



Circular Economy

What is a circular economy?





Production cycles

- *"80% of a products environmental impact can be determined at the design stage"*

ellenmcarthurfoundation.org

By designing with circular economy principles, we can create clothing which lasts longer, can be more easily repaired, reused and finally recycled. We can create fabrics which improve soil quality rather than pollute it, and we can create equitable work for people around the world.

- 100% resource use in production.
- Renewable, recyclable or biodegradable resource inputs.
- Resource recovery; maximising economic value of product return flows.
- Product life extension, wasted materials are maintained by repairing and remanufacturing.
- Shared Platforms to promote collaboration among users
- Product as a service, transitioning from previous ownership models to leasing pay for use arrangements



Ellen Mac Arthur Foundation



Resource vs Innovation Strategies



Re-use, repair, repurpose an item you no longer wear

Identify the end user, what could we design with re used and repurposed materials

Take, wear, throw away



Care, share, repair

Slowing the resource loops- Secondhand-shops
- Online, swap communities

Closed slowing- Care & Repair services

Closing the resource loops-Recycling, multiple re use
,take back schemes, leasing systems, rentals, clothes libraries



Narrowing the loop-using less materials in manufacture process

Closed Narrowing-reducing packaging, biofabrication

Open closing-using recycled materials



Love your Clothes

Use, Care and Repair

Knowledge share to keep our clothes in circulation

- Pre-loved, Identifying Quality and Ethical Trading.
- Washing, drying and Ironing techniques
- Repairs & Alternations
- Stain removals
- Recycling
- Swapping/Sharing
- Charity Shops
- <https://www.loveyourclothes.org.uk/>



Zero Waste Design



Innovations at the design stage to design out waste

- Buttons and zips that can be easily removed without losing fabric
- Fabrics with stretch that can easily be recycled
- Design using bacteria, pigment onto silks to dye fabric naturally using nature
- Using Avocado, onion, turmeric, beetroots to naturally alter colours

BioFabrication



Using synthetic biology; to redefine our material future, example

- "leather" made from mushrooms and superstrong yarn made from spider-silk protein.
- kombucha-based material that can be used like fabric or vegetable leather to make clothing. (<https://www.mycoworks.com/>)
- Langoustine shells replacing polymer

The Jeans Redesign



Supporting 70+ organisations worldwide committed to taking action and make fabric within circular economy guidelines

- **MUD** makes, rents and recycles organic cotton jeans since 2012.(Netherlands)
- **Unspun**-eliminates all cutting waste following a 'made to order' circular business model.

