

Nook

Degree Project for Bachelor of Fine Arts in Design
Main field of study Industrial Design

2020

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LUND
UNIVERSITY

Nook

by

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Degree Project for Bachelor of Fine Arts in Design
Main field of study Industrial Design

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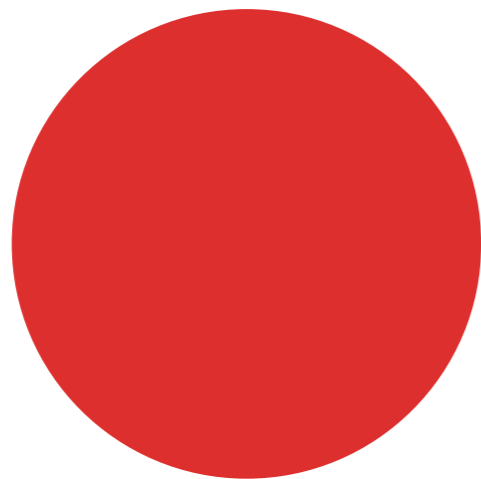
2020

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Sammanfattning

I detta projekt tar vi oss an problemet att inte ha ett eget utrymme i en trångbodd levnadssituation som barn. Vi tror det är viktigt för barns utveckling och välmående att kunna leka och upptäcka världen på egen hand, och att ibland få göra detta utan en vuxens närvaro. Men hur skapar man utrymme för självständig lek om man bor i en liten lägenhet i en storstad, och kanske delar rum med ett syskon? Detta projekt handlar om att skapa ett sådant rum, och resultatet är en modulär möbel som kan utvecklas tillsammans med barnet när det växer upp, och som kan anpassa sig till dess föränderliga behov.



Abstract

In this project we address the issue of not having a space to be on your own when living in a small space situation as a child. We believe it is important for children's development and wellbeing to play and discover the world and themselves, sometimes without the supervision of an adult. But how do you find that space if you live in an urban situated apartment, and share bedroom with a sibling? This project focuses on creating this sort of space, and the result is a modular furniture that can develop with the child as it grows, and adapt to its changing needs.

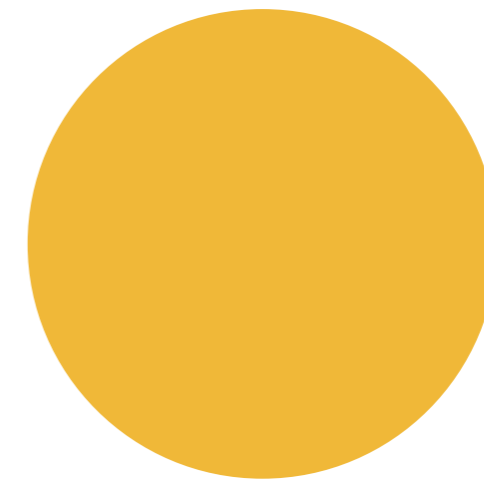


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Dedicated to Richard Öhman and Berit Svensson.



Background

This project started with a desire to design and develop a product for children. Today, around 1 billion children live in cities, and the numbers are growing. As more people live in cities, the places we live in tend to grow smaller, which is why we would like to focus on small space living situations in this project.

The aim for this project is to create a product for children who grow up in an urban small space living situation. We build our brief to focus on a child that grows up in an urban situated apartment, meaning that the product should develop with the child as it grows older and be able to adapt to the changing needs of its user.

Initial Brief

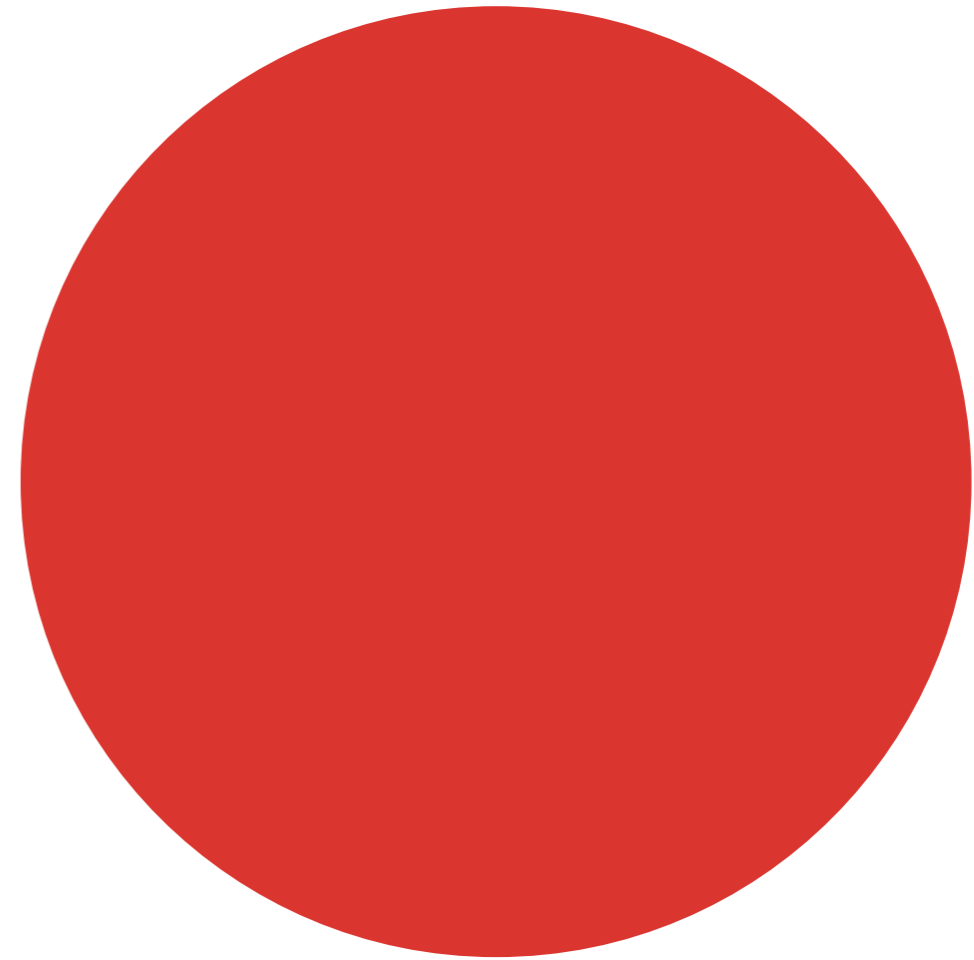
“ Design for **children** who **grow up** in an urban small space living situation ”

Method

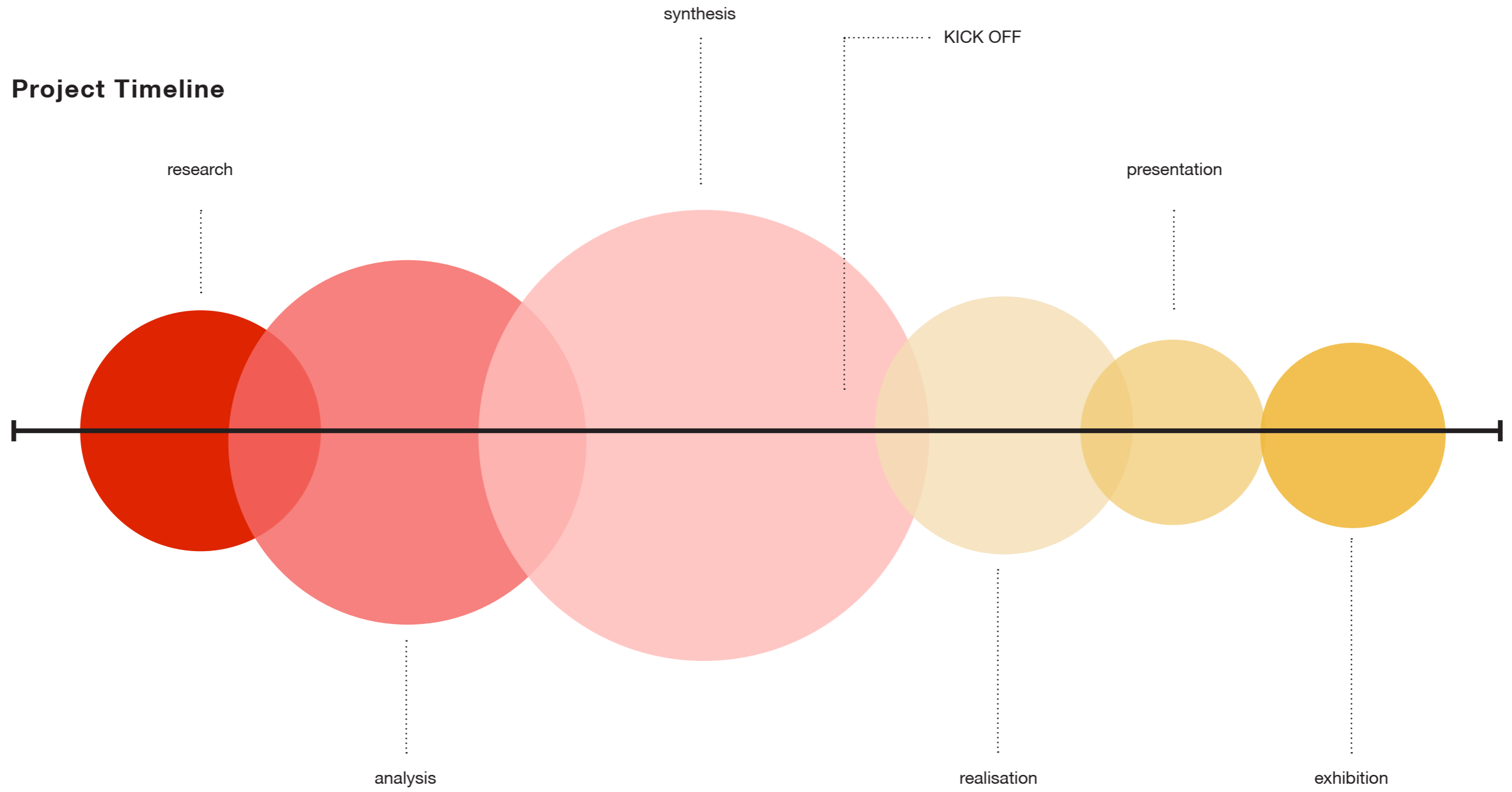
The design process was built on research through reading articles, books, but most of all listening to people representing our target group. Interviews with children, parents, psychologists and interior architects has been important to give us insights to identify existing problems and needs. A survey was conducted to confirm the projects ideas and a home visit gave us a deeper understanding of the everyday life for a family with children.

To evaluate and develop our ideas we built mockups and full scale prototypes, as well as sketching and 3D-modelling.

Through discussion and conversation amongst ourselves, we have been able to move forward in our design process, making proper decisions based on our investigations.



Project Timeline





Demarcations

This project was conducted on the spring of 2020, during the Covid-19 pandemic. This unprecedented situation led to many unexpected challenges during the design process. As all education had to be conducted on distance, we did not have the opportunity to use the workshops to build and test prototypes in the intended materials. Most importantly, due to the need of social distancing, we did not have the possibility to perform user tests which would have been an important asset in the design process. In a possible future realisation of the project, thorough tests including children would have to be conducted in order to validate our design choices.

History of Design for Children

The including of children's needs when designing products and services is a relatively new way of thinking. The concept of childhood emerged from the Age of Enlightenment (1718 - 1789) with philosophers such as Jean Jacques Rousseau and Mary Wollstonecraft leading the way. Before that, children were merely thought of as undeveloped adults, who simply would have to adjust to a world designed for grown up beings. With new ideas about what children are and need, also came the notion of design for children. However, the furniture made for children in the 1800's were mostly adult furniture simply made smaller. In the beginning of the 1900's, the special needs of children in comparison to the ones of adults were started to be considered in the design process.¹ Today, design for children is an established segment in the world of design. In 2015, the first design week aimed solely on children, Kids Design Week, were held in Milan.²

¹ Kimberlie Birks. *Design for Children: Play, Ride, Learn, Eat, Create, Sit, Sleep*. Phaidon Press Ltd 2018

² Dan Howarth. Children's products are a "huge market" for design brands. *Dezeen*. 2016-02-16. <https://www.dezeen.com/2016/04/11/childrens-products-huge-market-furniture-brands-kartell-big-game-marcel-wanders-front-milan-design-week-2016> (2020-04-14)



Photo: Ecobirdy. <https://www.moveisdevalor.com.br/portal/startup-belga-utiliza-artigos-descartaveis-para-criar-moveis> (2020-04-15)

Urbanisation & Small Space Living

For the last 200 years, the number of people living in cities has grown rapidly due to the industrialisation and modernisation of the world. Since 1900, the percentage of the world's population that lives in urban cities has grown from 16 to 56 percent. It is expected that by 2050, more than two thirds of the global population will live in urban areas.¹

As we move towards a higher percentage of people living in cities, the places where we live tend to grow smaller. This growing trend has been acknowledged by big furniture companies such as IKEA who works continuously to find new solutions for compact living.² Living in urban areas may impact the possibilities for children to go outside on their own, since the surrounding area might not be safe or child friendly.

In 2020 the world is facing a new challenge, the Covid-19 virus, which is spreading across the globe, completely paralyzing societies as whole cities are put in to quarantine. As people have to spend more time in their homes together with their families, personal space might become more of an issue for those who live small.

¹ Rosling, Hans. *Factfulness*. Natur & Kultur Allmänlitteratur. 2018

² IKEA. Livet Hemma. <https://livethemma.ikea.se/etikett/kvadratsmart/> (2020-04-15)



Growing up - Sustainability in design for children

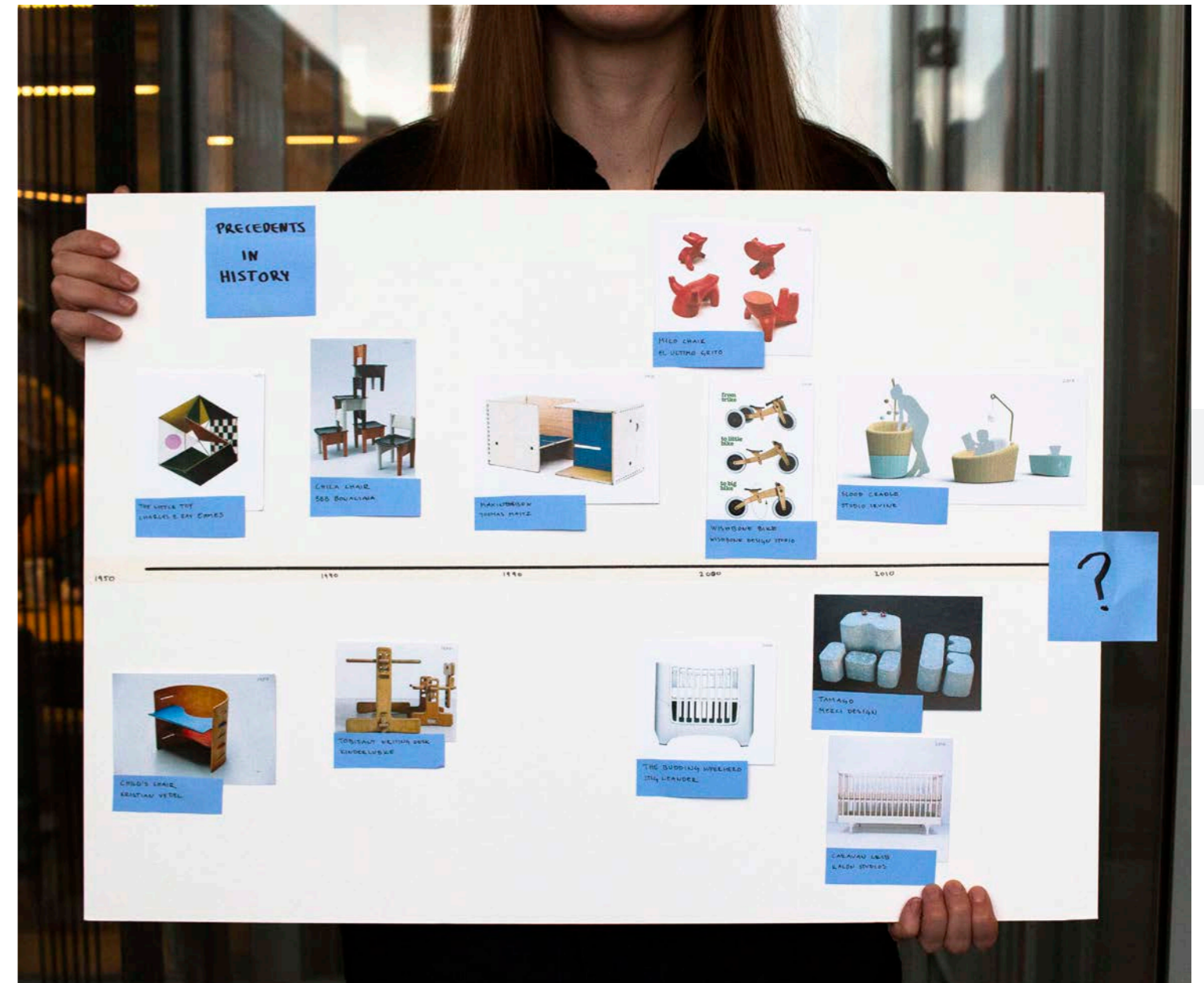
Designing products for children are challenging in many ways, as there are numerous criterias for children's products when it comes to safety, which always needs to come first. The construction and material of choice needs to keep a high standard to ensure no risks for the user. It also needs to allow rough handling, and there can be no risk of the product breaking if , for example, thrown or dropped on to the floor. ¹

While keeping safety as our main requirement for the design, we strive to make sustainability the second. One could argue that safety and sustainability goes hand-in-hand as nothing is sustainable if it meanwhile is not safe to use, the same goes for the opposite. What we mean by sustainability in this case is a product that has a longer lifespan and evolves with the child as it grows.

The changing needs of children during different life stages can cause products for children to be short-lived, if they only have one function. Products that change and adapt to the child as it grows tends to stay longer with the same user, which we believe is more sustainable. ²

¹ Lueder & Rice. *Ergonomics for Children: Designing Products and places for toddlers to teens*. London & New York. Taylor & Francis. 2008

² Kimberlie Birks. *Design for Children: Play, Ride, Learn, Eat, Create, Sit, Sleep*. Phaidon Press Ltd 2018



Looking at history to find out more about sustainability in children's design.

Own Space

To further specify our project direction, we decided to focus on own space as a part of our brief. Mathilda Nilsson, a psychologist at BUP in Malmö, who meets many children in her work told us that “Something that I often notice in my conversations with children is the lack of having an own room or space. In some cases families live in such a small space that one of the kids has to sleep in the living room”. This quote along with our initial research made us believe that personal space at home is an important social issue that we should address in this project.

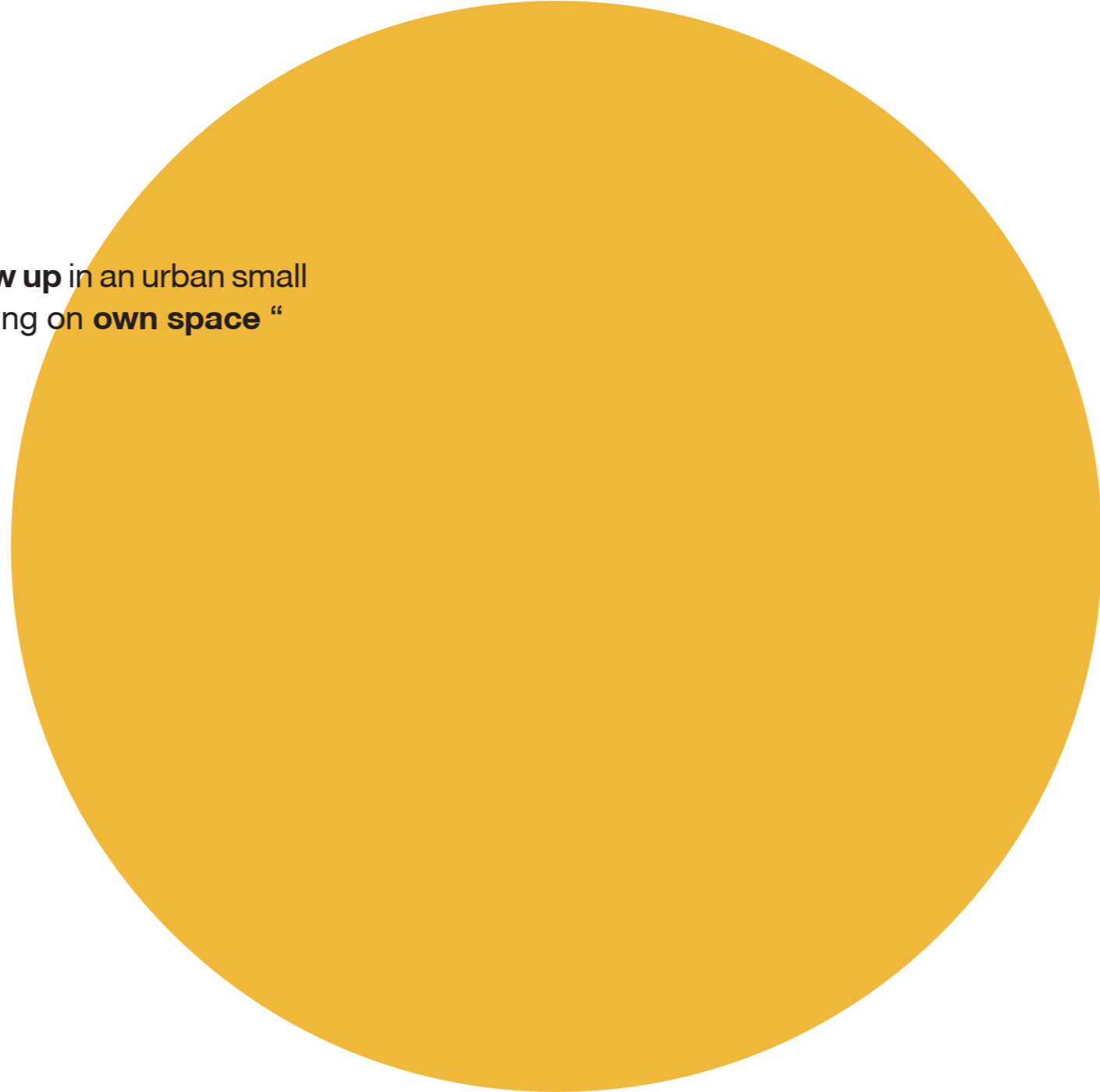
“Something that I often notice in my conversations with children is the lack of having an own room or space. In some cases families live in such a small space that one of the kids has to sleep in the living room”

Matilda Nilsson, 28
psychologist at BUP Malmö



Updated Brief

“ Design for **children** who **grow up** in an urban small space living situation, focusing on **own space** “



Why do we live small?

Economy, geographics & family situation, can all be a factors in why we live small. One might want to live bigger but can't due to economic reasons. Others choose to sacrifice square meters to be able to live in a popular location, for example in a city centre. Changing life-situations such as a baby, a new partner moving in with two children from an earlier relationship, or an elderly or sick relative who needs caretaking might also lead to a more crowded living situation.¹

When is space an issue?

As children grow, so do their need to explore the world on their own, without an adult present. At the time when children starts school it is typical that they seek privacy from siblings, parents or other grown ups when playing at home or outside, either together with a friend or alone. In early teenage years, privacy at home becomes more a necessity than a wish.

¹ Koffmar, Linda. *Bostadsområdet avgör synen på trångboddhet*. Uppsala Universitet. 2016-12-15. <https://www.uu.se/nyheter-press/pressmeddelanden/pressmeddelande-visning/?id=3656&typ=pm> (hämtad 2020-04-15)



Photo: <http://moercar.com/elegant-photo-of-fabulous-bunk-bed-ideas-to-inspire-you/> (2020-04-15)

Cultural differences in attitudes towards crowded living

There is a huge difference on the perception of crowded living between different cultures. In Sweden for example, the most common ideal of a housing situation is one bedroom per child, one bedroom for the parents, a common living space, kitchen and bathrooms. Many Swedish parents think of one bedroom for each of their children as a must, even though some experts suggest that this is an unnecessary ideal as there is no health or social benefits with having children playing and sleeping in separate rooms.¹

Another interesting phenomenon around small living spaces in Sweden, which can also be applied to other western societies, is the vocabulary that is used. When a family lives for example in a trendy studio in a city centre by choice, we call it compact living. The phrasing suggests a lifestyle which is full of enlightened choices and smart solutions. But, however, if the situation is due to economic reasons and there is a family living in a cheap and small apartment in a suburb, we call it a crowded living situation, which has a far more negative sound and meaning to it. In other cultures, for example in Asia, several generations under the same roof and families sharing bedrooms is the common standard. This cultural aspect of expectations on the home environment is important to keep in mind.

¹ Koffmar, Linda. *Bostadsområdet avgör synen på trångboddhet*. Uppsala Universitet. 2016-12-15. <https://www.uu.se/nyheter-press/pressmeddelanden/pressmeddelande-visning/?id=3656&typ=pm> (hämtad 2020-04-15)



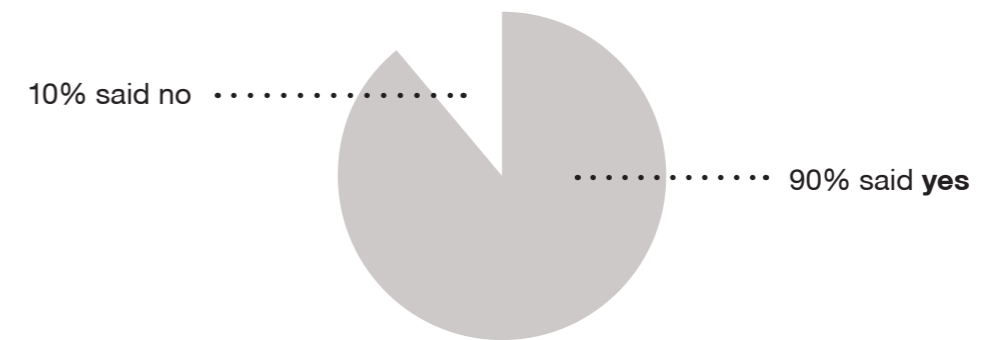
Survey

To further verify the idea of children needing their own space and to better understand how, when and why children seek solitude we made a survey that we send out to parents. The survey had 56 participants and we asked questions regarding living situation, family constellation and where in the home the child usually plays and how.

We discovered that the majority of the parents notice that their child has a need to be alone from the rest of the family. The most common places where the children play is the living room and their own room, if they have one. When the child wants privacy, most go to their room and close the door. Survey participants with children that do not have their own bedroom, mentioned that the child instead chooses another place in the house e. g. the kitchen or the parents bedroom to be alone in. The most common activities the children of the participants likes to do while playing on their own was play on computer, smartphone or tablet, watch a movie, read, draw or listen to music.

- 90 % of the participants children usually plays with an iPad, smartphone or computer when alone.
- Other common activities that the participants children does when being alone are watching a movie or television, playing with lego, drawing and listening to music.

We asked parents if they ever notice that their child has a wish to be alone from the family when at home.



Charlotte Tenje

Interior Designer at Com&In at IKEA Älmhult
Mother of three grown up children



Charlotte was educated as an interior architect at Konstfack in Stockholm and has worked at the Communication and Information department at IKEA Älmhult for 16 years. She is a mother of three and knows a lot about how to design and furnish for children.

There is a lot to think about when furnishing a room for children as an interior architect at IKEA, Charlotte tells us. “At IKEA we call it living with children and every interior architect at IKEA must go through an education called childrens school “, she says. Charlotte thinks many rooms for children today are too put together and she doesn’t like that the adults decides where the child should or should not play. She likes open solutions and comments “who wants to play and craft with their noses against the wall” on a picture where a child’s desk is angled towards the wall.

