

STRATEGIES FOR CIRCULAR DESIGN

Linda Zamboni

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TRANSNATIONAL TRANSITIONS LAB

Digital Design for Circular Practices // VET

BIELLA,
ITALY

LECTURE_Strategies for circular design

Waste as a value

with Linda Zamboni



Linear economy & circular economy

“NATURE OPERATES ACCORDING TO A SYSTEM OF
NUTRIENTS AND METABOLISMS
IN WHICH THERE IS NO SUCH THING AS WASTE.”

from
“**Cradle to cradle**”
By McDonough and Braungart

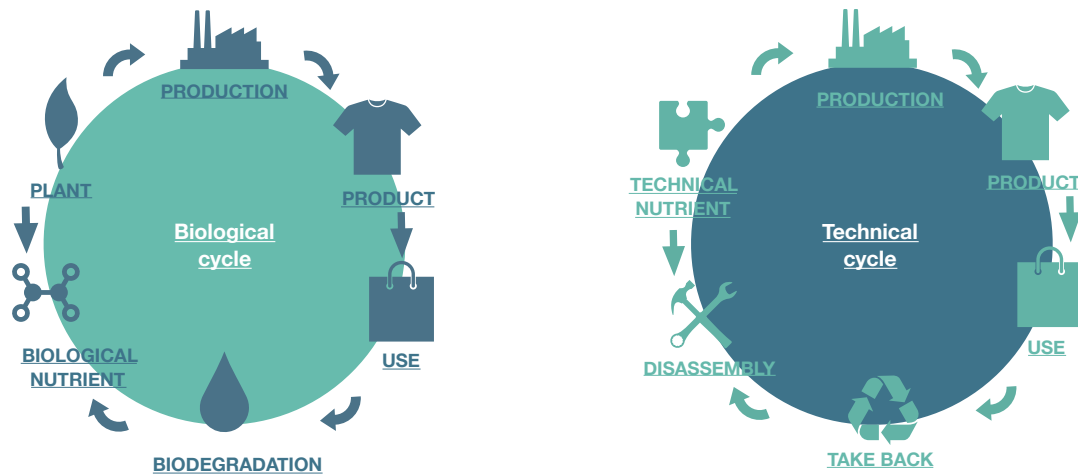
LINEAR ECONOMY



CIRCULAR ECONOMY



Biological & technical cycles



CE principles implies that all products and industrial processes should be designed in such a way to **enable the perpetual flow of the nutrients** (materials or final products) within two distinct metabolism, the biological and the technical cycles.



Rethinking fashion

The circular economy model proposes a sustainable alternative by emphasising the continual use of resources.

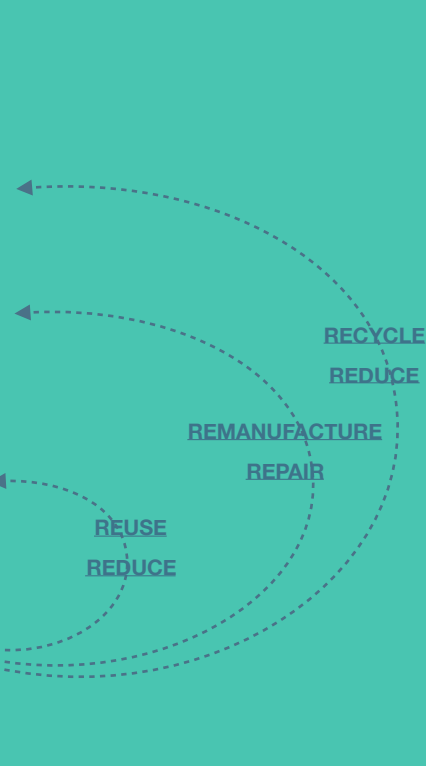
To effectively transition to a circular fashion economy, several strategies have been identified:

REDUCE, REUSE, REPAIR, RECYCLE and more, in order to provide a framework for reducing environmental impact at various stages of the product lifecycle and to avoid **WASTE**.

LINEAR ECONOMY



CIRCULAR ECONOMY



Where is waste generated?



PRE-consumer waste

Pre-consumer waste is the off-cuts, fabric scraps, rejected samples, and unsold stock.

&



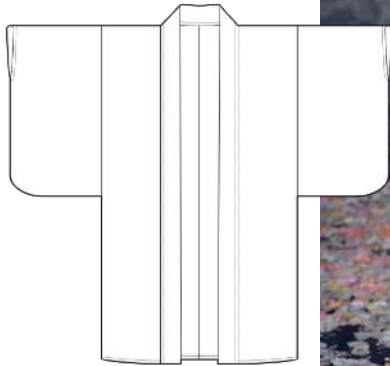
PRE-consumer waste

Post-consumer waste is made of goods that have been owned, used or unused, and ultimately discarded.

Pre-consumer phase strategies

1

Zero waste
pattern



>> Kimono jacket from Dior SS2019



#GEOMETRIC SHAPES



>> Zandra Rhodes Zero waste dress

Zero waste pattern



>> Upcycled draped dress from **Marine Serre SS20**

Pre-consumer phase strategies

2

Upgrading
technologies



**#pattern
optimisation
softwares**



**#3D virtual
sampling**



**#3D knitting
&
3D printing**

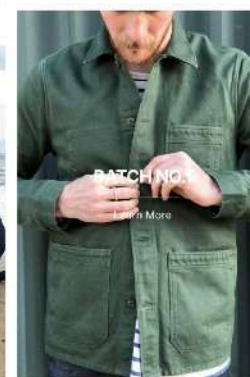
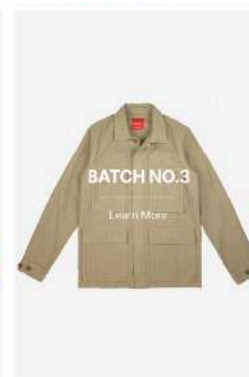
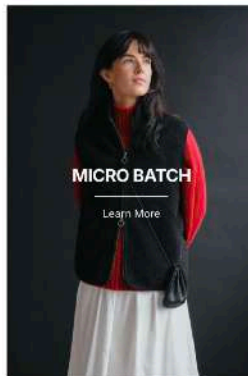
Pre-consumer phase strategies

3
Made
-to-
order

#LIMITED BATCHES

We think waste is a design flaw.

We have no stock room, because we have no stock. We make only what is ordered, and even returned jackets go to new homes from our waiting lists. The offcuts from our making process are recycled into new thread, or occasionally form collaborations, [like this one](#).



>> Batches archive from [Painter Jacket Co](#)

Post-consumer phase strategies

1 Design for material CYCLABILITY

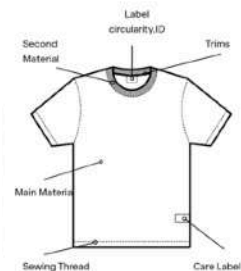
BIO AND TECH CYCLES

To ensure circularity in either the bio- or tech-cycle, it is necessary that all components of one product, including reinforcements, threads and trims, belong to the same cycle.



