'Buddy Buggy' Design Folio

Chicco - Ride On Project

DPD40004 Product Design Engineering 6: Professional Design Attributes

Dan Cabral - 7537891: September 1, 2014

CABRAL DESIGN STUDIO

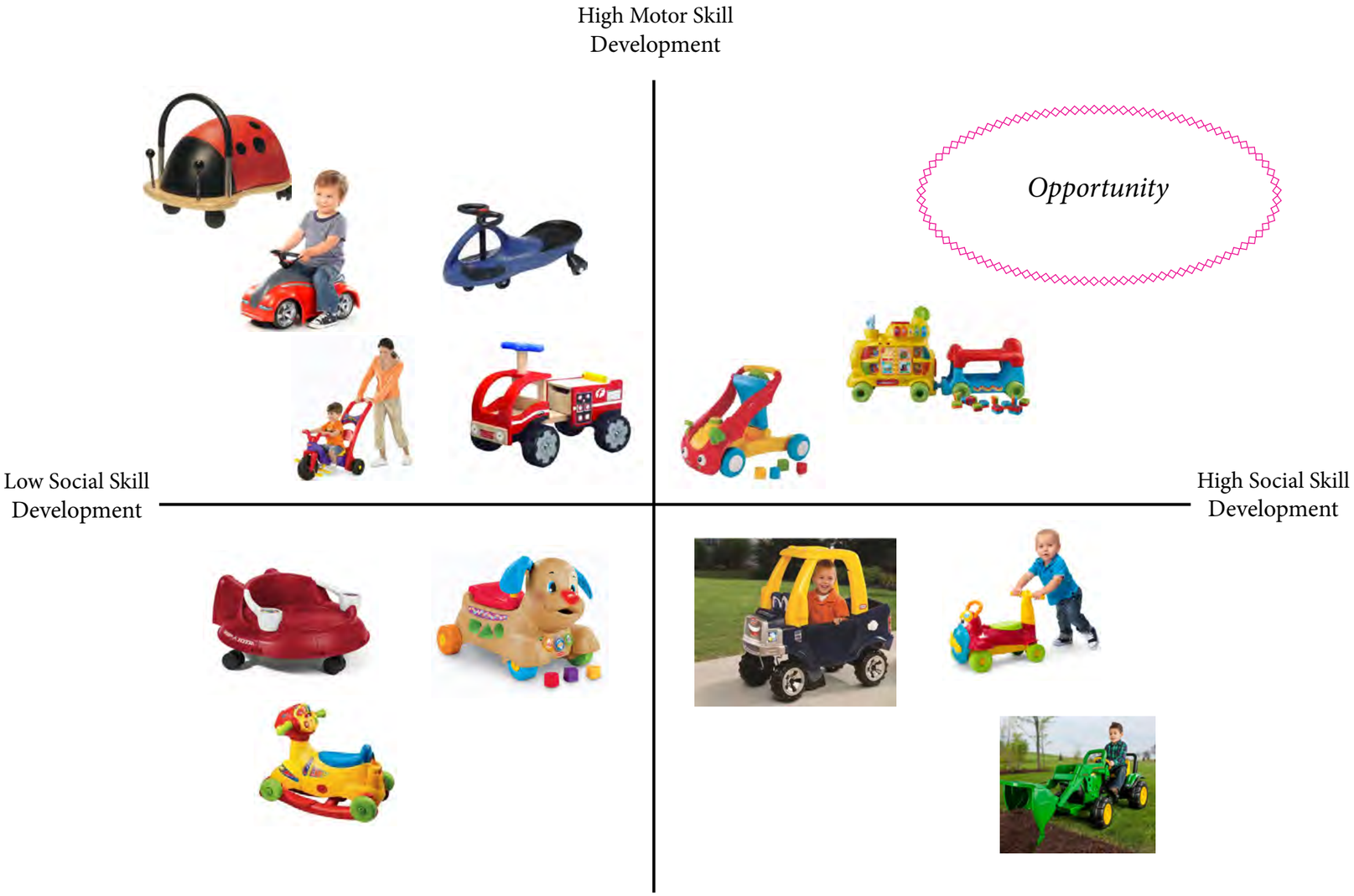
Research

I initially researched existing/ competitor 'Ride-On'products to see what is currently used.

I gained insight towards appearances, colours, themes and styles of ride-on designs.

I then created 'Opportunity Matricies' to efficeiently conduct product benchmarking and identify market gaps.

Opportunity Matrix criteria used:
1. Motor skills vs Cost
2. Motor skills vs Verbal development.
3. Motor skills vs Social skills (shown to the right)



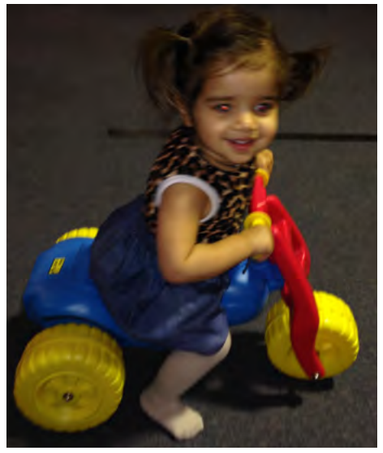
Research

The second phase of research was to physically observe how children use/interact/behave when using Ride-Ons, and to witnes how these products benefit a childs development.

Face to face observation and handling of existing ride on toys allowed me to understand how they are made, from what materials, and how they function when in use.

The Ride-On (shown above) had a major influence on my design concept, as I designed the 'Buddy Buggy' to function and operate with the same principles and with similar componentry.

It was very benefical to observe how my 2 year old cousin used the blue tricycle Ride-On (shown to the right) to maneouvere herself around a play center.



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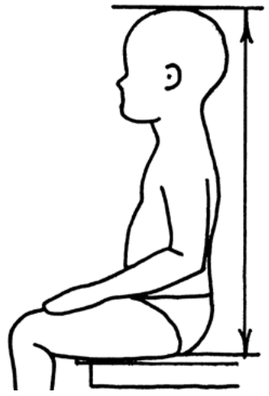
Research

My final stage of research involved collecting anthropometric data for children between the ages of 12-36 months.

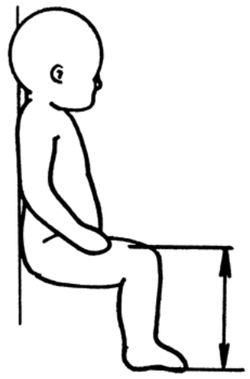
The mean values for 1, 2 and 3 year olds, for a range of relevant infant anatomy dimensions, were averaged to provide overall mean parameters, which were considered as design constraints for dimensioning the Buddy Buggy components.

Anthropometric Data Reviewed:
1. Sitting Height
2. Buttock-Knee Length
3. Sitting Knee Height
4. Shoulder-Elbow Length
5. Lower Arm Length
6. Shoulder-Buttock Height
7. Hip Depth
8. Lower Torso Breadth
9. Inside Hand Grip Diameter



1.

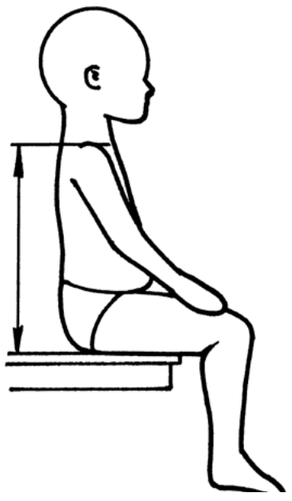
2.



3.

4.

5.



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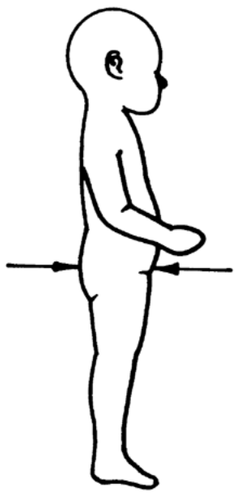

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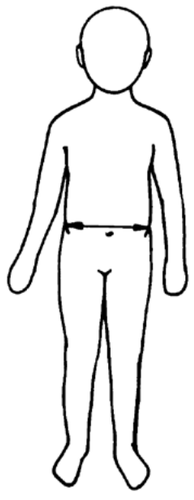

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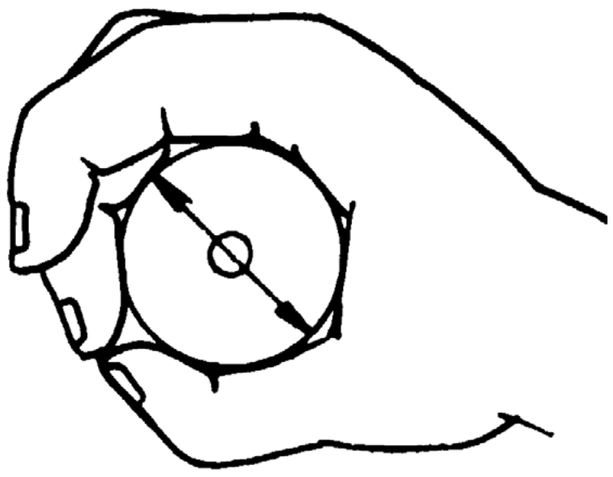

9.

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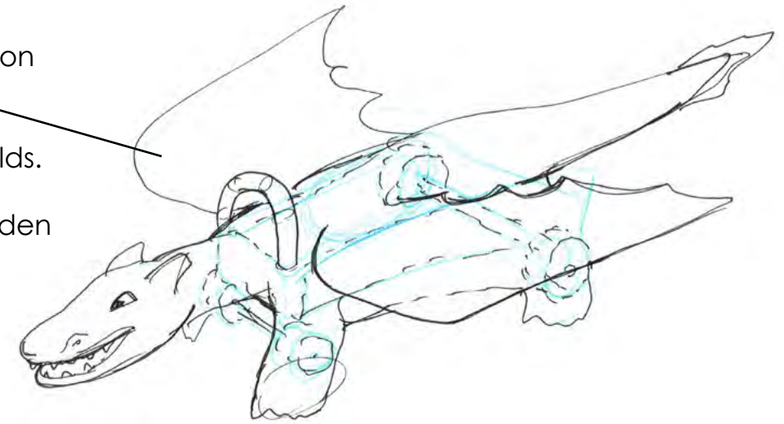
Ideation

Concept Generation Skecthes to brainstorm ideas while exploring forms and functions.

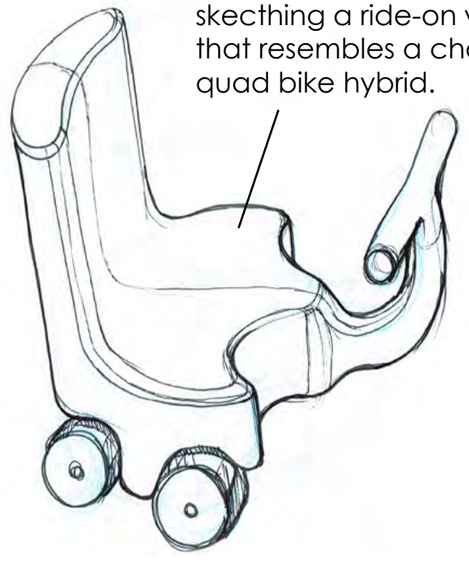
Themed as a famous Pokemon character - Charizard.

Would require complex moulds.

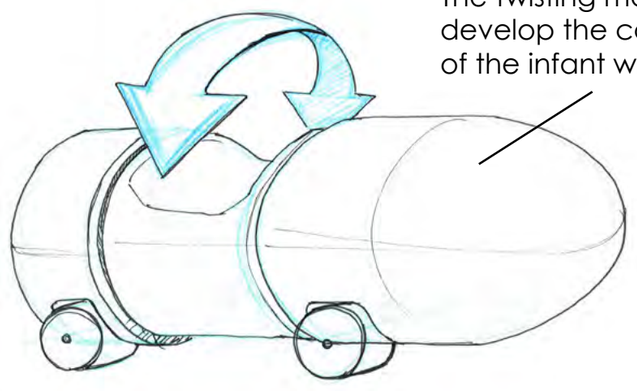
Wheels and internals are hidden by the exterior.



Was trying to experiment skecthing a ride-on with a form that resembles a chair and quad bike hybrid.



The twisting motion would develop the core muscles of the infant when in use.



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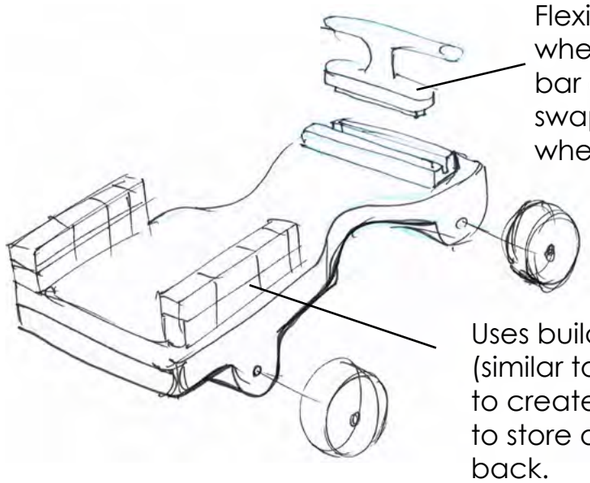
Ideation

Concept Generation Skecthes to brainstorm ideas while exploring forms and functions.



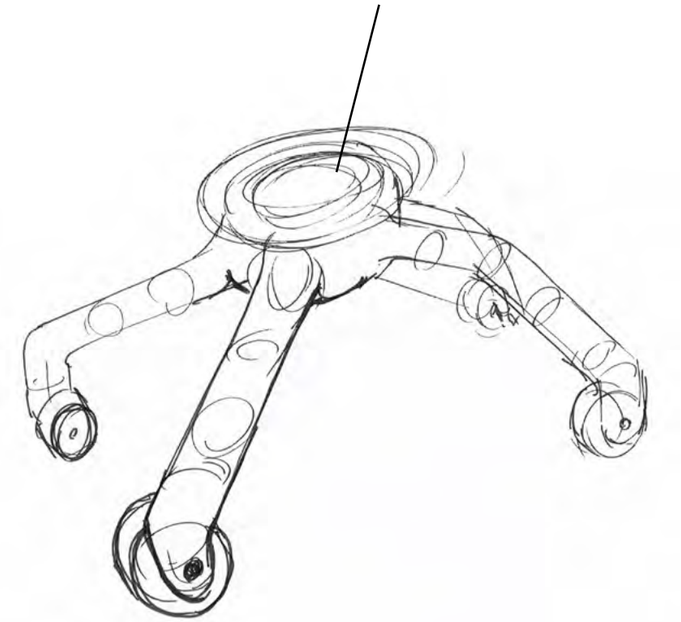
Flexible components where the handle bar can attach to be swapped with a steering wheel.

Uses building blocks (similar to lego pieces) to create a container to store other toys in the back.

Platform for a baby to rest/lay on whilst using hands and legs to crawl.

Can also be used as a pusher, or to ride-on when sitting upright.

By using caster wheels and having a form where the infant can sit on this unit in almost any direction, children can explore the world easily.