Charlotte describes children as social beings that wants to be where others are. Therefore she is skeptical of small children having their own room and brings up an example of how her own family of five shared one bedroom for a period of time. She believes that children need their own space but indicates that all children are different and need more or less own space. When asking if she had any advice to us when designing for children, she said “Bring out the childishness in yourselves and use a lot of empathy. Go down on your knees and try to see things from a child’s perspective”.



Photo: IKEA. www.ikea.se/products (2020-04-15)

When designing for children in small space living, IKEA doesn’t have too many options. The bed KURA, a bed with a built in space underneath or above the bed, is a common solution she uses when furnishing small apartments. One of Charlotte’s favorite child product at IKEA is PLUFFSIG, a foldable mattress that encourage children to activate themselves. The mattress can be laid out on the floor or placed vertical as a wall. She likes products that are divisible and another favorite is BUSA, a flexible tube that can be flat packed. She also likes when toys have space for interpretation and mentions CIRKUSTÄLT, a foldable circus tent, from IKEA as an example of how interpretation is left out.

“ Bring out the childishness in yourselves and use a lot of empathy. Go down on your knees and try to see things from a child’s perspective. ”

Helene Annemark

Mother of two

Helene is a mother of two children, 6 and 8 years old. The family lives in a house in Malmö and both children have their own bedrooms. The children still likes to sleep in the parents bed and the lack of space result in one of the parents sleeping in the children's bedroom. She also explains that that her youngest daughter more often expresses that she wishes to play on her own and asks her parents not to come inside her room while she is playing. Helene explains that her daughter then spends time trying out several different outfits. Other activities the children likes to do while spending time on their own is reading, drawing, role playing, play on ipad, play ball games and play with toys e. g. lego, stuffed animals, dolls. "My daughter is six and shows signs of wanting to be left alone. She tells us not to come into her room and then she spends her time trying out several different outfits".

“ My daughter is six and shows signs of wanting to be left alone. She tells us not to come into her room and then she spends her time trying out several different outfits ”



Photo: Adobe Stock

Home Visit

To further investigate in how small space living situations and children work together, we visited the Ahlgren family in Flyinge. There, the families two daughters, Wilma 10 and Alice 8, share a part of the living room as their bedroom. The two girls does not mind sharing room, and the family spends much of their free time in their home. The girls usually plays on their own, Wilma likes to build with Lego or draw at her desk in the living room while Alice reads or play with her iPad. If they play together they usually play video games.

The visit gave us some useful insights of what the everyday life is for a family with children, and what it is like to share a room with a sibling. The girls father, Bengt, tells us that as the girls are getting older, he notices that their need for time apart from each other is growing, and that he usually solves this by letting one of them hang out in his bedroom upstairs or in the kitchen.



Alice showing her favourite iPad game



Wilma

10 years old

Pre-teen

Likes to play with Lego

Spends much time in front of the bathroom mirror in the morning

Alice

8 years old

Wakes up early and plays with iPad

Likes to read

Target Group

The main target group in this project are children who live in an urban situated apartment where space is an issue. Due to traffic and a non-child friendly environment surrounding the apartment, going outside to play or seek solitude might not be an alternative for the child. In our research, we found that the wish to play alone usually starts (if it does) when the child starts school or pre-school. We therefore decided to focus on children in the ages of 6 and up to 10 years old.

Even though the main focus is users who live in small spaced apartments, we believe that a well designed product would suit a larger group of children in different housing situations.

The secondary target group for this project are parents. As caregivers and buyers, it is important that the designed product should also meet their needs. As we mainly target people who live small, we need to consider the unique needs of those who live in rental apartments. When living in a rental property, putting screws into walls and ceilings might not be possible.



Photo: Adobe Stock

Personas



Photo: Adobe Stock

Sam, 6

Sam is 6 years old and lives with his mother, father and two little sisters who are 5 and 3 years old. The family lives in an 2 bedroom apartment in central Stockholm, and Sam shares the smaller room with his 5 year old sister, while the youngest sleeps in their parents room.

Sam likes to read comic books when he comes home from school, but doesn't like to be interrupted by his sisters who wants to play with him or his parents who asks questions, and has taken the habit of locking himself in the bathroom for a moment of reading with no interruption. As the family only has one bathroom, this can sometimes cause conflicts.

Need: A place where Sam can sit and read in privacy.



Photo: Adobe Stock

Lisa, 8

Lisa is 8 years old, she is the only child in the family and her parents are divorced since three years back. She lives every other week with her Mom in a one bedroom apartment in central Malmö. Her Mom has a new partner who lives with them as well. Since the apartment is quite small they all share one bedroom and have a dividing wall to seperate the beds. Lisa finds this quite annoying since the others needs to pass her part of the room in order to get to theirs and she has mentioned that she would like some sort of curtain to close of her space better. When Lisa plays she likes to build with lego or play on her ipad.

Need: a place where Lisa can play where no one sees her

6-8 year old childrens development ¹

physical	mental	feelings	social	interests & hobbies
milk teeth starts falling out	a lot of fantasy and imagination	can talk about feelings	starts school	can read and write on their own, develops interest in reading
eat more	enjoys magic tricks	express anger in words rather than through actions	wants to try out sleepovers, but can change their mind quickly	collects & organizes stuff
can ride a bike	dreams & nightmares	big changes in daily life can make child in need of feeling and acting younger at home, ex. starting school	understands that people have different kinds of thinking and opinions. But can't see that both can be right. One is right, one is wrong.	engages in sports and games with rules
learns to swim	phobias and worries	proud of their bodies and abilities, likes to show it off in front of an audience	new people can be scary ex. at birthday parties	compete to test their abilities
explores their bodies and sexes	starts to comprehend time. then, now, future. Life and death	can need encouragement when learning	do not understand irony (6-7)	
develops fine motor skills: cut with scissors, write etc	memory differs	8 and older - emotions turns inward	starts to collaborate, can argue their cause and find solution.	
not good in traffic, slow reaction and reflexes. can't rely on hearing and vision to understand speed	describes themselves by looks and physical abilities		develops and understanding of what others think of oneself	
	develops patience		gets a best friend	
	can concentrate for longer		tests independence; be with friends without adult, explore on their own	
	can read by themselves		thinks about justice and what is fair. "why can she and not I"	
	tries out words and how to use them, bad words are exciting			

¹ 1177.Vardguiden. *Barnets Utveckling 6-9 ar*. <https://www.1177.se/barn--gravid/sa-vaxer-och-utvecklas-barn/barnets-utveckling/barnets-utveckling-6-7-ar/> (2020-04-15)

Needs & requirements

Child

space where "I" decide
 space for solitude
 space for self-expression
 space for feeling secure
 space for exploration
 room for creativity
 room for play

Sustainability

longevity
 repairability
 adaptable use

Caregiver

organized space
 adaptable space
 safety for child
 easy to handle
 solitude
 not time consuming
 no screws in walls

Safety

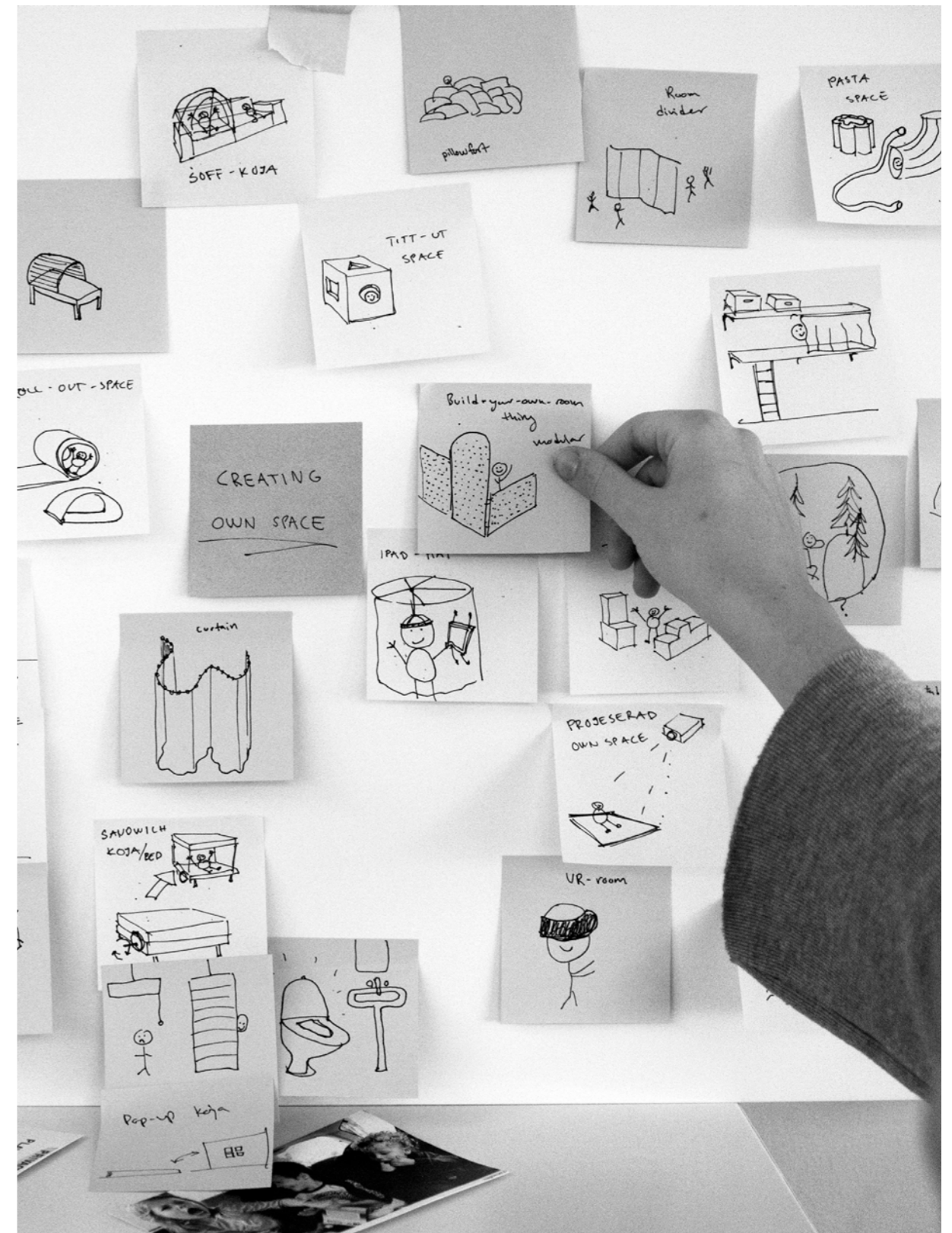
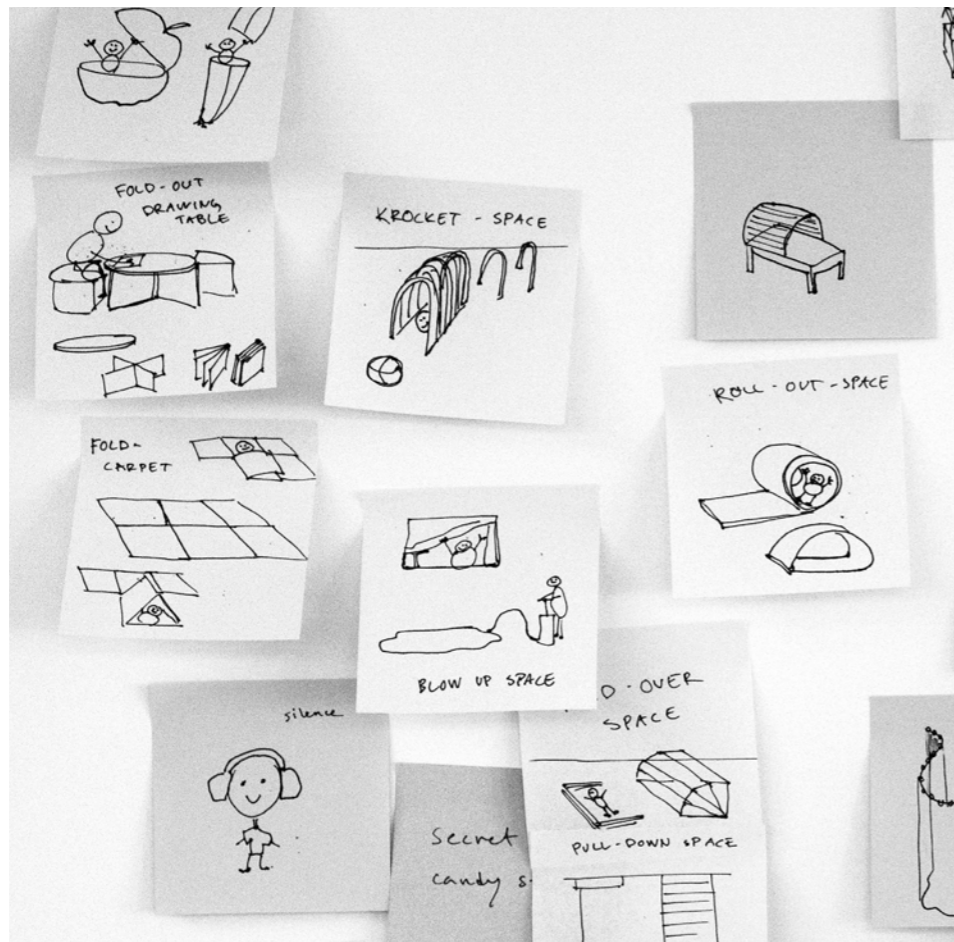
suitable for child
 no sharp edges
 easy to handle
 weight
 trustworthy
 non-toxic material

Functional analysis

Verb	Noun	Rank
provide	own space	HF
be	safe to use	N
encourage	creativity	N
improve	organization	D
allow	play	N
emphasise	self-expression	D
adapt	to user	N
be	sustainable	D
be	affordable	D
allow	easy usage	N

Concept generation I

To generate ideas, we brainstormed on ways to create own space for children when living small. From this, we came up with over 30 product ideas that could be divided into 6 different concept categories.

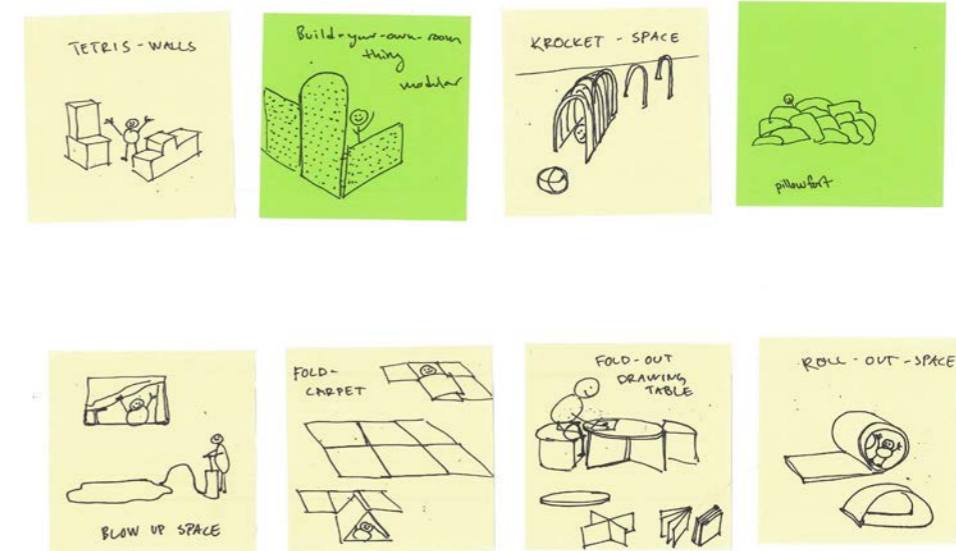


List of concepts

- Using and adapting existing space or furniture to create own space
- Virtual Reality and Technology as space when physical space is not available
- A foldable / expandable product which can be “popped up” when needed, and hidden/stored when not.
- A shelter/playroom that the user can enter when in need.
- A space divider that can create own space by separating a room into two.
- **A modular product, that you can build and design your own space with, and change when needed**

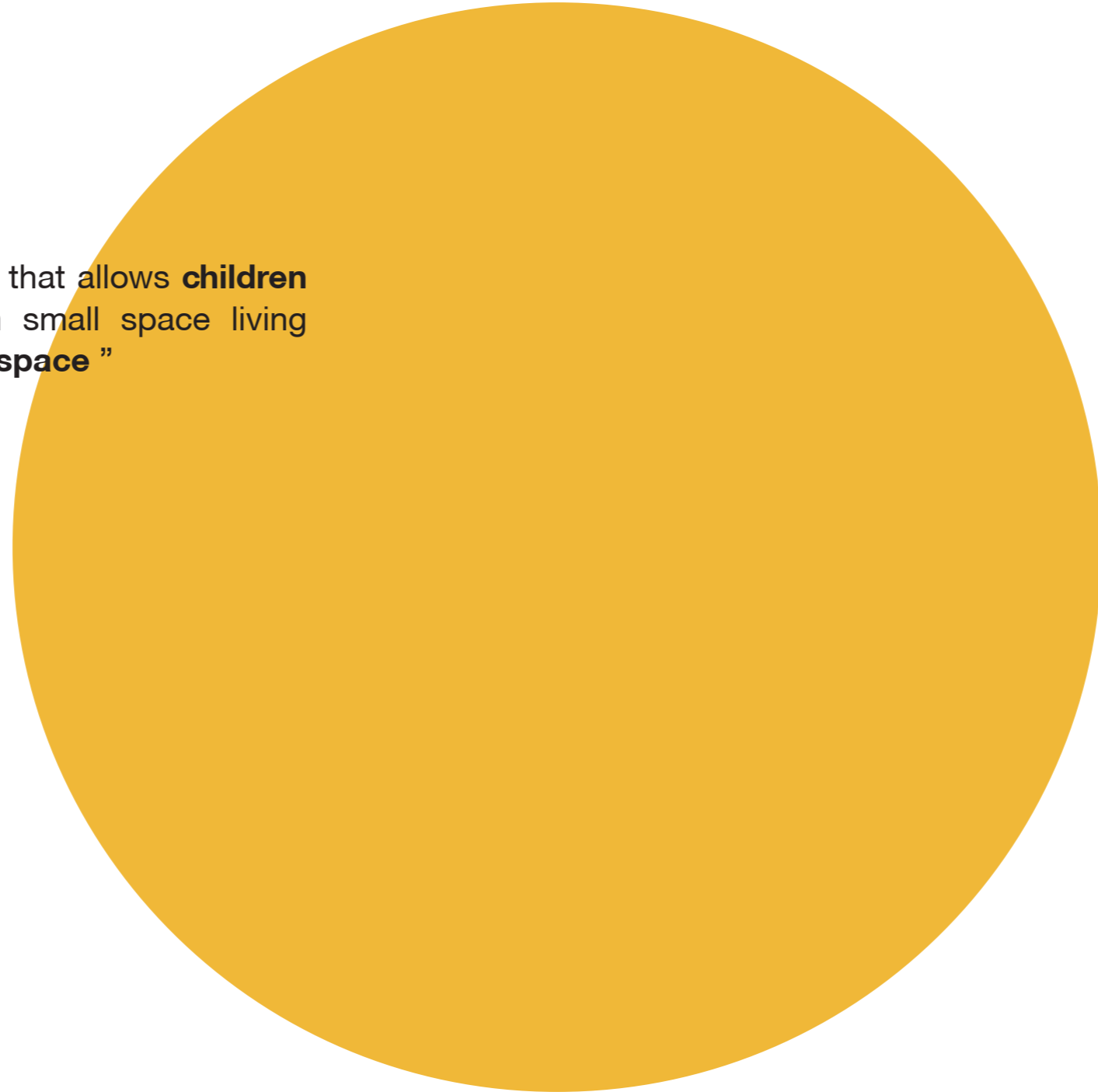
Modular concept

As we are working towards a primary target group that has little space, and demands a solution that will suit every family's unique situation, we decided to continue with the last concept. A modular solution that can be changed after the user fits the need for a product that can grow with the child as it gets older. It can also emphasize self-expression and encourage creativity by allowing the user to change the appearance of the product after preference.



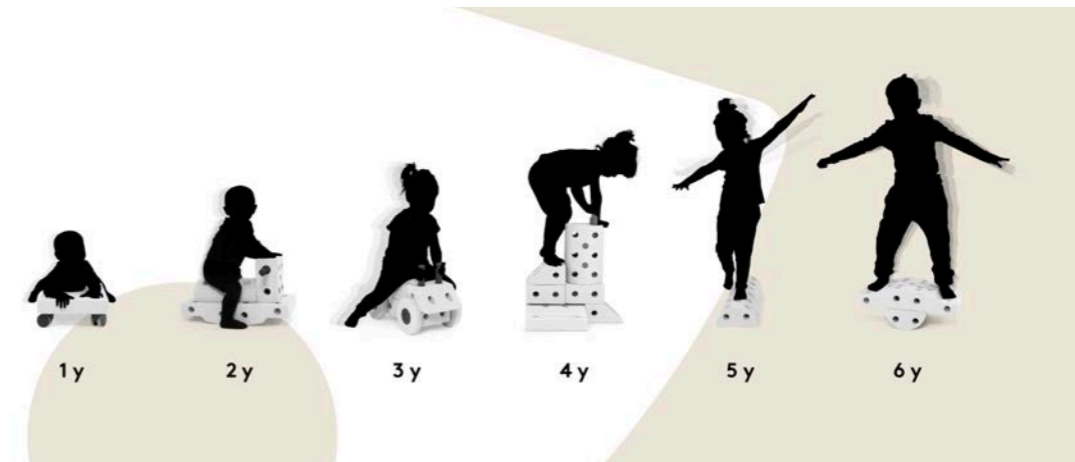
Final Brief

“ Design a **modular** product that allows **children** who **grow up** in an urban small space living situation to create their **own space** ”

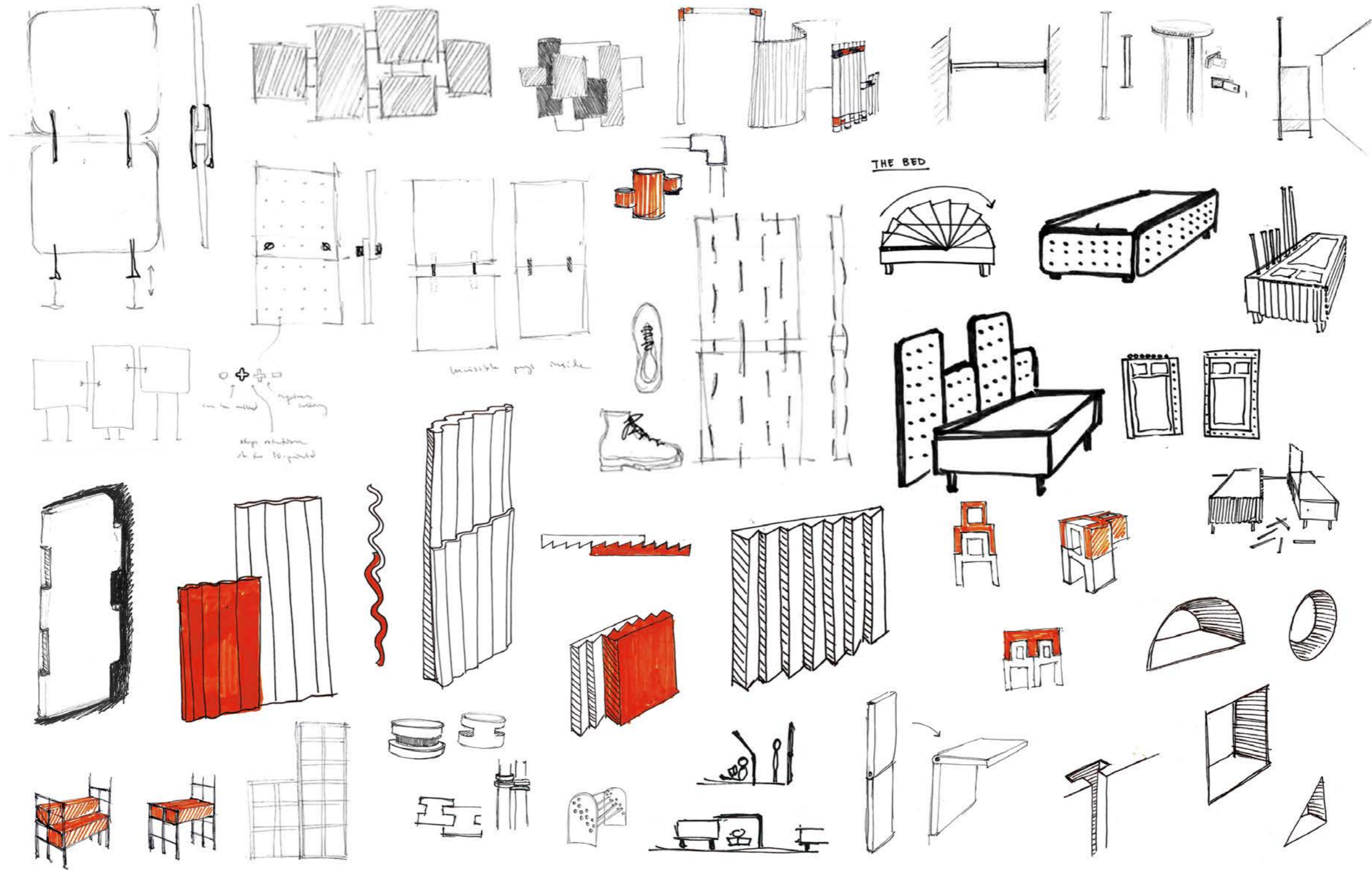


Precedents

Looking at the market we could find a few modular products that engages children in creating their own space, or can develop with the child as it grows.



Photos: <https://modu.modutoy.com/>, <https://trigonos.cat/>, <http://www.edu2.it/>, <https://www.smarin.net/> (2020-04-15)



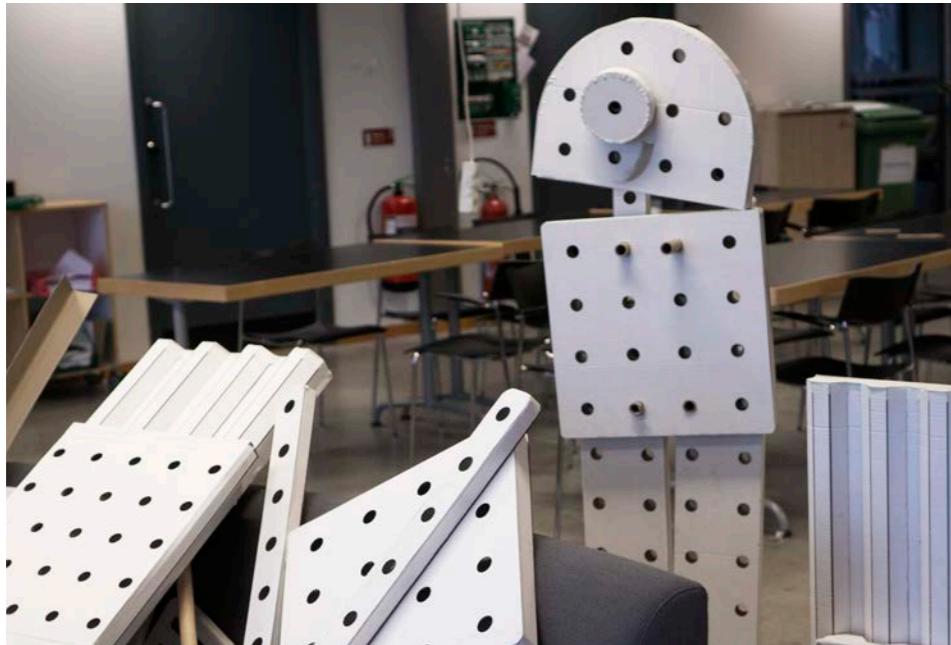
Concept generation II

Through sketching, mockup building and 3D-modeling, we explored modularity. Going three-dimensional early in the process was important for us to understand the complexity and possibilities of our project.