MONO-CYCLE APPROACH

All parts, even stitching yarns such as buttons, thread, size and care label etc will need to match the main material of the piece and its recycling cycle.



DISASSEMBLING

Products need to be designed in a way so that different materials can be recovered separately to be either recycled in the technical cycle or decomposed in the biological cycle.



Recycling & recovery components

1

Design for
material
CYCLABILITY

MONO-CYCLE
APPROACH

DISASSEMBLING



>>Disassemblable shoes development by Nike (Presto Clip, Zvezdochka, Link series, Link Axis)

Repairability and maintenance

1

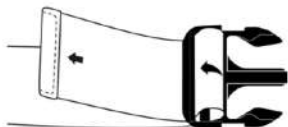
Design for
material
CYCLABILITY



15.00.03 LOCKMONSTER
BUCKLE
€0.00



15.00.12 SIDE RELEASE
BUCKLE
€0.00



>> Freitag online spare parts shop & repair service in flagship stores;

MONO-CYCLE
APPROACH

DISASSEMBLING

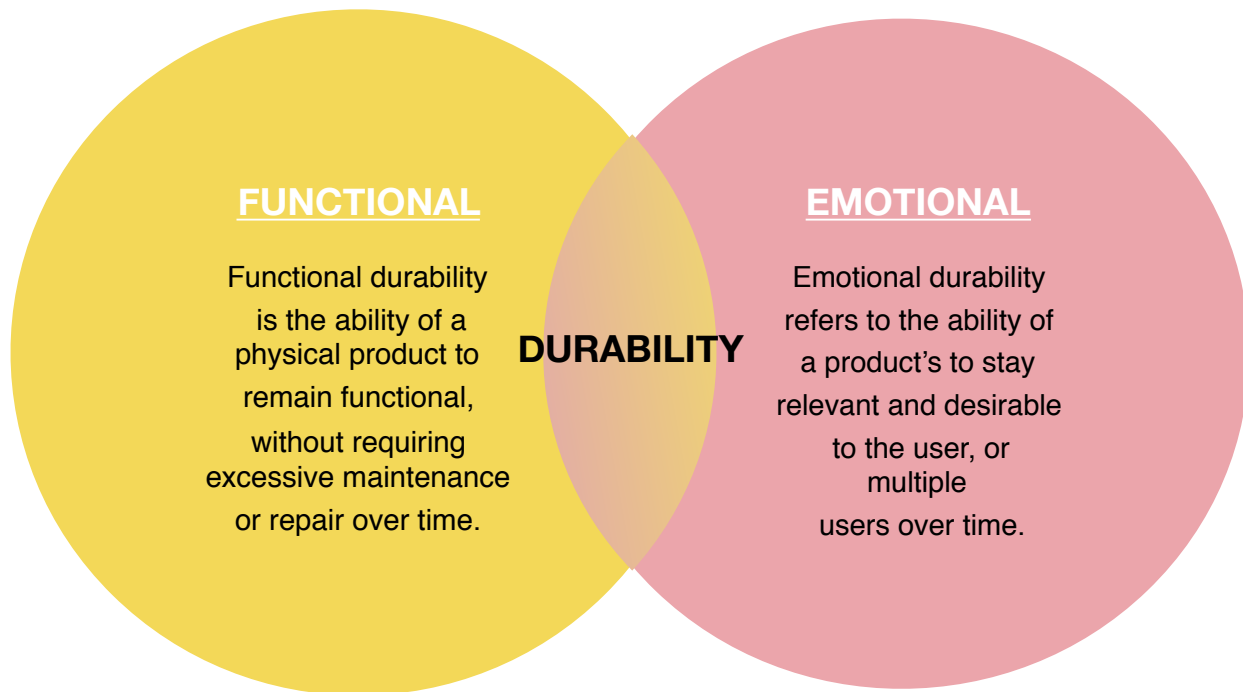


>> Freitag MONO[PA6] BACKPACK

How to extend the life cycle of products?

2

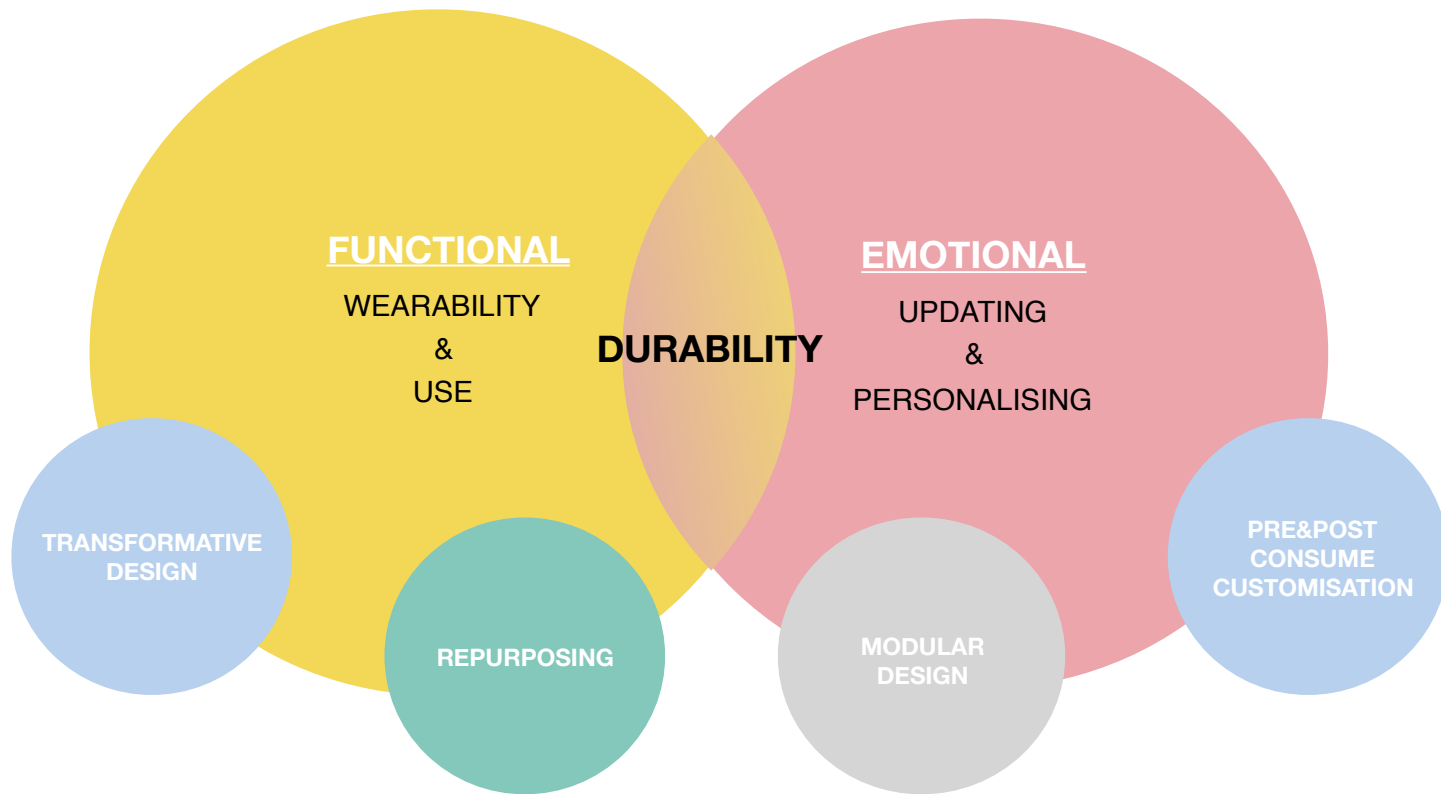
Design for LONGEVITY



Which are the design strategies?