90% Organic content

82% recycled content

Rivet elimination

94% phase out of chemicals

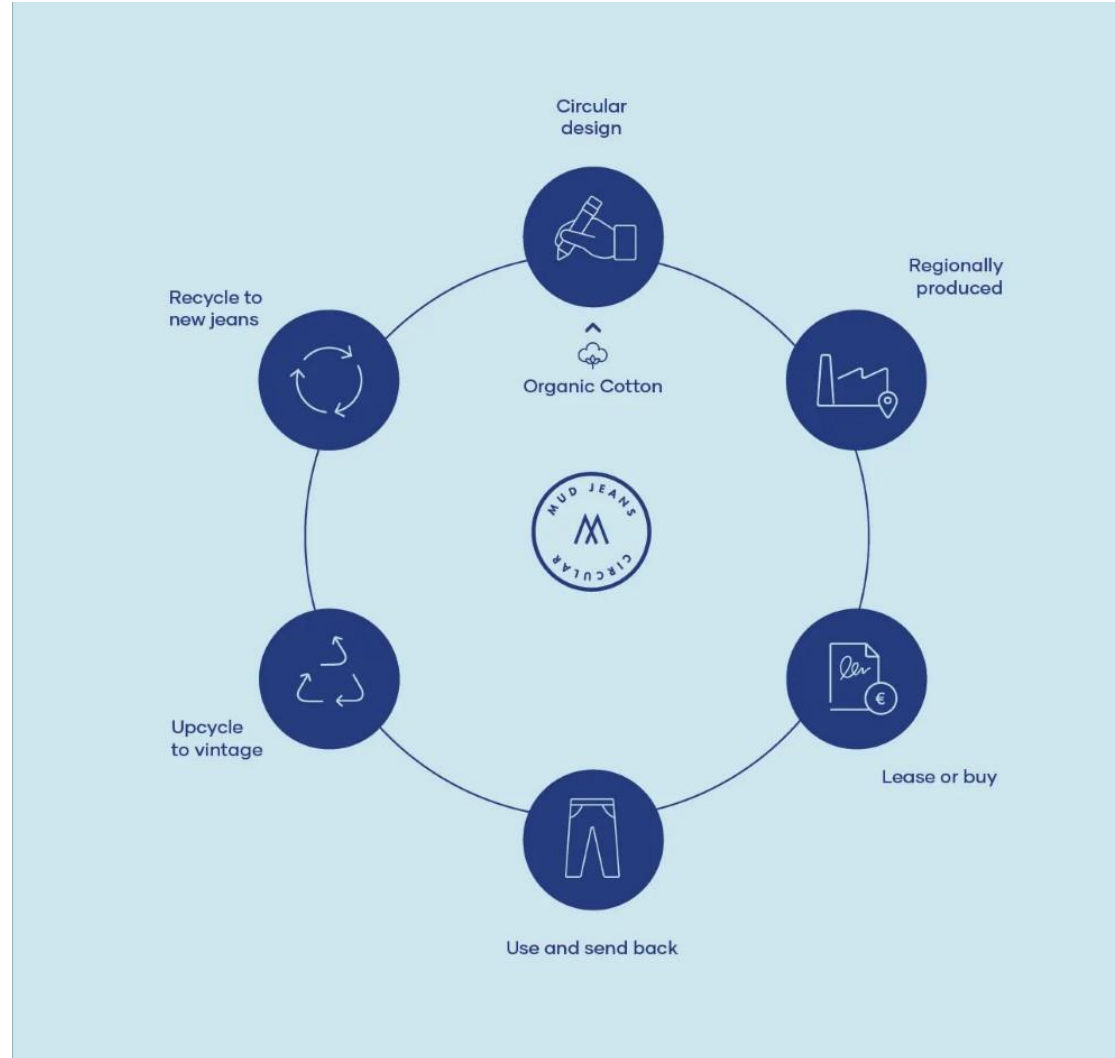


Eliminated finishing processes eg sandblasting, stone finishing

Durability testing

Built in traceability using QR codes

Circular Design



TECHNOLOGY FOR A CIRCULAR ECONOMY FASHION INDUSTRY

Teijin along with other Japanese companies such as Toray Industries Inc. and Jeplan Limited are global leaders in closed loop systems and technologies for material processing.

Polyester used to make clothing is called polyethylene terephthalate (PET) which is also used in the manufacture of plastic bottles. New chemical technology can process used plastic bottles into uniforms, sportswear and fashion.

THE TEIJIN ECO-CIRCLE™

Teijin Limited has been working with schools in Japan since 2010 on return systems for polyester school uniforms that can be recycled and made into new products. The technology can also be used in fast fashion and sportswear such as football strips called Eco-Circle™.

CEW TASK

Read the clothing labels in your wardrobe.

How many clothes in your wardrobe are made from polyester or are mixed fibres?

Count how many different fibres your clothes are made from. Do you know which ones are natural and which are synthetic?

Find out more: www.lynnwilson.co.uk
Lynn Wilson, FRSA



WINSTON
CHURCHILL
MEMORIAL



Case Studies

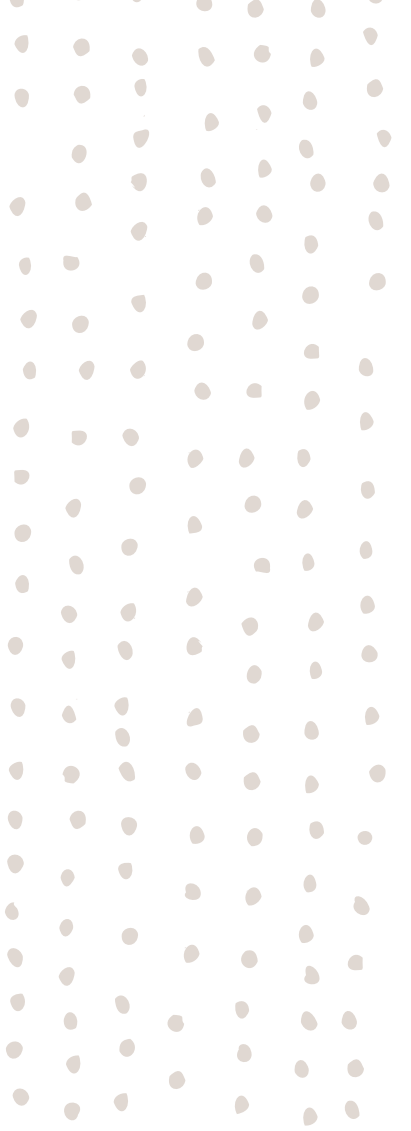
- **Teemil** (only make what they need and use organic cotton, offsets extra costs by minimising other places) Packaging made from plants, powered by renewable energy and discount scheme where they get a discount on next order when recycled.
- **Patagonia** 'Worn Wear' second hand sales since 2017, trade in and repairs, testing rentals initiative, and designing Tee-Cycle, zero waste T shirt made from old t shirts. Investment in wind & solar.
- **Aday**-uses fibres made from seaweed from the Icelandic coast with 82% of mills with water recycling & purification systems.
- Italian designer **Salvatore Ferragamo** released a collection from leftover orange peel (700,000 tonnes discarded yearly in Italy alone)
- **Good on you** is an American app which rates brands (credentials directory, worker conditions, materials used etc)