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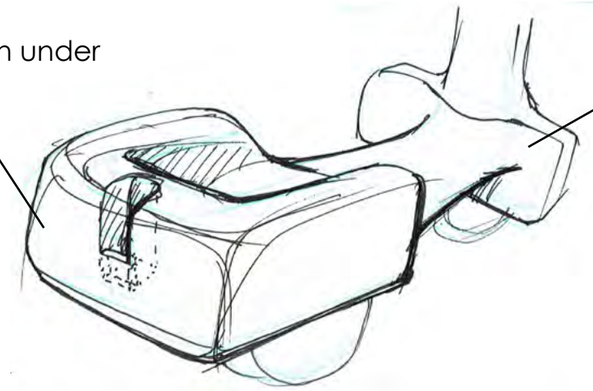

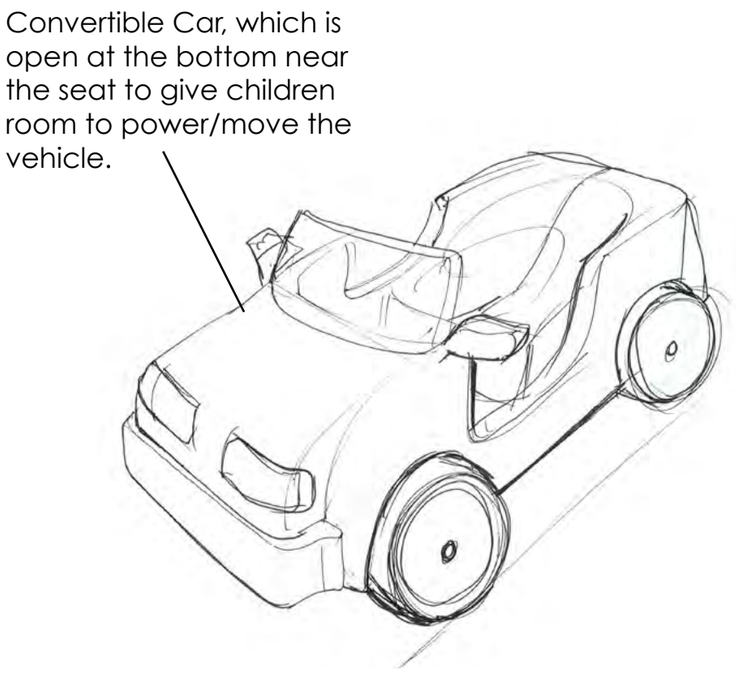

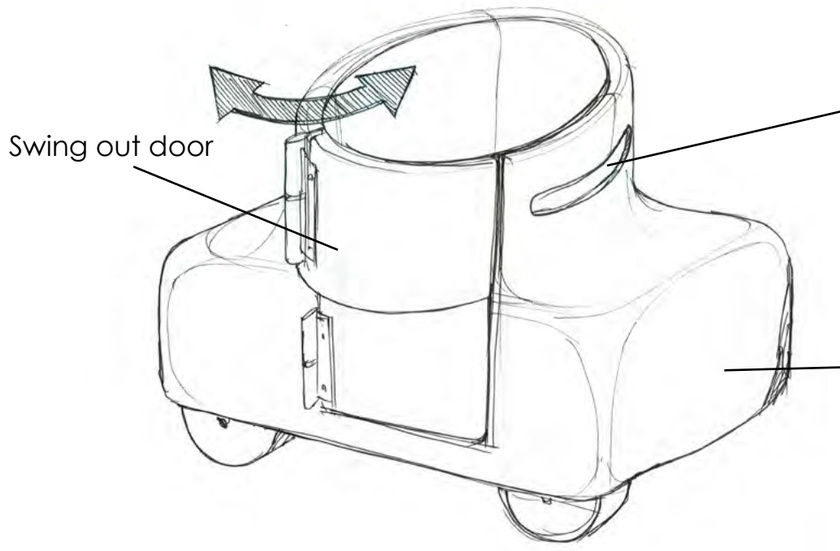

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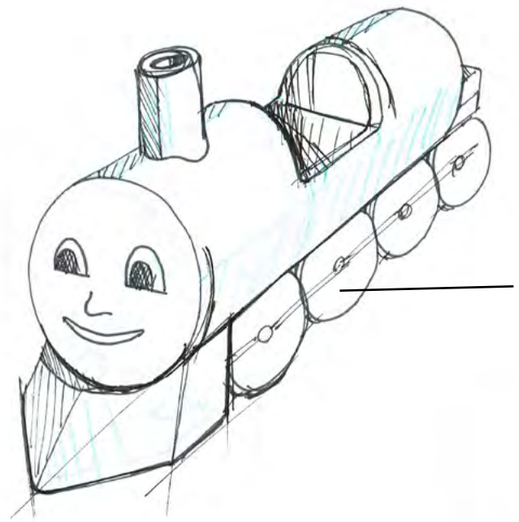
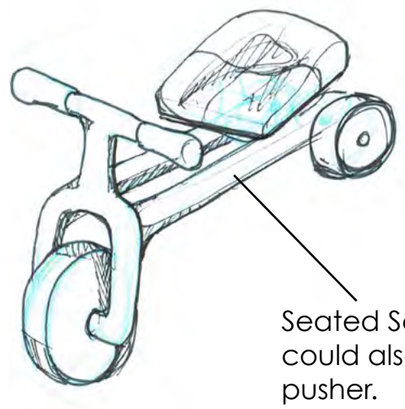
Ideation

Concept Generation Skecthes to brainstorm ideas while exploring forms and functions.

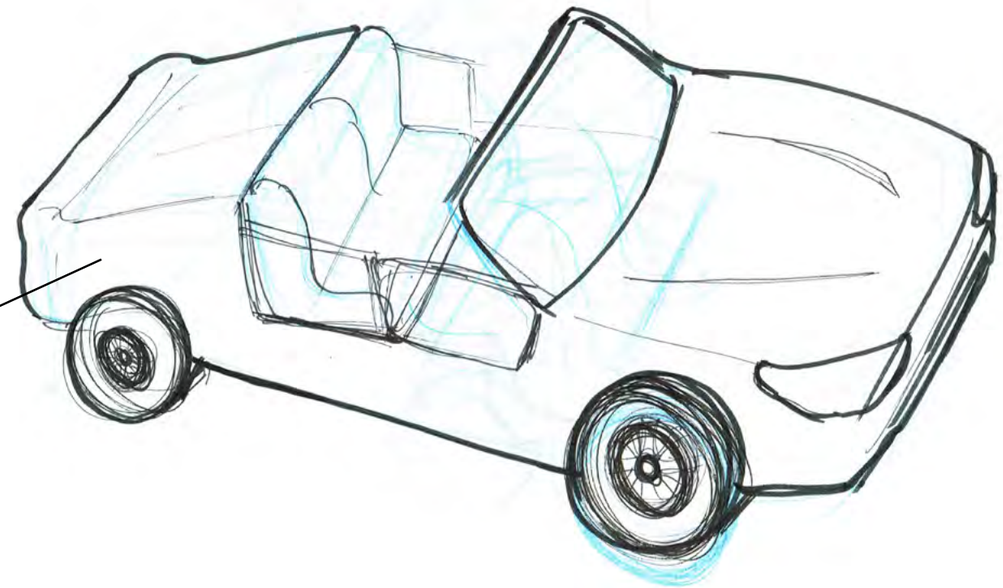


Themed as children show character 'Thomas the Tank Engine'

There are existing motor powered toys, but not Ride-ons that are powered by the user.



Seated Scooter that could also be used as a pusher.



Convertible Car, which is open at the bottom near the seat to give children room to power/move the vehicle.

With no doors the child can easy enter and exit.

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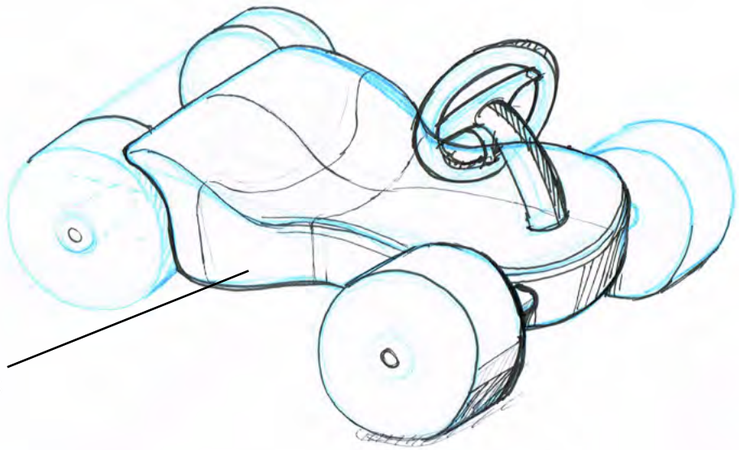
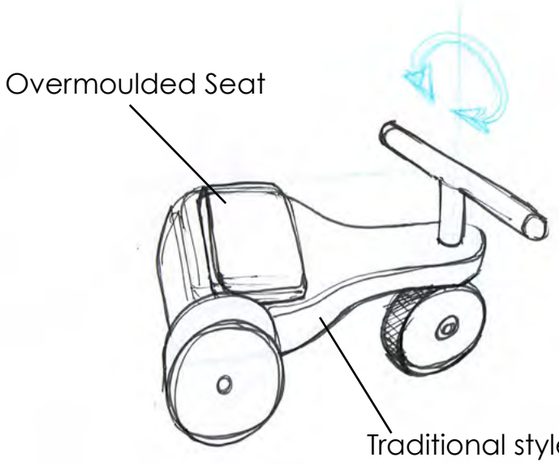
Ideation

Concept Generation Skecthes
to brainstorm ideas while
exploring forms and functions.



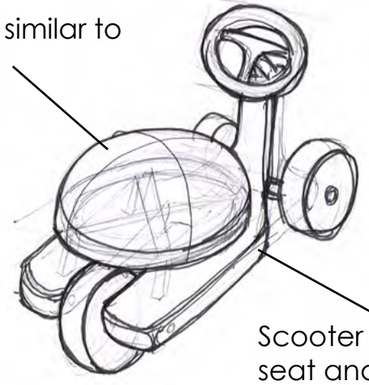
Rotomoulded organic
form with generous fillets
and curvature.



Overmoulded Seat

Traditional styled tricycle

Injection moulded seat.
Simplistic mould design.



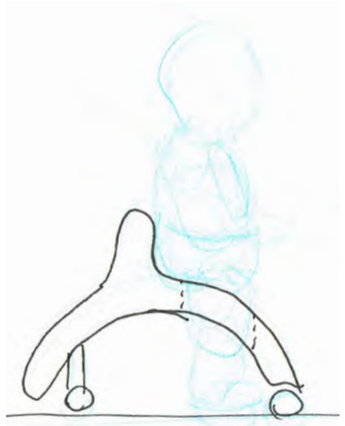
Made from PP, similar to
exercise balls.

Scooter with a inflatable
seat and steering wheel

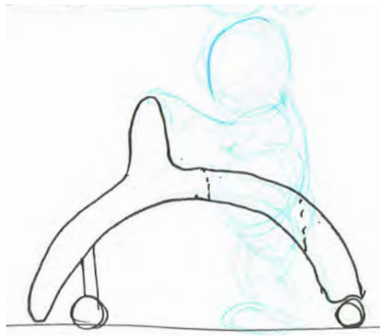
Ideation

Concept Generation Skecthes to brainstorm ideas while exploring forms and functions.

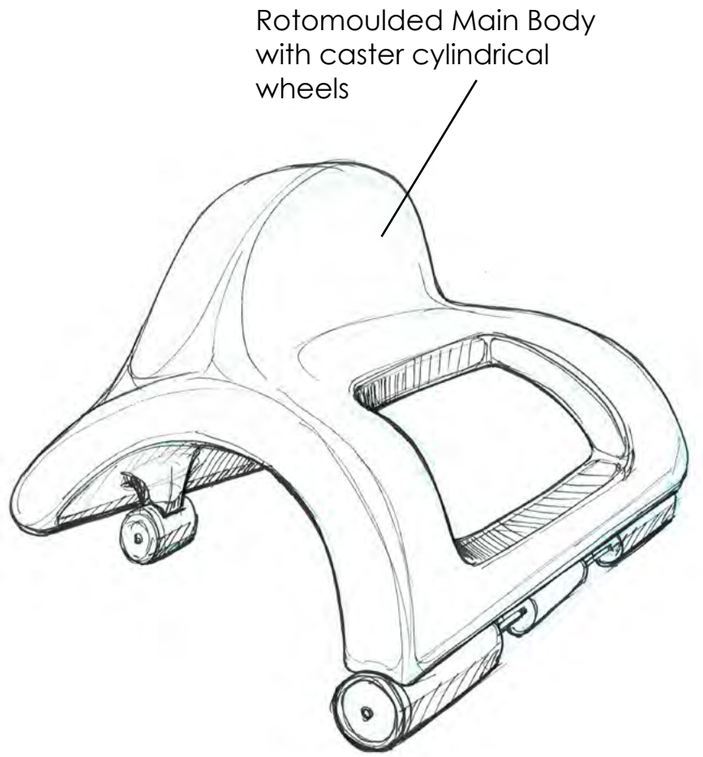
Child leans forward to have the chest resting on the support.



Child seating whilst using with backrest to ride on.

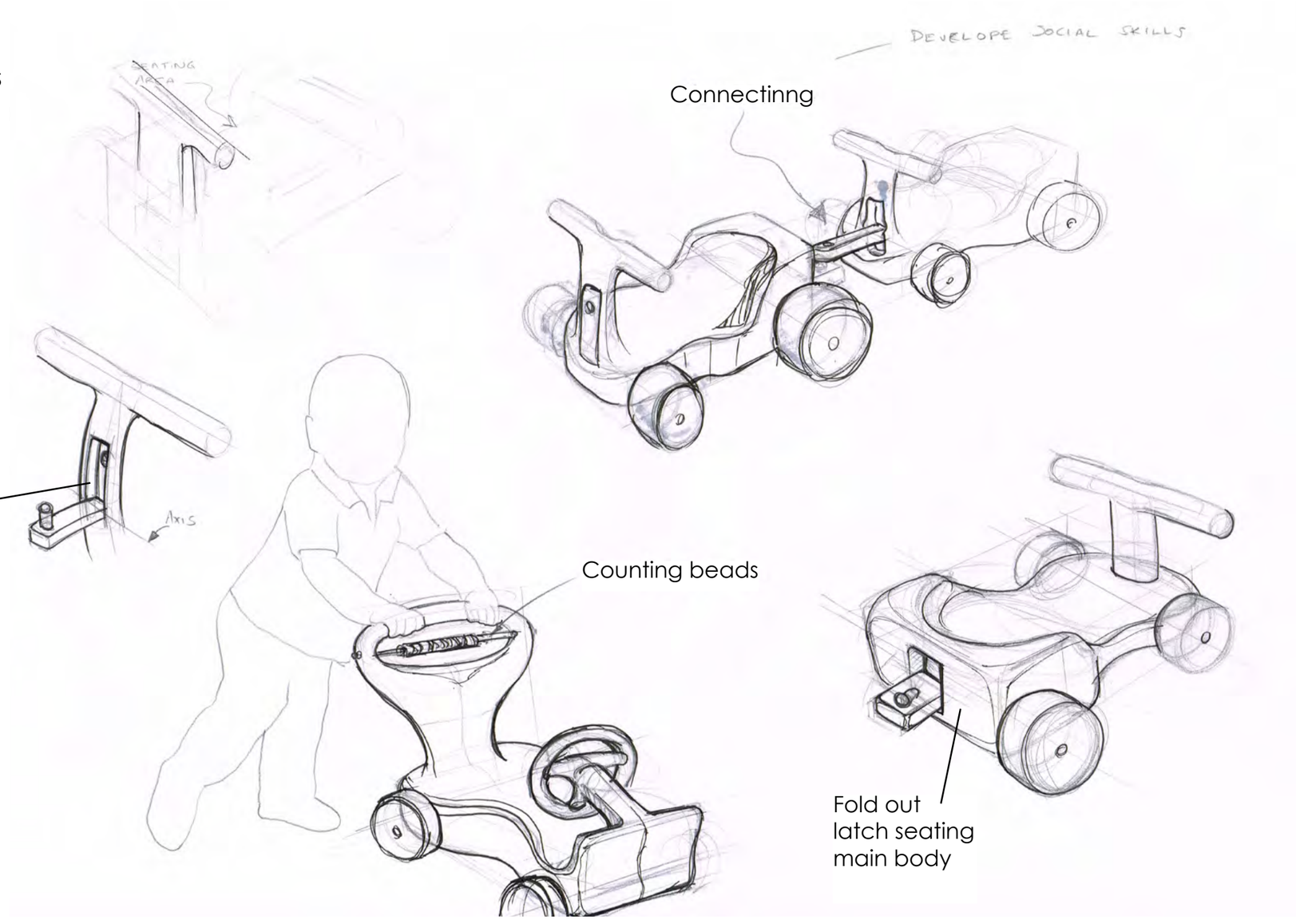


Child using the backrest to hold onto whilst walking and pushing on.



Ideation

Concept Generation Skecthes to brainstorm ideas while exploring forms and functions.



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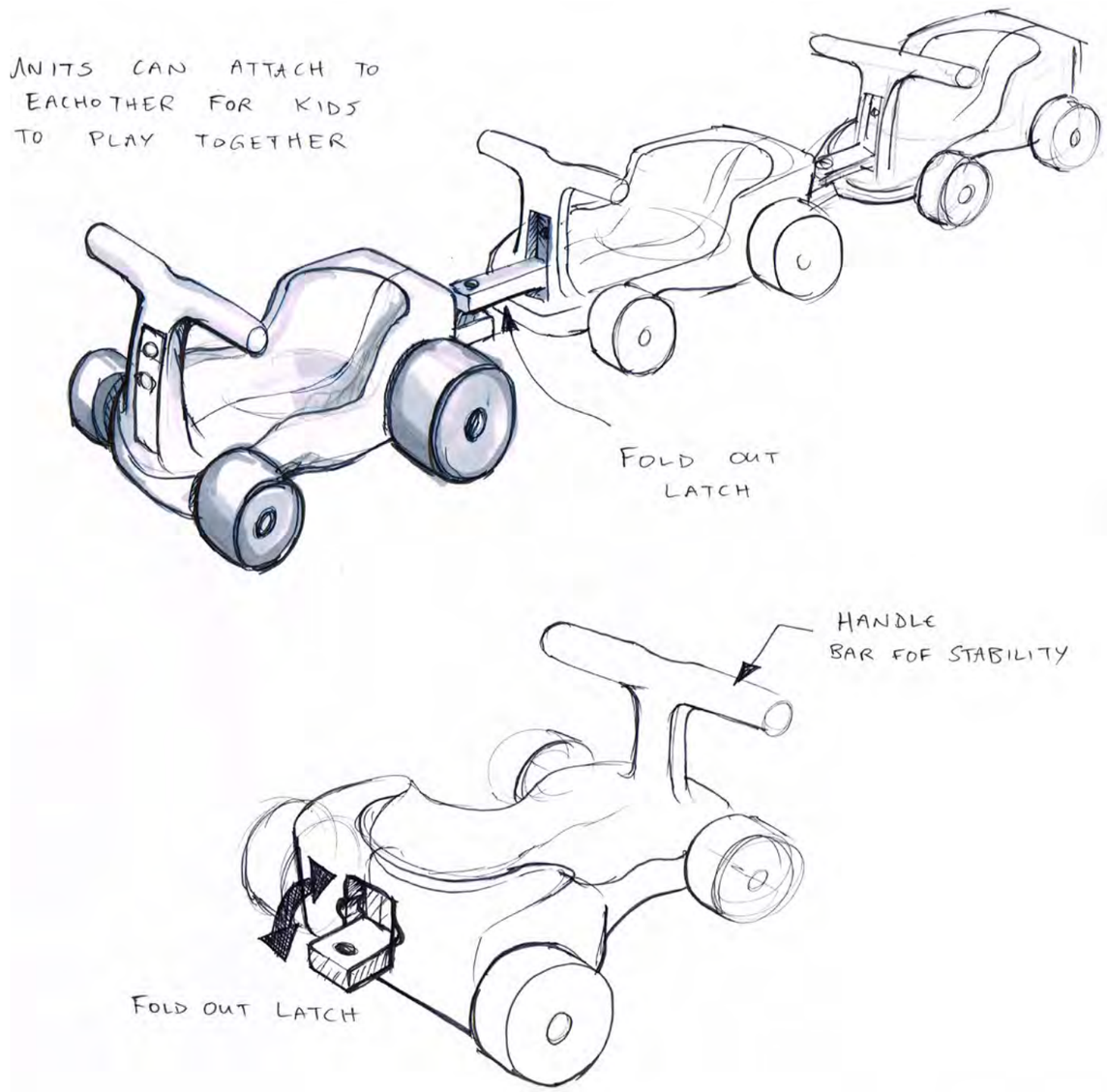
Ideation

Concept Generation Skecthes to brainstorm ideas while exploring forms and functions.

