

The Task

This project is a sustainable design project. It aims to redesign a product, service or environment to improve its sustainability.

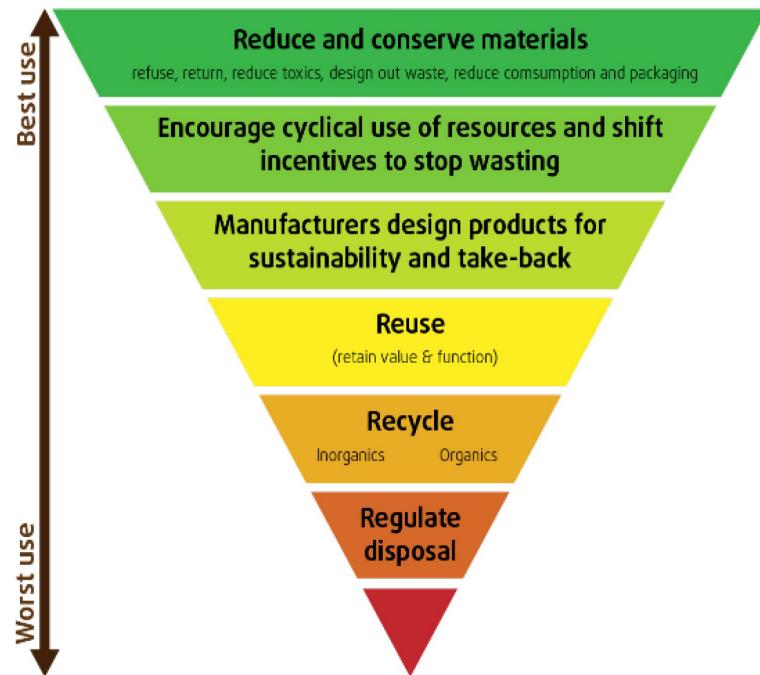
How can products, services, and environments be redesigned to extend their useful life beyond their original intended purpose?

This product should also consider the stakeholders needs and wants as well as the circular economy, to design a sustainable and functional product

Sustainable design is more relevant than ever in today's world, where waste in landfills is increasing. Landfills are a major source of pollution, and they can also contribute to climate change. By redesigning products, services, and environments to be more sustainable, we can reduce our impact on the environment and help to create a more sustainable future.

Sustainable design:

Ideally, a product will be at the top of this pyramid: making it more sustainable as it doesn't get thrown away.



The pillars of sustainability and how to design products which obey them

1. Environmental Sustainability: Design products with a focus on minimizing environmental impact. Consider using renewable materials, reducing energy consumption, and incorporating eco-friendly manufacturing processes. Aim to create products that have a minimal carbon footprint and promote biodiversity conservation.
2. Social Sustainability: Ensure that the design considers the well-being of people and communities. Prioritize the use of ethically sourced materials, fair labor practices, and safe working conditions. Design products that are inclusive, accessible, and culturally sensitive, considering the needs and preferences of diverse populations.
3. Economic Sustainability: Design products with a long lifespan, durability, and the potential for repair and reuse. Consider the life cycle costs and the economic feasibility of the product, aiming for resource efficiency and waste reduction. Explore innovative business models, such as product-as-a-service or sharing platforms, that encourage a circular economy and sustainable consumption patterns.

What is the circular economy vs the linear economy?

The circular economy conserves resources by prolonging product and material use, reducing the need for extraction. It minimizes pollution by maximizing product and material lifespan, reducing waste and associated environmental harm. The circular economy generates employment opportunities in repair, reuse, and recycling sectors.



- The linear economy relies on finite resources— e.g fossil fuels, minerals, and metals. This can have a negative impact on the environment, such as deforestation, soil degradation, and water pollution.
- The production and disposal of products in the linear economy can create pollution. For example, the production of plastics releases harmful pollutants into the air and water.
- The linear economy produces a lot of waste. In the United States, about 3.4 billion tons of waste is generated each year. This waste ends up in landfills, incinerators, or the environment.

The 9Rs are a set of principles that can be used to reduce waste and promote a more sustainable way of life.

