

WEIGH  
TO GO!



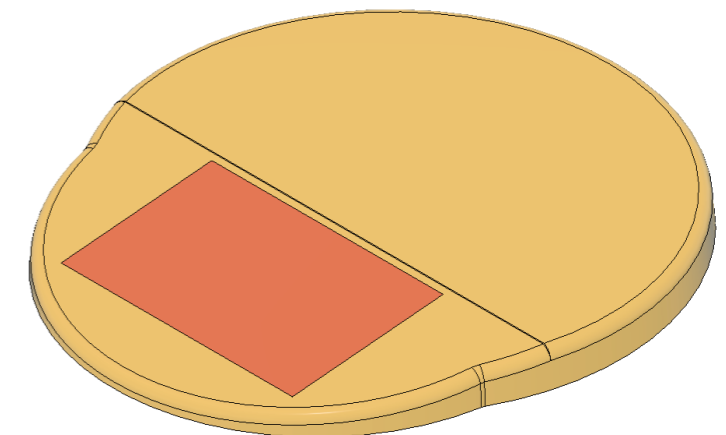
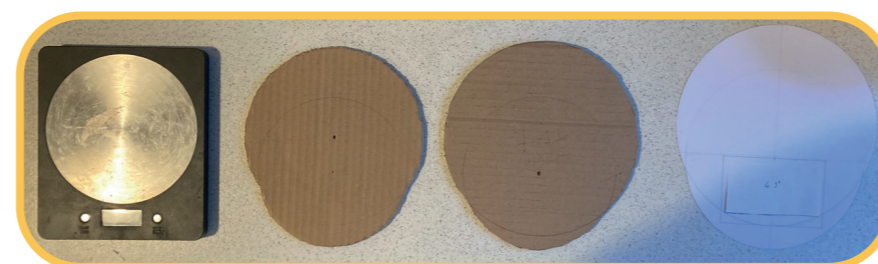
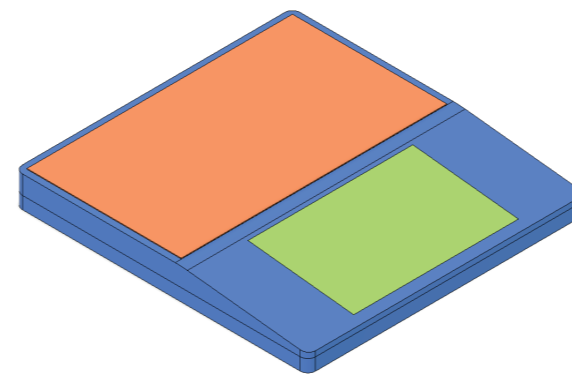
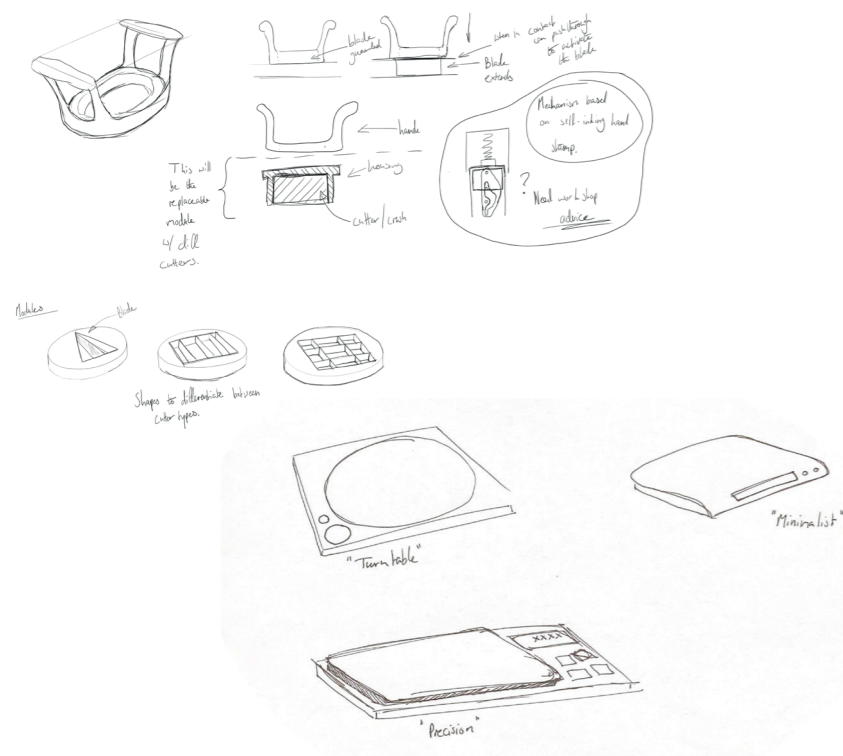
# The journey



This product started with a look at the educational philosophy of Montessori which emphasises independence and views children as eager to learn.

Learning to cook is a vital skill. Cooking is such a rewarding experience and children are at the perfect age to develop new skills. Research also shows that children enjoy eating food that they helped to make themselves.

Through a lot of cooking sessions I discovered lots of issues experienced while teaching in the kitchen. The main three were: **Time, Mess and Safety**



Many concepts were developed to tackle these issues. These were narrowed down through user feedback and a concept valuation.

Smart scale concept chosen. Many iterations were developed of the scale were developed. Cardboard models were used to demonstrate the goal-orientated system to my user group.

Final model. Design iteration with assistance of stress analysis and plastic flow modelling.

# Research

Lots of people struggle with cooking as they get older, it isn't a skill everyone learns. You can make it through life without ever having to learn how but it is a huge improvement to the quality of your life if you know how to cook.

A 2017 YouGov survey said that 1 in 8 people avoided cooking from scratch. Learning these skills can lead to an improved diet and better quality of life. Studies also indicate that children are much more likely to eat meals they have had a hand in preparing.

## User experiences:

Children and parents experience lots of issues in the kitchen. Preparing for teaching is time consuming, requiring lots of preparation. Cooking also produces lots of mess and time is spent cleaning up afterwards. Children experience lots of barriers due to their lack of experience and understanding. Very few tools are designed for their level and they need a lot of assistance from parents/guardians to make progress through recipes.

## Market analysis:

Looking at the existing product sector there are three main categories. Montessori (specialist) products, cooking themed toys (general) and cookbooks. Outside of the specialised Montessori area there isn't a large breadth of cooking specific products focused at children. The products focused at children are mostly child-friendly cookbooks or toys emulating kitchenware.



Can't read numbers Great at scooping

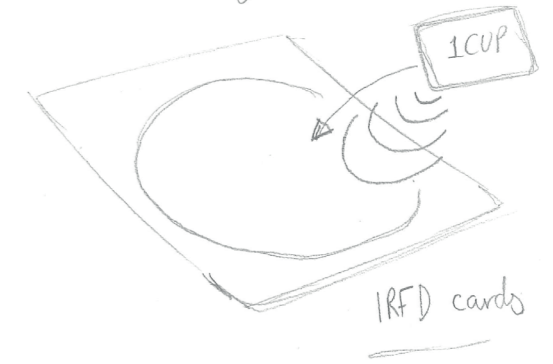
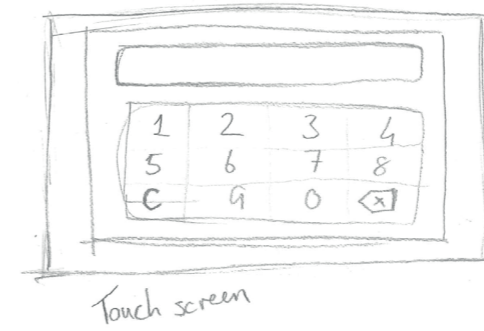
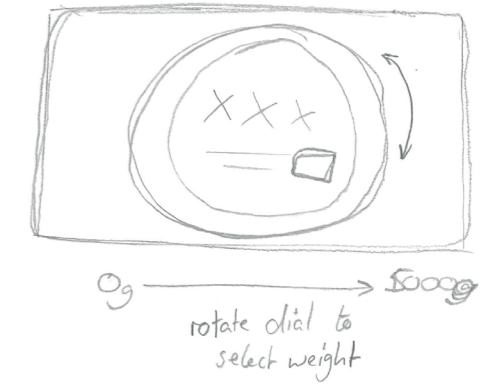
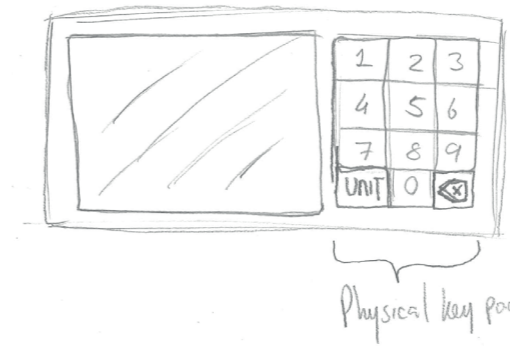
# Initial concept