Concept generation III

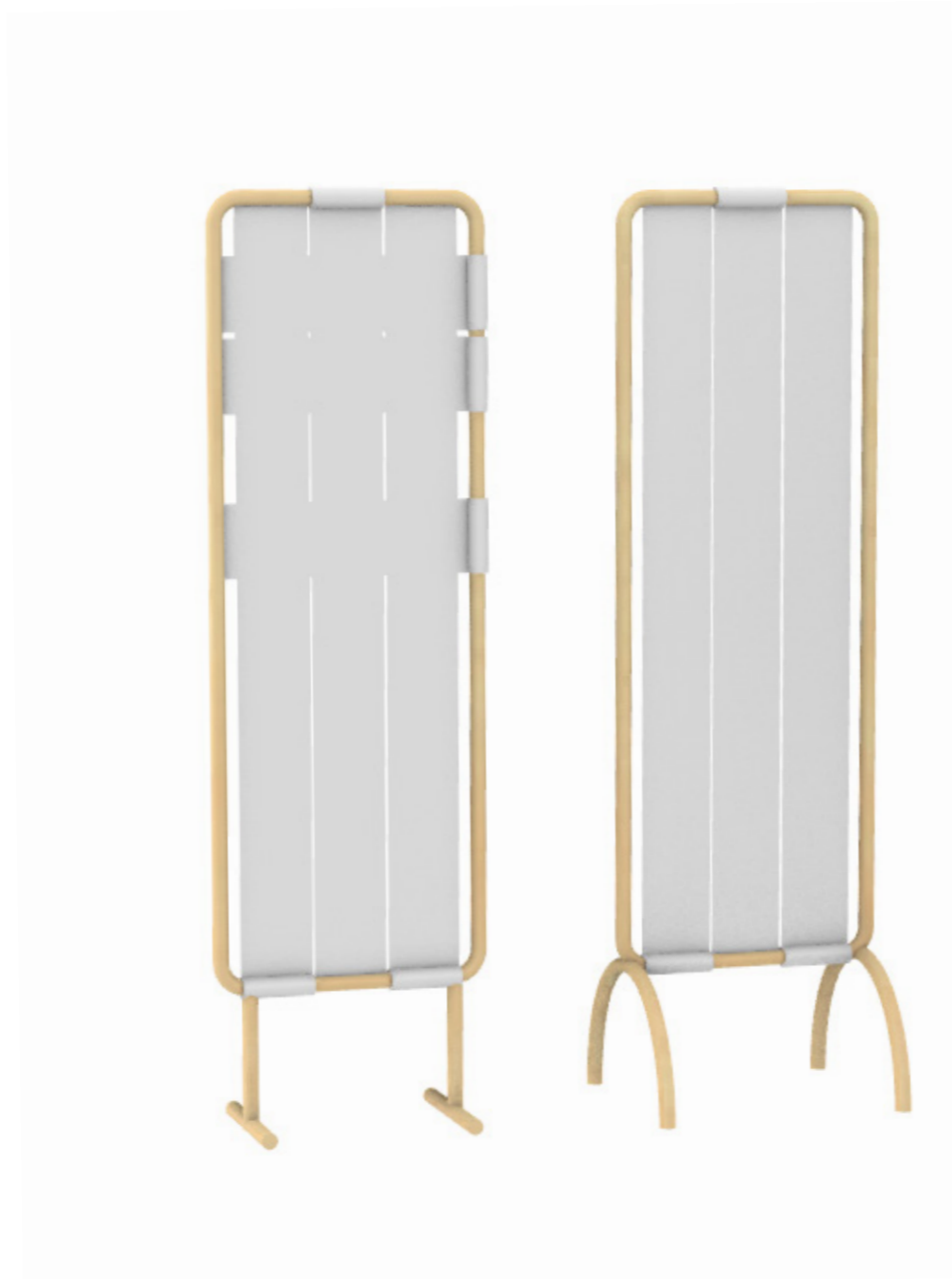
To further try out our ideas we created full scale mockups on some of the concepts we thought had most potential. After, we could evaluate and compare the concepts to each other and finally select one we continued working with.



Curtain concept

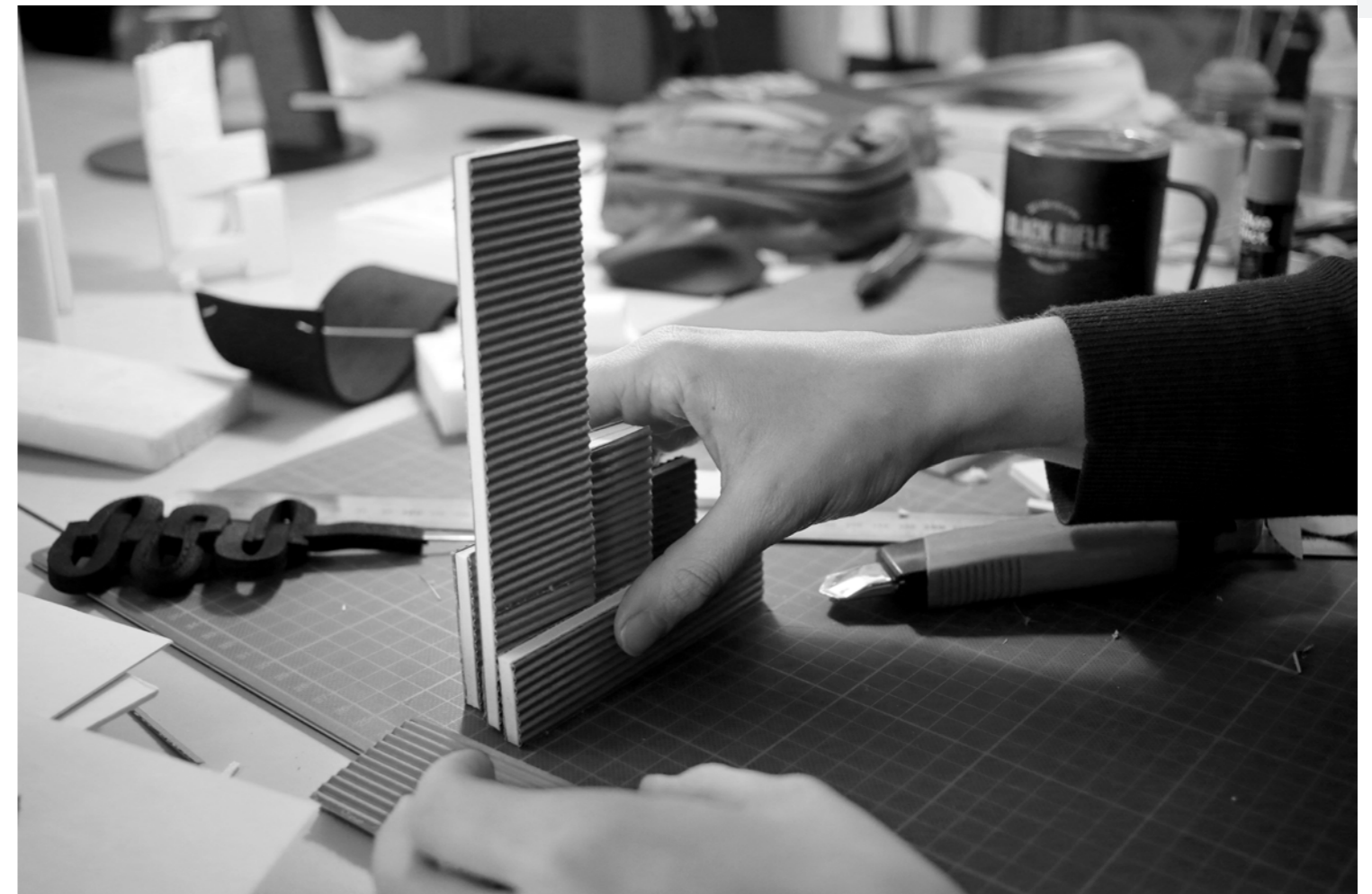
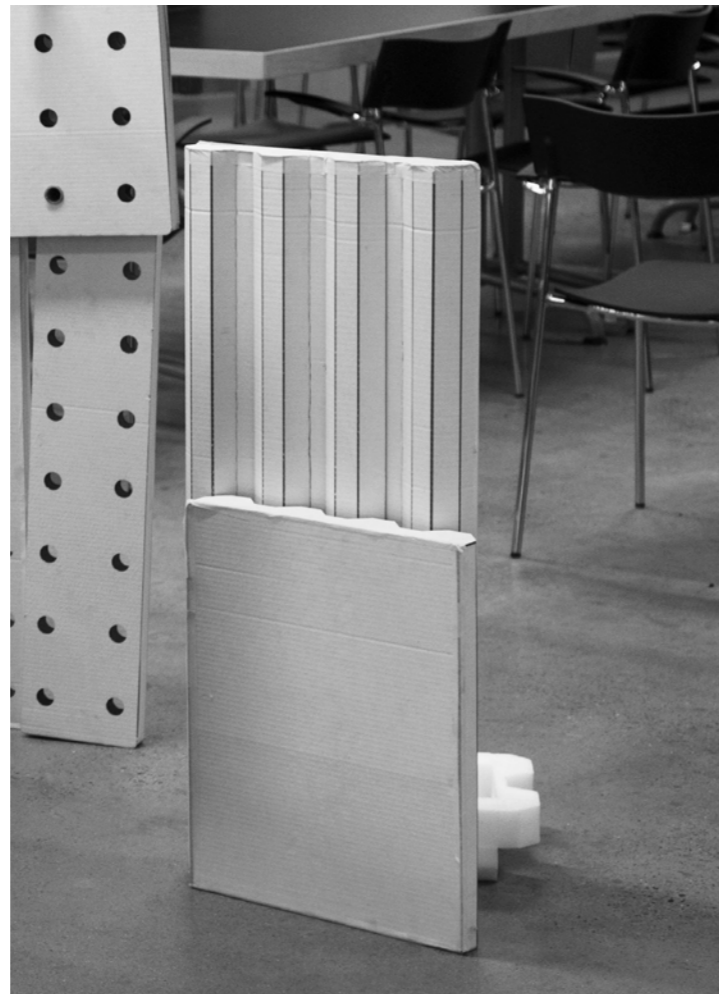
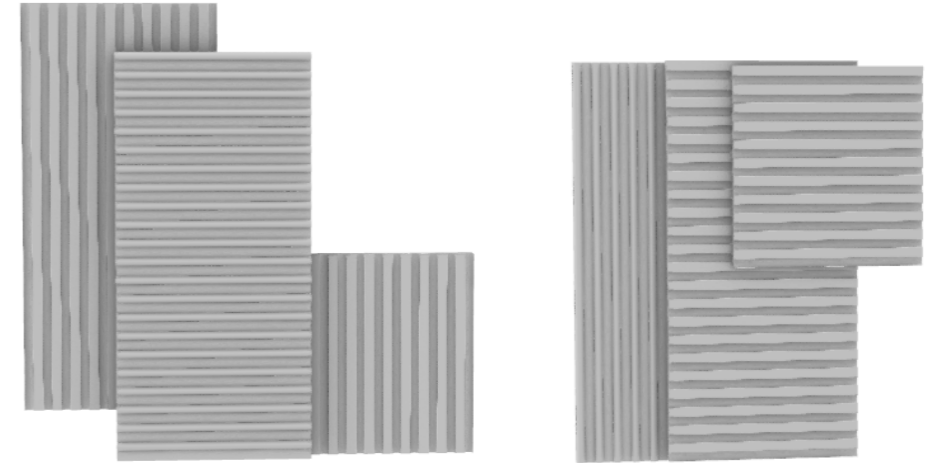
- + Allows personalisation
- + Textile gives softness
- + Light weight
- + Reparability
- + Minimalistic

- Too complex
- Does not feel like a children's product
- Fragile



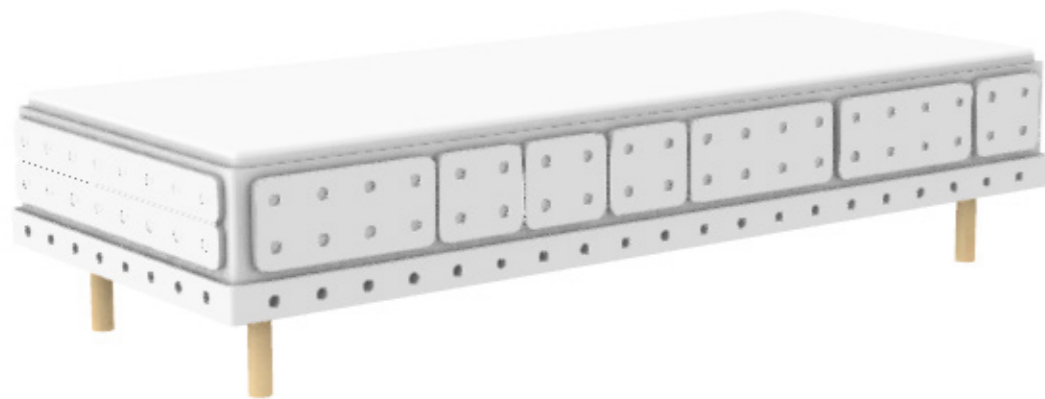
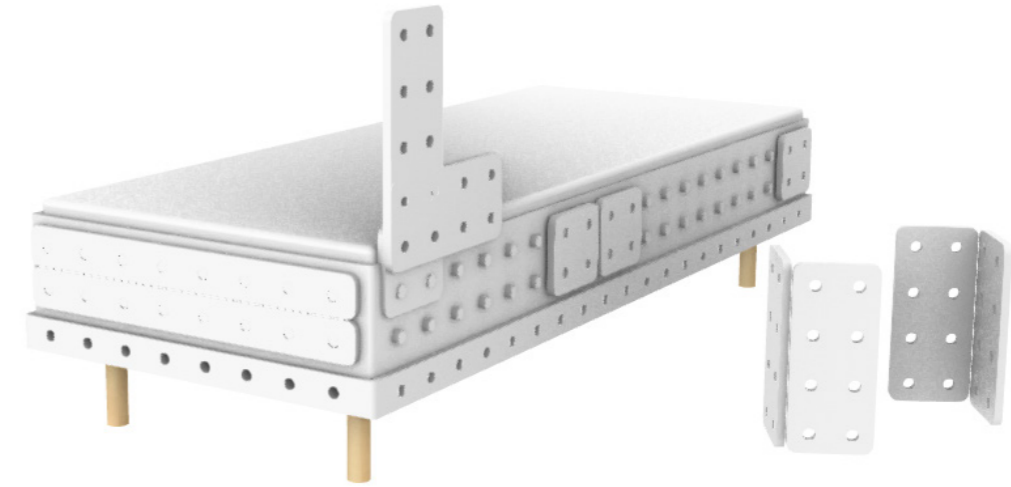
Sliding walls concept

- + Minimalistic
- + New idea, have not seen this before
- + Semiotically pleasing
- Technically challenging, how would it work?
- Heavy
- Too complex for a children's product



Bed concept

- + Applicable for compact living
- + Does not require much floor space, only a bed frame
- + Allows customization
- + Modular
- No clear way of usage, too abstract
- Restricted to the area around bed, can't be moved
- Heavy



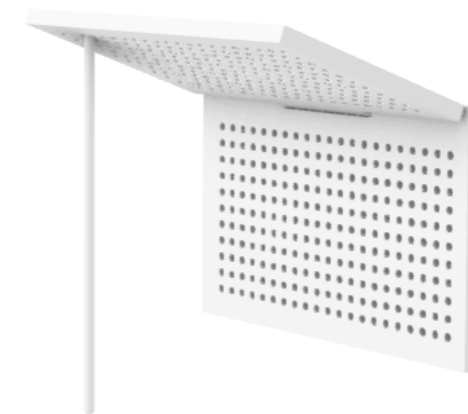
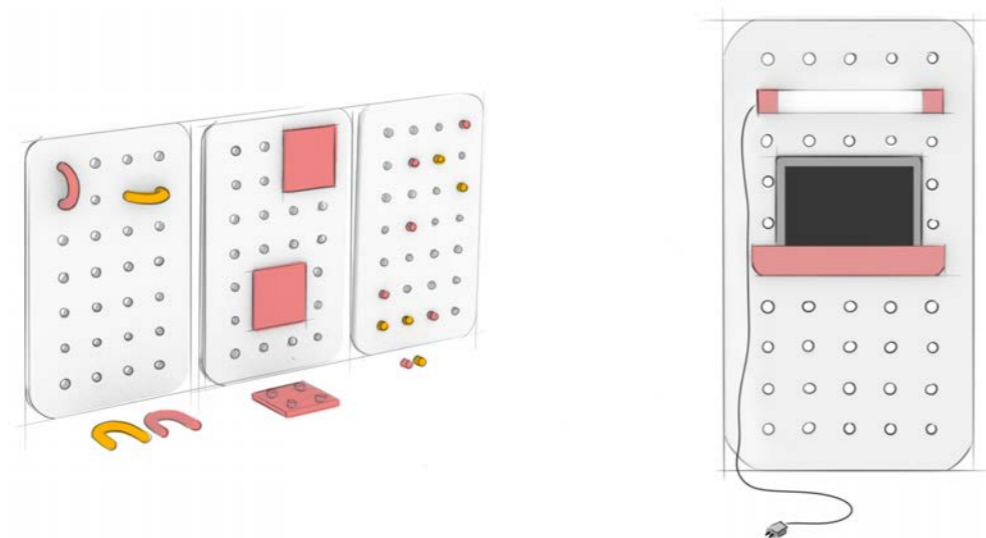
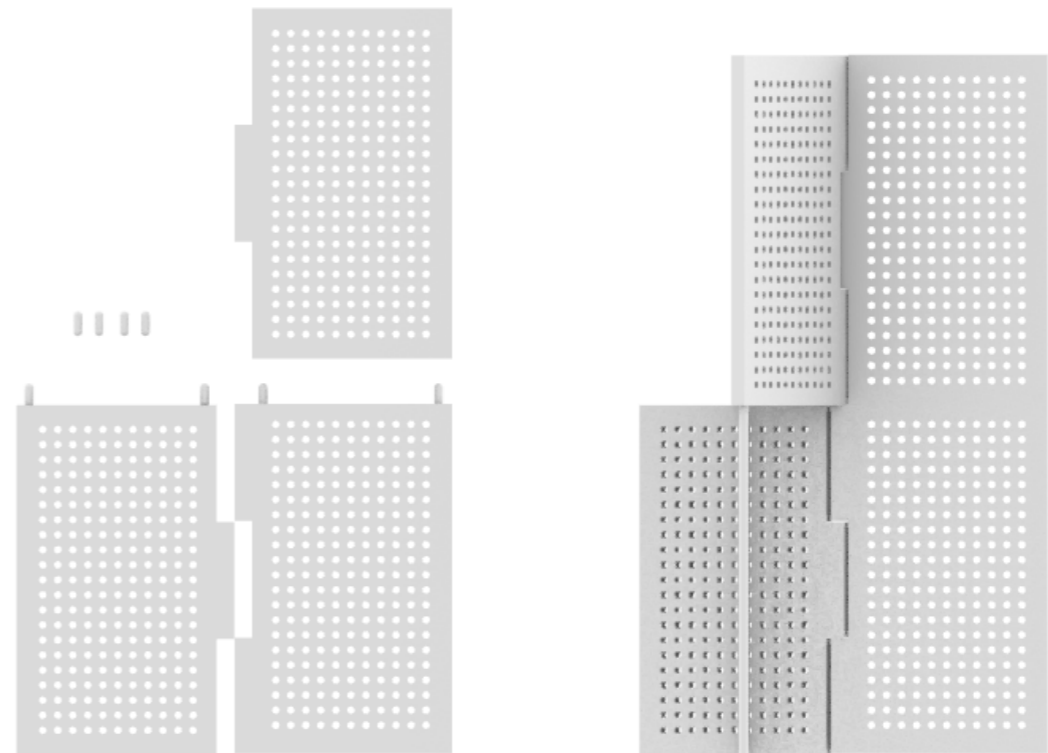
Final concept

After evaluating, we chose to continue with the pegboard concept as we believed it to have the most potential to meet the changing needs of the user. A pegboard can easily allow interaction and creativity in a not too complex way, suiting a child.

Pegboard concept

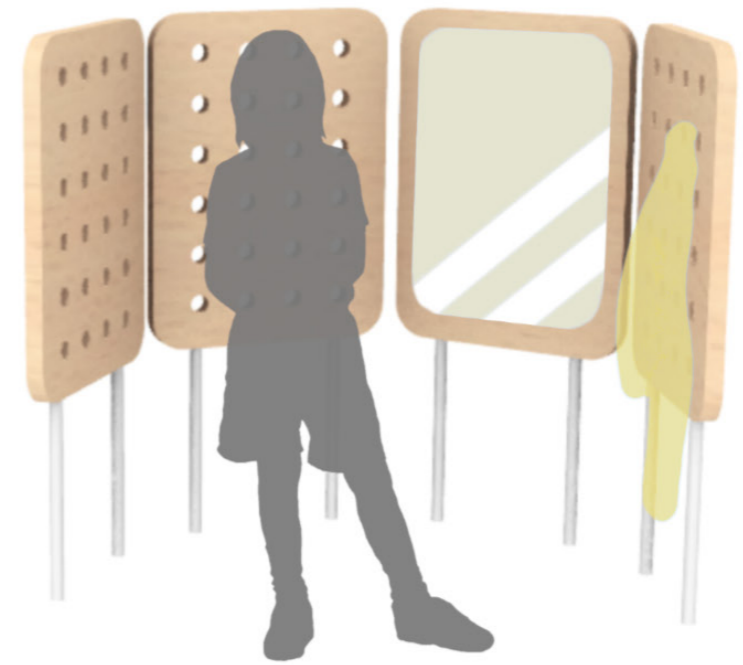
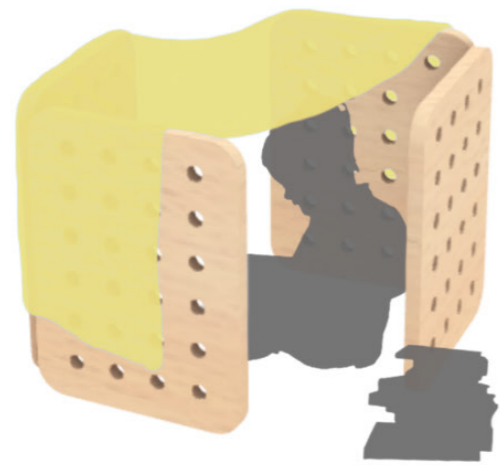
- + Potential to “grow” with child
- + Allows personalisation
- + Modular
- + Can be moved around / used in different places

- Pegboards are already used a lot, this needs to be different somehow



User Scenario

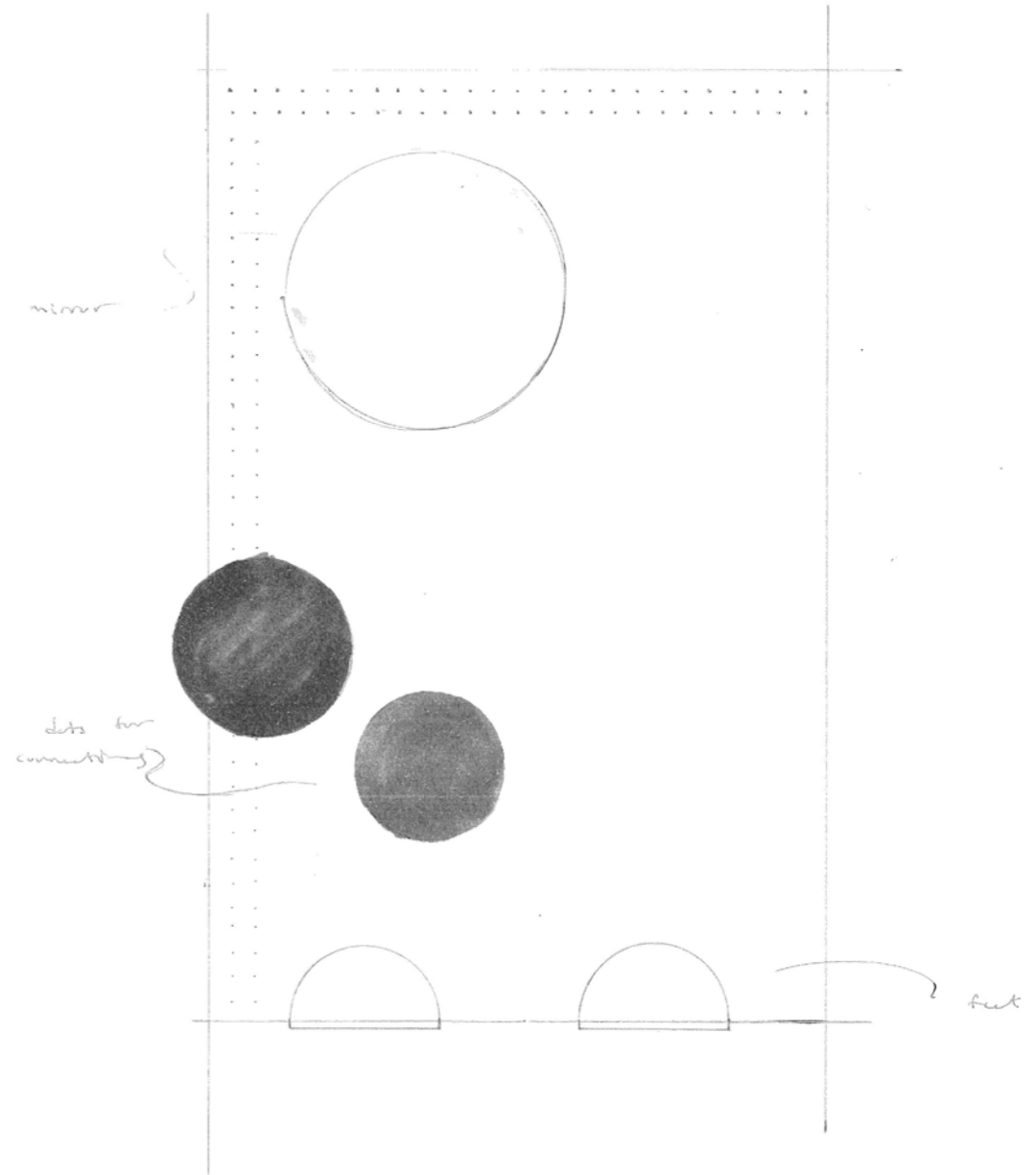
Our initial idea of how the pegboard concept could develop as the child grows older to adapt to its changing needs.