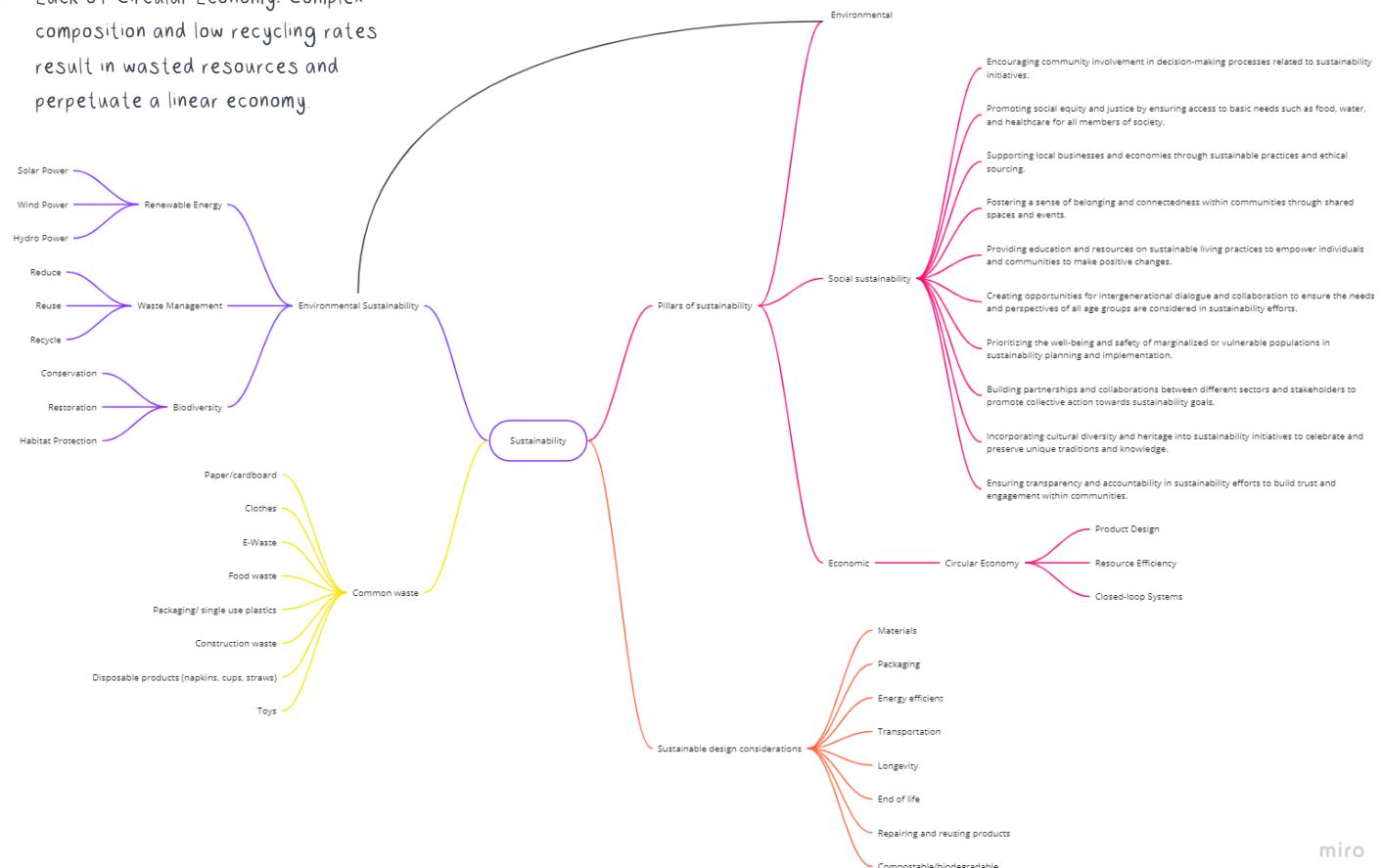
- **Refuse:**
Promotes conscious consumption and reduces unnecessary or unsustainable products. Implementation: Designing sustainable alternatives and advocating for responsible purchasing choices.
- **Rethink:**
Encourages innovative thinking to minimize environmental impact and meet consumer needs. Implementation: Considering the entire product lifecycle and identifying opportunities for improvement.
- **Reduce:**
Minimizes material usage, energy consumption, and waste generation. Implementation: Designing products with fewer components and optimizing material usage.
- **Reuse:**
Extends product lifespan and reduces the need for new production. Implementation: Designing products with durable materials and modular components for easy repair or repurposing.
- **Repair:**
Facilitates product repairability, extending its useful life and reducing waste. Implementation: Modular designs, easy-to-source spare parts, and repair guides.
- **Refurbish:**
Restores products to like-new condition, reducing waste and supporting a circular economy. Implementation: Offering refurbishment services and designing products for refurbishment.
- **Remanufacture:**
Restores used products to like-new condition, conserving resources and reducing waste. Implementation: Designing products for easy disassembly and recovery of valuable components.
- **Repurpose:**
Considers alternative uses for products after their initial purpose, minimizing waste. Implementation: Designing products with repurposing possibilities or packaging that can be reused.
- **Recycle:**
Diverts waste from landfills and reduces resource demand through material recycling. Implementation: Using materials with high recycled content and promoting proper disposal and recycling practices.

Primary research and locating areas of the linear economy to improve

COMMON WASTE



- Why are single use plastics not good?
- Resource Depletion: Production relies on non-renewable fossil fuels, depleting resources and exacerbating climate change.
- Environmental Pollution: Improper disposal leads to plastic pollution, harming wildlife and ecosystems.
- Waste Generation: Short product lifespan contributes to a global waste crisis, with inadequate disposal and recycling infrastructure.
- Energy Consumption: Manufacturing consumes significant energy, contributing to greenhouse gas emissions.
- Lack of Circular Economy: Complex composition and low recycling rates result in wasted resources and perpetuate a linear economy.



E-Waste
Cables, chargers, and devices
Often cables and devices are discarded and can't be used once the device is replaced with a newer one. Waste of resources, and wires\phone parts could potentially be used and repurposed\repaired



Single use plastic– used for food. Packaging, GLAD wrap, Ziploc bags, rubbish bags.

Many examples of these single use packaging are common household items. Many products found have single use packaging which did not following the sustainability hierarchy. This



Single use plastics in beauty\skincare\bathroom products



Paper, cardboard– toilet paper, Paper towel, notebooks, newspapers, magazines



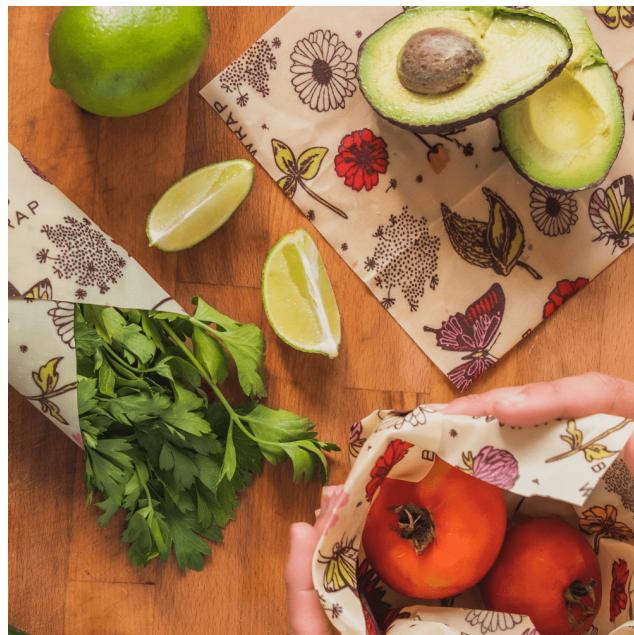
Clothing waste– damaged, ripped, or unused.– often can be re-spun.

Fabric and textiles

Secondary Research— evaluate products

Bee's Wrap

"From storing food in the kitchen, to packing sandwiches and snacks on the go, Bee's Wrap is a small sustainable swap that adds up to make a big impact."



1. Cradle to Cradle Design (C2C): Bee's Wrap promotes the creation of products that can be fully recycled, composted, or biodegraded at the end of their life cycle. Bee's Wrap's use of organic cotton, beeswax, jojoba oil, and tree resin enables its biodegradability and compostability, making it compatible with the C2C philosophy.
2. Dieter Rams' Principles of Good Design: Bee's Wrap can be evaluated based on Dieter Rams' principles of good design, which include factors such as simplicity, functionality, and environmental friendliness. Bee's Wrap exhibits simplicity in its design and purpose, offering a functional solution for food storage. Its emphasis on sustainability and reduction of plastic waste also aligns with Rams' principles of environmental friendliness.
3. Circular Design: Bee's Wrap embodies circular design principles by promoting reusability and reducing waste. It encourages a shift away from the linear "take-make-dispose" model of single-use plastic wraps and embraces a more circular approach. The wraps can be used multiple times and, at the end of their life cycle, they can either be composted or naturally biodegrade, closing the loop and reducing environmental impact.
4. The Three Pillars of Sustainability: Bee's Wrap can be assessed through the lens of the three pillars of sustainability: environmental, social, and economic. It demonstrates environmental sustainability by utilizing natural, biodegradable materials and reducing reliance on single-use plastics. In terms of social sustainability, it promotes awareness and behavior change towards more sustainable practices. Bee's Wrap showcases innovative use of materials and design to contribute to the field of sustainable food storage.

