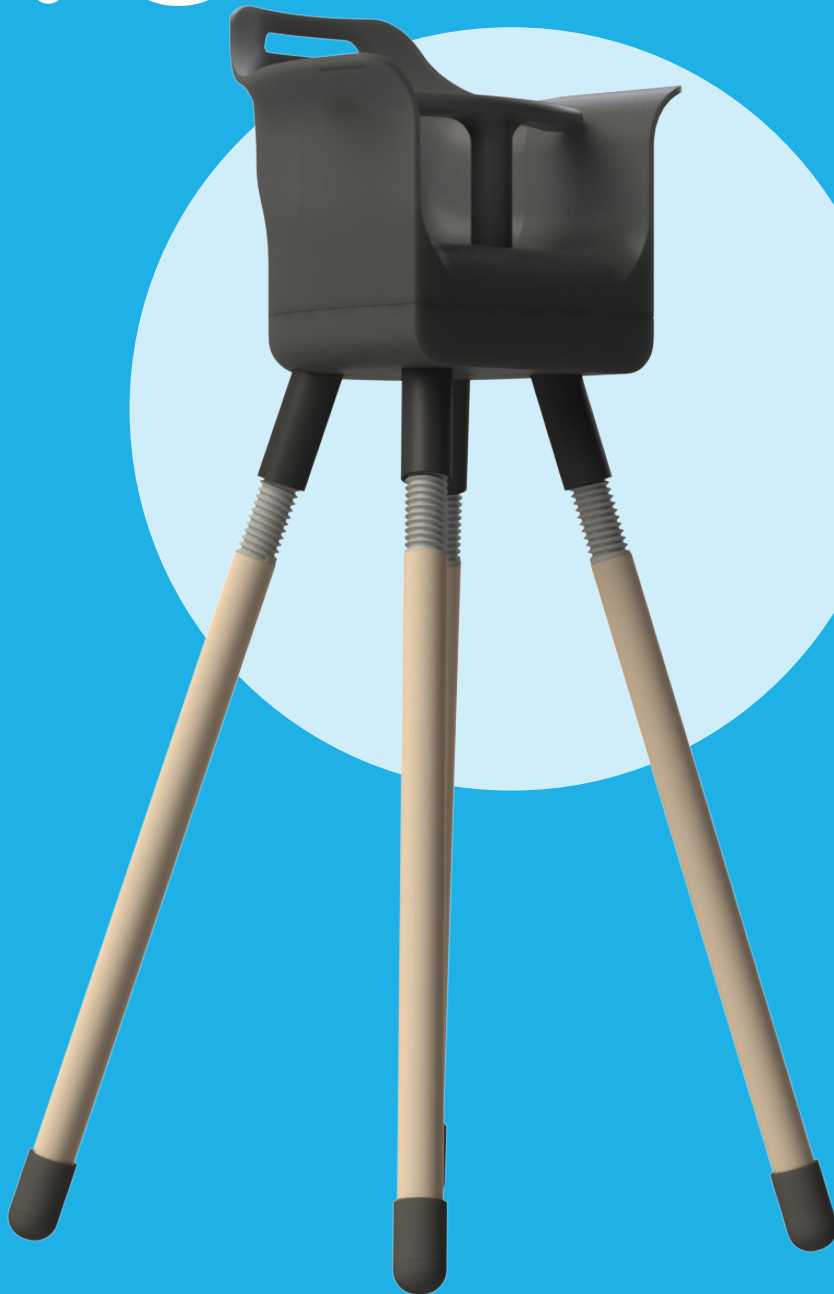


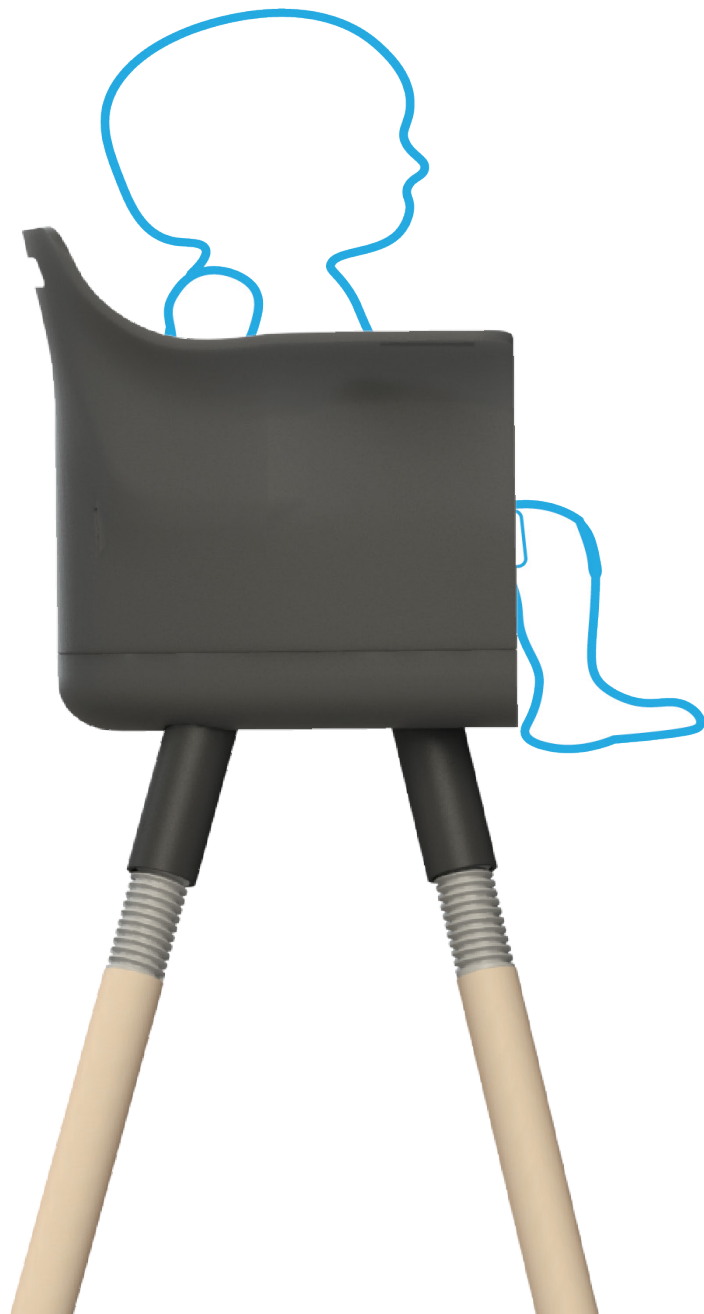
nu



kid

Shaelyn Leung
2019-2020

shifting baby furniture
into a new direction



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Final Year Project submitted to the
School of Animation, Arts and Design,
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of the requirements for a Bachelor of
Craft and Design in Industrial Design

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01

the introduction.

nu
kid

nu kid is a modern children's furniture brand that is designed for the sharing economy. Their mission is to create furniture that is well-designed through function and creating longevity through the furniture products that can be for temporary use. This collection starts off with a highchair redesign.

The **nu kid highchair** is a redesign on the modern day highchair that focuses on function and safety,

This concept was developed after intense research about the Toronto housing market and the challenges that millennials are currently facing. It has become a challenge to own home through the limited market and competitive prices. Due to an expensive cost of living, limited housing options, and other issues; there is correlation with millennials and their choice to not have kids. Therefore, I decided to transition my focus for my Capstone Project from small spaces to millennials who want to grow their family in these small spaces but are facing problems that may be restricting them.

The nu kid highchair takes these problems into consideration through its pricing and function. Of course, the brand does not enforce millennials to have kids but creates a system that fits their lifestyle to consider the option of growing a family.

design proposal

To **design a baby to toddler highchair that can be easily integrated into the growing sharing economy of Toronto** and hopefully grow into a family of more baby products.

The product will **have replaceable parts and can be easily customized to promote cleanliness and adaptability**. The target buyer of this design will remain for **Millennials** who want to grow their family but have been evidently choosing not to have kids due to environmental issues, economic problems, and social factors. The products will reflect their lifestyle, beliefs, and their small spaces.

This system will **encourage the second hand use** of the highchair to extend its product lifecycle and reduce the waste of highchairs piling up in landfills. The highchair typically lasts a family for 2 to 3 years of the baby's life and is then given away or thrown out.

To achieve a well-designed product that should last long, it will focus on having a **timeless aesthetic** and the use of new materials that are currently not really used in the baby market. These materials will be environmentally-friendly and still hold properties to promote a clean product for the baby.



Image 1.2 Baby Eating

02

the problem.



Image 2.1 Baby in an apartment

“Millennials are choosing not to have kids due to the rapidly increasing housing market, smaller spaces, social issues, and their lifestyle.”

This problem differs to each person as not every millennial experiences the same problems. In fact, “Many of Toronto’s downtown condo buildings are now brimming with children” (Chiasson, 2017). **“A baby boom is already underway in Toronto”** (McGillivray, 2017), which means it’s a good market to get involved in. The earlier half of millennials continue to have kids but the problems seem to be more evident with the latter half of the millennial generation. **“Growth in the 35 to 44-year-old age bracket – prime home-buying and family-starting years – will be “higher than it has been in decades,”**” (McGillivray, 2017). This predicts that later there will be another baby boom, hopefully of the younger generation having kids when they

get older. **“Delaying marriage and childbirth has mostly been a trend among those under 30”** (Petramala & Clayton, 2018) years old. More than half of the millennial generation is younger than 30 years old.

It is clear that a lot of millennial population and Toronto based surveys agree that **a big percentage of millennials do not want to have kids** because they have endured at least one of the factors listed above. If millennials continue to not have kids it could impact the next generation and society. Not only is that important but millennials will be the majority of those choosing to have kids or not for the next two decades.

why are millennials unable to afford having kids?



Image 2.2

● the limited housing market

Toronto's housing market currently is made up of "Condos [which] account for 81.5%" (Toronto Housing Market Analysis, 2019) of all completed housing projects. This projects that **condominiums will dominate the housing construction** for the future. **Housing ownership will become too expensive to afford** for those who fall in the average income. This will leave renters stuck waiting to own their own house due to current housing prices. **Younger households looking to live in Toronto will be constrained by their limited income.**

The "median owner **household income declined by 15%** while **average home ownership costs grew 60%**" (THMA, 2019).

The rapidly increasing housing market prices are preventing millennials from buying a home to settle in and possible start a family in. Most millennials would prefer to be financially stable which involves owning a house before having kids since renting would be an extra expense monthly on top of the expensive price to raise a kid. Today's housing market has made it **increasing impossible for millennials to buy their starter home.**

● struggle to gain financial stability

Another economic reason why millennials are choosing to not have kids is that they believe that they **cannot afford to support their child** as they have trouble supporting themselves already. Many **millennials have hefty student debt** that they need to pay off. Having kids is another expense that can put them in debt even more. The **average student debt is approximately, \$26,000** (Statistics Canada, 2019) in 2010 but has drastically increased due to the yearly increases of tuition. "Only three and four out 10 will accomplish the feat within three years of finishing their studies" (Alini, 2019). Sadly, **millennials are found working harder to less pay** than generations before them. Once out of school they are not guaranteed a full-time position in their field and often have to take lower wages, freelance work with no benefits, or multiple part-time jobs to support them.

Likewise, **it is taking millennials more time to achieve financial stability.** Sadly, a 9-5 job is not enough to be able to afford to live in Toronto, it often leaves them little to put away into savings after totaling up their expenses. This leaves them with no extra of their money to raise a baby.

Millennials are often choosing their careers over starting a family for their comfortability and stability. They want to be financially stable before they make their sacrifices to have children. This also means the parents having to give up 9 plus months to have the luxury to have a baby. These 9 plus months (maternity or paternity leave) can be paid or unpaid but still does not match what they make if they were working full-time. This can cause more financial problems, not including having to provide for the baby through buying furniture, clothing, food, healthcare, childcare, etc.

● being able to afford raising a child

Raising a kid can be very costly, the average yearly price to raise a kid is “13,366” (Global news, 2017), which adds up to roughly **\$240,588 over 18 years.** These numbers do not include the pricey cost of child care. **Child care can cost as much or even more than tuition costs,** roughly “\$1,685 a month, or a whopping \$20,220 a year, which is basically the cost of a second mortgage” (Gardner, 2019). **Toronto still tops the list of being the most expensive price for child care in Canada.** For millennials to balance work and a child, childcare is important. Millennials already have trouble

affording for themselves which makes it scary for them to have to add another mouth to feed that is dependent on them. They are scared that they won’t be able to afford to raise a kid and give them the best life.

Although, you can definitely save money when raising a kid by buying second hand products and other solutions. But all that can still add up and can be costly. Raising a child is a big milestone in life but has become delayed by millennials due to wanting financial stability before having a child to be able to afford them.

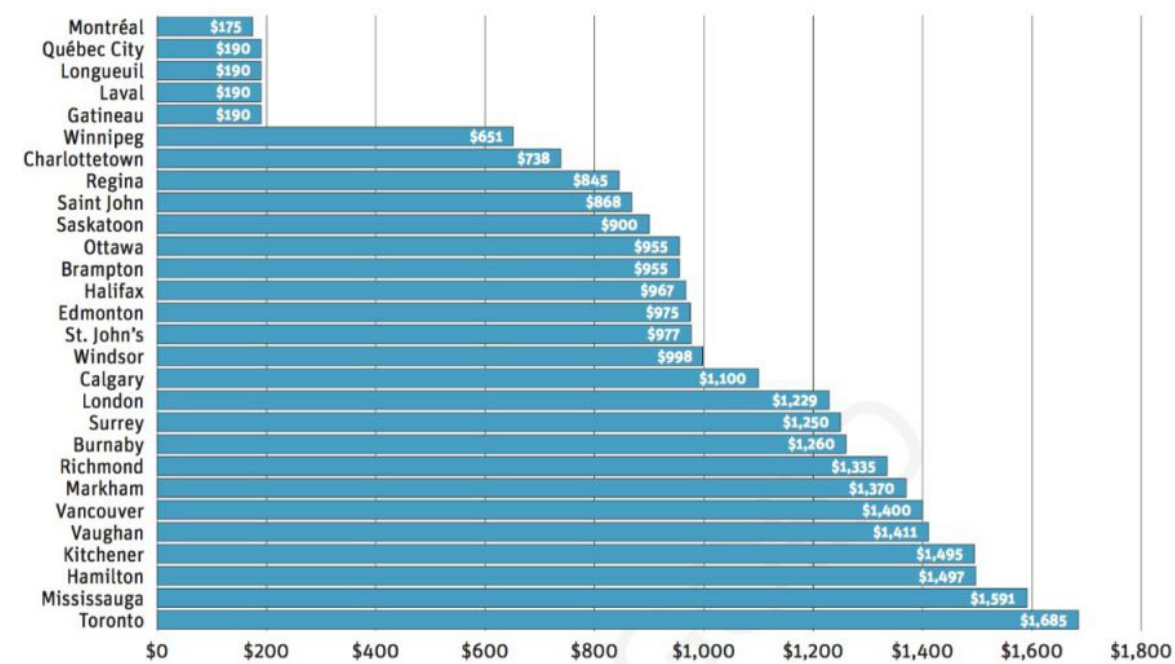


Image 2.3 The City with the Highest Daycare Costs in Canada



Image 2.4 Women Stressed over Bills

what are other factors that impact growing a family?

