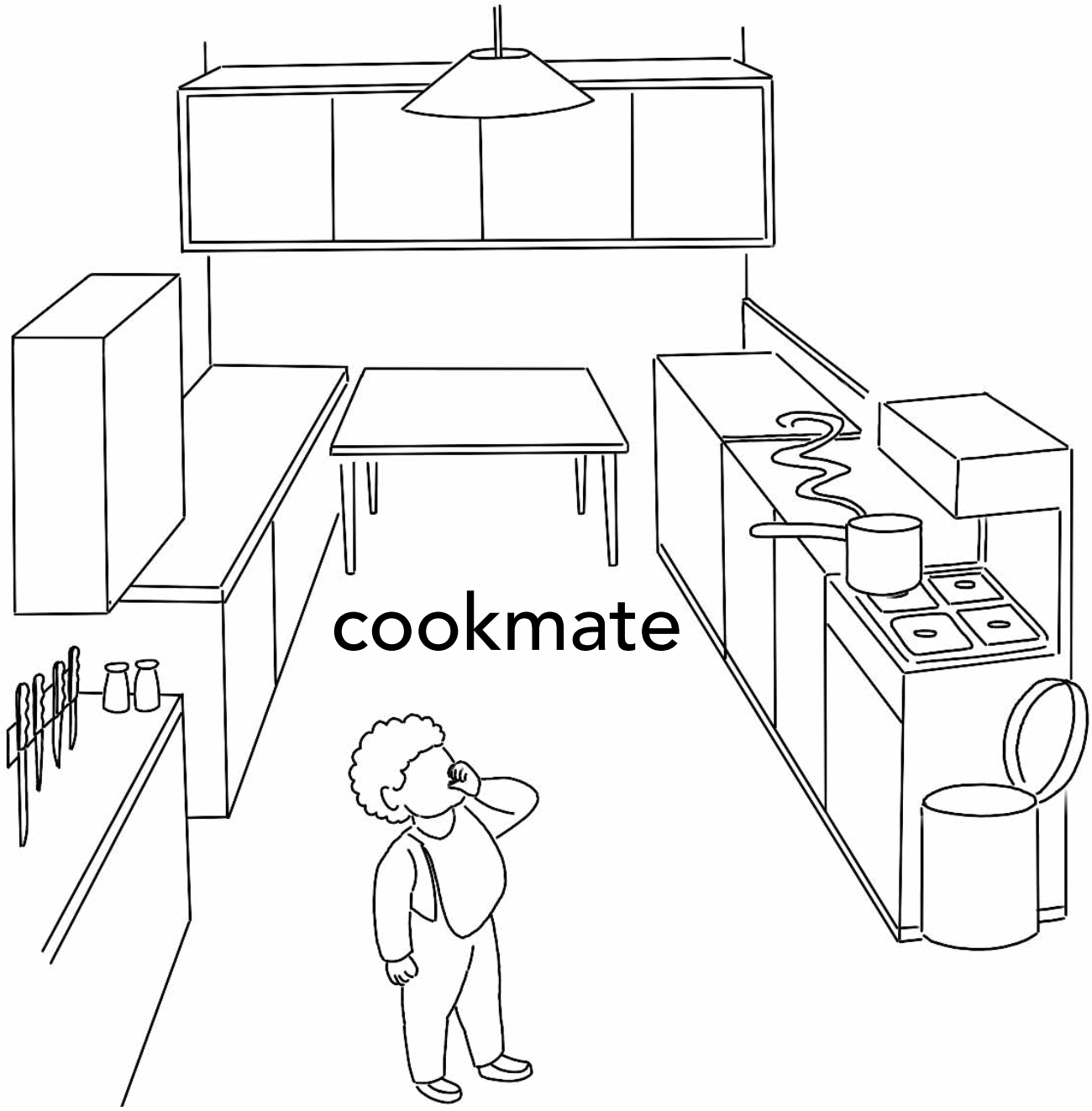


cookmate

Dylan Newman
2022-23

contents

dedicated to and inspired by my niece, lucy.

pt. 1
introduction.
problem

Each year, approximately 12,000 children die from unintentional injuries with about 2,000 related to injuries within the home. Unintentional home injury deaths among children are primarily caused by firearms, fire and burns, drowning, falls, choking and poisoning, and suffocation. Young children are particularly at risk because of developing cognitive and motor skills needed to perform important decision making and activities.

My project's research and processes will further develop into the design of a safety product catered towards protecting children in the kitchen. The goal is to provide parents and those also caring for young children with an assisstance tool to prevent injuries and deaths among such children, oven and stove related. The feeling of losing a loved never dissapates, therefore tackling missed safety opportunities may avoid these tragedies.

background

Growing up with my niece in the household, we developed a strong bond. It felt as if I was her older brother and possessed a sense of responsibility and accountability. Part entertainer and part care giver when others were not around.

I was taught at a young age to take care of others before yourself and having a young child in my household, made for extra precaution and anxiety. The result of misaction leading to reprecussions as a youth is an experince no child should endure and inspires to provide a creative solution.

Generally, with safety measures in place, these accidents are preventable and can grant a child with a chance to remember their childhood as a fond experience.

pt. 2 research. **statistics**

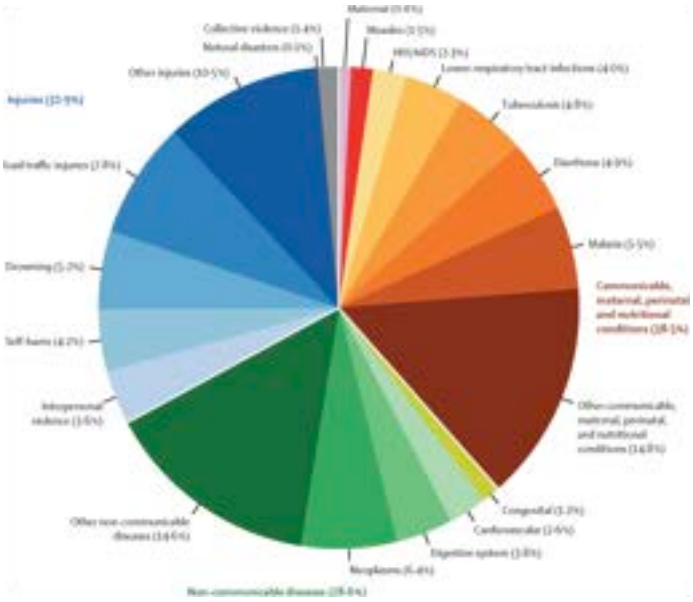
Each year, about 2,000 children ages 14 and under die as a result of a home injury.

Falls are the leading cause of nonfatal injury for children. Children ages 19 and under account for about 8,000 fall-related visits to hospital emergency rooms every day

Drowning is the leading cause of unintentional injury-related death among children ages 1 to 4. [1] The majority of drownings and near-drownings occur in residential swimming pools and in open water sites. However, children can drown in as little as one inch of water.

About 100 children are killed and 254,000 are injured as a result of bicycle-related accidents.

Airway obstruction injury (suffocation) is the leading cause of unintentional injury-related death among infants under age 1.



https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(21)00566-0/fulltext [1]

The more gruesome statistics fly beneath the radar for their harsh realities and upsetting picture.

Majority of the 20,000 deaths among children were injury related causes. [2] Common deaths in North America unfortunately resulted from vehicle crashes and unintentional or homicidal firearm related injuries. Firearms now rank as the top cause of death among children in the United States of America.

Suffocation, drowning and drug overdose followed the top cause. Suffocation is the top cause of among infants and one year old children, drowning among one to four year olds and motor vehicle accidents seen in five to nineteen year olds.

An increase among the Black and Hispanic community children in 2016 of 50% and 37% in poisoning and drug overdose deaths, respectively.

Table 1. The 10 Leading Causes of Child and Adolescent Death in the United States in 2016, in Order of Frequency.*

Cause of Death	No. of Deaths	Rate per 100,000 (95% CI)	Percent of Deaths
All causes	20,360	26.06 (25.70–26.42)	
All injury-related causes	12,336	15.79 (15.51–16.07)	60.6
Motor vehicle crash	4,074	5.21 (5.06–5.38)	20.0
Firearm-related injury	3,143	4.02 (3.88–4.16)	15.4
Homicide	1,865	2.39 (2.28–2.50)	
Suicide	1,102	1.41 (1.33–1.50)	
Unintentional	126	0.16 (0.13–0.19)	
Undetermined intent	50	0.06 (0.05–0.09)	
Malignant neoplasm	1,853	2.37 (2.27–2.48)	9.1
Suffocation†	1,430	1.83 (1.74–1.93)	7.0
Suicide	1,110	1.42 (1.34–1.51)	
Unintentional	235	0.30 (0.26–0.34)	
Drowning	995	1.27 (1.20–1.36)	4.9
Drug overdose or poisoning	982	1.26 (1.18–1.34)	4.8
Suicide	123	0.16 (0.13–0.19)	
Unintentional	761	0.97 (0.91–1.05)	
Congenital anomalies	979	1.25 (1.18–1.33)	4.8
Heart disease	599	0.77 (0.71–0.83)	2.9
Fire or burns	340	0.44 (0.39–0.48)	1.7
Unintentional	272	0.35 (0.31–0.39)	
Chronic lower respiratory disease	274	0.35 (0.31–0.40)	1.3

https://www.nejm.org/doi/full/10.1056/nejmsr1804754 [2]

Fire and burn related injuries specifically cause nearly 300 children and adolescents to die each year, and over 100,000 are admitted to a hospital or treated in an emergency department.

Most children ages 4 and under who are hospitalized for burn-related injuries suffer from scald burn (65%) or contact burns (20%). Hot tap water burns cause more deaths and hospitalizations than burns from any other hot liquids.

Young children have thinner skin than adults; therefore, a child's skin will be destroyed more rapidly and by less heat. Thicker skinned areas of the body include the palms, soles, back, scalp, and the back of the neck. Thinner skinned areas are the front of the trunk, inner thighs, bottom of forearms, and the inner arm area.

interviews

Interviews were conducted through friendly approach of bystanders accompanied with a child during the afternoon hours at Trinity Bellwoods Park in Toronto and Downey's Farm in Caledon. Questions consisted of:

Q1: Has there ever been a concern for your child's safety when at home?
Q2: Has your child ever gravitated towards specific object or activity that may cause them harm?
Q3: Are there any areas or objects in your home that could improved in terms of protection and safety?
Q4: Do you own any safety items in your home? Do they match your decor and aesthetic of your home?

Person A Father of 1

A1: My daughter had a scare with grapes. We cut them up and they were still too large and she began **choking**.
A2: My other daughter loves to eat and always tries to take my food, also tries to cook with me with **sharp utensils**.
A3: Me and my wife have our knives out on display, could possibly case them.
A4: We own the **mask for drawing out food or objects** in case of choking.

Person B Mother of 2

A1: I allow my kids to be more **risky when they play**, not specifically.
A2: **Stairs** are the only place I worry where my girls go.
A3: Maybe gating off certain areas. The playground in our backyard could be better protected for when the girls fall.
A4: We are from Germany so a lot of our things are out, rather than guarded.

Person C Mother of 1

A1: My daughter tends to leave all her toys out on the floor which she trips on.
A2: I am most afraid of my daughter **pinching her skin** on toys or **poking her eyes** with a toy.
A3: Cabinets could be locked so makeup can not be accessed and sharp corners of toys could be covered.
A4: Our safety products stick out for the most part, baby gates aren't permanent and **don't match gold decorations**.

Person D Mother of 1

A1: My daughter was born prematurely so we are always extra careful with everything and anything.
A2: My baby would try to help **unload the dishwasher**.
A3: She recently learned how to **unplug cords from the outlet**, maybe having them hidden or locked in.
A4: Just gates and cabinet locks. They are a different colour and **don't match perfectly, but could be worse**.

Person E Mother of 3

A1: Having multiple kids, my eyes had to be everywhere, **falling down the stairs** was my biggest concern.
A2: My son would play with dirt in the plants and the corners of tables
A3: My grandkids like to **climb furniture** and that could be stabilized in place.
A4: My children are grown so my house is not as safe as it once was.

Person F Care Taker & Baby Sitter

A1: Not so much kids, but my dog is curious and **attempts to get into the oven** when he smells what is in.
A2: Medicine cabinet was mistaken as it **looks like candy to a child**.
A3: Our swimming pool could be gated, dogs try to jump in.
A4: My dog is blind so there are bumper guards, but they are **bulky additions**.

Person G Father of 2

A1: Having big dogs and small children generally doesn't mix, so mostly when things get rowdy.
A2: My youngest toddler tries to **climb on cabinet and fridge handles**.
A3: Having those outlet covers could help, they are just hard to get out sometimes.
A4: We own large dog gates, they take up a lot of space, which also scratches the floor so we put mats under, ugly.

Person H Father of 1

A1: My son is very adventurous so being safe in the backyard garden is my biggest worry.
A2: My **tools in the garage** interest my son and everything can cut fingers off.
A3: The fridge doors automatically close and I am **afraid it may close on him** when he gets curious and hungry.
A4: At the moment no, they are pretty cheap and I feel I can do a better job.

Person I Daycare Worker

A1: During arts and crafts time the kids try to **eat materials mistaking it for food**.
A2: Cleaning supplies and strollers.
A3: Most areas in the daycare are child proofed, **maybe crayon guards** so they can get eaten or shoved places.
A4: Daycare is mix and match.

Person J Daycare Worker

A1: Mostly falling and when they scrape themselves.
A2: The kids are interested in the **washer and dryer**, almost like it is a spaceship.
A3: Peanut allergy protection.
A4: **Corner bumpers, cabinet door locks and door knob covers**.

