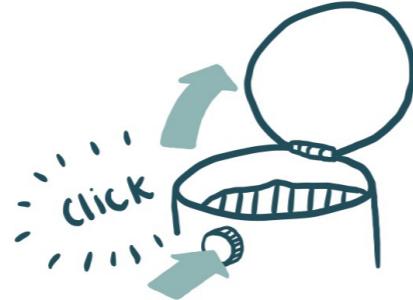
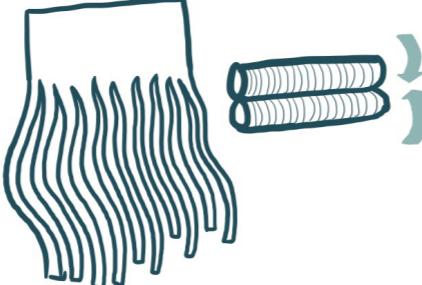
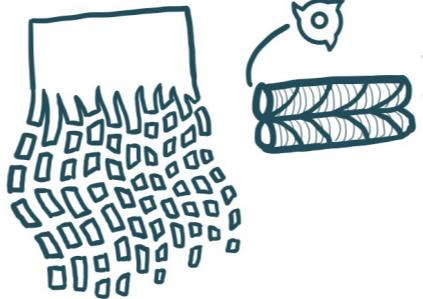
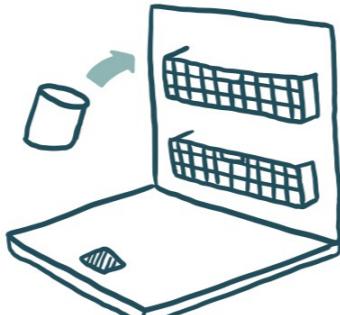
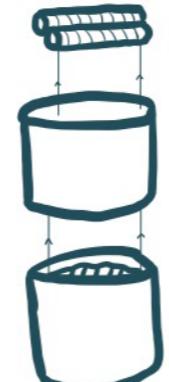
- Rotating handle (designed to give more torque - easier to rotate blades)
- Disassembly allows for easier cleaning
- Changeable blades for different purposes
- Green + neutral colours

- High capacity shredder storage
- Removable lid
- Different sections for paper/credit cards
- Handle for portability
- Switch (changes power/ shred speed)

- Compact design
- Removable lid
- Well-organized interior sections
- White = hygienic
- Orange = visible accent colour
- Vent on the lid