● **adapting to small spaces**

Due to the growing population and limited space to grow, Toronto is forced to expand upwards through multiple level Condos. Majority of the Condos being built consists of having 1 to 2 bedrooms, which is evident from the bar chart below (Figure 1.2, THMA, 2019). “Toronto has the largest gap between actual and ideal home size in all of Canada, with **33% of respondents living in properties smaller than 1,000 square feet**, and 28% wishing for homes larger than 2,500 square feet.” (Jisa, 2017). Therefore 33% of almost half a million residents live in spaces that are smaller than a thousand square feet. The small space already limits homeowners on what pieces of furniture they can own as the **spaces can become cramped**. The small spaces do not create space to raise a child properly.

The limited housing options are preventing millennials to have kids. The new housing units being developed in **Toronto consists of “41 per cent have two or more bedrooms”**(McGillivray, 2017). This shows that the new developments in Toronto might not meet the demand of millennials who want to settle down and have children. **One bedroom is not enough space to raise a child**, they definitely could make it work but many new parents prefer to have a bigger space before having children. **Having a separate bedroom for the baby is beneficial for the child and its growth.** Therefore the limited space can make millennials rethink about how much baby furniture they will need to fill their already limited space to raise a child.

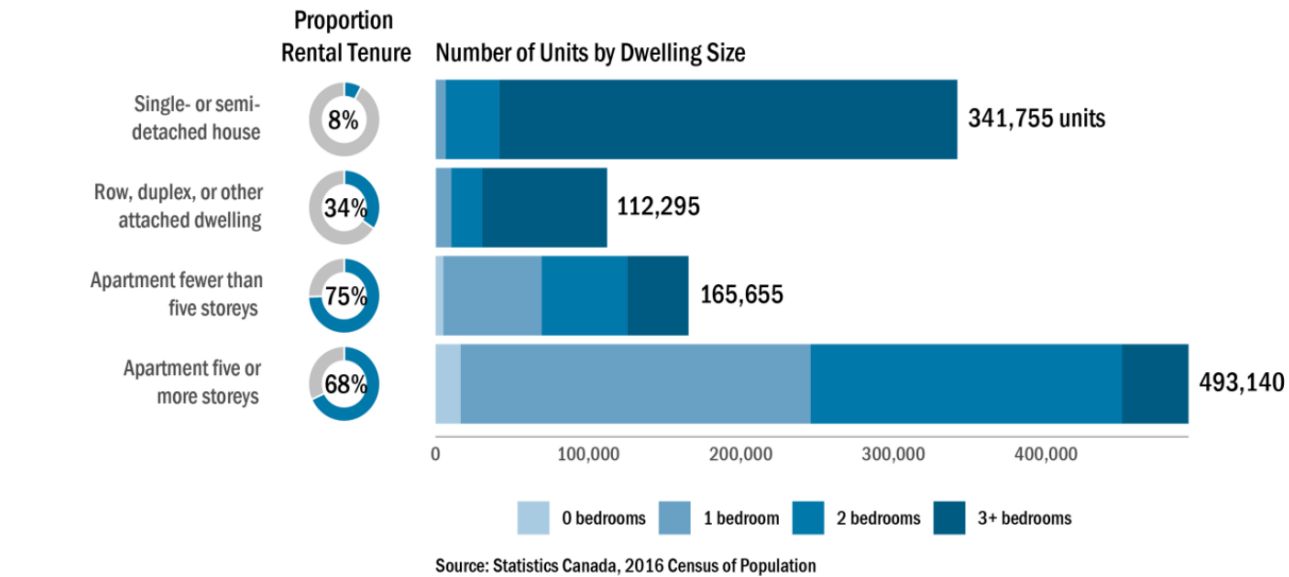



Image 2.5 Breakdown of Toronto’s Housing Market by Dwelling Type and Size

WHAT IS CONSIDERED A GOOD HOME SIZE VS. ACTUAL LIVING AREA BREAKDOWN BY CITY



	VANCOUVER		SASKATOON		KELOWNA		TORONTO		WINNIPEG		MISSISSAUGA		HALIFAX		OTTAWA		HAMILTON	
Living area	Desired	Actual	Desired	Actual	Desired	Actual	Desired	Actual	Desired	Actual	Desired	Actual	Desired	Actual	Desired	Actual	Desired	Actual
Under 1,000 SQFT	20%	29%	9%	32%	4%	9%	8%	33%	15%	39%	7%	24%	1%	21%	7%	14%	6%	23%
1,001 - 1,500 SQFT	16%	18%	41%	46%	24%	30%	24%	26%	37%	39%	26%	23%	15%	28%	17%	30%	19%	21%
1,501 - 2,000 SQFT	19%	14%	28%	15%	21%	22%	23%	16%	25%	11%	18%	35%	28%	21%	29%	25%	27%	27%
2,001 - 2,500 SQFT	14%	16%	10%	4%	20%	14%	17%	10%	10%	5%	26%	12%	26%	10%	25%	17%	24%	11%
Over 2,501 SQFT	32%	24%	11%	3%	32%	26%	28%	14%	12%	6%	23%	5%	30%	21%	24%	14%	25%	19%

Image 2.6 Actual Living Area Breakdown by City

● social impact on millennials

Millennials grow up in a society around innovative technology and social networking, therefore they are extremely aware of their image and are highly influenced by society. Society tends to unappreciated millennials and still treats them like children, this can impact their views on wanting to have kids. They think that they still haven't grown up by how they are perceived as being a millennial, this makes them consider the fact that their unable to positively raise a kid and support them for the rest of their lives.



Image 2.7 Millennial Stressed

Social pressure is another factor that makes having kids unappealing for millennials due to the pressures of having to be on track. **There is pressure of following a certain schedule created by society that is influenced by the previous generation's time-line**, such as being married by a certain age and having kids young. The previous generation can be blindsided by current struggles and challenges that millennials face to want to be able to follow that same time-line that they had. This can be through pressure from family members, the media, and other sources.

The social pressures may affect the millennials time-line of when they want to get married and start a family, causing a correlation of women having kids at an older age.

The older generation does not see that millennials cannot afford things like them and do not live the same lifestyle as them. Women have more choices in what they want to do with their body or life; **Millennials are often choosing their careers over starting a family, which leads to getting married and having kids later.**

● being environmentally cautious

Another problem that has been changing the minds of millennials to have kids is climate change and environmental issues related to overpopulation. The current issues has made millennials rethink if they want to bring a child into this World, where the environment is slowly degrading. **Many believe that not having kids will help save the planet and limit the effect humans have on the environment.** This has become a common reason that people are choosing not to have kids. **Over population causes more consumption of products** which ultimately calls for more resources and creates a depletion of resources. This can be seen in our limited fresh water supply, huge garbage landfills, and climate change.

Millennials have also been choosing to live a zero plastic or waste life. They are finding ways and choosing

products to **reduce their carbon-footprint.** This has caused the government to start the ban of single-use plastic such as plastic straws and plastic bags.

Baby Highchairs typically last 2-3 years with a family max. After their necessities have been met with the highchair and their baby grows out of it, **the user usually gets rid of it by throwing it away** or giving it away.

Every year, **“Canadians throw away over 3 million tonnes of plastic waste”** (Trudeau, 2019), which represents up to \$8 billion per year in wasted resources and energy. **These plastics can either end up in landfills or in the ocean, every year up to 8 million tons of plastic has ended up in our oceans** which has created the discovery of the great garbage patch.

Image 2.8 Plastic built-up in Landfills



03

the research.

demographic

For my Capstone Project, I will focus on the user and demographic of my baby furniture system towards millennials within the housing market of Toronto. I chose Toronto because it is a dense city and in the future **millennials will be the ones who will occupy majority of the Condominiums being developed in Toronto.** My chosen demographic was targeted based on my extensive research and for their unique lifestyle. **Millennials are the current and next generation of parents.**

Millennials are defined as anyone born between the year 1980 and 1996. The characteristics of millennials are more advanced due to their upbringing being filled with technology and the social network world. Their lives differ from current homeowners and are optimistic to want to adapt to these small spaces and make them their own, and hopefully grow a family.

Since the millennial generation is quite big, I've decided to focus on

a specific category of millennials. The area of focus will be **middle-class millennials who are financially stable but not able to afford to buy a house in Toronto.** They are very aware of their carbon-footprint and how bad products have been effecting the environment. They've been **conscious of what they buy** and are choosing products that usually consist of recycled or organic materials. They also prefer **to buy locally to support the area they live in.**

In Toronto, "millennials outnumber Boomers, they are the fastest growing cohort in the region and will continue to be over the next decade."

(Petramala & Clayton, 2018). The future predictions identify millennials will be the ones living in small Condominiums in Toronto. This is due to their limited income restricting them from purchasing houses with the rising prices in the housing market. Millennials are residing in the smaller spaces because of affordability issues, societal inequality, limited options, necessity, and other problems.



Image 3.1 In the city

● minimal lifestyle

The Minimal lifestyle has become a big trend in today's society through related shows and books related to this lifestyle. For example, the 2019 trending Netflix show "Tidying Up with Marie Kondo" is about sharing her tips on tidying up your life through her brand and KonMari method. Her minimalism-inspired approach has become very popular within Millennials **to not want to keep stuff and items** that do not bring use or joy. This differs from the previous generation who were living for stuff. This is not to say that the current generation does not buy things because we do but we are a little **more conscious and aware of what we buy and how many things we own.**

Millennials are trying to limit their consumption and not own so much since they already have limited space and care about their carbon-footprint. **Millennials are finding other ways to do that such as traveling and living a minimal life to be happy with what they already have.**

target market

The target for this Capstone Project is **to be versatile and easily integrated into those who participate in the Sharing Economy.**

The sharing economy can be defined as a service or way of distributing goods that is different from the traditional methods. Some examples of companies in the Sharing Economy are Uber, Airbnb, and reselling and trading apps. **“The sharing economy is built on the idea of collaborative consumption.”** (Roos, 2014) Collaborative consumption is

when only a few individuals own the goods and other people can pay **through a service to “borrow” them.** This system creates a way to use a product when it is not in use and **extend its value to the user and owner of the product.** The main reasons why people use the sharing economy because of its ideology and for its environmental awareness it brings, **“such as sustainability and green consumption, [which supports their] reputation and economic concern.”** (Hamari, Juho, et al, 2015).

● benefits

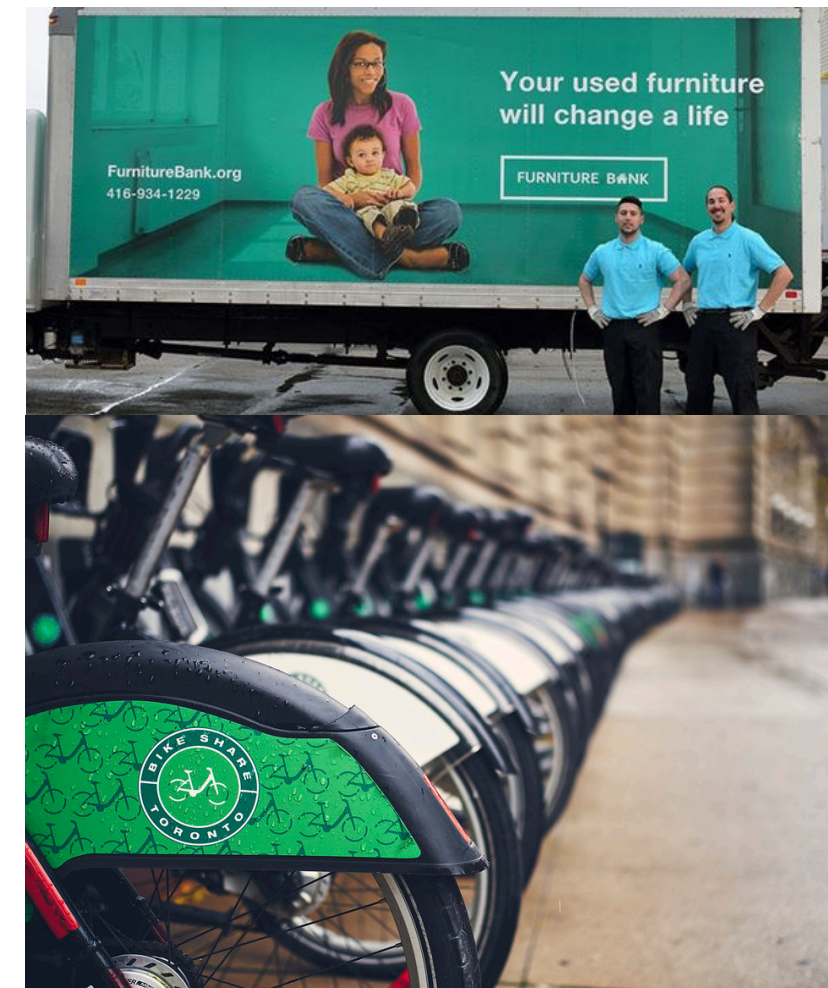
The sharing economy is highly beneficial through an environmental and economic points of view. Through an environmental aspect the product is shared among many users, therefore it creates less of those products that need to be made/produced. **This cuts down on industry pollution and lowers your overall carbon footprint.** By an economical and financial aspect **it allows those who cannot afford expensive products for themselves**

access to it. It also allows others to make extra money such as those who buy the good to rent out.