2

Design for
LONGEVITY



#refreshing #updating

2

Design for
LONGEVITY

PRE & POST
CONSUME
CUSTOMISATION



>>Co-creation by **Golden Goose**

#adaptable

2

Design for
LONGEVITY

TRANSFORMATIVE
DESIGN



>> Transformative tailoring by Hussein Chalayan

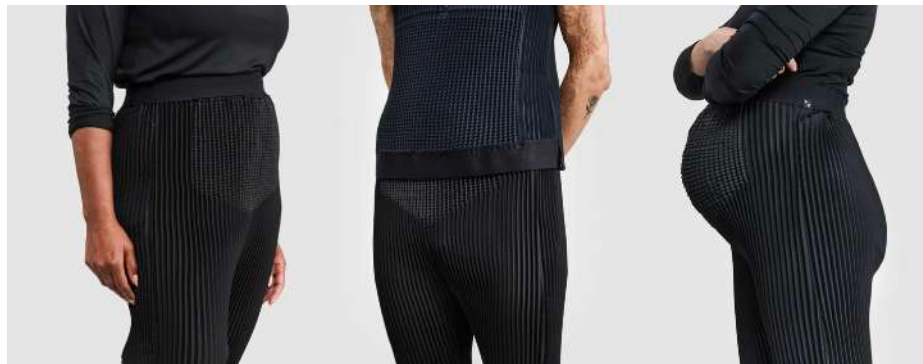
#inclusivity

2

Design for
LONGEVITY



TRANSFORMATIVE
DESIGN

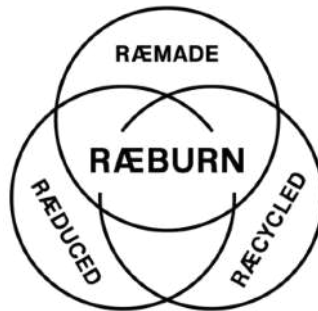


>>Expandable versatile outfits & accessories by **Petit Pli**

#zerowaste #recycled

2

Design for LONGEVITY



REPURPOSING



>> The RÆBURN Men's Air Brake Overshirt & RÆMADE Triple Spot Anorak by **RÆBURN**

transeasonal #adaptable

2 Design for LONGEVITY



MODULAR
DESIGN



>> Buildable & reversible outerwear by **Marfa Stance**

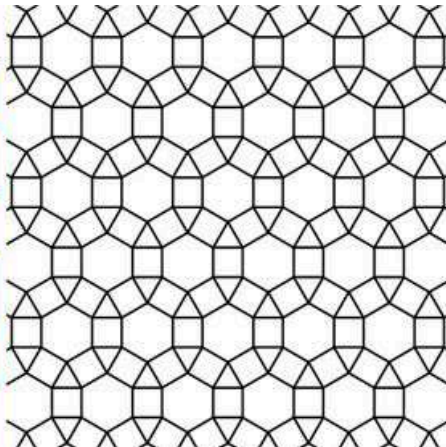
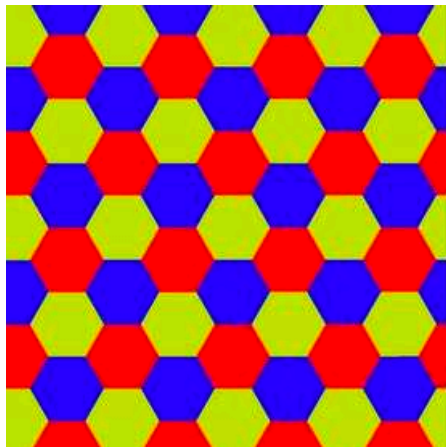
Introduction to **WORKSHOP_Zero waste design** Create a modular bag

Modular design

Modular design is a strategy that separates a product into smaller parts which can be used or be combined in either the same or a completely different product, *giving new life to obsolete unwanted goods*.

It brings many other advantages as it *reduces reliance on virgin raw materials*, as well as the energy needed to extract them, simplifying the repair of broken parts.

Tessellation



>>**Left:** An example of regular tessellation

Center: An example of semi-regular tessellation

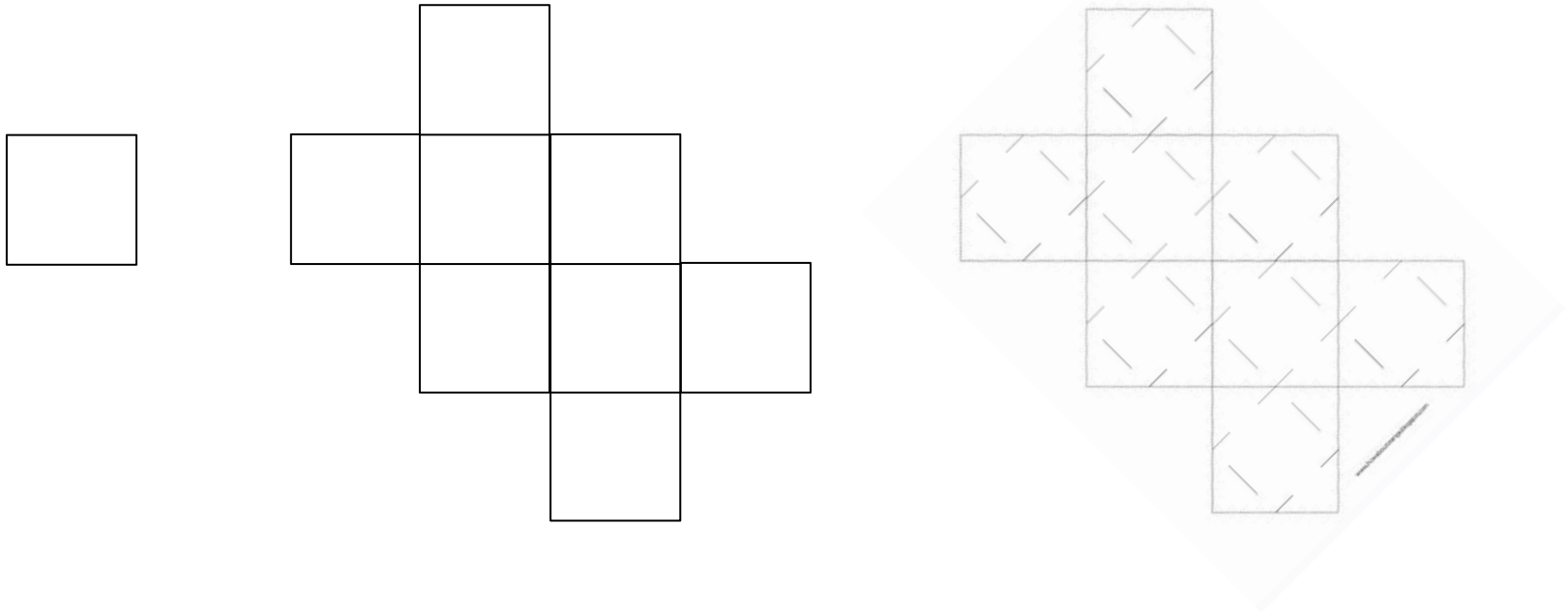
Right: An example of irregular tessellation