Parents and child workers shared similar stories and insights that proved to be beneficial. Common problems related to children with toys, children taking large falls and children in the kitchen. Aesthetics and decor seemed to be important, with some participants having no safety features in their home at all.

market

The child safety market is and extremely large and flooded with products far and wide. Many products are reiterated a plethora of times and solve a quick fix to everyday problems. Focusing in depth onto current safety products for children at home, more specifically in the kitchen.

Gas stove knob covers [3] attach over the stove's dials to keep children from switching it on. The covers can unlock and flip open to access the gas range. The covers fall off and once the child figures out how to unlock the cover, the safety product is no longer safe.

The oven door and cabinet locks [4] work in a similar fashion with magnetic openings or upward latches. A easy solution to prevent a child from opening oven doors or harmful filled cabinets, but can easily flipped open and the child can access the oven interface.

Kidco stove knob covers [3]

Clippasafe Oven Door Lock [4]

Qdos adhesive stove guard is a three sided guard to prevent children from reaching knobs, open flame and cookware [5]. The stove guard is more likely to fit with the aesthetics of a typical modern home in todays society. The guard is stuck to the countertop with peel off adhesive with potential to be rip off from the perspective of a child from below.

Qdos adhesive stove guard [5]

The other rendition of the stove guard by Prince Lionheart presents a one sided angled polycarbonate sheet stuck to the stove top with double sided 3M tape [6]. The piece is adjustable from the sides to fit different widths of stoves and easily installed. Similarly, since the guards are not a permanent solution, with force, the guard can be ripped off from the downward pull of a curious child.

Prince Lionheart stove guard [6]

Silicone oven rack covers provides the user with added protection from burns on the wrist and hands from the harmful and heated rack. Made from a heat resistant silicone, the universal design can be used on all ovens and reused over and over again [7]. Attachment method, material and usability are all seen as inspiration for my research and development.

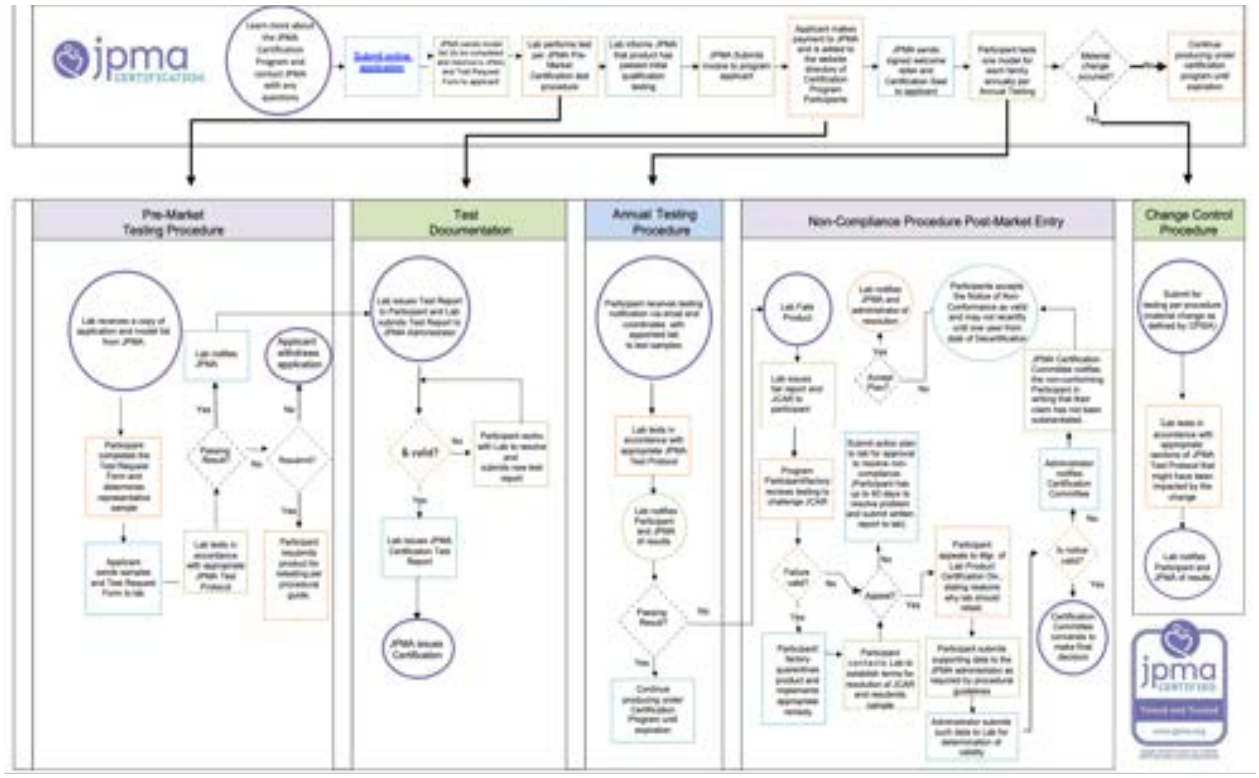
Oven rack covers [7]

As ovens are designed with the intent of a nice front view, the Clevamama oven door guard is transparent to still view the inside. The guard suctions on to the oven door to prevent children from burning themselves on the hot glass while watching the meal cook [8]. Clevamama is a clever product to prevent burns and scalds, but has had some review problems with suctioning to be aware of.

Clevamama oven door guard [8]

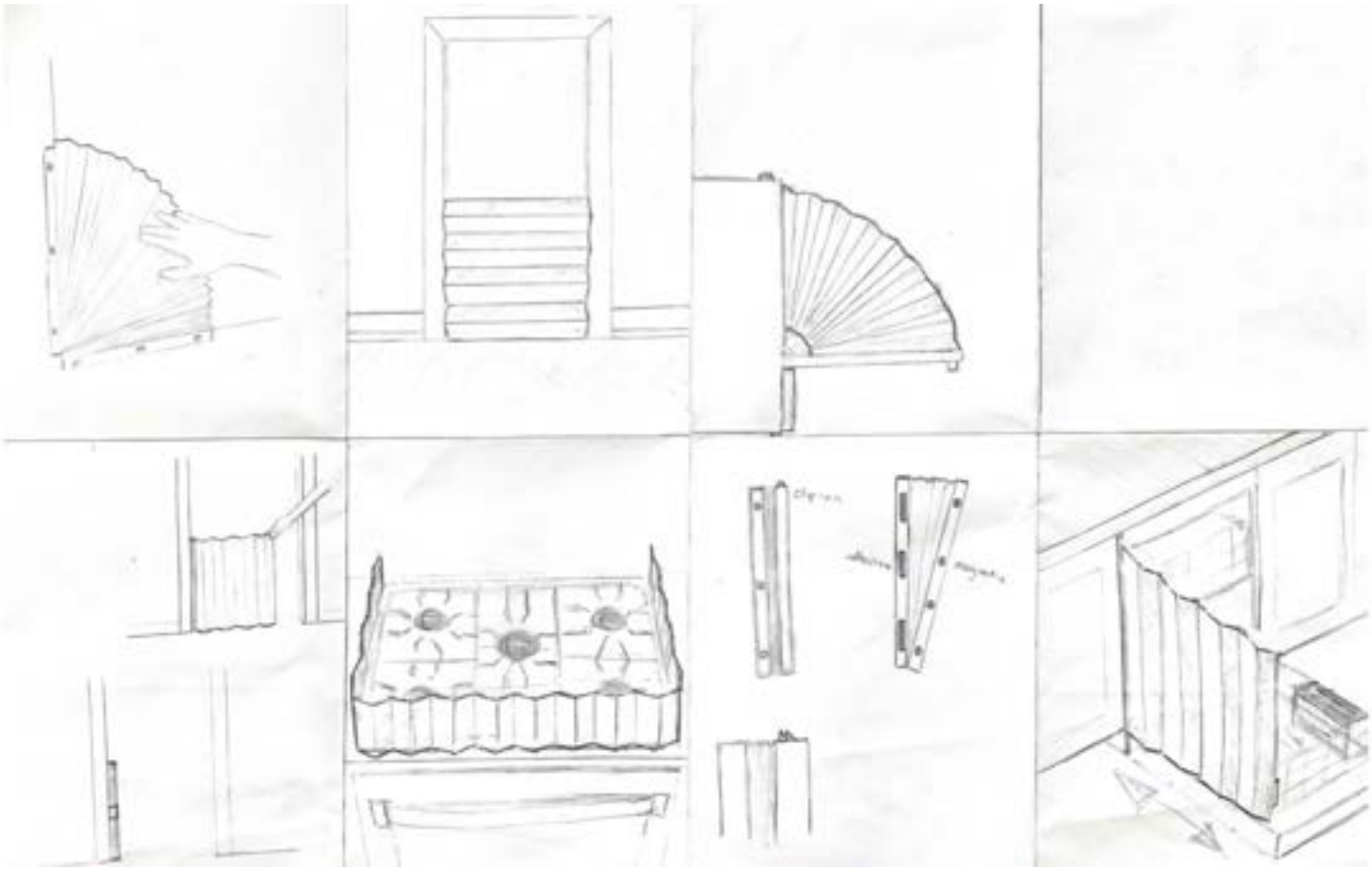
requirements

The JPMA (Juvenile Products Manufacturers Association) is a certification that has been present for over 40 years to ensure parents purchase the safest products for their children. Baby products must meet minimum government requirements based on safety and use. The JPMA Certification Seal signifies a product meets these and additional requirements in today's marketplace. To become certified, each product is sample tested at an independent laboratory to verify it meets the highest standards for safety, performance and functionality. JPMA's process and goals are to advocate for safety through product certification programs and legislative and regulatory involvement, support a broad and diverse membership through member-only programming and industry promotion and act as a comprehensive source for baby product information and education. The lengthy certification process is as follows [9]:

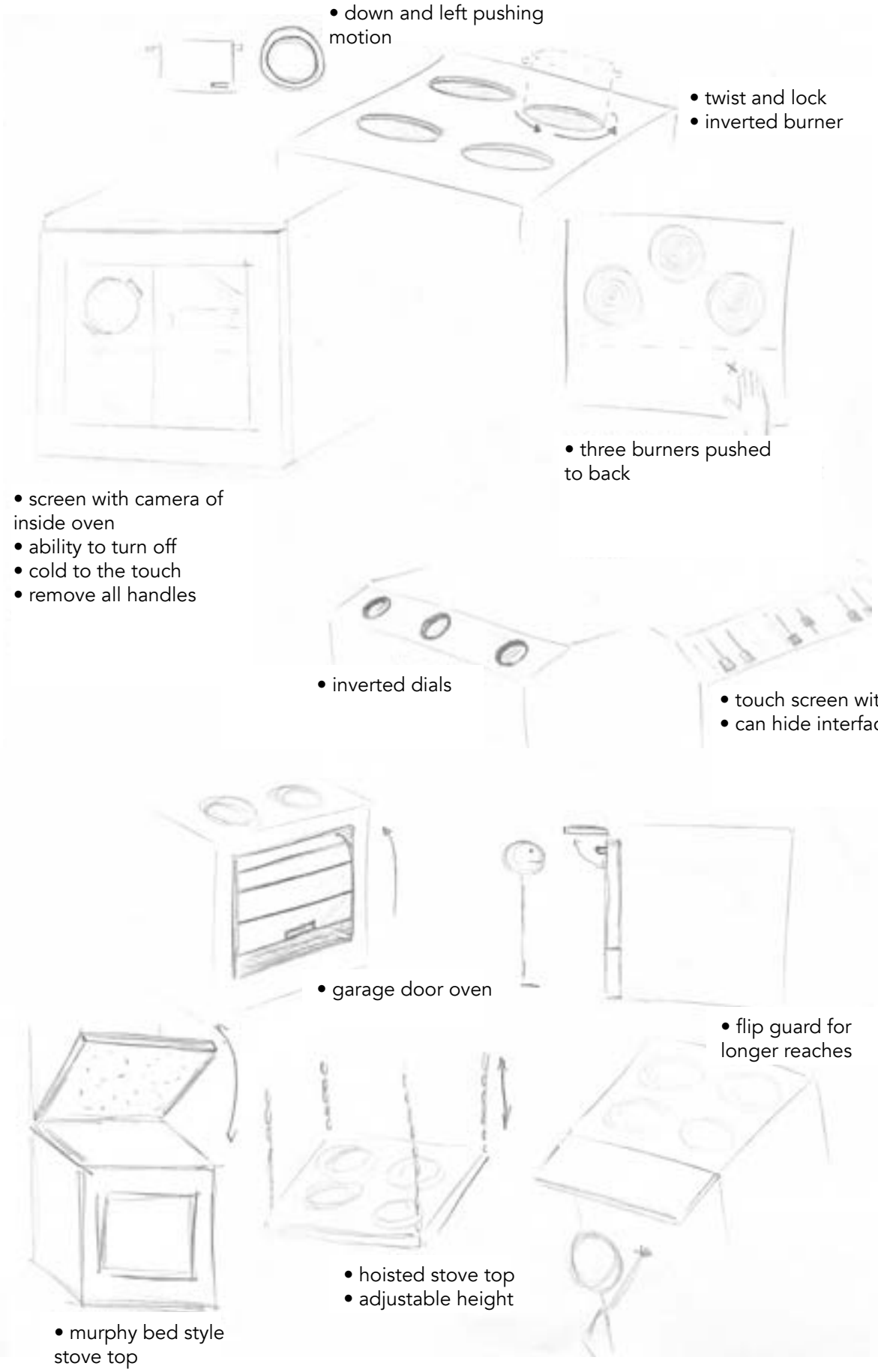


https://cdn.ymaws.com/www.jpma.org/resource/resmgr/2018/jpma_certification_process_f.pdf [9]

pt. 3
ideation.
sketching



Initial sketching centered around the idea of expanding and contracting guards. Whether for an appliance or a doorway, the accordion design was a modern and minimal take on child safety.