This will be beneficial for my product that I design as it will **beneficial local companies who buy it to rent it out.** It will also benefit middle-class millennials **to borrow good quality baby products** that helps lower their carbon footprint and **reduce plastic waste from piling up into the landfill.**

● examples of companies

Image 3.2 Examples of companies within the Sharing Economy



interviews

stephanie singh

millennial mother of two

interview topics:

- being a millennial mother and if she faced any challenges
- her opinion is on second hand baby products.

Stephanie is good with using second hand baby products but said it depends on what it is and its function. Although, she would rather buy new things for cleanliness and sanitary reasons.

Steph did not keep much of her first child’s baby furniture, therefore had to buy new products for her second child. She donated most of her used bay furniture, which when owned lasted her about 18 months. She is willing to spend more money on better quality pieces of furniture that is safer and durable for her children.

She believes that the baby market is already big but will get even bigger soon. Steph likes the idea of extending the lifecycle of the product because of current environmental issues and climate change.

Steph agrees that it is expensive to raise children.

thang tran

industrial designer and father of two

interview topics:

- feedback on design proposal and research behind the idea

The problem is a no brainer. He likes the idea of the sharing economy as he doesn’t keep his baby furniture after raising his kid but likes to pass it on to family or resell it.

He bought back the same highchair design (AGE Hilo highchair) that he used for his first kid on-line from another person.

He is willing to spend more on a good quality product as well which is why he continued to use the same brand/designed stroller and highchair for his second child.

He loves the idea of expanding the lifecycle of a product; wants me to focus on longevity. This longevity can be amped through the design or materials. The design should be a timeless aesthetic to be able to last many generations.

He brought up the new law that Europe is currently enforcing, keeping parts for 10 years, to see how I can apply that law into my design. I should research what the common recalls are on baby furniture to see if it’s a certain part always breaking to design that better.

Interviewing Thang brought great insights on materials and focusing more on the design.

karen foster

professor at Dalhousie University

interview topics:

- current problems occurring such as the rapidly increasing housing market
- why millennials are choosing to not have kids, small spaces, etc.

Karen agrees that millennials will face challenges in high housing prices and are going to pay the price of climate change but are doing better than their parents previous generation.

Millennials need more credentials to get a higher paying job to get quicker financial stability.

Karen believes that millennials are not having kids because “kids are expensive, women are increasingly working full-time outside the home, people are concerned about population increases, kids don’t have the economic benefit, and birth control is widely available and effective”. “

Childcare is getting very expensive in most Canadian provinces. For dual-earner couples / families without a stay-at-home parent, it can be crippling—as much as thousands of dollars a month—more than tuition! In a context where dual-earner couples are the norm, this means most families with young children are dealing with childcare costs”.

lee fletcher

industrial designer at fig40 and father

interview topics:

- feedback on my design proposal
- design focused and manufacturing processes

After his kids grew out of the baby furniture he did resell it.

Lee would use baby furniture but not if it’s wood (gets sticky). Highchair must be easy to clean to be passed on. Industrially sanitized?

Lee bought the Stokke Tripp Trapp highchair and enjoyed the design and how long it lasted in his house (5 years).

I should spend most of my time on the design and its assembly, the product can be disassembled and packed back into the box it came into and shipped back to the company. This will make the product easier to pass on and carry to a new location.

I should worry about the products composition and which parts are rigid versus removable components. Brings up the idea of the products narrative, the manufacturing process is important. This product is creating a system and a new experience without the user having to buy the product new.



Image 3.3 AGE Hilo Highchair

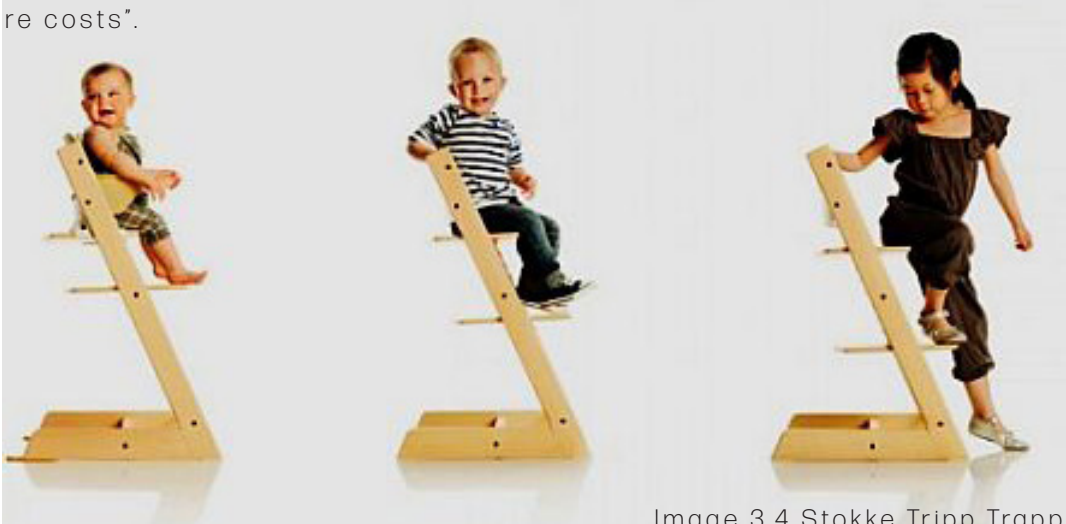


Image 3.4 Stokke Tripp Trapp

interviews

ryan dyment

employee at the sharing depot

Interview Topics:

- to get an experts perspective on the sharing economy and also ask questions about what the common clientele is
- proposed my design proposal to see if it is possible to integrate this product and if there is potential for this product in the market.

Ryan is a big supporter of the sharing economy and sees that there is longevity in this system.

Believes that sharing has become mainstream more than ever and it will continue to grow because of technology and living spaces are shrinking.

The Sharing Depot's current customers are usually males ranging between 20 to 35 years old. Currently, tools are their most popular items that are rented out. They admit that they haven't really marketed themselves to the parent community as much as tools.

They do not accept furniture items as they are too big to hold in the store and will be loaned out for more than just a week. But if a customer asks about baby furniture, they usually recommend going on kijiji or facebook marketplace.

Ryan thinks that my project is possible but with some challenges; such as transporting the product and sanitation. This interview helped me understand the sharing economy and how it is growing in Toronto.

cassandra

employee at ella+elliott

Interview Topics:

- their clientele and the products they sell in their store.

Their clientele are usually above 30 years old to 35 years old, they are usually established in their career and have settled down to grow their family.

There customers like to buy quality, high-end designs that are quite pricey. They prefer products that are made out of raw materials like wood and are locally made, there is the odd very expensive acrylic crib.

Their customer are willing to spend more money on better quality products that makes them feel like the product is safer and more durable.

Most of their in-store product displays are made out of companies that are local or made within the GTA or Canada. This reduces their carbon footprint of shipping products to them but also makes it accessible when ordering for their clients.

Their client's usual buy based on the design, they are big on 3-in-1 cribs and conversion kits as it grows with the child and lets the product use last longer.



Image 3.5 ella+elliott store front



Image 3.6 ToolLibrary store front

synthesis

I started my Capstone Project Research on designing a furniture system for small spaces, this has now transitioned into redesigning a baby highchair targeted towards millennials that can be easily integrated into the sharing economy but still follows the same principles of affordability, high design, and small spaces. This transition occurred from the problem of **millennials choosing not to have kids was a frequent issue** that came up in many housing market, millennials financial struggles, and small space articles.

There are many more factors and reasons why millennials are not having kids but these are some of the main ones and more logical ones that have been evident through my research. These are just the main ones that I want to focus on and that will impact my design. After speaking with some experts with the research I currently have, I have been challenged to research more and not only blame these problems. My product will not solve every problem but **will create a system that is affordable and support millennials who want to have kids**. Of course, I cannot change the minds of people who for sure do not want kids. Although, this highchair design will focus on the big issues and current problems

that millennials face which are being limited to living in small spaces, financial stability is harder to achieve, and social pressure to want to raise a child with the best.

It is highly evident that small spaces limit the growth of families, either it being **restricted to 1 to 2 bedrooms or having under 1,000 square feet to live in**. The new housing developments in Toronto are continuing to build more 1 bedroom condos than 3 plus bedroom condos. The small spaces can help support the choice to not have kids as it is harder for millennials to buy a bigger place in Toronto that can allow them to grow their family with ease.

The housing market in Toronto makes it increasingly harder for millennials to afford to own a house due to **rapidly competitive and increasing house prices**. Likewise, millennials job salaries do not match up to the housing market, making it even harder for them to achieve financial stability and own a house. This makes the choice easier for millennials to opt out of having kids because of **financial and economic issues**. **Affordability when raising a baby** it is very important since there are a lot of expenses that are required for the child.



Image 3.7 Toronto Skyline

The millennials lifestyle will highly impact this design of being minimal, modern and function-focused. The design has to be **easily adaptable to their living space**. From my research, the lifestyle of Minimalism is on the rise. This shows how people are not keeping things that they do not need any more or that brings them joy. And that they are limiting themselves to how much products they consume. This is important for my highchair design since after the baby grows out of using the highchair, it will be passed on or thrown away.

Millennials are **more environmentally aware** and have been choosing not to have kids because of climate change and the effects of over population. Therefore, my product will focus on **extending its lifecycle** and not just being thrown into a landfill in the end.

In the end, the research will help me back up how these variables affect the problem of millennials choosing not to have kids. It **is a real current issue** that can be hurtful for the future of population growth and society. I will use these main problems as key part of my design and ensure that they are kept in mind with any decisions I have to make on my design.

market study

why a highchair?

A highchair is **considered one of the important pieces of furniture required when raising a baby**. The highchair is not only beneficial to the baby to **create a safe ergonomically upright position when eating but also creates a comfortable feeding position for the parents**. Although, the highchair is not just used for feeding but **can be used in many other rooms. The highchair must be easy to clean and emphasize safety for the baby**. The highchair usually has adjustable **safety straps, safety latches, a crotch post, adjustable seat heights, and no exposed hardware**. These are to ensure the product is safe and

stable to withhold the weight and movement of the baby. **Currently, highchairs can have a big footprint and be bulky within the home**. Due to how much space it takes up, **people are leaning towards versatile highchairs with multi-functional components**. Highchairs can be fairly expensive, almost costing the same as a stroller or a crib. **The typical highchair is used from when the baby is 4 months old to the latest of 3 years old**.

From research, the structural body of the highchair is typically made out of Wood or Plastic. The highchair can include a fabric lining or some sort of padding.

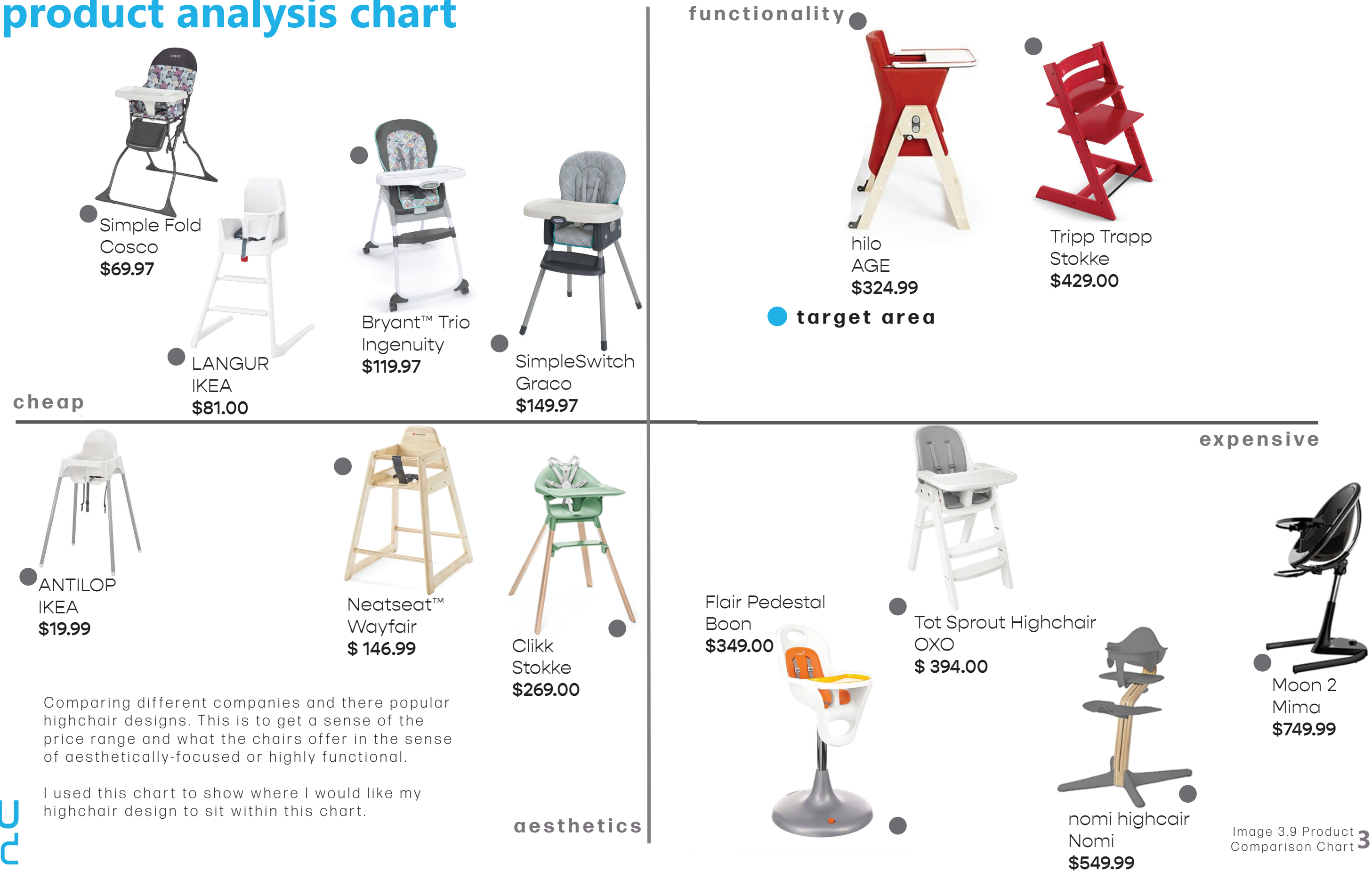
importance of the highchair?