The sketches on this page were produced during the concept bomb exercise.

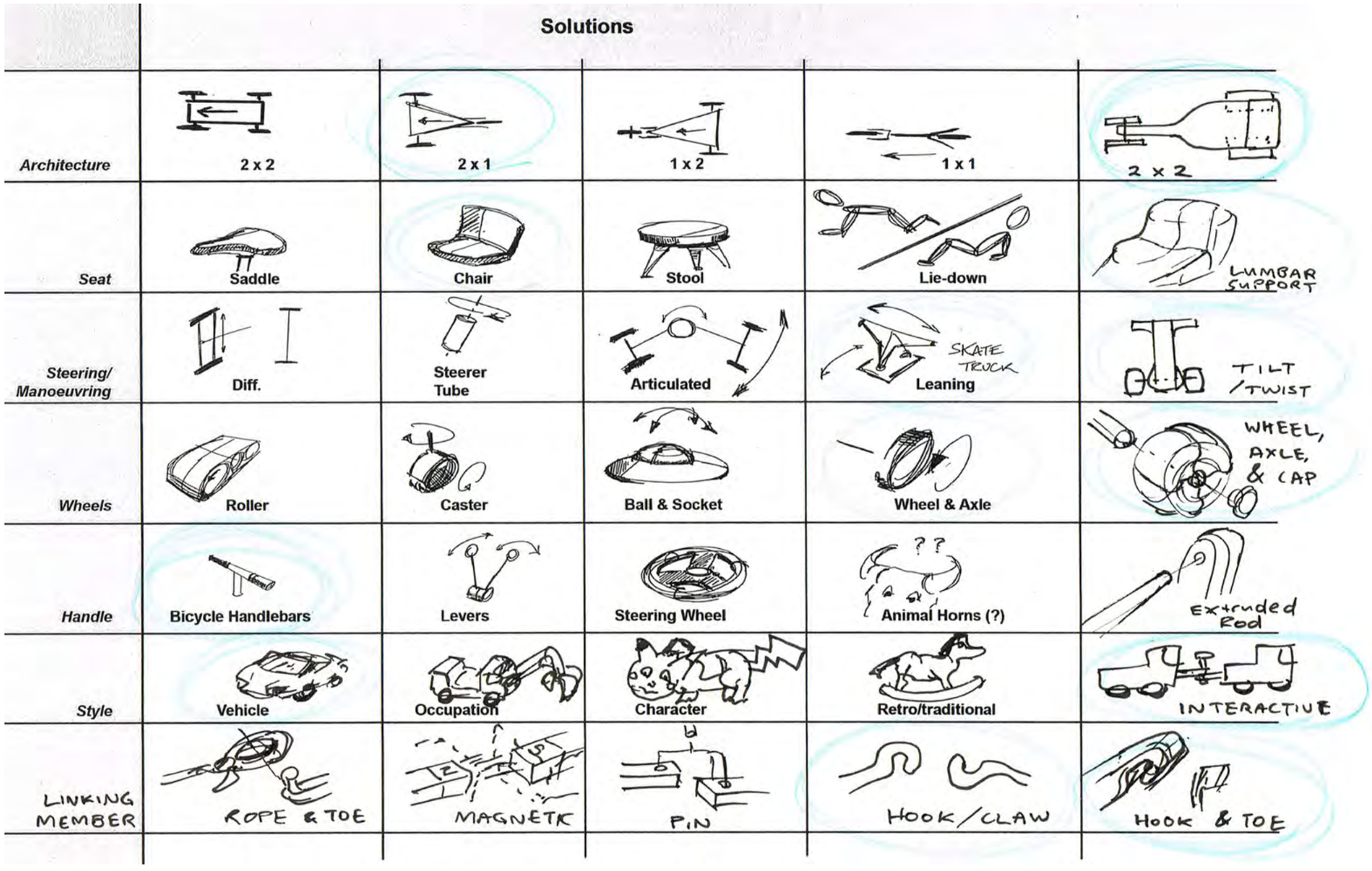
Based on my research I decided that it would be best to not only design a Ride-On toy that would develop childrens motor skills, but also develop their socilal skills and encourage them to interact with others.



Ideation

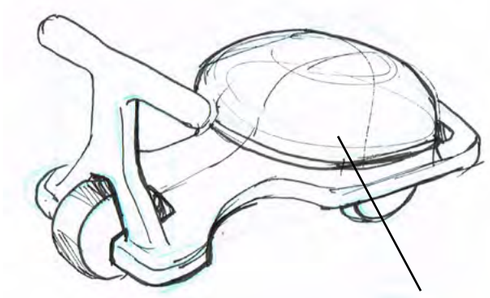
Concept Generation thumbnail skecthes were applied to the Morphology Chart shown here.

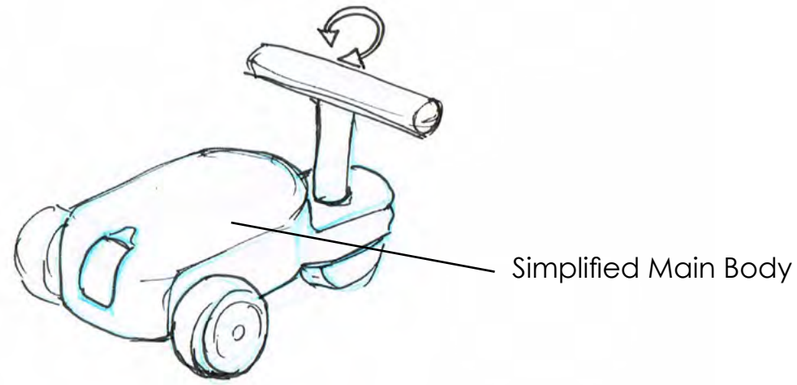
The morphology chart technique was used to explore various features and functions that would potentiallly be used for the further Ideation and development of the Buddy Buggy design while avoiding fixation.

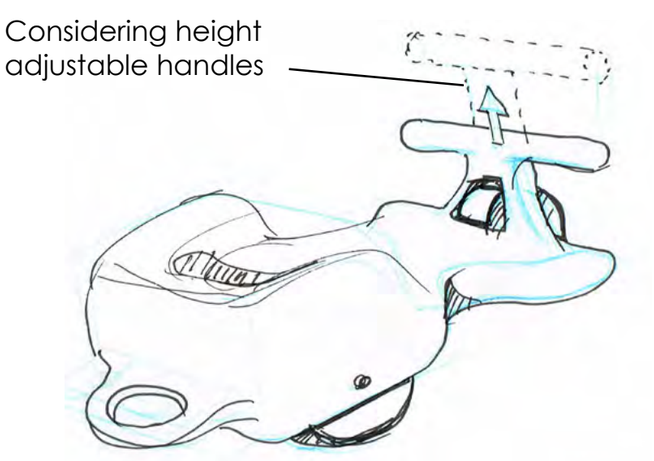


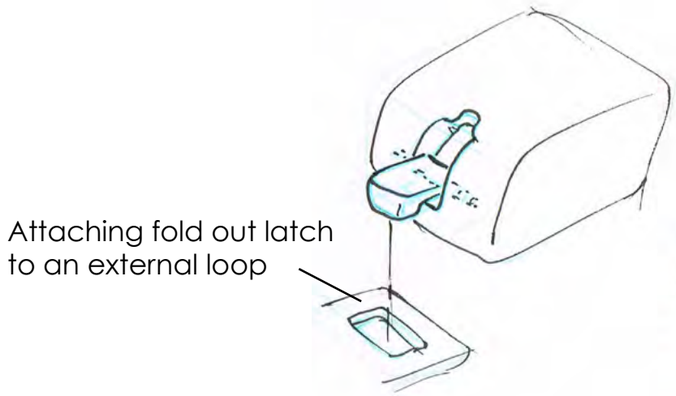
Ideation

Further generating ideas to explore features and functions that could be implememented towards the design of the Buddy Buggy components.

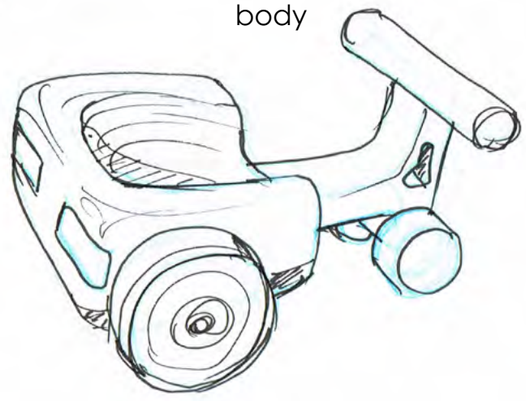






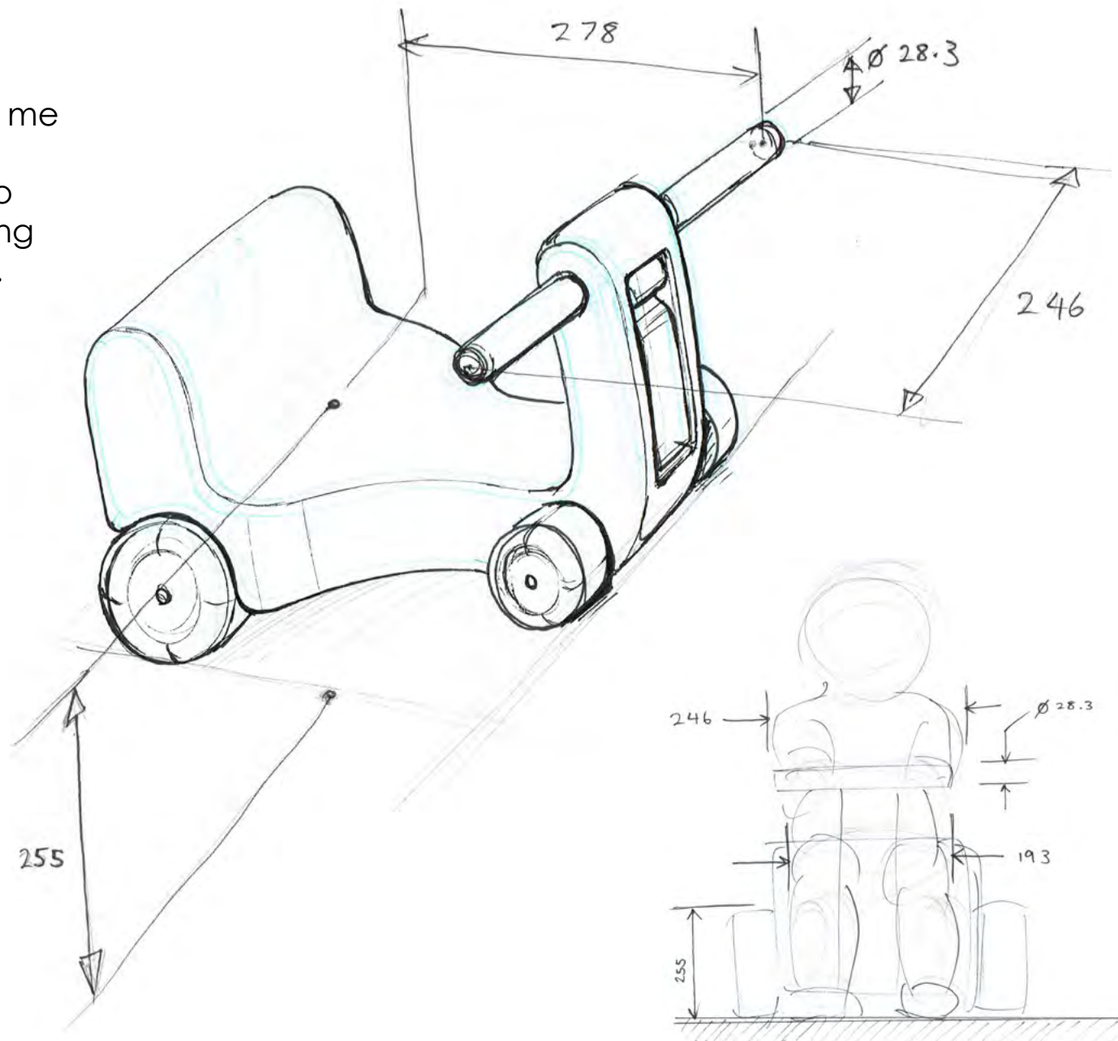


Exploring the idea of attachments swinging out from the sides of a main body

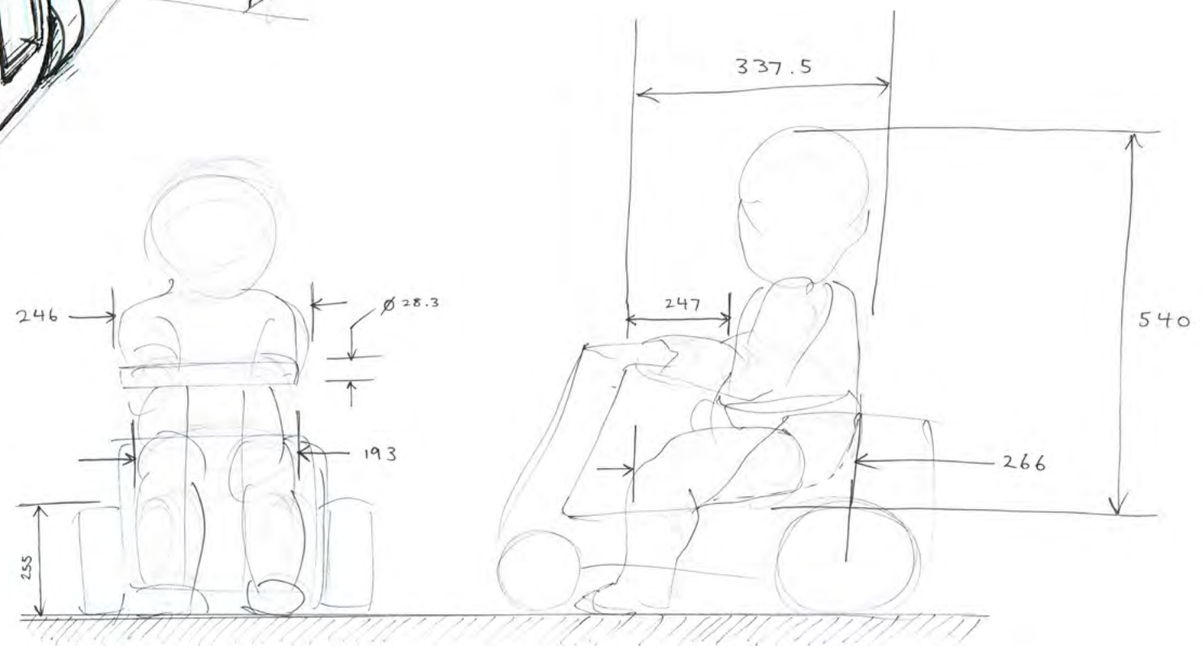


Development

After generating many concepts, ideas, forms, functions and features, a design freeze compelled me to the stage of seting parametric dimsionions to prepare for CAD modelling and get a sense of scale.

