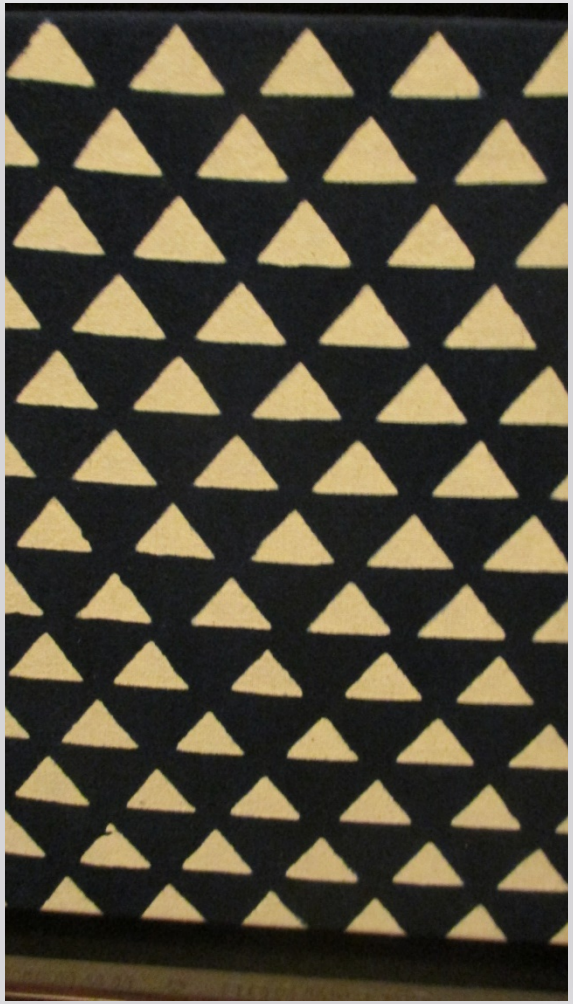
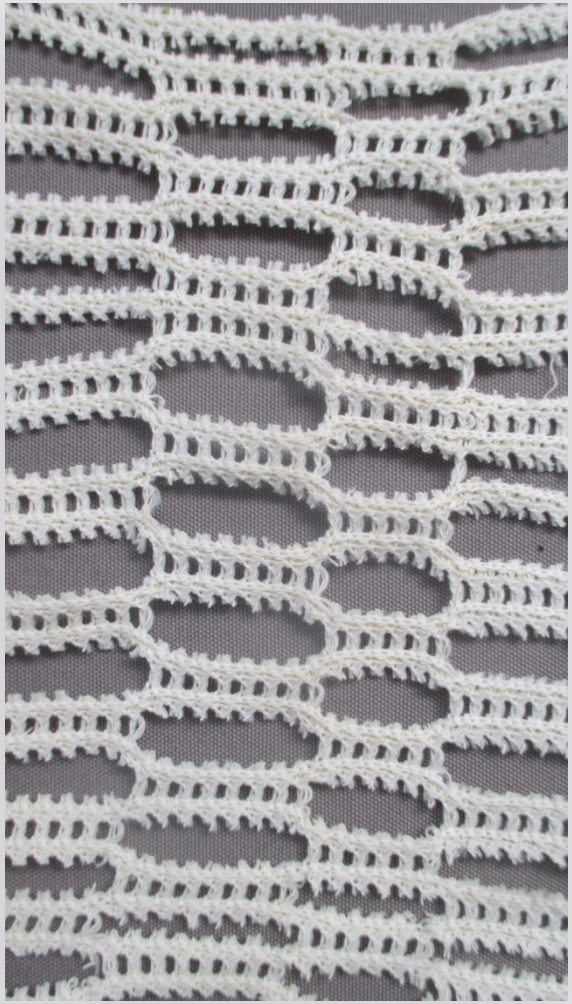
Rhythm
Repetition
Surface

Crystal Flowers in Halls of Mirrors
Aalto University
Laura
Isoniemi
9.2 20212019





Repetition and symmetry in nature

- Trees and branches
- Animals
- Plants

Kauniita sulkia ja höyheniä. 1 Sulka närhen *(Garrulus glandarius)* siivestä; 2 metsäpyyn *(Tetrastes bonasia)*, 3 turkinpyyn *(Perdix perdix)* ja 4 koirastavin *(Anas crecca)* höyhen; hieman suurennettuja.

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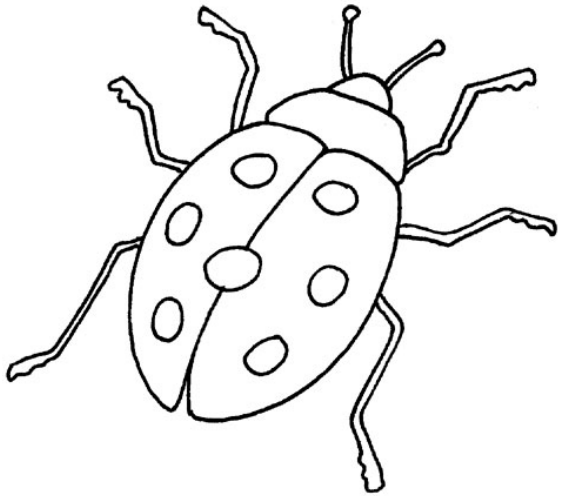
- Symmetry in plants