## Goal:

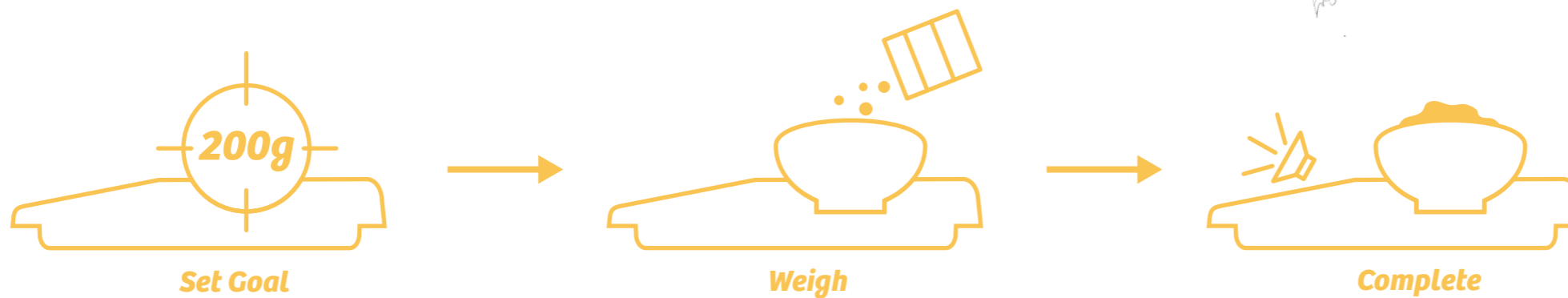
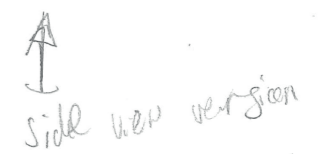
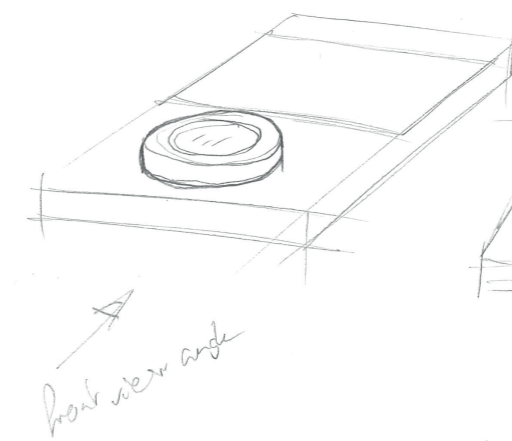
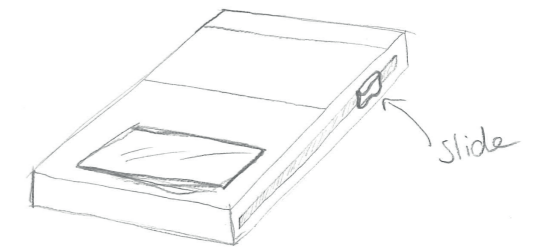
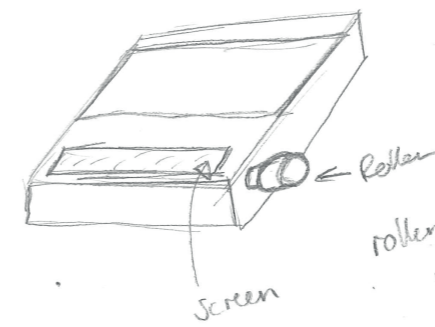
Develop a product that assists children with cooking and reduces the need for parental input to greater encourage children and improve their independence.

## User interactions:

A wide range of interaction types were considered from phone apps to physical knobs and sliders. Through discussion and feedback with my user group it was decided that a touchscreen would be the most accessible touchpoint for young children. Due to the prevalence of I pads and other touch screen based devices children are growing up with an intuitive comprehension of touchscreens.