• down and left pushing motion

• twist and lock
• inverted burner

• three burners pushed to back

• screen with camera of inside oven
• ability to turn off
• cold to the touch
• remove all handles

• inverted dials

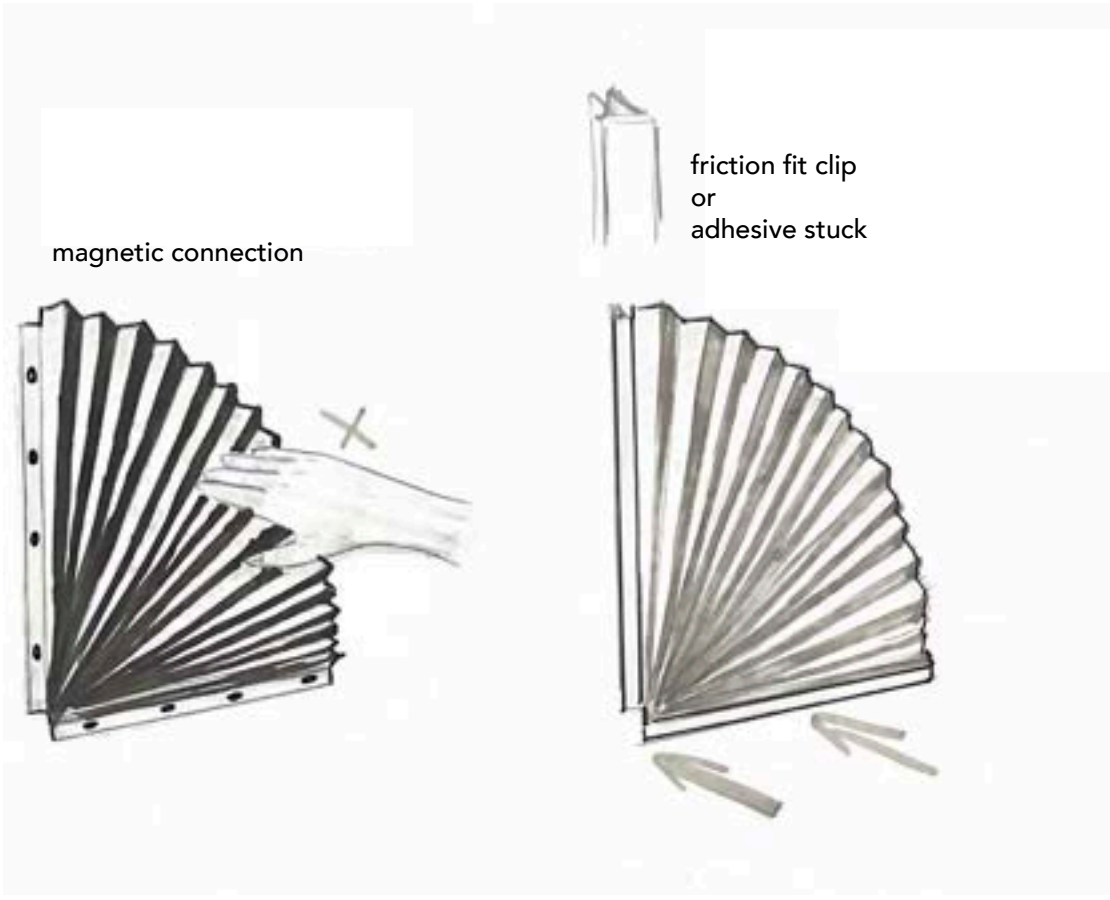
• touch screen with sliders
• can hide interface