/ˈtɛsɪˈleɪʃn/

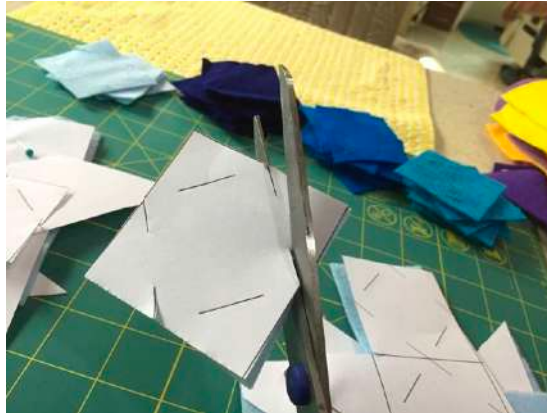
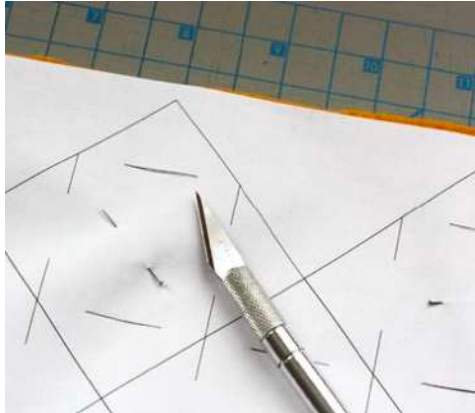
noun

the process or art of tessellating a surface, or the state of being tessellated.
an arrangement of shapes closely fitted together, especially of polygons in a repeated pattern without gaps or overlapping.

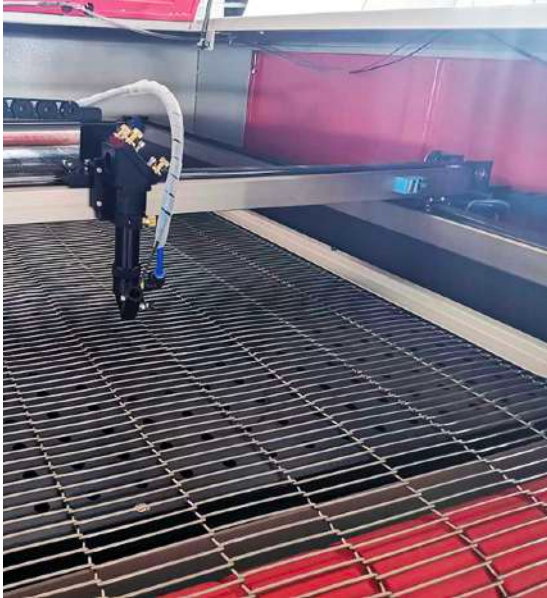
Phase 1 >> 2D DESIGN: Module & interlocking design



Phase 2 >> Paper prototyping: module & interlocking testing on paper



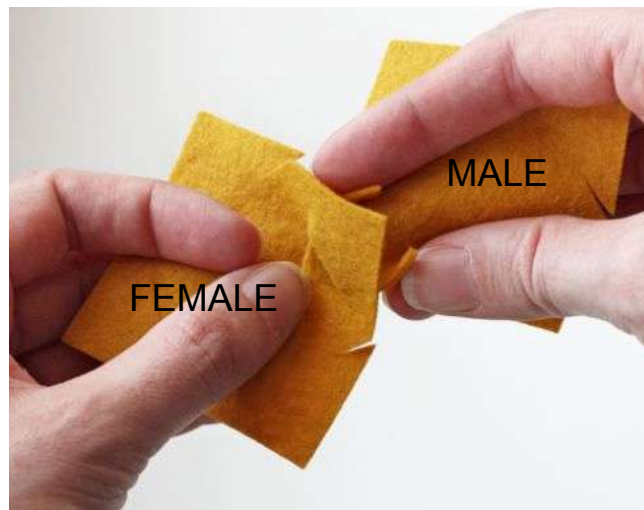
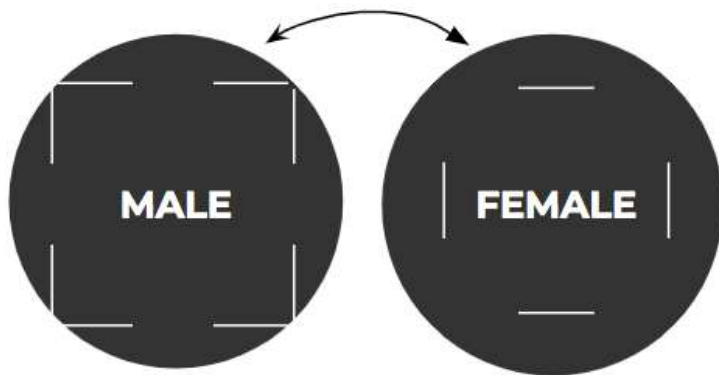
Phase 3 >> Laser cutting