## Physical UX

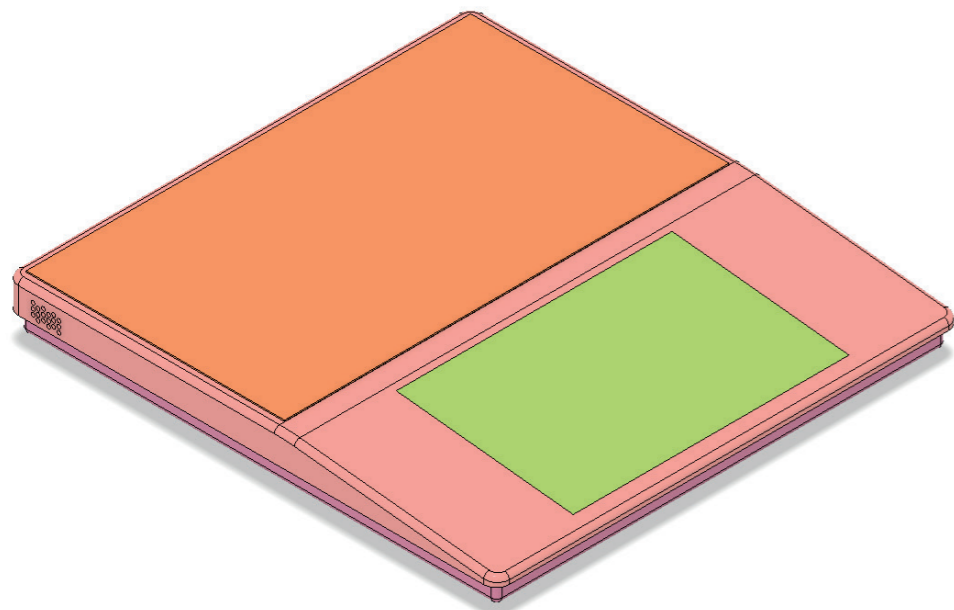
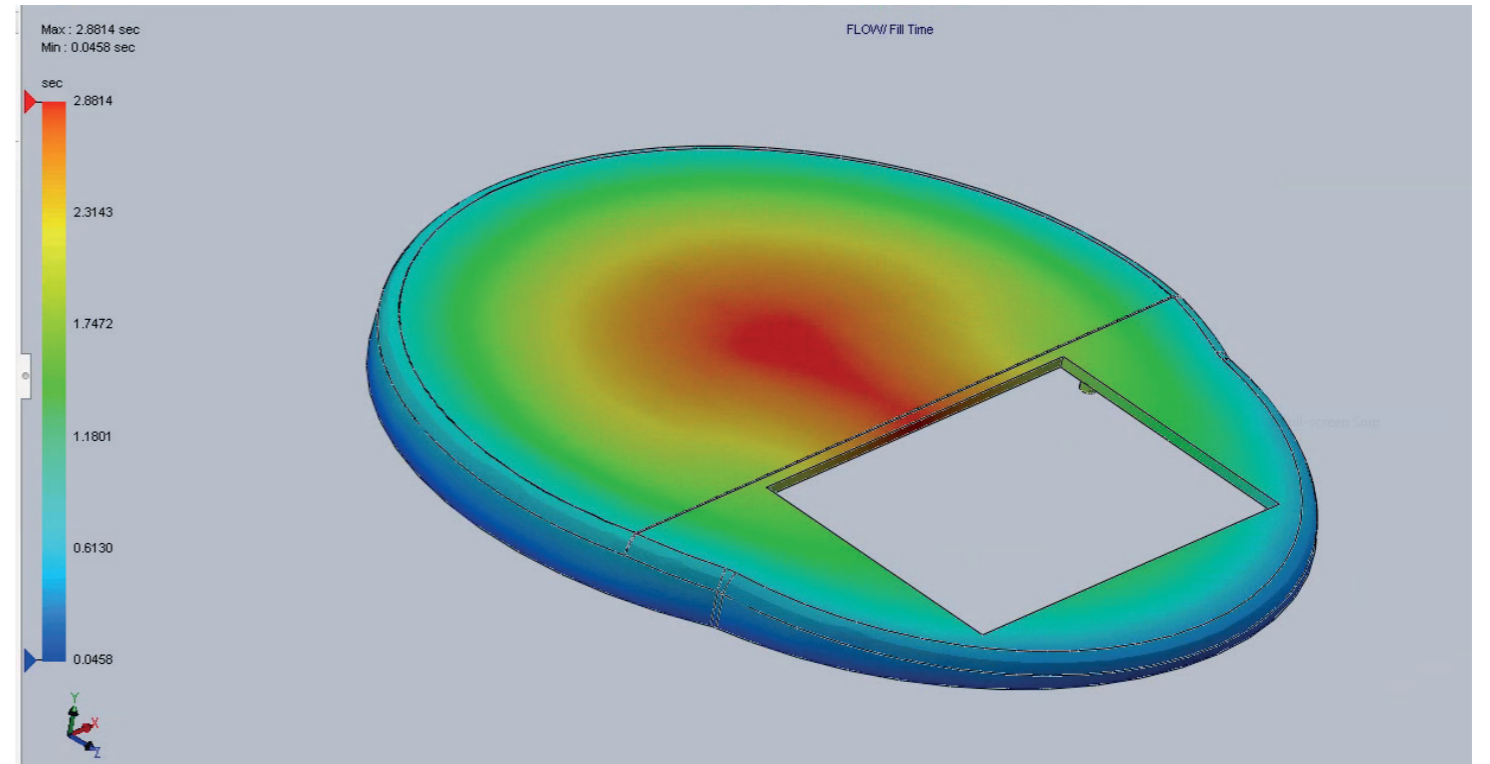
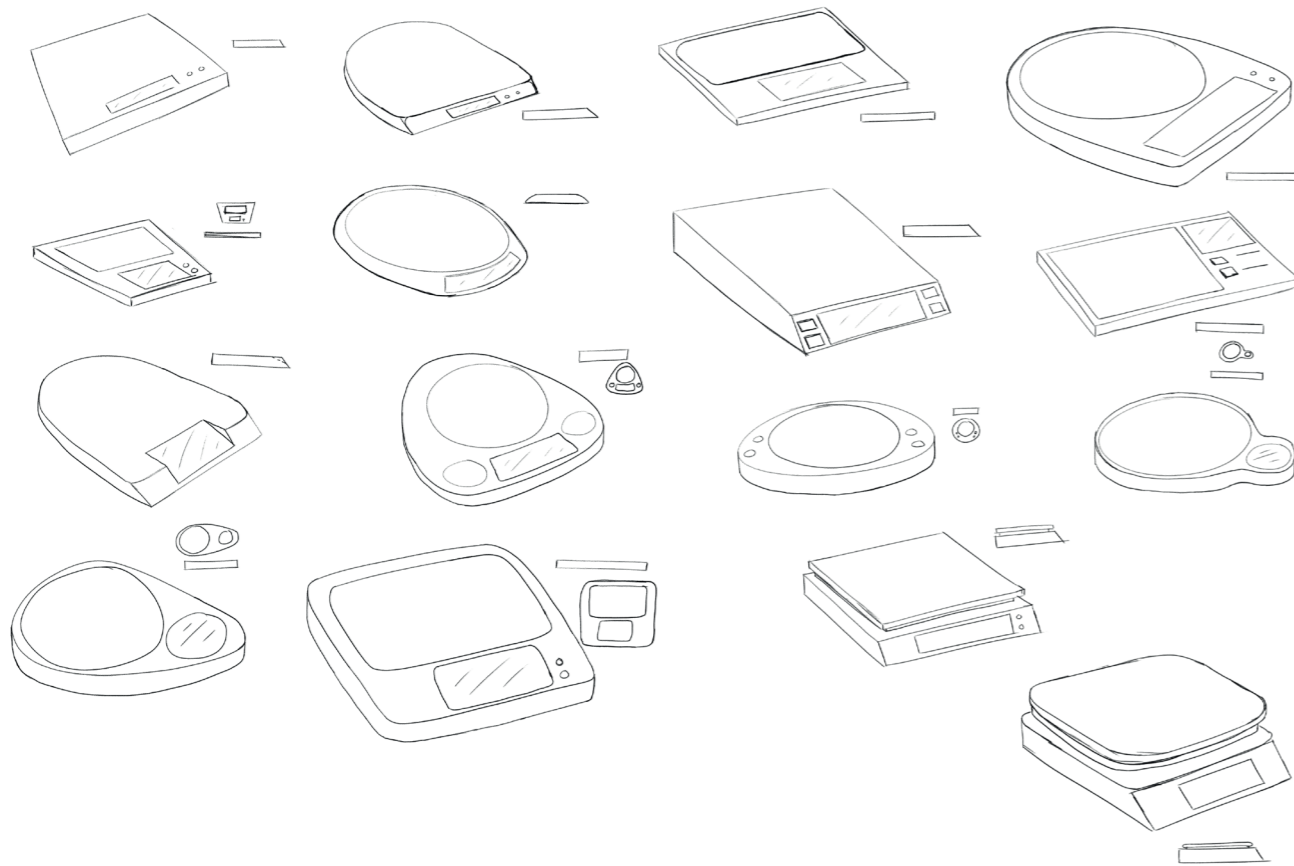


# Development

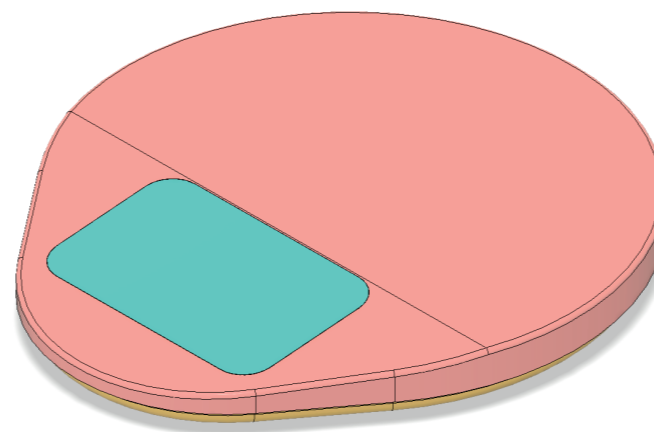
The shape was developed with the help of my user group.

A more rounded aesthetic was adopted to better reflect my target group and help differentiate the product from others on the market.

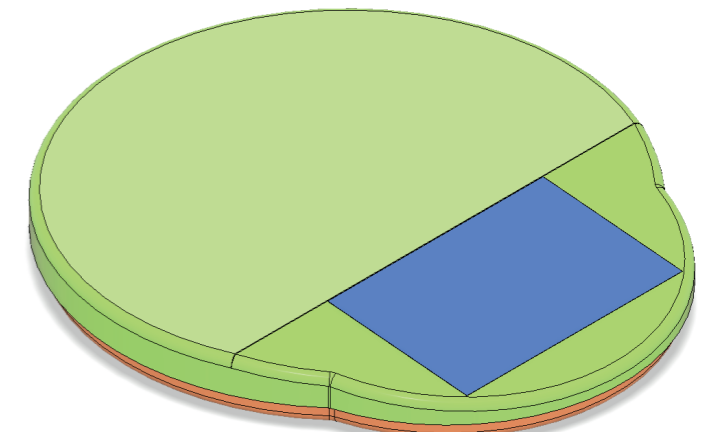
The design was refined through the use of static and flow analysis studies to ensure it remained feasible, balancing aesthetic quality and manufacturing capabilities.