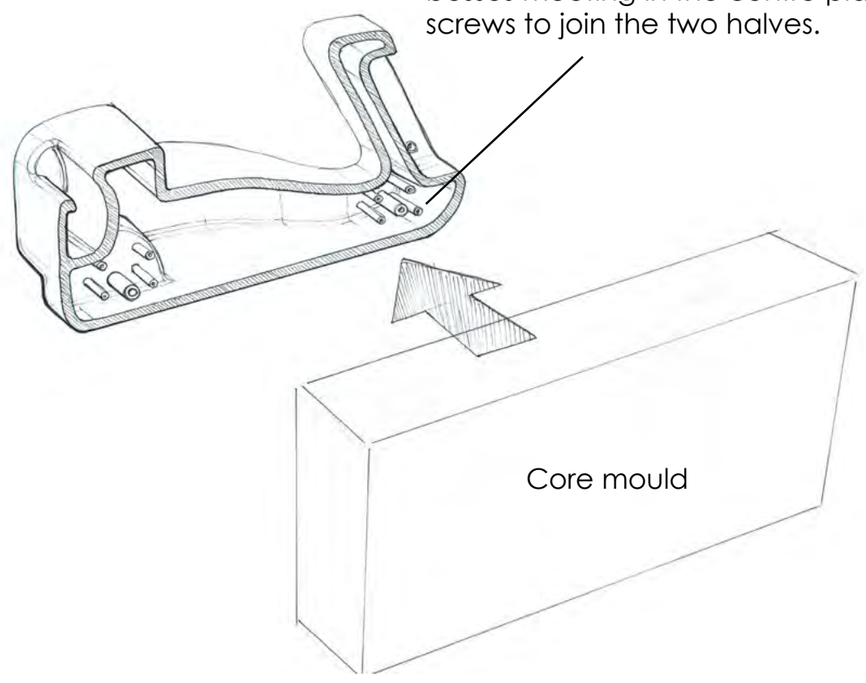


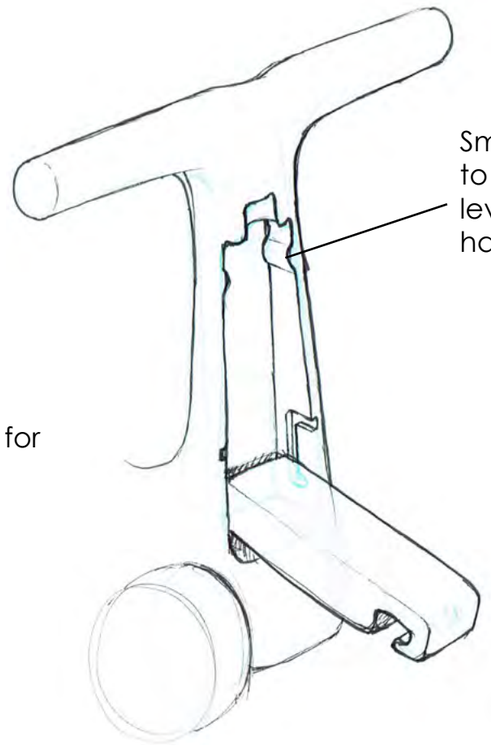
Once happy with the basic form, I used the anthropometric data from my research to set parameters and design constraints.



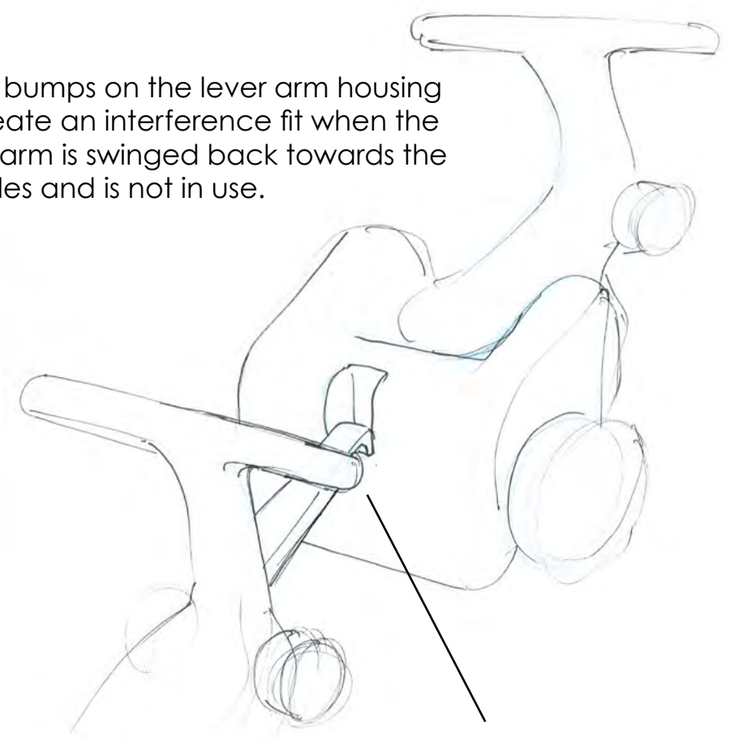
Development

Resolving and developing areas in the design through sketching, while also considerinng appropriate manufacture processes to create the components.





I initially planned on having the main body Rotomoulded, but came to find that injection molding two halves would be easier to manafacture a component with the geometry that I designed and desired.



Developing the tool used to attach two ride-ons by skecthing a lever arm with a hook on the end, which is to grasp onto a section in the rear of the main housing.

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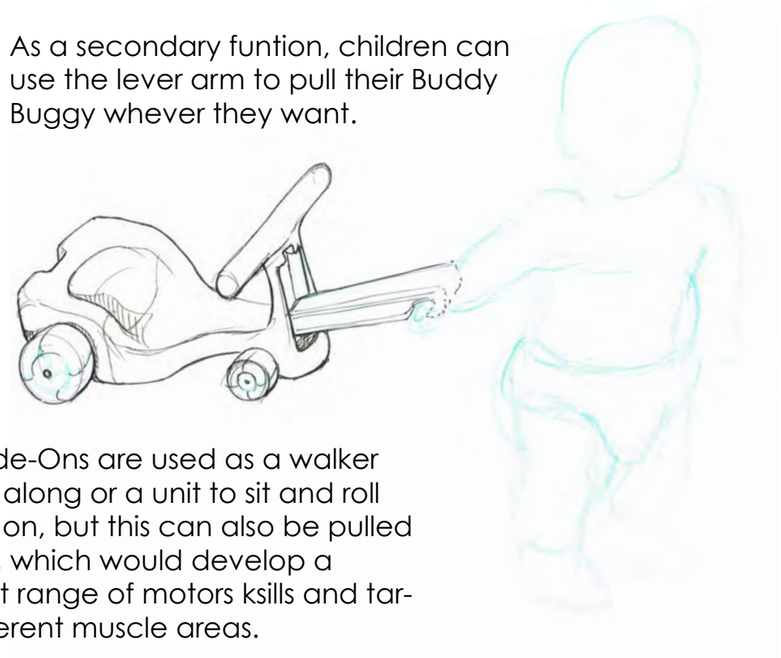
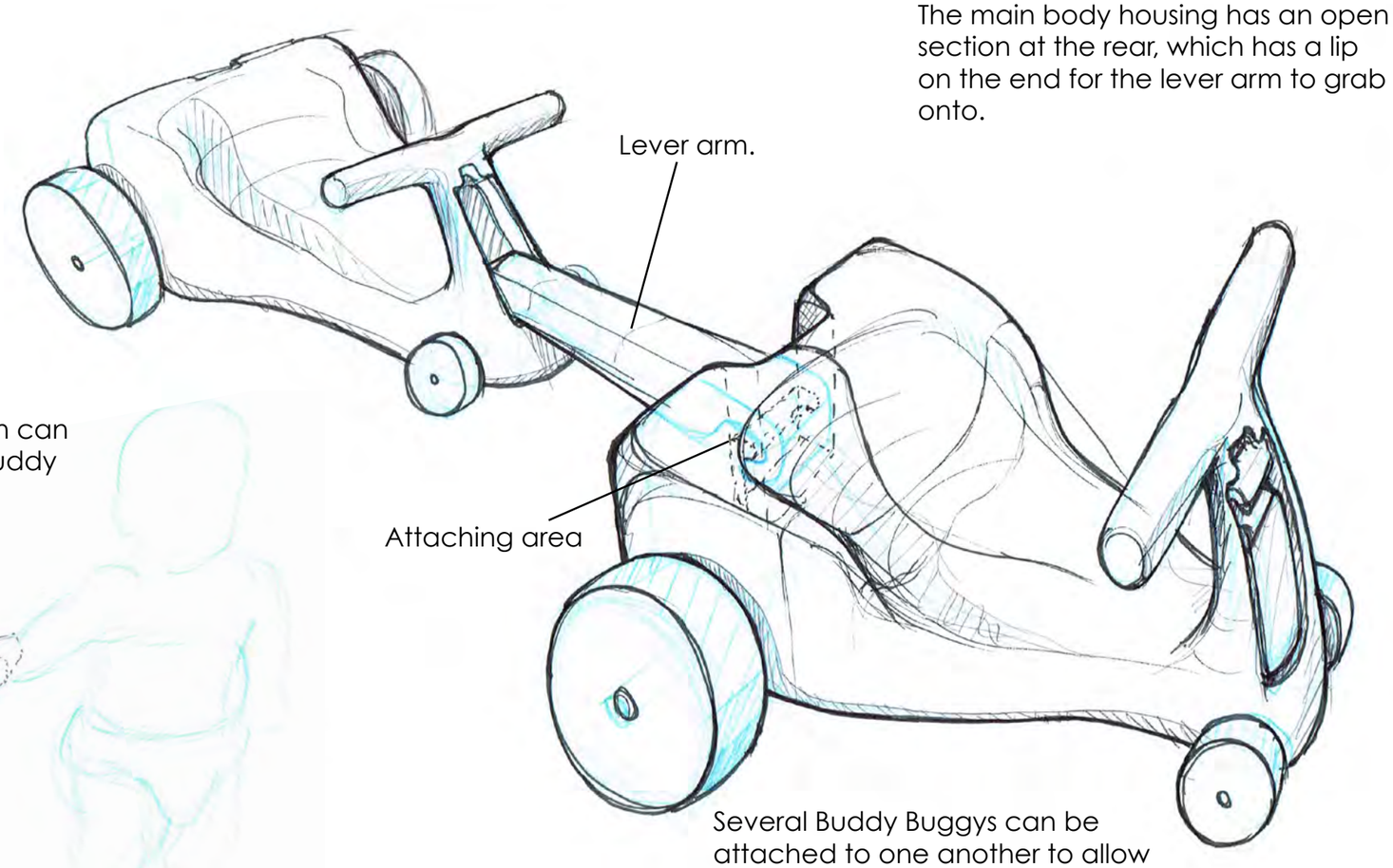


As a secondary funtion, children can use the lever arm to pull their Buddy Buggy whever they want.

Most Ride-Ons are used as a walker to push along or a unit to sit and roll around on, but this can also be pulled around, which would develop a different range of motors ksills and target different muscle areas.



The main body housing has an open section at the rear, which has a lip on the end for the lever arm to grab onto.

Several Buddy Buggys can be attached to one another to allow several children to play/interact/ co-operate and explore together.

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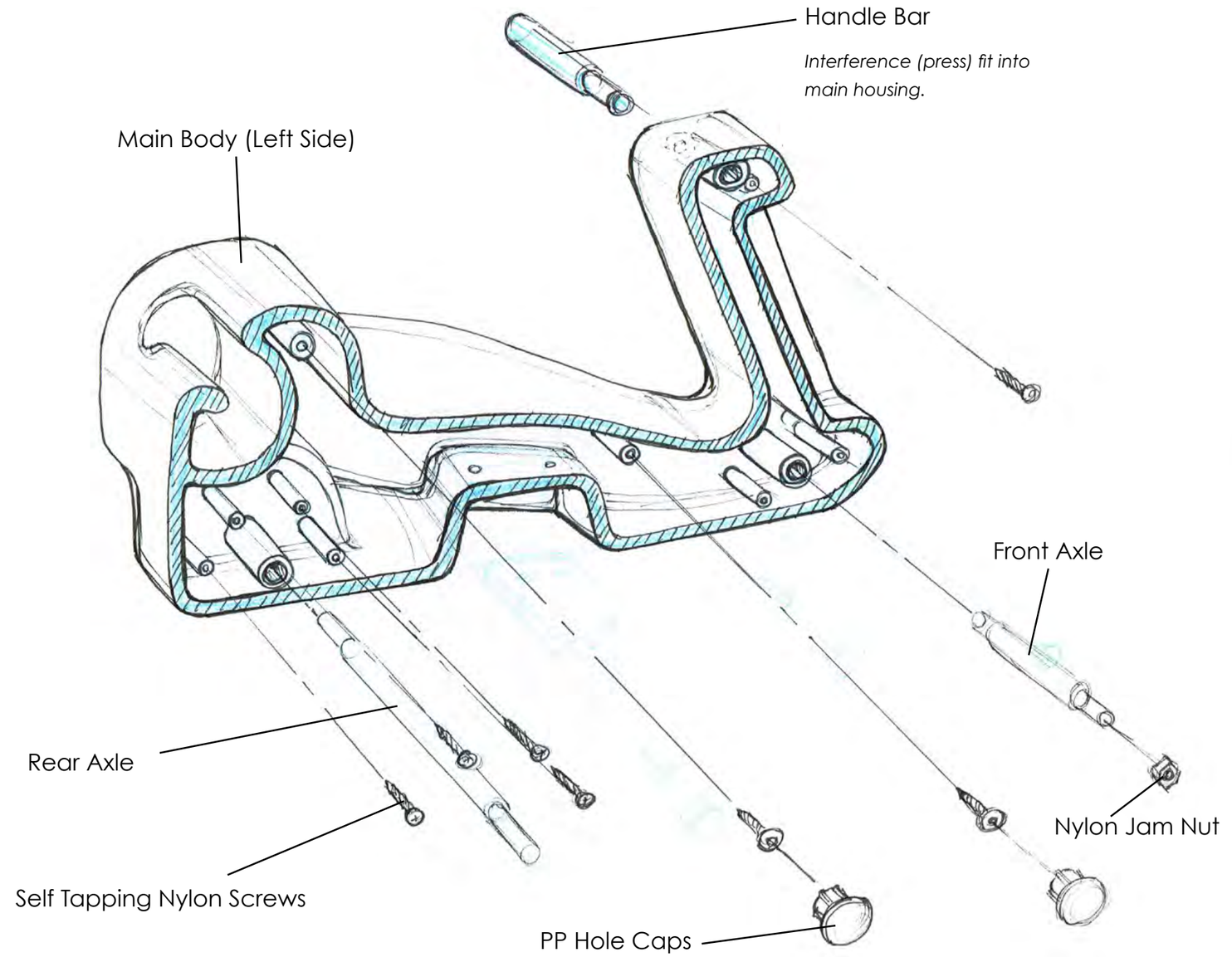
Development

Resolving and developing areas in the design through sketching, while also considerinng appropriate manufacture processes to create the components.

I decided to use injection moulding to process the main body.

This was because I would be able to achieve high dimensional accuracy, uniform wall thicknesses, and achieve well moulded structural elements such as ribs and extruded bosses.



Visualisations

Visualisations

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Visualisations

The Buddy Buggy is designed to not only be develop a childs motor skills, but also their social skills.

It encourages children to play together, interact and make friends.

The Buddy Buggy would be most ideal for children to use as a tool to interact with eachother in environments such as kindergartens, day cares and play centers.

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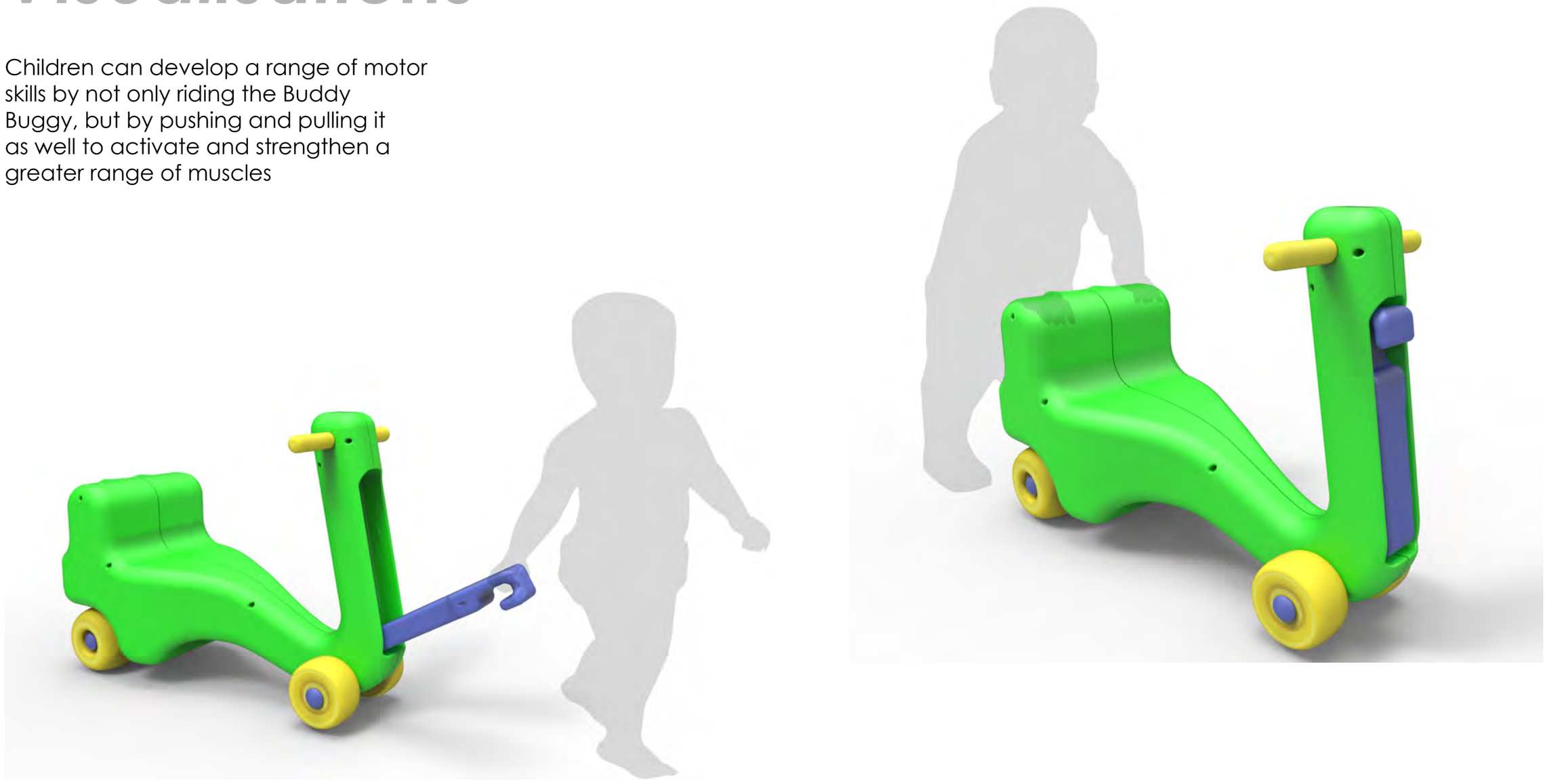
Visualisations

Children can develop a range of motor skills by not only riding the Buddy Buggy, but by pushing and pulling it as well to activate and strengthen a greater range of muscles



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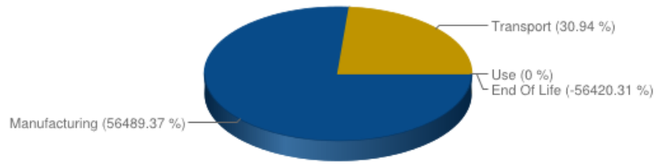
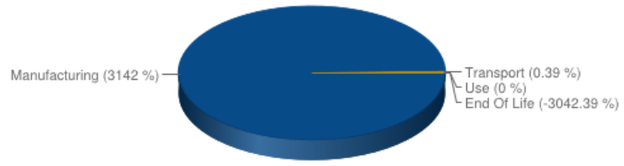
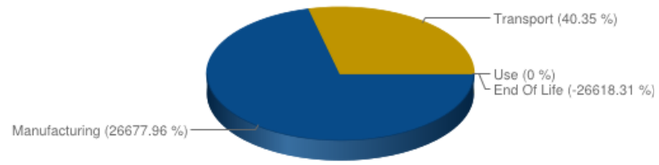
Analysis

Life Cycle Analysis of all the Buddy Buggy components was conducted using Greenfly to review data regarding the environmental impact.