The highchair creates a routine and a comfortable place for the baby to eat. It helps enhance the baby's mobility and their sensory skills as it gives them a safe and structured place to explore either through food or activities that occur in the highchair. **The highchair gives the baby freedom to move around but still stay secured to the chair**.



Image 3.8 Plastic Formed Booster Seat

product analysis chart



product comparison analysis



Booster Seat

- 9-12 months to 3 years max
- Usually a Plastic form with the 5 point strap harness and a removable tray
- Can sit on top of a chair that the user already owns or on the floor (Convenience)
- Good for traveling
- Smaller and lighter version of a highchair
- Portable
- Cheaper in price
- No padding, tends to be very uncomfortable for the baby
- Needs safety straps to secure to the chair

Highchair

- 0-4 months or 6 months to 3 years max
- Creates a convenient height for feeding for the parents and engages the baby with the family at the table
- Provides comfort for the child
- Benefits fine motor skills and safe explorations
- Adjustable seat heights for growth
- Easy to clean (Plastic cushions, Dishwasher safe)
- Takes up floor space but their are solutions to reduce that (Folding up)
- Versatile to a lot of living spaces
- Provides a proper feeding posture for the baby
- Can be used in any room
- More sturdy
- Lots of options and designs



Image 3.10 Comparison Chart of the Booster Seat, Highchair, and Hook-on Chair

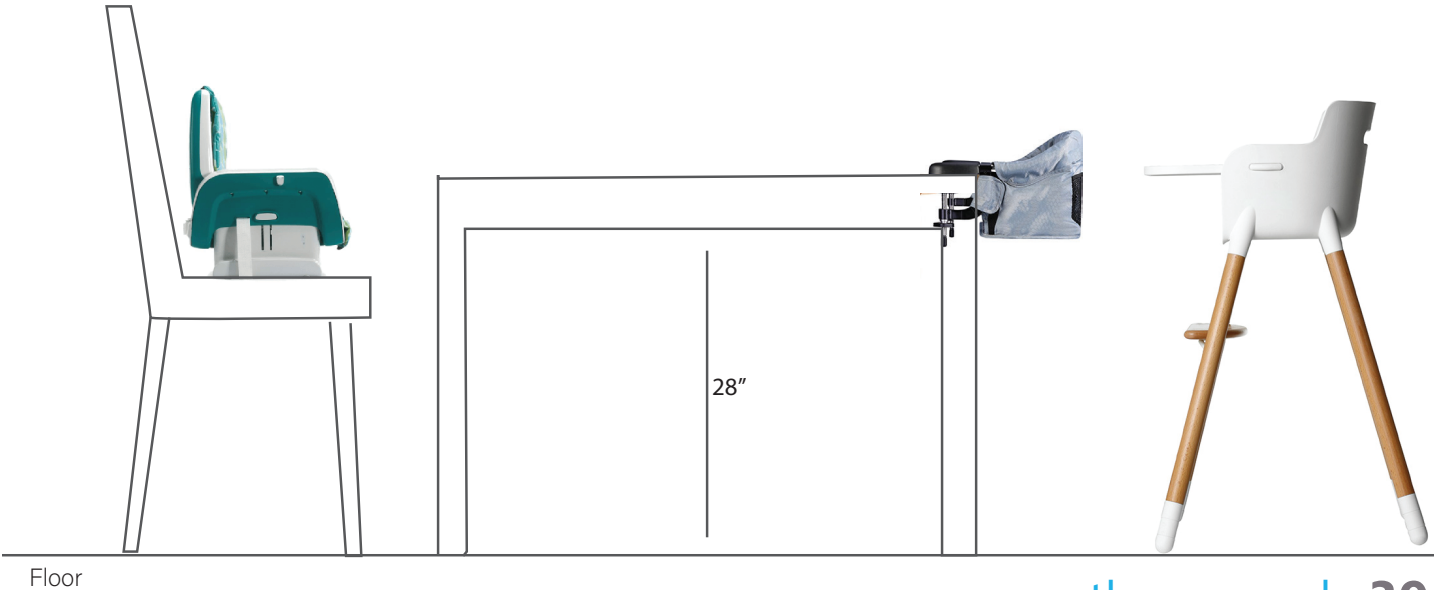


Hook-on Chair

- 6 months to 12 months (due to weight limitations)
- Not very versatile to all seating situations, needs a sturdy table surface to attach to
- Hard to get child out of
- Difficult to clean due to usually being made out of fabric
- Folds up and easy to travel with
- Can come with storage
- Can only be used at the table
- Space Saving
- Do not offer much benefits to the child nor support to help their sitting posture
- Products have a similar design

This product comparison analysis helped me **compare the three required products for raising a baby and see if there are any intersection within them** and find anyway to design just one product to replace all. From my findings, **I see that the booster seat and highchair have a lot in common.** This helped me discover the multifunction part of my design. **I want my design to be an easy to use highchair, where the seat comes off the base to turn into a booster seat that is easy to carry and lightweight.** From existing products, of course 3-in-1 products exists and have similar function but my design will be different.

Image 3.11 Diagram Comparing the Heights of the Booster Seat, Highchair, and Hook-on Chair



product reflection

common problems

From research and reading mommy blog's, problems have risen from using their highchair. A common problem that most mothers talk about is the **comfort of their highchair**, they find all hard plastic seats makes their child uncomfortable when sitting for too long. Babies need to spend long periods of time in the highchair or are there frequently. Another problem I saw from other products is the **disassembly of the highchair** to hide it away when its not in use. It often involves having to thread the legs out of the base to pack it away. That can be an inconvenience when your hands are full with a baby. From recent recalls, any highchair with telescoping legs have been recalled due to the chair legs collapsing.



A more dangerous issue with highchairs are its **stability**; "Approximately 9,400 children suffer such injuries every year—one per hour—and most injuries are associated with landing on wood or hard tile floors." (Gunderman, 2013) It has been common for the highchair to tip over form the movement of the child or if the baby is not wearing the harness they can slip through.

important functions

The functions that the highchair provides is what makes a great highchair design. It should be intuitive and easy to use when a parent is busy with their baby, yet very safe and easy to clean. The disassembling of the chair will be important as it will be used in small spaces, it needs to be easy to put away when not in use. The chair should be multi-functional to want millennials to buy it. From research, it seems that the most popular baby products are 3-in-1 highchairs or highchairs that grow with the child.

The seat should be adjustable to the environment (table) and to the baby. This can be through the adjustable height legs or an adjustable seat.

Another required function is the any function that supports safety. This means that the highchair **should have a 5-point harness, a crotch post, and hidden hardware.**

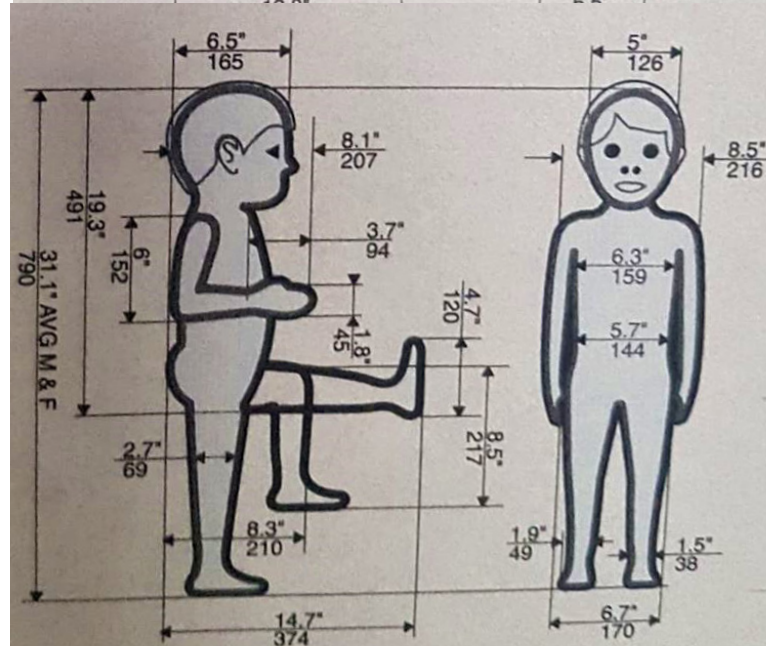
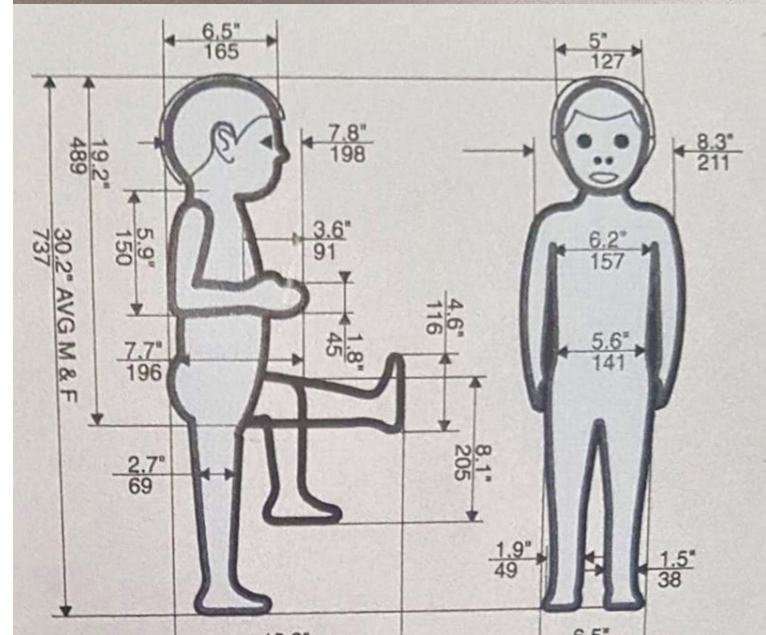
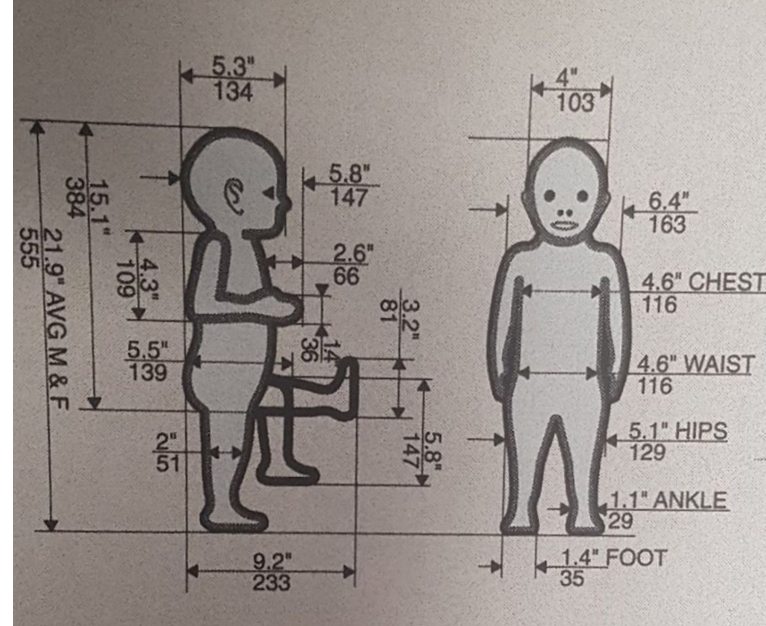


Image 3.14 Example of a components required for a Highchair

baby development

anthropometrics

I studied different body sizes from the age of 2 months to 19 months to help dimension my seat. The chair was mainly based on a 12 month old since it was the mid-range of how long I would want this chair to last within a child's life: up to 2 to 3 years max for the highchair.



growth chart

2 months

Body gets physically stronger.

Starts exploring with their legs and hands.
Stretching them out.

3-5 months

Learn to support head.

Plays with hands.

6-8 months

Rolls overs.

Can hold toys with a whole palmar grasp.

9-11 months

Sits up without support.

Starts to crawl.

Picks up toys with pincer grasp

12-15 months

Starts to stand up.

May take First steps.

Develops the Tripod grip.

16-19 months

Begins to walk unassisted.

Able to stack and balance objects.

20-23 months

Can run and walk comfortable.

Can use complex objects such as zippers or tower blocks.



Image 3.16 Cute Baby

design brief

To design a modern highchair for Millennials in the sharing economy to use as a tool to raise their child with. The chair will address versatility and safety through the design and functions.

The chair will create longevity within the products functions and modularity to be easily fixed and cleaned. This will allow the user to easily pass on the chair to another family to then customize the chair to their own style and feel safe about using a second-hand product.