- Symmetry in trees and branches

- Symmetry in animals

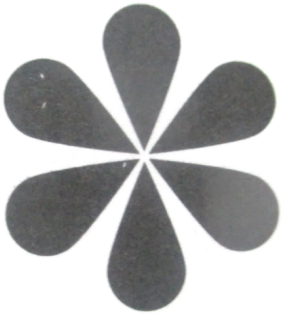


1. Ordering principles in symmetry

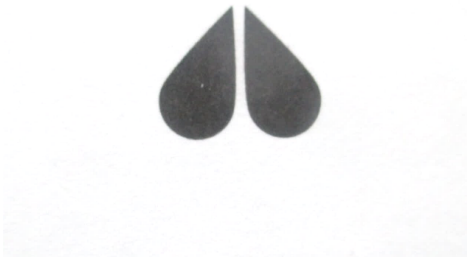
a) Drop reflected

b) drop

c) reflected,copied and rotated drop



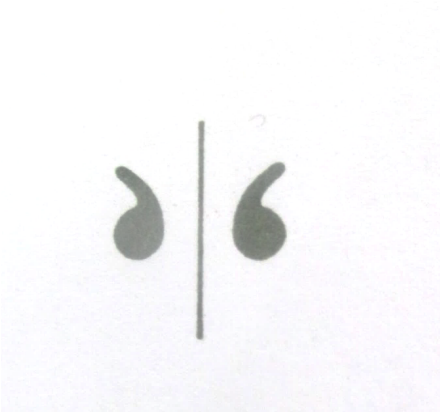
d) Reflected by one side reflected

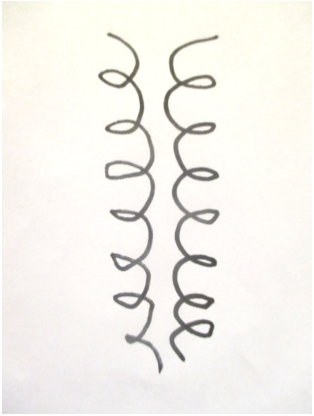


e) group of 4 drops

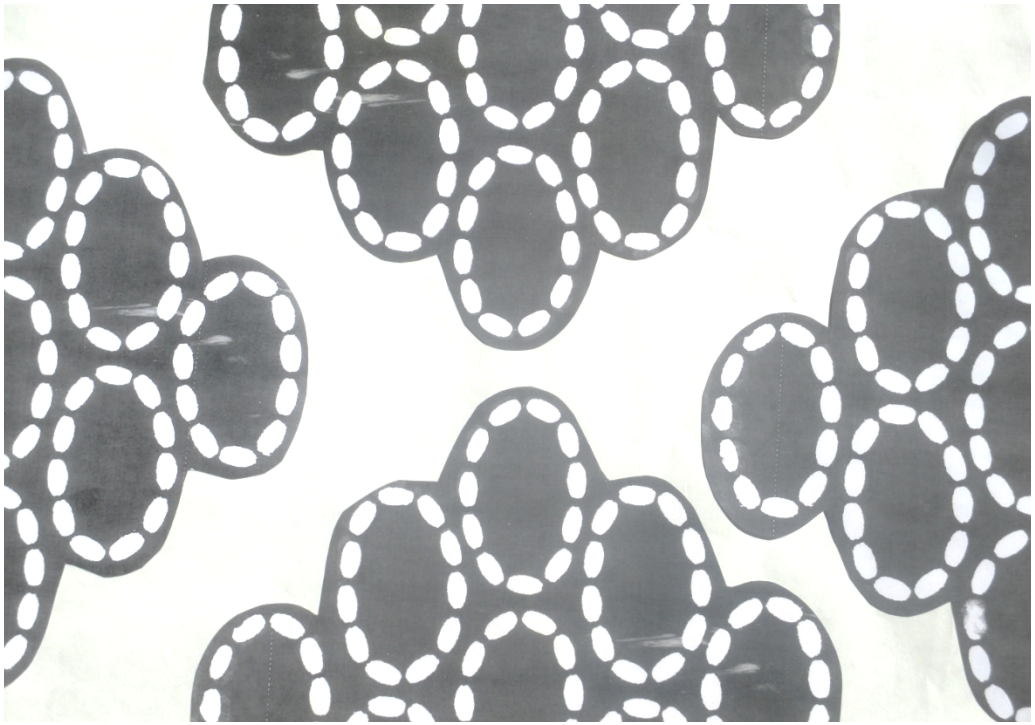
f) 4 groups of 4 reflected drop groups

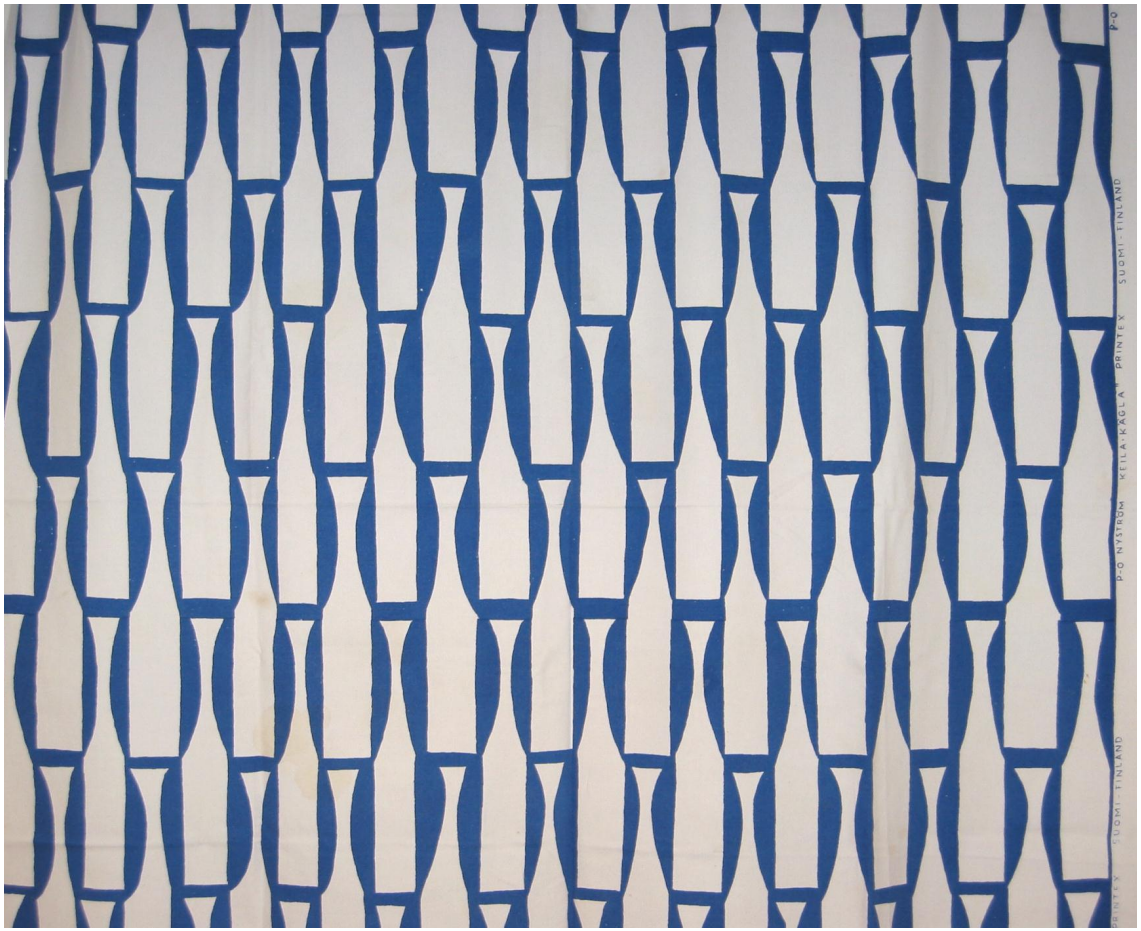
Reflection about a line



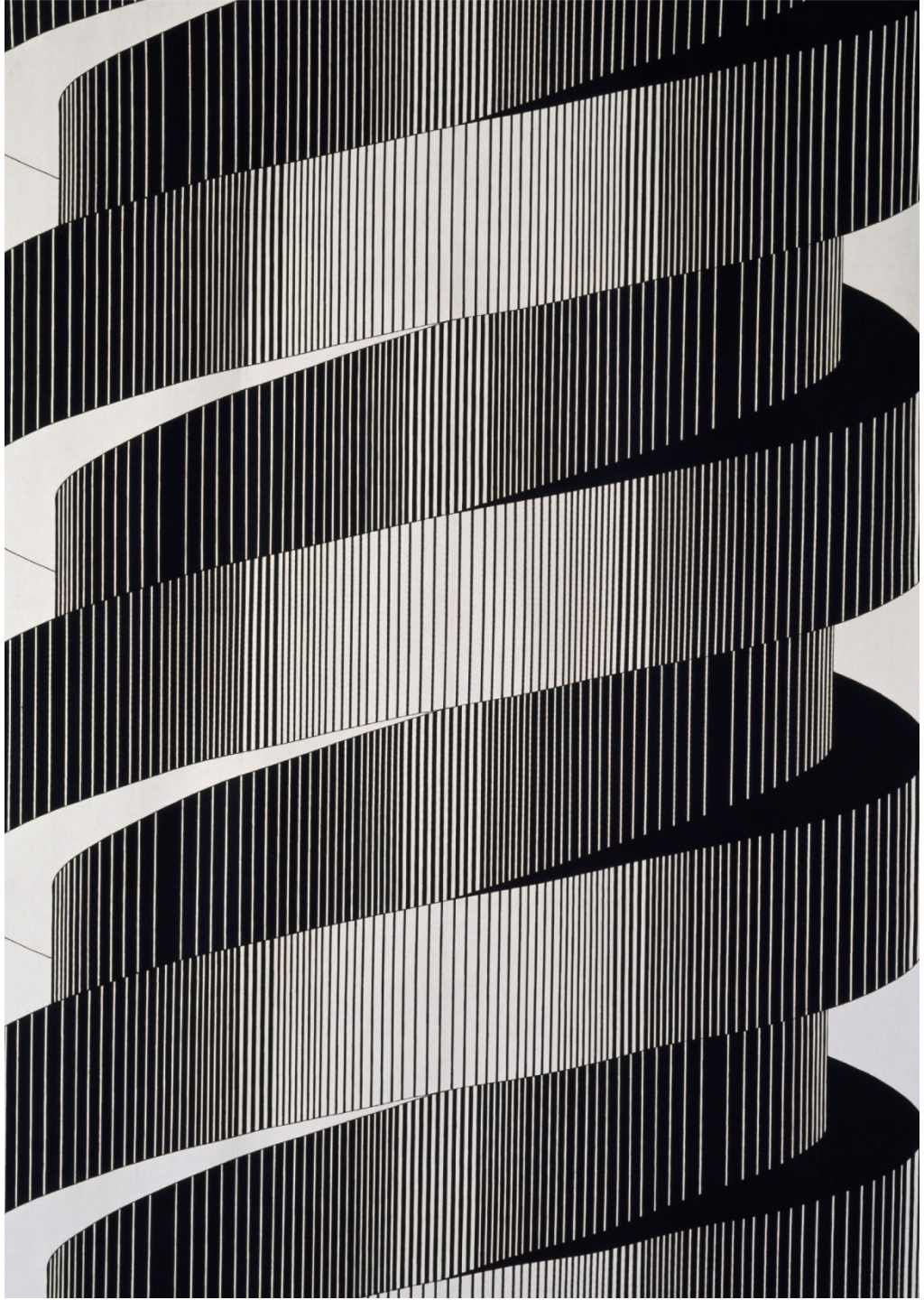


Symmetry in textiles

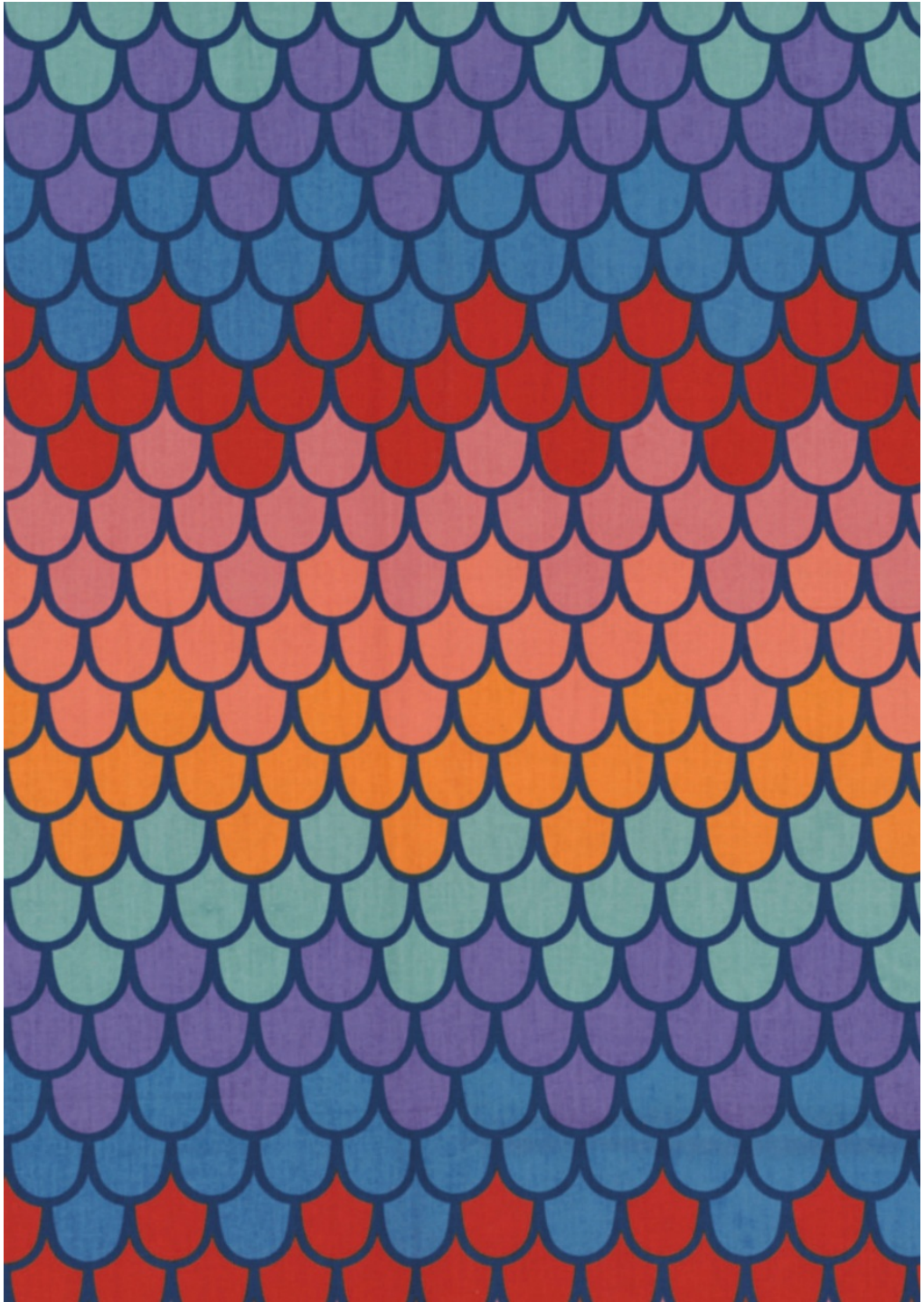



PRINTEX SUOMI-FINLAND
P-O NYSTRÖM KEILA-KÄGLA PRINTEX SUOMI-FINLAND
P-O

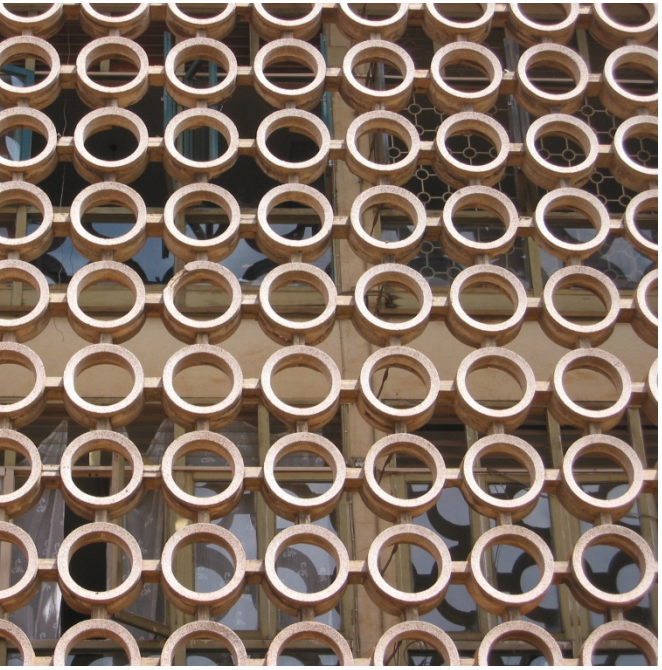
Repetition and symmetry in fabrics.
Time can be seen in the composition of the textiles.
British textiles from the 40´,50 ánd 60´.Heals.
Victoria and Albert Museum.