Moodboard

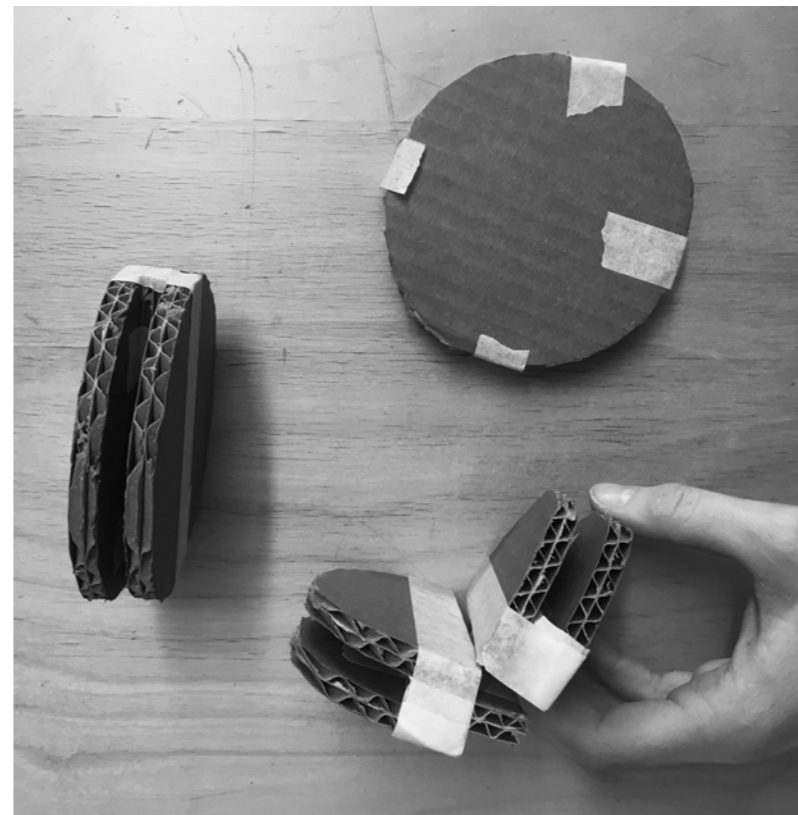
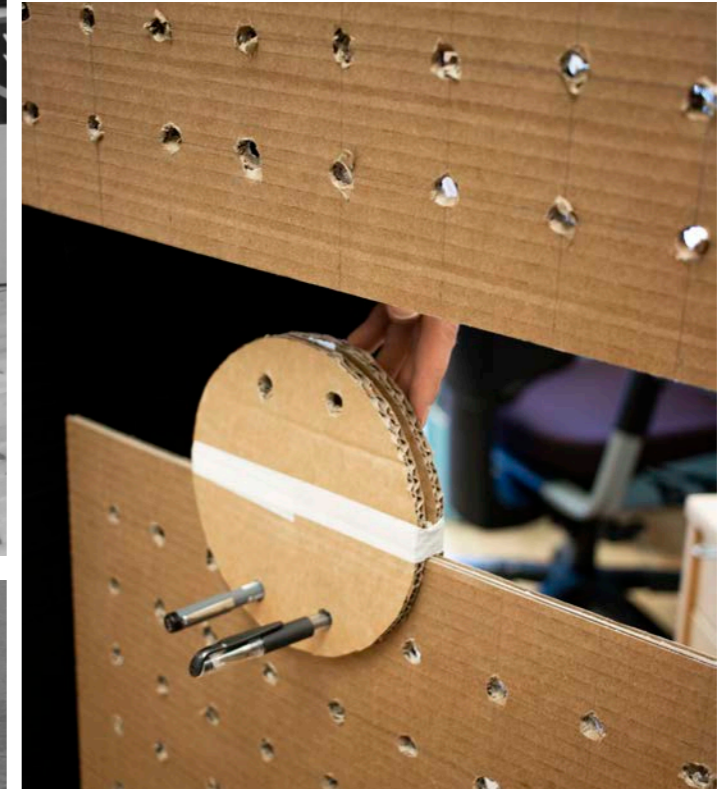
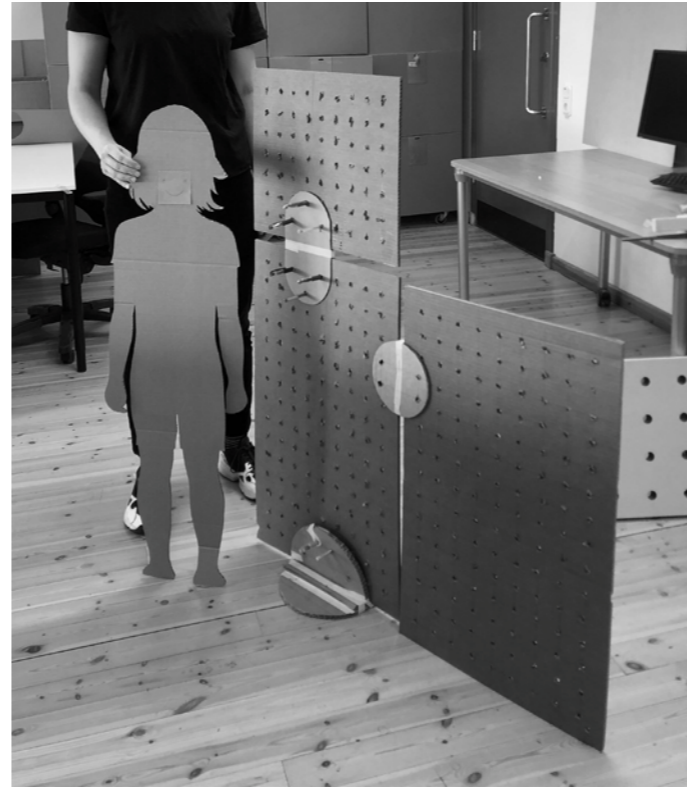
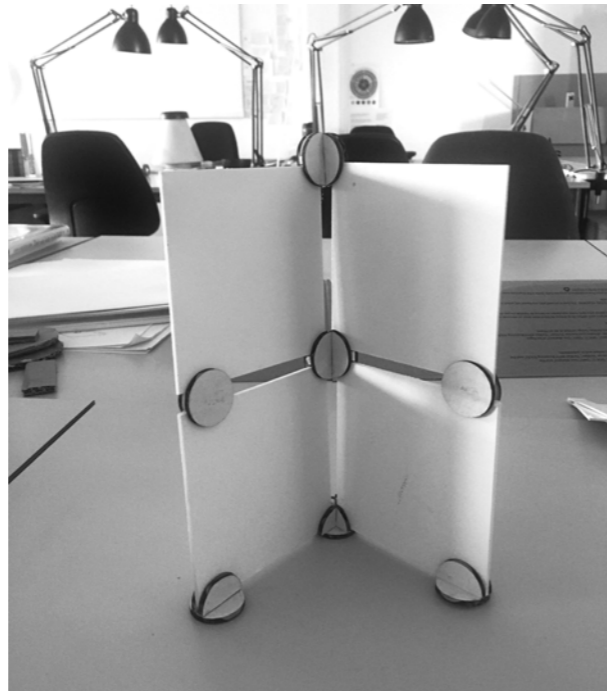


Photos: <https://www.ikea.com/>, <https://pegboard2.hairstylesday.com/>, <https://www.designboom.com/> (2020-04-15)



SYNTHESIS

Building three dimensional mockups was important to test and develop our chosen concept.



Accessories

The pegboard walls build up the space itself. But what happens in that space? How is it used? We want the user, the child, to decide. But to encourage the user to fill the created space with activity, and to make the product more interactive than just a few walls, we need something more. A pegboard is only a board with holes unless you can attach something to it.

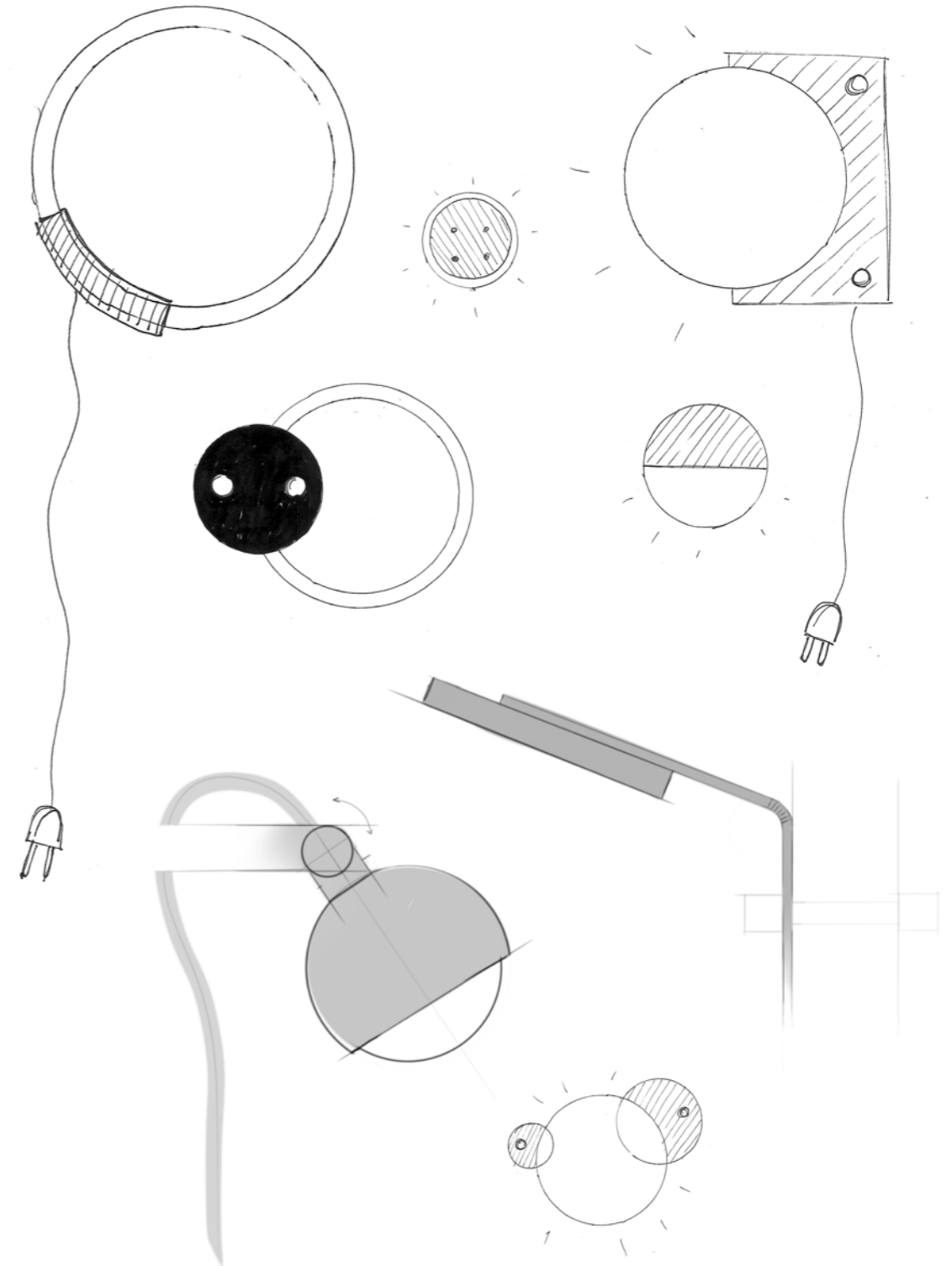
Looking at the needs of the user and the different age groups (from a 6 year old who likes to read comic books to a 10 year old who wants to dance and try on outfits in front of a mirror), we could point out some different scenarios of how to use the product, and what accessories that would be needed. These accessories could be additional products to complement a building set, in order for each user to decide on how the product will be used.

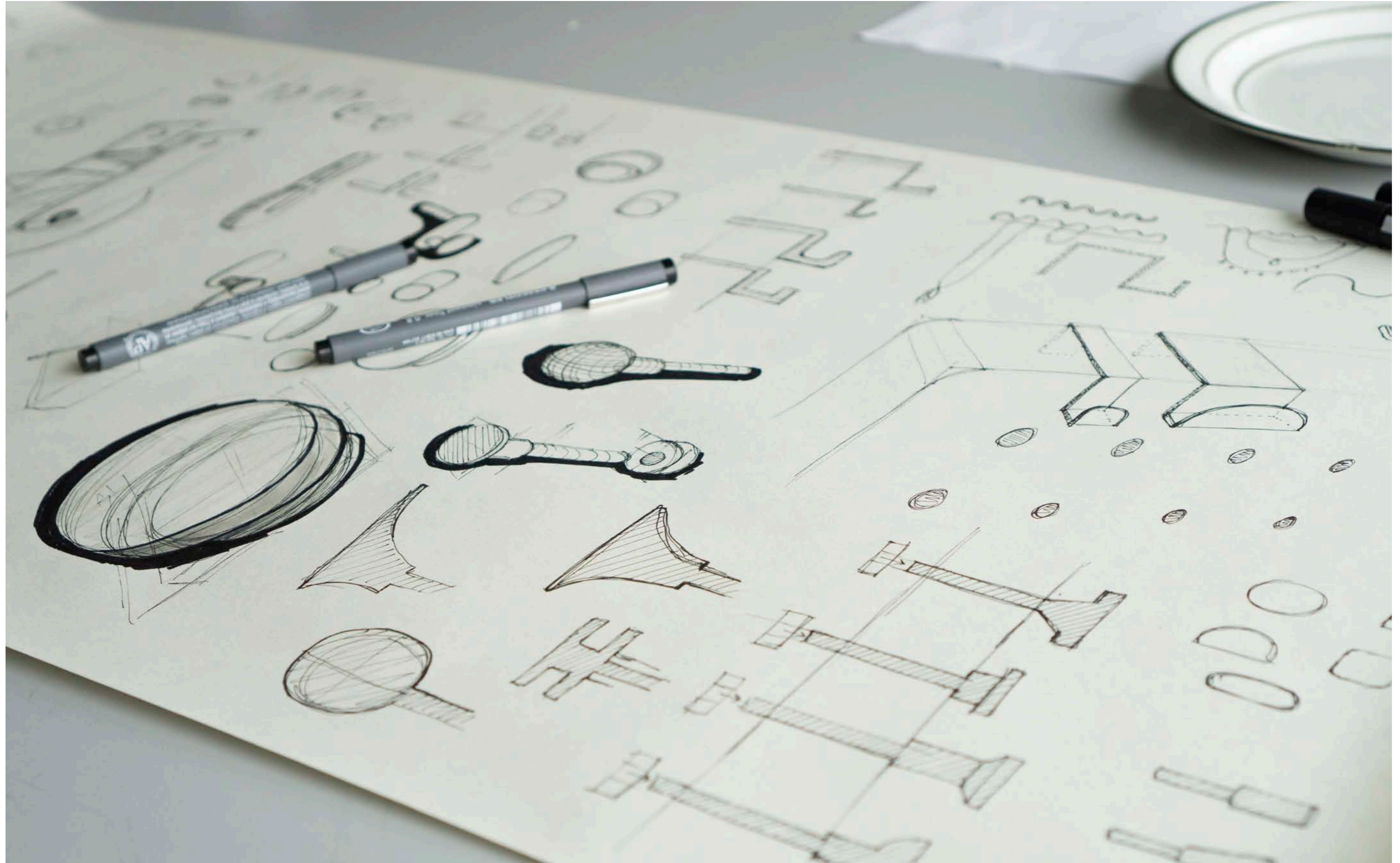
Accessories

- Mirror
- Hooks
- Shelves
- Ipad/phone-holder
- Reading / Sleep luminaire
- Table / desk
- Clothing rack
- "Dots" for games
- Pen holder / organization helpers
- Clamps for notes / drawings

Needed for the construction

- Hinges
- Connections
- Feet
- Wheels



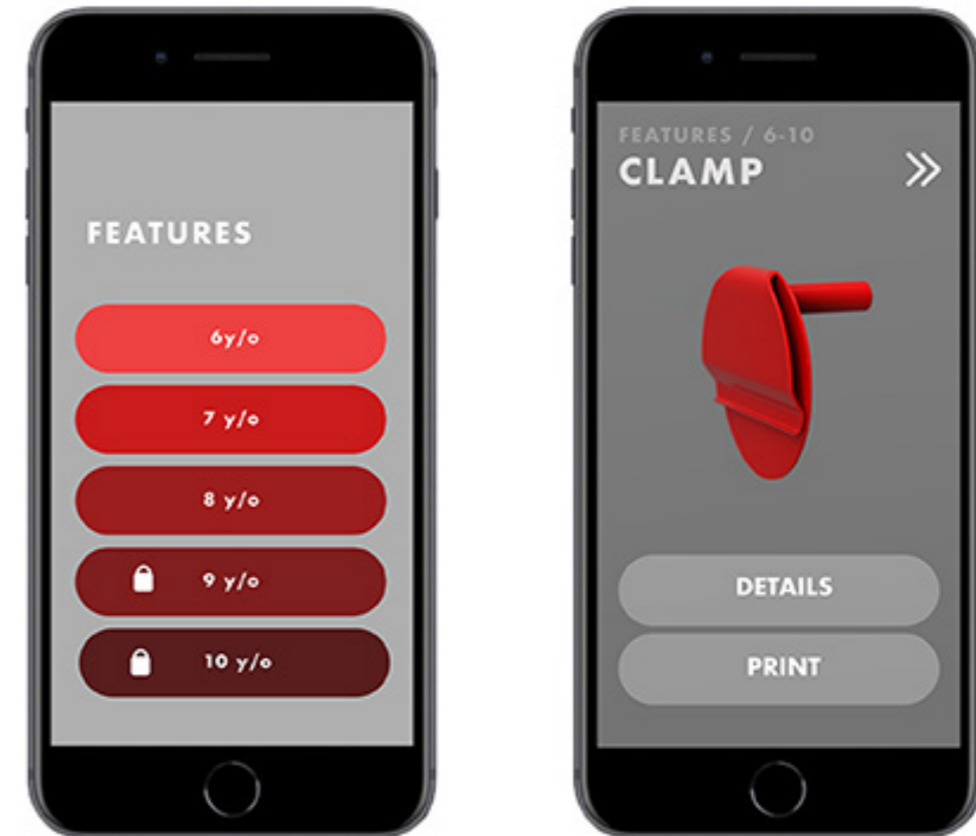


3D-printing as a feature

To further encourage customization, 3D printing could be an interesting feature in our concept. By giving the user the possibility to print their own accessories and choosing color, shapes, etc, the variations of the product usage and ability could be endless. This sort of feature could also encourage children to learn and develop skills within STEM (Science, Technology, Engineering & Maths), which is a growing field within the toy industry. STEM toys today are mostly marketed towards boys, and this is one of the biggest issues regarding gender typing in the toy industry, as it undermines girls future careers within STEM occupations. As our product is targeting all children and would not be marketed towards specific genders, we hope that it could encourage all children to learn and develop spatial, problem solving and mathematical skills.¹

There is however some safety concern regarding 3D printing that we would have to take in mind if this were to be produced. Parts should not be too small, in order to avoid choking hazards, and some limits of what can be printed by the child should exist. Perhaps a software that sets parameters of what can be made could be used, where the child can choose between different styles and features to make their own, personal, accessory.

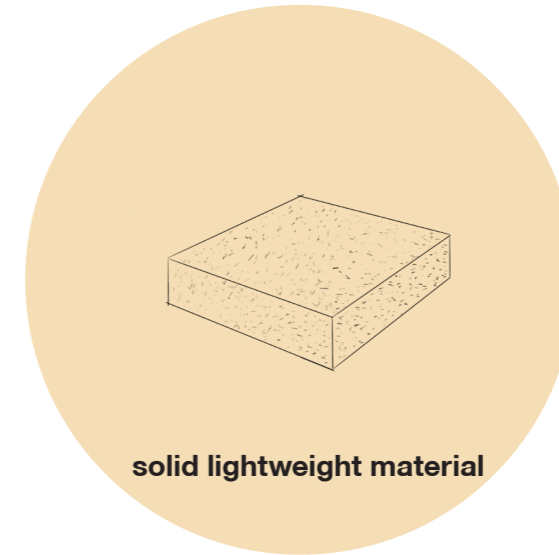
¹ Office of the Press Secretary, The White House. *FACT SHEET: Breaking Down Gender Stereotypes in Media and Toys so that Our Children Can Explore, Learn, and Dream Without Limits*. 2016-04-06 <https://obamawhitehouse.archives.gov/the-press-office/2016/04/06/factsheet-breaking-down-gender-stereotypes-media-and-toys-so-our> (2020-04-15)



Material

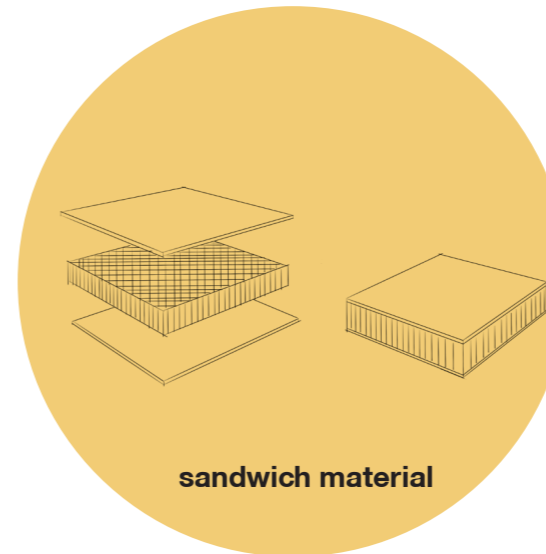
As our product will be used and handled by children, the material needs to be lightweight enough for the child to carry it. We looked into different ways to create lightweight materials and found three possible solutions, a solid lightweight material, a sandwich structured material or a frame structured material. We believe that a solid lightweight material would suit our project best. This could be made of either plastic foam, such as an EVA-plastic, or be made from a natural material like cork.

Cork is a natural closed-cell foam that is waterproof, remarkably stable, lightweight as well as soft and warm to the touch. The smell, feel and look gives a earthy feeling and a calm atmosphere, and we believe it would suit a childrens furniture. ¹



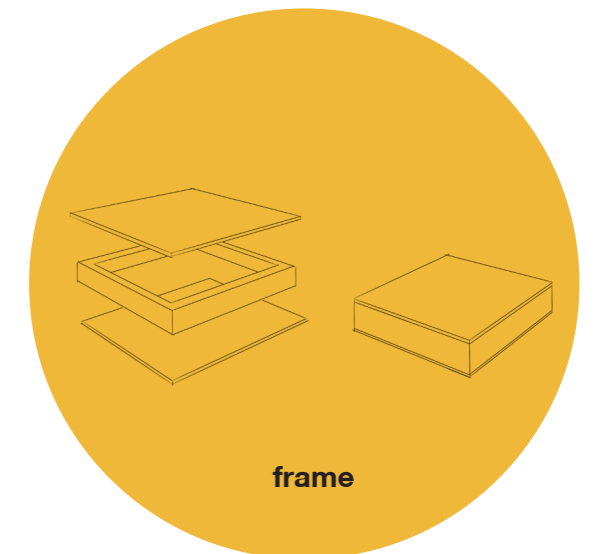
solid lightweight material

The material itself is lightweight and durable enough to be used on its own. E. g. EVA-foam, solid cork



sandwich material

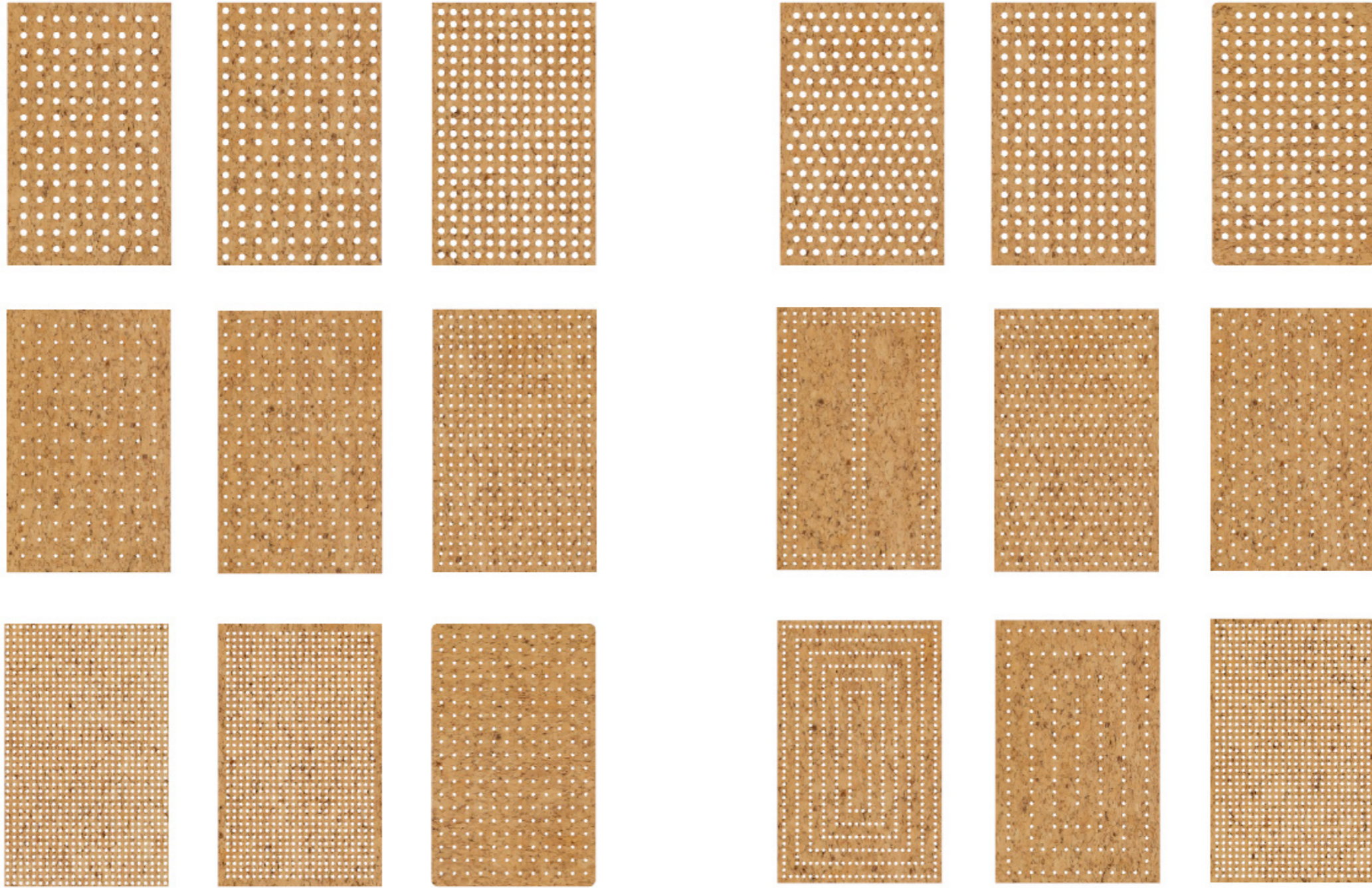
The structure of the material is made from different layers with a durable outside and a lightweight structure in between.



frame

The structure is made from a covered frame with a hollow inside to make it as lightweight as possible.

¹ Ashby, Mike & Johnsson, Kara. *Materials and Design* (third edition). Oxford. El Sevier.