Soapack

"Soap bottles that become soap once you've used them. Soapack bottles will melt away once they are no longer a use to you. To make the product, a vegetable oil-based soap is dyed using plants, minerals and flowers. This is moulded and a layer of beeswax keeps the bottles waterproof before all the soap has been used. The bottles will dispose of themselves when in contact with water or when they're empty."



Strengths

- Sustainable Material: Soapack bottles are made entirely of vegetable oil-based soap, aligning with the pillar of environmental sustainability. This choice of material reduces reliance on plastic and offers a biodegradable alternative.
- Design Aesthetics: The use of pigments from minerals, plants, and flowers enhances the visual appeal of Soapack bottles, aligning with the design principle of aesthetics. This attention to aesthetics can attract environmentally conscious consumers who appreciate well-designed products.
- Innovation: Soapack's concept of using soap as packaging demonstrates innovation in sustainable design. This approach challenges conventional packaging practices and promotes a more environmentally friendly solution.

Weaknesses

- Durability and Protection: Soap-based packaging may have limitations in terms of durability and protection compared to traditional plastic packaging, potentially impacting product integrity during transportation or storage.
- Limited Product Compatibility: The suitability of Soapack bottles for different toiletries or liquid products may vary. Compatibility issues with certain formulations could limit the range of products that can be packaged in Soapack bottles.

Opportunities

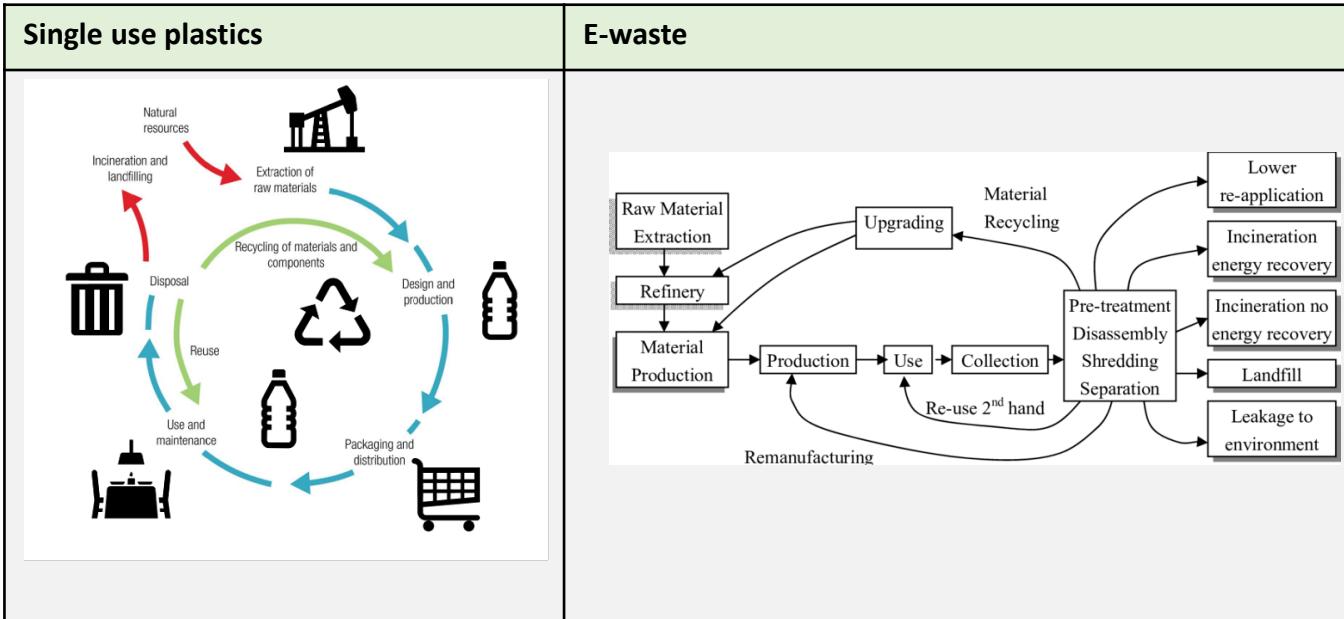
- Sustainable Branding: Soapack bottles provide an opportunity for brands to align themselves with sustainability principles and showcase their commitment to environmental responsibility. This can lead to enhanced brand perception and increased consumer loyalty.
- Market Differentiation: Soapack's innovative and eco-friendly design can differentiate brands from competitors who continue to use traditional plastic packaging. This uniqueness can attract environmentally conscious consumers seeking sustainable alternatives.

Threats

- Consumer Perception: The acceptance and adoption of soap-based packaging may face challenges due to consumer skepticism or resistance to change. Education and effective communication about the benefits of Soapack bottles would be crucial to overcome these barriers.
- Cost and Scalability: The production costs of Soapack bottles and their scalability to meet market demands may pose challenges. Achieving cost-effectiveness while maintaining quality and sustainability could be crucial for market success.

Focusing on circular products and linear products

Flow diagrams of the use/life cycle of:



Secondary research: right to repair.

Right to Repair is a strong sustainability focused brand that promotes repairability, aligning with circular economy principles. Its strengths include commitment to sustainability and consumer empowerment. However, challenges lie in limited brand awareness and manufacturer resistance. Opportunities exist in growing consumer demand and collaborations with manufacturers. Threats include legislative barriers and rapid technological advancements. Overall, Right to Repair strives to make a significant impact in fostering sustainability.

What stops a product from being a part of the circular economy?

- Single-use mindset: Design approach prioritizing convenience and immediate functionality, disregarding durability and reuse.
- Planned obsolescence: Intentional design strategy for products with a limited lifespan, driving repeat purchases and discouraging repair or reuse.
- Lack of repairability: Products not easily repairable or replaceable due to integrated components, proprietary parts, or specialized tools.
- Non-standardized components: Variations in product design hindering finding compatible replacement parts or accessing repair services.
- Fast-changing trends: Industries where products quickly become outdated, leading to a disposability culture driven by the need to keep up with trends.
- Cost considerations: Economic factors favoring low-cost manufacturing over repairability and sustainability.

