

Sheffield's Children's Hospital
Short Grad

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Background



Sheffield's Children's Hospital is one of the four dedicated children's hospitals trusts in the UK.

The hospital treats patients usually from 0-16 with some patients reaching 18.

The hospital has been established since 1876 and since 1948 it has been providing service under the NHS.

(Sheffield's Children's Hospital, 2016)

Five-Year Strategic Objectives

- To provide healthcare to children of the highest standards available in the UK
- To work in partnership with others to reshape healthcare for children in Sheffield
- To develop and expand our role as a provider of specialised services for children
- To expand the Trust's role as an expert provider of specialist pathology services
- To be a national leader in research and education in children's healthcare

This Five Year objective is put in place to set direction for the hospital to set themselves and the Trust Strategic objectives.

Center OF Excellence

Sheffield's Children's Hospital treats a large amount of different pediatric problems, however the Hospital has focused on a series of certain departments that they classify in their "Center OF Excellence". These subject areas are what the hospital focus their intentions towards regarding research

Neurosciences
Muscle and Bone
Clinical Genetics
Breathing
Gastroenterology and Nutrition
Metabolic Disease
Oncology
Major Trauma

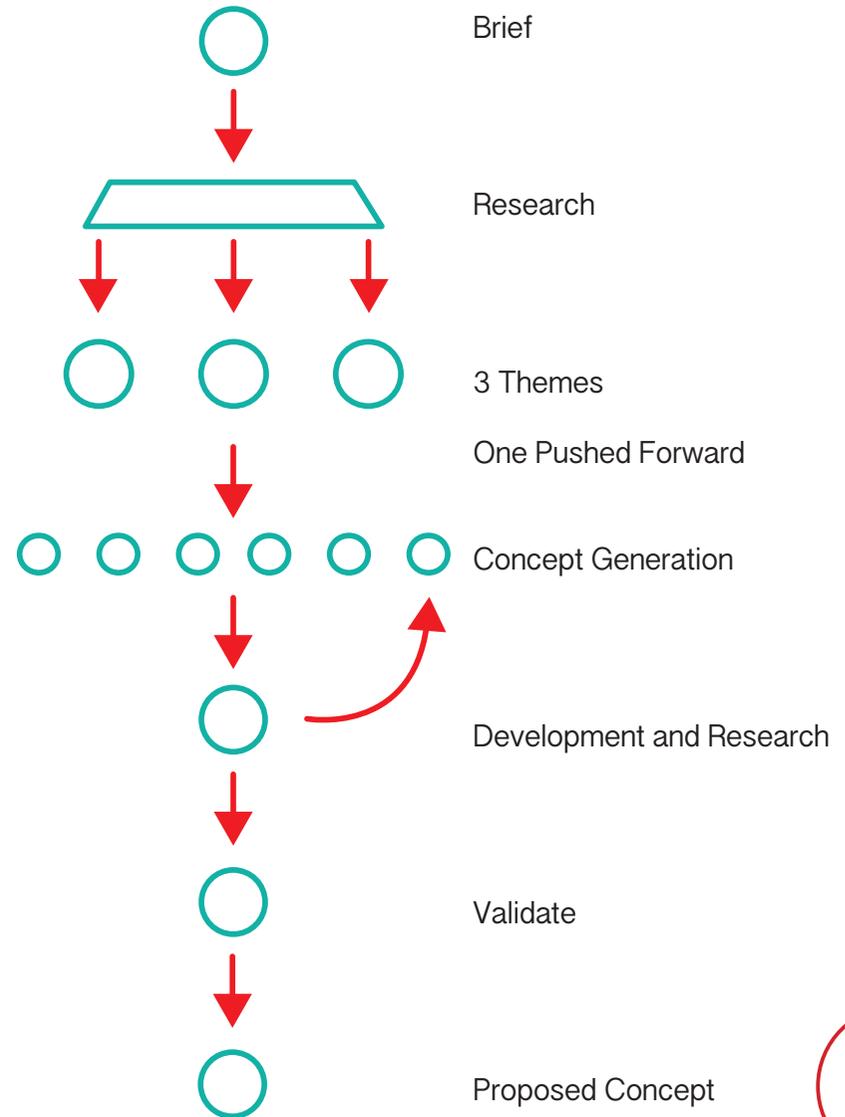
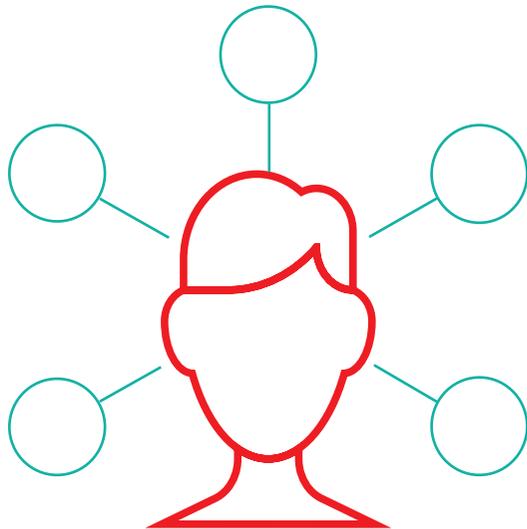
The Approach