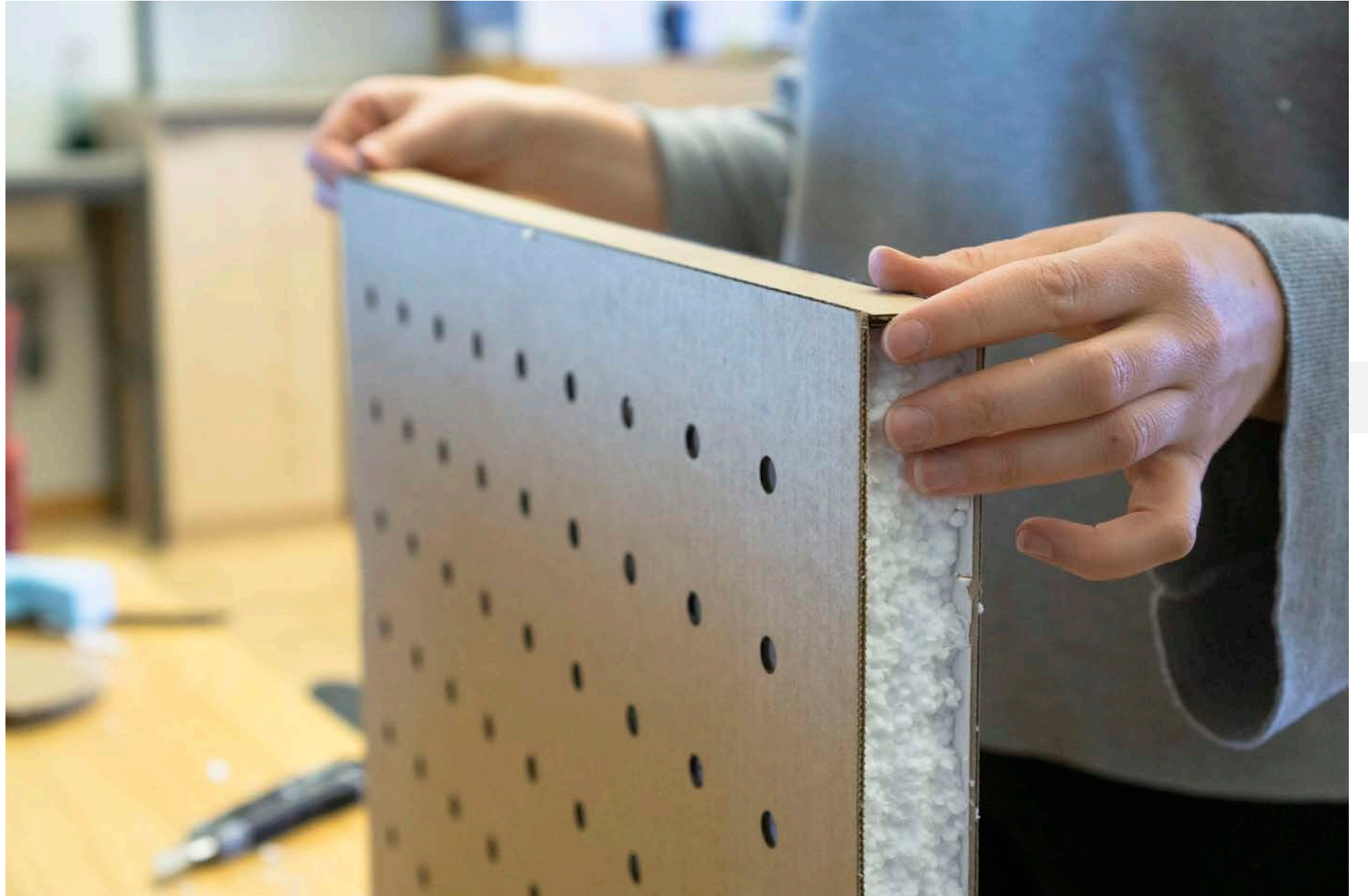


Holes and pattern variations

Functional Model

To be able to evaluate our design, we made a functional model in styrofoam and cardboard to represent the weight and qualities of a lightweight material such as EVA-foam or cork. To join the boards together we made connectors and joints in cardboard and 3D-printed screws.

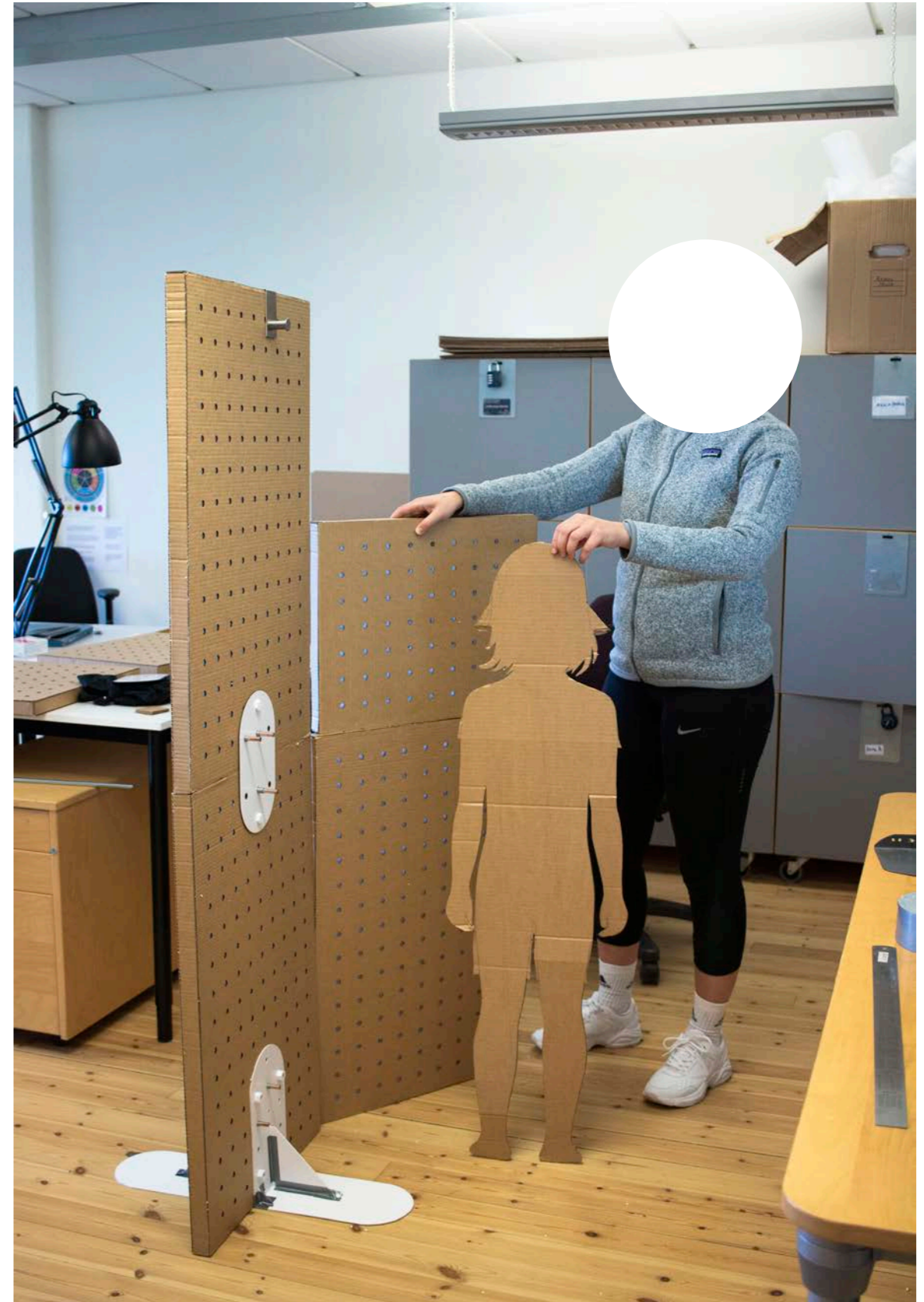




Boards

The models made from styrofoam and cardboard made a good imitation of the real materials properties and was very helpful when testing the concept. The boards are very light weight, rigid, and feels safe for a child to handle. What we could not evaluate with these models were the feeling of the real materials, for example the warm and soft touch of the cork board.

The design of the boards suggests many ways of usage as there is no clear direction of up and down, front and back. This could be a positive feature as it opens up for creativity, but it will need considerations as it may lead to misuse. We tested two sizes on boards, 50x80 and 50x40 cm, and the different height combinations when putting them on top of each other. From this we realized that two long boards (50x80) on top of each other was too high, for safety reasons but also because it did no longer seem like a children's product. There after we discussed ways to prevent users to build two long boards on top of each other, for example different hole sizes on the different boards might be a solution. After this, we decided to add 10 centimeters in height to the smaller board, so it would now be 50x50. By adding this height, we figured the product would still suit our age group of 6-10 year olds. Further on, we believe that the sizing and distancing of the holes is working well, as does the thickness of the board.

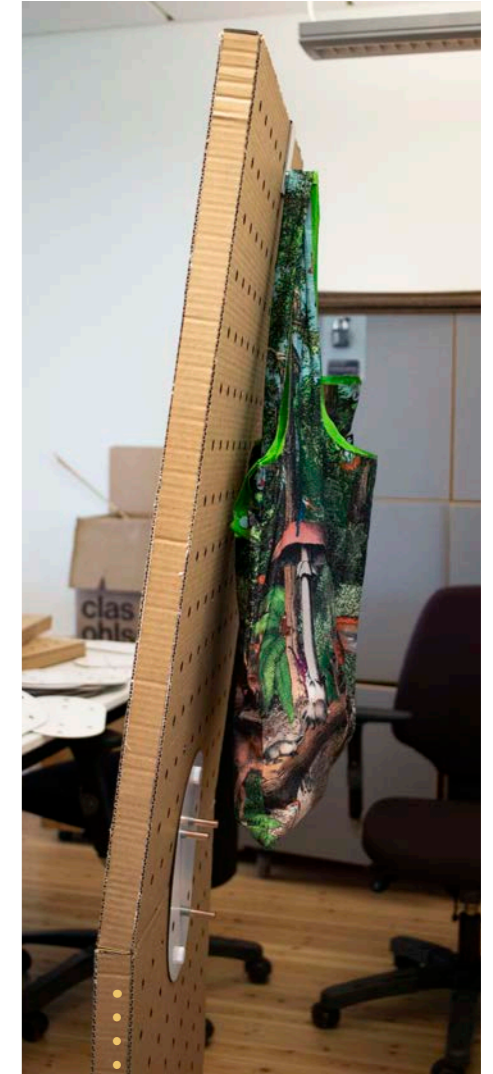
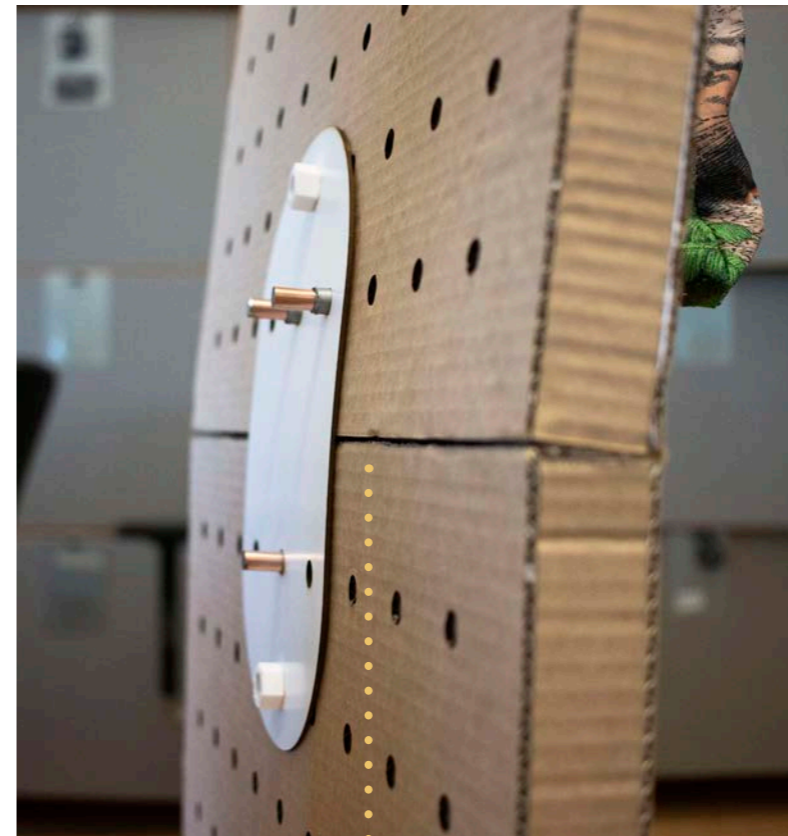


Hinges and connecting points

To evaluate the way the boards are connected to each other we made models of the hinges and connectors in cardboard, and 3D printed screws in PLA-plastic. The screws gave us an idea of how the 3D-printing feature would have worked in terms of construction and weight, and the result was very pleasing. The lightweight plastic pieces can function as well as any metal screw, but would be much more suitable for a child to play with. The sizing of the screw-nut would have to be bigger to prevent choking hazards as well as improving grip surfaces. When finalizing the design, we believe that a good option would be to have the screws integrated with the hinges and connectors to minimize the number of loose pieces, and make the handling of the product easier.

The cardboard connectors and hinges was a bit harder to evaluate as the material allowed way more flexibility than a plastic piece would. This did however let us observe the weak points in the constructions very clearly and helped us understand the importance of a well designed structure. By using weights we tested the model and identified the weak points that would need our attention when finalizing the design.

Other than material, the number of holes used for hinges and connecting parts are a critical aspect when looking at stability. To avoid a rotational force creating instability in the structure, two screws or more are needed on every side of the connecting point. The placement and numbers of hinges and connectors are also important to build a steady construction, and will need considerations in the design process in order to prevent misuse.

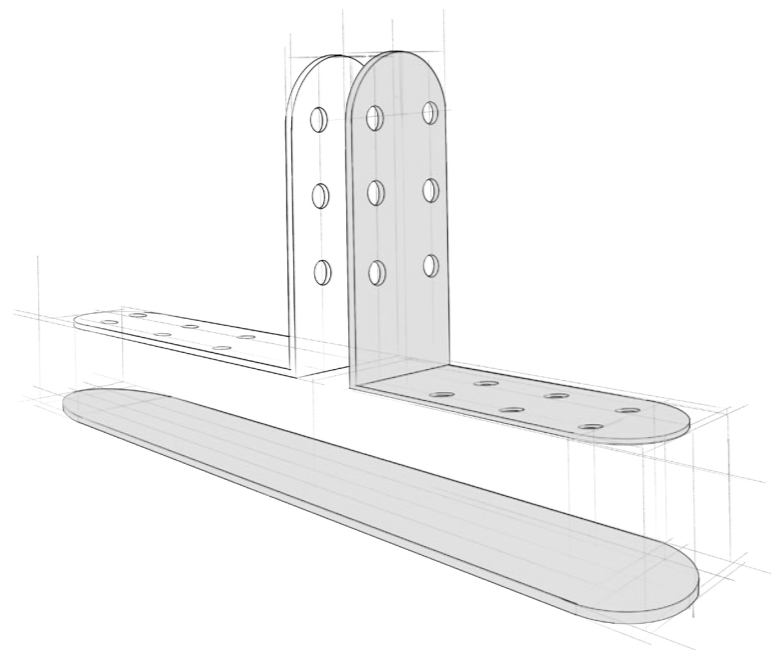


weak points

Feet

The models of the feet were also made in cardboard which just like the hinges and connectors, were not the most ideal material for testing and validating our design. However, it did let us identify the critical points in the design in order to further develop and finalize the product. Since the rest of the product is made from a lightweight material to fit the target group, the feet needs to be made heavier to keep the structure from falling. When testing with weights, it was clear to us that the feet were to weak and lightweight to resist the force. When adding weight to the feet, this problem was reduced to a minimum. The tests made it clear to us that sheet metal would be a suitable material for this part of the product.

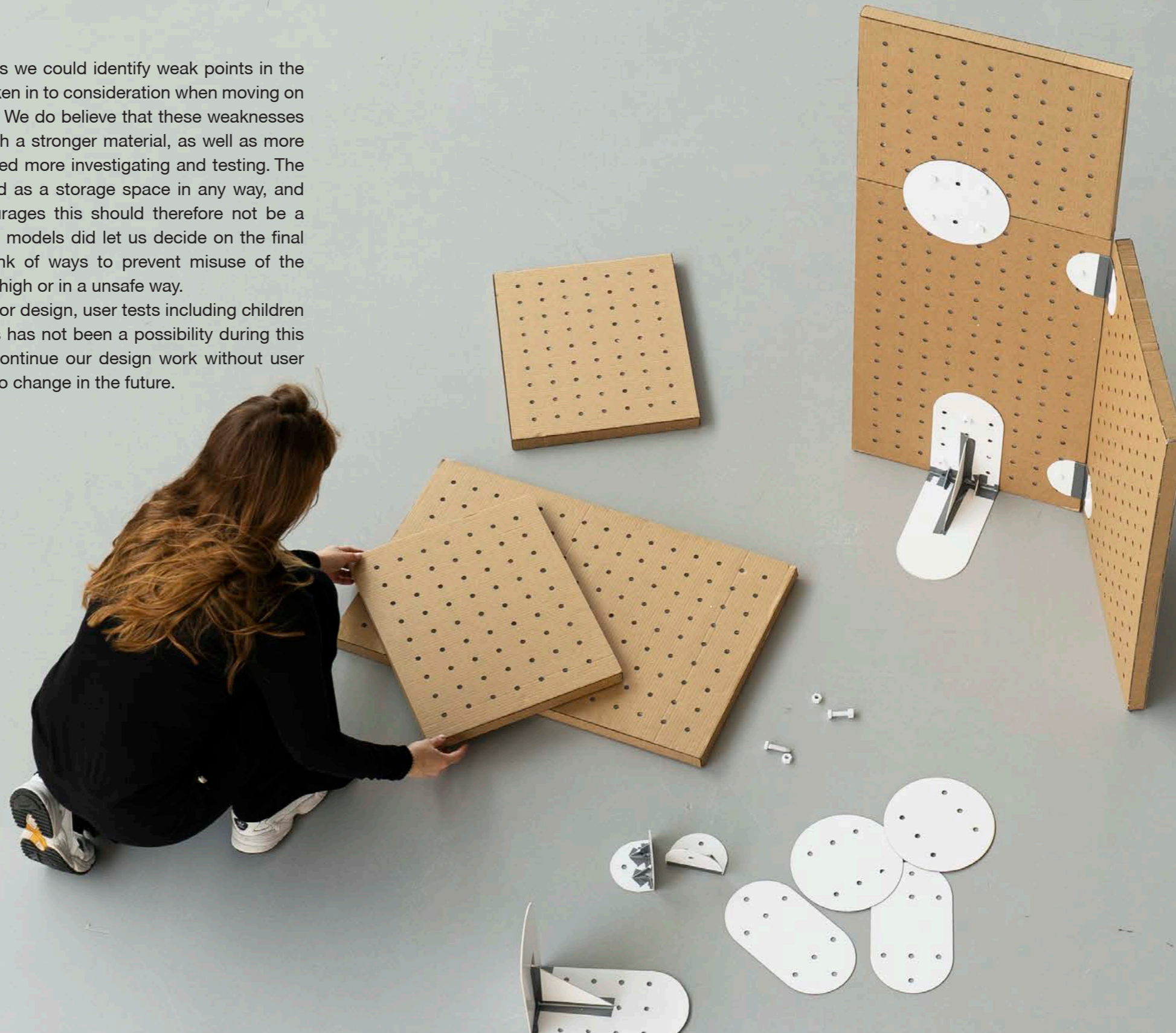
Since we had already decided that two long boards on top of each other was not a good idea, we looked at the possibility on using the feet in order to give height to the product, and open up for more ways of usage. We believe this would be possible if the feet had a stronger construction and were made into one piece instead of two separate parts.

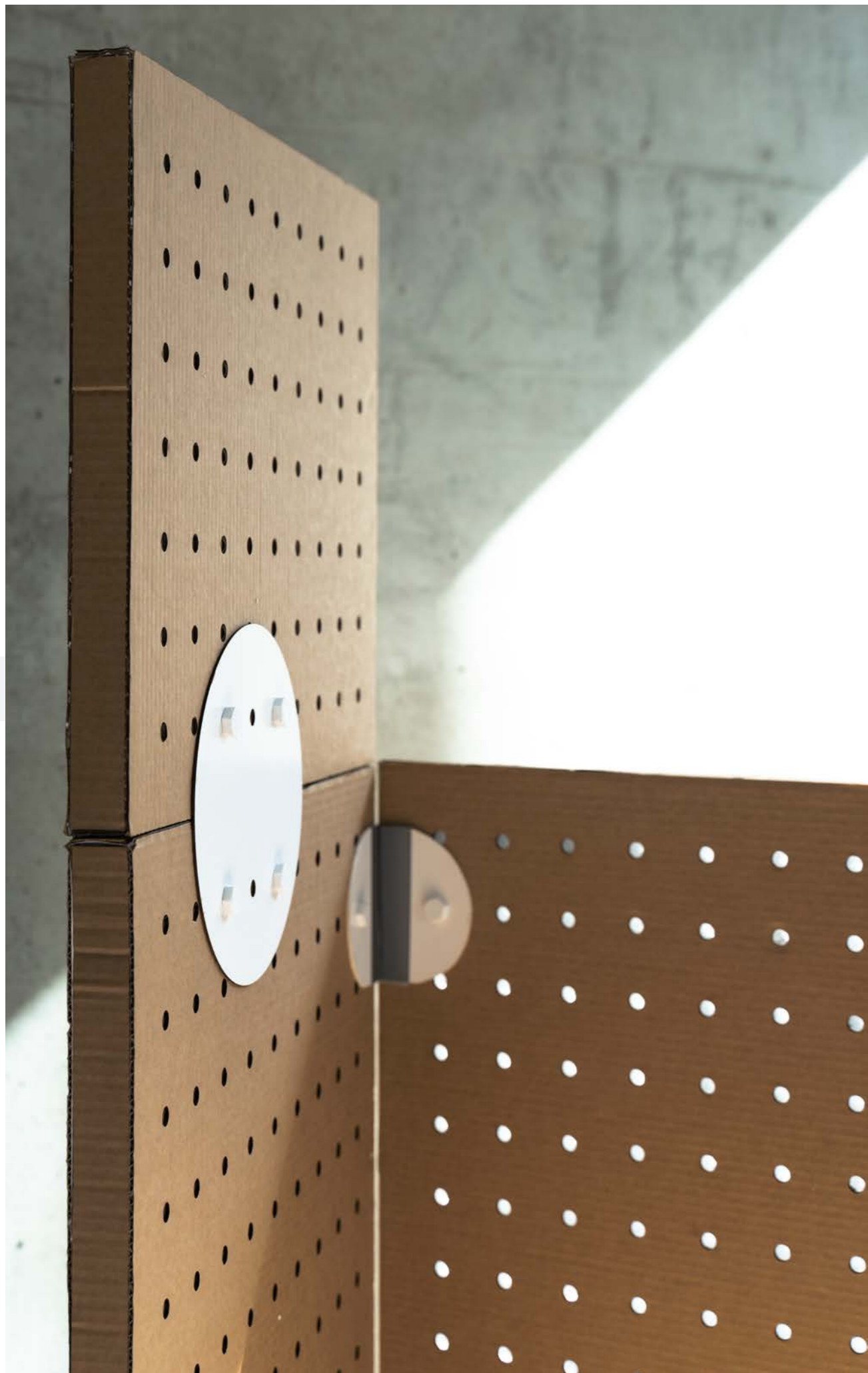


Evaluation summary

After testing our functional models we could identify weak points in the construction. These need to be taken in to consideration when moving on with the finalization of the design. We do believe that these weaknesses will in a certain degree vanish with a stronger material, as well as more weight in the feet, but this will need more investigating and testing. The product should not be considered as a storage space in any way, and hooks or other items that encourages this should therefore not be a part of our design. The functional models did let us decide on the final measurements and made us think of ways to prevent misuse of the product, for example building too high or in a unsafe way.

To further evaluate and validate or design, user tests including children would be most preferable. As this has not been a possibility during this project, we reserve the right to continue our design work without user tests, with hopes for this subject to change in the future.

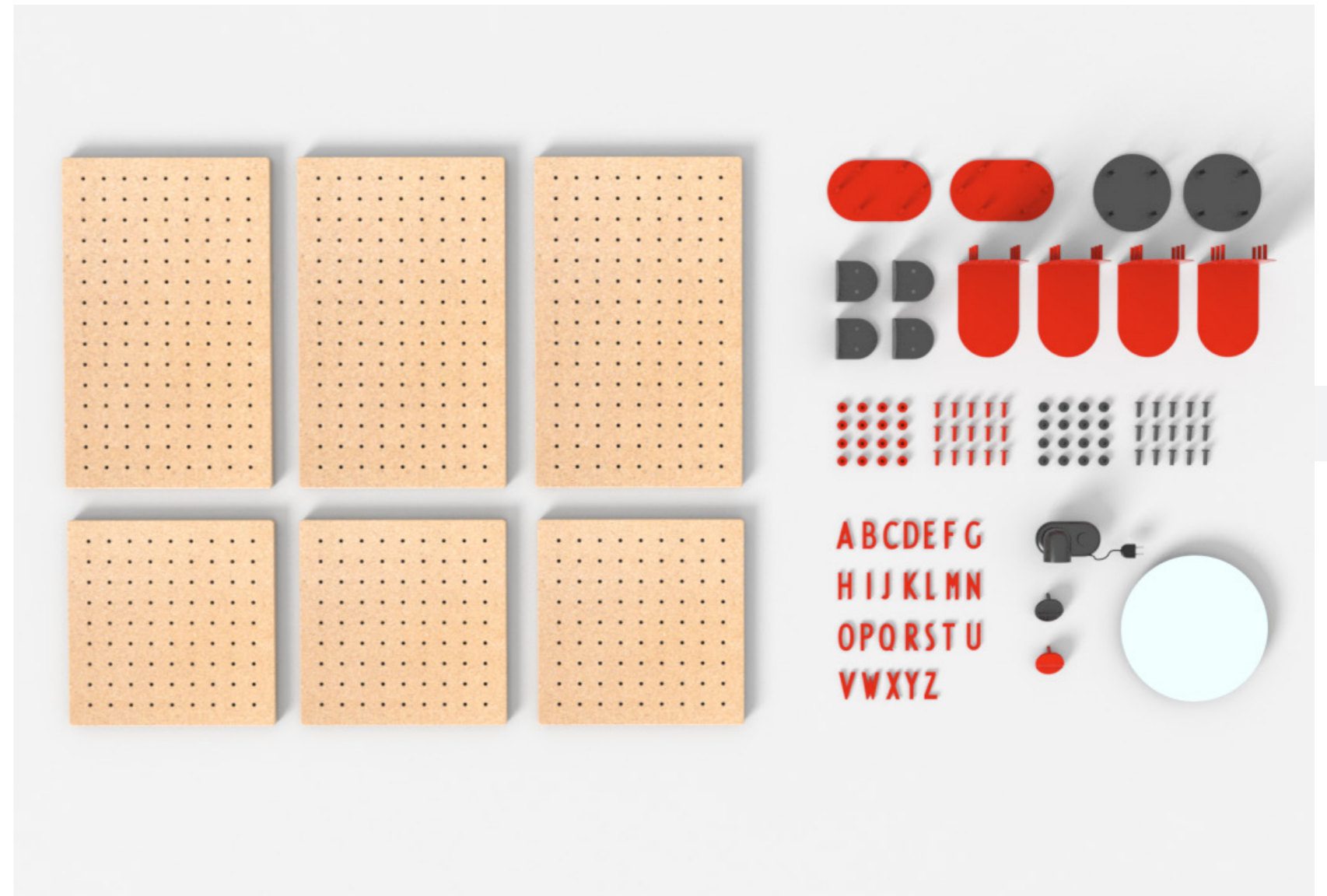






Nook

The final concept is Nook, a modular furniture for children from 6 to 10 years old. Nook is a set of pegboards with connections and accessories that together can create numerous combinations of spaces. A place to sit and read in solitude, a room for exploring your talents, a space for creativity, or simply a place for play. The modularity of the product lets it adapt to the changing needs of the child as it grows.