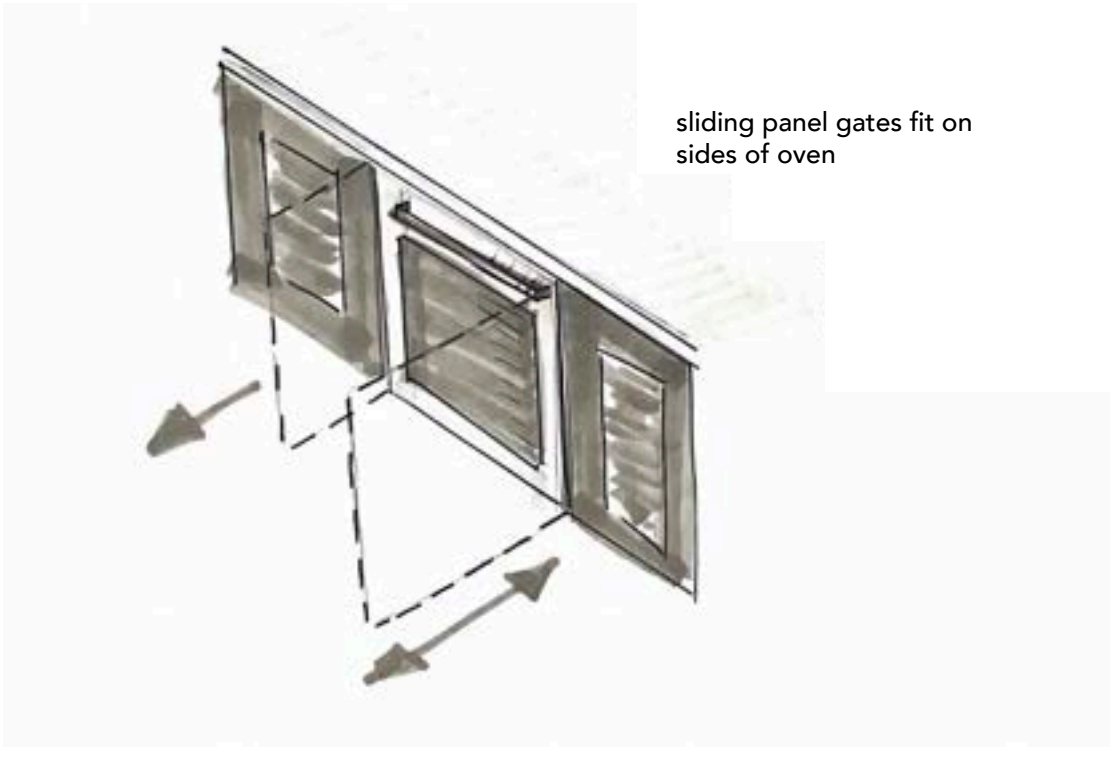
• garage door oven

• flip guard for longer reaches

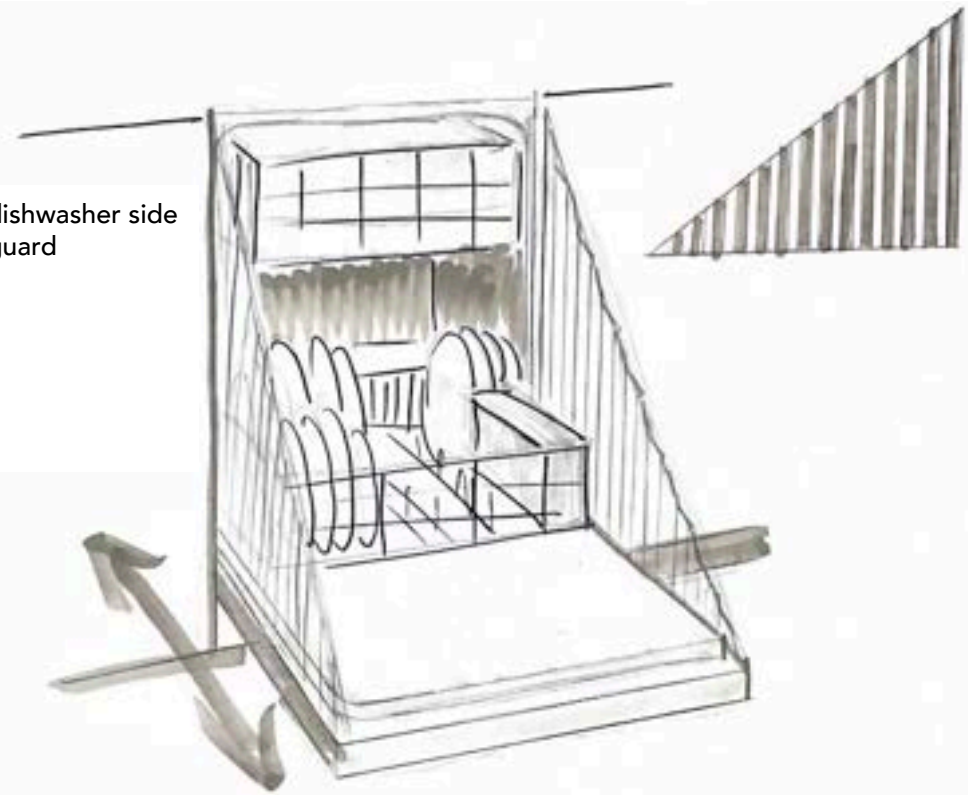
• hoisted stove top
• adjustable height

• murphy bed style stove top

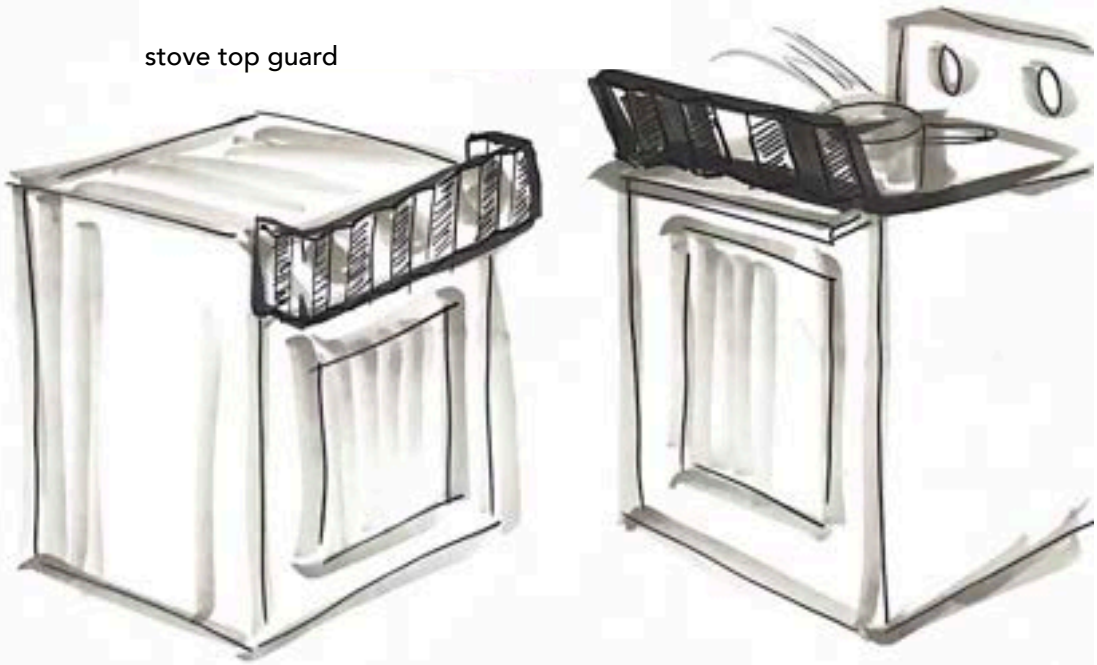

magnetic connection
friction fit clip
or
adhesive stuck

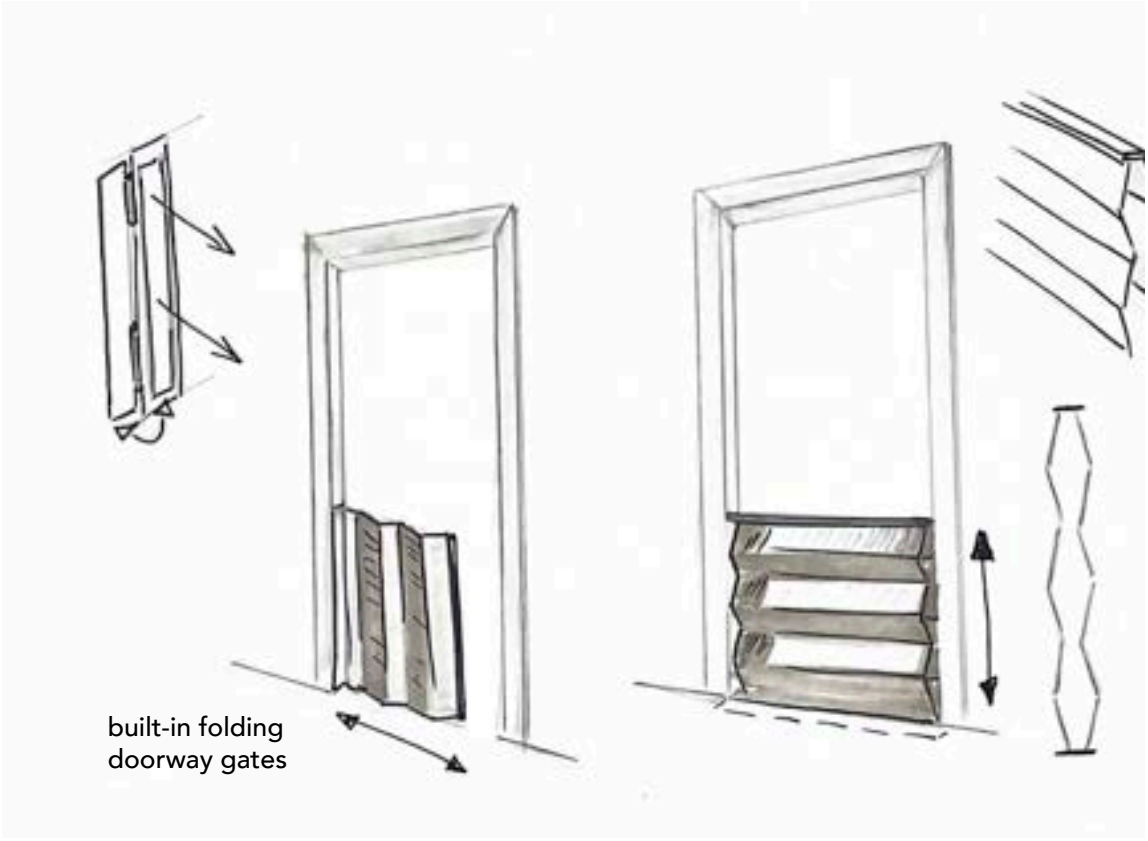

sliding panel gates fit on
sides of oven

dishwasher side guard

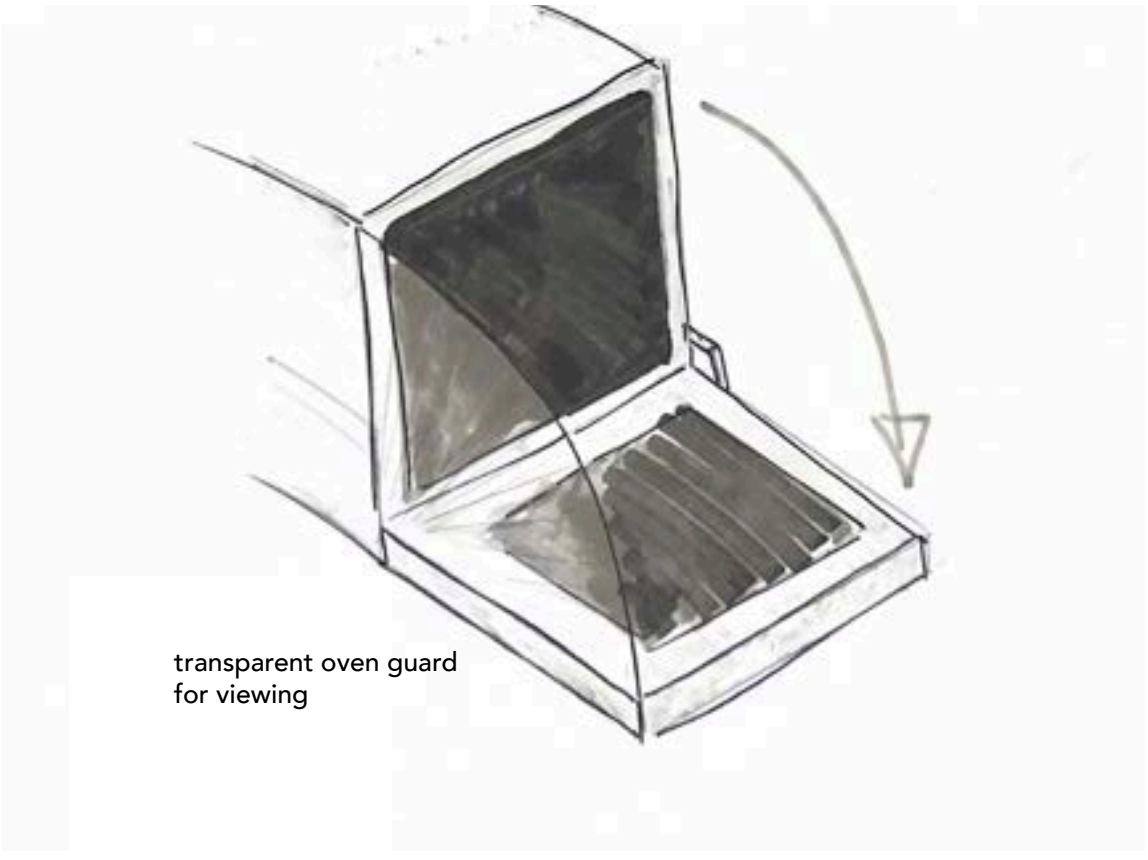


stove top guard

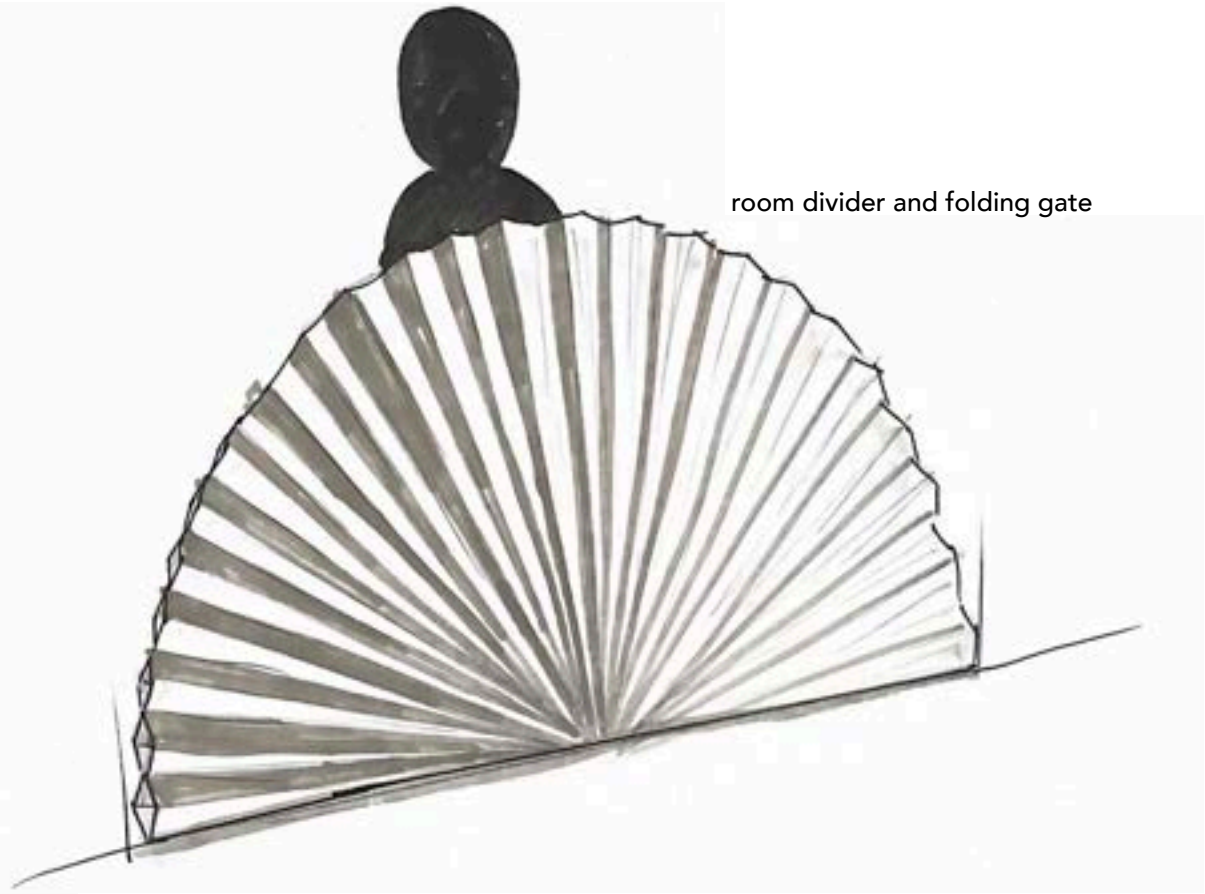




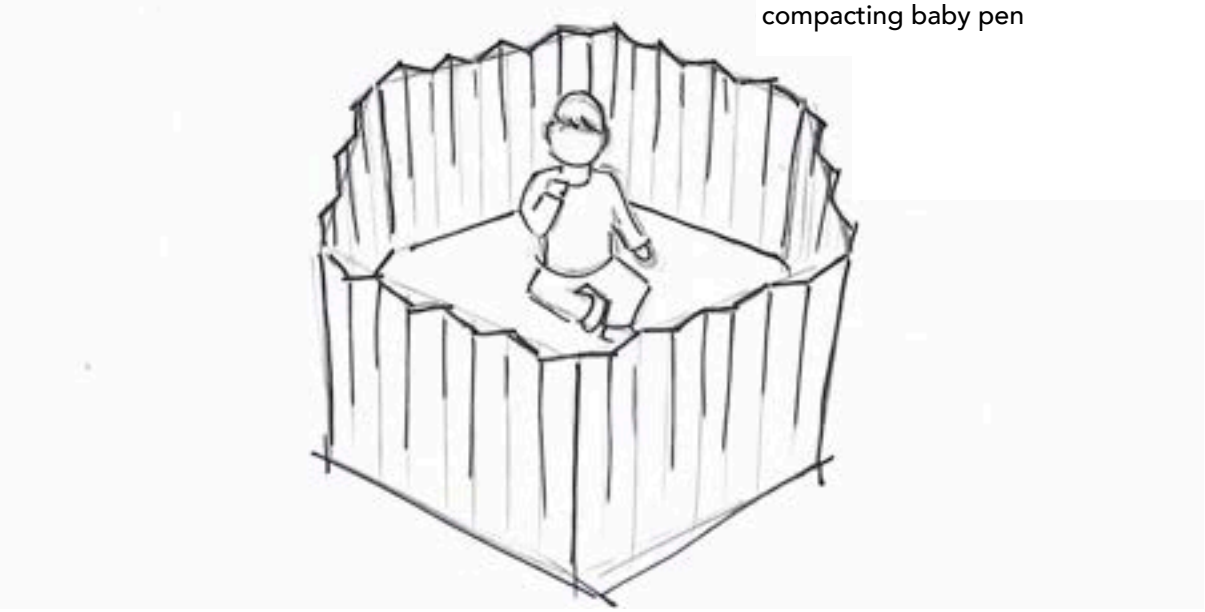
built-in folding
doorway gates



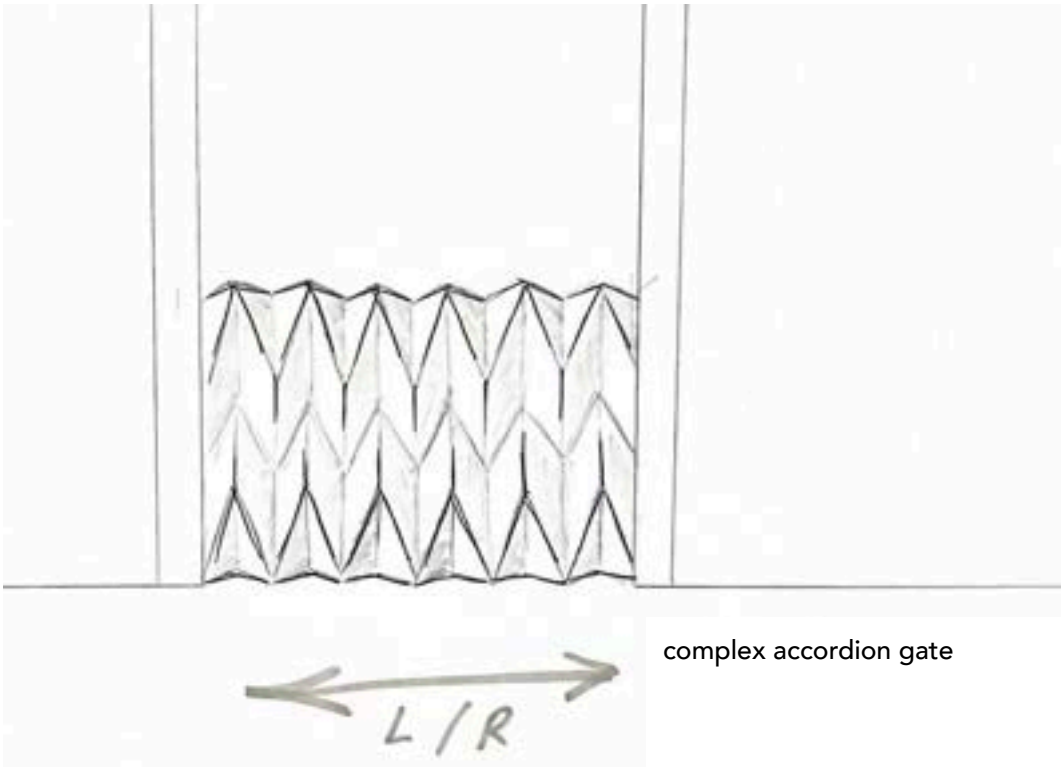
transparent oven guard
for viewing



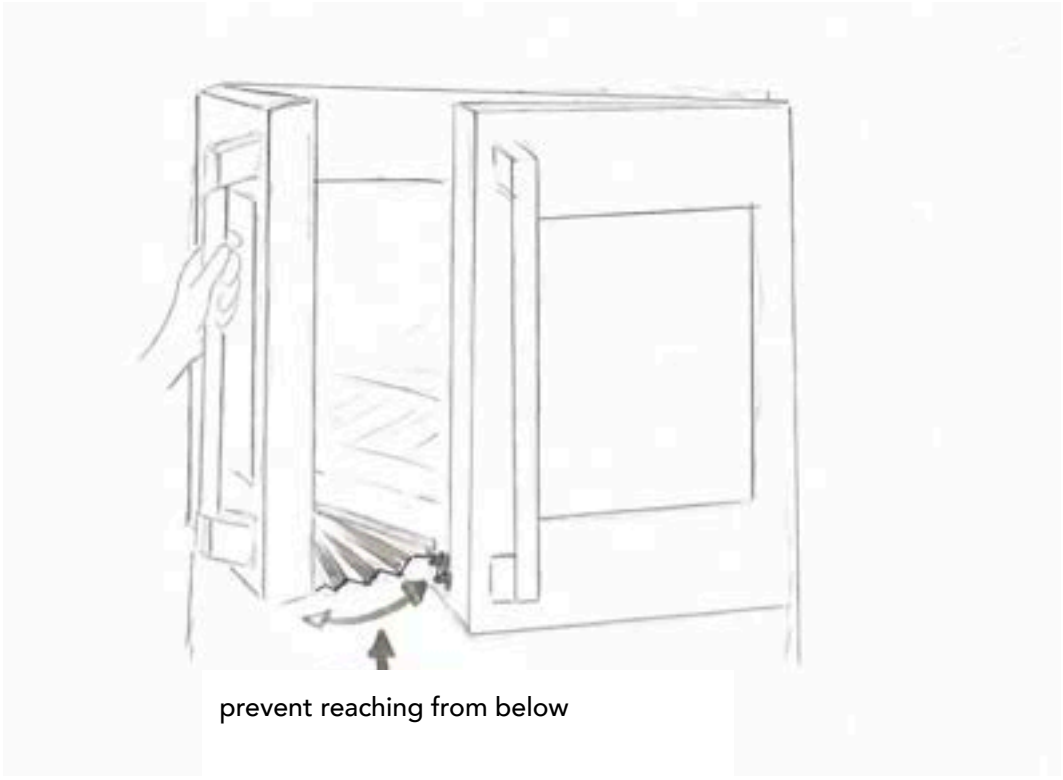
room divider and folding gate



compacting baby pen



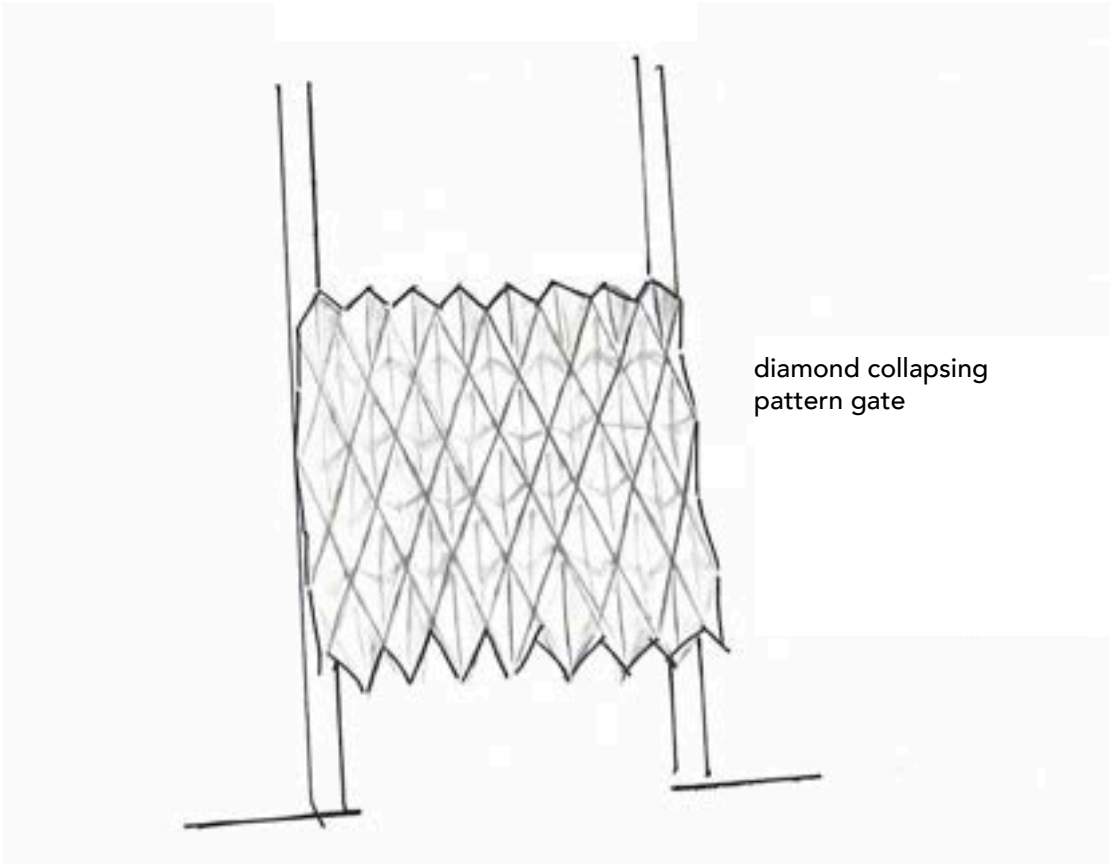
complex accordion gate



prevent reaching from below

herringbone style gate
or guard

left to right



diamond collapsing
pattern gate

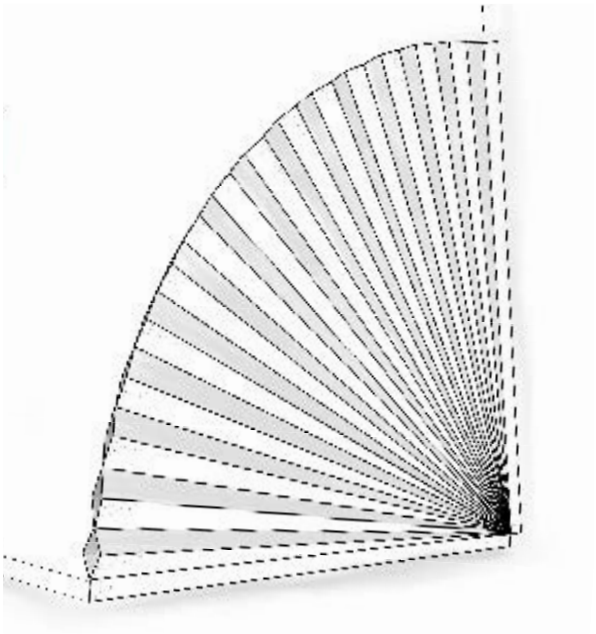
storyboard

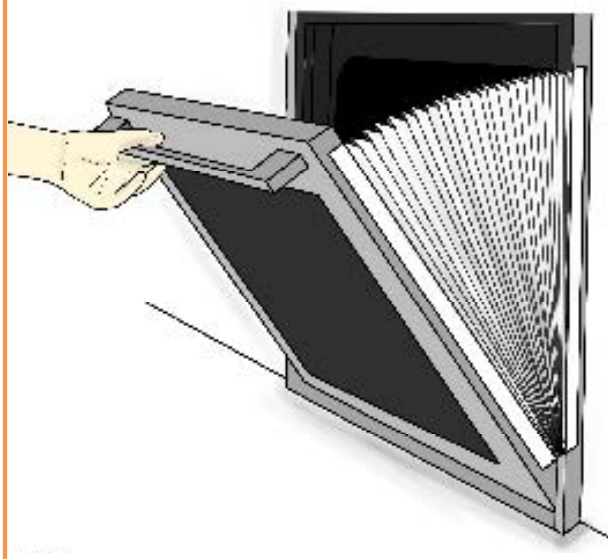
The use case scenario would find children lingering within the kitchen, looking to emulate their parents actions. Children may take advantage of full hands or disobey commands as curiousity of smells and warmth take over. Whether it is reaching up onto the stove top or into an open oven, it is a teaching moment that these elements may cause harm to them and their bodies.

three concepts

01

Built-in Magnetic Adhesive





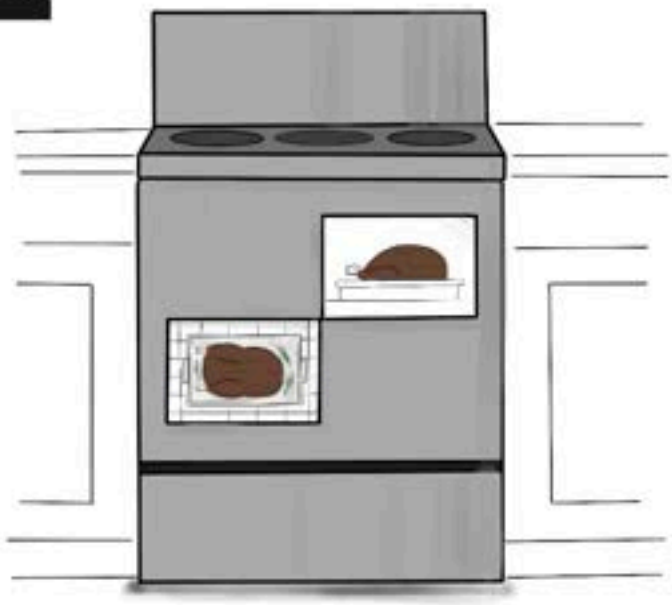
The oven attachment prevents children and pets from potential split second scalds and burns being curious in the kitchen.