Model 1

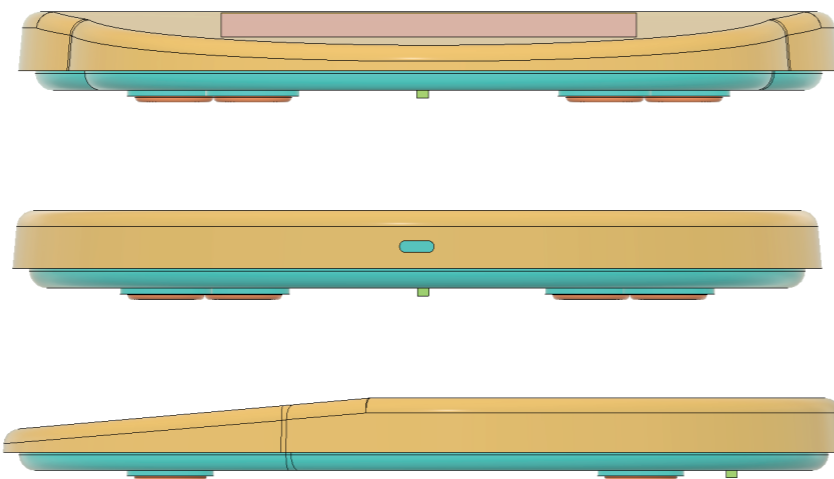
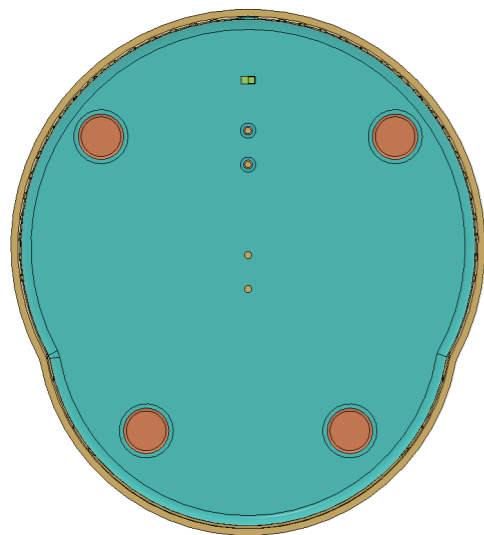
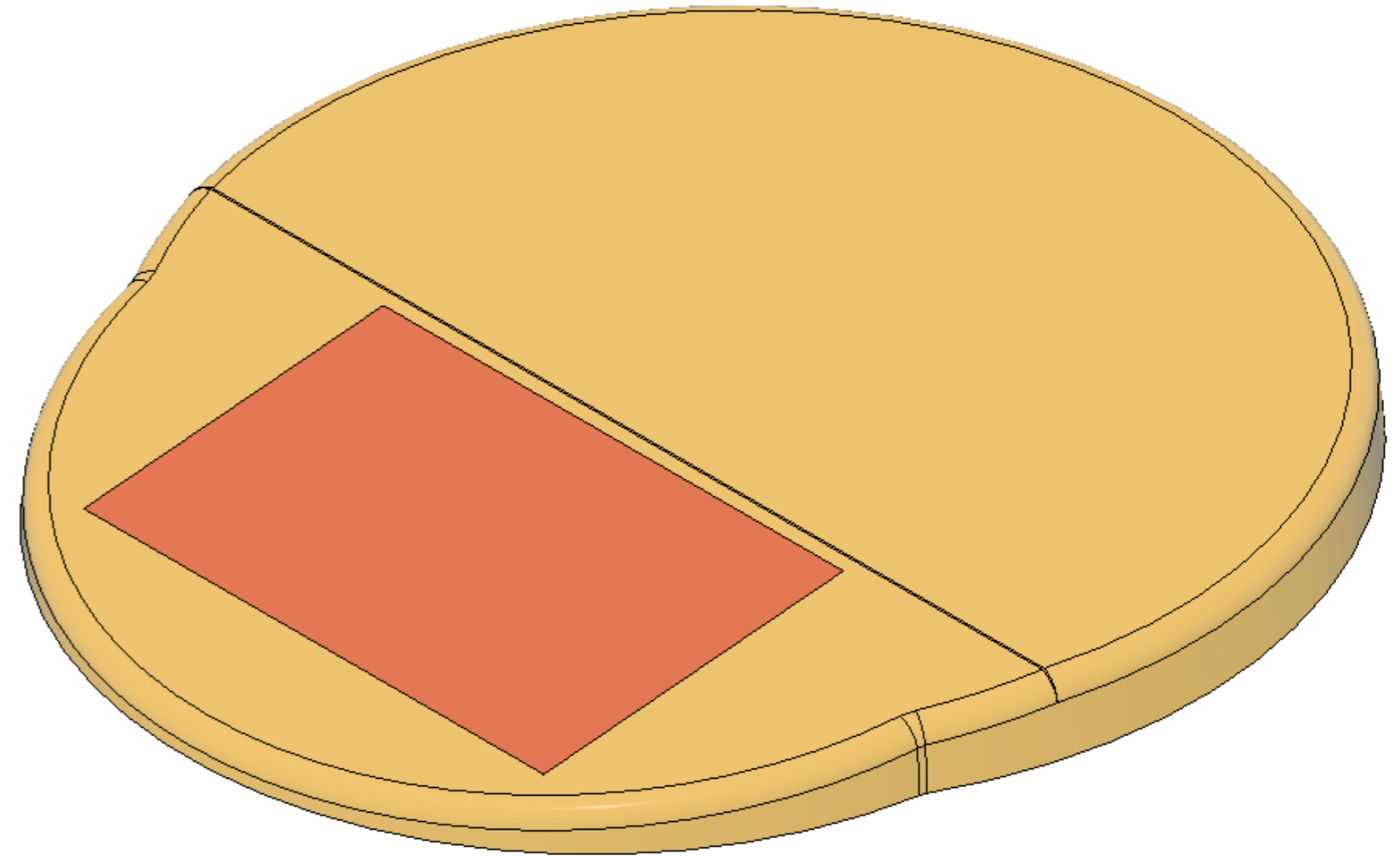
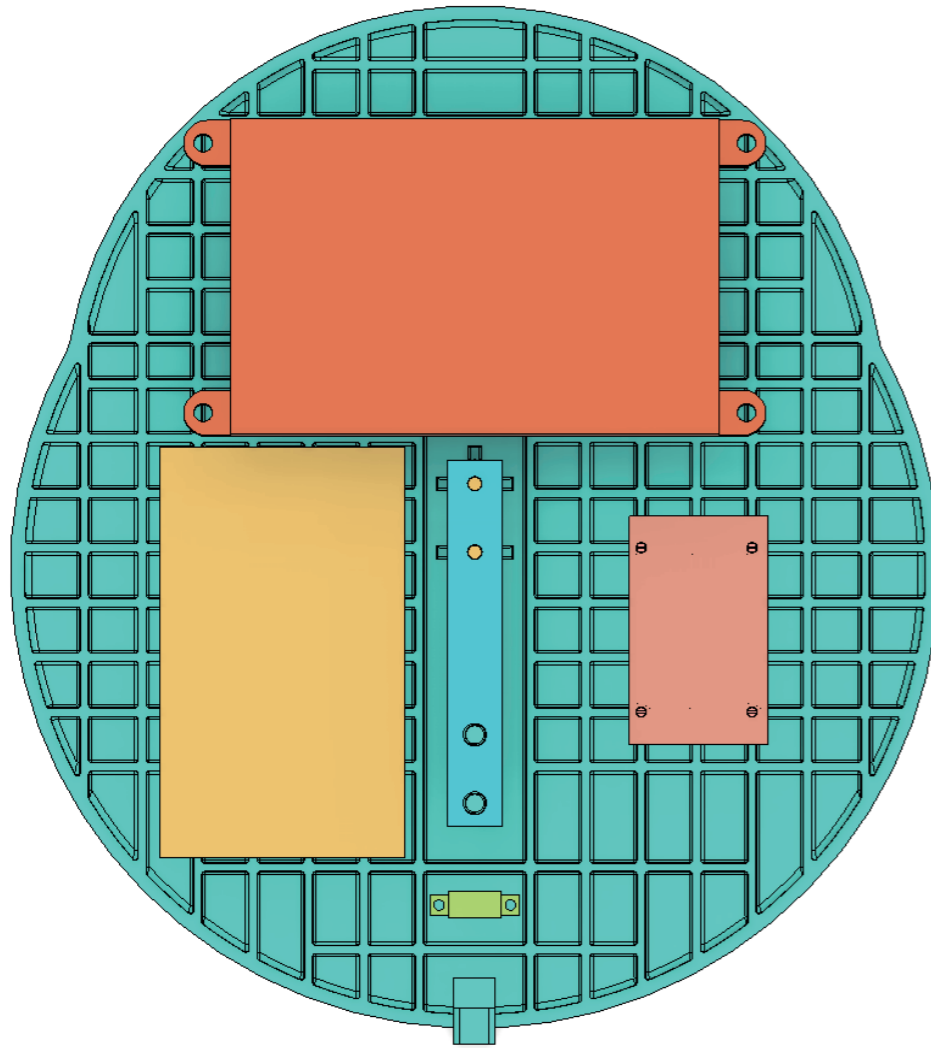