nook

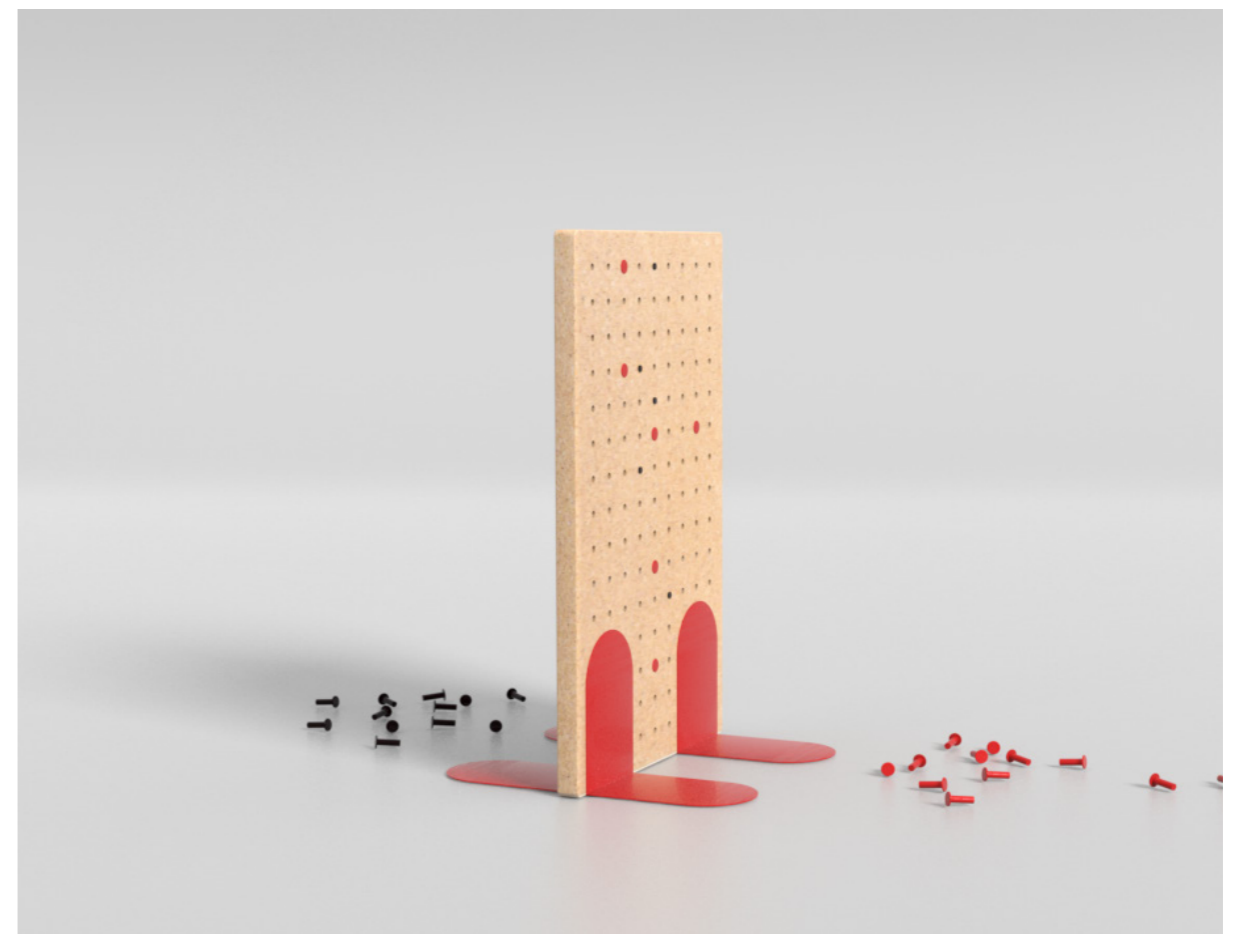
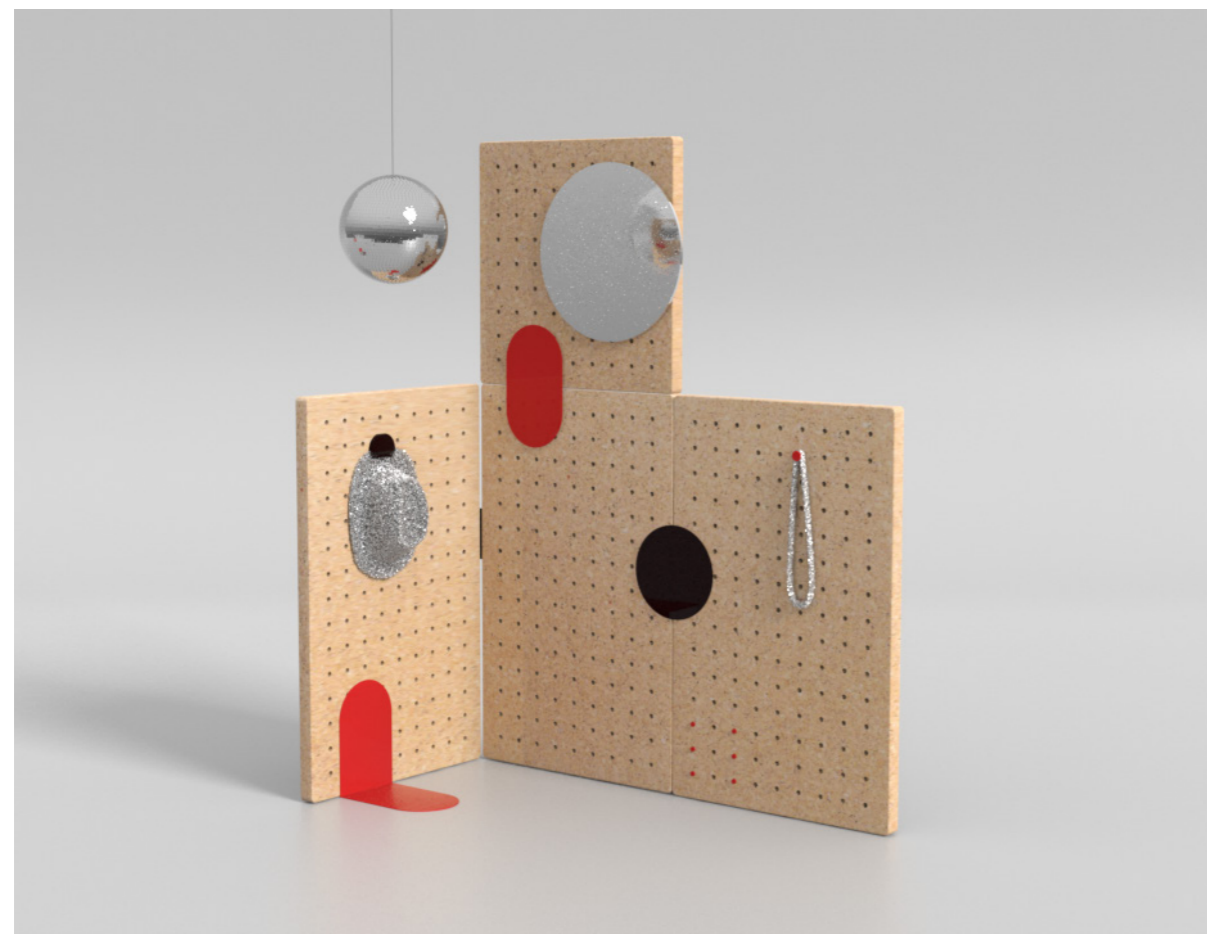
noun

/nu:k/

a small space that is hidden or partly sheltered:

“a cosy/sheltered/quiet nook”

FINAL RESULT



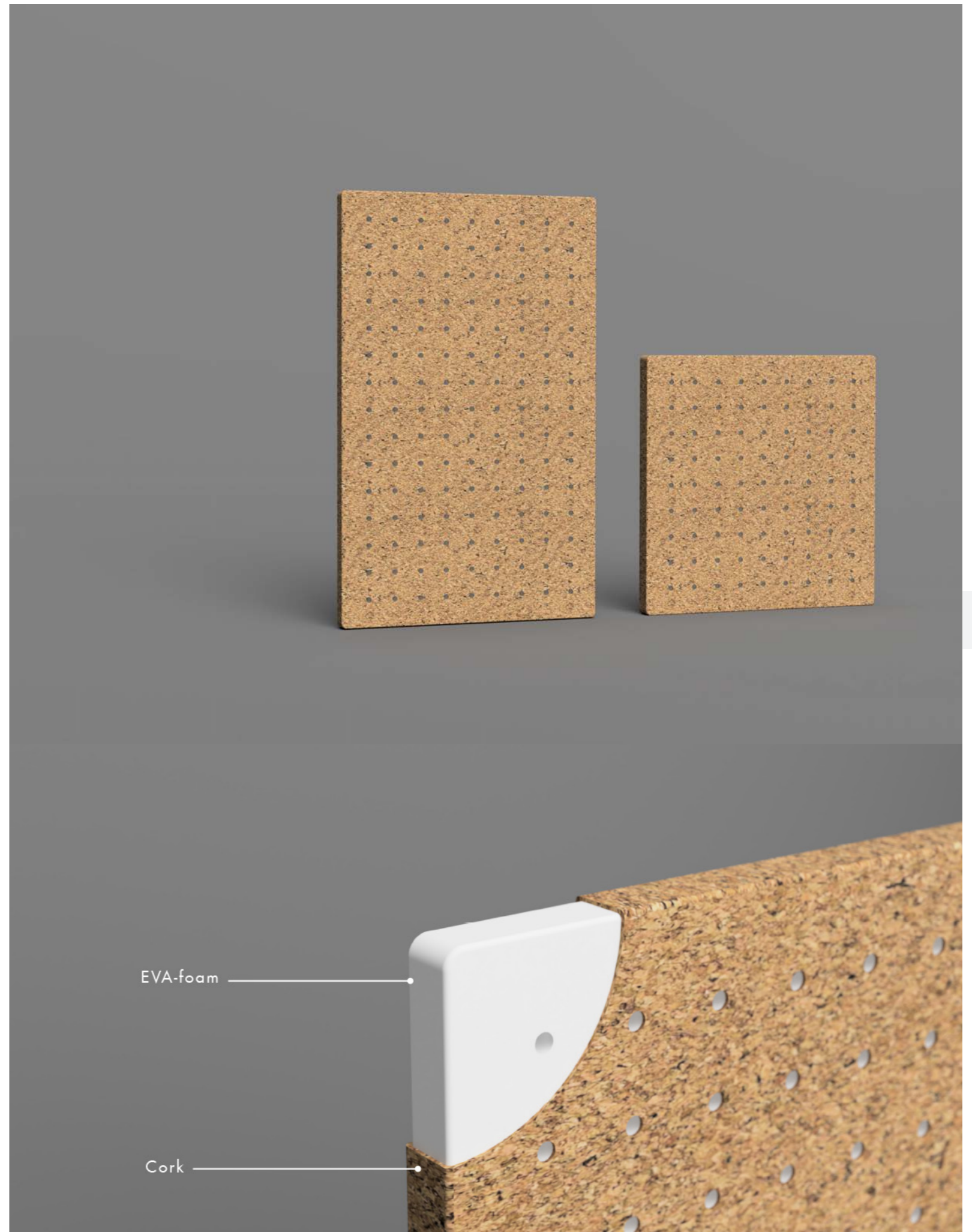
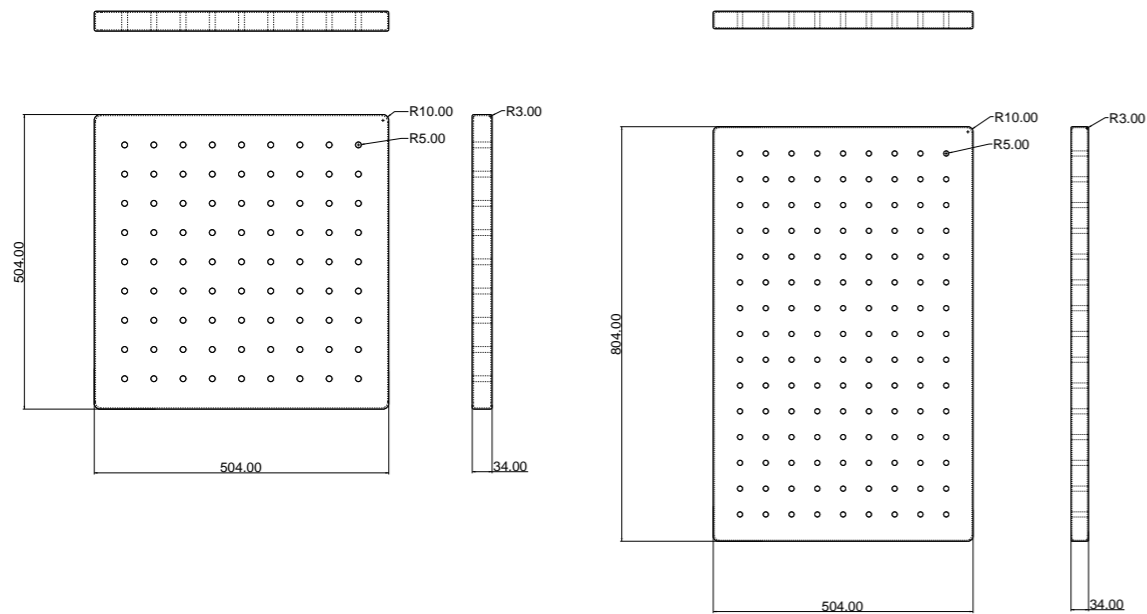
Assembly

With the help of an adult, Nook is assembled with connecting joints and screws. The holes in the boards allows the child to later change the appearance and functions of the product on its own with accessories, which can encourage creativity and self-expression.



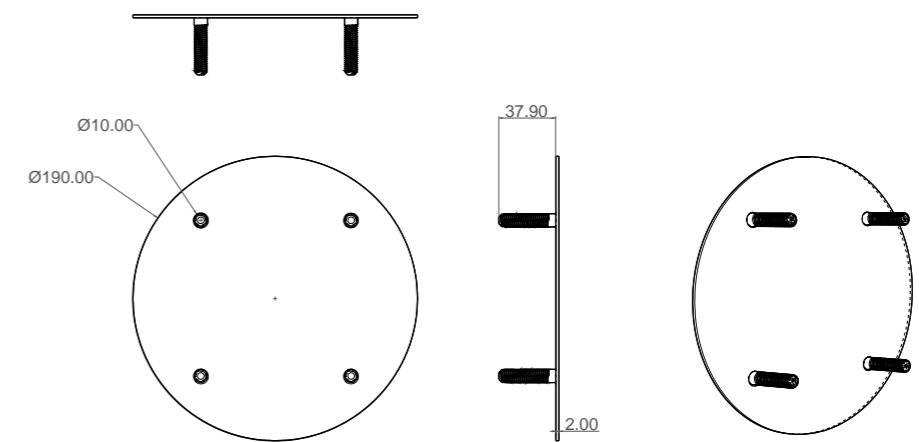
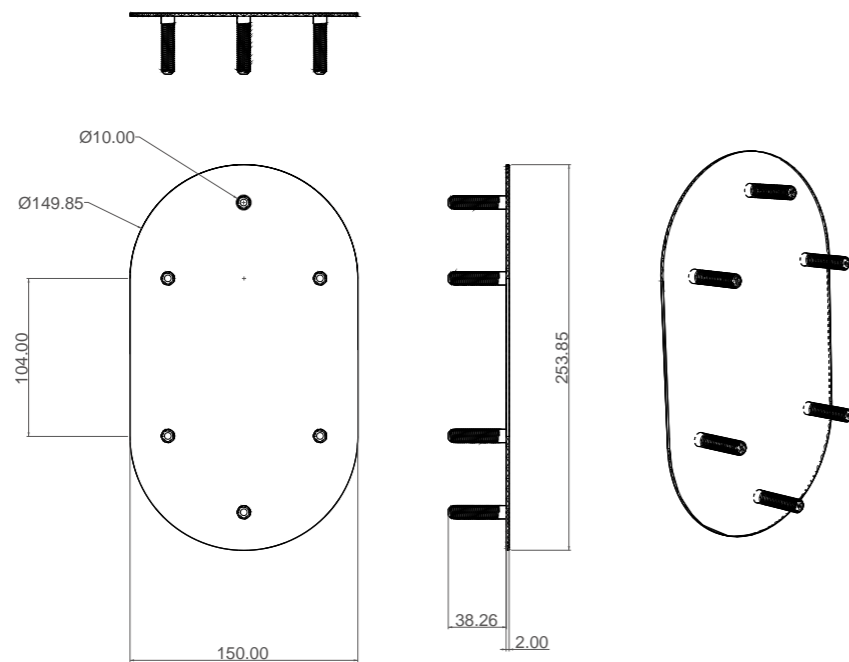
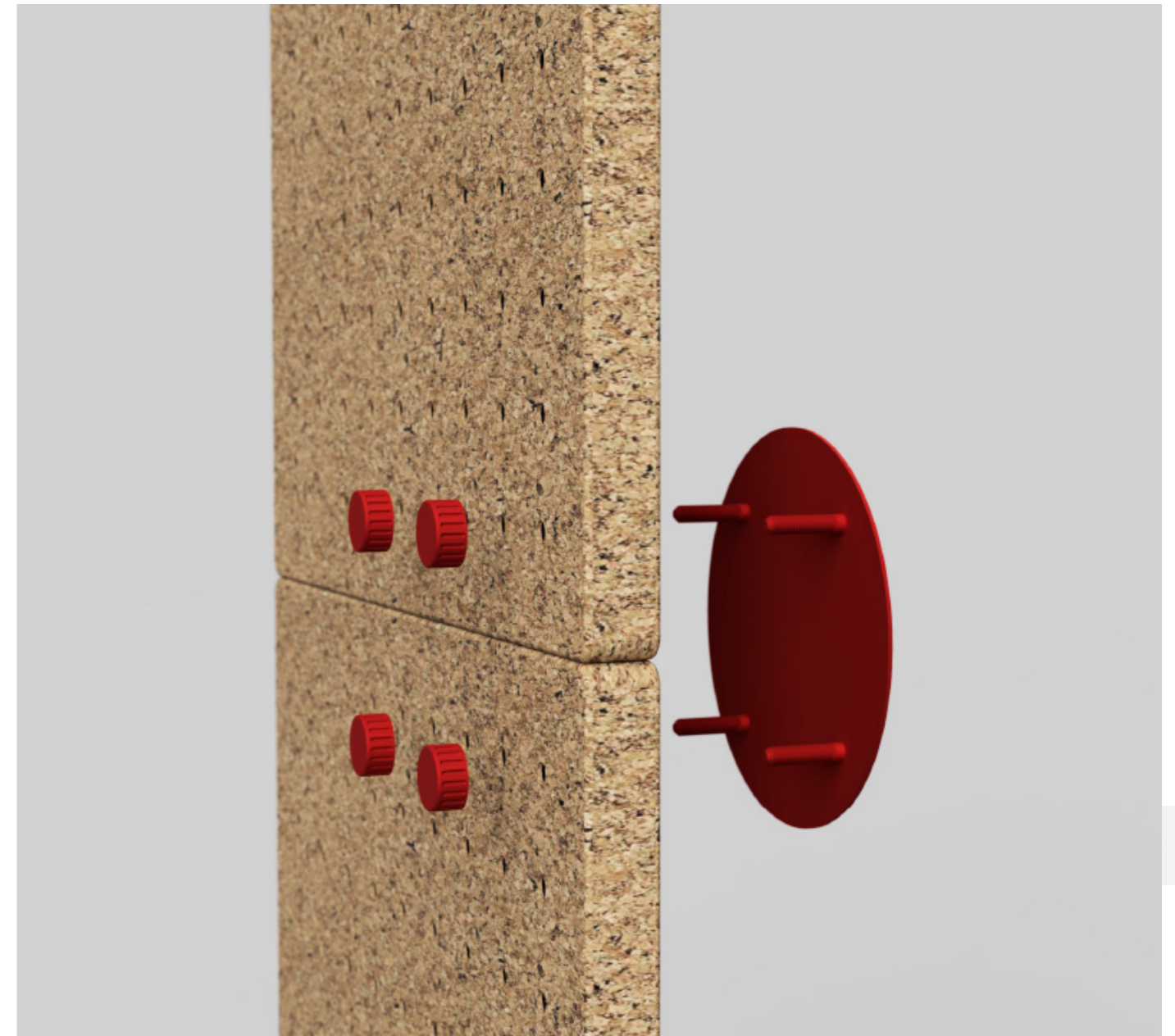
Boards

The boards are made of a light weight, rigid, foam material such as an EVA-plastic, covered with corkboard. Both materials are very light weight and suits being handled by children. They are also shock resistant and can stand rough handling, and won't create much noise if dropped to the floor. The sizing and distancing of the holes in combination of the thickness of the board itself makes the product less see through, which gives the user a greater sense of not being seen.

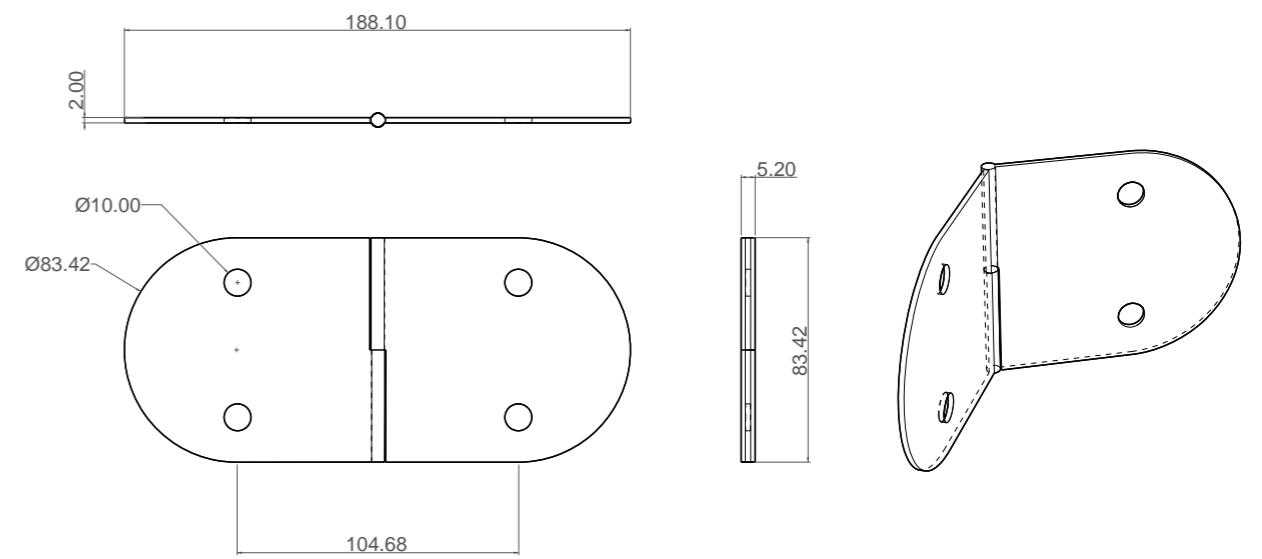
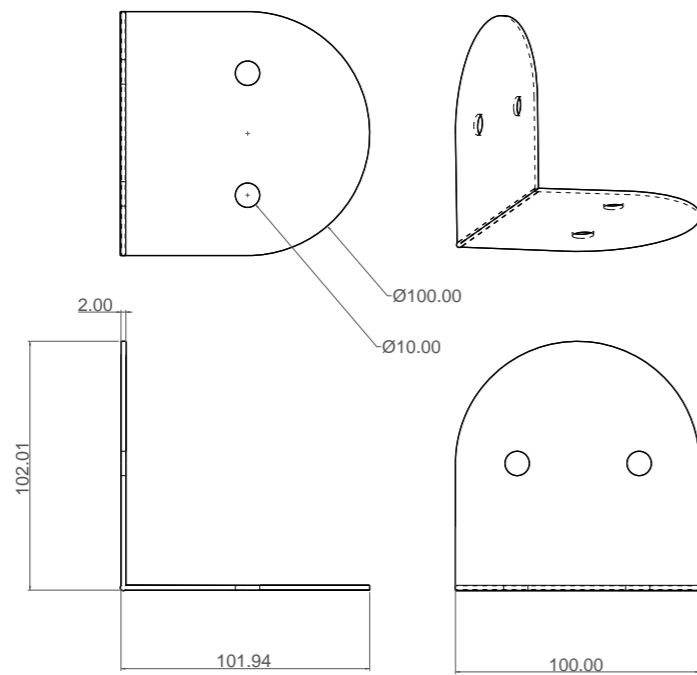
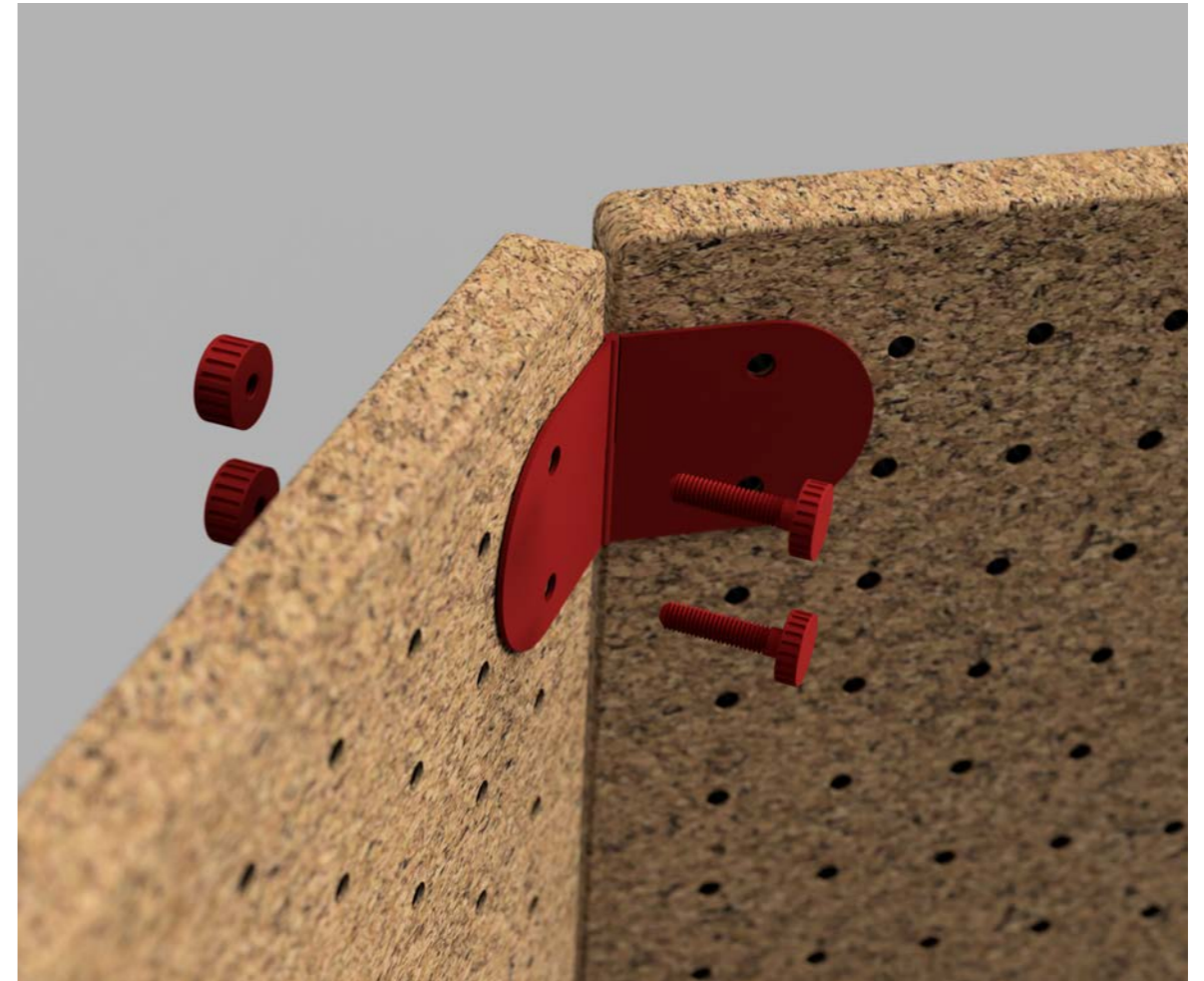
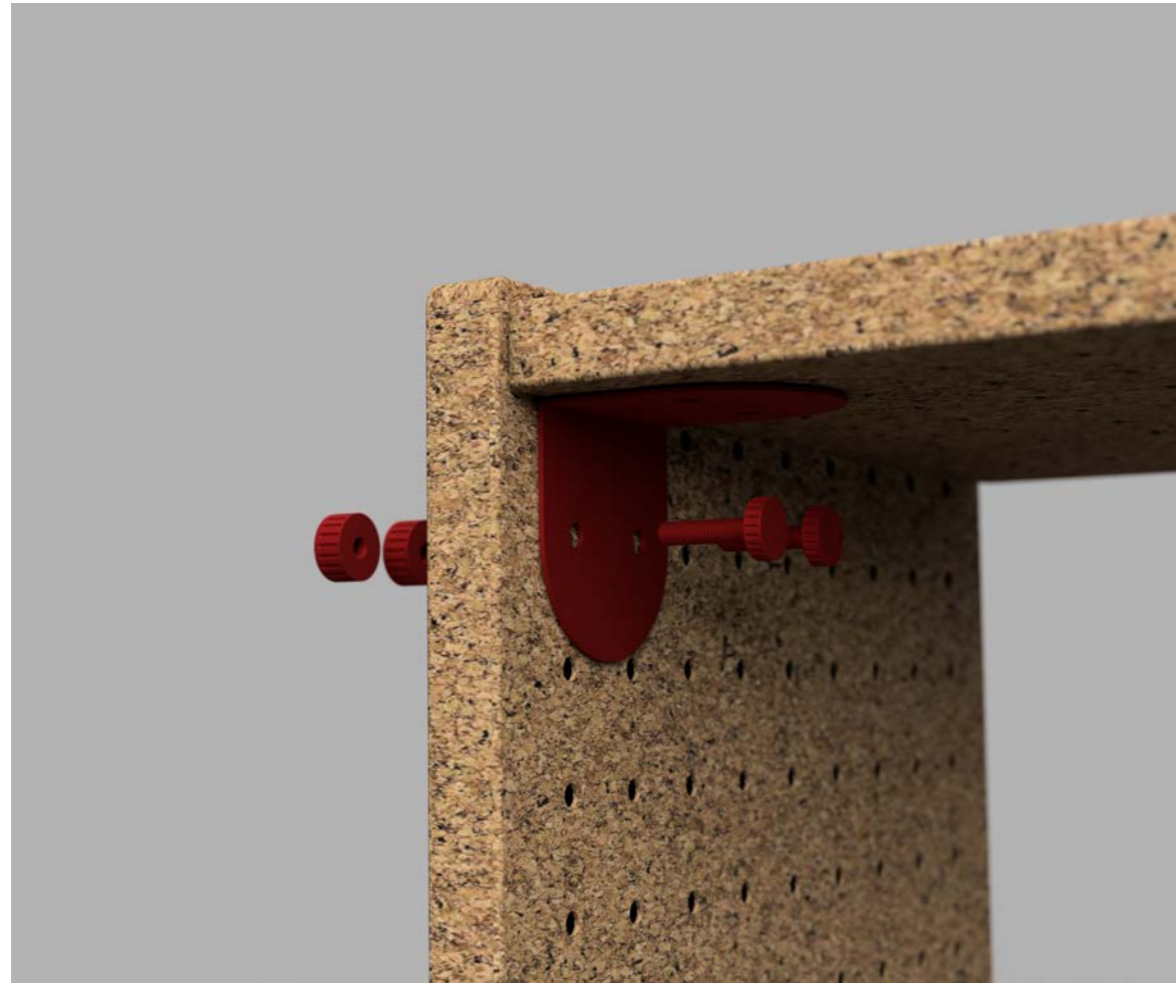