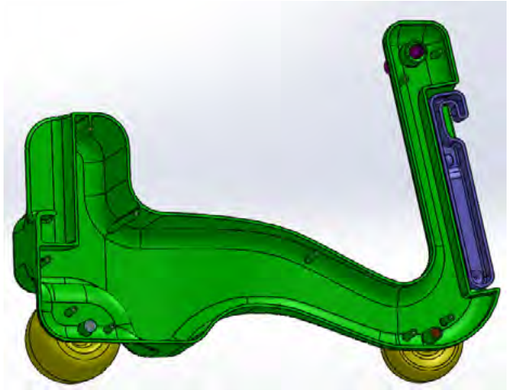
Totals	Solid Waste (kg)	Water Use (kL)	Global Warming (kg CO2 eq)	Energy Demand (MJ LHV)
Manufacturing	0.21	0.01	11.36	393.46
Transport	0	0	0.02	0.22
Use	0	0	0	0
End of Life	-0.21	-0.01	-11.33	-392.97
Total	0.01	0	0.04	0.7

Assembly	Part	Qty	Material	Process	Amount	Unit	Recycled Content	Costing	Eol Destination
New Assembly									
	Main Body (Left)	1	HDPE		1.67	kg	0	$0	HDPE
				Plastic Injection Moulding	0	kg	0	$0	
	Main Body (RIght)	1	HDPE		1.67	kg	0	$0	HDPE
				Plastic Injection Moulding	0	kg	0	$0	
	Pulling Lever	1	HDPE		0.3	kg	0	$0	HDPE
				Plastic Rotational Moulding	0	kg	0	$0	
	Handle Bar	2	PP		0.03	kg	0	$0	PP
				Plastic Rotational Moulding	0	kg	0	$0	
	Front Axle	1	HDPE		0.39	kg	0	$0	HDPE
				Plastic Extrusion	0	kg	0	$0	
	Rear Axle	1	HDPE		0.05	kg	0	$0	HDPE
				Plastic Extrusion	0	kg	0	$0	
	Front Wheel	2	HDPE		0.19	kg	0	$0	HDPE
				Plastic Rotational Moulding	0	kg	0	$0	
	Rear Wheel	2	HDPE		0.32	kg	0	$0	HDPE
				Plastic Rotational Moulding	0	kg	0	$0	
	Axle Cap	4	PP		0.01	kg	0	$0	Recycling PP
				Plastic Injection Moulding	0	kg	0	$0	
	M4x40 Cross Recessed Screws	10	Nylon		0	kg	0	$0	Nylon

Analysis

Design for Manufacture has been considered through out the process for designing the Buddy Buggy.

Structural analysis had also been conducted at various stages throughout the project to ensure that the design would be safe for use and avoid failure for safety reasons.



Design for Manufacture

The most complex components of the Buddy Buggy are the two Main Body halves, which are to be manufactured by injection moulding HDPE.
To avoid the use of sliding cores (save on tooling cost), I think there are two areas that would fail to obtain uniform wall sections, which arose in my attempt to remove all undercuts.
Thus the rear grapsing chamber and the front end that houses the lever arm needs to be further resolved to obtain uniform wall thickness to avoid shrinkage on the exterior and proper function.
The other components comprise of simplistic geometry for easy mould design and manufacture, using rotomoulding, injection moulding and extrusion (materials are HDPE and PP).

Structural Analysis

As the Buddy Buggy to designed to be used by children, it is to have a very high safety factor where it is almost impossible to fail/deform/cause an accident when in use. I would improve on the structure of the design by introducing more internal structural ribs to the main body.
The lever arm is designed to rotate about holes in the main body, however friction and excesive pulling during use may cause it to wear and deform over time, so I would refine this area of the design by using a self lubricating material to over mould the mating surfaces, or use an alternative material which would be more appropriate for the components and their functions.

Analysis

Design for assembly and disassembly has been considered throughout the design process to ensure that the Buddy Buggy can be easily repaired or have parts replaced and installed by an adult or guardian.

Reflection on the overall design of the Buddy Buggy has been provided to evaluate the product on how successfully it fulfils the breif supplied by Chicco.

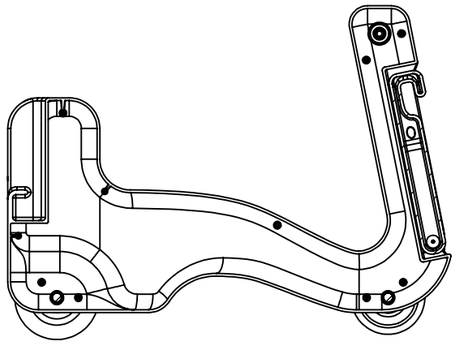
Engineering Documentation is found on the following pages.

Design for Assembly

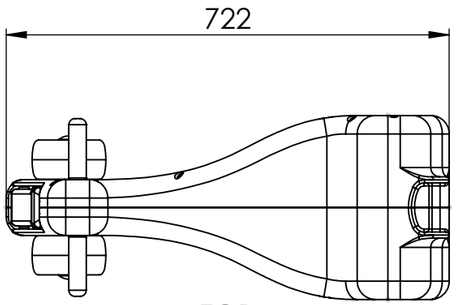
The main body halves are joined together by using 10 nylon screws. The handle bars snap fit into the main body, while the axles are press fitted into the main body. The wheels are slide fitted onto the axles, and constrained in their designated area by interference fitting axle caps, however sufficient clearance ensures that the wheels are free to rotate. The lever arm is held in position by the two main body halves and is also free to rotate, however when clicked into its upright position and held in place with minimal interference so that a child could pull it out.
As all components are made from recyclable/reuseable materials I have designed the Buddy Buggy to be easy to disassemble so at the end of life of the components they should not resort to landfill. I also wanted it to have a simple assembly so that a parent or guardian can easy pull it apart or resassemble if necessary.
However to further improve on the structure I would add more screws to fasten components together and reduce the amount of interference fits to increase the safety factor, reliability and ultimatley make it easier to disassemble.

Structural Analysis.

The Buddy Buggy would truly help children develop their sense of movement, motor skills and spacial awareness, while also developing their social skills, ability to lead/follow/co-operate, and encourage them to interact and make friends.
All of which I think are important skills to adopt at early ages.
To conclude, the Buddy Buggy is also made entirely from rigid plastics, it is environmentatly friendly, child safe, is easy to manufacture and easy to assemble.



SECTION DC-DC



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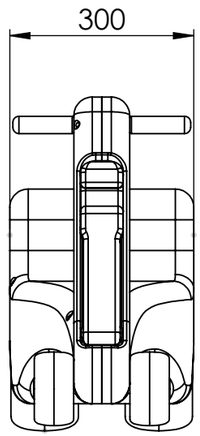

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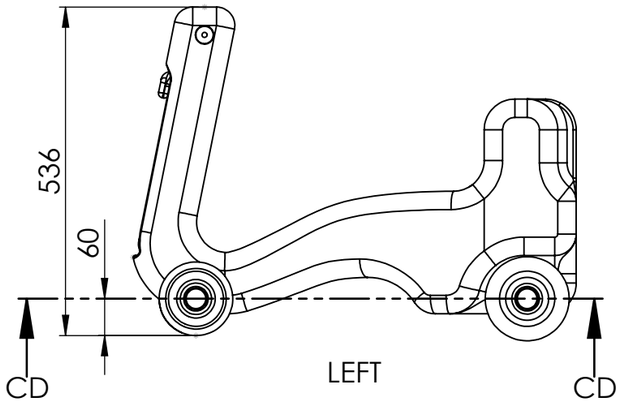

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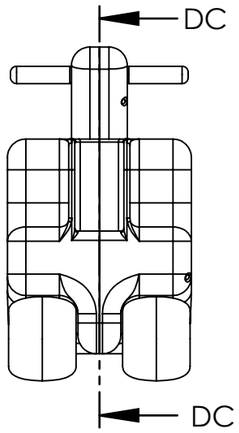

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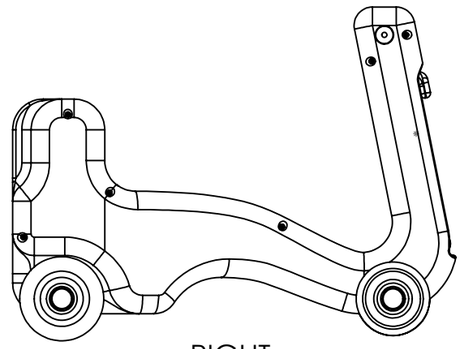

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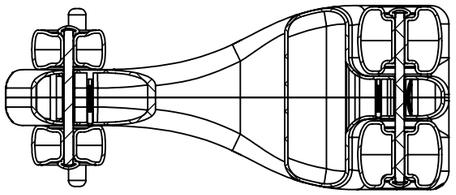
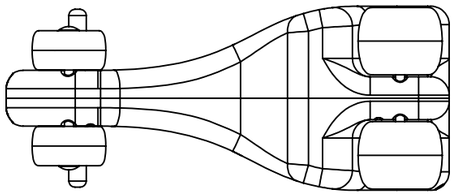


SECTION CD-CD



BOTTOM

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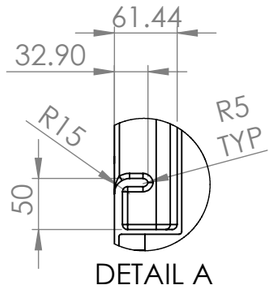
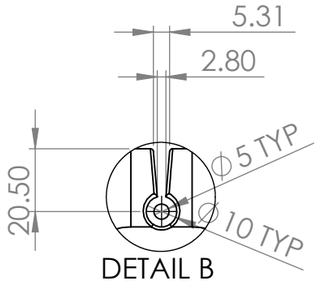
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
		PART NUMBER: C.RO-BB.A	
NAME: Dan Cabral		PART NAME: Buddy Buggy Assembled	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Injection Moulding
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:10	SHEET 1 OF 12
			A3



DETAIL A
SCALE 1 : 6



DETAIL B
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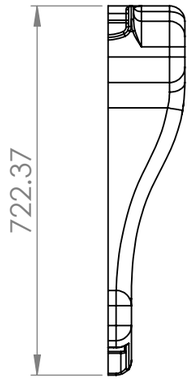

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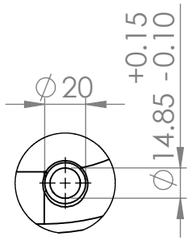

DETAIL C
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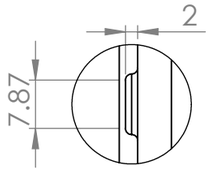

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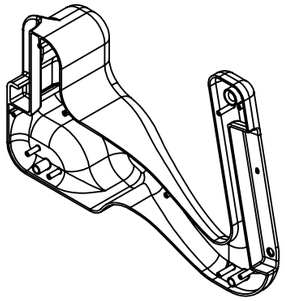
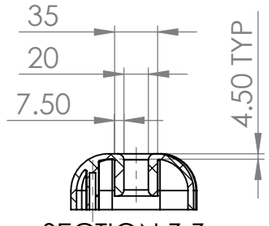
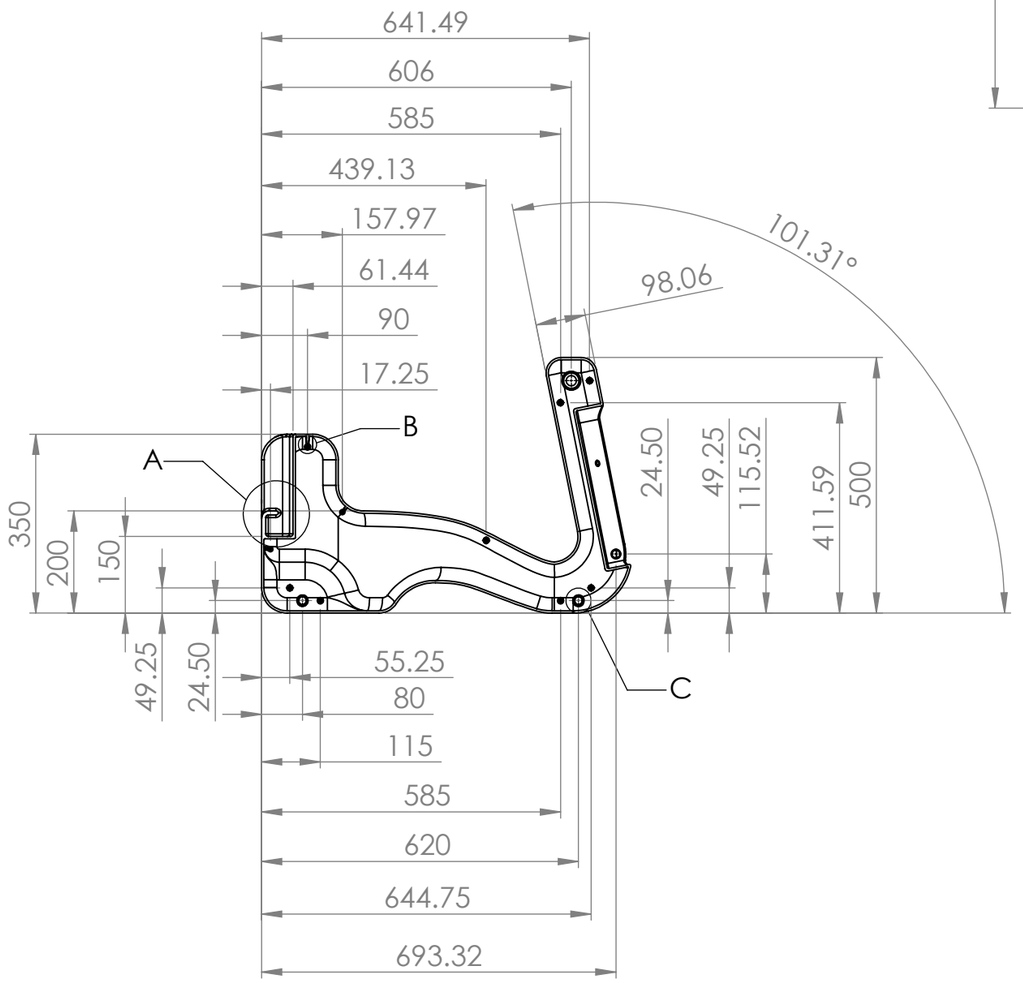




SECTION Z-Z
SCALE 1 : 5



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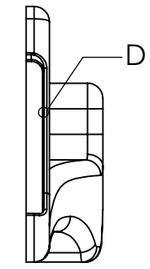

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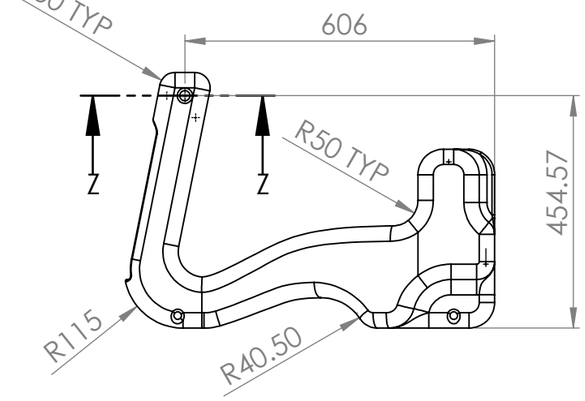

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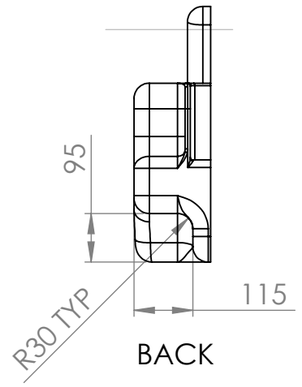