What stops a product from being a part of the circular economy?

Lack of Repairability	Key Aspects
Integrated Components	Products designed with integrated components that make it difficult to access or repair individual parts.
Adhesive Bonding	Use of adhesives instead of mechanical fasteners, making disassembly challenging and often resulting in irreversible damage.
Proprietary Parts	Dependence on proprietary parts or specialized tools that are not easily accessible, limiting repair options to authorized centers.
Design Complexity	Complicated internal structures, miniaturization of components, and intricate wiring systems that hinder diagnosis and repairs.
Lack of Documentation	Inadequate availability of service manuals, repair guides, and technical information, making repairs more challenging.

Research into green/eco friendly materials:

RECYCLED COTTON Recycled cotton is produced using either post-industrial or post-consumer waste. Recycled cotton helps to prevent fashion waste from ending up in landfill. **ORGANIC BAMBOO (AKA BAMBOO LINEN)** When bamboo is harvested, it can be done without killing the plant itself. That means that bamboo can renew quickly. Bamboo consumes more CO2 than some trees. It doesn't require a lot of inputs and can survive on rainfall alone.

ECONYL To cover our recycled material basics Econyl is simply recycled nylon. It uses synthetic waste from ocean plastic, abandoned fishing nets, waste fabric and forms them into new nylon fabric. While it feels exactly the same as nylon, this fabric is made using a closed-loop system, and doesn't require as much water.

Material	Pros	Cons	Typical Uses
Bamboo	Highly renewable and biodegradable	Energy-intensive processing	Flooring, furniture, structural elements
Cork	Renewable and biodegradable	Limited availability, relatively higher cost	Flooring, wall/ceiling coverings, sealing
Recycled Plastic	Durable, versatile, reduces plastic waste	Quality degradation with repeated recycling	Building materials, furniture, decking
Reclaimed/Sustainable Wood	Aesthetically pleasing, reduces environmental impact	Additional treatment/processing, limited availability of reclaimed wood	Building materials, flooring, furniture
Straw Bales	Sustainable, good insulation properties	Limited load-bearing capacity, vulnerability to moisture	Construction of walls, insulation

Initial ideas

Design criteria

Aim:

Products, services, and environments to be redesigned to extend their useful life beyond their original intended purpose

Design criteria DC's: colour coded

DC1: Redesign of an existing product from the linear economy - for the circular economy

DC2: Manufactured from products which would be landfill

DC3: Re-usable and repairable - durable, and designed for disassembling

DC4: Sustainable Materials: Use responsibly sourced, renewable, and recyclable materials to minimize environmental impact.

DC5: innovative, long lasting

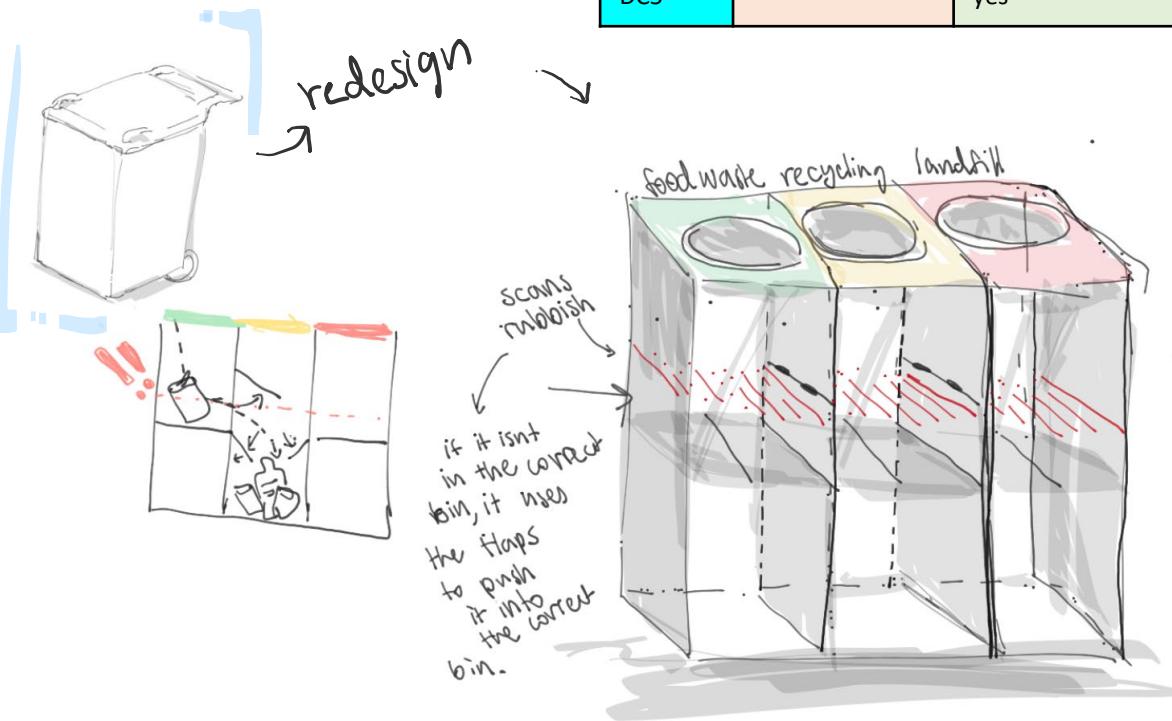
Must consider:

Cost and profitability

Energy and water consumption

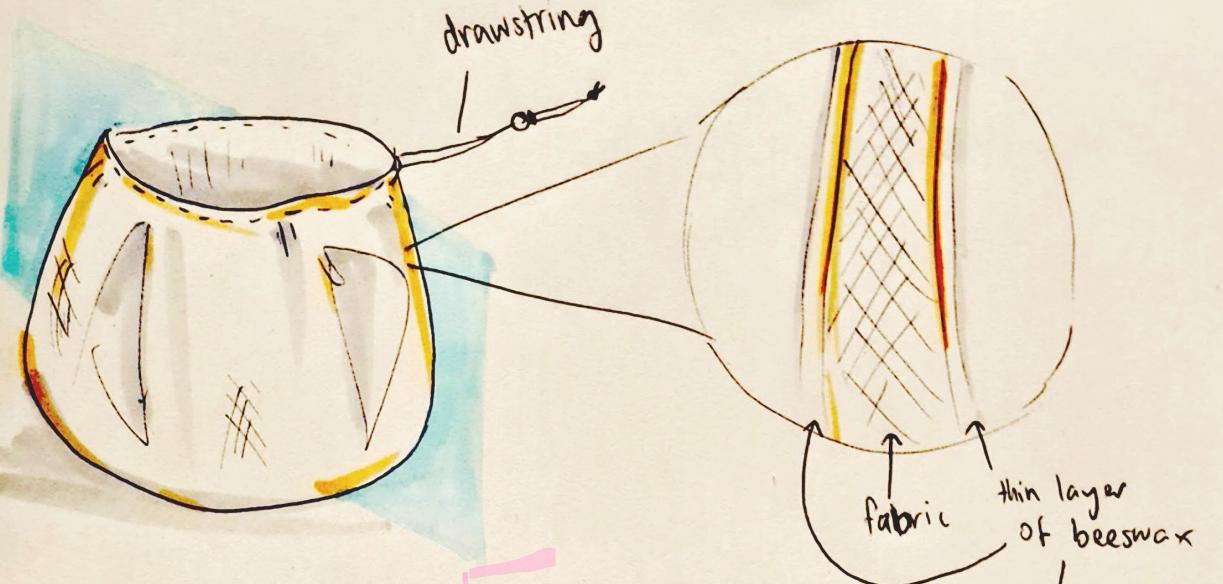
Influence on society - will they try to be more sustainable?

DC1		Yes- redesign
DC2	no	
DC3	no	
DC4	no	
DC5		yes

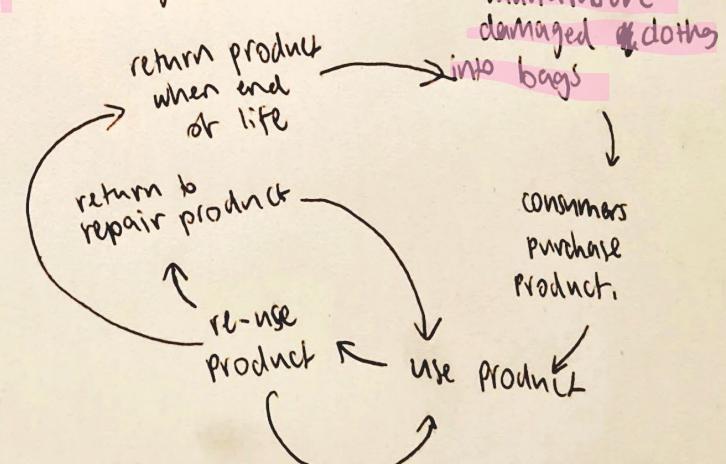


DC1		yes
DC2		yes
DC3	Not designed for disassembling	Re-usable
DC4		yes
DC5		yes

often wasted: textiles, clothing, (food) single use plastic



textiles & clothing are often thrown away by charities like salvation army which cannot use ripped or damaged clothes. sustainable sourced material



consider:
 -> if it is drawstring needs a plastic/wooden bead?
 -> can it decompose?
 -> will fabric from 2nd hand be able to break down?
 -> dyes may be harmful.

features:
 -> waterproof
 -> re-usable
 -> multi-purpose
 -> use in place of plastic wrap
 -> store items
 -> store food
 -> durable

Part B- design brief and criteria

Design Brief

The redesign problem centers around identifying products, services, or environments that have a limited useful life and exploring ways to extend their sustainability. The focus is on reimagining these entities to enhance their economic, social, and ecological impact on human well-being. The redesign should align with the principles of sustainable design, considering its long-term viability, positive societal contribution, and reduced environmental footprint. It should emphasize circular design approaches, such as reusing, repurposing, or recycling materials and components, to promote a closed-loop system.

Two main product designs fulfill the criteria the most—

1. the paper clay, compostable bottles to replace cosmetic bottles. They are made from paper which is too small for curbside recycling which would usually end up in landfill when it could have been recycled. This innovative, sustainable design will prevent unnecessary plastic from being used for bottles, while also recycling the paper scraps which usually end up in landfill.
2. the diy soft plastic bag. Programs like redcycle have shut down, so soft plastics are filling up landfill at a quicker rate. These kits engage users to have fun while being sustainable by sewing pre-sewn soft plastics together to create a strong, sturdy, reusable bag. The bag also uses textiles which would have been thrown away for the handle. Users can easily repair it, and when it becomes hard to repair, they can easily separate the textile handle from the soft plastic with scissors.

This both of these products help to solve/reduce the problem of recyclable items ending up in landfill— which is becoming increasingly problematic as landfill dumps get larger, and pollution enters oceans, and harms wildlife.

Aim:

Products, services, and environments to be redesigned to extend their useful life beyond their original intended purpose

DC1:

Redesign of an existing product from the linear economy— for the circular economy

DC2:

Manufactured from products which would be landfill

DC3:

Re-usable and repairable— durable, and designed for disassembling

DC4:

Sustainable Materials: Use responsibly sourced, renewable, and recyclable materials to minimize environmental impact.

DC5:

innovative, long lasting

Note:

must consider whether the design opportunity is profitable for economic sustainability of both the customer and company

Must influence community to make more sustainable choices— whether that be through the product or more.

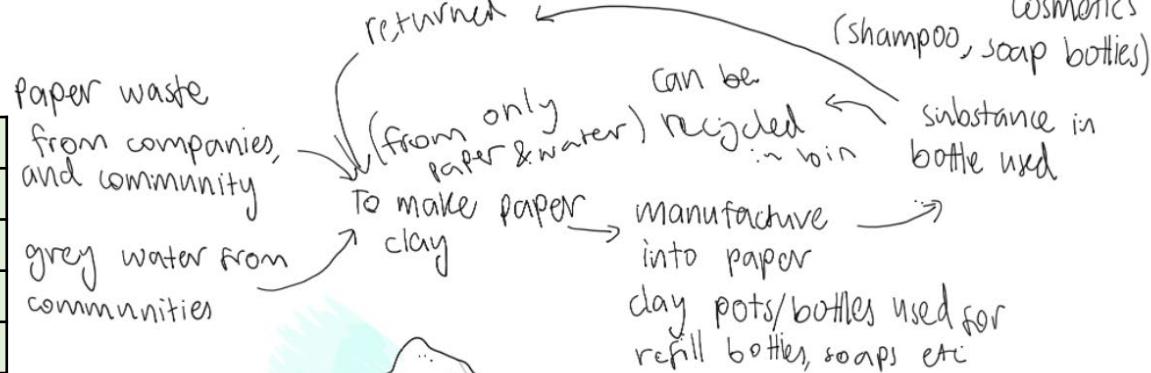
Initial ideas

SCAMPER to improve ideas

SCAMPER

Paper waste idea + to extend the life of single use plastics in bottles/cosmetics

DC1		yes
DC2		yes
DC3		yes
DC4		yes
DC5		yes



Stakeholder feedback:
This is very cool, and would definitely lower the amount of plastic waste my household goes through. We often purchase plastic bottles a lot - this would significantly reduce it.