Joints

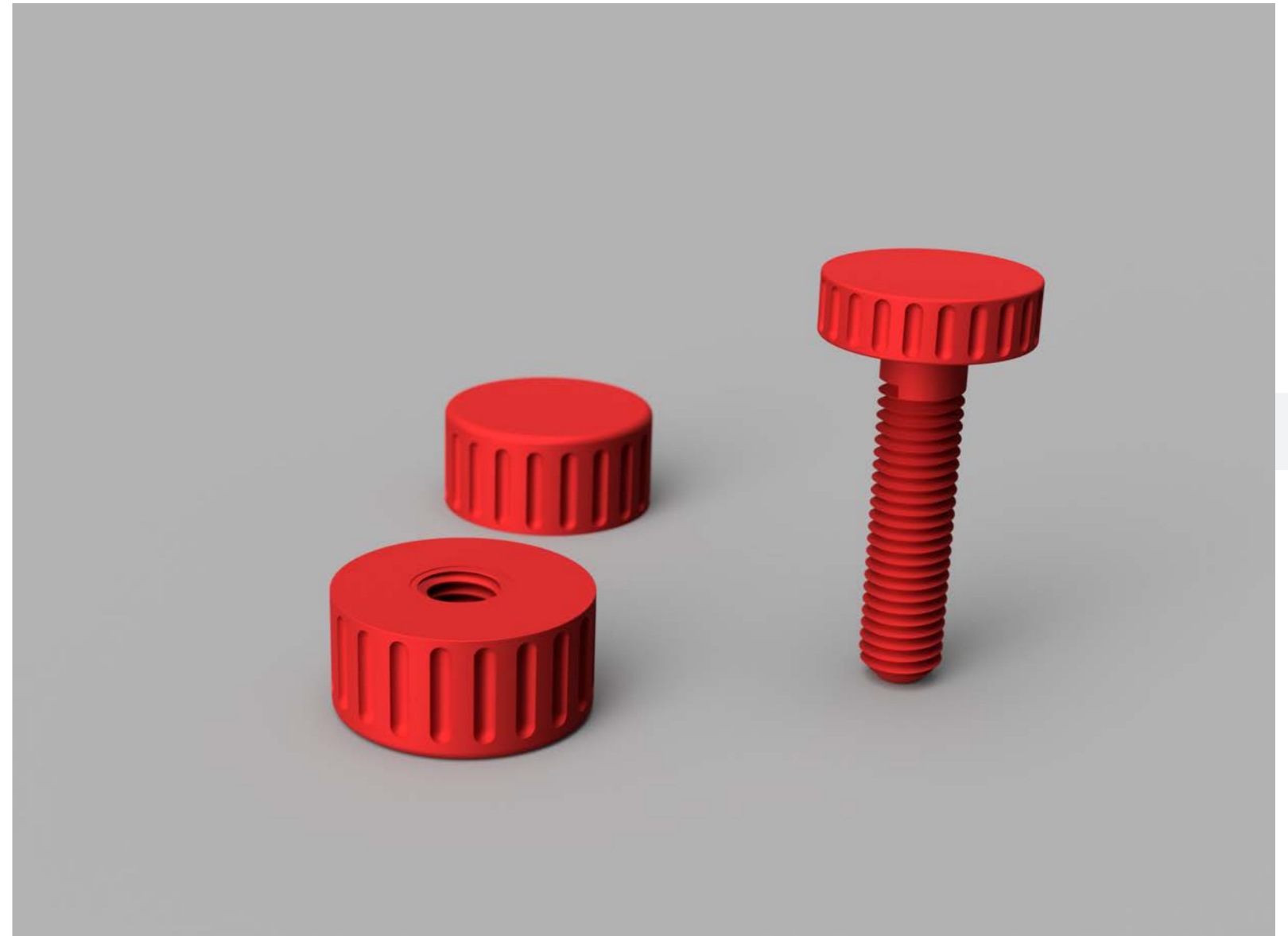
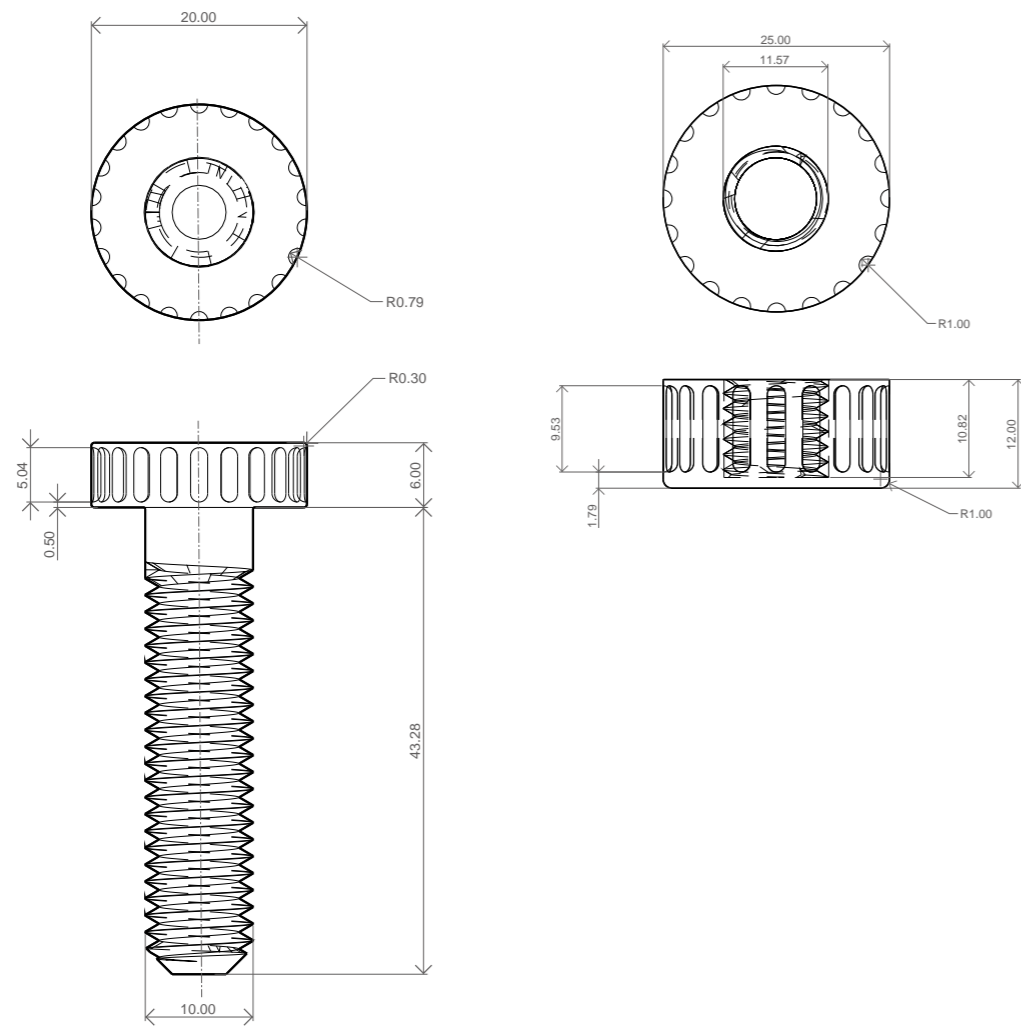
The boards are connected with hard plastic joints that comes in different shapes and sizes. The hinges and angled pieces attaches to the board with loose screws and nuts. The flat pieces have screws integrated into the design, minimizing the number of small parts, as well as making the assembling easier. Other than material, the number of holes used for hinges and connecting parts are a critical aspect when looking at stability. To avoid a rotational force creating instability in the structure, two screws or more are needed on every side of the connecting point. The placement and numbers of hinges and connectors are also important to build a steady construction.



FINAL RESULT

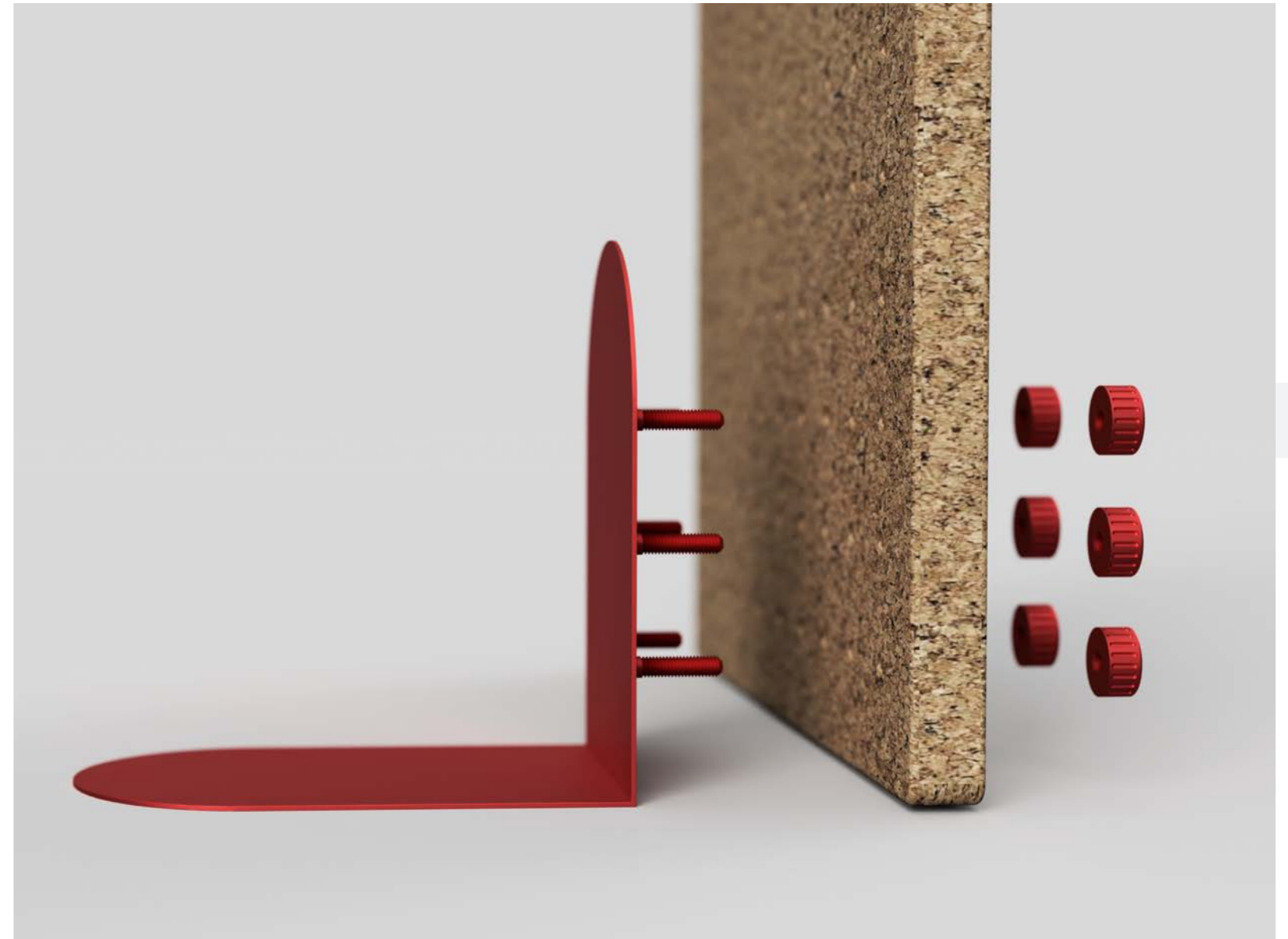
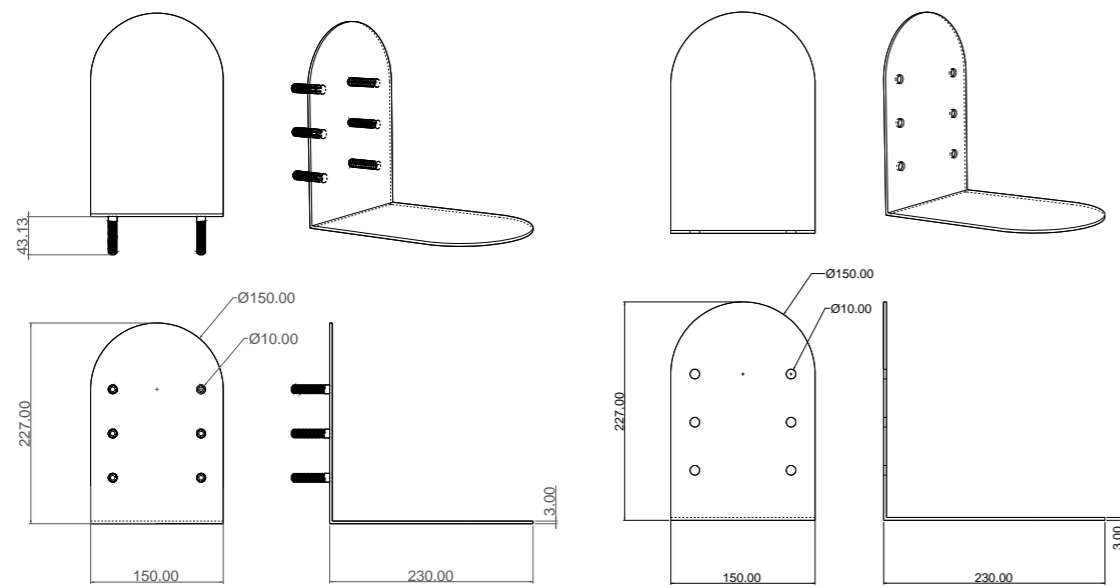


Screw and Nut

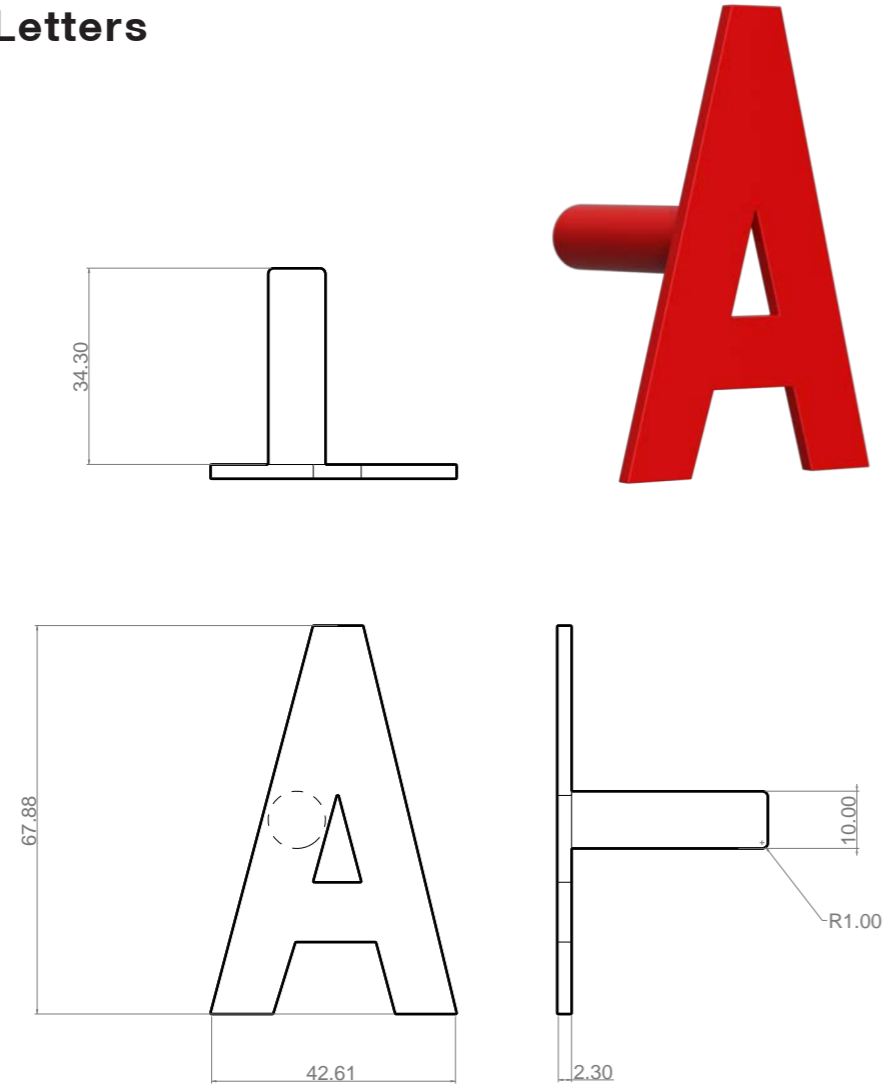


Feet

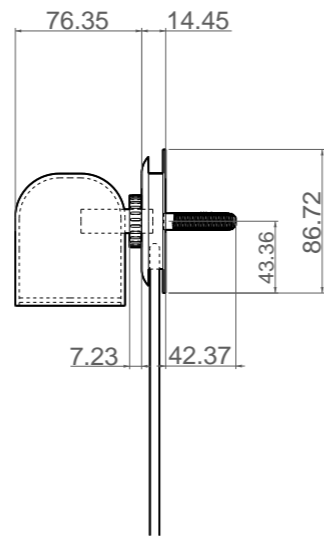
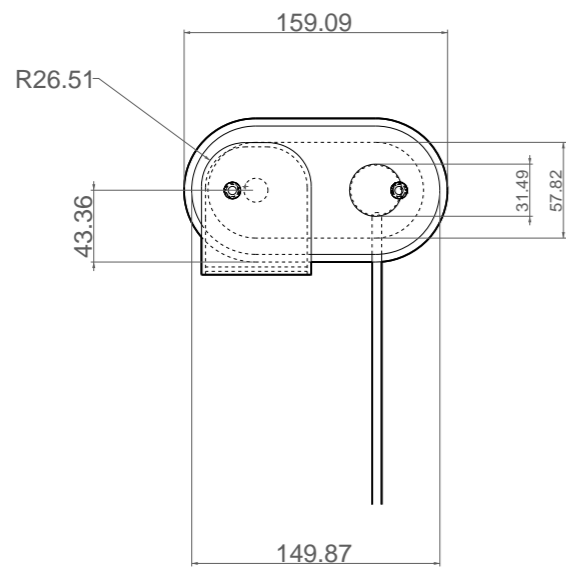
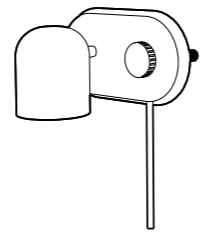
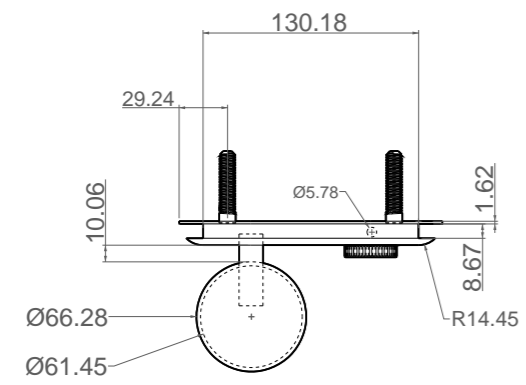
The feet are made from sheet metal in order to give weight and stability to the construction. As well as the joints, they are connected to the boards with the help of screws.

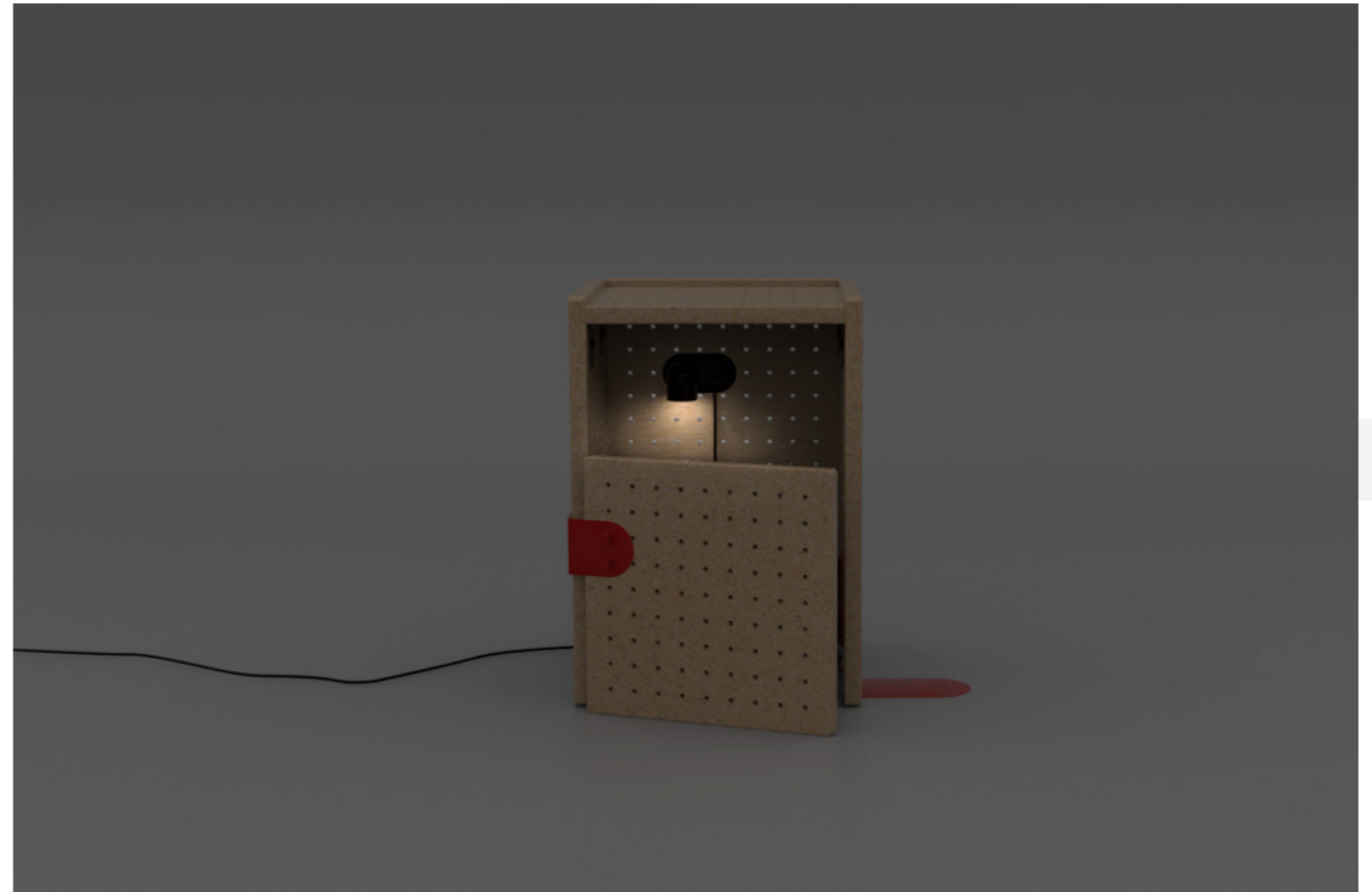
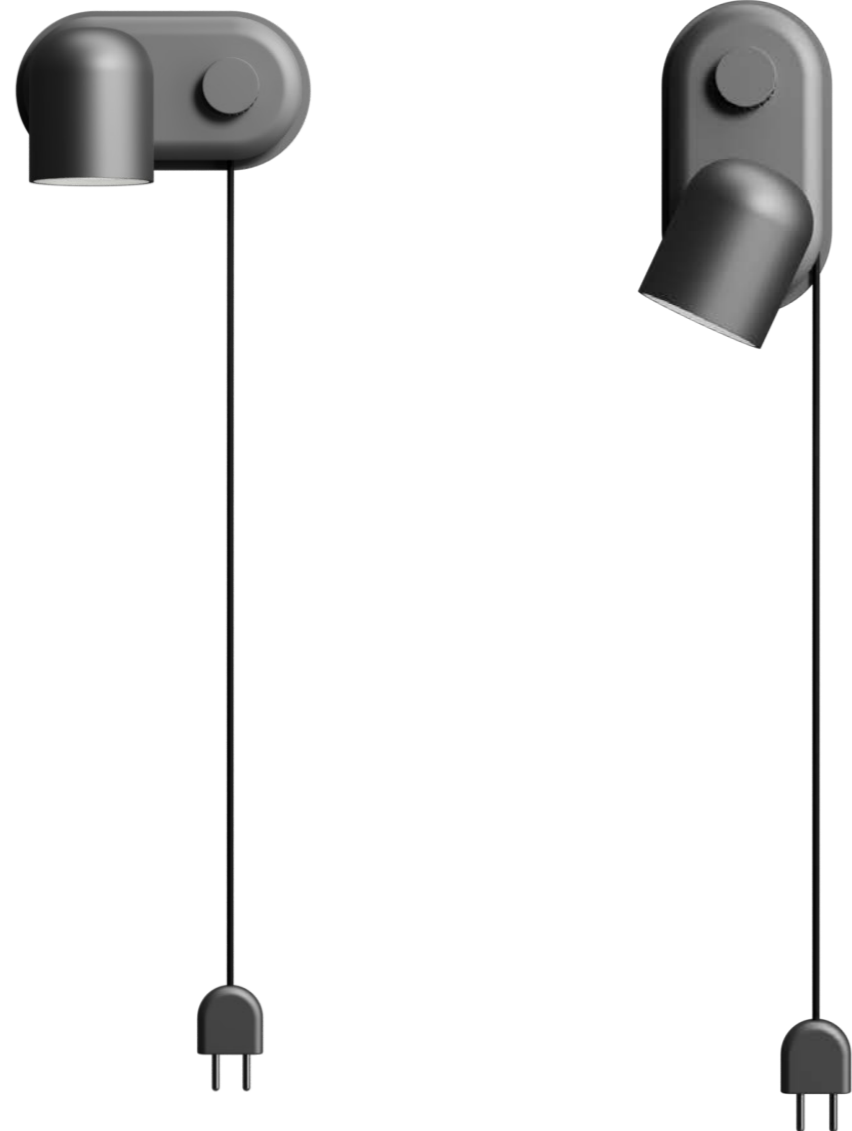