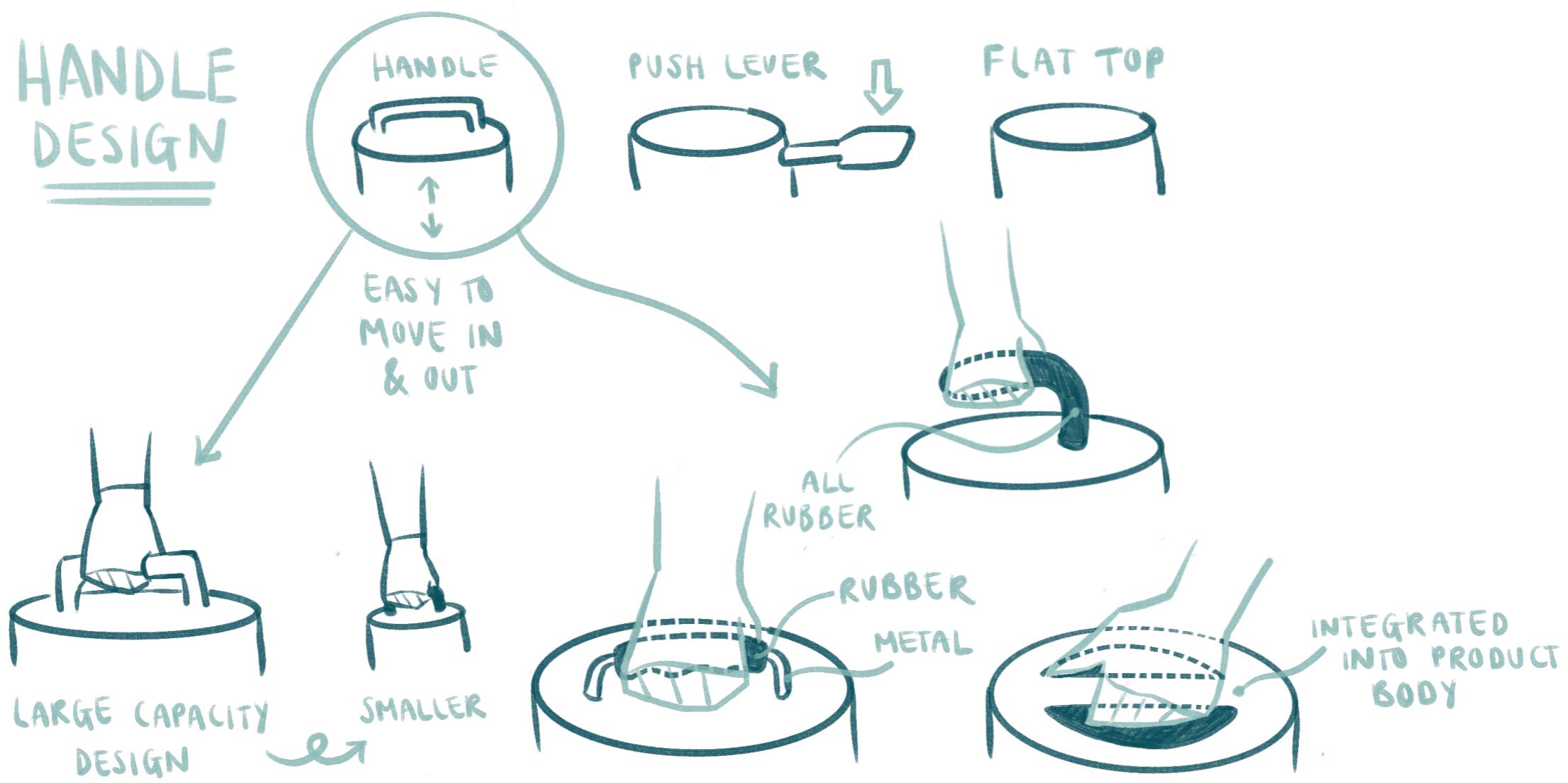
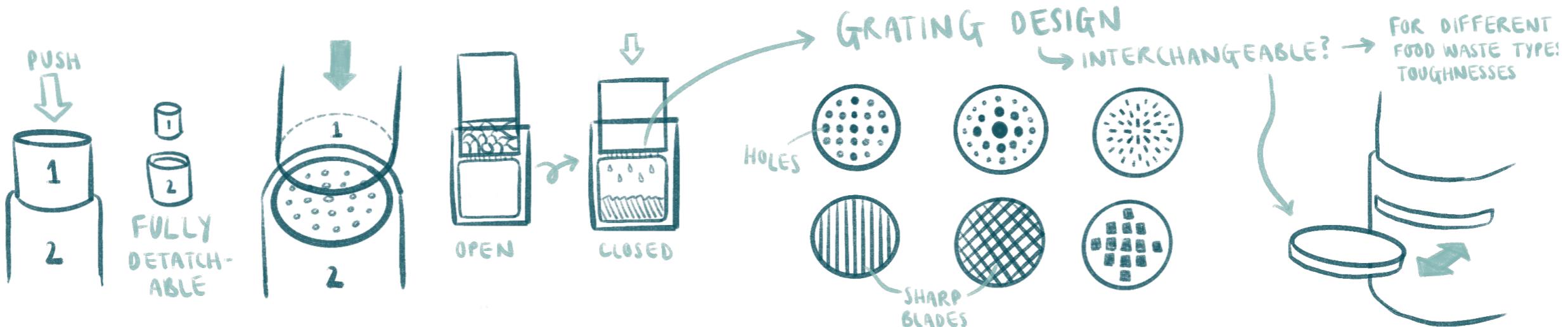
Morphological Analysis