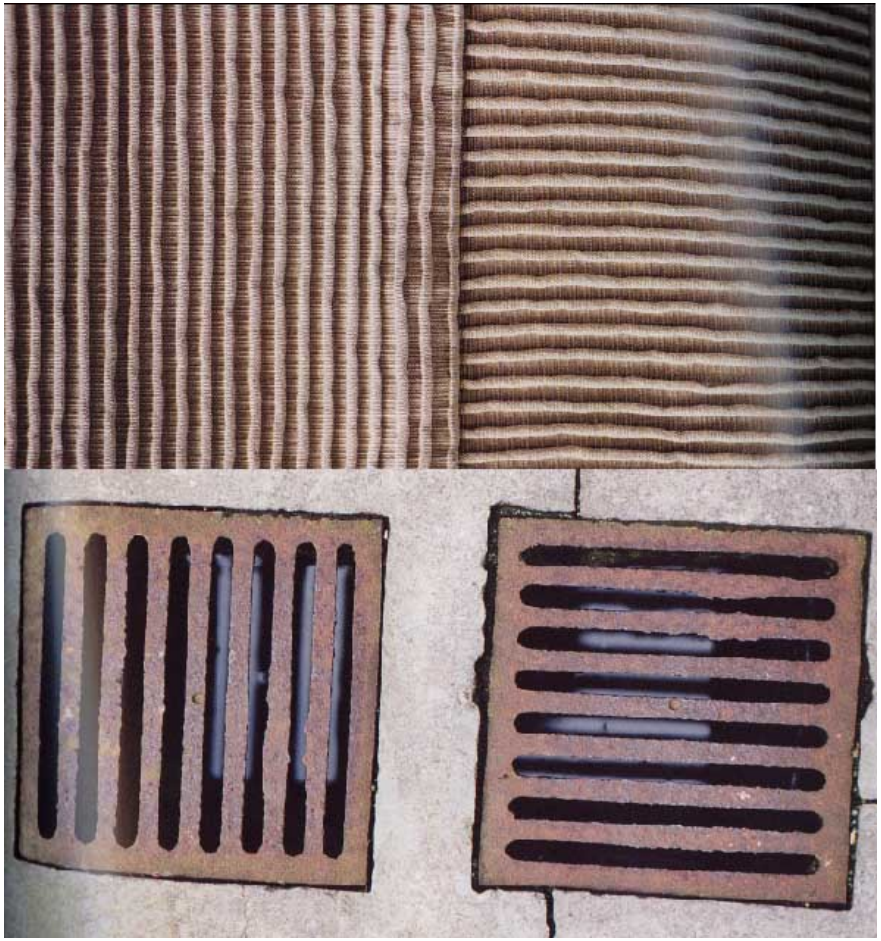
Barbara Brown for Heals ,1969.

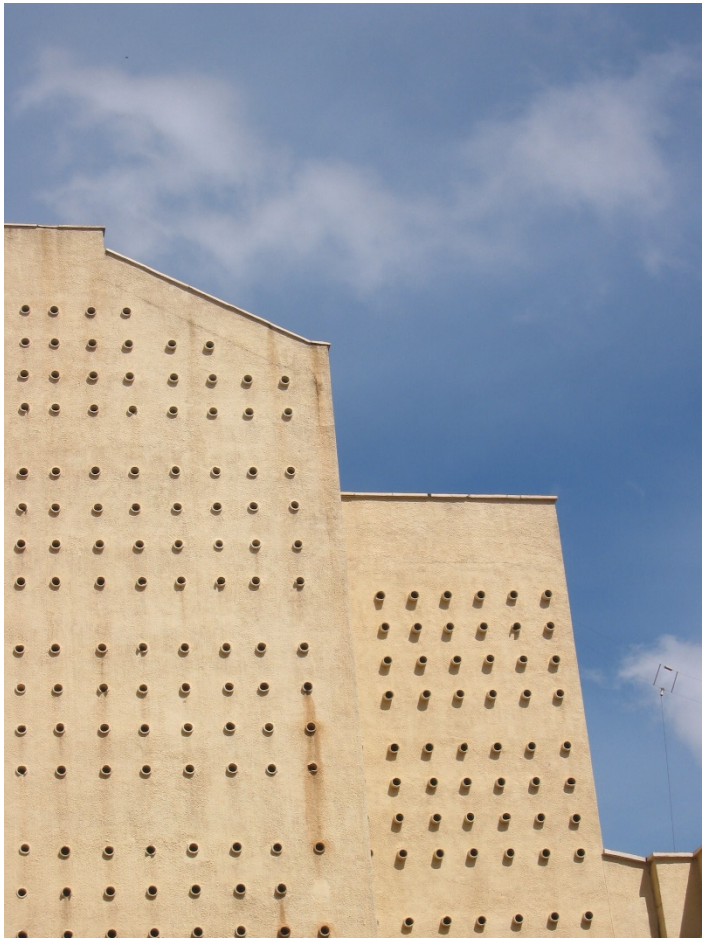


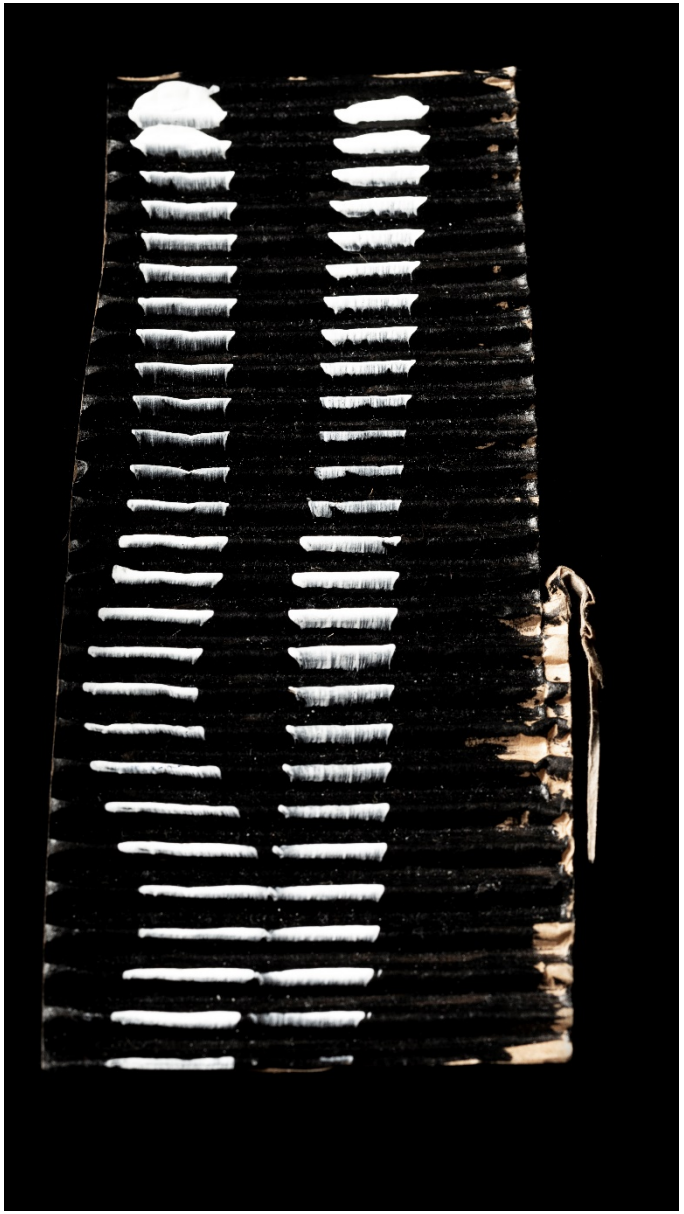
Repetitions in built architecture



Rhythm





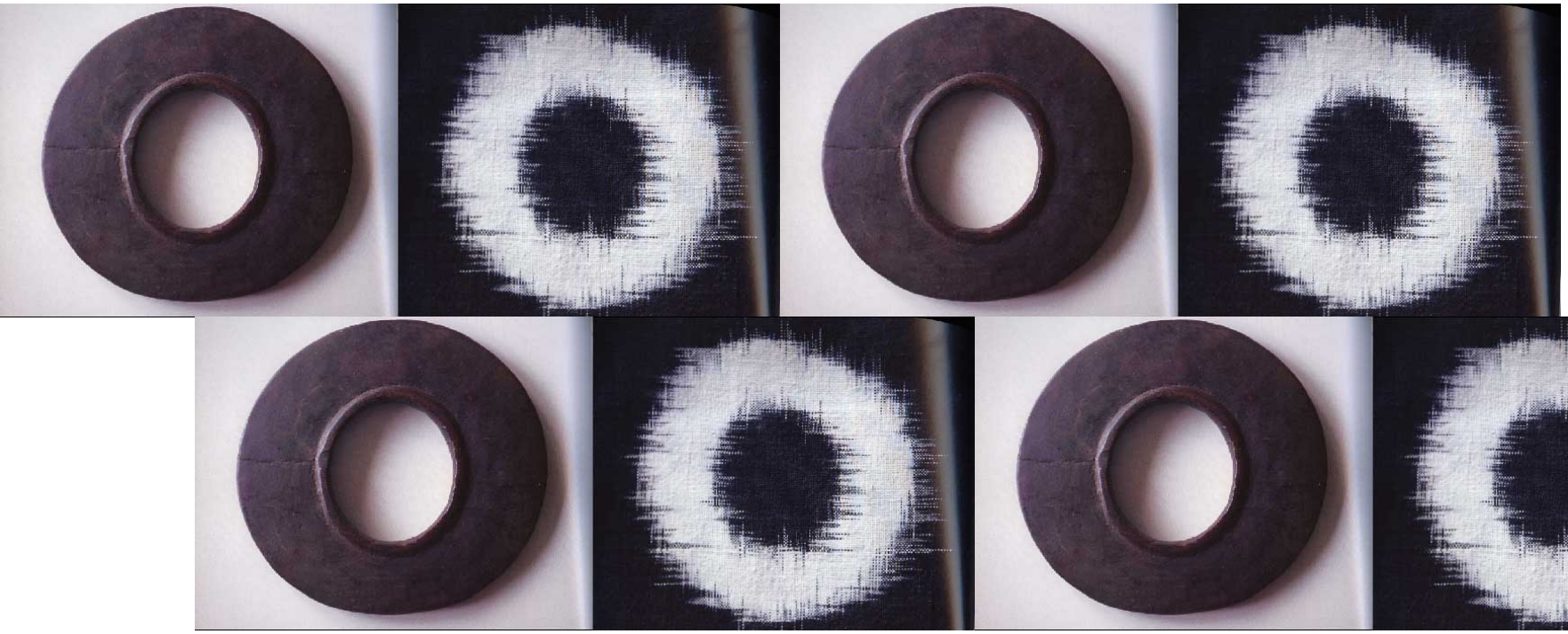


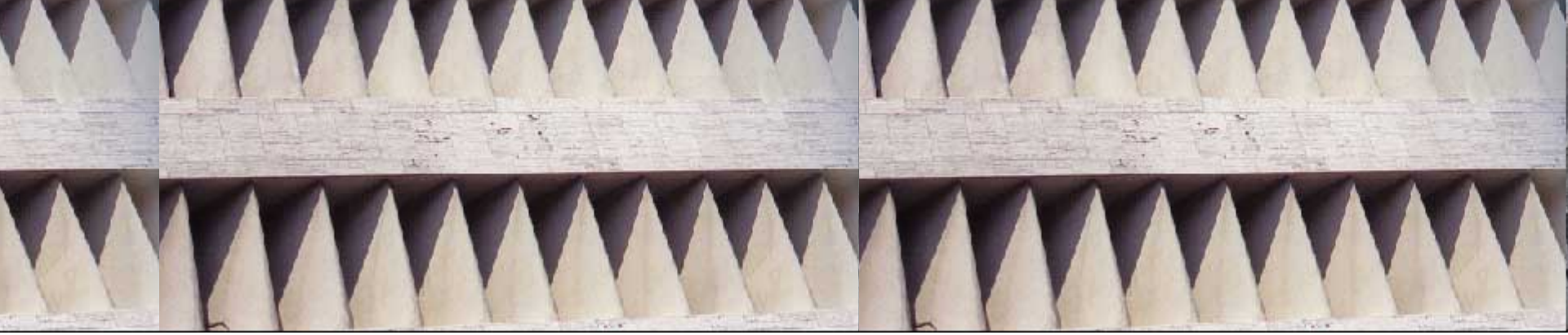
Surface design

- Surfaces that seem to be continuos are created by repeting the module or wanted figure element systematically .