The approach for this project will be driven by in-depth research throughout almost every stage of the design process. The project will have a product designed as the outcome of this research. Research will be undergone with the help of the Sheffield Hallam Research Center and Sheffield's Children's Hospital as a form of primary research, the desire is to use this information and back it up with validation from medical databases like PubMed, The King's Fund and Demos.

Before the research is complete three themes will be chosen around Pediatric Care. These themes will be what will drive the project through the research and after this one of the three selected themes will be selected.

The chosen theme will then be developed into a product outcome using research collated from Sheffield's Children's Hospital and the Research Center.

The outcome will be validated and tested to make sure the deliverable is providing a service that is needed and improving the quality of a Pediatrics life.



Fear / Theme One

After tutorial one it was time to select themes in which the research would be focused towards.

The first theme chosen was Fear. Chanksy (2016) stated that fear in new places is often due to a child's "developing imagination". This statement shows that fear can be controlled using the imagination and developed into a product to help a child conquer a fear while under pediatric care.

In a hospital environment there can be two different types of fear, sporadic and continuous. Injections top the list of sporadic fear with 35.3% of patients saying this was their biggest fear (BestDoctorsBlog, 2016).

D'arcy Lyness PHD stated that "Sometimes it helps to talk to your child about your own stresses and how you've been able to overcome them. Remind your child that letting go of worry allows space for more happiness and fun." (D'arcy Lyness, 2013).

Initial Idea - Music Therapy

While constructing research it became clear that one method of coping with fear became more and more common in reports and studies. Music Therapy has been proven that it "provides creative energy that is usually lost in the hospital shuffle" (Shulman, 1982).

A study was also completed by, Fitzmaurice MD and Holm MD (2008) in hospital waiting rooms to see how music influences anxiety levels in patients. They found there was a significant decrease in anxiety levels when music was played.

This gives validation to a proposal of using music therapy to combat fear in pediatrics.