Multi-Function

Safety

Comfort

Modern

Timeless

Modular

Intuitive

04

the ideation.

style boards



Image 4.1 Millennial Style Board

modern
minimal

neutral
comfort



Llyod Loom
Ray and Charles Eames
Jersey Seymour
Phillipe Starck
Aero Saarinen



organic
natural
light
playful
high-end
good design

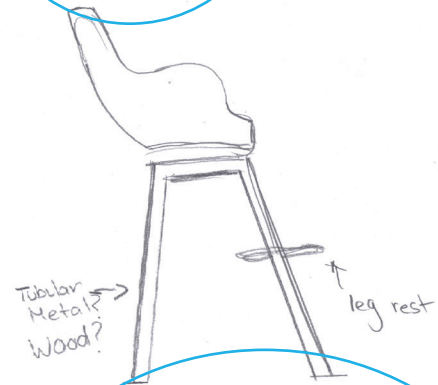


Image 4.2 Modern Chairs Inspiration board

concept sketches

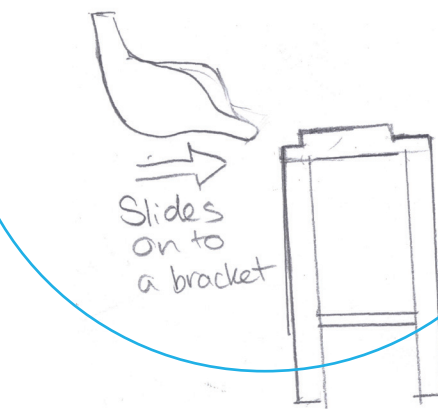
01

-Base & Seat are two components



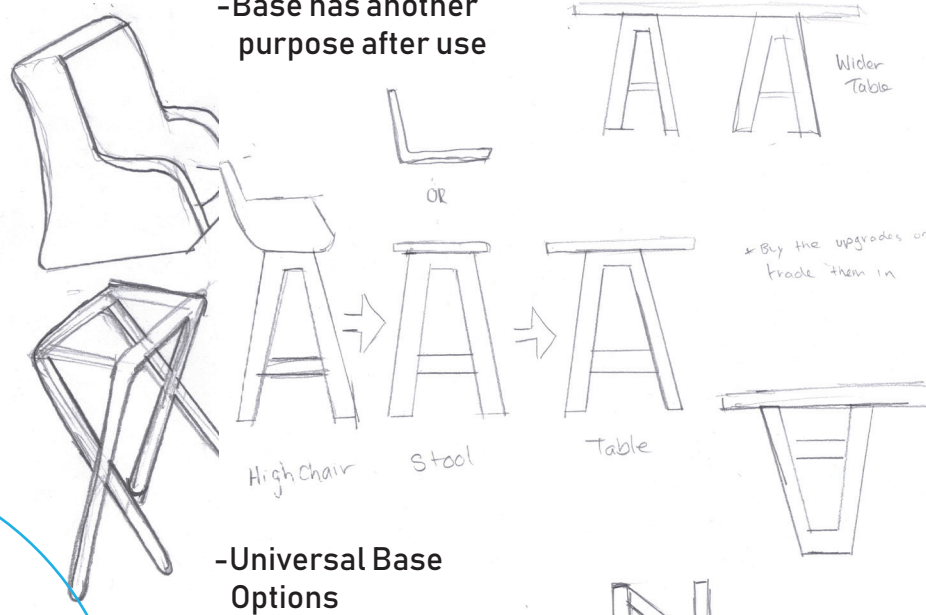
02

Slides on to a bracket

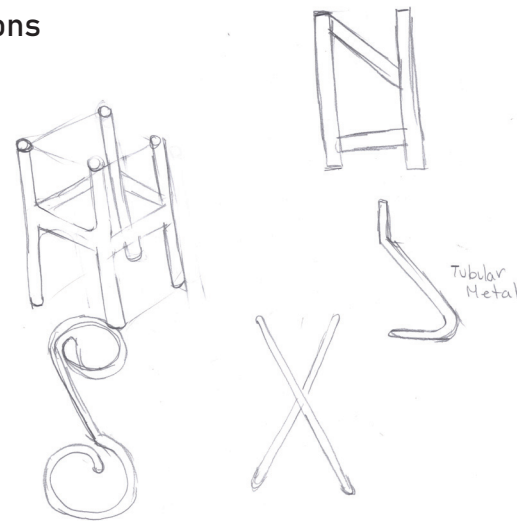


03

-Base has another purpose after use

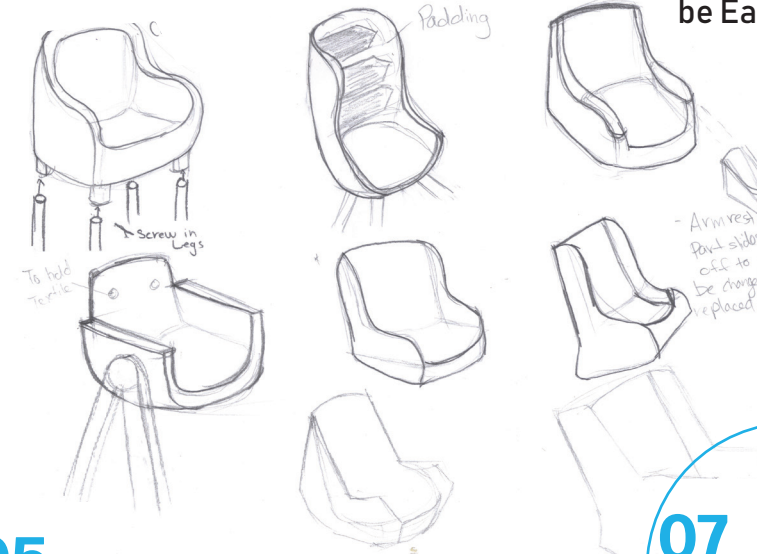


-Universal Base Options



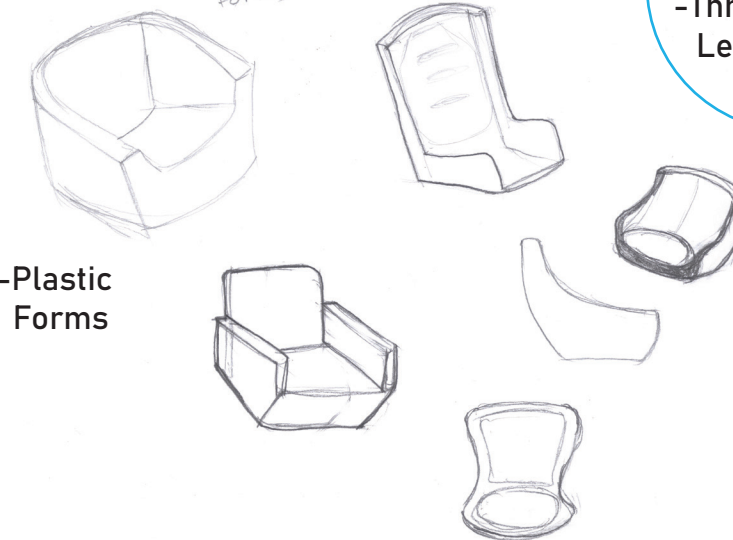
04

-Rotational Molded Forms



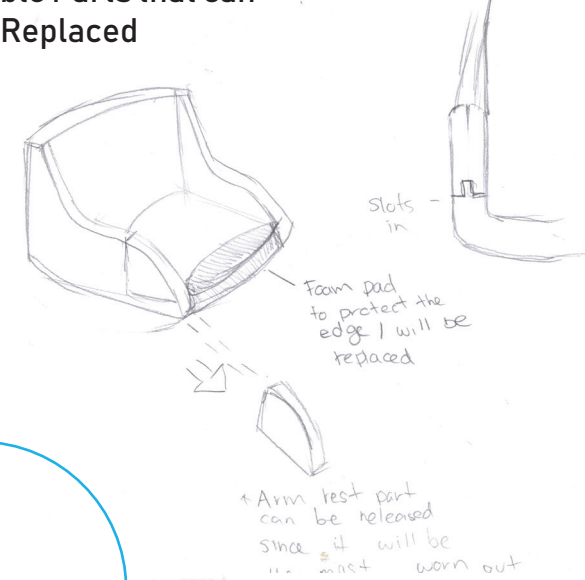
05

-Plastic Forms



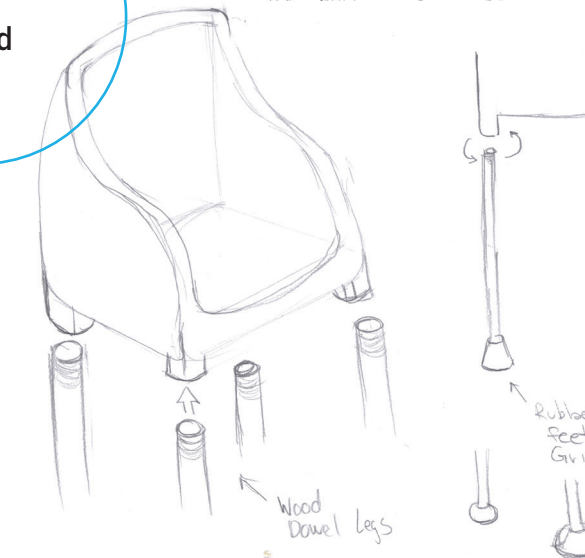
06

-Removeable Parts that can be Easily Replaced



07

-Threaded Legs



I liked the concept of the base and seat being separate to make the seat have more function than just being a highchair.

This multi-function aspect of the highchair became very important when ideating and developing more concepts.

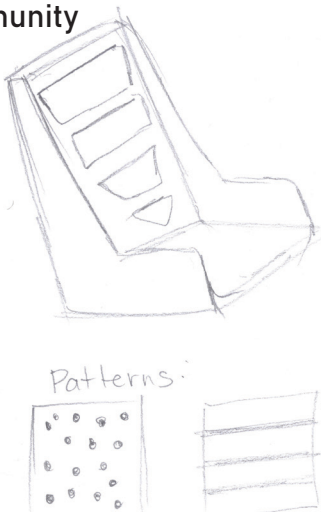
The manufacturing process of plastic molding has caught my eye and has allowed me to get more organic and minimal forms that would influence a modern design.

Threaded legs will play an importance in the function and adjust-ability of the highchair.

concept sketches

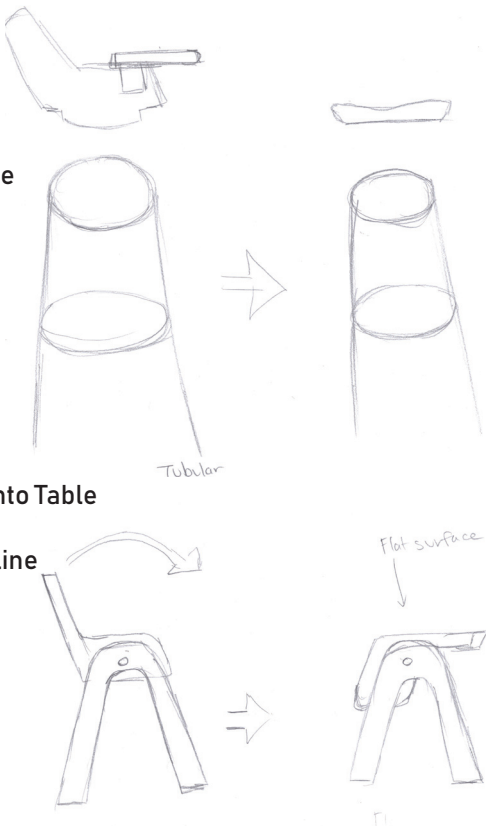
08

- Customizeable Fabric Cushions/Padding
- Should be Odor-free/Stain resistant plus easy to clean
- Could be handmade or Sourced from the online community



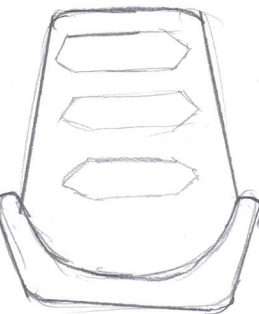
09

- Grows with you
- Same Base with more functions
- Buy separte Add-ons

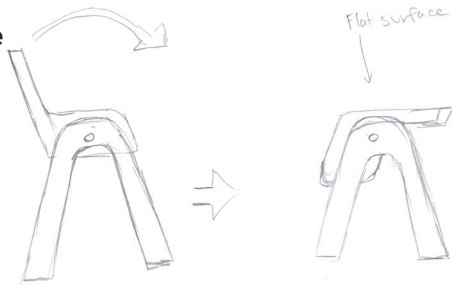


10

- Chair Flips into Table
- 1950s Storkline Highchair

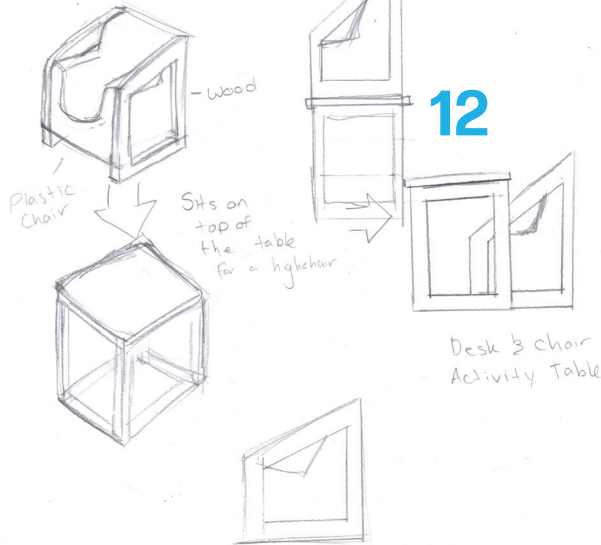
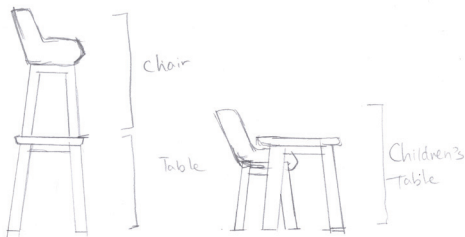


+ Can be customized through colours and patterns



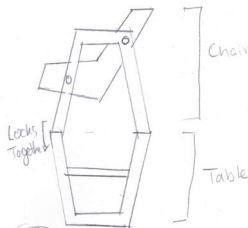
11

- Stackable Highchair
- Turns into another function



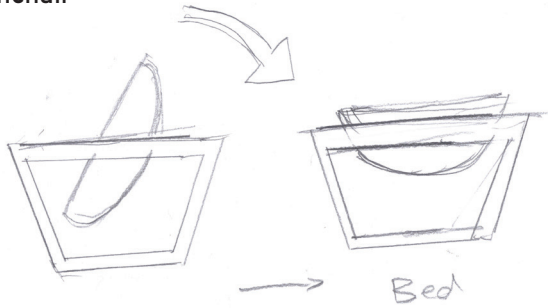
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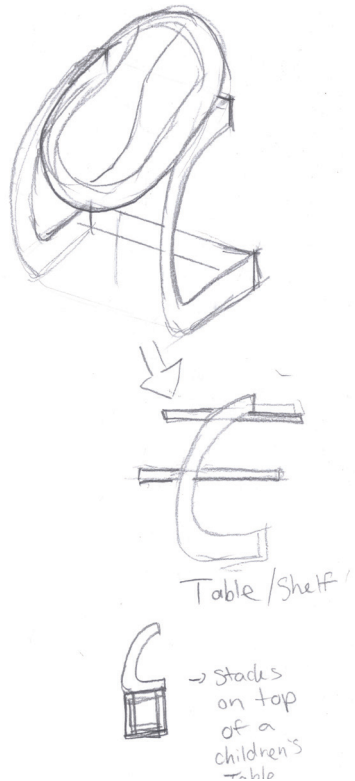


14

- Convertible Highchair



15



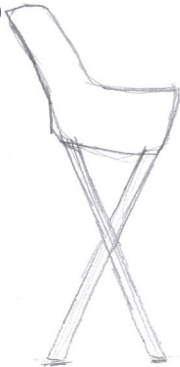
Fabric is an important part of the chair to create a comfortable seat for the child to sit in.