- The surface is consited together out of the printed elements and the empty space in between the elements.Unprinted and printed areas together create the rhythm to the surface.

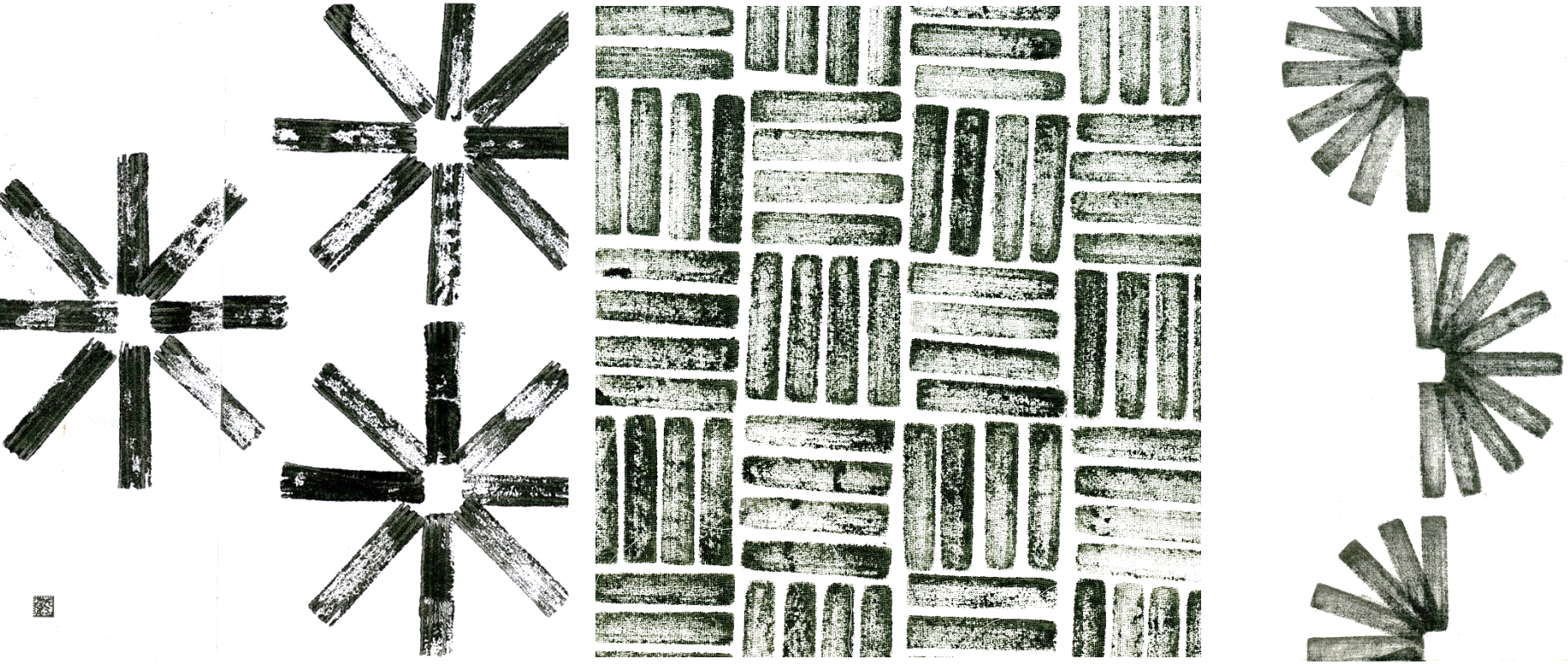
- The rhythm between the figure elements is born from the changes and variations between the unprinted and printed parts.

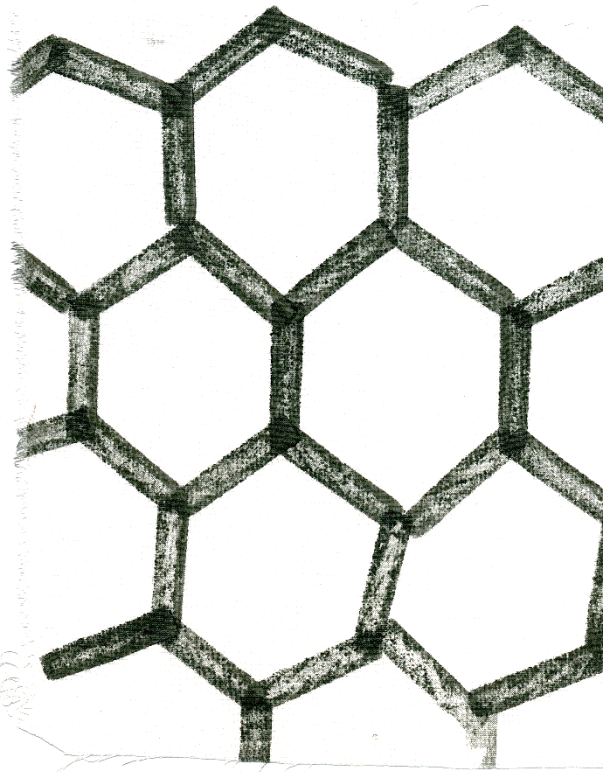


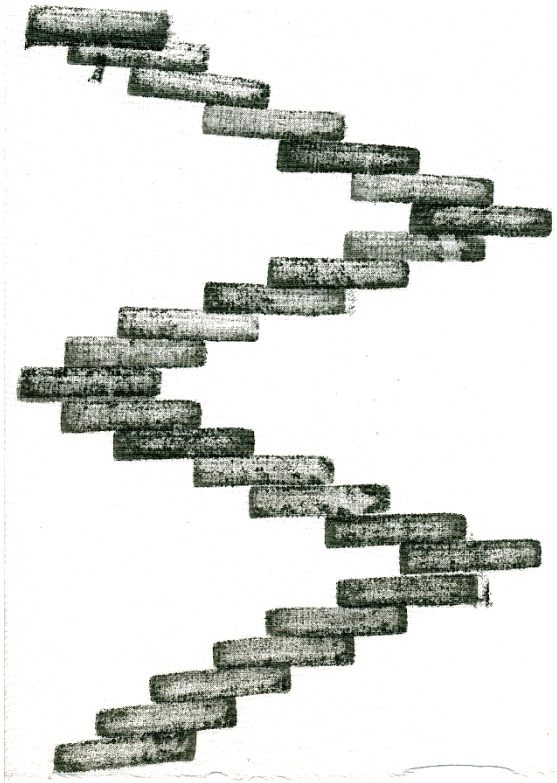


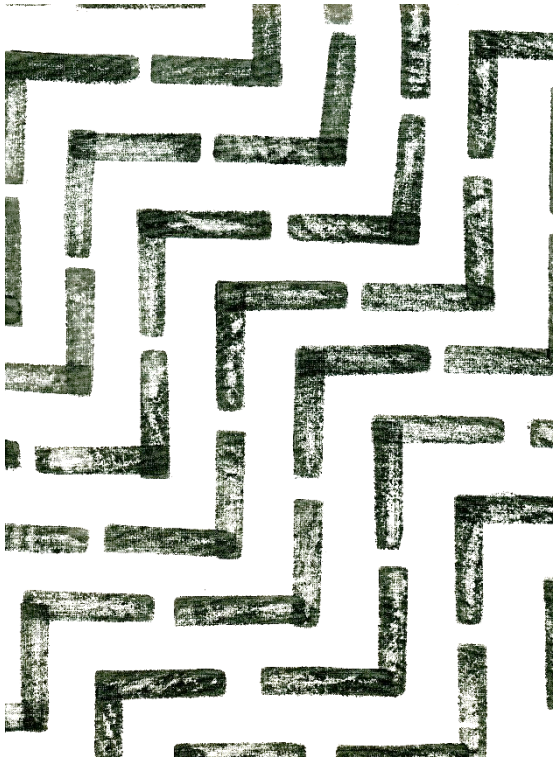
- When building the surface , note:
- To what **direction** you repeat the figure
- How **often** you repeat the figure(density)
- Horisontal, diagonal ?
- As an ornament
- Movement in the surface