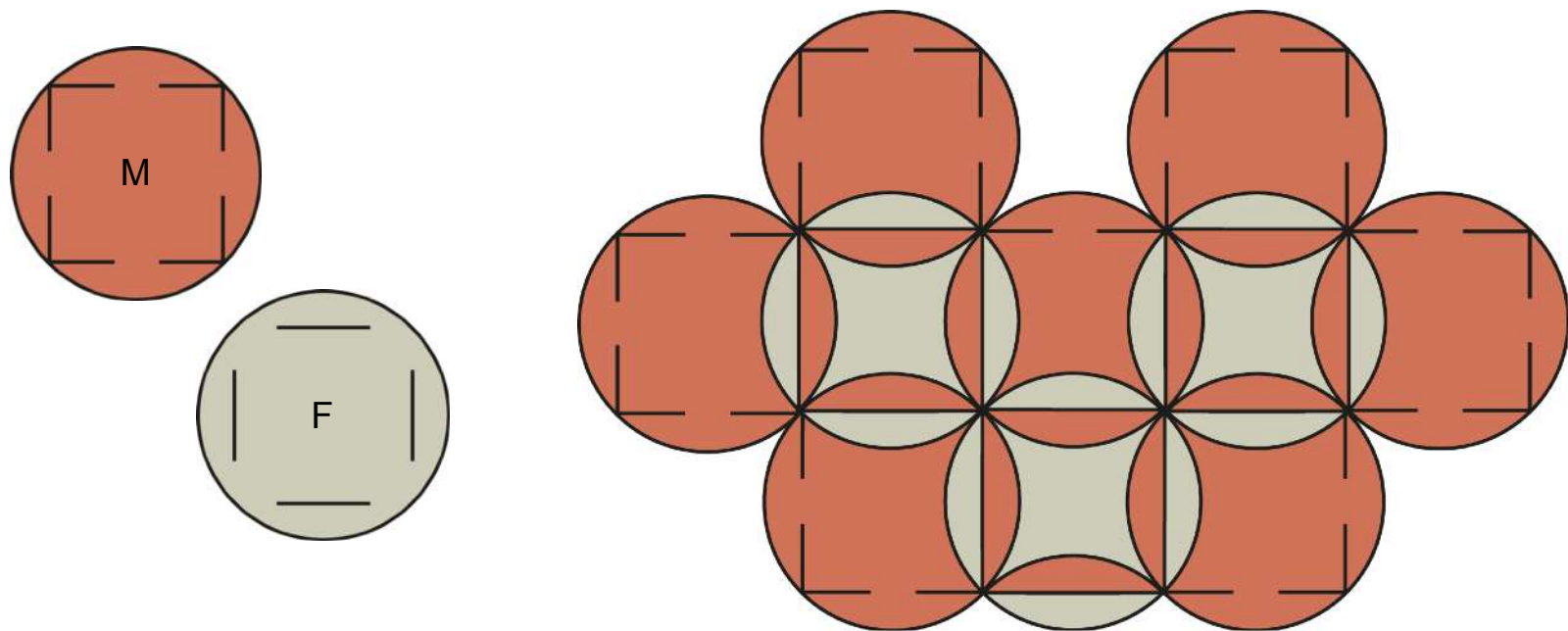
Phase 4 >> Nesting: material test & colour combinations



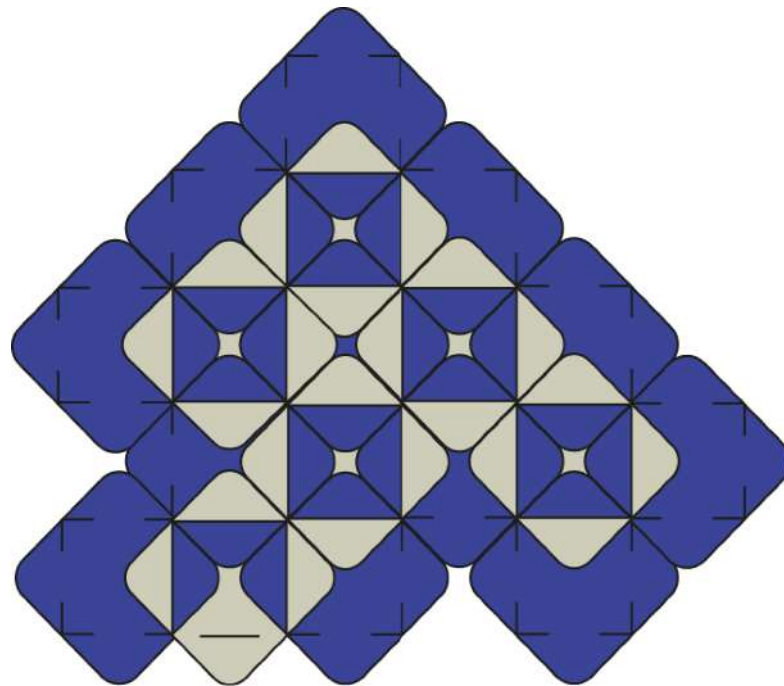
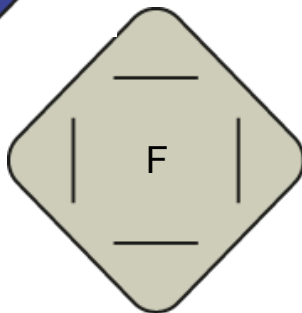
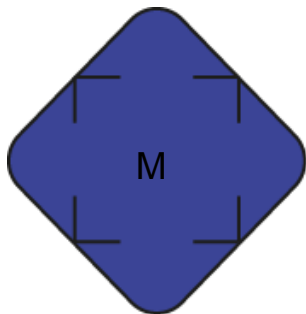
Focus >> Nesting: design the interlock



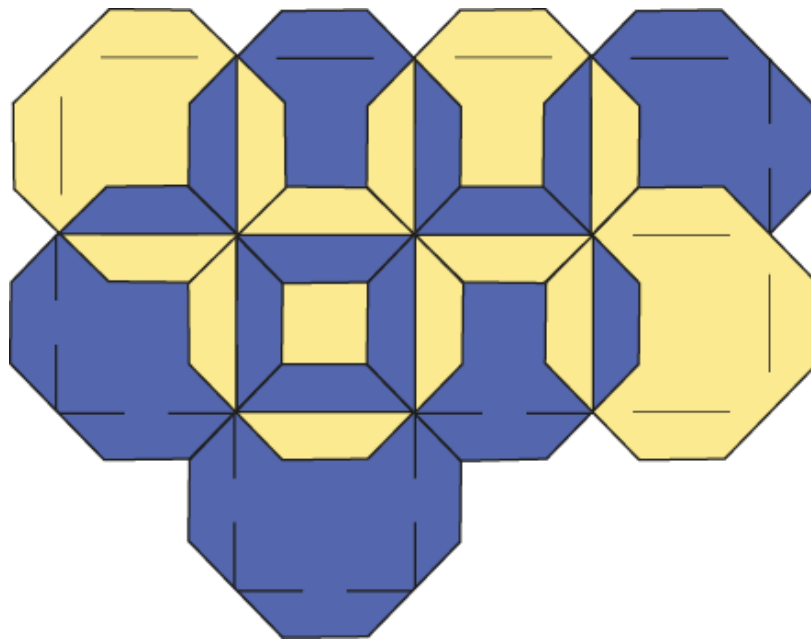
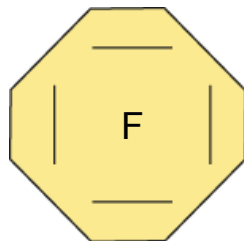
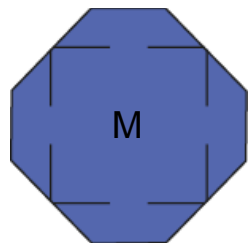
Male + Female Connection