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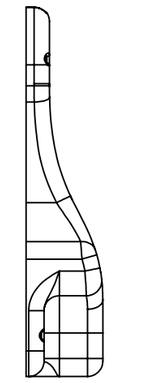

BOTTOM

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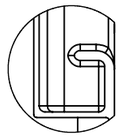
		PART NUMBER: C.RO-BB.1	
NAME: Dan Cabral		PART NAME: Main Body (Left Side)	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Injection Moulding
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:12	SHEET 2 OF 12
			A3



DETAIL F
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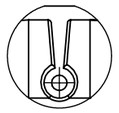

DETAIL G
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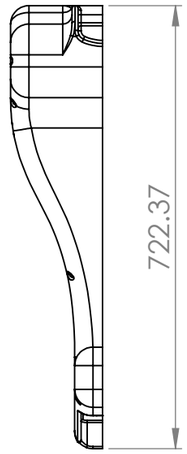

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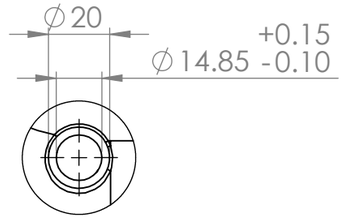

DETAIL H
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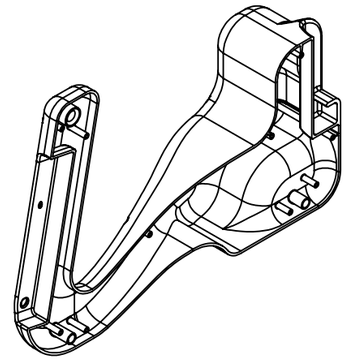

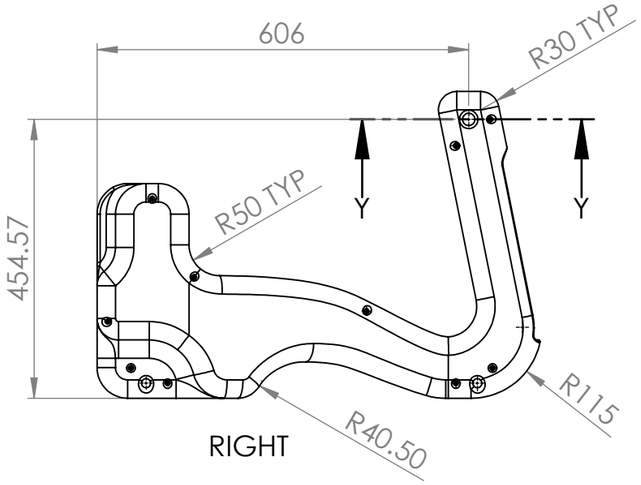

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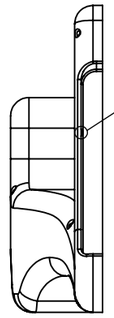

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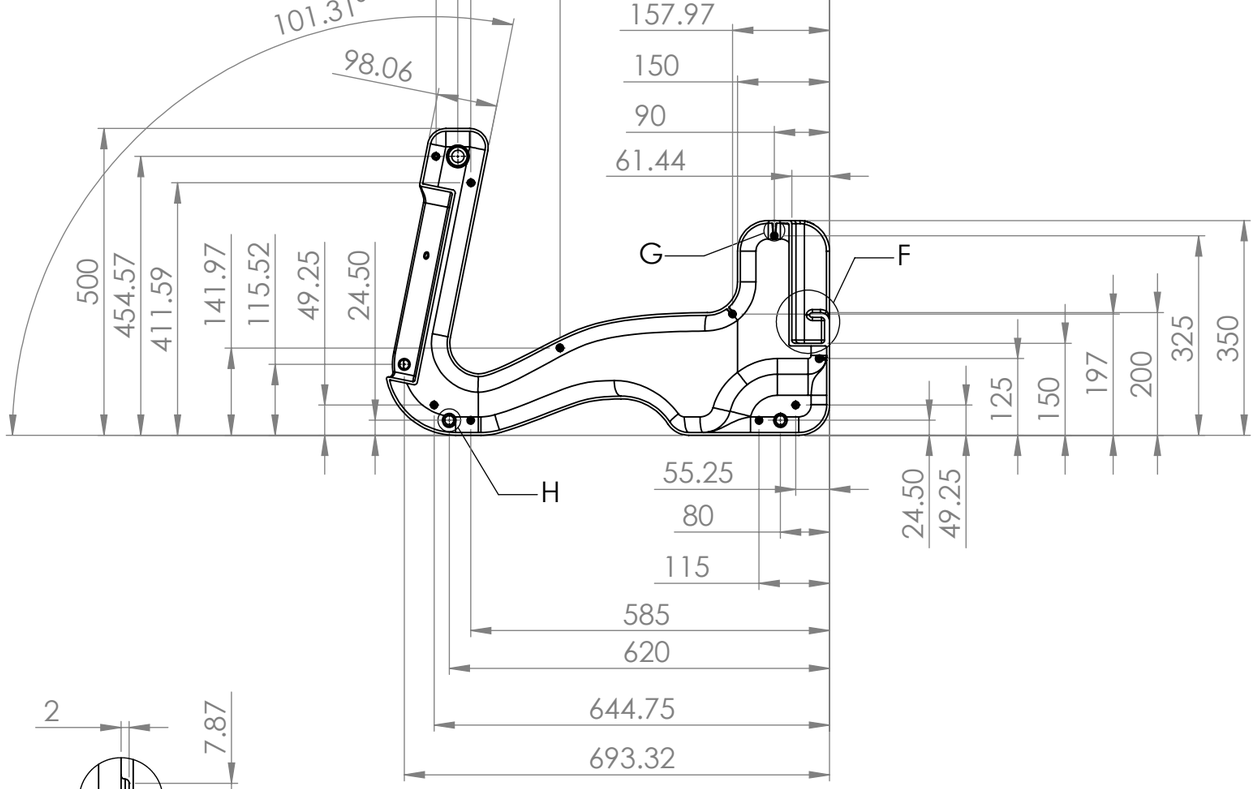

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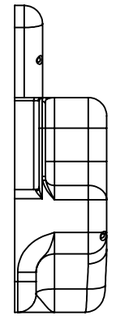

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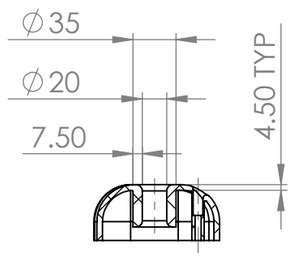

SECTION Y-Y
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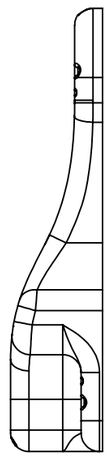

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DETAIL E
SCALE 2 : 3

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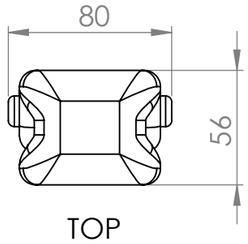
		PART NUMBER: C.RO-BB.2	
NAME: Dan Cabral		PART NAME: Main Body (Right Side)	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Injection Moulding
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:10	SHEET 3 OF 12
			A3



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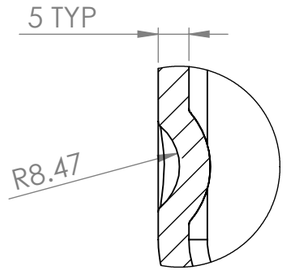

DETAIL I
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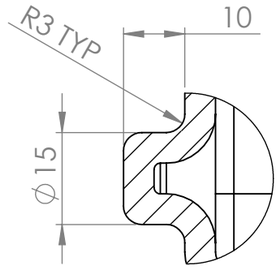

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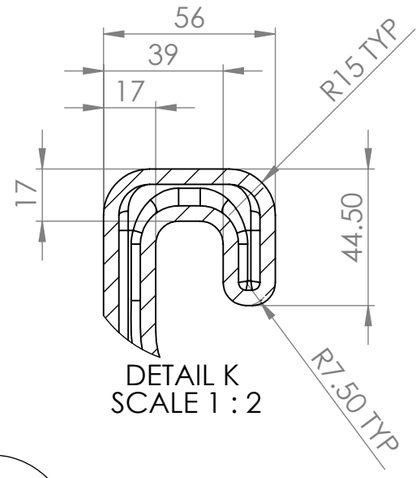

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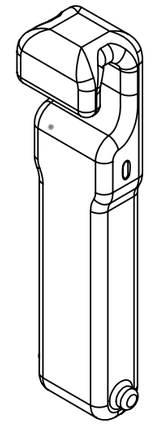

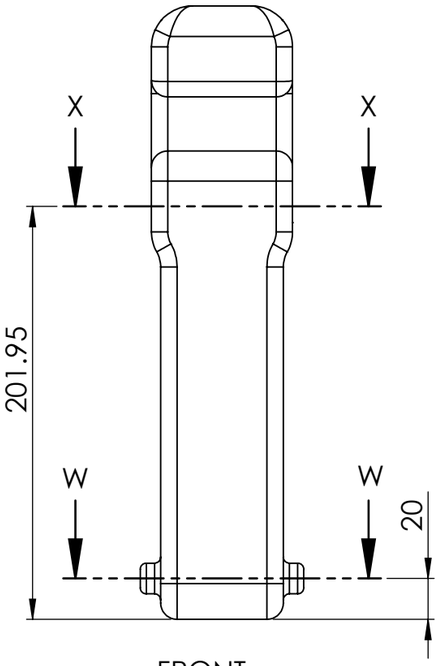

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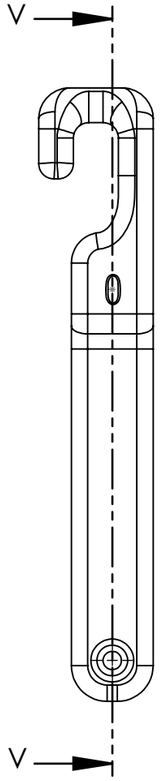

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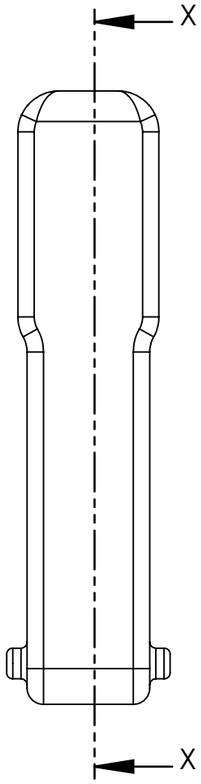

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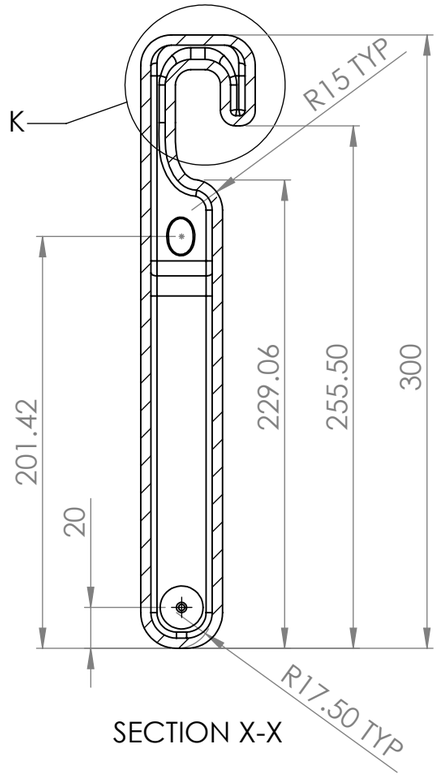
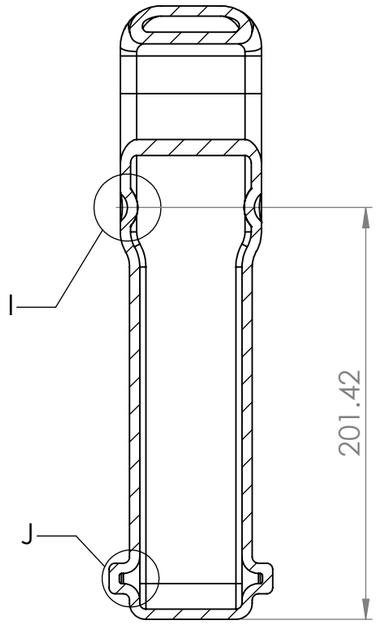
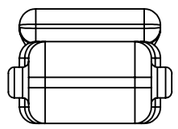


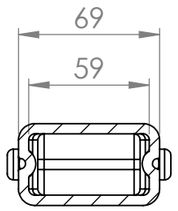
SECTION X-X



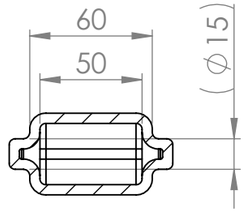
SECTION V-V



BOTTOM



SECTION X-X



SECTION W-W

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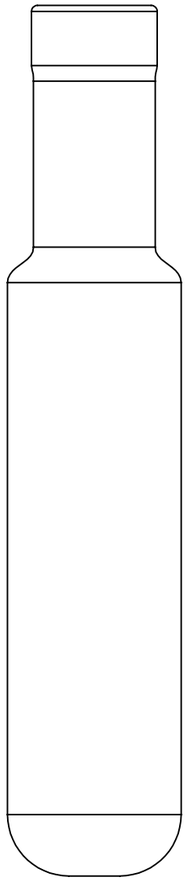
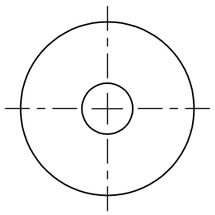
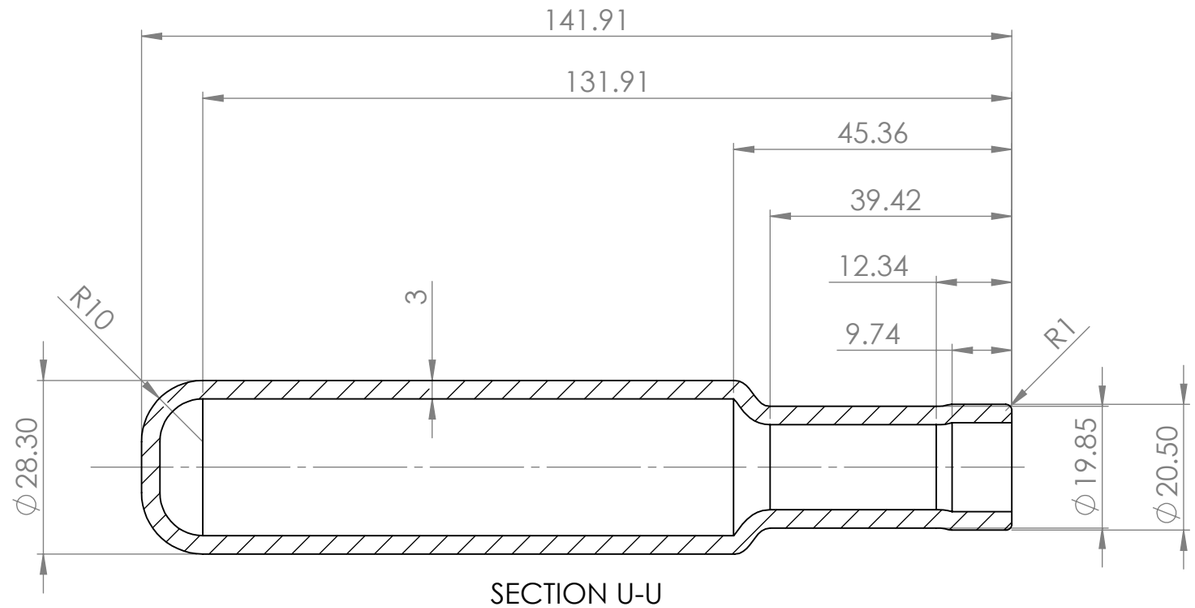
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
		PART NUMBER: C.RO-BB.3	
NAME: Dan Cabral		PART NAME: Pulling Lever	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Rotomoulding
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:3	SHEET 4 OF 12
			A3



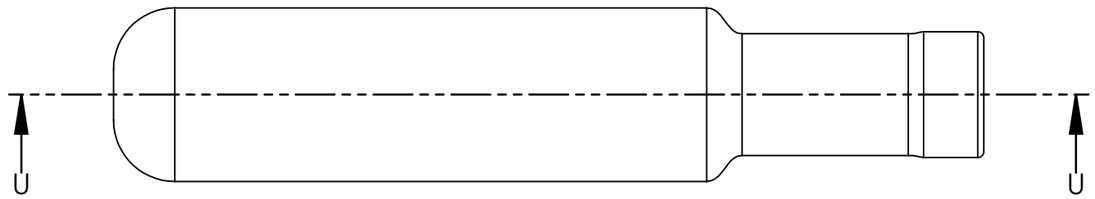
TOP



FRONT



SECTION U-U



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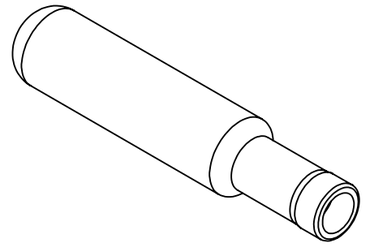