The patterns for the fabric will be highly influenced by modern forms/shapes and colours.

concept sketches

16

- Foldable Highchair
- Easy to Store



Chair Body Comes off

18

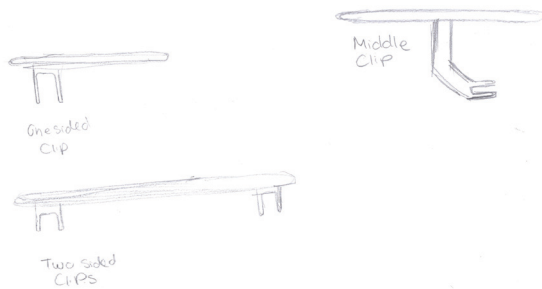
- Food Tray Shapes

Clips into base of chair



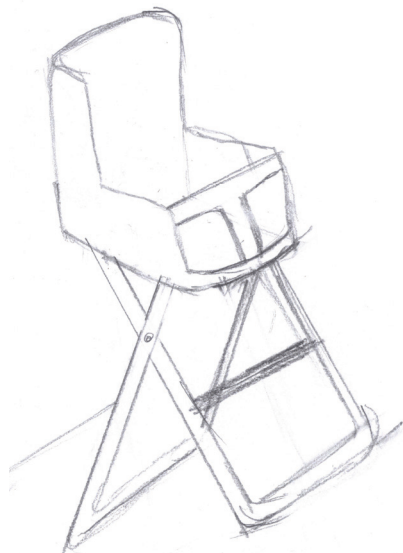
19

- Clip-on Food Tray



17

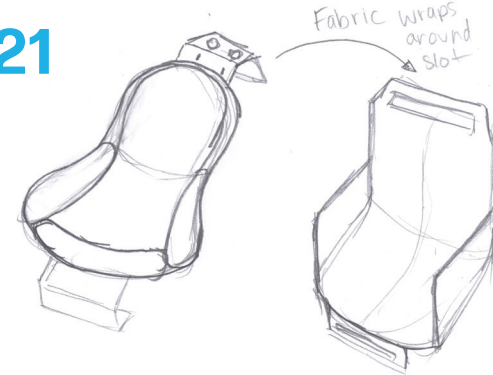
- Easy to Assemble and Disassemble
- For easy carrying



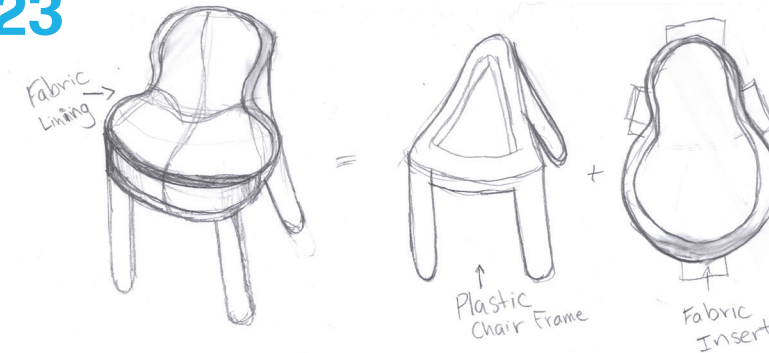
20

- Fabric Insert that Attaches to a Form

21

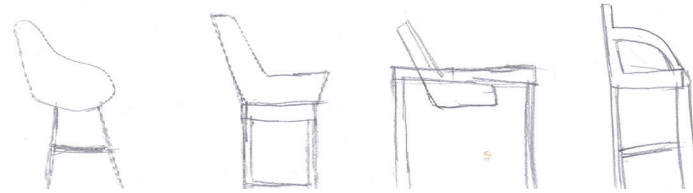
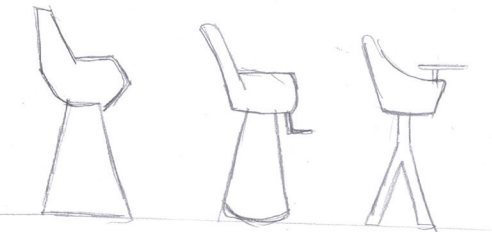
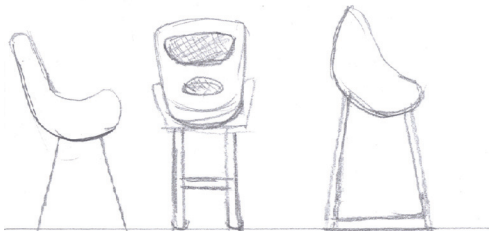
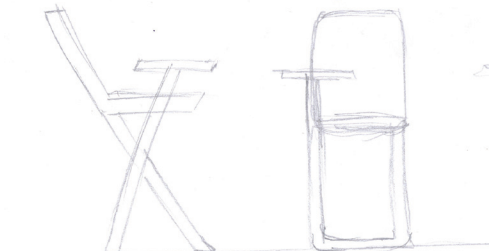
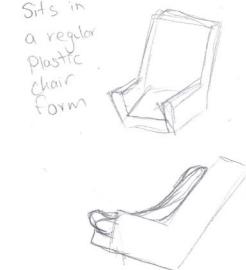


23



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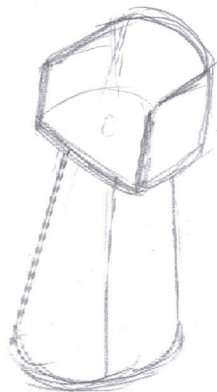
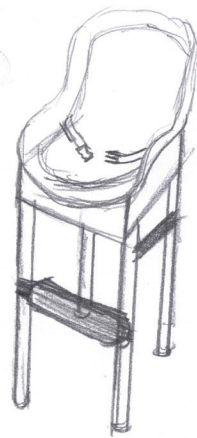
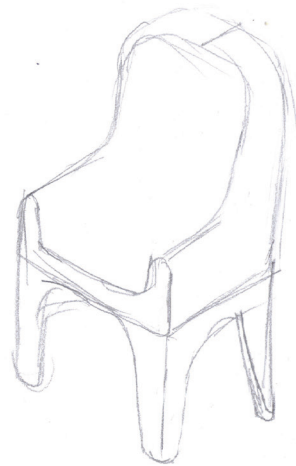
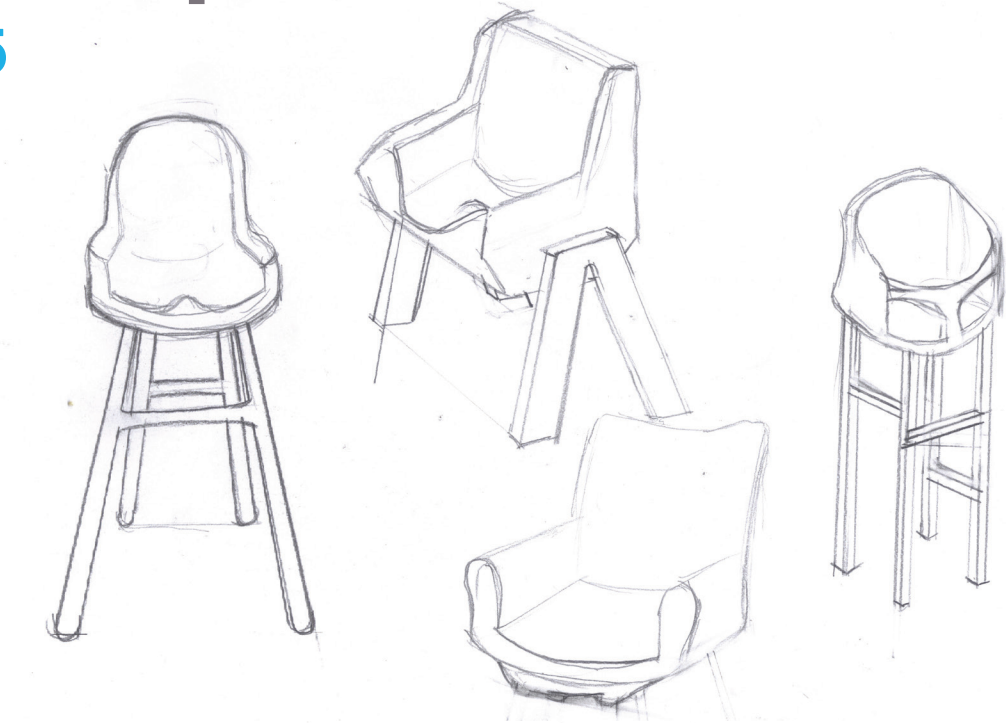
- Chair Forms (Sideview)



The fabric component should be able to come off to encourage cleaning the fabric to create a clean and safe chair.

concept sketches

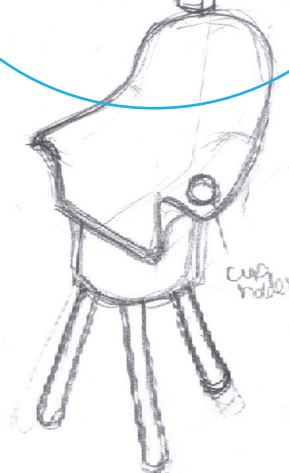
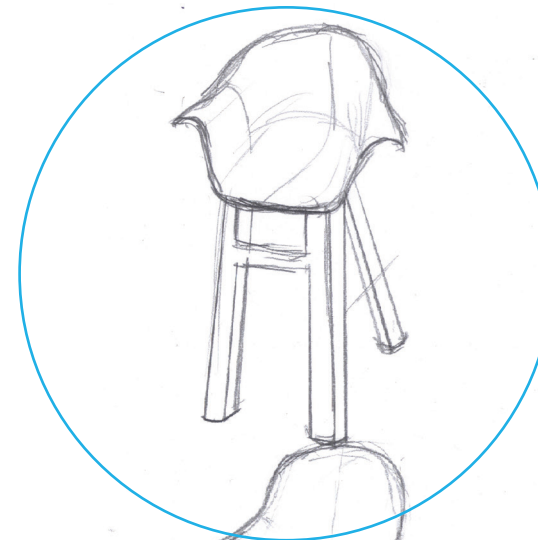
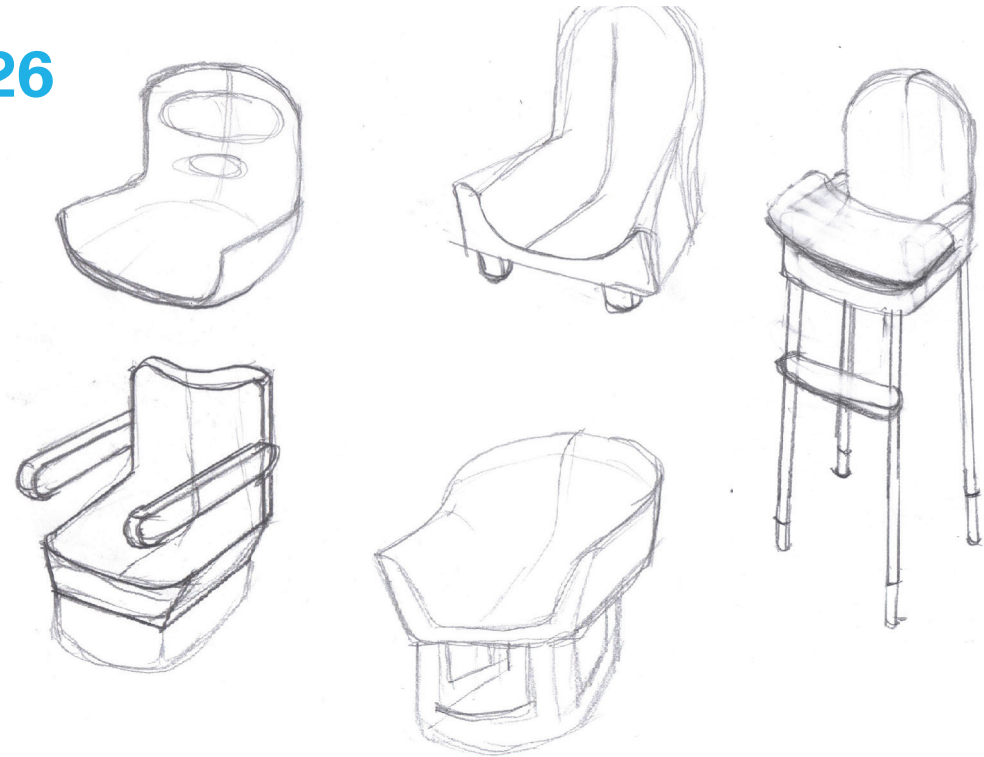
25



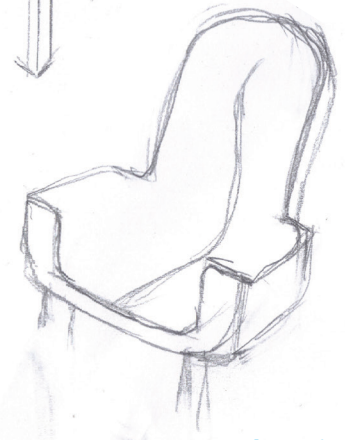
Just playing around with different highchair forms.

I chose a modern seat form that could possibly be plastic thermo-formed.