Final shape - The "Tulip" v1



The "Tulip" v3

# Final design



The smart is a new innovative take on digital scale design. The smart scale is aimed at improving children's access and engagement in cooking.

The smart scale uses a goal-orientated measuring system to take the guess work out of your hands and simplify the weighing experience.

Just select your units, set you goal weight and start measuring and the scale lets you know when you're finished!

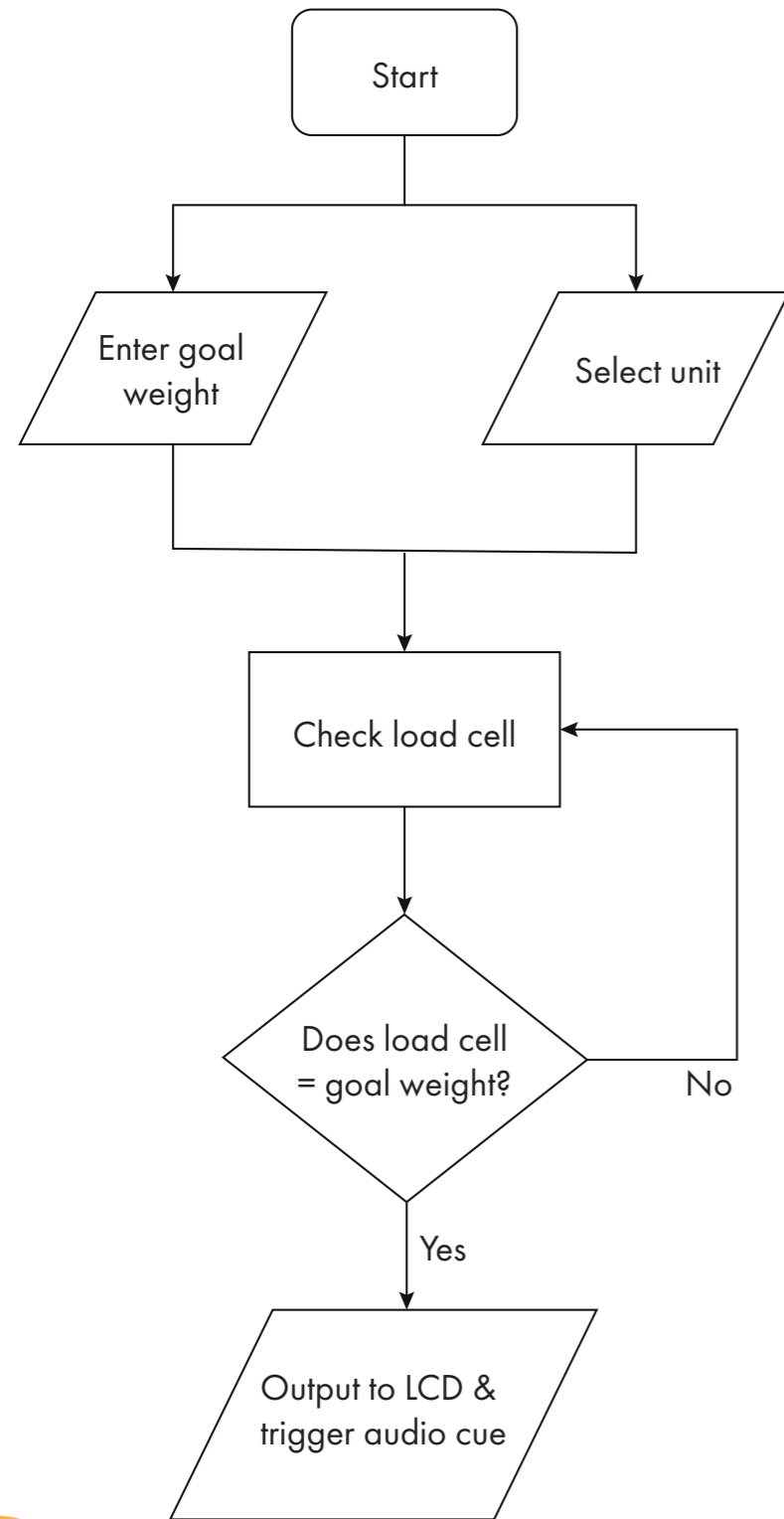
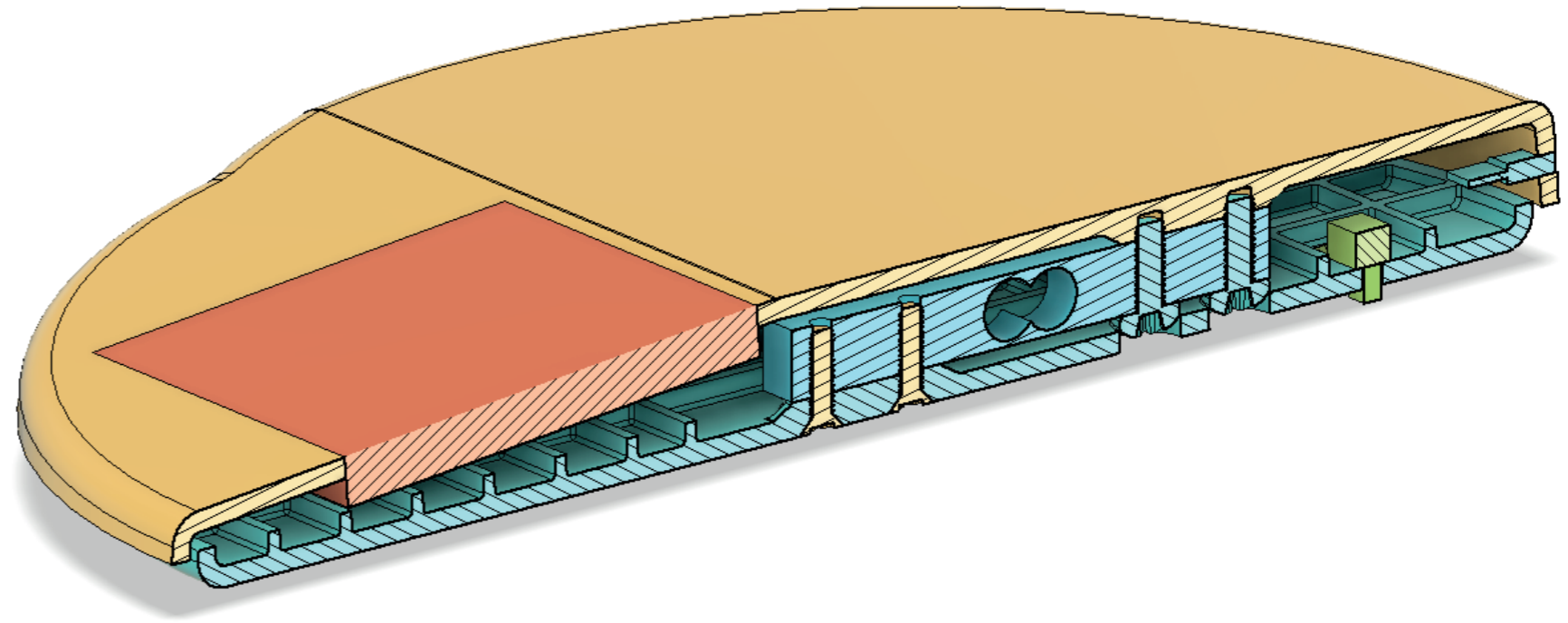
# How does it work?