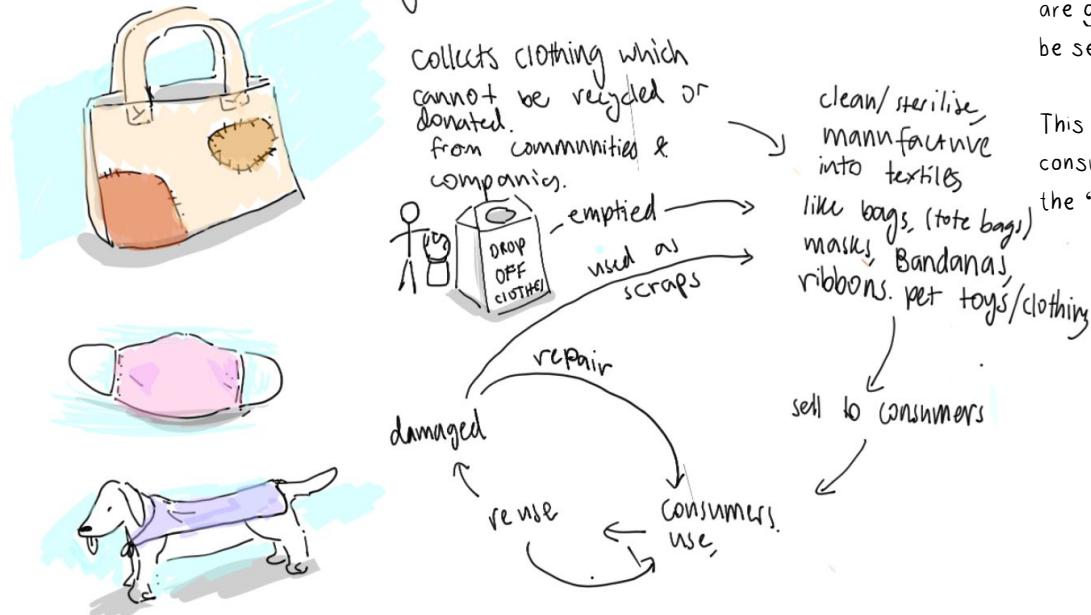
no dyes/colours so it is easier to continue the recycling process

SCAMPER - bag idea + kits
Rather than selling the bags/recycled products, the fabrics can be sold as a kit for consumers. This could be a fun activity for kids or anyone, as the fabric cuttings are given to the correct sizings, and can be sewn by the consumer.

This also brings in the IKEA effect - consumers feel more satisfied because they 'made' the product.

DC1		yes
DC2		yes
DC3	no	repairable
DC4		yes
DC5	no	

waste → bag idea + clothing waste.



Stakeholder feedback:
I like that this is made directly from soft plastic bags. It seems like a fun activity to make these, even for kids. I think the patterns would be quite cool, and it would be very fun to customise.

SCAMPER - bag idea + kits + soft plastic waste
The soft plastic bags which cannot be recycled in curb side or Redcycle can be used to make the bags.

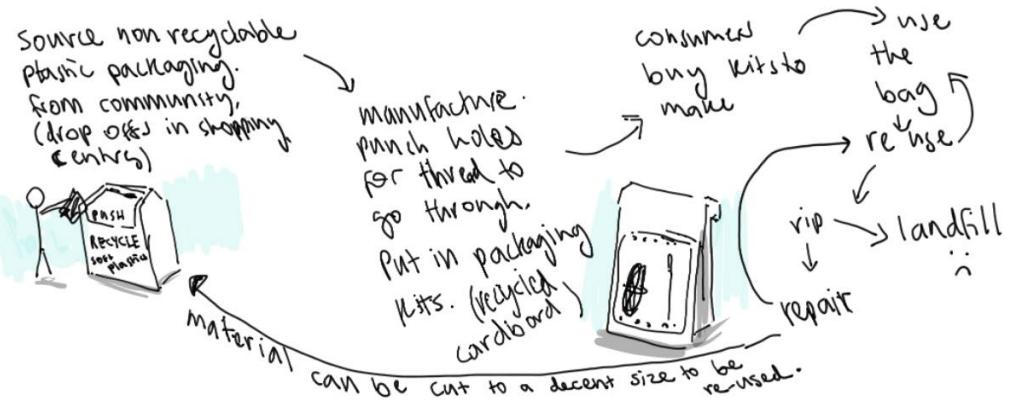
Single use plastic + bag idea + textile waste + paper waste



many packaging bags can't be recycled because of the foil lining inside the soft plastic. however, the plastic and foil inside makes the bag considerably stronger.

DC1		yes
DC2		yes
DC3		yes
DC4		yes
DC5		yes

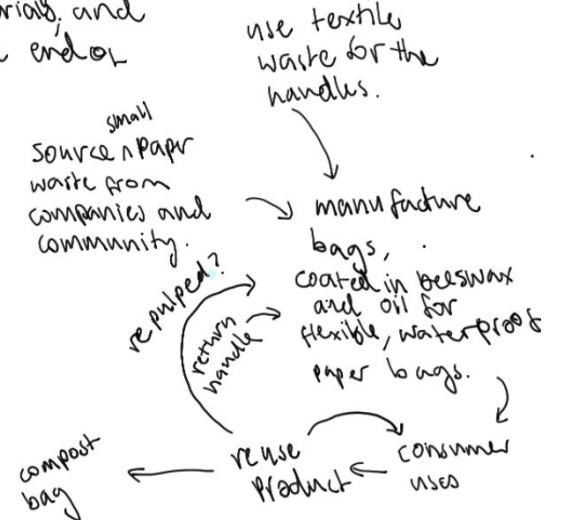
DIY bags



Paper idea + textile food bag idea.

many reusable shopping bags aren't made from recycled materials, and end up in landfill at the end of their use.

use paper waste to create re-usable bags.





Prototyping with paper clay

- ↳ this would work if it had some sort of lining inside to hold the soap/shampoo substance.
- ↳ the container is porous, so the contents may dry out.
- ↳ collection of small paper/cardboard will be a struggle, and it won't be collected by many households.
- ↳ because of this, it may be hard to earn money from this idea.

stakeholder feedback

- "I think this is a good idea but I would have trouble collecting the small paper bits, and then it is more annoying to have to drop them off somewhere."
- "I like that they are compostable, but if they need a plastic lining, that kind of ruins the point of it."