Either built in to the oven door, or attached through magnet or adhesive.

The guard sits inisde the gap of an oven door seal or just outside, depending on the make of the oven. Possibilities extend out to the stove top and child safety gates as well.

Material exploration consists of ceramic papers, kitchen safe silicons, and heat resistant plastics such as; Polyetherimide, PEI, PEEK, PTFE, PBI, etc.

02

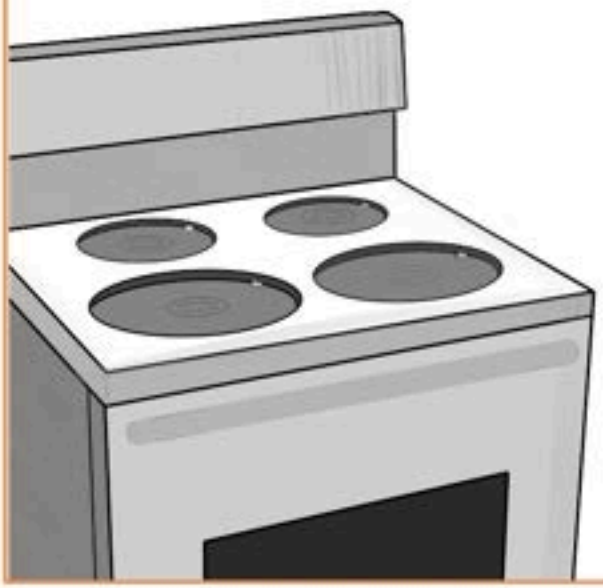


The oven system revolves around minimal interface and accessible heating elements to prevent burns.

Out of sight and out of mind is the idea with the opportunity to turn off the cold to the touch screen and monitor from a device that children can enjoy safely.

The burners are pushed back to create space from the possiblity of reaching children from the floor. The front area now becomes a warming place and can be turned off.

03



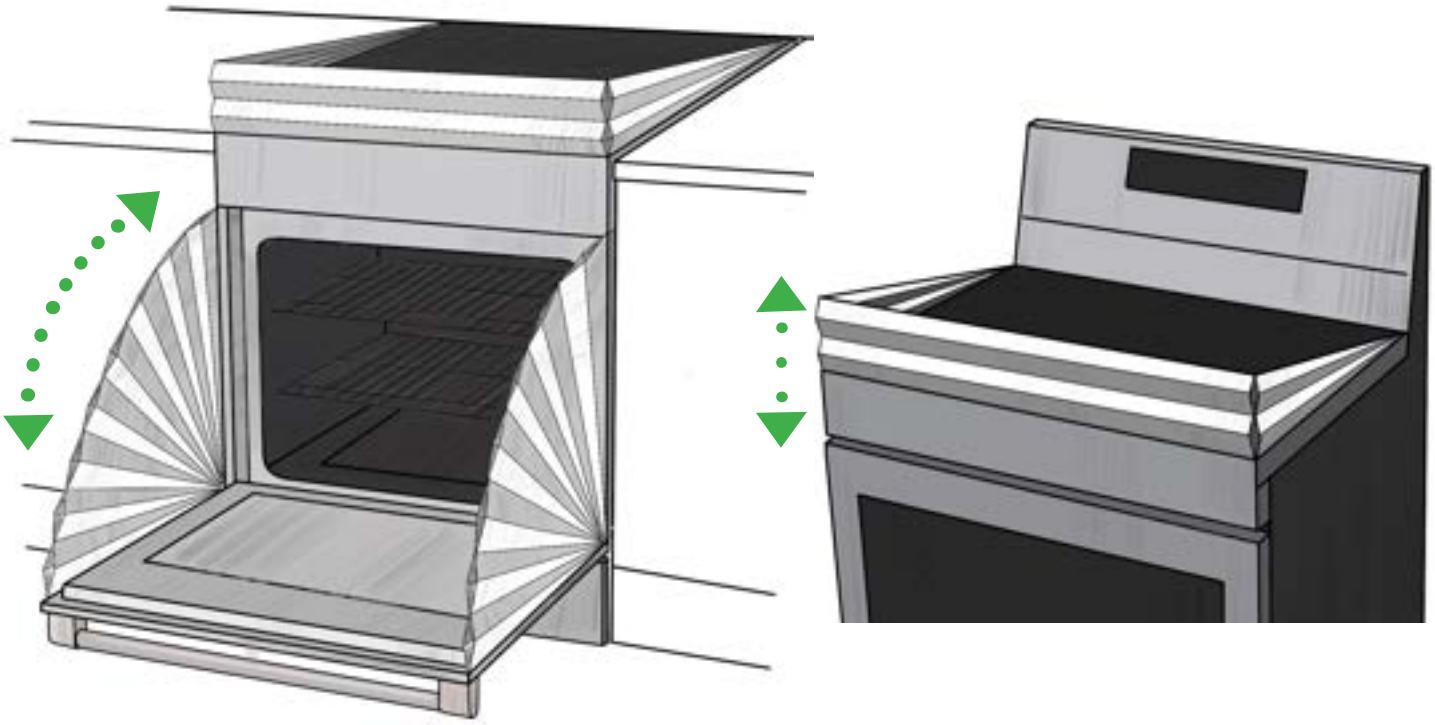
The oven system prevents reaching children from pulling down cooking pots and pans, causing spills and burns to themselves from below.

Pots and pans can be used from a pushing down and twist to the right motion, similarly to a pill bottle. This ensures that the cookware is locked into place and can not be pulled down.

The burners also prevent children from playing with dials and knobs, with minimal interface and can not turn on the heating elements.

The cookware features a groove indentation that will fit into an extruded piece on the rim of the burner, allowing it to lock into place and rotate.