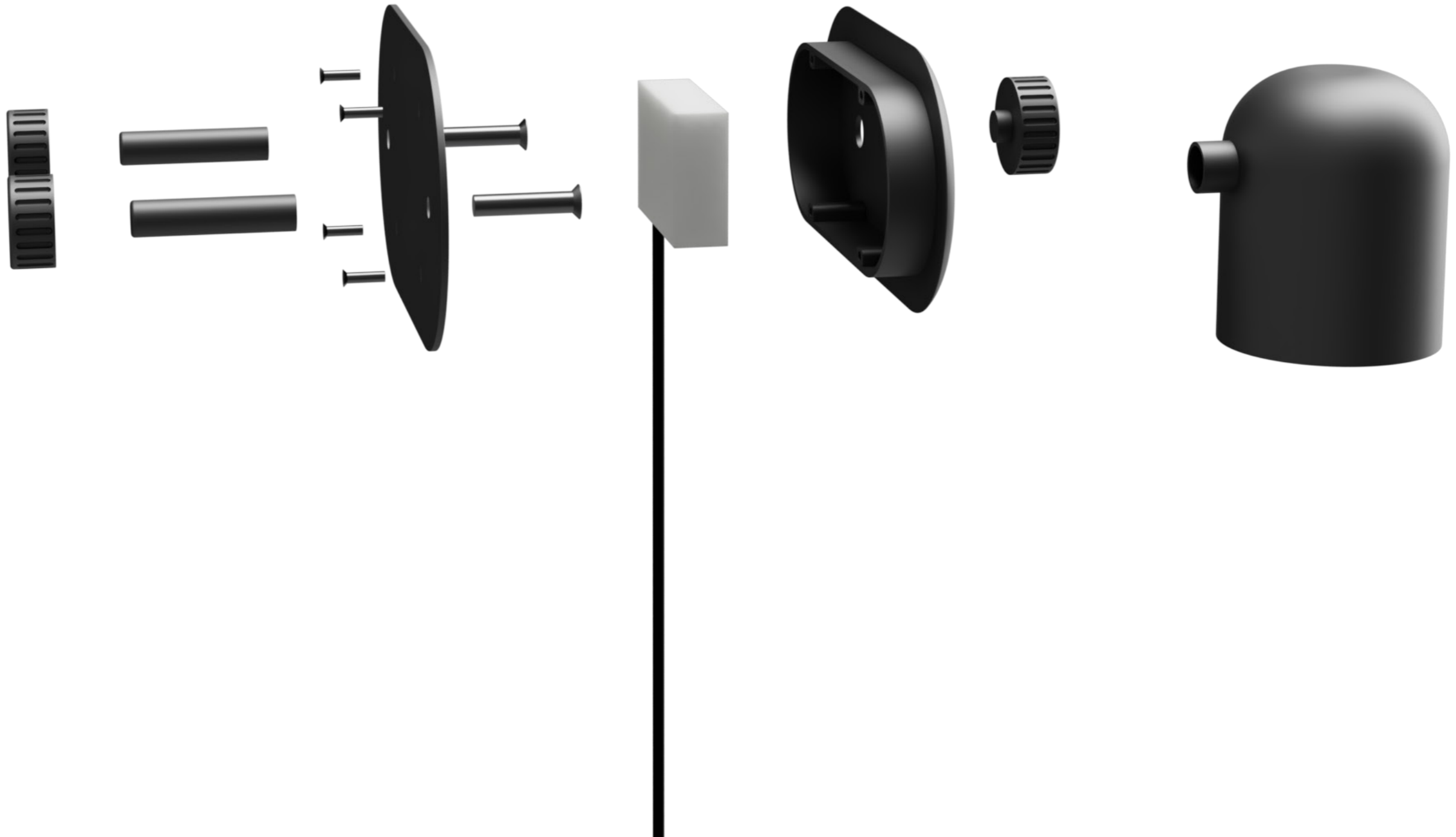
Letters



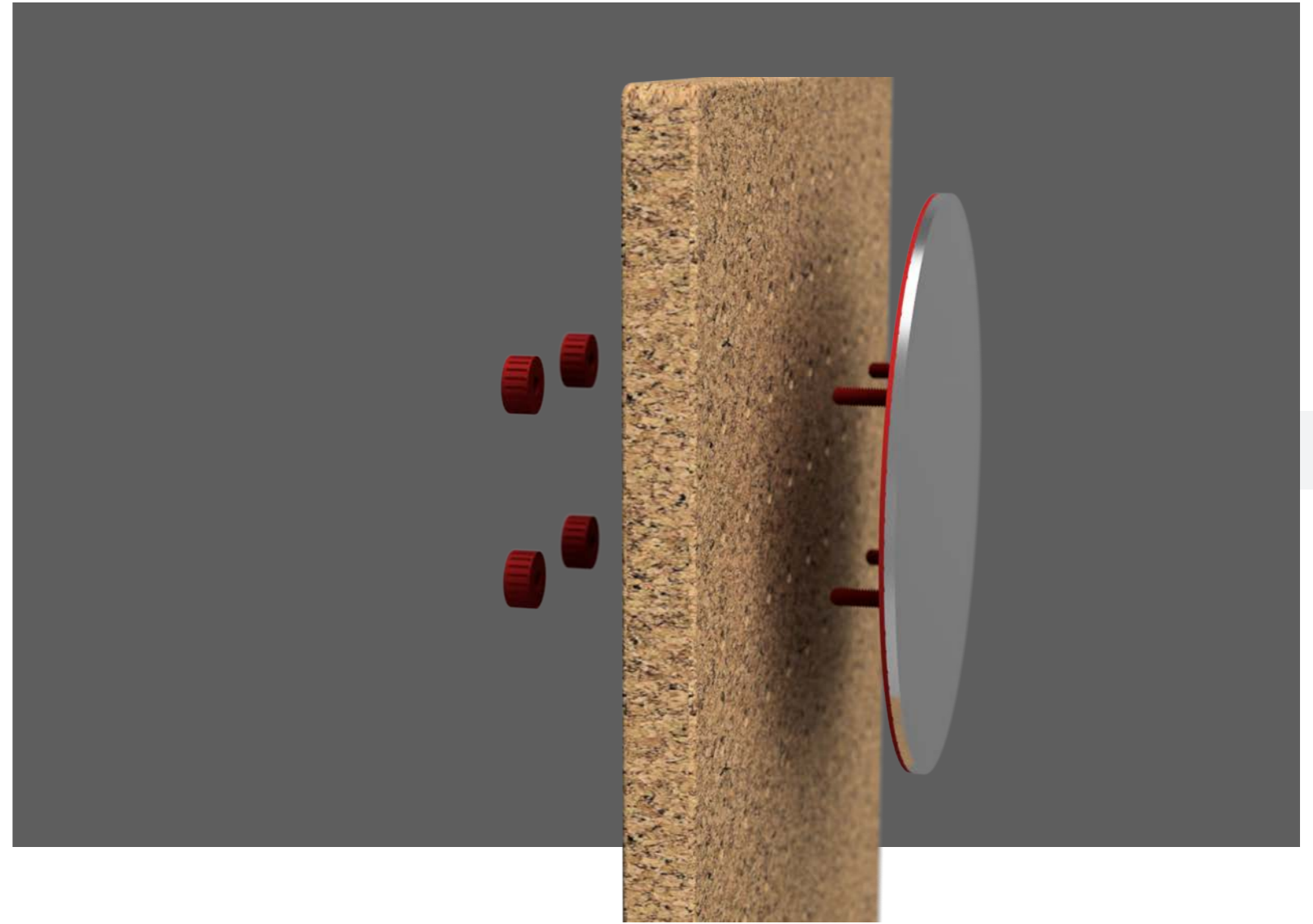
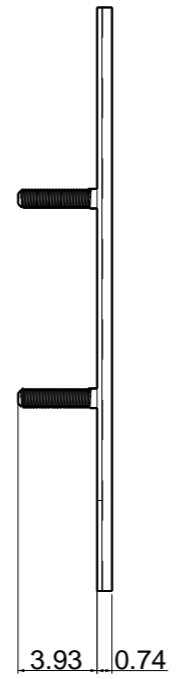
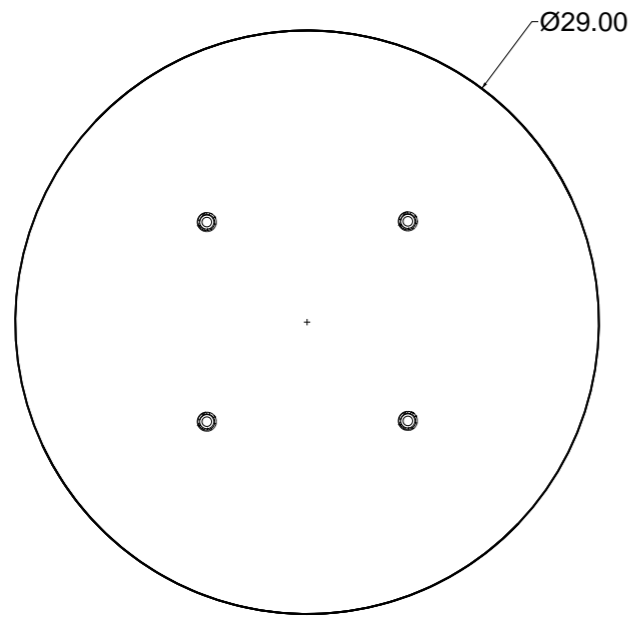
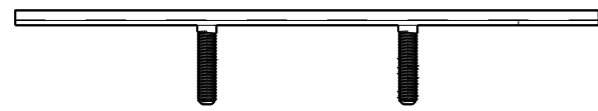
Lamp



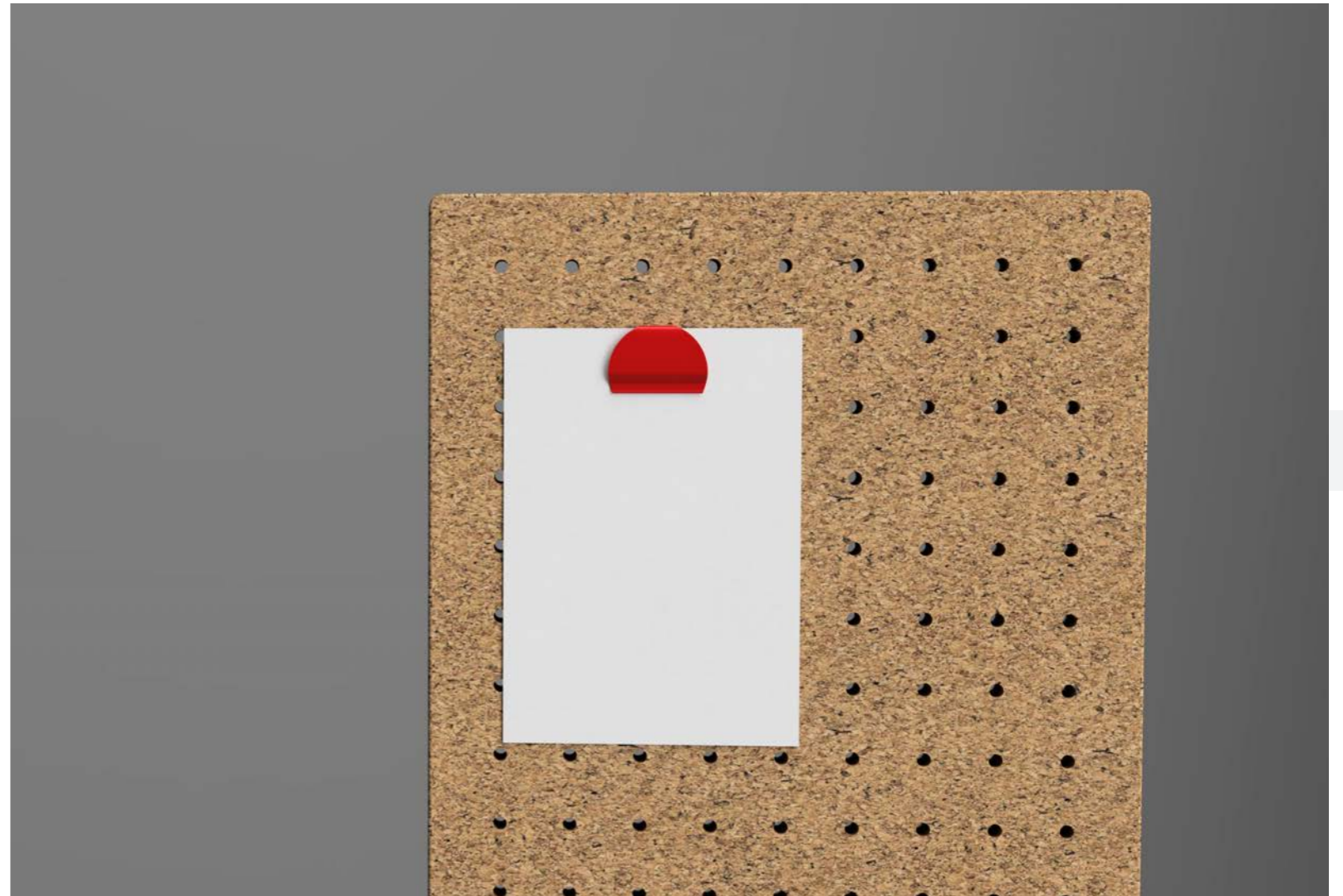
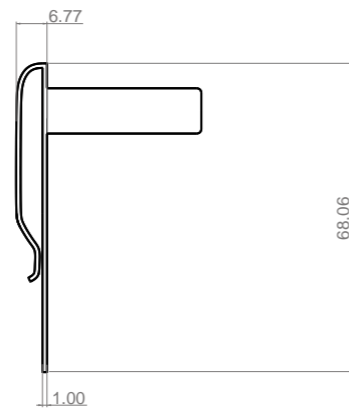
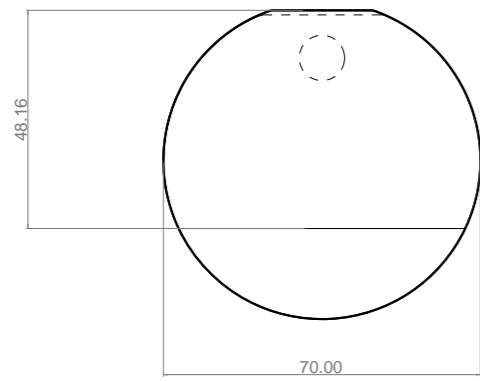
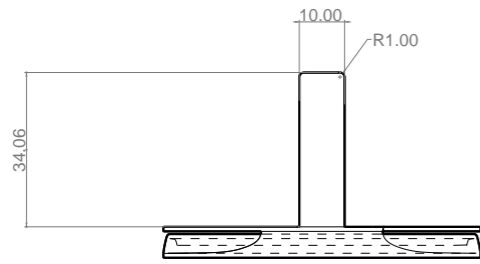




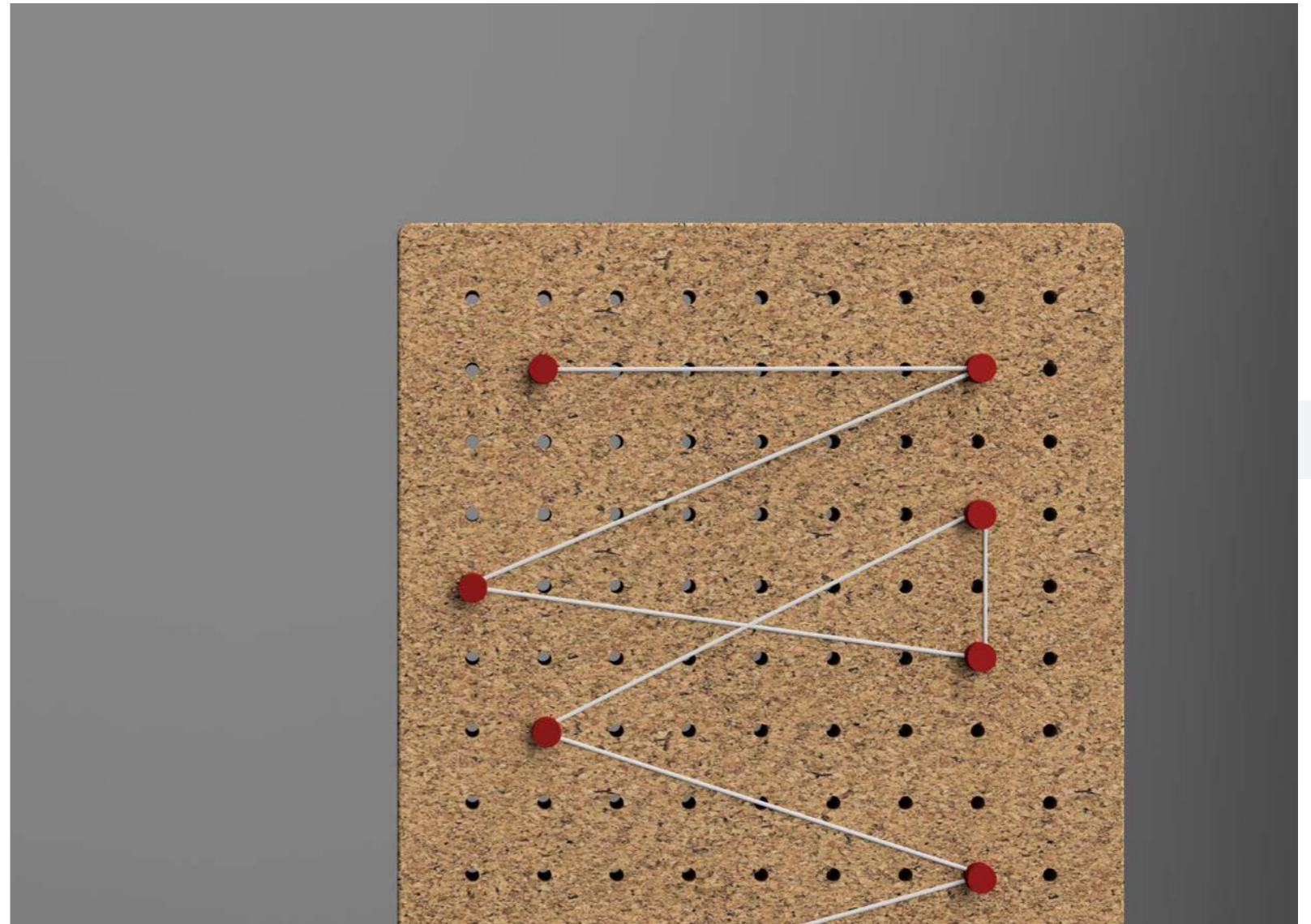
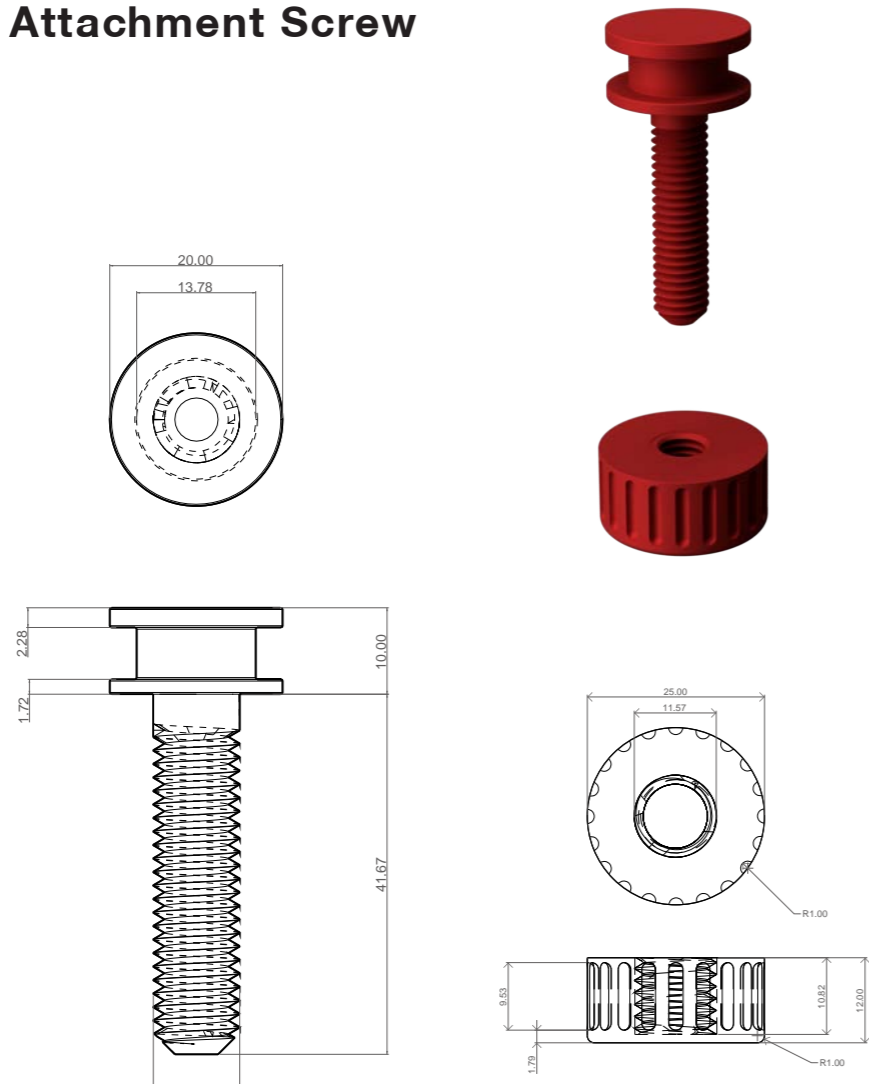
Mirror



Clamp



Attachment Screw





Anna-Maria



This project has in many ways been a great learning experience for me. Designing for children was something I had never done before and it was a great way to challenge and use all the knowledge I have gained during this education.

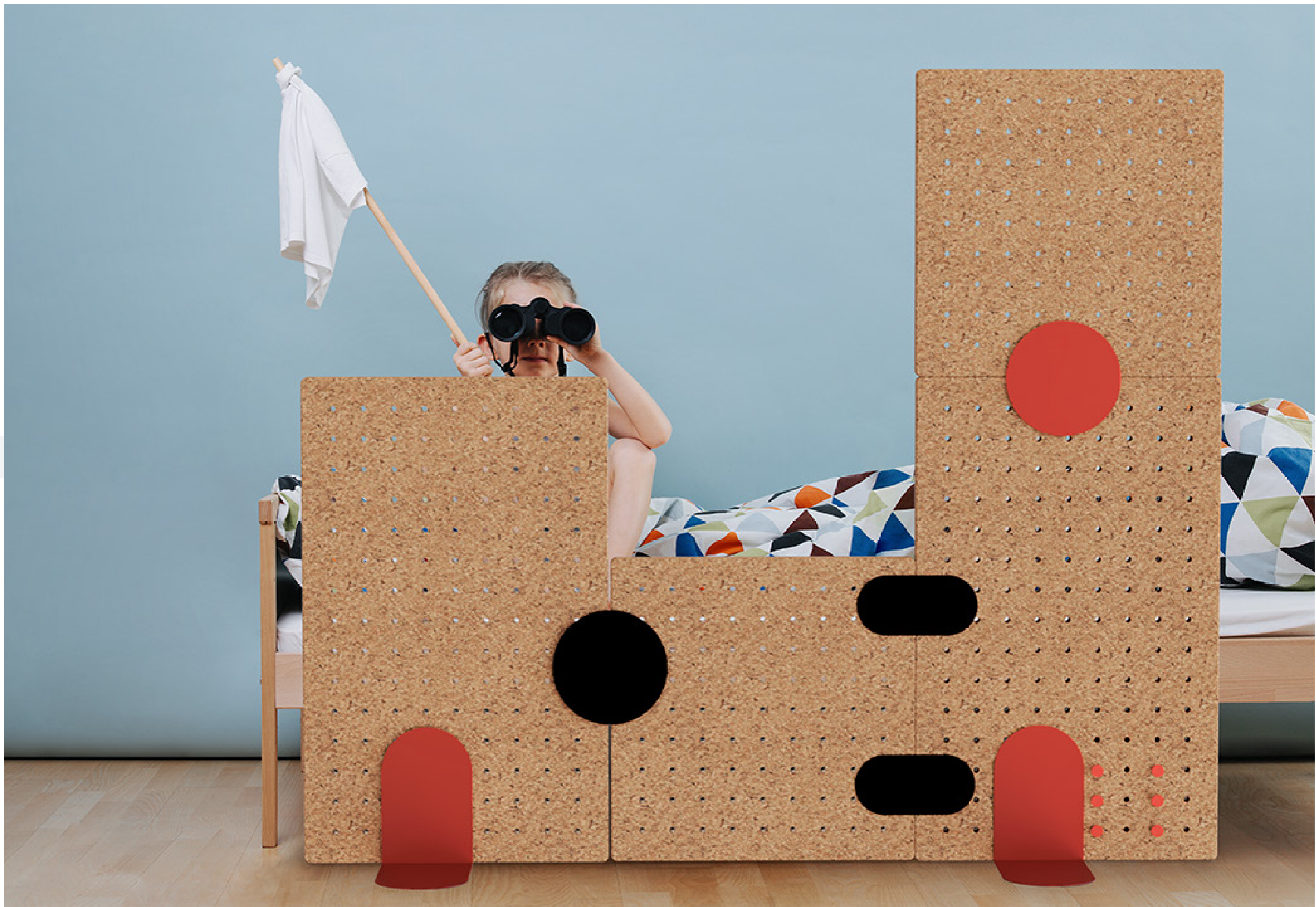
The fact that we were not able to involve children as much as we would have liked and the lack of access to the workshop, really challenged our planned outcome in this project. Still we manage to fulfill some of our goals, and I am very happy I got to work together with Agnes in this project. We complemented each other and generated a workflow that brought this project forward despite all the challenges. I am proud over what we and our classmates accomplished during this final project of our education.

Agnes



Looking back, this project has taught me many things. Working in team with Anna-Maria has resulted in great discussions and talks about design which has supported our process onwards. Communication has been the key to success in our collaboration, and helped us keep our focus and motivation throughout the semester.

Not being able to access the workshops has really pushed us to be creative and see possibilities in the limited resources available. Watching my classmates facing the same challenges and coming up with great solutions to carry their projects forward has been inspiring and has given me a new understanding in how problem solving is the true essence of a designers way of looking at the world, and the real motivation in our work.



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