Irish Circular business models

- Pure Clothing <https://www.pureclothing.ie/pages/our-supply-chain>
- Upcycled dead stock materials and citrus byproducts <https://www.feri.ie/>
- Wetsuits onto purses tote bags etc <https://theupcyclemovement.com/pages/our-story>
- Footwear from apple peels <https://samplafootwear.com/>
- T shirts, hoodies, sweaters from recycled PET blended with organic offcuts <https://www.duesouth.ie/>
- Clothing from recycled marine plastics <https://zizo.ie/>
- Baby Doll vintage; All products are second hand, biodegradable packaging and a tree planted to offset the carbon footprint of each order <https://babydollvintage.com/collections/all>
- Rentals; [The Borrower boutique](#), [Rag Revolution](#), [Covet](#), [Designer Room](#), [Ivory Closet](#), [Coco Boutique](#)





Task

Lets design the solution!

Exploring the Problem & the End User through design thinking

- Explore and formulate the problem
- Design
- Prototyping



PROBLEM STATEMENT:
How can we transition to a circular economy in the fashion industry?

The purpose of the ideation process is to come up with as many innovative ideas in relation to the problem statement as possible. Now that the creative muscles are warmed up we can get started.

You will need:

- Plenty of post-it notes in different colours if possible
- Pens, markers, crayons, pencils...
- A4 paper, one per person

Working in groups of six students (max.) let the students decide which aspect of Fast Fashion they would like to address.

- Re-Design
- Manufacture
- Re-Use and Repair
- Microfibres

Once they have picked a topic collectively each student individually writes down as many ideas they can possibly think off on individual post-it notes - give them 5 minutes for this activity.

Give them another 5 minutes to look at all the ideas and pick one each to develop further.

A4 sheet of paper

Lots of ideas on individual post-it notes



IDEATION ACTIVITY






PROBLEM STATEMENT:

How can we transition to a circular economy in the fashion industry?

The purpose of the ideation process is to come up with as many innovative ideas in relation to the problem statement as possible. Now that the creative muscles are warmed up we can get started.

You will need:

-  Plenty of post-it notes in different colours if possible
-  Pens, markers, crayons, pencils...
-  A4 paper, one per person

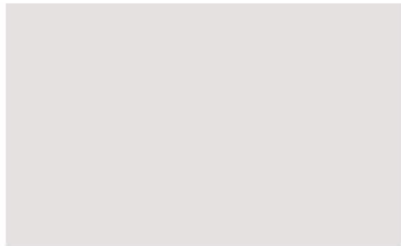
Working in groups of six students (max.) let the students decide which aspect of Fast Fashion they would like to address.

- Re-Design
- Manufacture
- Re-Use and Repair
- Microfibres

Once they have picked a topic collectively each student individually writes down as many ideas they can possibly think off on individual post-it notes - give them 5 minutes for this activity.

Give them another 5 minutes to look at all the ideas and pick one each to develop further.

A4 sheet of paper



Lots of ideas on individual post-it notes



SOLUTION SKETCH



Example Prototype



"The most sustainable garment is the one already in your wardrobe"-

Orsola de Castro, Fashion Revolution

Useful Links

<https://ellenmacarthurfoundation.org/topics/fashion/overview>

<http://sdgsforall.ie/wardrobe-change/>

<https://hollymcquillan.com/about/>

<https://www.loveyourclothes.org.uk/>

<https://www.circulareconomywardrobe.co.uk/>

<https://eu.patagonia.com/ie/en/stories/our-quest-for-circularity/story-96496.html>

<https://circulardesigninstitute.ie/>

<https://livinglightlyinireland.com/2017/02/02/sustainable-ethical-clothing/>

<https://emmagleeson.com/>

Ted Talks

https://www.ted.com/talks/natsai_audrey_chieza_fashion_has_a_pollution_problem_can_biology_fix_it

https://www.ted.com/talks/suzanne_lee_why_biofabrication_is_the_next_industrial_revolution

<https://www.youtube.com/watch?v=1mbqwOK9kNM>