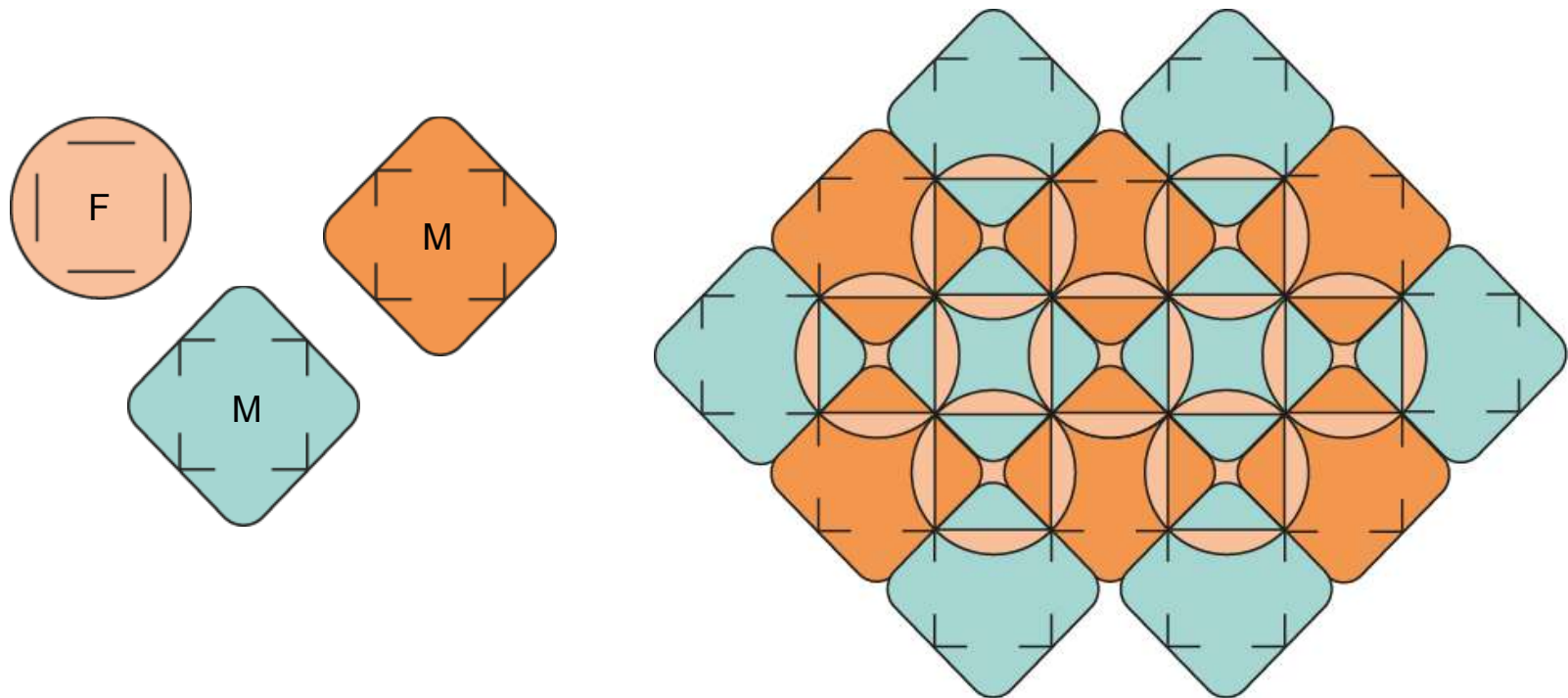
Male + Female Connection



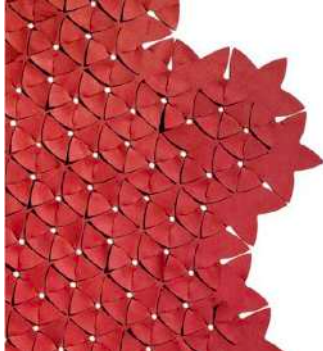
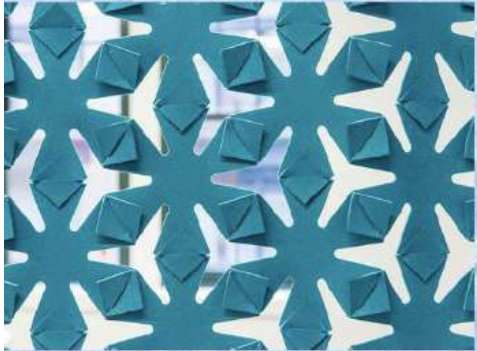
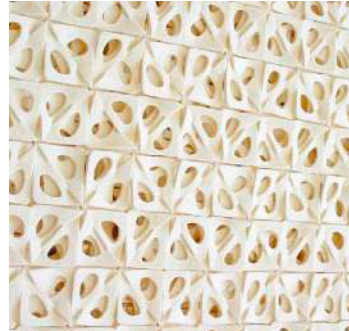
Male + Female Connection



Male + Female Connection



2D interlocked modules



From 2D to 3D



>> Emma Picanyol
IAAC FabLab Barcelona



>> Valentina Frunze
ZIPHOUSE Moldova



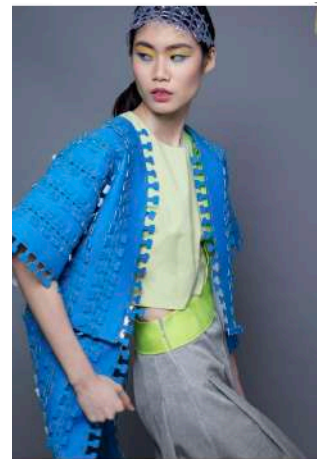
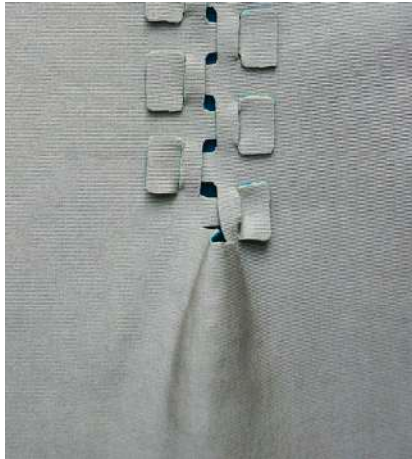
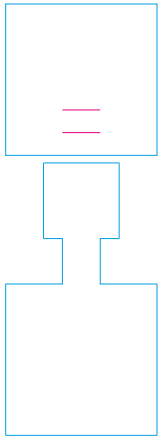
>> Variable Seams
x Balena