Prototyping plastic bags.

- ↳ very strong - holds 4kg. at least.
- ↳ handles are stitched on - designed for disassembling - just cut.
- ↳ beneficial for extending the useful life of the packaging.
- ↳ kits to make the bags.

top view of bag
↓



"I think this product is very useful, and would last for a while before having to be repaired/thrown away. also, having it be buildable by the consumer is fun and engaging - like a mindful activity."

Stakeholder feedback indicated the bag made of soft plastics is better in terms of sustainability, longevity, and purpose to the stakeholders.

Sustainable packaging - made from paper waste

collect soft plastics from drop off points

source paper waste for packaging



ink is only black - stops the unnecessary mixing of dyes. the packaging can be recycled in curbside.

landfill

return for potential use

rips - user can easily repair

re-use

consumers make and use bags.

SWOT STRENGTHS

WEAKNESSES

OPPORTUNITIES

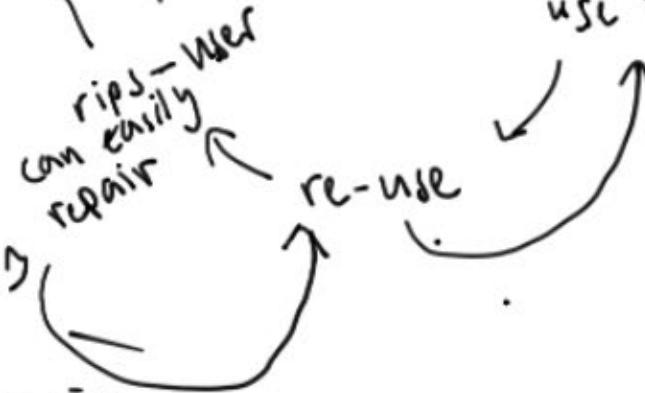
THREATS

- extends the useful life of soft plastics
- made from recycled materials
- good for kits

→ has to be thrown away at the end of its life. (but extends its life)

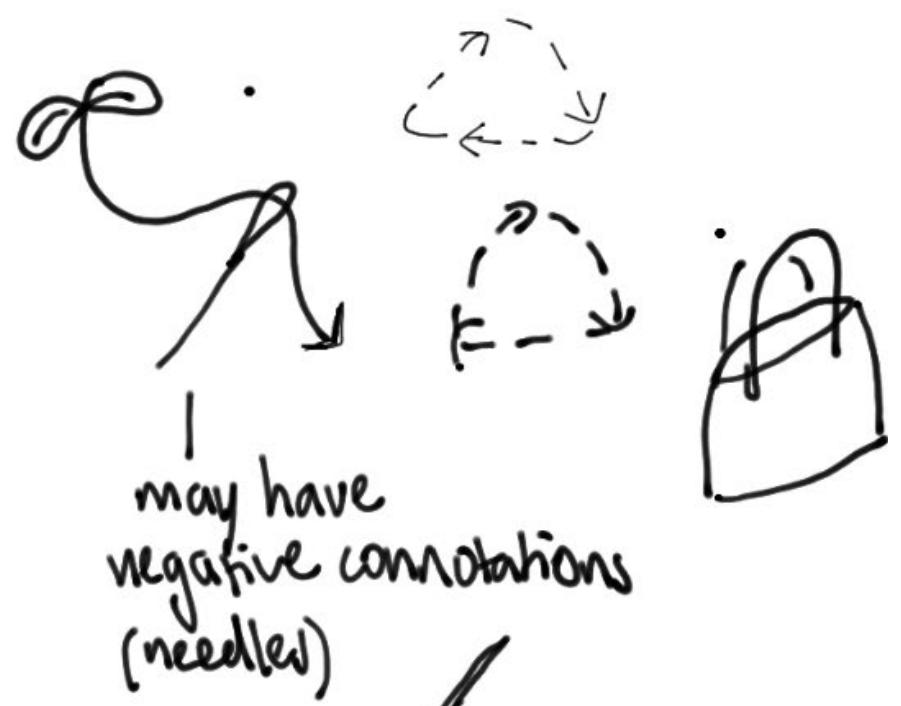
- profits from selling product.
- energy consiory
- ↳ solar power
- water walk?

not recycled enough soft plastic from community? wasting energy?

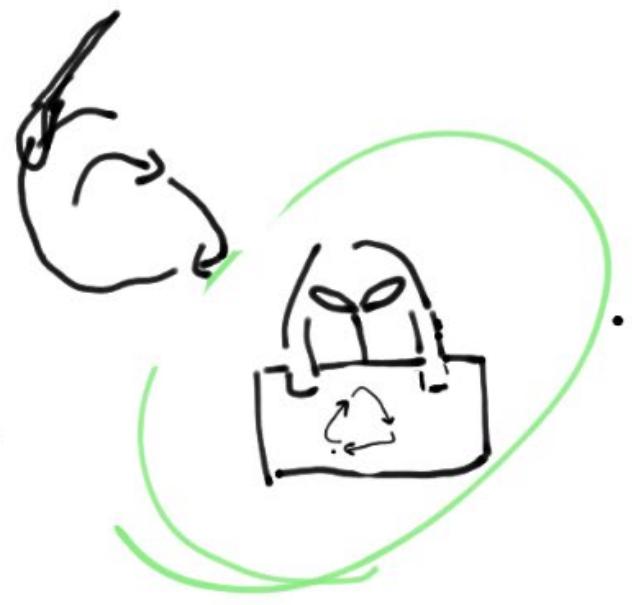


logo brainstorming

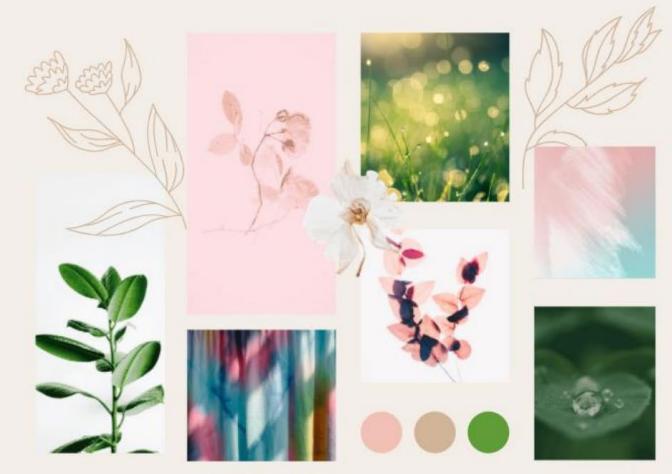
ICONS



The colours have a peaceful character, while using natural colours like tan and green.