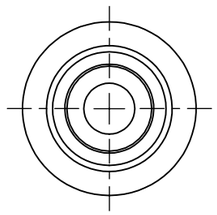

BACK

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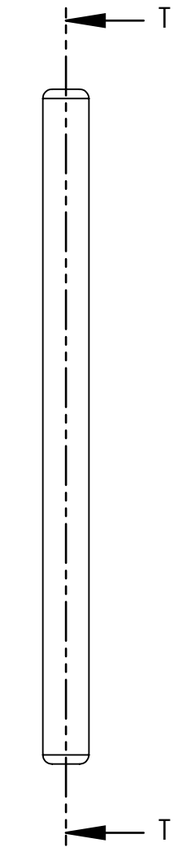
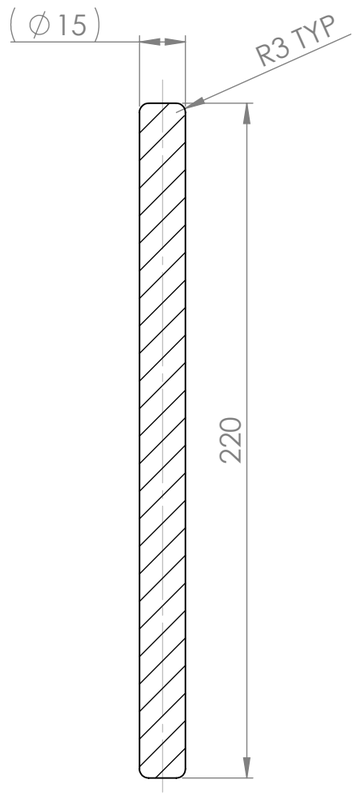
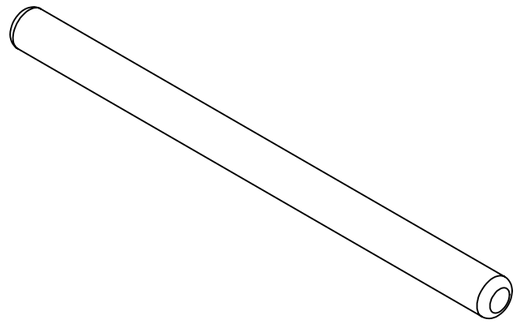
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
NAME: Dan Cabral		PART NUMBER: C.RO-BB.4	
PROJECT: Chicco - Ride On		PART NAME: Handle Bar	
SUBJECT/UNIT: DPD40004 - PDE6		MATERIAL: PP / PROCESS: Rotomoulding	A3
		SCALE:1:1	SHEET 5 OF 12

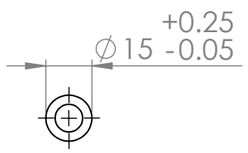


TOP

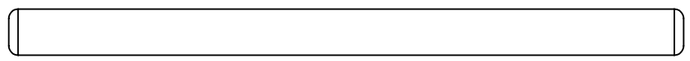


SECTION T-T





FRONT



LEFT

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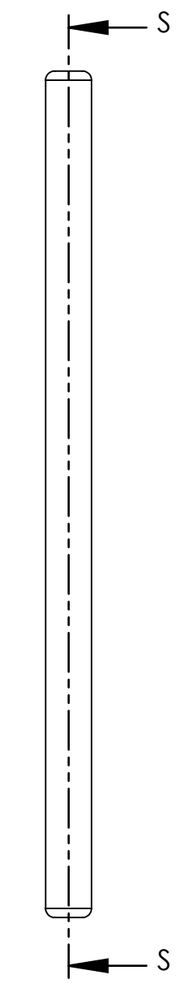
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
		PART NUMBER: C.RO-BB.5	
NAME: Dan Cabral		PART NAME: Front Axle	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Extrusion
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:2	SHEET 6 OF 12
			A3



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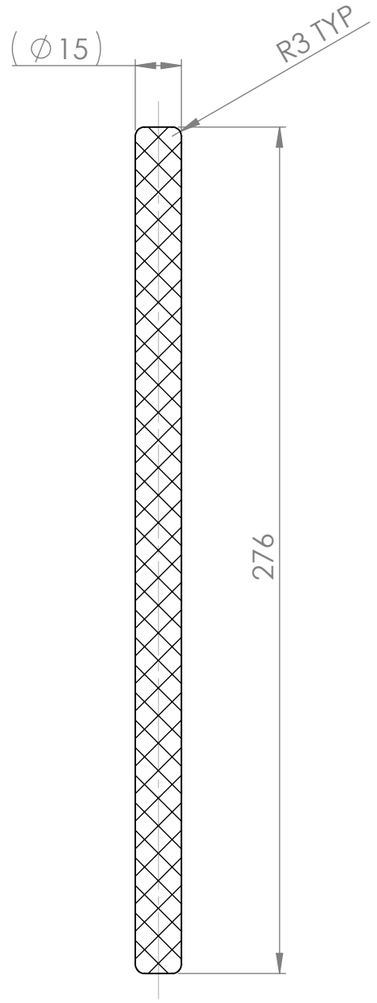
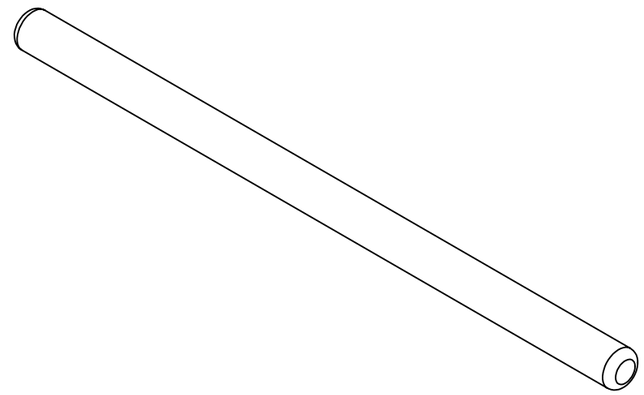
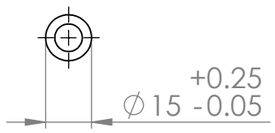


SECTION S-S





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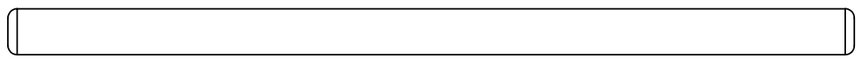

LEFT

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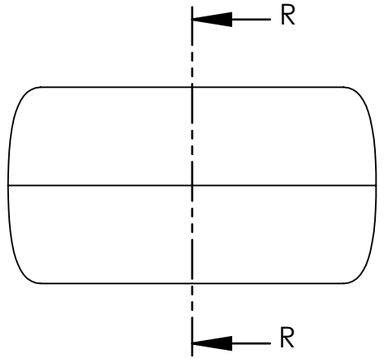
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
		PART NUMBER: C.RO-BB.6	
NAME: Dan Cabral		PART NAME: Rear Axle	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Extrusion
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:2	SHEET 7 OF 12
			A3



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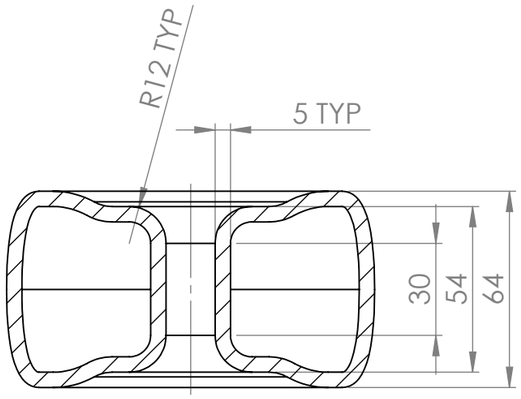
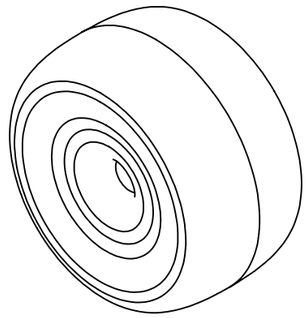
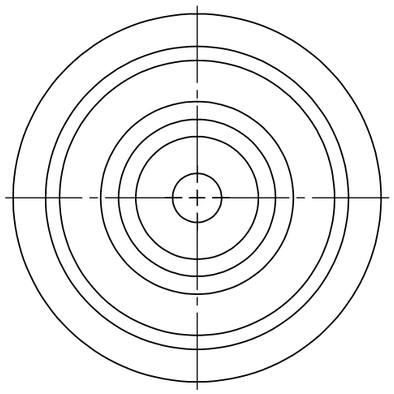


SECTION R-R





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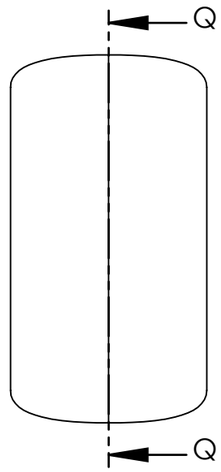

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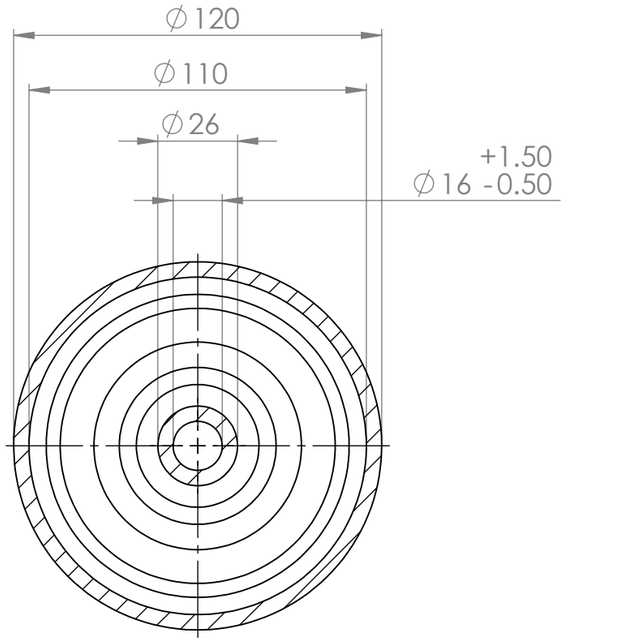

SECTION Q-Q

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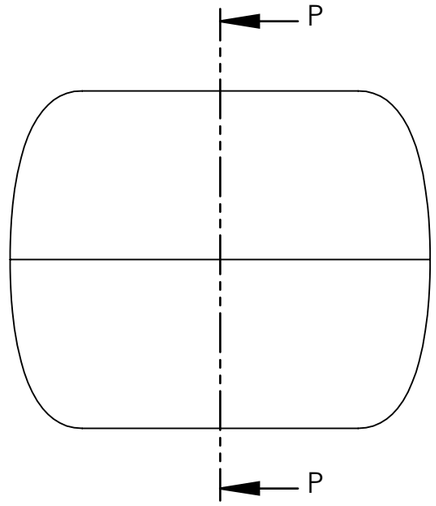
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
NAME: Dan Cabral		PART NUMBER: C.RO-BB.7	
PROJECT: Chicco - Ride On		PART NAME: Front Wheel	
SUBJECT/UNIT: DPD40004 - PDE6		MATERIAL: HDPE / PROCESS: Rotomoulding	A3
		SCALE:1:2	SHEET 8 OF 12



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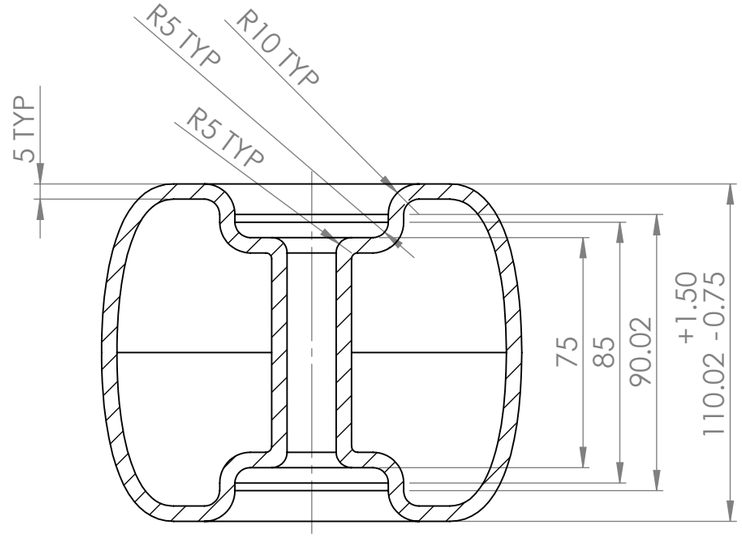
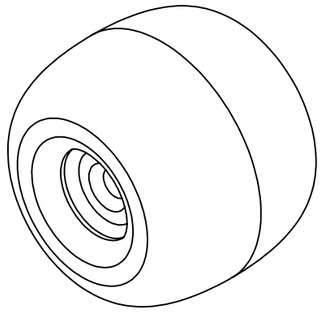
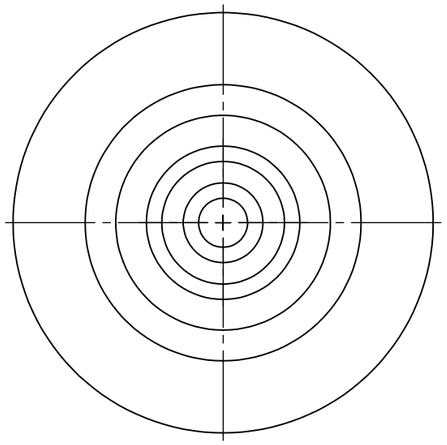
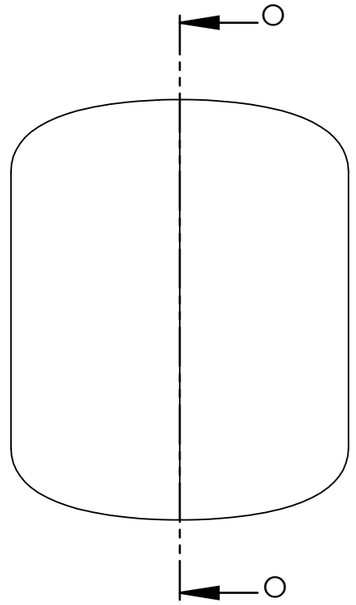


SECTION P-P





FRONT



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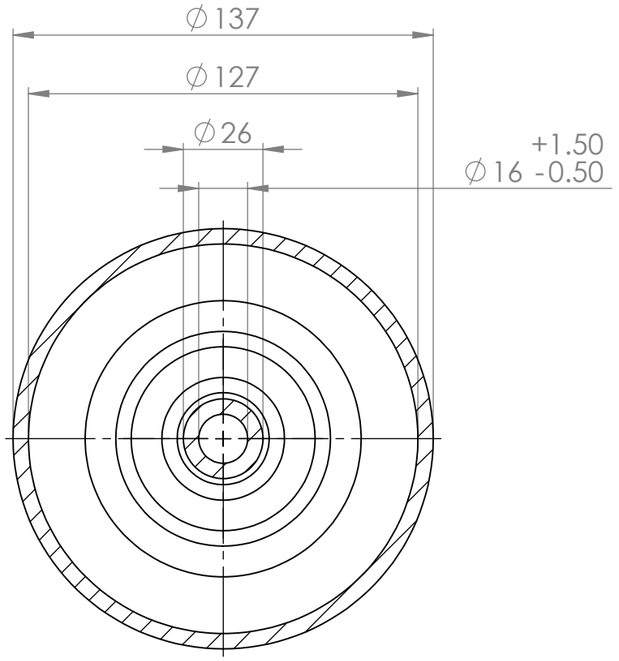

SECTION O-O

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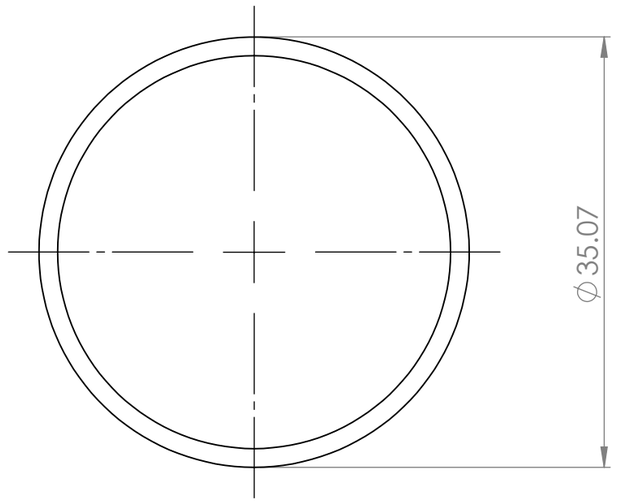
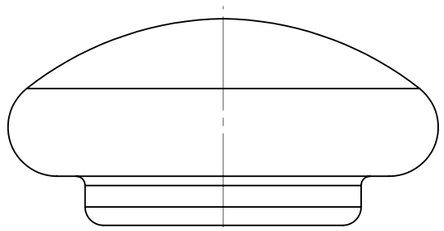
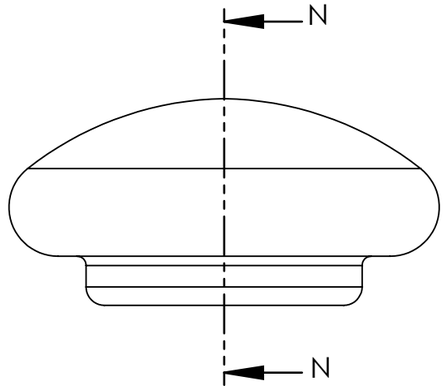
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
NAME: Dan Cabral		PART NUMBER: C.RO-BB.8	
PROJECT: Chicco - Ride On		PART NAME: Rear Wheel	
SUBJECT/UNIT: DPD40004 - PDE6		MATERIAL: HDPE	PROCESS: Rotomoulding
		SCALE:1:2	SHEET 9 OF 12
			A3