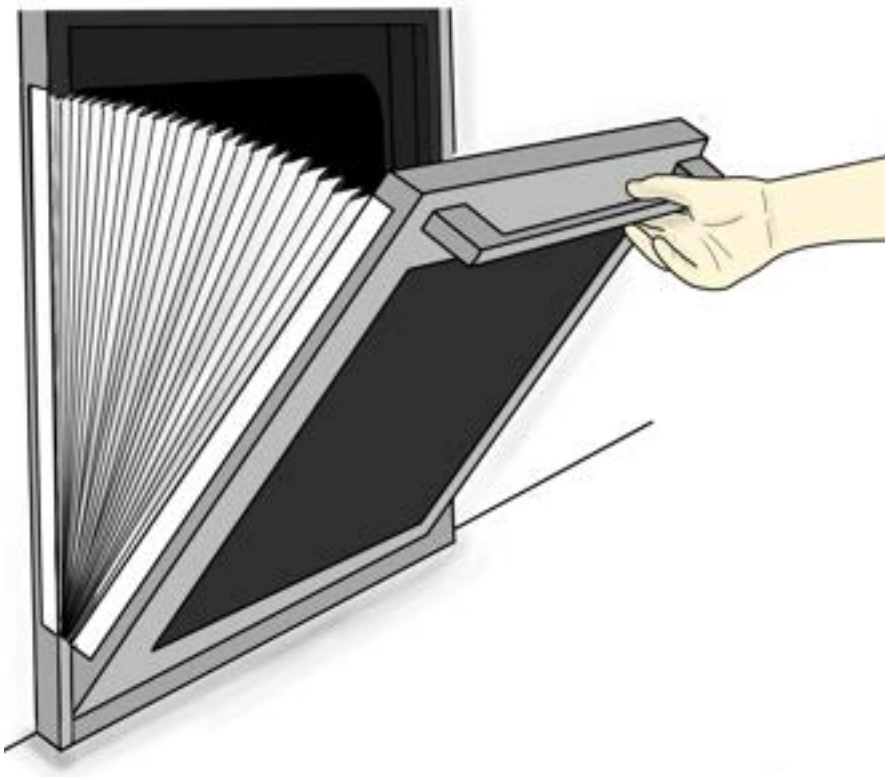
final concepts

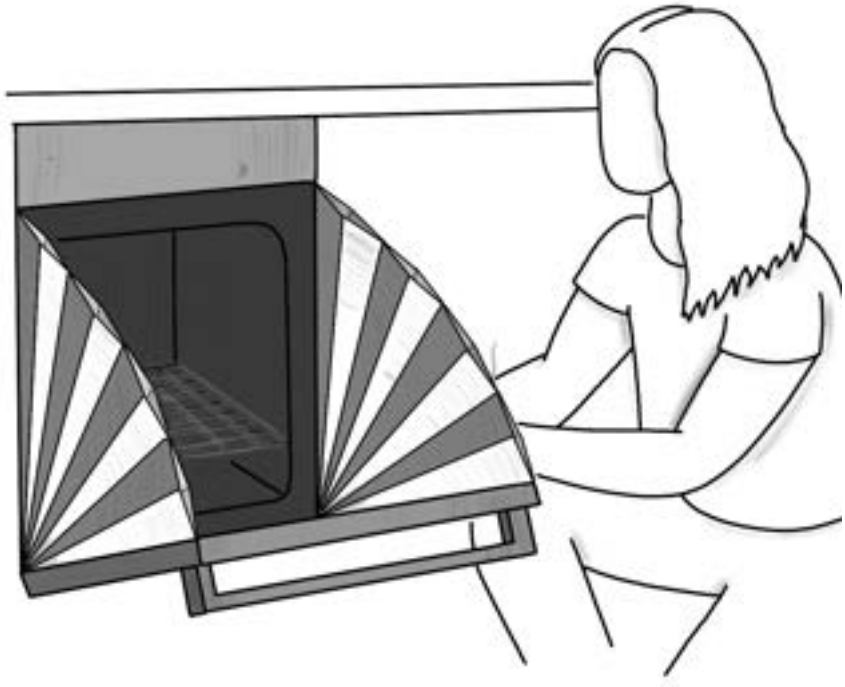


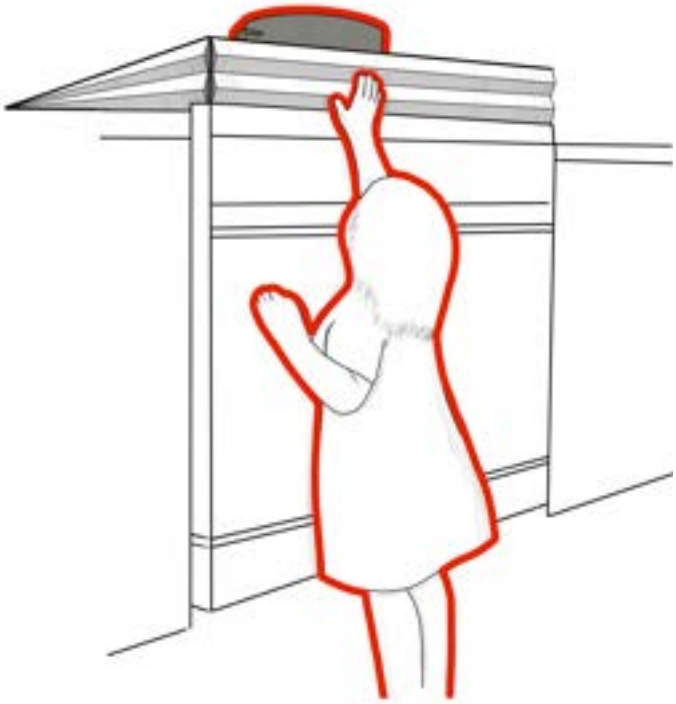
The pair of protective guards work together to protect hazardous areas in the kitchen environment.

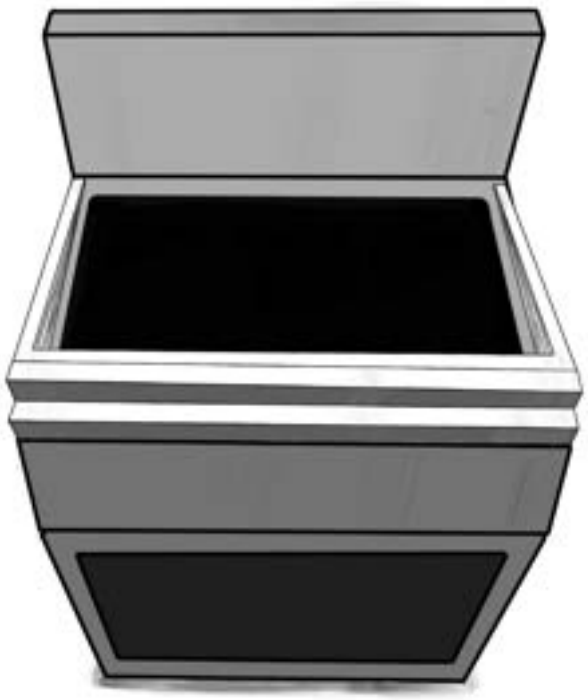
The guards are adhered to the appliances side and top surfaces.

The folding capability allows for the product to close shut, fold flat to store away, and easily expand and contract.







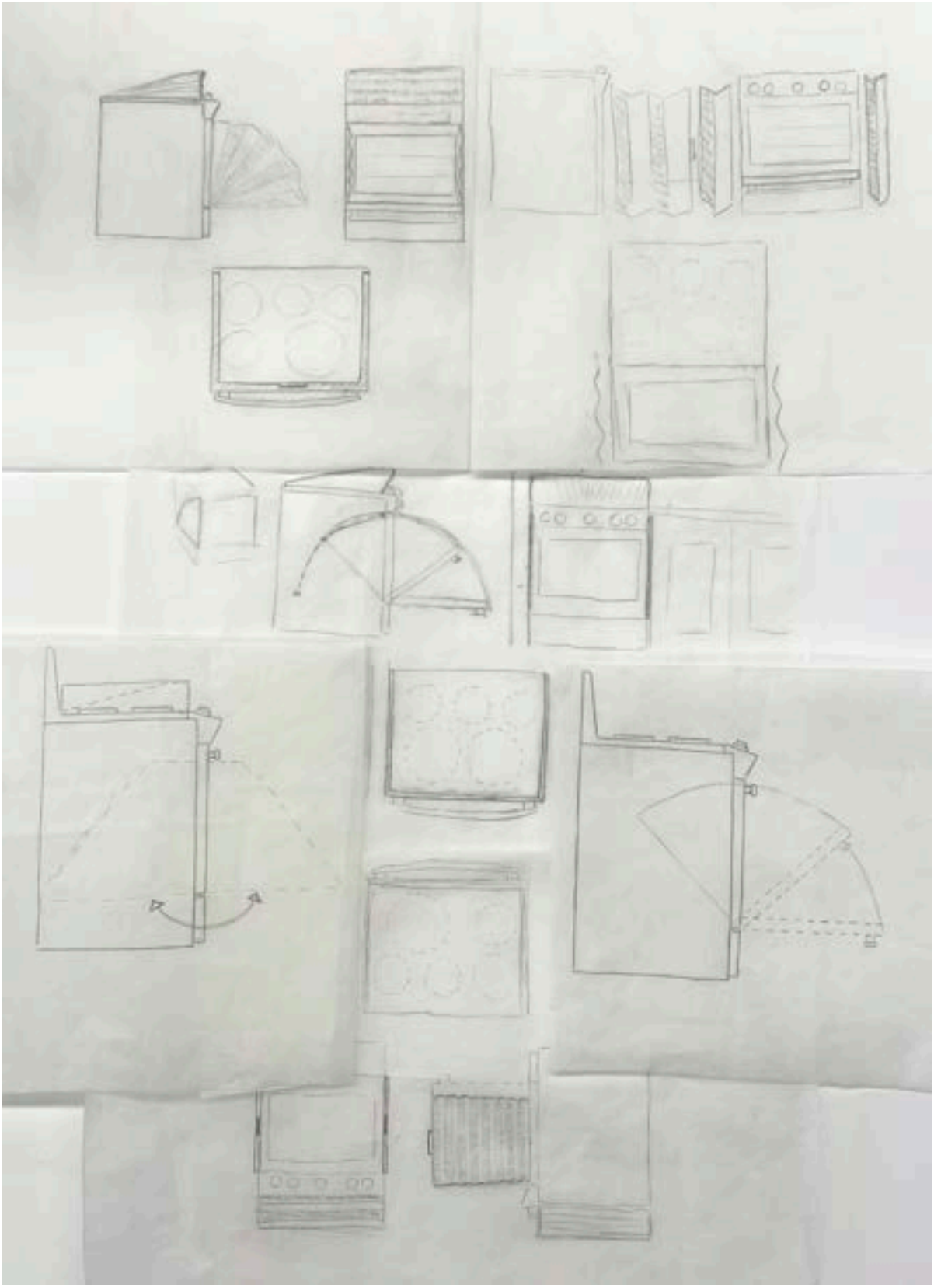


pt. 4
prototyping.
development

As the pair of kitchen products progressed, engineering and materiality concerns arised. Specifically, problems with structure, crevices, pinch points and melting points of such materials.

A head ache of problems opened trying to solve a simple problem with an overly complex solution.

Simplifying the original design and aesthetic was sacrificed in order for proper fabrication and general feasibility.

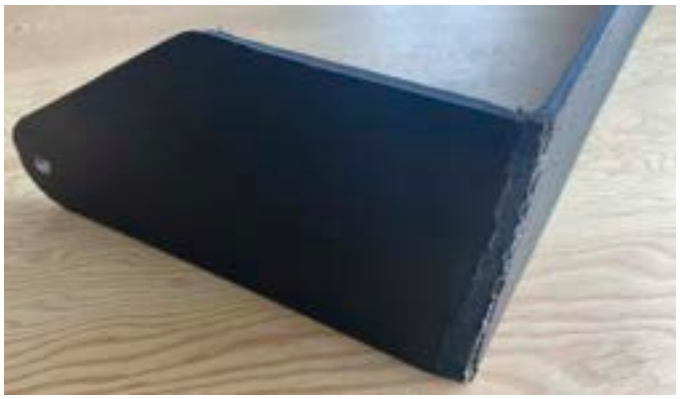


stove guard process

Beginning the process of designing the stove top guard was challenging for the lengths it brought me to. Encountering many problems with form and function, as the product was simplified.

Shifting away from an accordion design opened the opportunity for a flat injection moulded part.

Iterations beyond focused on the idea of maneuverability to avoid a fixed guard, giving users the option to move if needed.



Working on a pin hinge system, the iteration adhered to the stove top or countertop.

The flat guard is a discrete option for the kitchen in order to protect children from the elements.

The main issue would be the user interaction for rotating the guard from the front to the back. Adding a handle or slot can allow to easily move the guard without awkward grabbing.

To account for ventilation on the back of stove tops, a variety of angles were tested to move along the hinge system. This angle would prop the guard in the back position to allow for air flow.

Testing a variety of angles and heights for the stove guard through PLA printing.

Various heights and widths of pin hinges were tested to find the best suited option.

Initially, the guard had surrounded the hinge, but faced the problem of thin plastic parts prone to breaking.

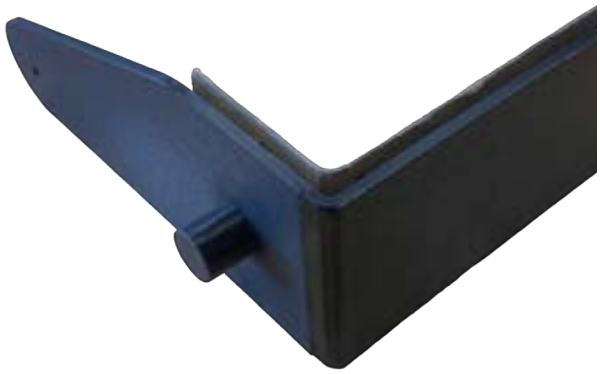
The final hinge was decided upon, surrounding the hinge with the pin encasing the inner layer.