Best practices: Junya Watanabe

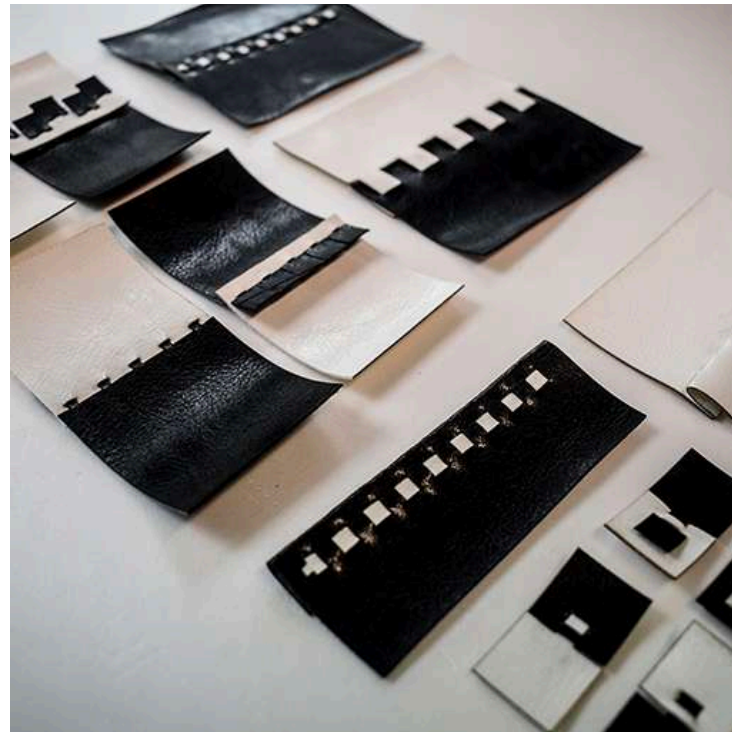
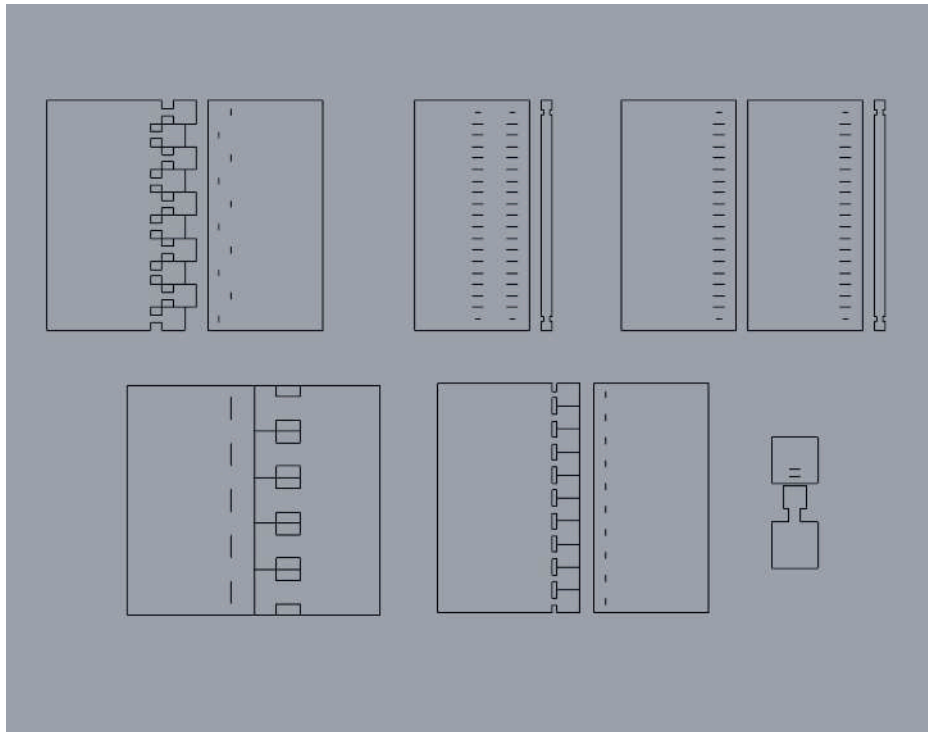


>> Junya Watanabe
Fall/winter 2016 collection

Interlocking pattern elements



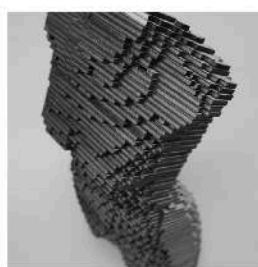
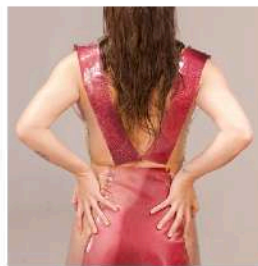
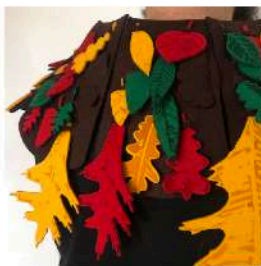
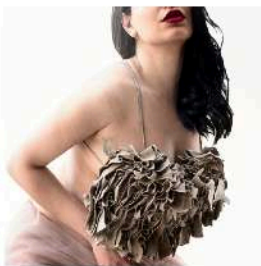
>> Metabolism collection by Bolor Amgalan



>>Interlockings by Matie Sosa

Online platform >> oscircularfashion.com

Welcome to the Fabricademy Open Source Circular fashion
catalogue



[Browse all designs](#)

Coffee break ☕



Hands-on activity

- ❑ **Bag** style presentation
- ❑ Module assembling with **paper and scissors** to understand modular design application
- ❑ **Exploring** interlocking/modules **functioning**
- ❑ **Pattern creations** by the use of coloured elements

Martin Margiela MM6 Japanese bag



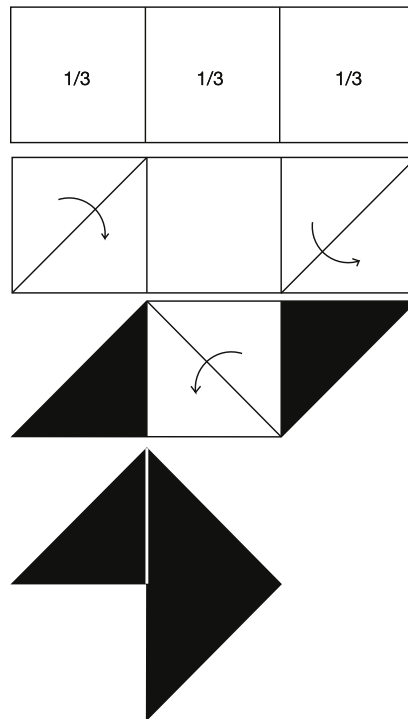
Introduced for the first time in the Autumn Winter 2009 collection, the Japanese Bag has become MM6's most emblematic accessory. **The characteristic triangular silhouette is inspired by the traditional Japanese technique of origami.** The buttons at the edges allow you to change the shape of the bag by folding it in different ways, a reference to the deconstructionist aesthetic code of the Maison. The Japanese Bag is reinterpreted every season with new dimensions and innovative fabrics, making the accessory timeless.