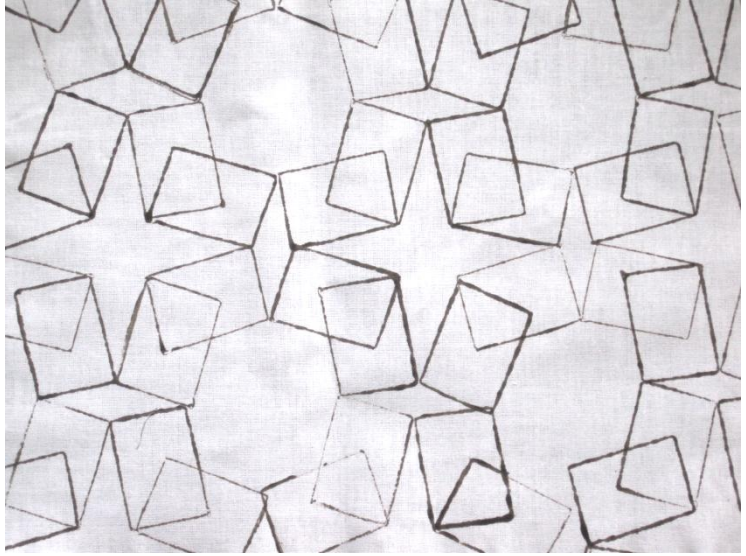
Variations of repeats

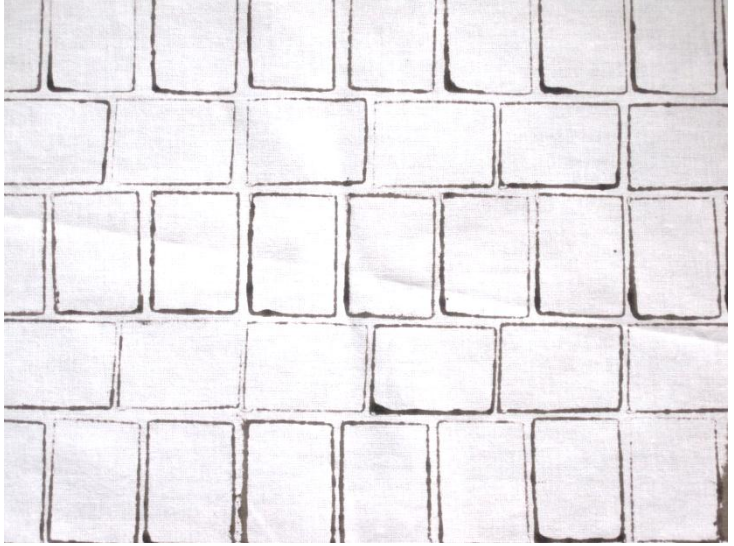


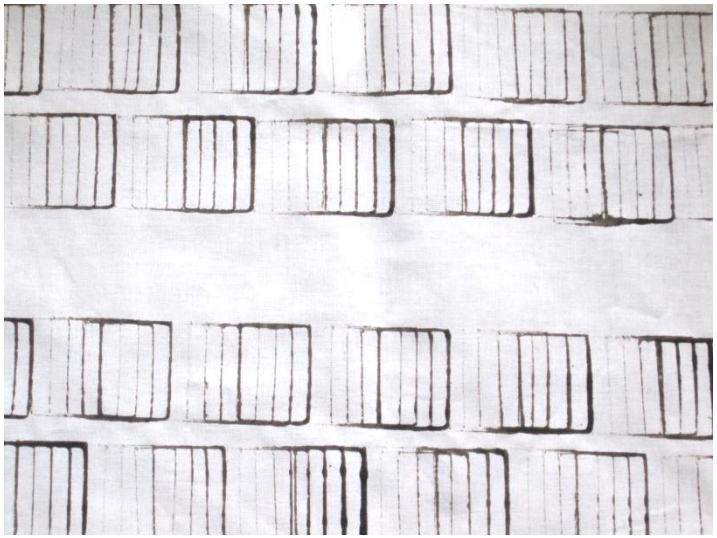


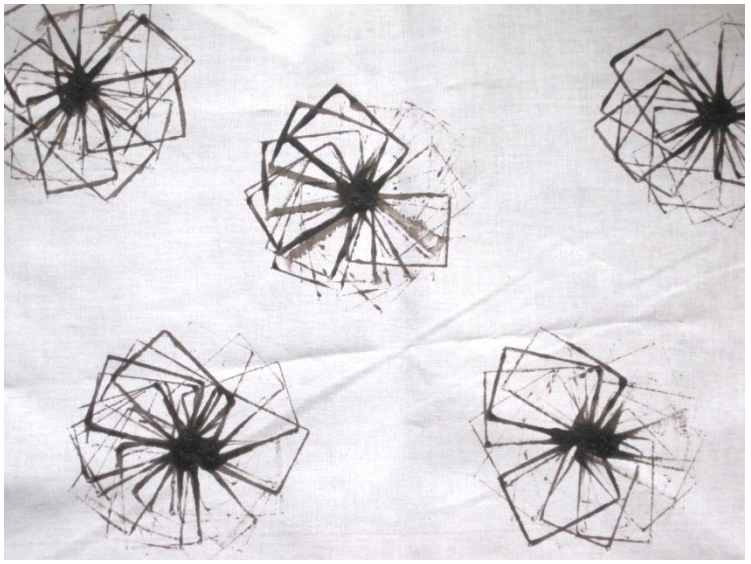




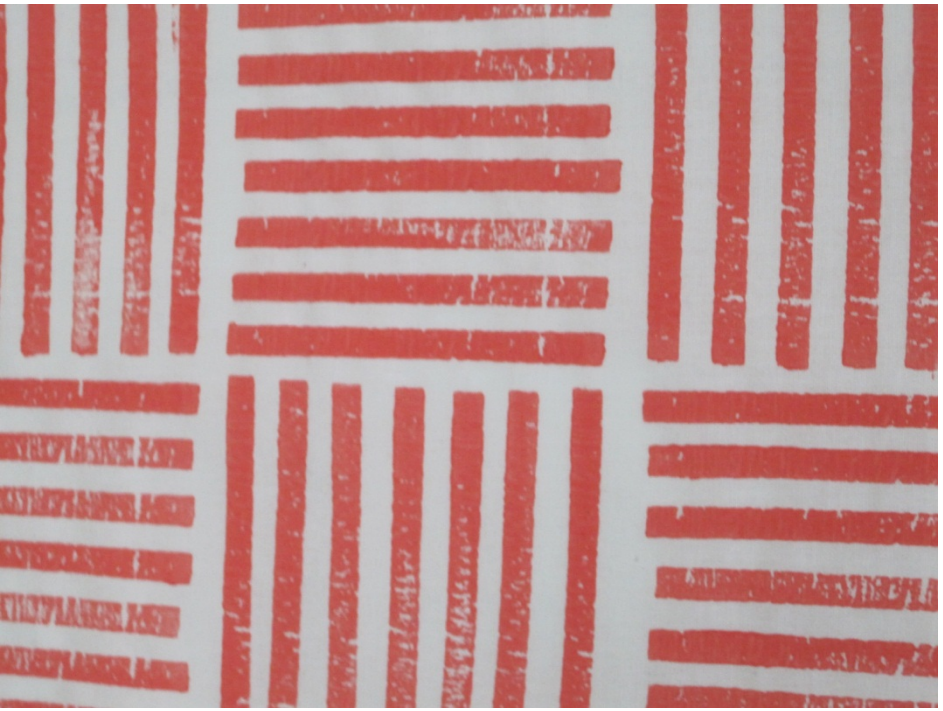


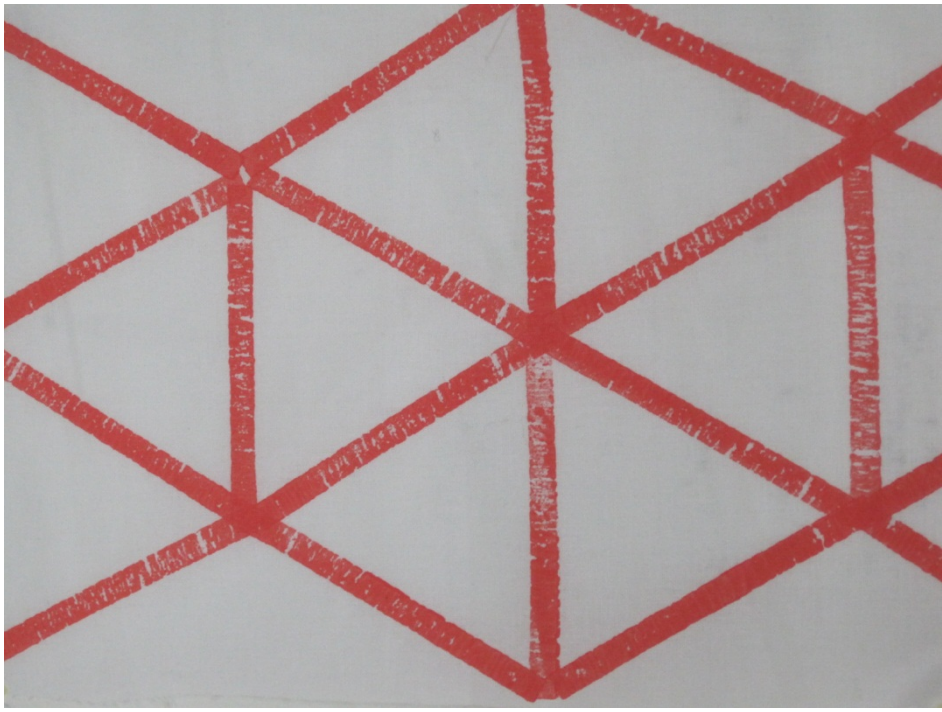






Examples

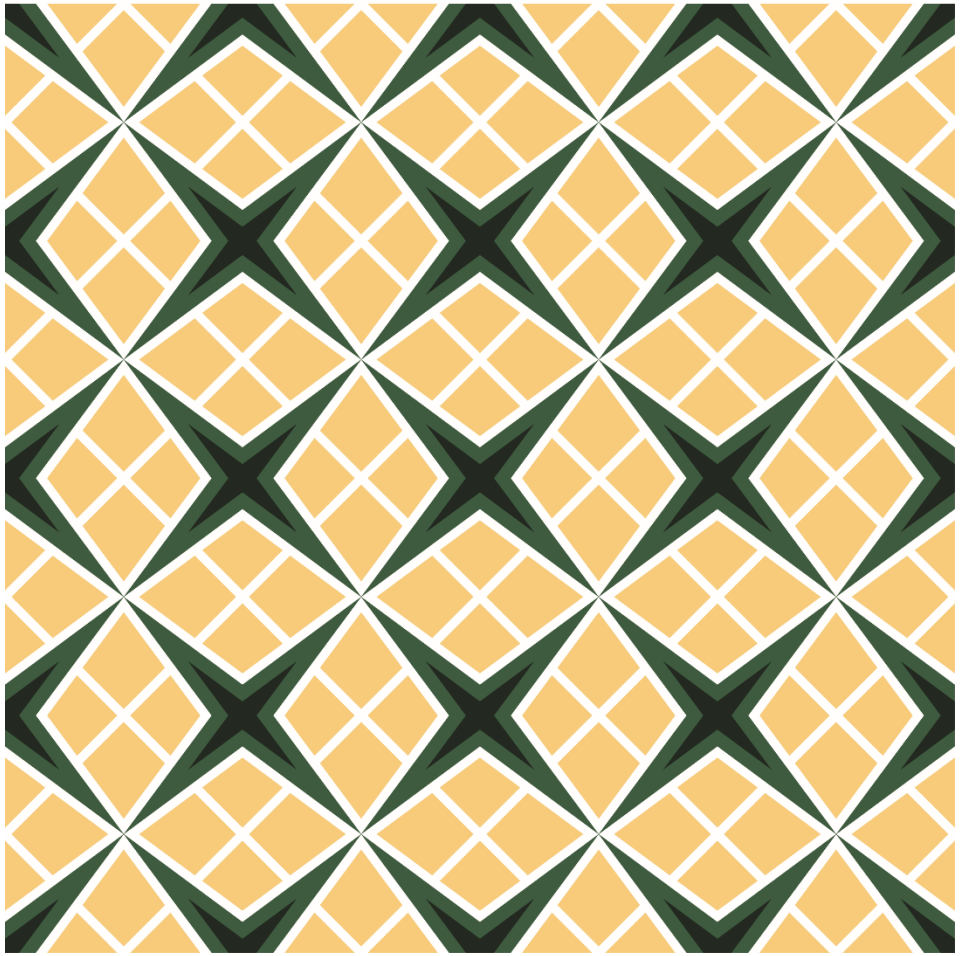


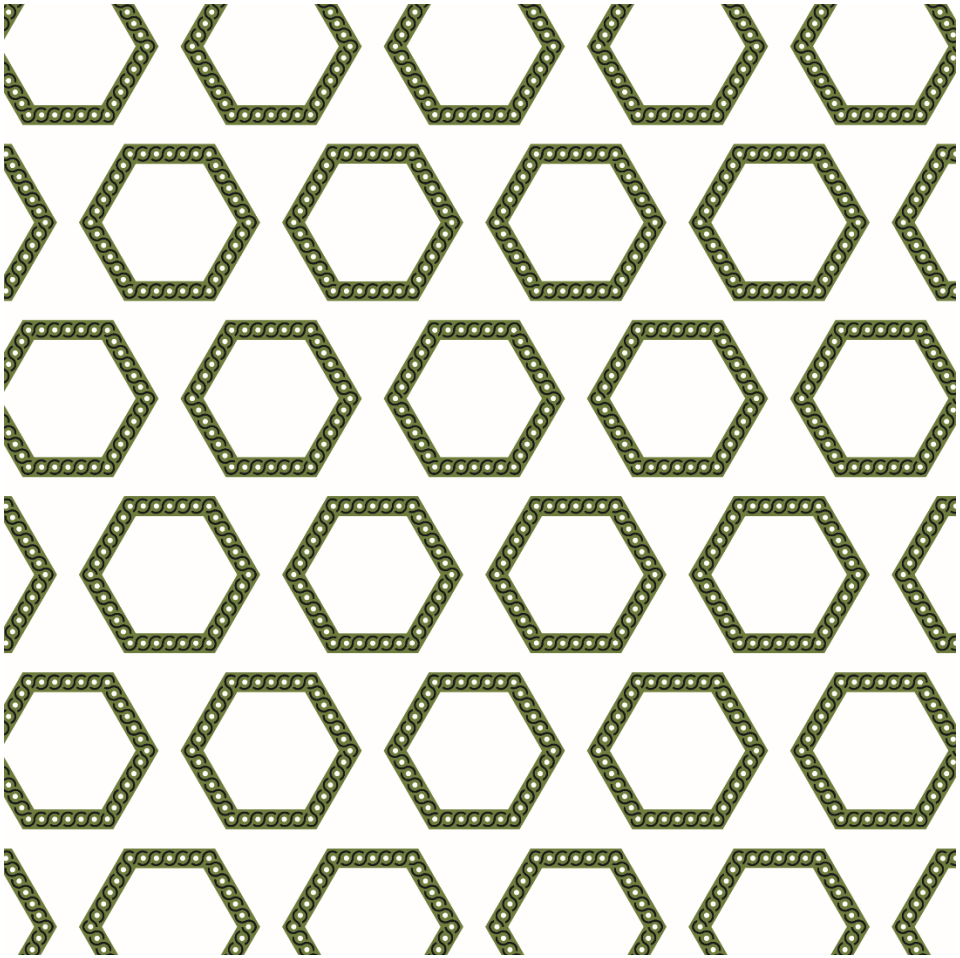