To inform myself on the hottest spots the guard would face, the burner was put on the highest heat against the form to display the heat zones.

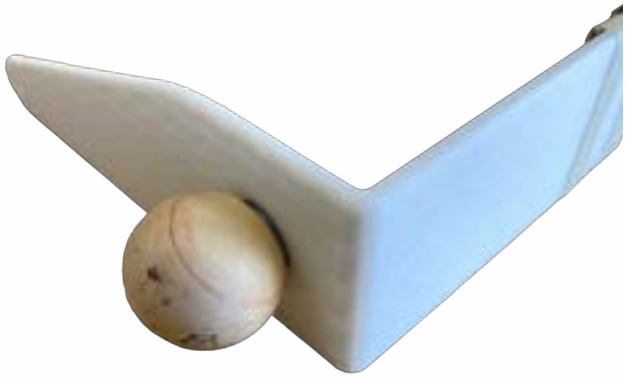
To create the most comfortable user experience, a handle would be added to the side of the guard in order to maneuver front to back.

Exploration featured divots, knobs, spheres and flat plates.

All options have merit, but with any design of products, users typically do not use it in the intended way.



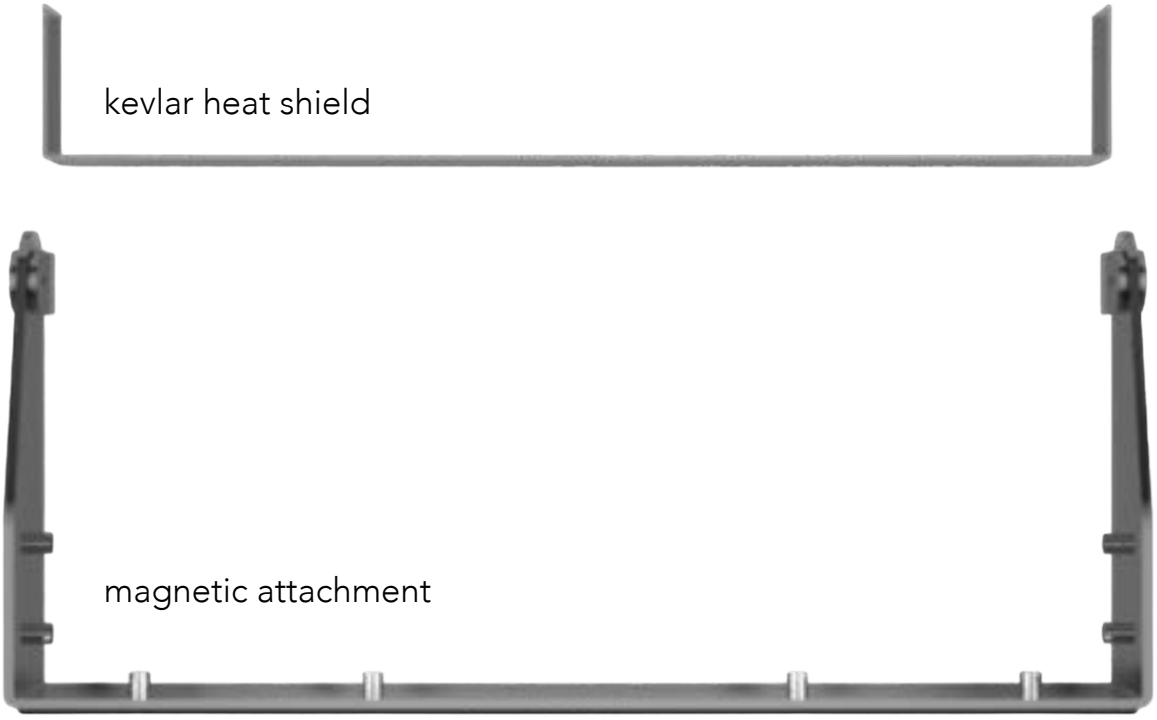
Bearings were tested for a rotational handle, but with high temperatures and thickness of the guard, it did not seem appropriate. Creating an opening for the use of the knob as a simple option.



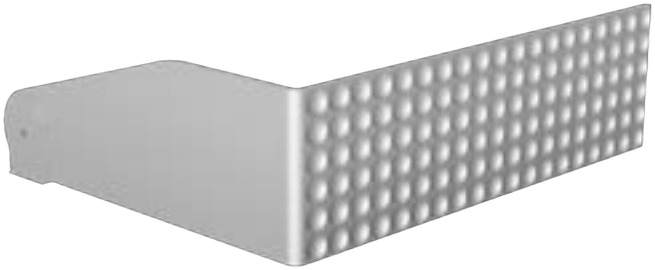
As prototyping progressed, accounting for all types of situations and appliances came into the space.

In order to fit all types of stove tops, an extending factor would have to be added. This would ensure all users cost adhere this product to their stove surface, no matter the width.

The guard was created in two with one part fitting inside its hollow opposite.

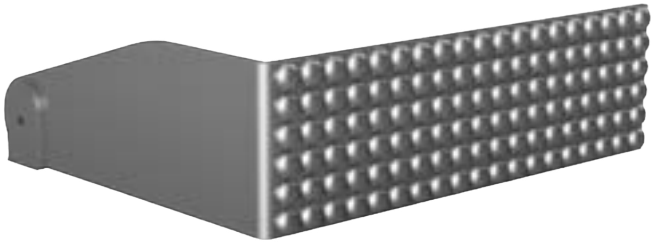


With many design challenges facing the protection of children from heat, materiality gave myself the most trouble. Finding the appropriate material that could withstand high temperatures for extended periods of time, non-toxic, and not hot to the touch.
An inner layer of kevlar sheeting was found to be protective from heat for an outer layer of pbi plastic. A middle air gap can help reduce heat and cool down and extended out to the outer layer

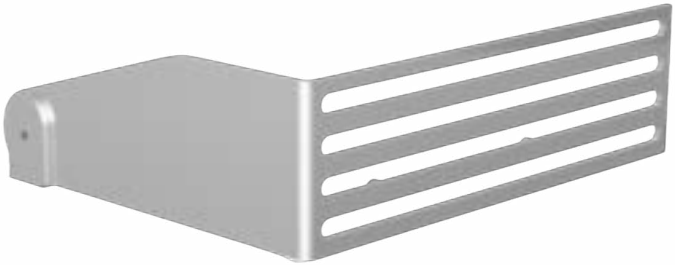


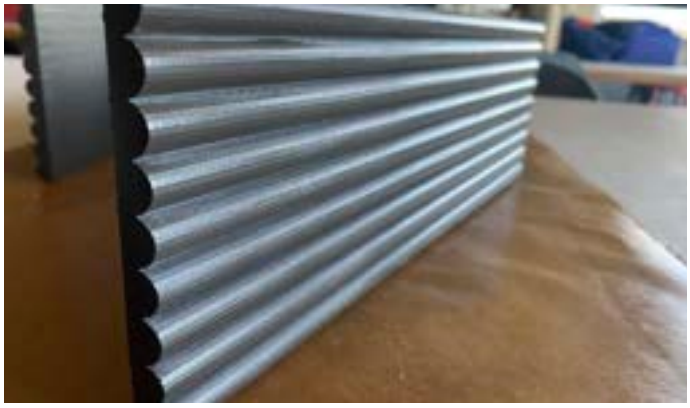
To reduce high temperatures on a potential interacted surface, a raised surface, fins or slots could help limit the heat.

Testing different patterns and orientations can potentially dissipate the heat in the event a child reaches for the surface.



Slots and fins seemed daunting and dangerous from a presentation stand point. Leading to a more conspicuous ribbed line pattern for much more visual flow.





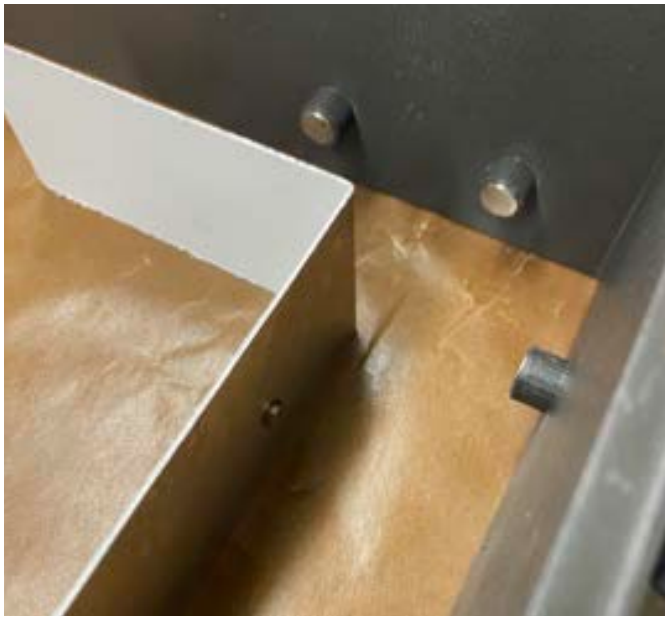
The final form of the guard is decided upon featuring a ribbed line front texture, inner layer magnetic attachment and pin hinge system.

The form is simple, aesthetically pleasing, while preventing children from reaching the stove elements.

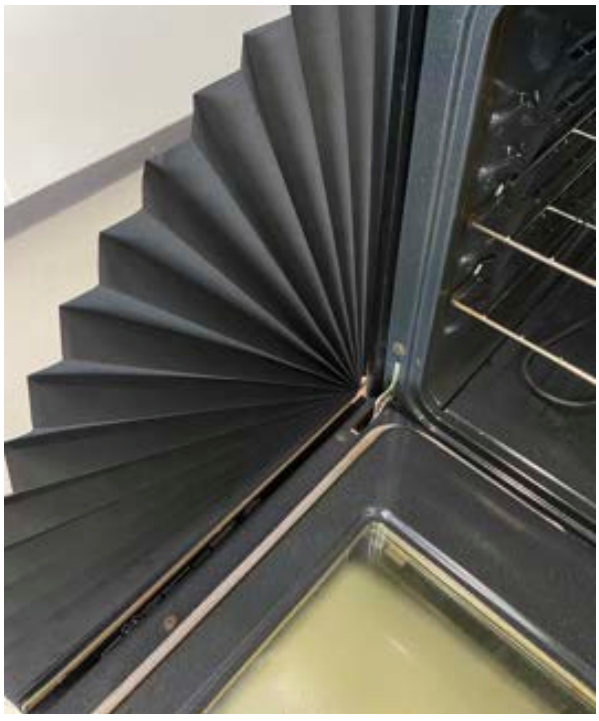
For modelling purposes, aluminum sheeting was used to emulate the kevlar heat shield.

As a removable part, the kevlar shield would magnetically attachment to the outer plastic posts and silicone layer for cleaning purposes.

The shield would be located in the corners to protect the important parts of interaction from the hot elements.



oven guard process



Beginning the process of designing the oven guard was the start of the entire project. Coming into thesis, the idea of an accordion like design for an oven is what drove the process.

This idea was the start of it all, but also the downfall of the project. Being fixated on a process that brings upon many issues, sets back the project.

But as time passes and the idea simplifies and matures, it opens for opportunity to explore similar feasible outcomes and achieve the same solution.

Encountering problems in the initial design and form inspired the next batch of iterations and its route to simplicity.

Expanding and contracting designs turned into flat sheets to rule out any cracks and crevices for food or liquids to potentially find its way into.

After many iterations, the quarter pie shape was decided upon best suited for guarding the oven opening.

Minor tweaks were done in order for the shape to fit well onto a variety of appliances. Oven door dimensions are fairly standard sizes for floor sitting appliances.

The guard had to fit the requirements of; being thin enough to fit between the oven and cabinets, adhere to the oven door, all while being able to withstand short bursts of high temperatures.

In order to account for users with stainless steel appliances, an adhesive track for the oven guard to rotate along.

The curved extruded T track locks in the oven guard to ensure no over extending and accidental removal or fall off.

To account for magnetic appliances, the best suited option would be an extruded piece on the corner of the guard.

The magnetic piece should rotate along the side of the oven with the guard and into the adhered stop to ensure no over extending.

The final form focused on two options
of a magnetic and adhesive attachment.

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The oven guards dimensions were finalized with material decided upon for fabrication.

Cleaning of the dirty $40 oven.

cookmate

pt. 5
final.

cookmate stove guard

The cookmate stove guard is a protective guard to prevent children from reaching the elements or cookware from below.

Constructed from an outer layer of PBI plastic, heat resistant silicone, alnico magnets, and an inner layer of kevlar heat shield. The guard stands at four inches tall and extends from twenty six to thirty four inches.

While positioned at the front of the stove top surface, a barrier is formed around cookware for protected, yet accessible cooking.

Working on a pin hinge, the stove guard may maneuver from the front to the back of the stove, out of the way when not needed.

The silicone knob allows for safe user interaction and accessibility for changing the guards position.

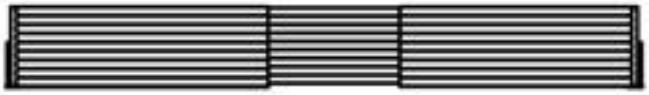
Attached to the stove top surface or countertop using 3M ultra high temperature double coated tape, a strong, but not permanent bond.

The tape can be easily removed and cleaned of any leftover residue.