## Screen:

A 4.3" resistive touchscreen will display and control the operation of the product. A resistive touchscreen was chosen as it requires physical pressure to activate where as a capacitive screen can be triggered with no contact at all and therefore likely to record false inputs from mess caused during cooking.

## Power:

The scale is powered by a rechargeable 2100 mAh Lithium-polymer battery. Giving the user up to 8.2 hours of battery life per charge, with a handy USB-C charging port on the back for quick and easy charging.

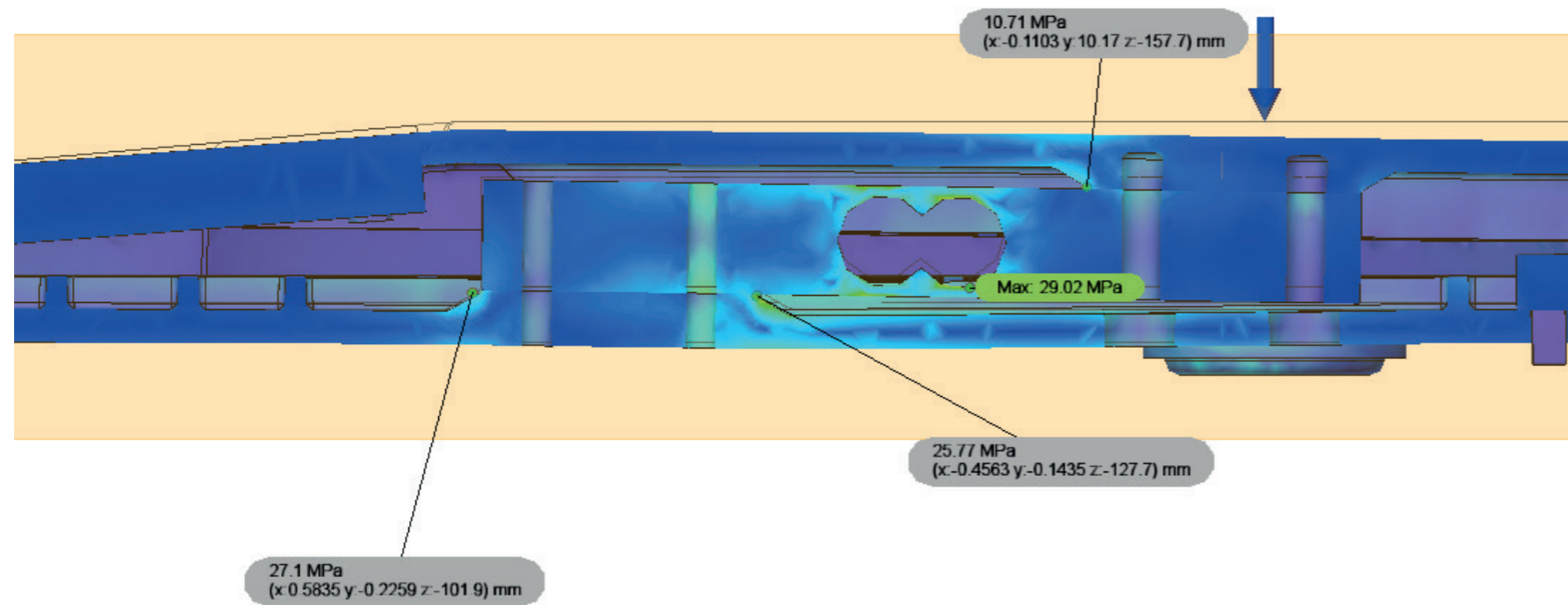


Goal-oriented measuring system wireframe

## Sensor:

The 10kg load cell will ensure the scale is accurate even at high weights. The scale is rated for max of 5KG which will adequately meet all your weighing needs.

# Materials & manufacture

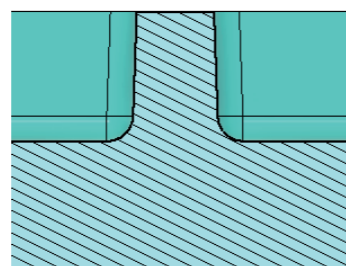
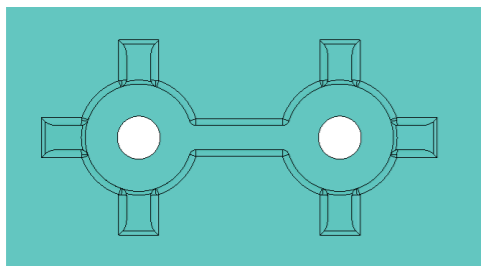


Static stress analysis resulting from a 35N load

## Materials:

ABS plastic was chosen for this product due to its excellent Yield and Tensile strength as well as its strong chemical resistance making it a perfect food safe material. A UV resistant additive will be combined with the base polymer to increase UV resistance and prevent colour fade over time. A nominal wall thickness of 3mm was selected. Originally a 2mm uniform thickness was selected but through plastic flow simulation analysis an increase to 3mm thickness reduced mould pressure by almost 50%.

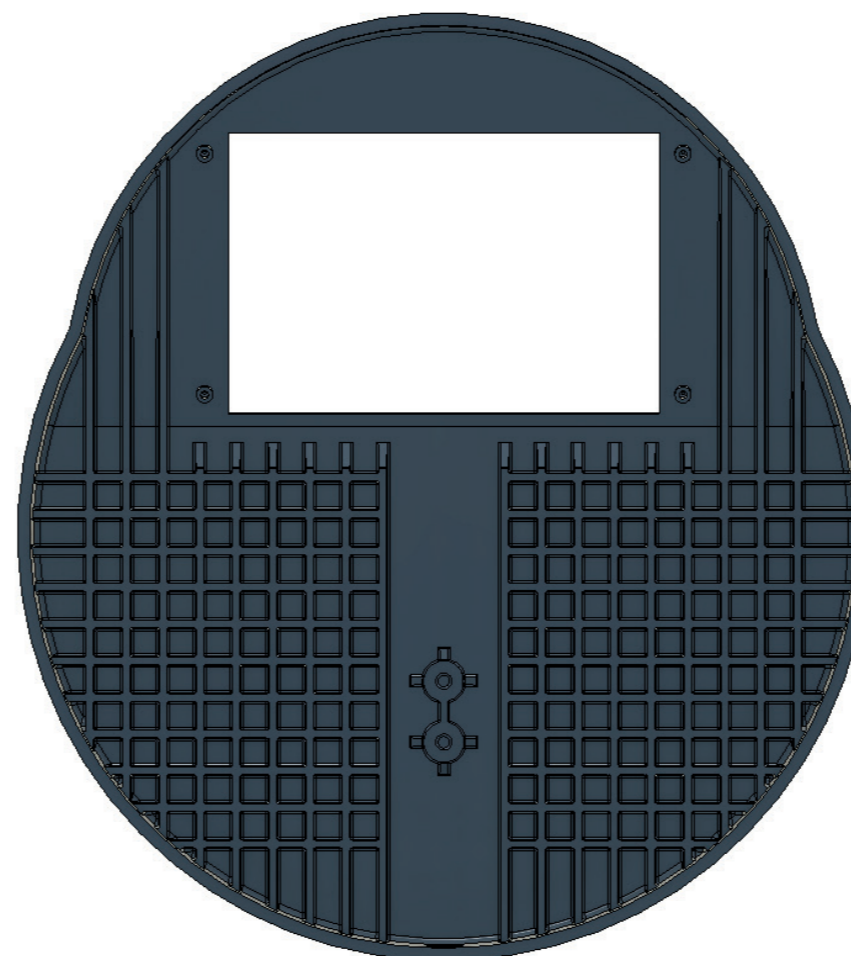
Ribs were also introduced into the design to strengthen the casing and ensure it did not plasticity deform under high loads. These designs were verified through static stress analysis simulations to ensure the forces exerted on the casing remained lower than the Yield strength of the material.