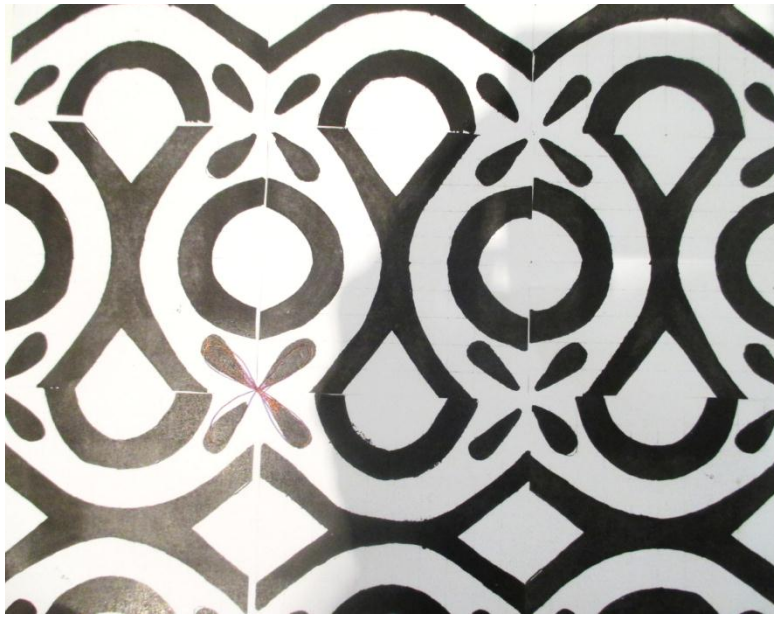
Ornaments

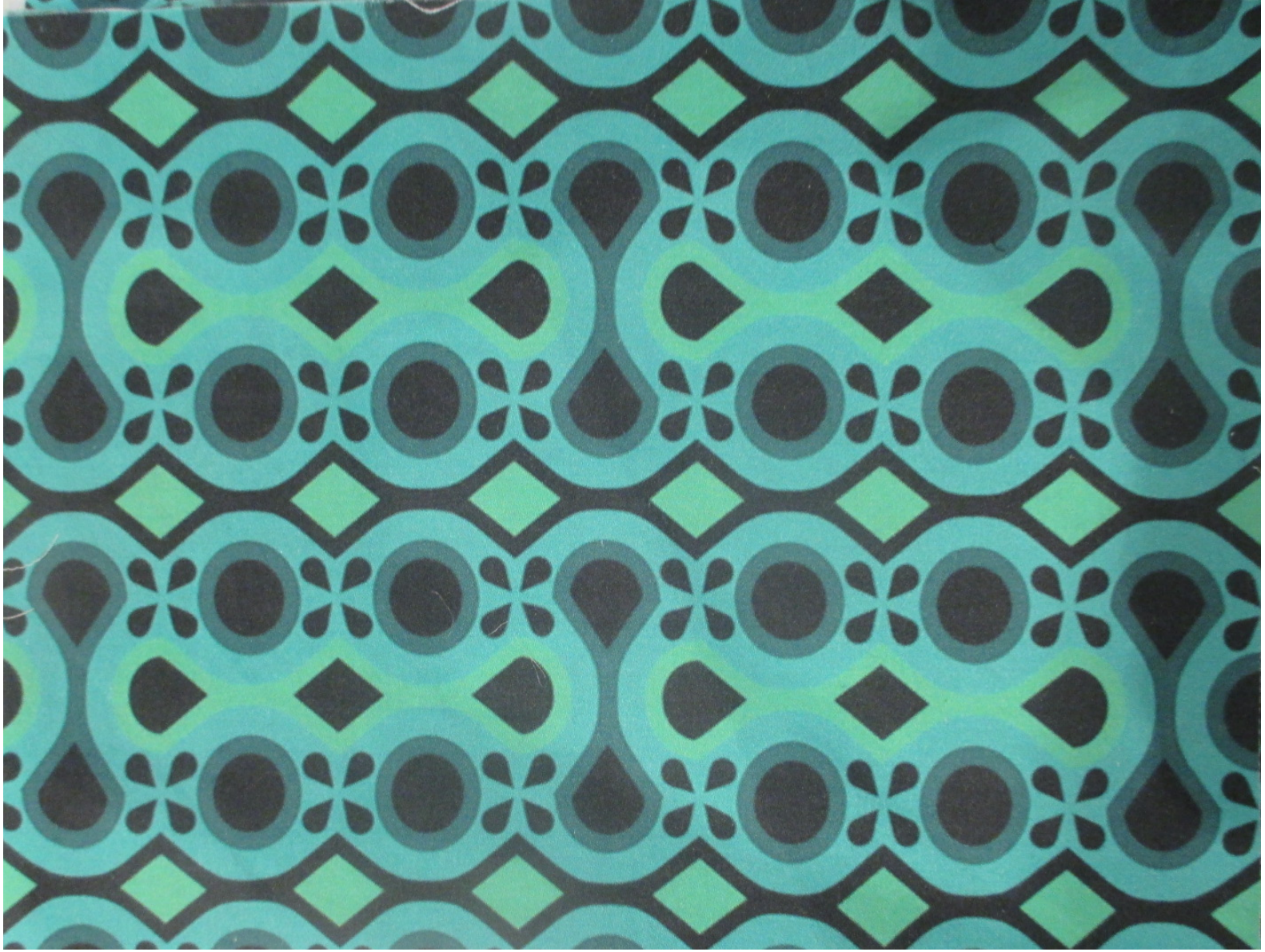
- Ornaments or repetitive decorations are designed by repeting one figure-element systemtically in rhythm
- In surface ornament figures repeat in both sideways and upwards.Such ornaments are used in clothing, tapestry , Ribbons ,fabrics, plates and tiles. In sideornaments figures repeat sideways.