TOP



FRONT



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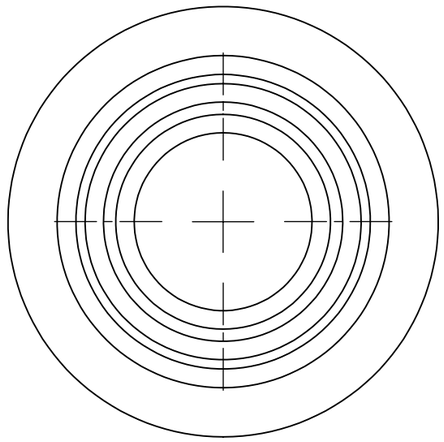
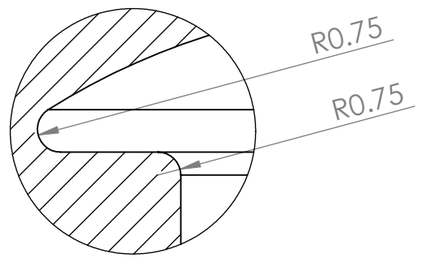
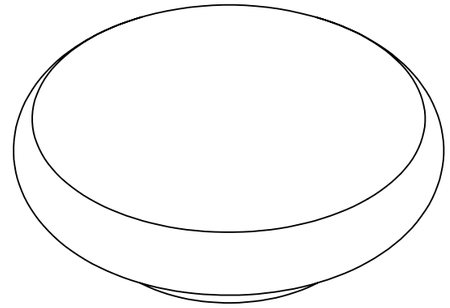
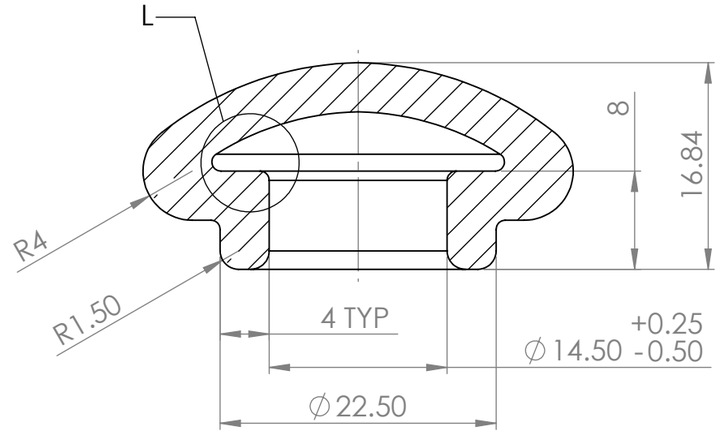


BOTTOM



DETAIL L
SCALE 5 : 1





SECTION N-N

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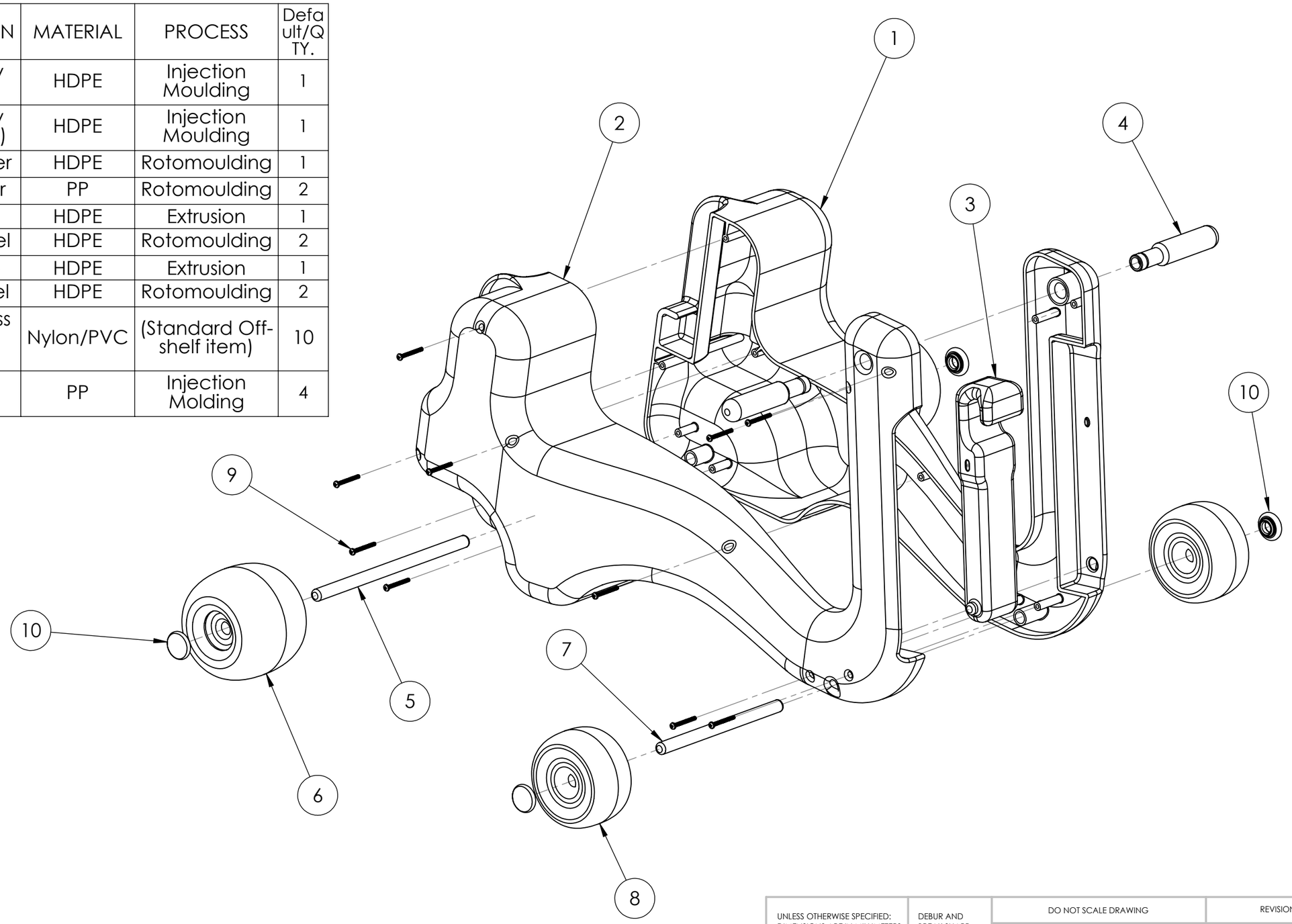
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
		PART NUMBER: C.RO-BB.9	
NAME: Dan Cabral		PART NAME: Axle Cap	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Injection Moulding
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:2:1	SHEET 10 OF 12
			A3

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	PROCESS	Default/QTY.
1	C.RO-BB.1	Main Body (Left Side)	HDPE	Injection Moulding	1
2	C.RO-BB.2	Main Body (Right Side)	HDPE	Injection Moulding	1
3	C.RO-BB.3	Pulling Lever	HDPE	Rotomoulding	1
4	C.RO-BB.4	Handle Bar	PP	Rotomoulding	2
5	C.RO-BB.6	Rear Axle	HDPE	Extrusion	1
6	C.RO-BB.8	Rear Wheel	HDPE	Rotomoulding	2
7	C.RO-BB.5	Front Axle	HDPE	Extrusion	1
8	C.RO-BB.7	Front Wheel	HDPE	Rotomoulding	2
9	PHMS-40S-B18.6.7M	M4x40 Cross Recessed Screw	Nylon/PVC	(Standard Off-shelf item)	10
10	C.RO-BB.9	Axle Cap	PP	Injection Molding	4



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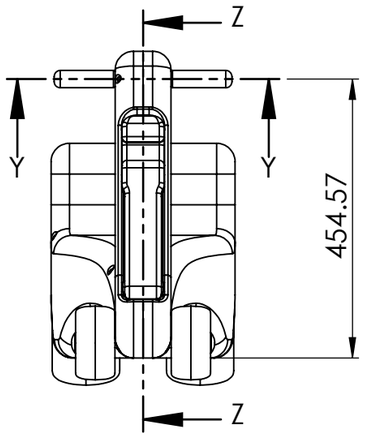
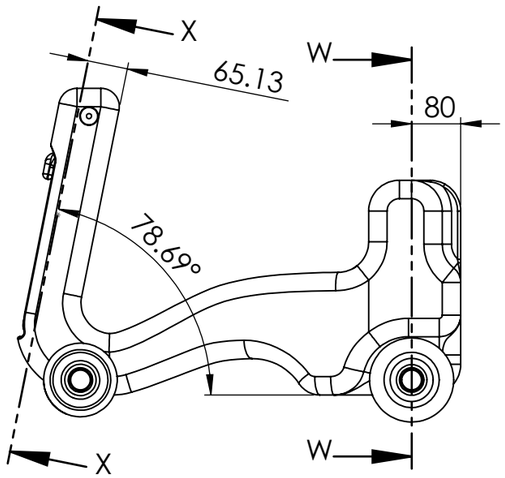
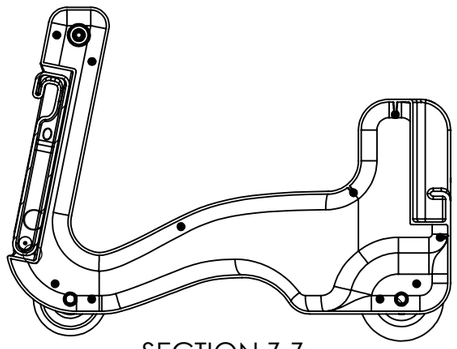
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
		PART NUMBER: C.RO-BB.A	
NAME: Dan Cabral		PART NAME: Exploded View & BOM	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Injection Moulding
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:5	SHEET 11 OF 12
			A3



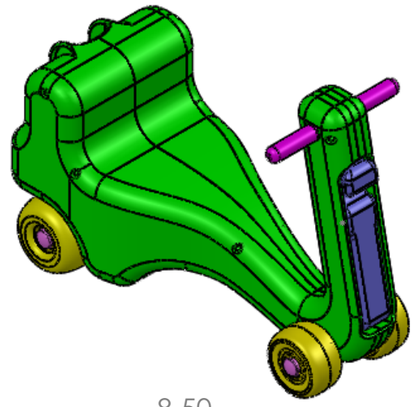
FRONT VIEW

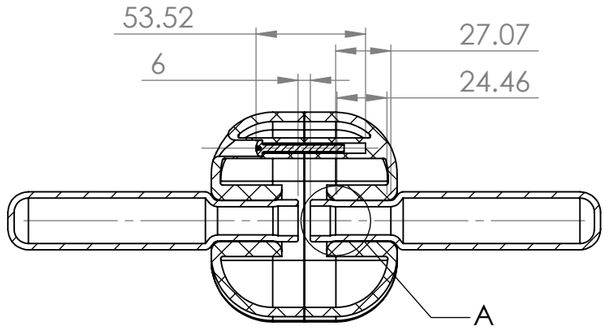


RIGHT SIDE VIEW

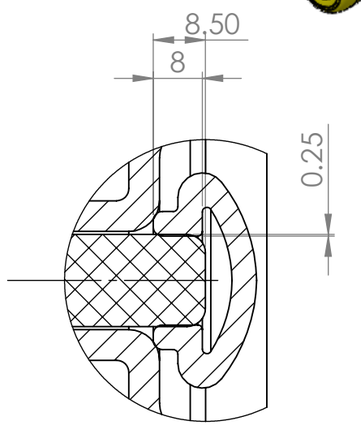


SECTION Z-Z
SCALE 1 : 10

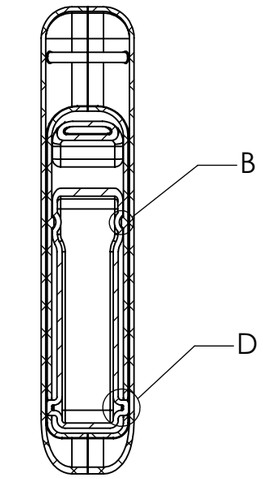




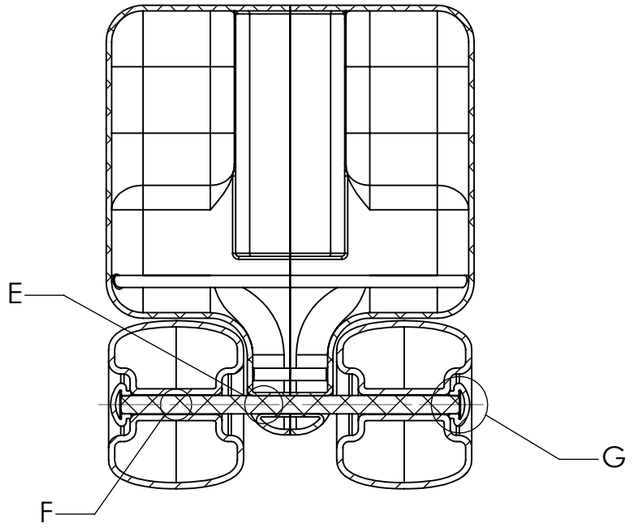
SECTION Y-Y
SCALE 1 : 3



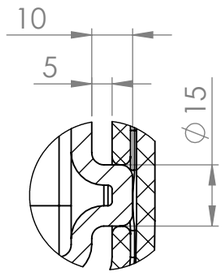
DETAIL G
SCALE 1 : 1



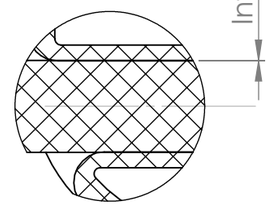
SECTION X-X
SCALE 1 : 6



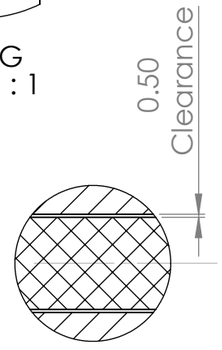
SECTION W-W



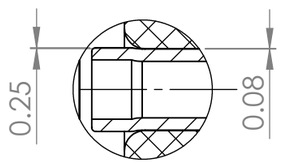
DETAIL D
SCALE 2 : 3



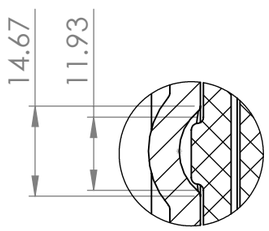
DETAIL E
SCALE 1 : 1



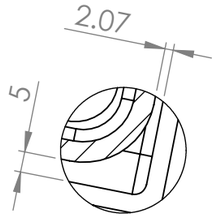
DETAIL F
SCALE 1 : 1



DETAIL A
SCALE 2 : 3



DETAIL B
SCALE 1 : 1



DETAIL C
SCALE 2 : 3

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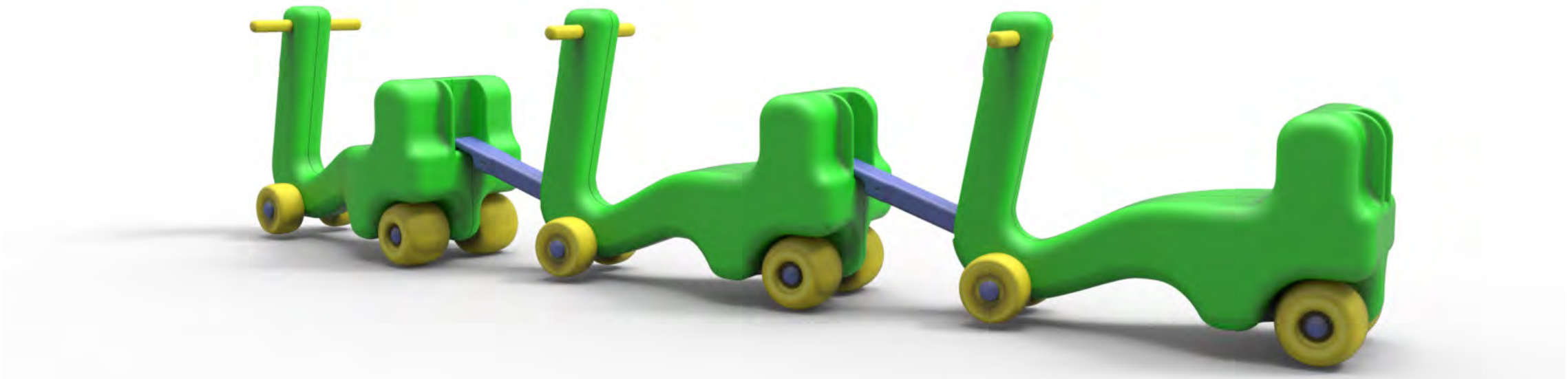
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: 2.4 TOLERANCES: LINEAR: ±0.50mm ANGULAR: ±1.50°	DEBUR AND BREAK SHARP EDGES WITH 1.5mm CHAMFER WHEREVER NECESSARY	DO NOT SCALE DRAWING	REVISION A
		PART NUMBER: C.RO-BB.A	
NAME: Dan Cabral		PART NAME: Assembly Detail	
PROJECT: Chicco - Ride On		MATERIAL: HDPE	PROCESS: Injection Moulding
SUBJECT/UNIT: DPD40004 - PDE6		SCALE:1:5	SHEET 12 OF 12
			A3



'Buddy Buggy' Design Folio

Chicco - Ride On Project

DPD40004 Product Design Engineering 6: Professional Design Attributes

Dan Cabral - 7537891: September 1, 2014

CABRAL DESIGN STUDIO