Analysing the alternative ways to approach different parts of the design

Feature of Design	Ideas for Approach
Opening Mechanism	 <p>button-operated hinged lid, magnetic</p>
Shredding Mechanism	 <p>strip-cut</p>  <p>cross-cut</p>  <p>micro-cut</p>  <p>crushing mechanism</p>
Cleaning Process	 <p>dishwasher safe</p>
	 <p>can be disassembled (parts cleaned individually)</p>  <p>self-cleaning</p>

Enhanced Sketching

Further exploration of my concept using digital sketching

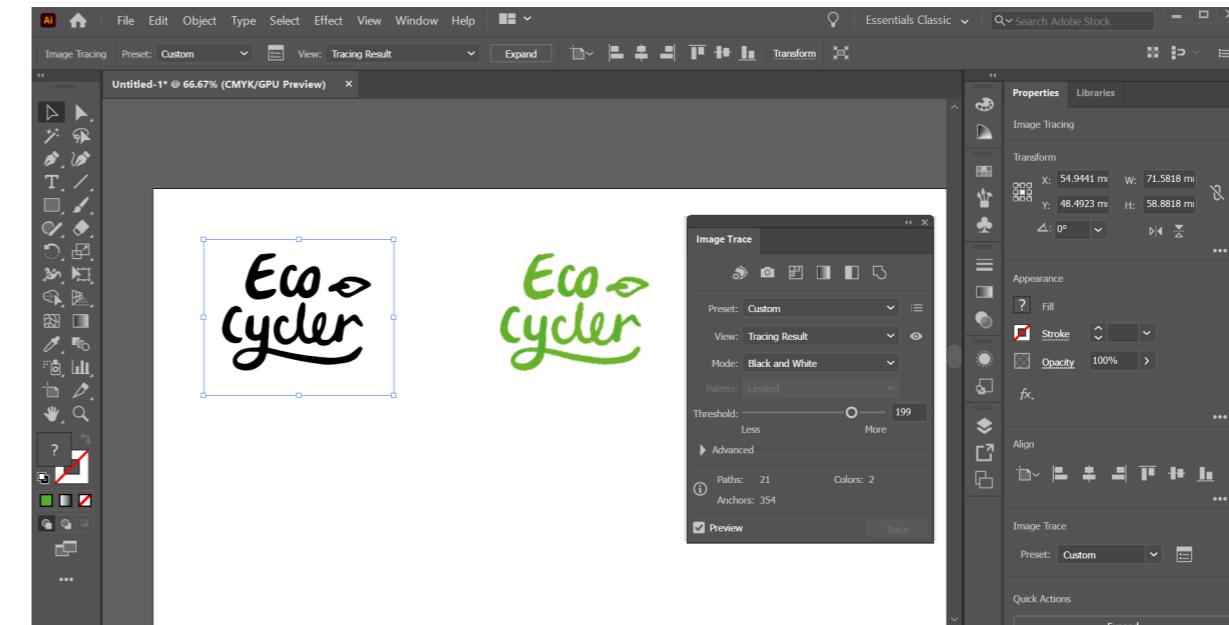


Product Logo

Creating a small logo design in Illustrator to put on the final product

eco-cycler
Eco-cycler
eco-cyder
Eco-cyder
eco-cyder
Eco-cyder
eco-cyder
eco-cyder
eco-cyder

eco-cycler
Eco-cycler
eco-cyder
Eco-cyder
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Eco-cyder