26



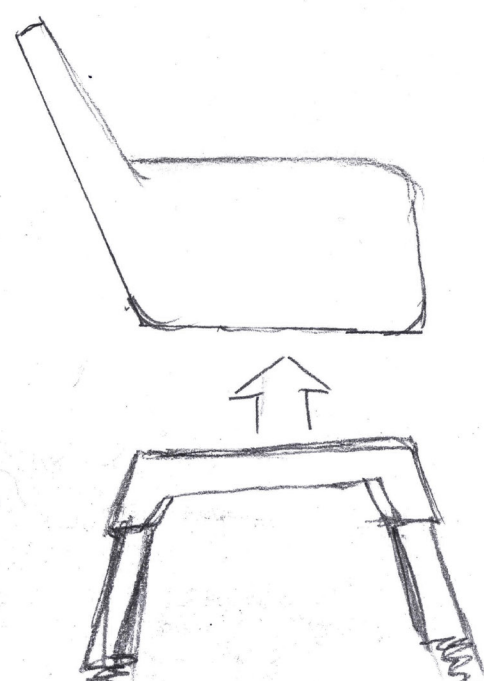
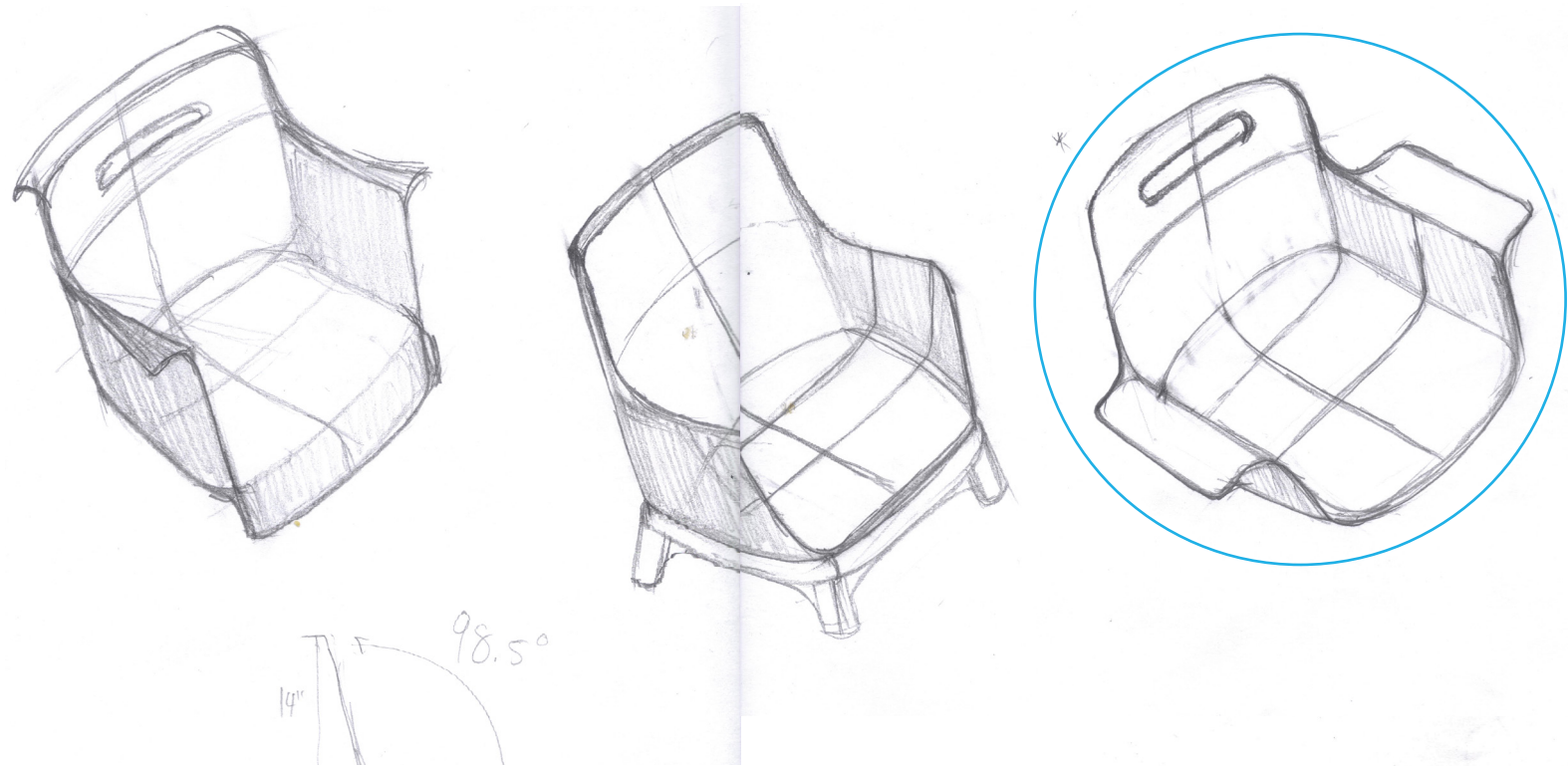
- Vacuum Formed Chair



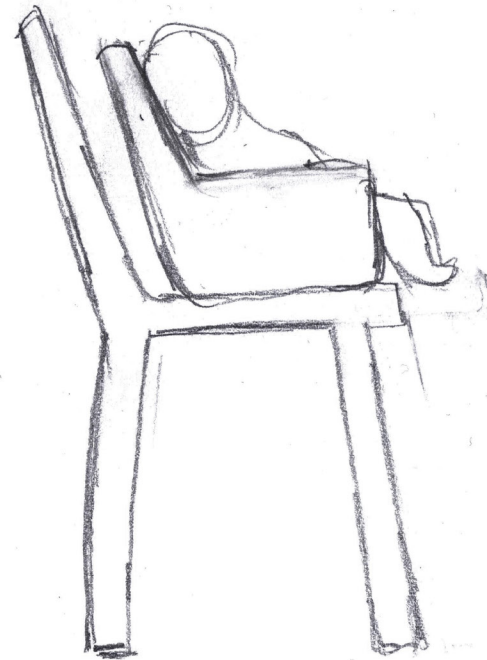
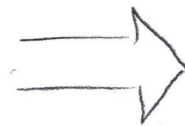
ideation development

After ideating multiple concepts, I decided to further the multiple-uses idea of the chair to be used as a highchair, booster seat for a chair or the floor. I continued **to design the seat to be plastic-formed.**

I furthered the concept of the base and the base being able to separate from itself but the base can stay standing up without the seat being attached to it to prevent the user from having to disassemble and reassemble when using the seat in other environments.



seat comes off

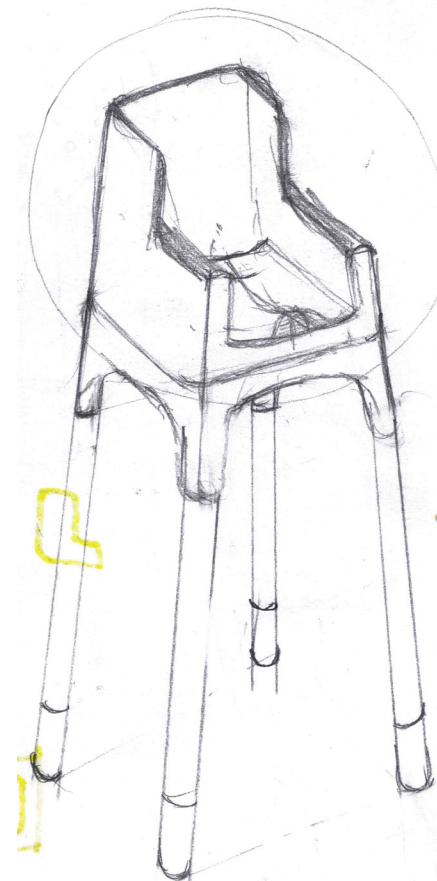


booster seat

or



floor seat



Seat
Pops
off

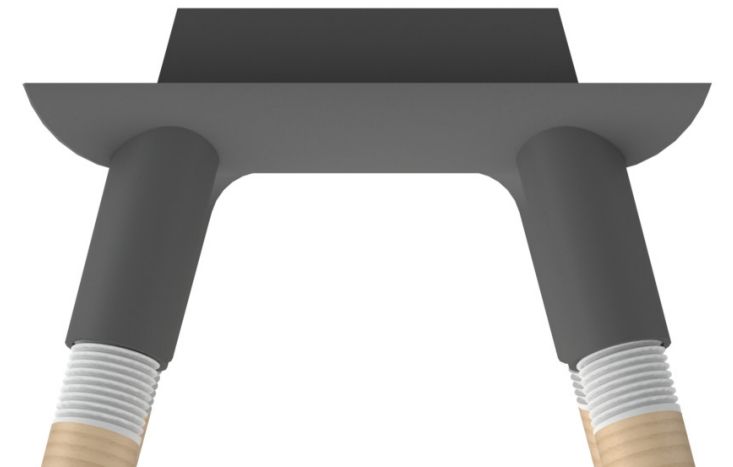
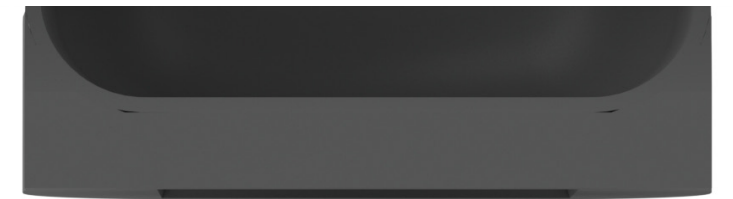
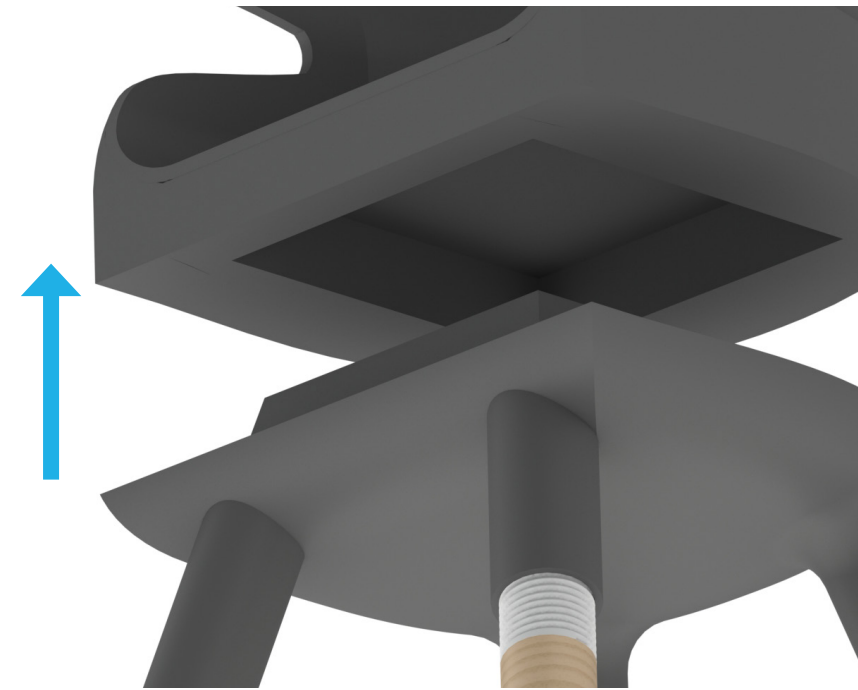
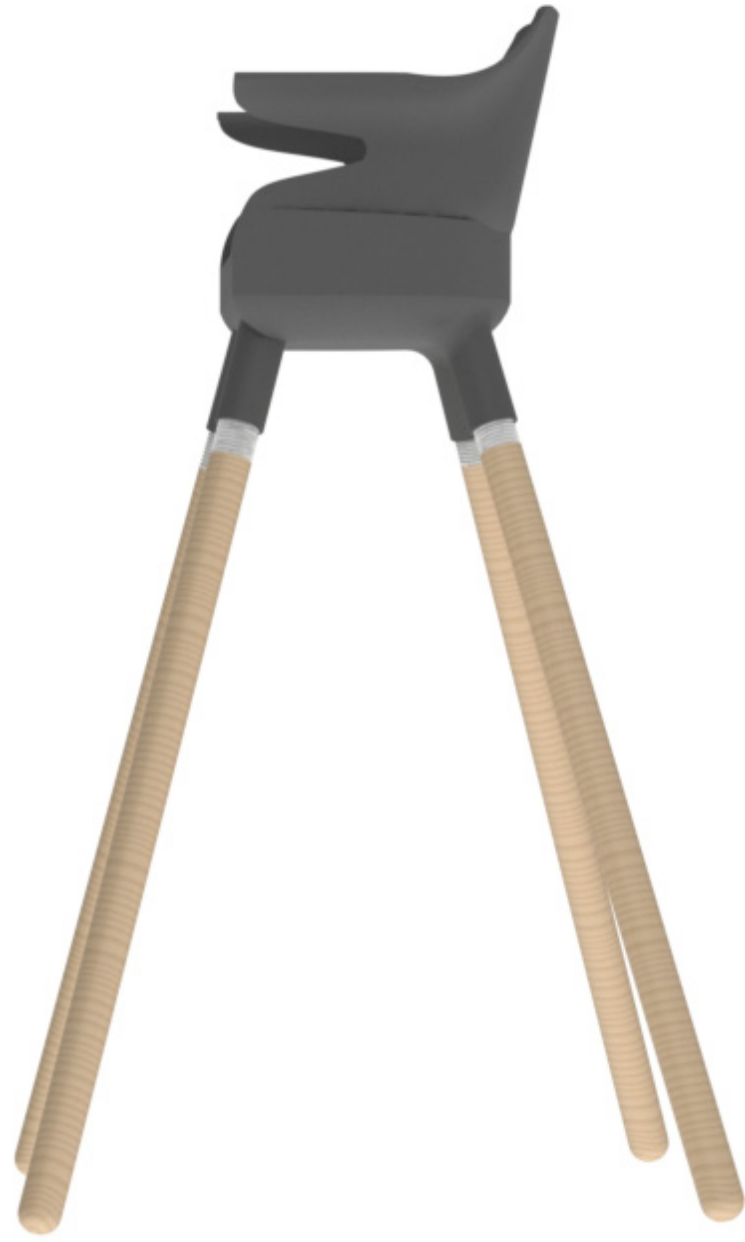
concept furthered

This is a rough rendering of the final concept and how it works. Its a plastic-formed seat and base with wood legs.

The legs connects to the base with threaded caps for adjusting the height and assembly.

The seat pops off of the base to be used for other purposes.