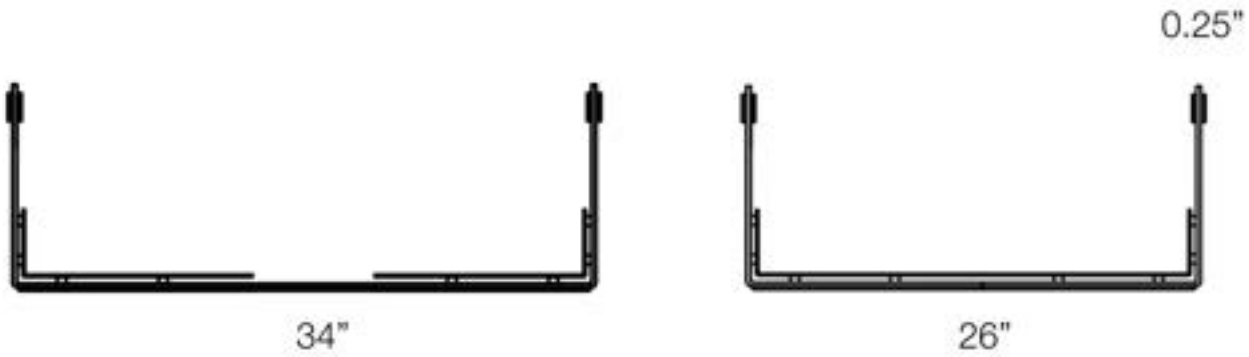
The inner layer of kevlar heat shield absorbs high temperatures from the stove elements, protecting the outer layer.

This layer may be removed from its magnetic posts for cleaning and washing purposes.

To account for different kitchen environments and varying appliance sizes, the stove guard may extend outwards to fit appropriate stove size.


4"

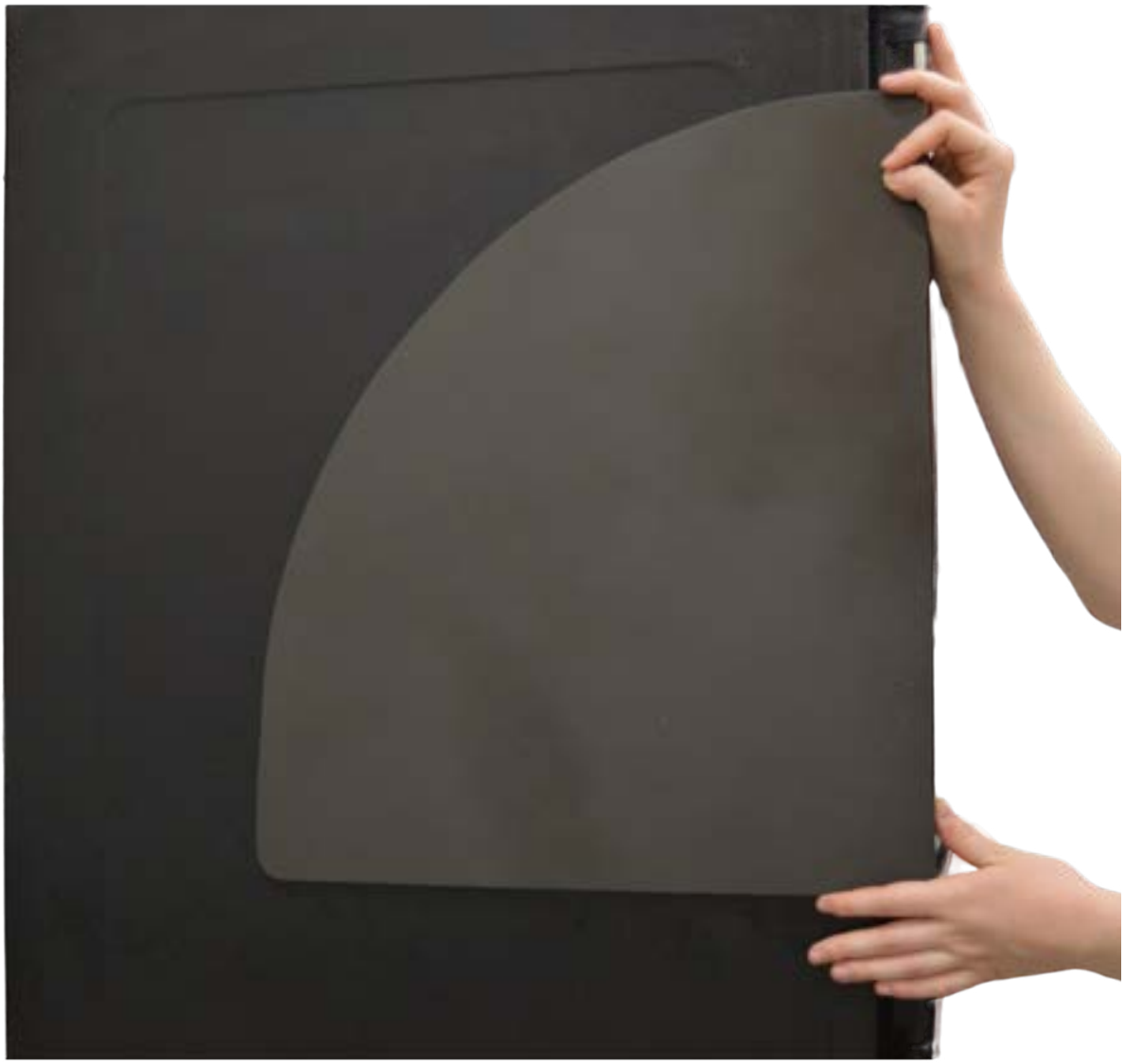

11"


0.25"
34"
26"

cookmate oven guard

The cookmate oven guard aims to prevent children from reaching into the oven when parents hands are full and commands are not being obeyed.

The PBI plastic sheet adheres to the oven door rotating with the door as it is opened. The twenty by eighteen inch part thinly slides between cabinet or wall crevices for attaching.

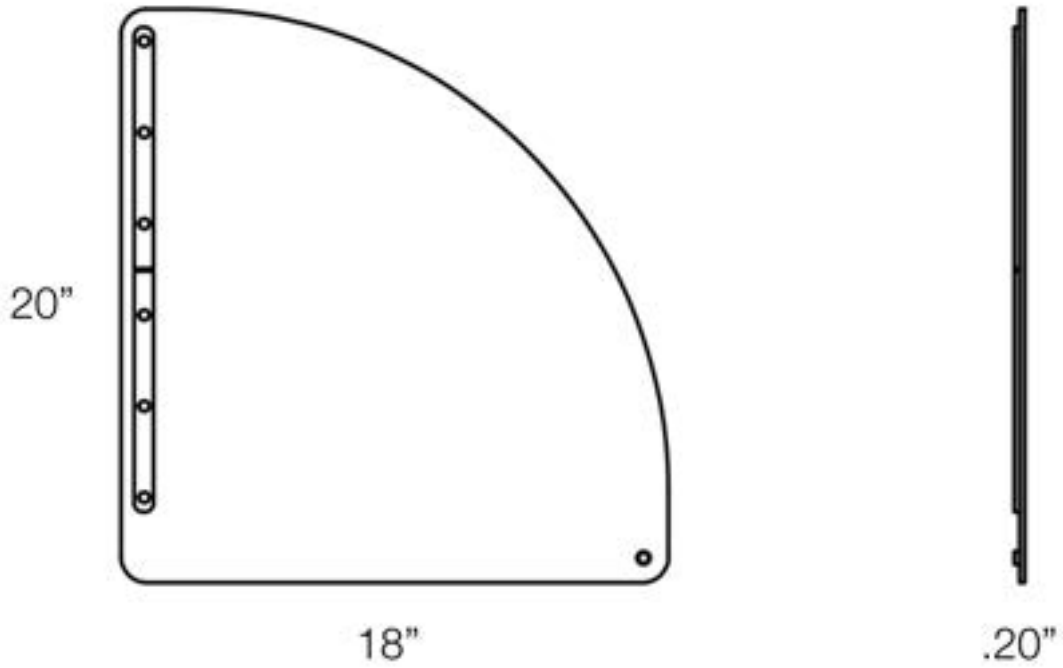


To attach the oven guard, simply place magnetic or adhesive strip onto side of oven door.

The guards rotational movement can work from a T track option or corner magnetic piece, depending on the appliance.

In order to prevent over extension or falling off the oven surface, a catch can be adhered to the side of the oven to act as a stop for the guard.

At maximum extension, the oven guards work to fill the gaps left while the dangerous door is open and can potentially be reached into.


20”
18”
.20”

pt. 6
synthesis.
next steps

There are many challenges to improve upon in order to have cookmate exist. The main concern throughout the year was materiality. Extensive research into an appropriate exact material will give this project the proper confidence.

As a pair, the oven guard may not fit aesthetically with the stove guard. Therefore, there is opportunity to add texture to the oven guard and potentially change its shape.

From a presentation standpoint, the stove guard in the backwards position will be seen a lot when not in use. Creating a better visual experience at all perspectives may make it feel as a whole.

Focusing on the life cycle of this safety product is essential as most children products expire or thrown out, lasting only for the needed period of time. Hoping to break this pattern and contribute to recycling and reusing.

self-reflection

After completing this year long project, I believe I learned so much along the way, but there is much more to learn. As a simple project, it had challenged me in many ways as a student and designer, but a fun process nonetheless. It is not exactly what I had envisioned on day one of the process, but this project gave myself the opportunity to grow as a designer and problem solver to apply to future endeavours.

Accidents happen within split seconds and delayed reactions of parents may not always make up for the the permanent damage caused. Focusing on this possibility drove this project and if these products can prevent children from harm, then I believe it is successful overall.

I am grateful to have completed this project over the course of a year and can hope it will developed further and successful one day.

thank you's

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Rodrigo Somocurcio
Mickey Wang

My mother, Geraldine Molloy
My father, Deon Newman

Dedicated to and inspired by my niece,
Lucy Newman.

bibliography

[1] Liu, L., Villavicencio, F., Yeung, D., Perin, J., Lopez, G., Strong, K. L., & Black, R. E. (2022, March 1). National, regional, and global causes of mortality in 5–19-year-olds from 2000 to 2019: A systematic analysis. The Lancet Global Health. Retrieved October 19, 2022, from https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(21)00566-0/fulltext

[2] Cunningham, R. M., Author Affiliations From the University of Michigan Injury Prevention Center (R.M.C., Campion, E. W., Others, J. K. and, Others, L. L. and, Others, D. R. and, Others, H. C. and, Armand, C. E., & Others, M. B. and. (2018, December 20). The major causes of death in children and adolescents in the United States: Nejm. New England Journal of Medicine. Retrieved October 19, 2022, from https://www.nejm.org/doi/full/10.1056/nejmsr1804754

[3] Kidco Stove Knob Covers (n.d.) Retrieved October 18, 2022, from https://www.kidco.com/product/stove-knob-covers-s323/

[4] Clippasafe Oven Door Lock (n.d.) Retrieved October 18, 2022, from https://hellobabydirect.com/en-ca/products/clippasafe-oven-door-lock?variant=42047114215677&gclid=CjwKCAjwwL6aBhBlEiwA-DycBIN0qhiIfyidqpmtwVM9-0_2zvOLyuQAjzB-qxw8WGPABuVJZyeJO5xoC3_gQAvD_BwE

[5] Qdos Adhesive Stove Guard (n.d.) Retrieved October 18, 2022, from https://qdossafety.com/adhesive-stove-guard

[6] Prince Lionheart Stove Guard (n.d.) Retrieved October 18, 2022, from https://princelionheart.com/products/adjustable-stoveguard

[7] Oven Rack Guards (n.d.) Retrieved October 17, 2022, from https://www.morethanbaking.com/product/oven-guards-silicone-2-pc-set/

[8] Clevamama oven door guard (n.d.) Retrieved from https://www.madeformums.com/reviews/clevamama-transparent-oven-door-guard-review/

[9] Certification program - juvenile products manufacturers association - JPMA. (n.d.). Retrieved October 20, 2022, from https://www.jpma.org/?page=certification

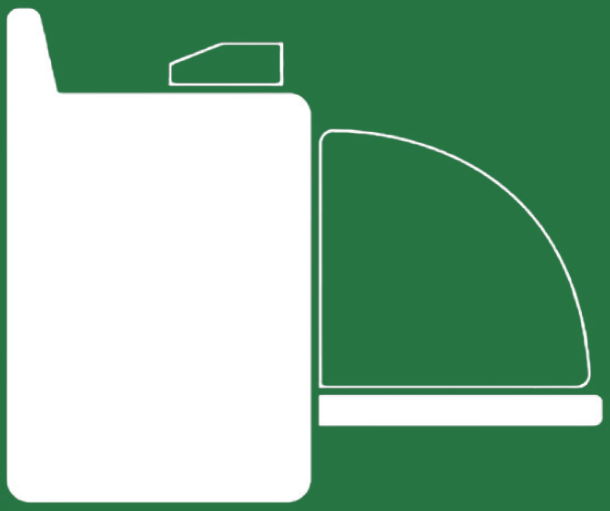
Centers for Disease Control and Prevention. (2022, September 6). FastStats - Child Health. Centers for Disease Control and Prevention. Retrieved October 19, 2022, from https://www.cdc.gov/nchs/fastats/child-health.htm

Centers for Disease Control and Prevention. (n.d.). Child injury. Centers for Disease Control and Prevention. Retrieved October 19, 2022, from https://www.cdc.gov/vitalsigns/childinjury/index.html

Default - Stanford Medicine Children's health. Stanford Medicine Children's Health - Lucile Packard Children's Hospital Stanford. (n.d.). Retrieved October 19, 2022, from https://www.stanfordchildrens.org/en/topic/default?id=accident-statistics-90-P02853

Government of Canada, Statistics Canada. (2022, January 24). Leading causes of death, total population, by age group. Retrieved October 19, 2022, from https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310039401

Roser, M., Ritchie, H., & Dadonaite, B. (2013, May 10). Child and infant mortality. Our World in Data. Retrieved October 19, 2022, from https://ourworldindata.org/child-mortality



cookmate