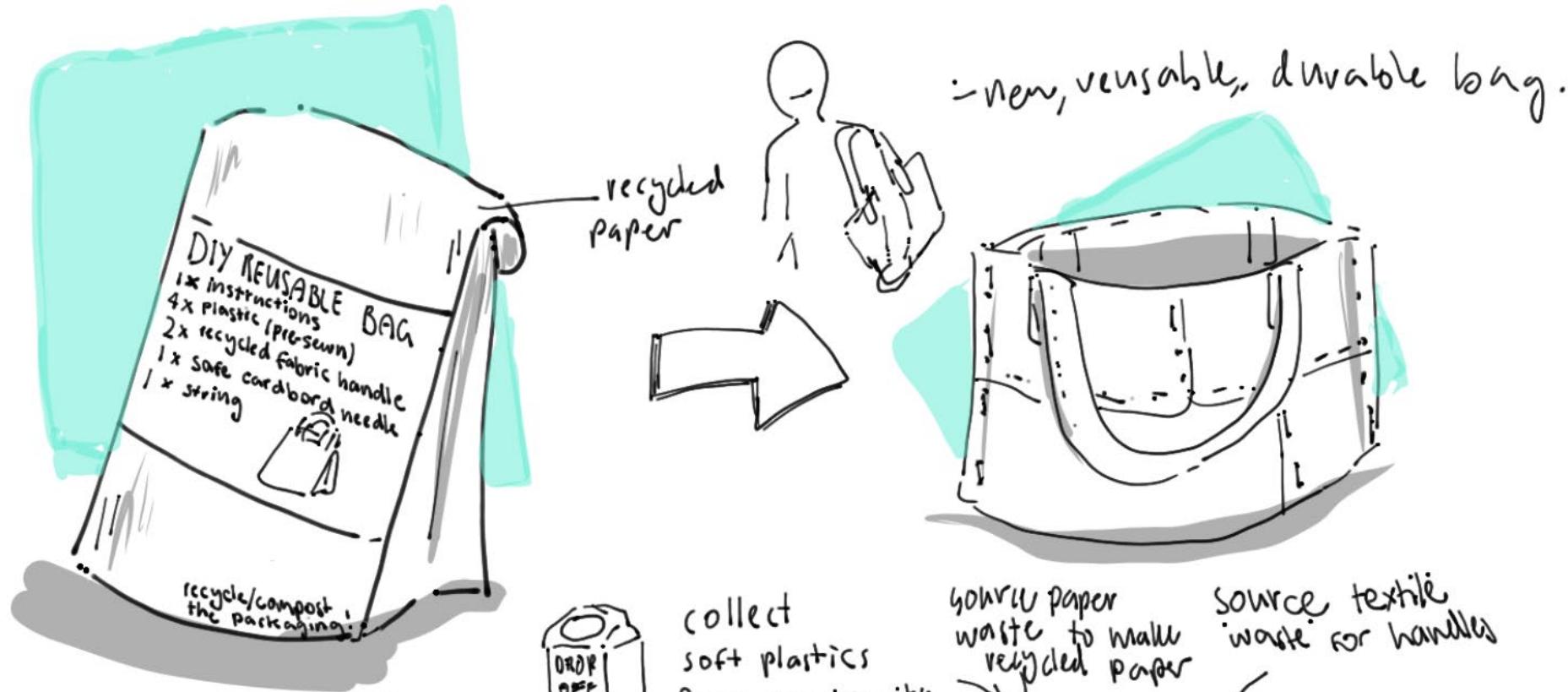


SCRAPS. LOVE



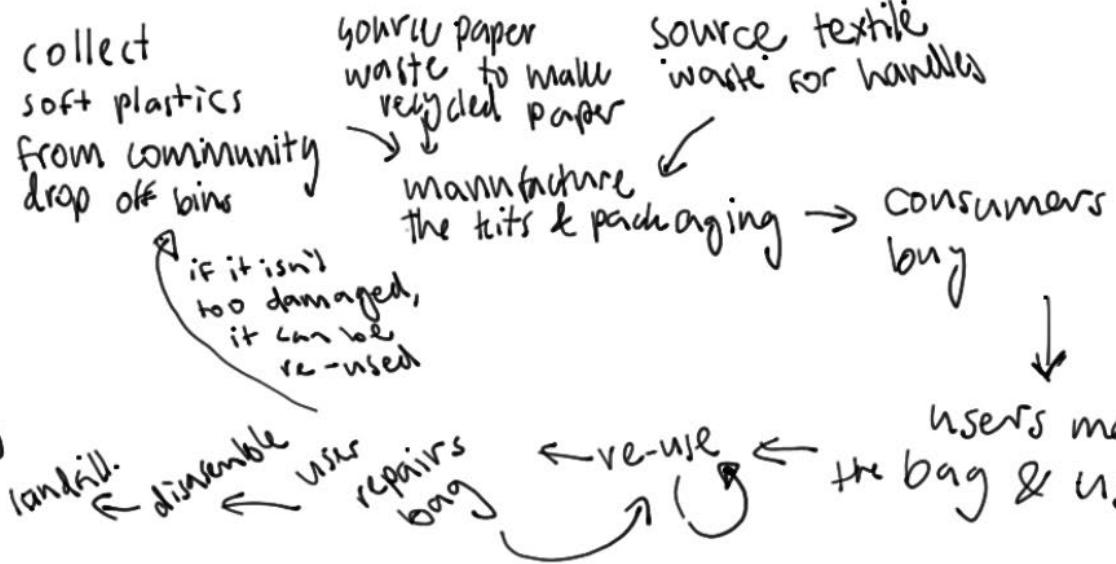
Moodboard
 This moodboard captures the intended vibe of the overall store. It uses calm, lush and welcoming images, that use soft and fresh textures. The typography allows for text that is easy to read and clean, not messy.

Final idea + evaluation



Simple, clean logo for the company - playful, but sustainable, with the handle of the a bag.

This service/product successfully extends the useful life of the packaging.
 ↳ uses its strength, and waterproof nature to its advantage as a bag.
 ↳ effective in the circular economy
 ↳ provides social sustainability - mindful activity as well as environmental & economic



Good for economic sustainability. Consumers will buy this product, even if they don't care too much about being sustainable - because it has a use outside of being 'just an activity' it can be used and reused. This means this product/service will be profitable for the company, and useful and valuable for the user.



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