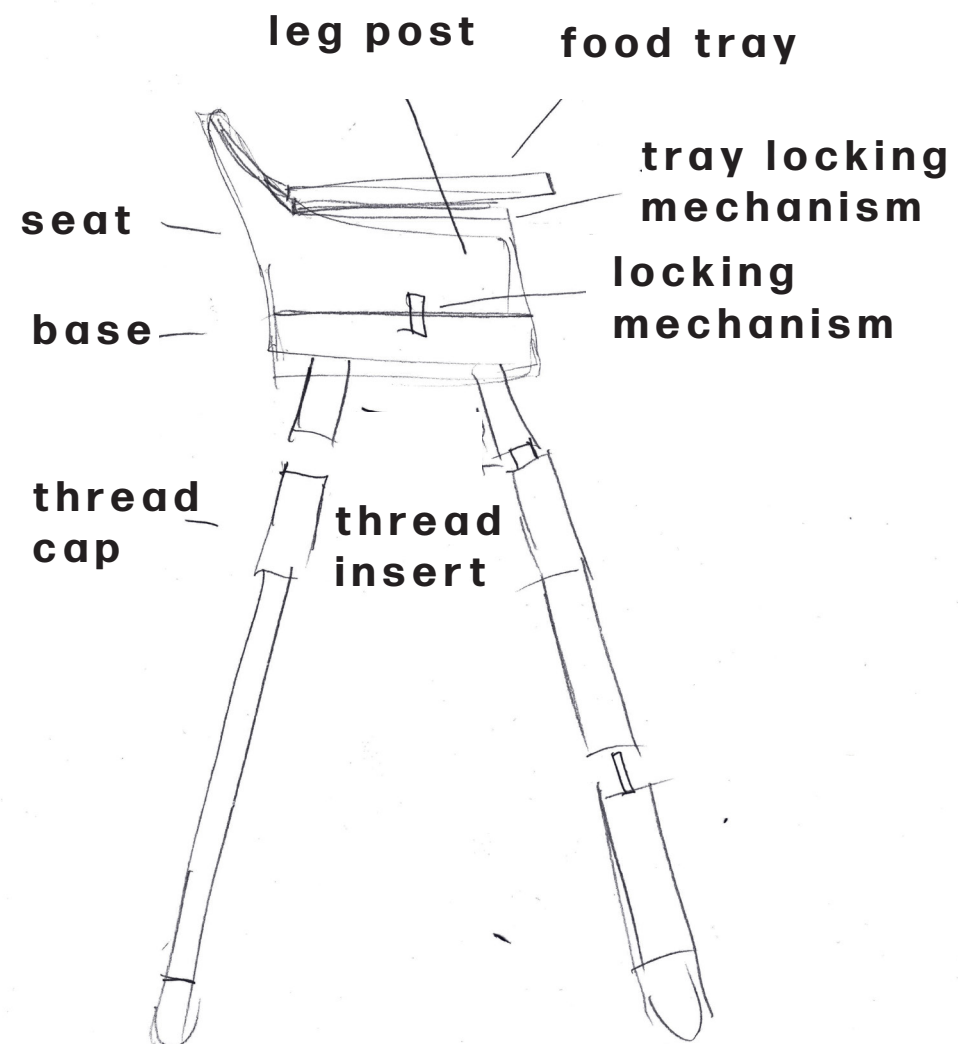
The tray slides onto the arm rests.



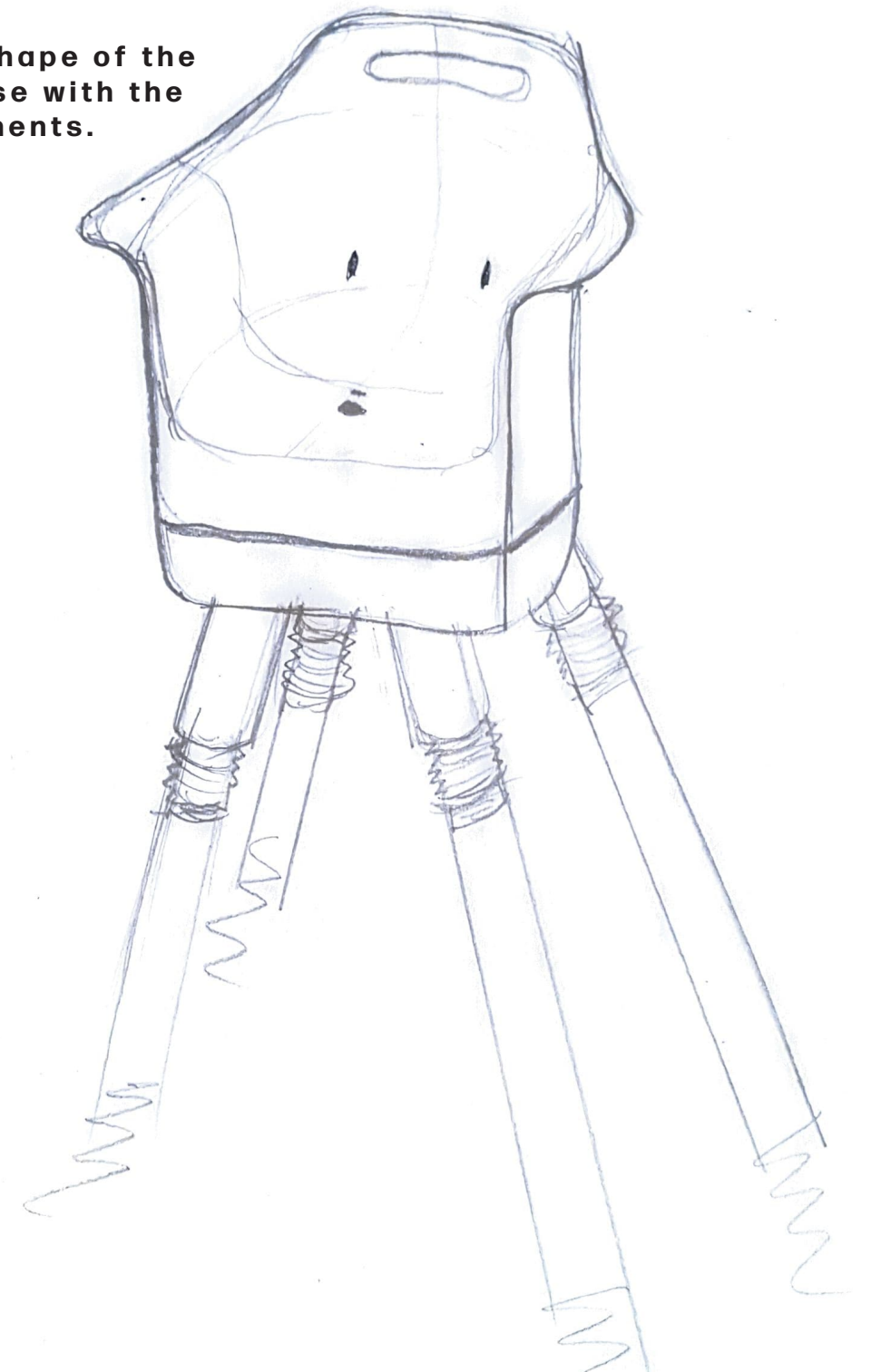
final concept and components

After finalizing a concept and design for the highchair, I had to ideate in more detailed for each of the components and mechanisms.

For this I made **a breakdown of all the components and mechanisms that create the chair.**



This is the **final shape of the seat and the base with the required components.**



05

the development.

rough models evolution

Playing around with
different bases and
designs.

Rapidly prototyped
different seat forms by
3-D printing them at 1:4
scale.



Image 4.4 1:4 scale of Design 1 and the Final Seat Form

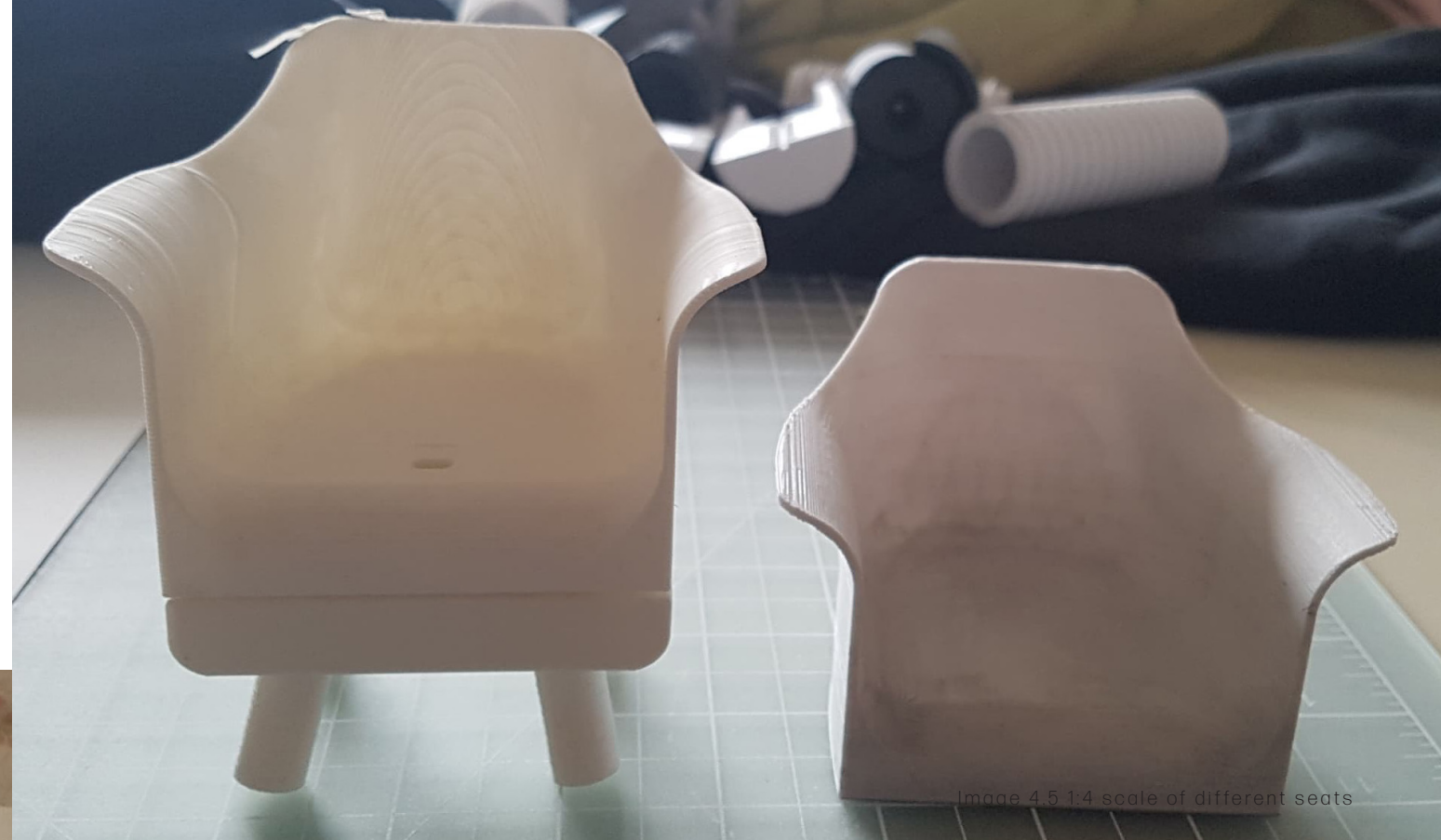


Image 4.5 1:4 scale of different seats



Image 4.6 1:4 scale of the final design and more detail of components

the locking mechanism

I made a quick pink foam model to test out **the seat to base locking mechanism** and the shape of it. It consists of a platform that ensures the seat stays in place and has something to register to when placing it onto the base.

The shape started off as a square but now the shape of that the seat sits over follows the shape of the outside of the base.

The holes at the top represent where the threaded insert will be attached too. **The shape of the base had to insure there was enough room to attach the legs through the threaded insert and cap plus create a sturdy footprint of the highchair legs.**



Image 4.7 Locking mechanism rough model

The mechanism that locks the seat to the base consists of redesign of the 1/4 locking system that already exists. The key turns into the cap that is connected the seat and is turned to lock.

Here I am testing the tolerance and how it will be assembled. The mechanism has two parts, one part, which is where it turns to lock, will be in the underpart of the seat. The second part is in the middle of the raised platform.

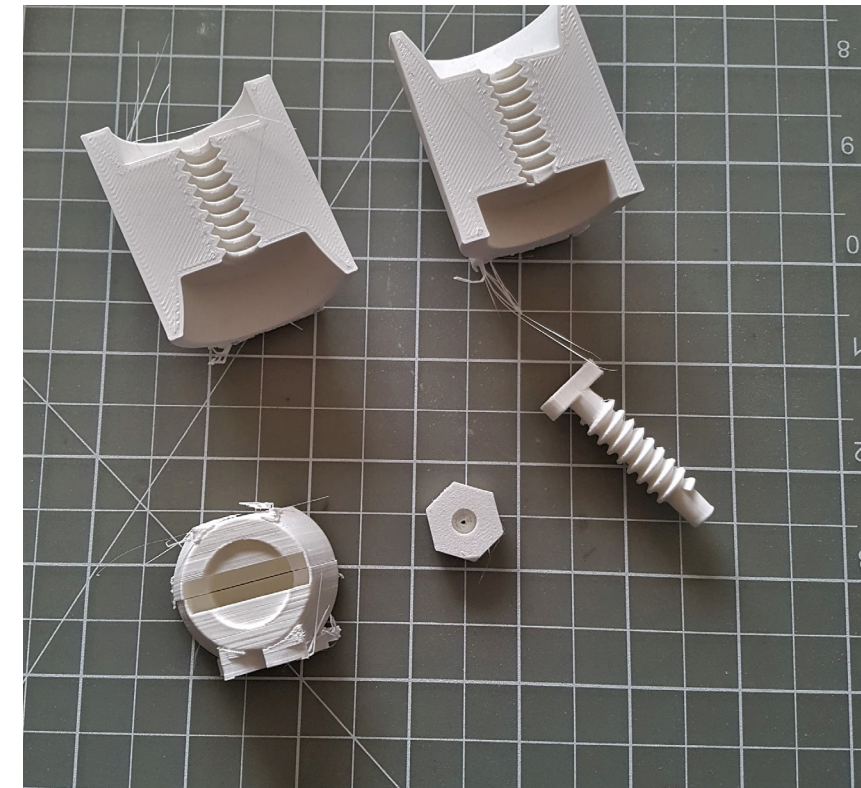


Image 4.8 1:2 scale of the locking mechanism

testing out the tolerance

For the thread leg cap, I had to play around with **the tolerance of the screw and focus on how the threaded insert connects to the base.**

I 3-D printed multiple test models until I got the tolerance right.



figuring out the shape of the base

The base seemed to be chunky in the first model. Therefore, I played around with different indents and cuts to make the base seem lighter and not just a base.

For the final design, I **just did a rounded sweep cut around the base.**