Vectorising and adjusting path in Illustrator

Eco-cycler

Eco-cycler



Final Story Board

Made using Adobe Illustrator



Final Design Presentation

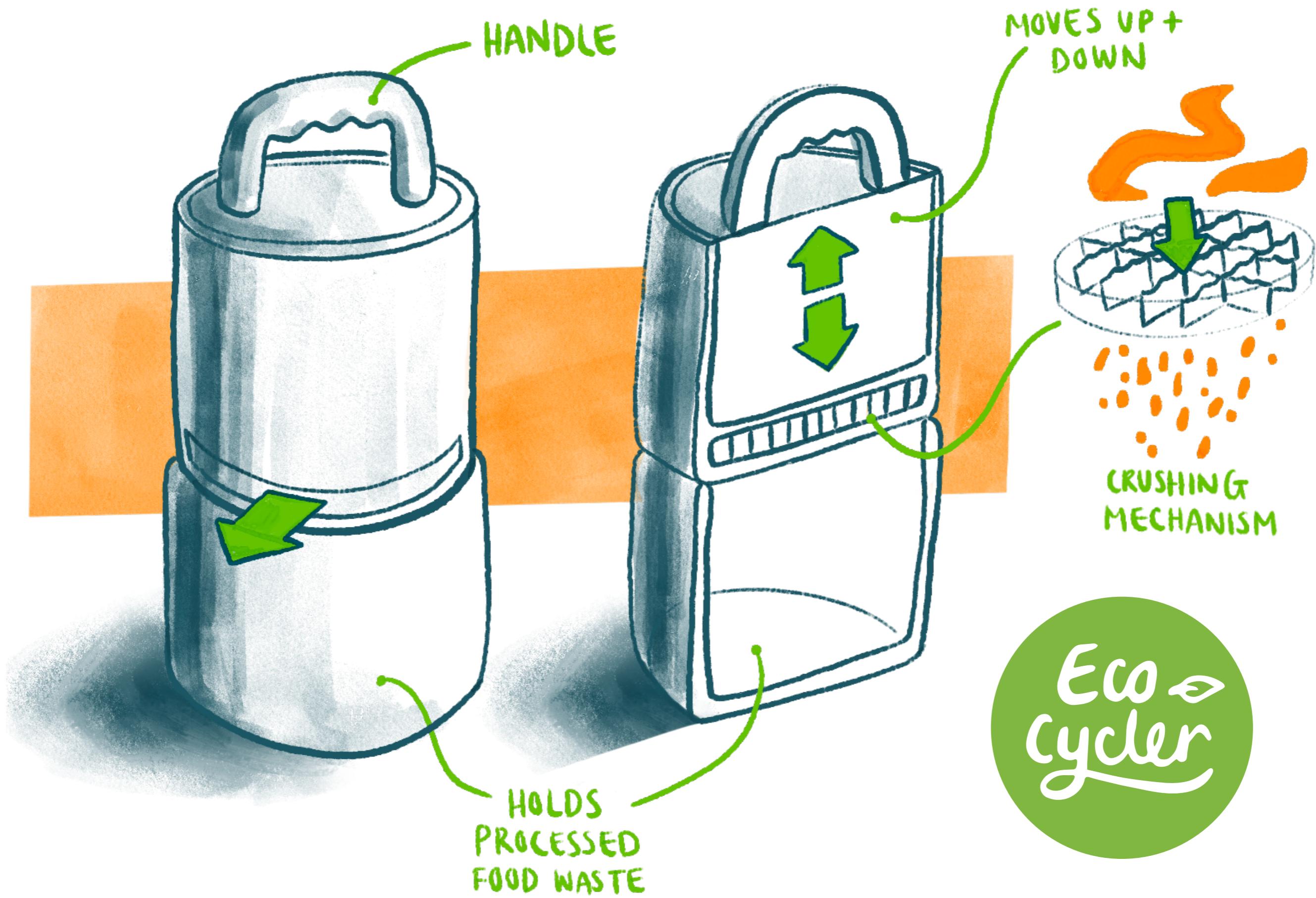


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- 1** OXO. [Internet]. 2020 [cited 3 December 2020]. Available from: https://www.oxouk.com/media/catalog/product/cache/1/image/1400x1400/8ccb9603cd1c8aa64a161403a3adb86b/o/x/oxo_

- 2** Chiba. [Internet]. 2020 [cited 3 December 2020]. Available from: <https://www.kitchen-knives.co.uk/media/catalog/product/cache/1/thumbail/75x/9df78eab33525d08d6e5fb->

- 3** Amazon. [Internet]. 2020 [cited 3 December 2020]. Available from: https://m.media-amazon.com/images/I/81EgGCwEcRL._AC_UY327_FMwebp_QL65_.jpg

- 4** Joseph Joseph. [Internet]. 2020 [cited 3 December 2020]. Available from: [https://johnlewis.scene7.com/is/image/JohnLewis/238105678alt7?rsp-pdp-port-1080\\$](https://johnlewis.scene7.com/is/image/JohnLewis/238105678alt7?rsp-pdp-port-1080$)

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