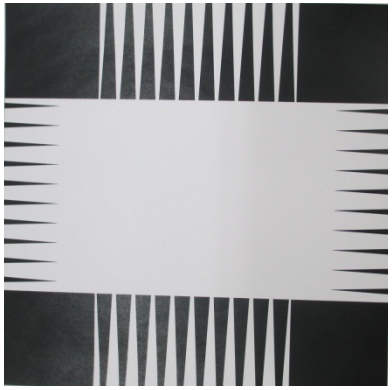
Repetition in tiles

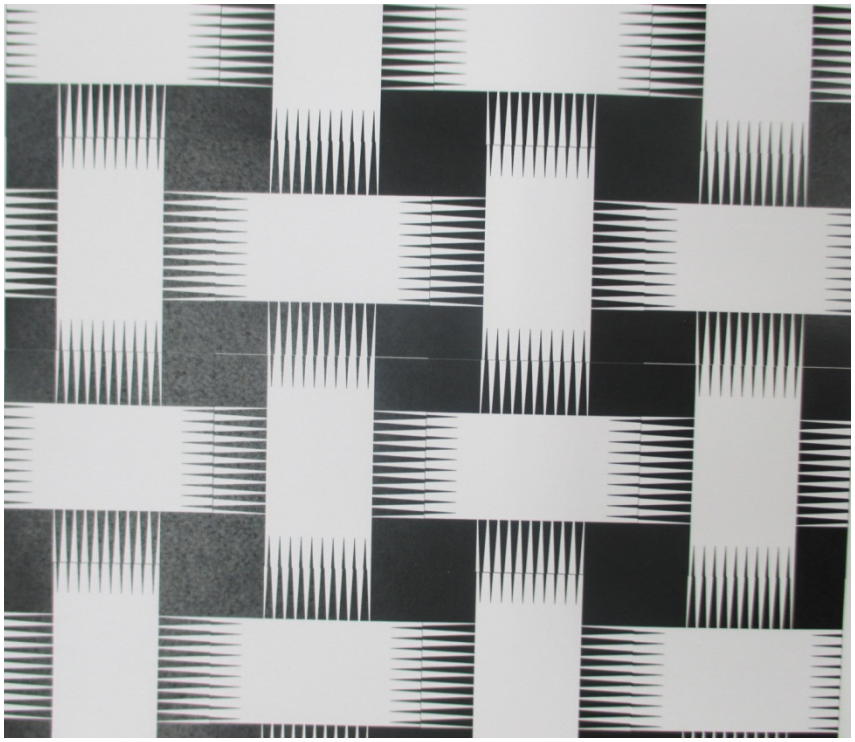


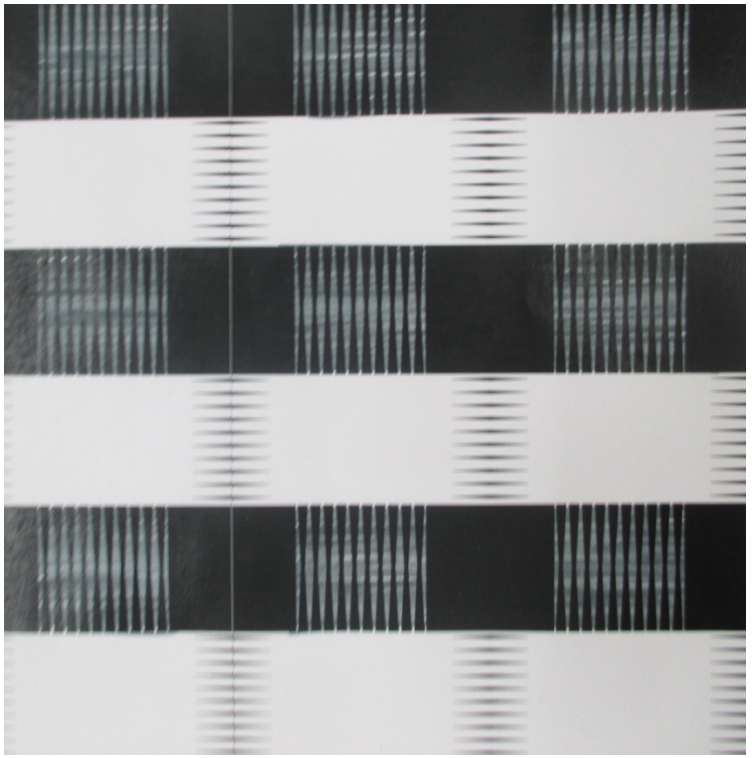


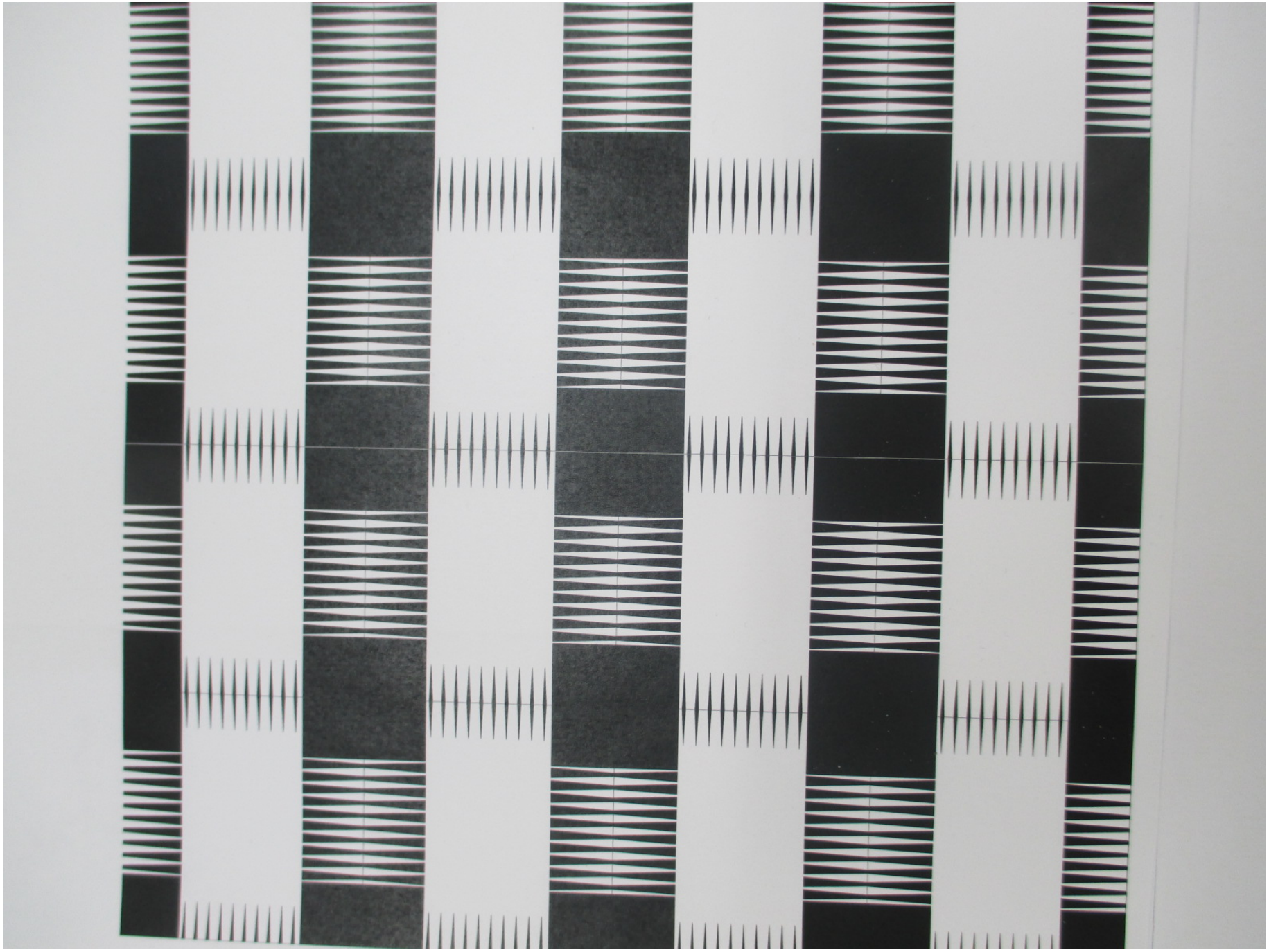


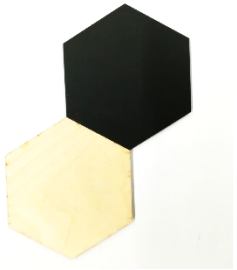










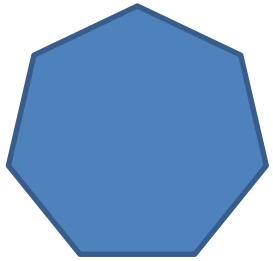


Tilings

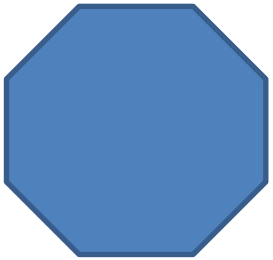
- A tile, by definition, is any geometric surface that can be used to completely cover a plane. Tiling means that a plane is covered entirely by organising the patterns into mosaic arrangements. Tiling takes advantage of the inherent characteristics of polygons. Tiling can be regular and semiregular.

Regular tilings

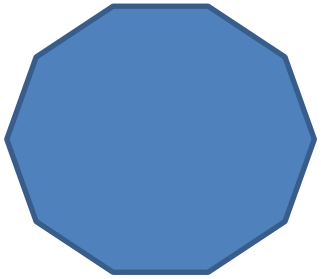
7 edged shape



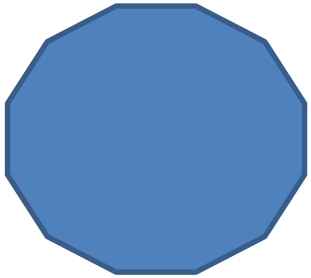
8 edged shape



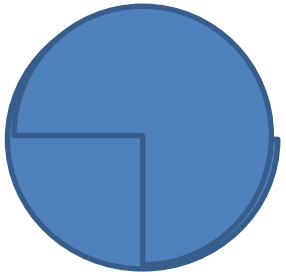
10 edged shape



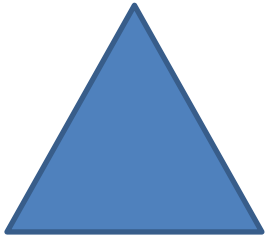
12 edged shape



round form

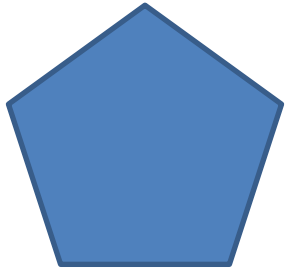


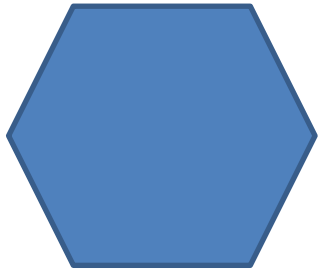
Triangle

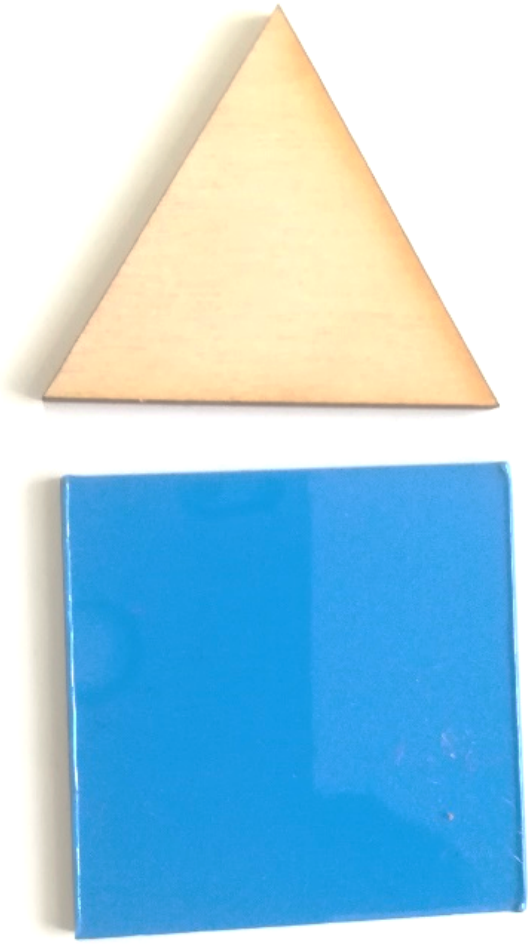


Square

5 and 6 edged shapes







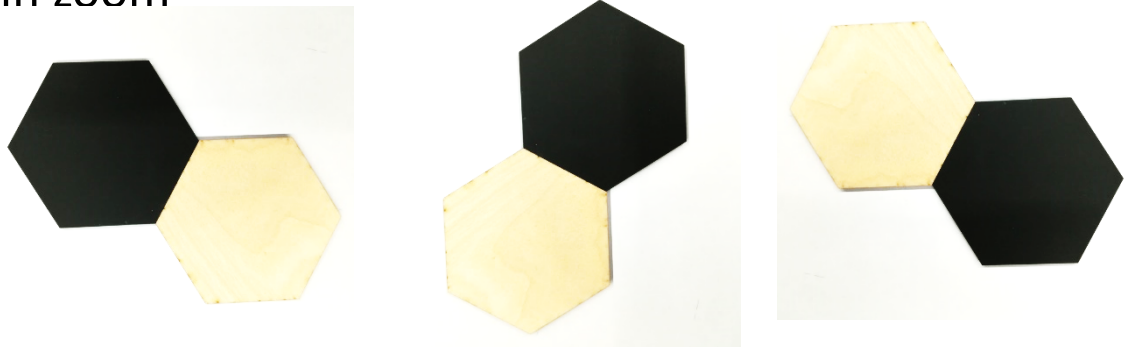
- Semiregular tiling is tiled with two or other regular polygons in such a way that they all fit together to form a seamlessly continuous surface.
- Source: Moscovich,Ivan: Älyjätti 2009

Exercise with tilings 9.2 2021

for groups A and B /Design Factory

- Each group take their own box of tiles
- Each group create at least **3 as different** as possible **surface** versions with the given tiles
- The content of the boxes are different. They approach **both** *mathematical* issues and *aesthetic* elements in design
- Work as a team, use all group members skills
- Make a presentation of the photos and solutions, incl the 3 versions by pictures , explain the solutions mathematical decisions.