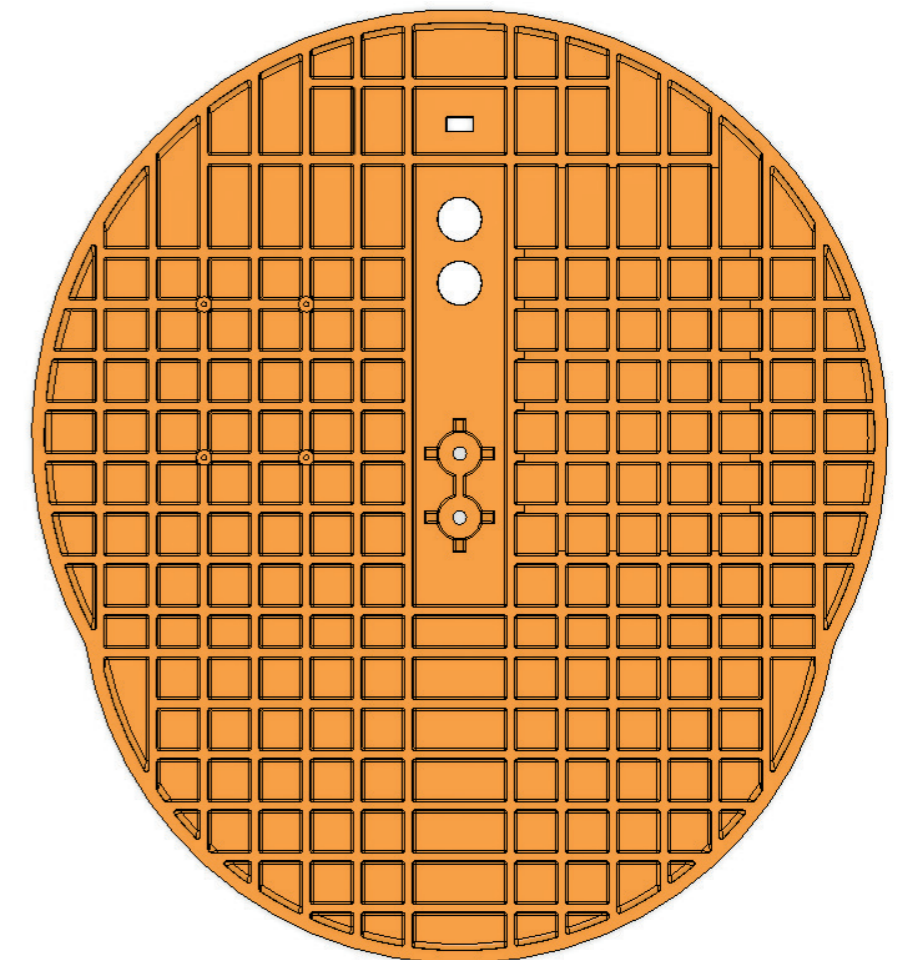
## Detail design:

Bosses and ribs were designed with a 1.8mm wall thickness (0.6 of the nominal thickness). A fillet of 0.6mm was added to bosses and fillets to ensure consistent wall thickness throughout the part. The top casing features 6mm tall ribs and the bottom casing features 3mm tall ribs.

There was a nominal draft of two degrees applied to all parts with a five degree draft applied to the top casing to account for a rough, VDI-39, surface finish.



Top casing



Bottom casing

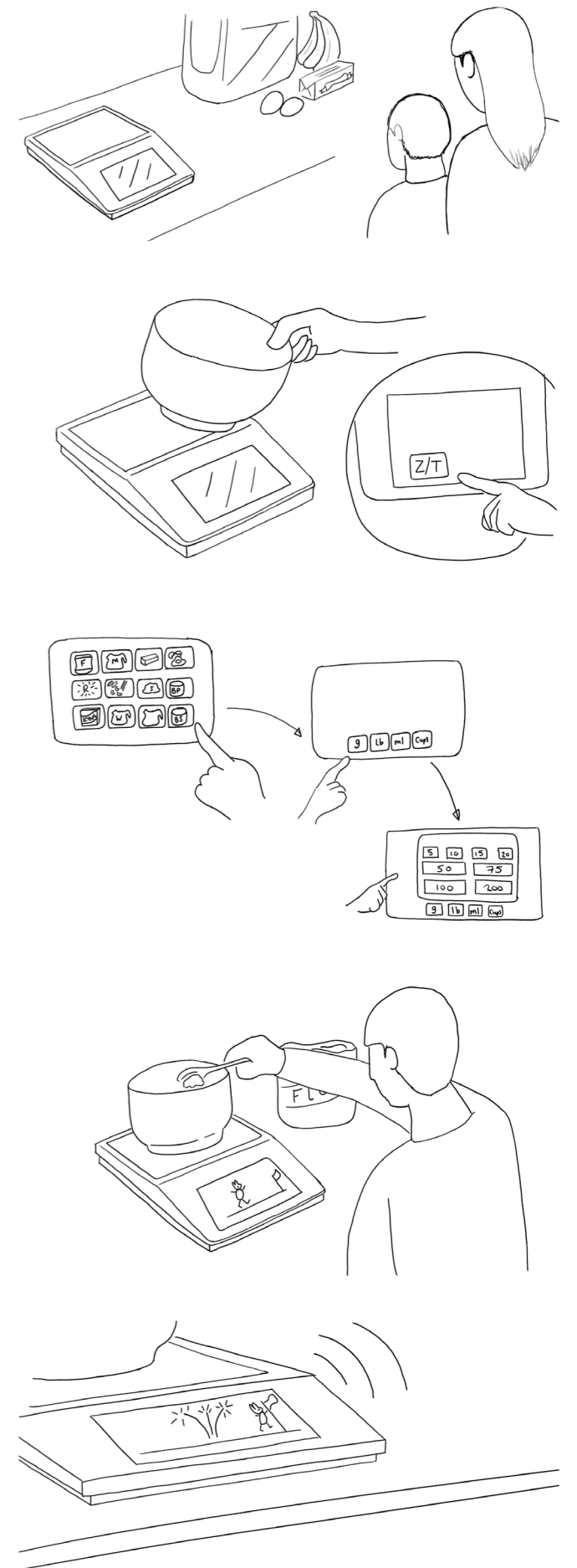


# User experience

The crux of the smart scale user experience is the goal-oriented measuring system. This system reframes the task so you are working backwards from a goal so you don't have to think about when to stop the scale will just let you know.