- **PATTERN 1**
FOLDING & STITCHING

PATTERN 1



Pattern 1

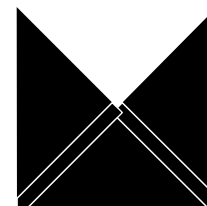
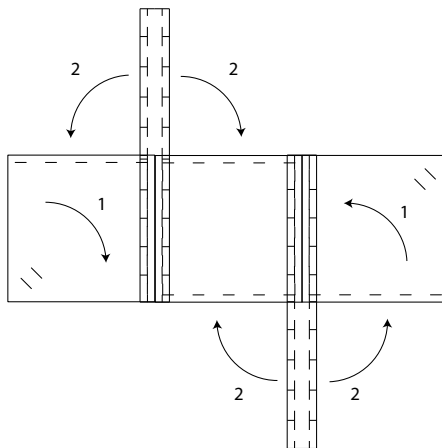
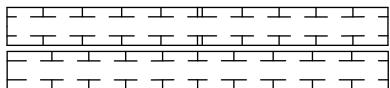
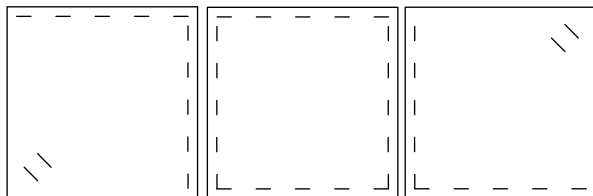
folded and stitched



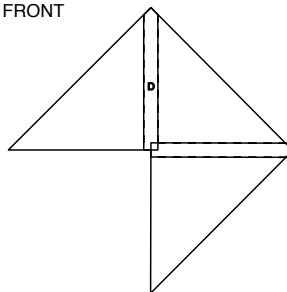


- **PATTERN 2**
INTERLOCKING SQUARES

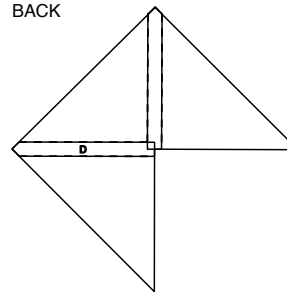
PATTERN 2

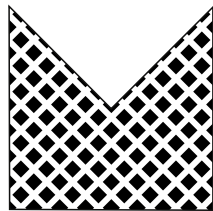


FRONT



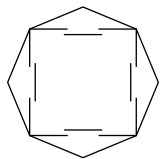
BACK



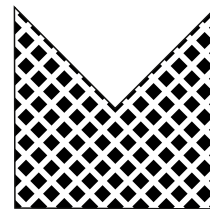
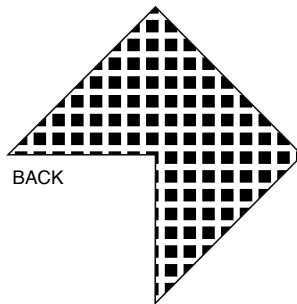
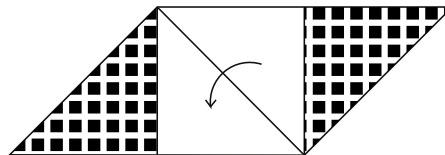
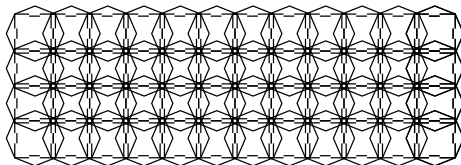
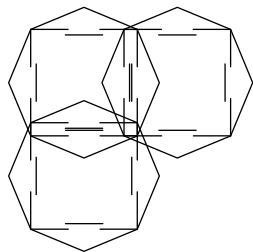
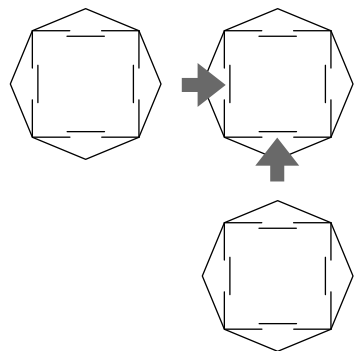


- **PATTERN 3**
INTERLOCKING OCTAGONS

PATTERN 3



x 48 pcs





Basic



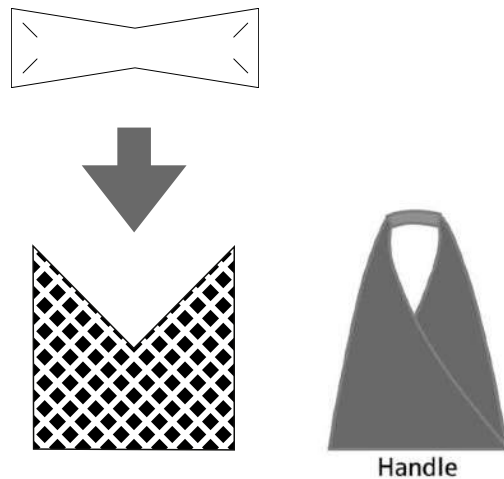
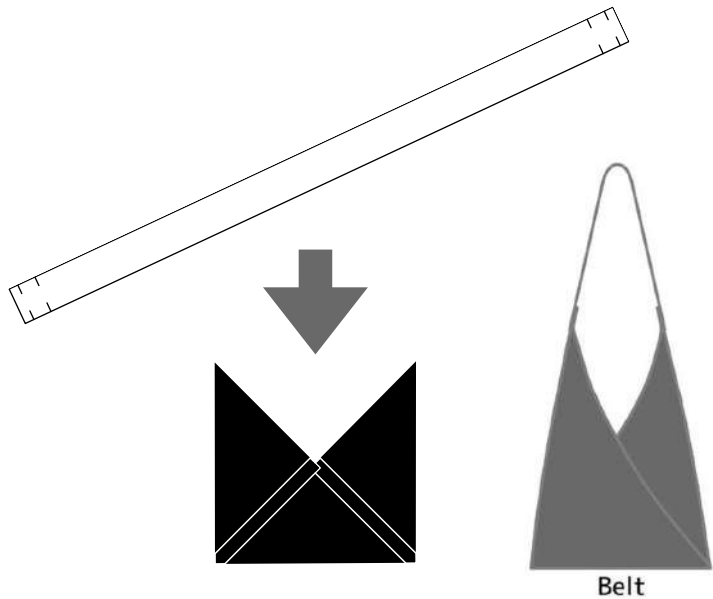
Handle



Belt

- Add the handle

Handle pattern



Thank you

transiti*ns