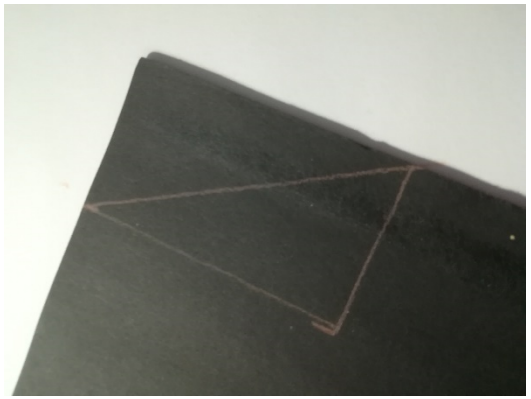
Return your group outcomes to MyCourses by 26.2. Presentations and feedback 4.3 in zoom

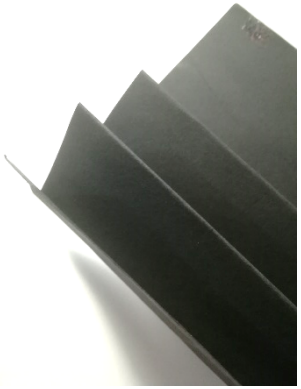


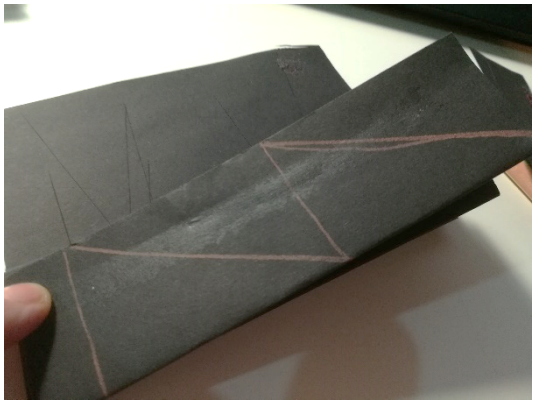
Group c/Online students

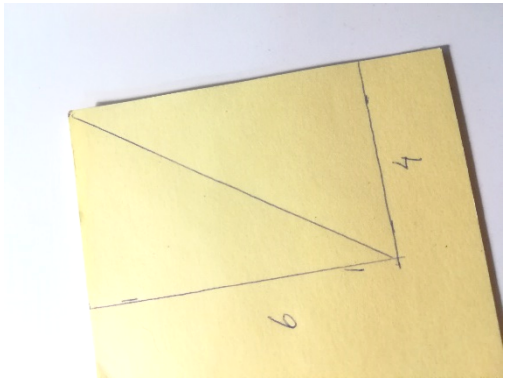
- Group: Verneri, Riitta and Sanni
- Measure from paper a rectangle 4x6cm and repeat it as many times as there is space in your paper. Fold the paper upwards –downwards so, that you get an accordion (according to the picture next page)
- Cut the folded rectangles and then divide each into 2 triangles (see pic next page)
- Make this with 2 other color paper, they can be recycled paper or even newspaper= 3 colors. Discuss with your group that you have same colors as you work as a group and you should have same colors.
- Return your group outcomes to MyCourses by 26.2.
- Presentations and feedback 4.3 in zoom

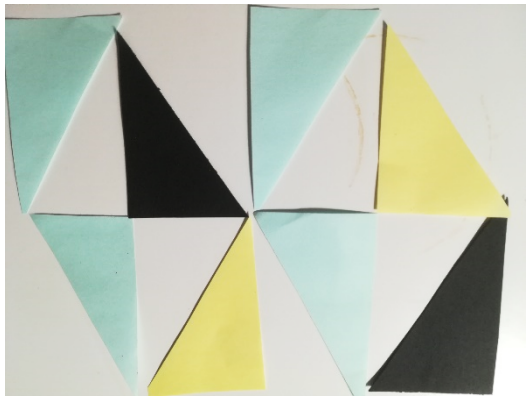
How to do/group c







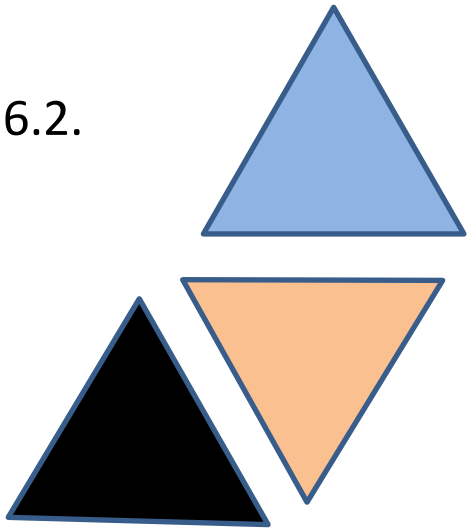




Group d/Online students

- Group Laura, Ekin and Emilia
- Cut from paper regular triangles, side length 4cm
- 3 different color papers, triangles, 15 pcs each color
- Make alone at home 3 as different surfaces as possible , then share with your mate and present from your 6 versions 3 most interesting. Prepare to explain your decisions. Discuss with your group that you have same colors as you work as a group and you should have same colors.

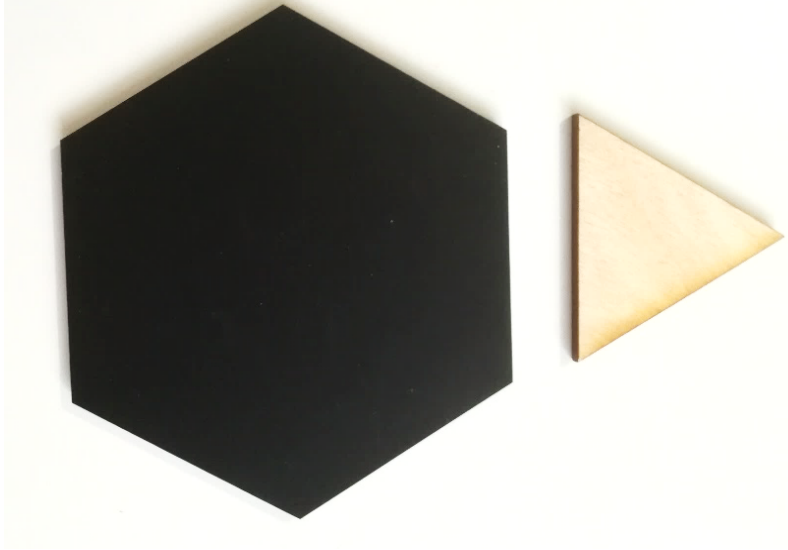
- Return your group outcomes to MyCourses by 26.2.
- Presentations and feedback 4.3 in zoom

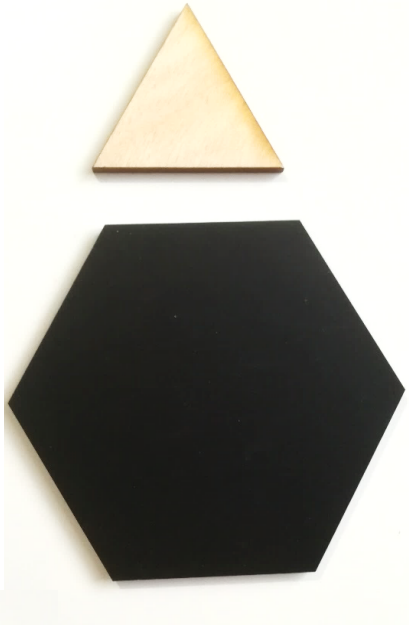


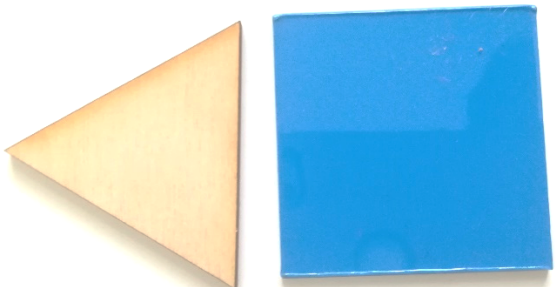
Target of the task:

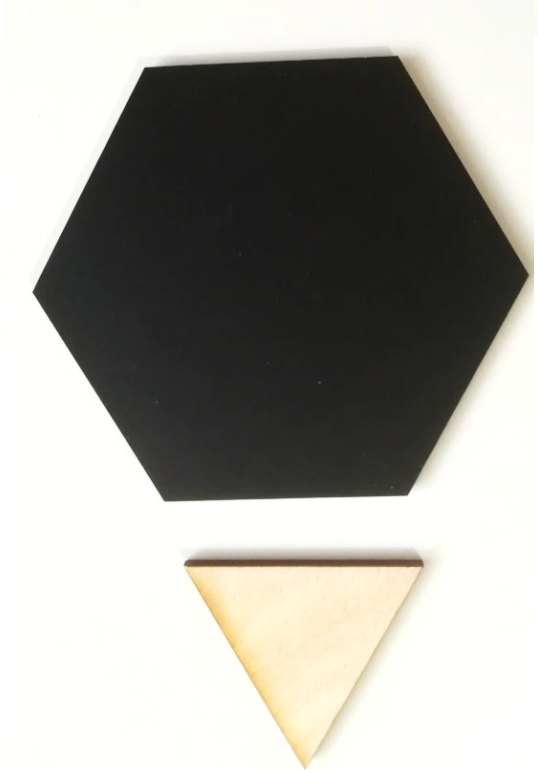
- To understand the mathematical actions by making them and making visible the beauty of it at the same time.
- To make visible the tiling systems and the different possibilities of repetition
- Use symmetry and also visual elements in creating surfaces
- To see and understand the material issues in surface design and their benefits/meaning in design

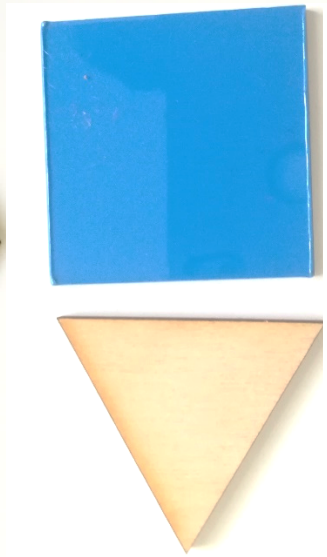
Playing

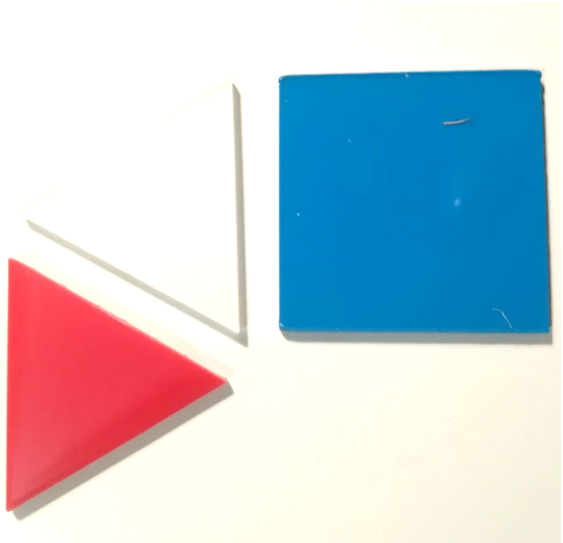


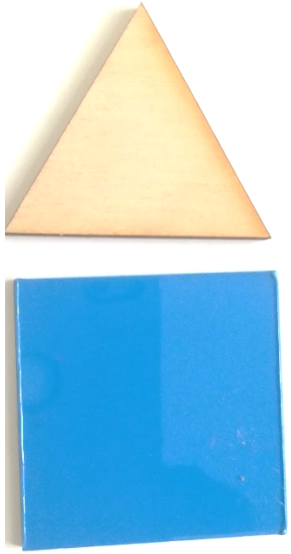












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