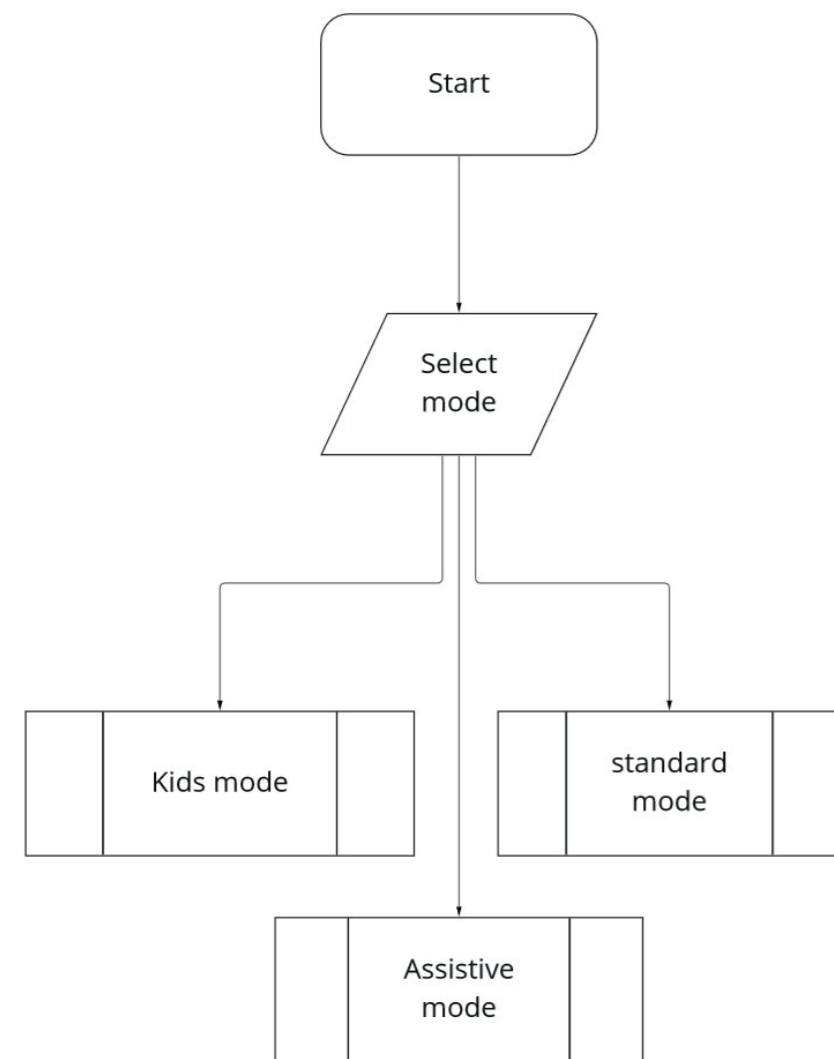


Prototype testing was conducted using paper mock-ups to refine the user experience and get valuable feedback from my user group.



# Three modes

The smart scale features three distinct modes catering to different user needs. It was important to the adults in my user group that any product have a long lifespan, something that could give them value even after their kids had grown up. This led to the development and inclusion of two additional modes. The "Assistive mode" and a standard scale function.

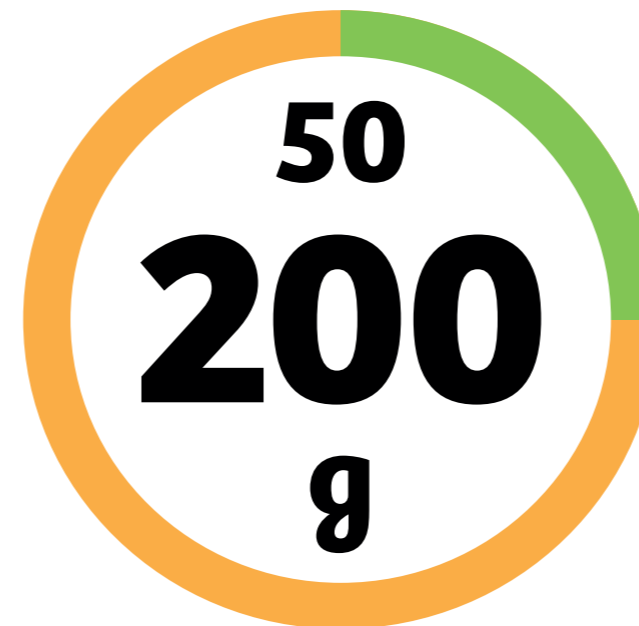


Mode selection wireframe

The "kids mode" is the flagship component and features engaging retro video game style graphics to engage young cooks. A victory animation and sound cue is played when you reach your target weight to signal you've completed your goal.

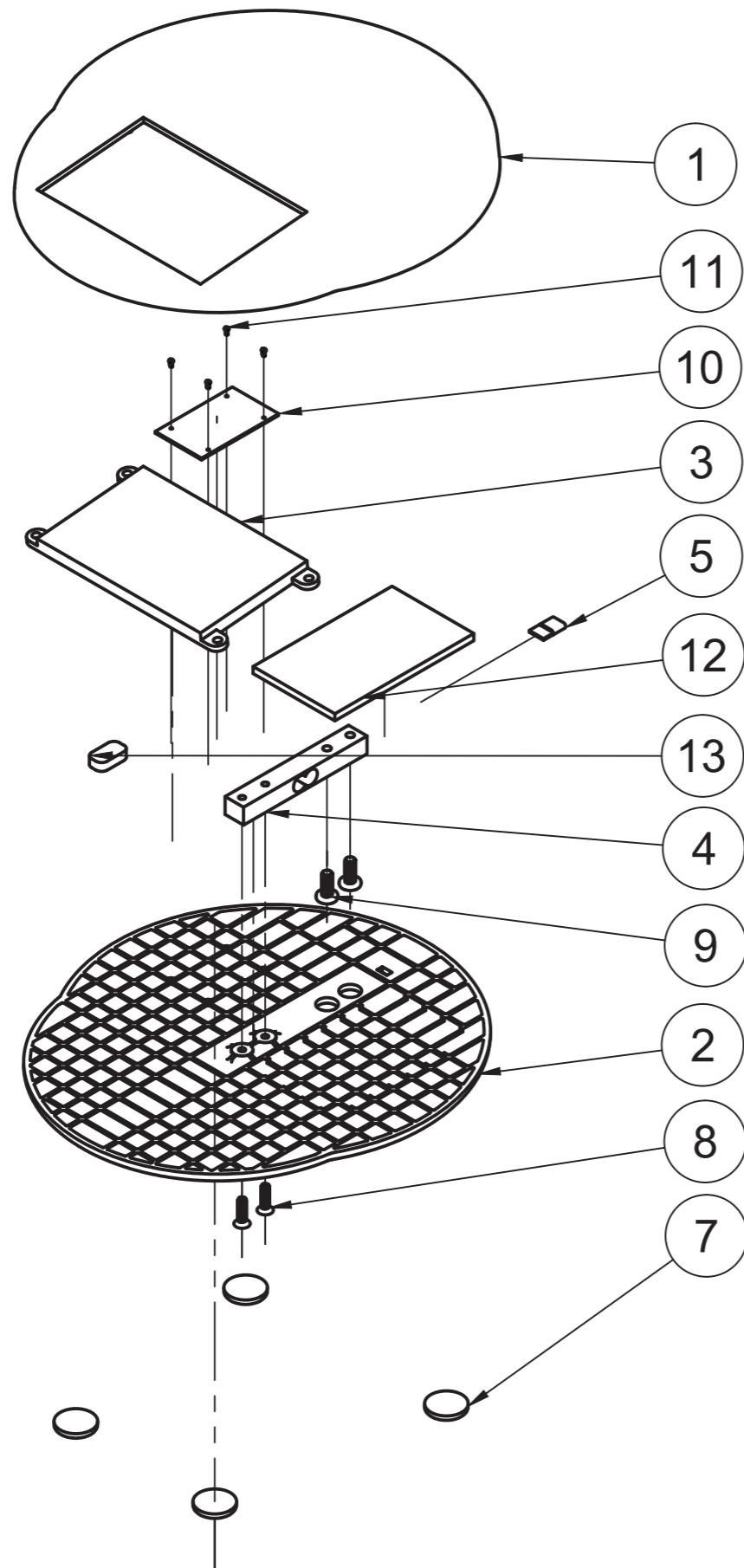


"Kids mode" - example UI



"Assistive mode" - example UI

The "Assistive mode" takes advantage of the same goal-oriented measuring system but delivering it in a more informative UI. The contrasting progress bar allows users to tell at a quick glance how close they are to the goal weight, with the exact weight displayed along side the unit of measurement. The sound cue plays when the goal weight is reached reinforcing the completion of the task.



Parts List			
Item	Qty	Part Number	Material
1	1	Top	ABS Plastic
2	1	Bottom	ABS Plastic
3	1	Screen	Electronics
4	1	Load cell	Steel
5	1	USB C	Electronics
6	1	Switch	Electronics
7	1	Rubber feet	Rubber, Black
8	2	92010A789_Passivated 18-8 Stainless Steel Phillips Flat Head Screw	Steel
9	2	92000A322_Passivated 18-8 Stainless Steel Pan Head Phillips Screws	Steel
10	1	PCB	Electronics
11	4	91800A077_18-8 Stainless Steel Narrow Cheese Head Slotted Screws	Steel
12	1	Li-Po battery	Electronics
13	1	Speaker (1)	Electronics