35.3% said injections was their biggest fear



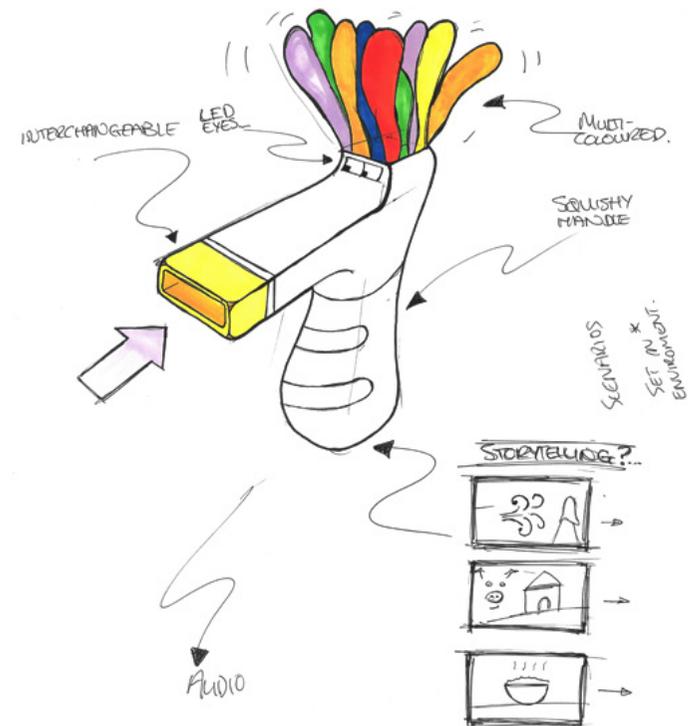
Music has capacity to energise or relax, to promote thought or distraction

Initial Ideas

While looking into the theme fear a number of initial ideas were thought of and put down into some ideation sketches.

These ideas have been put down on paper to show thinking and possible subject areas to help combat fear in pediatric care.

One thing that was found when a few initial ideas were sketched that the ideas were created were not generally stopping a child being frightened they were either a distraction therapy or a coping strategy.



Family Centered Care / Theme Two

Family Centered Care is a term developed in health care that looks at how a whole family is affected by a member being admitted to hospital.

Family Centered Care focuses on times the family are apart from one another and when they see each other, after or during their time in hospital.

Core Concepts of Family Centered Care

- Dignity and Respect
- Information Sharing
- Participation
- Collaboration



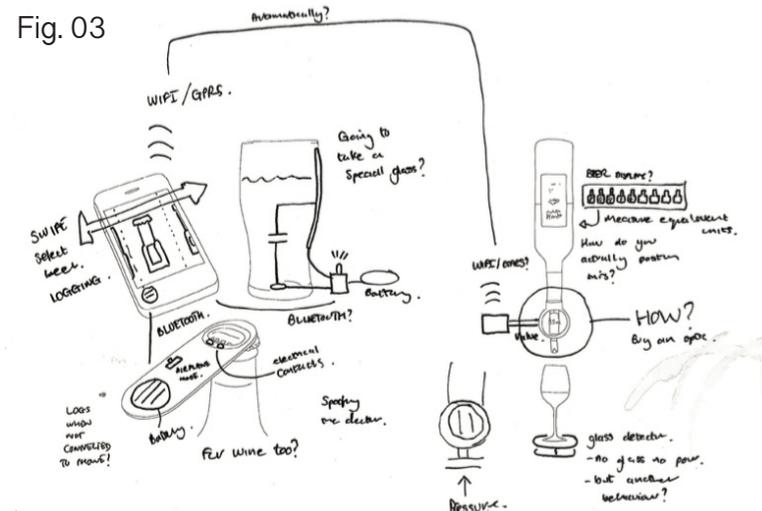
Case Study - HHC (Dr David Kirk)

A study by the Helen Hamlyn Center looked into how people cope with a member of their family working away due to their job. The study looked at methods of coping with a family member being apart from the rest of their family for long periods of time.

The study created three different techniques to help cope with this issue. They were called Ritual Machines. "A core element of domestic life is its ritualistic aspects, which are important features of the functional and emotional landscape of the home"(Dr David Kirk).

One of the ritual machines created was aimed at a young couple who spend a lot of time apart due to the husbands work. The machine looked at the couple sharing a bottle of wine together at night time after their child was in bed. To help keep this family ritual they focused on creating a ritual machine that would pour a glass of wine for both of them at the same time when they were apart.

The results of this were that the "machine became "quite special" to Holly and Craig". Showing how humans can still interact with each other even when their is a large distance between them.



Initial Ideas

There were a few concepts created around the idea of family centered care in the pediatric sector. The ideas focused on how a child could improve their time in hospital and how a family could cope better with their child being in hospital.

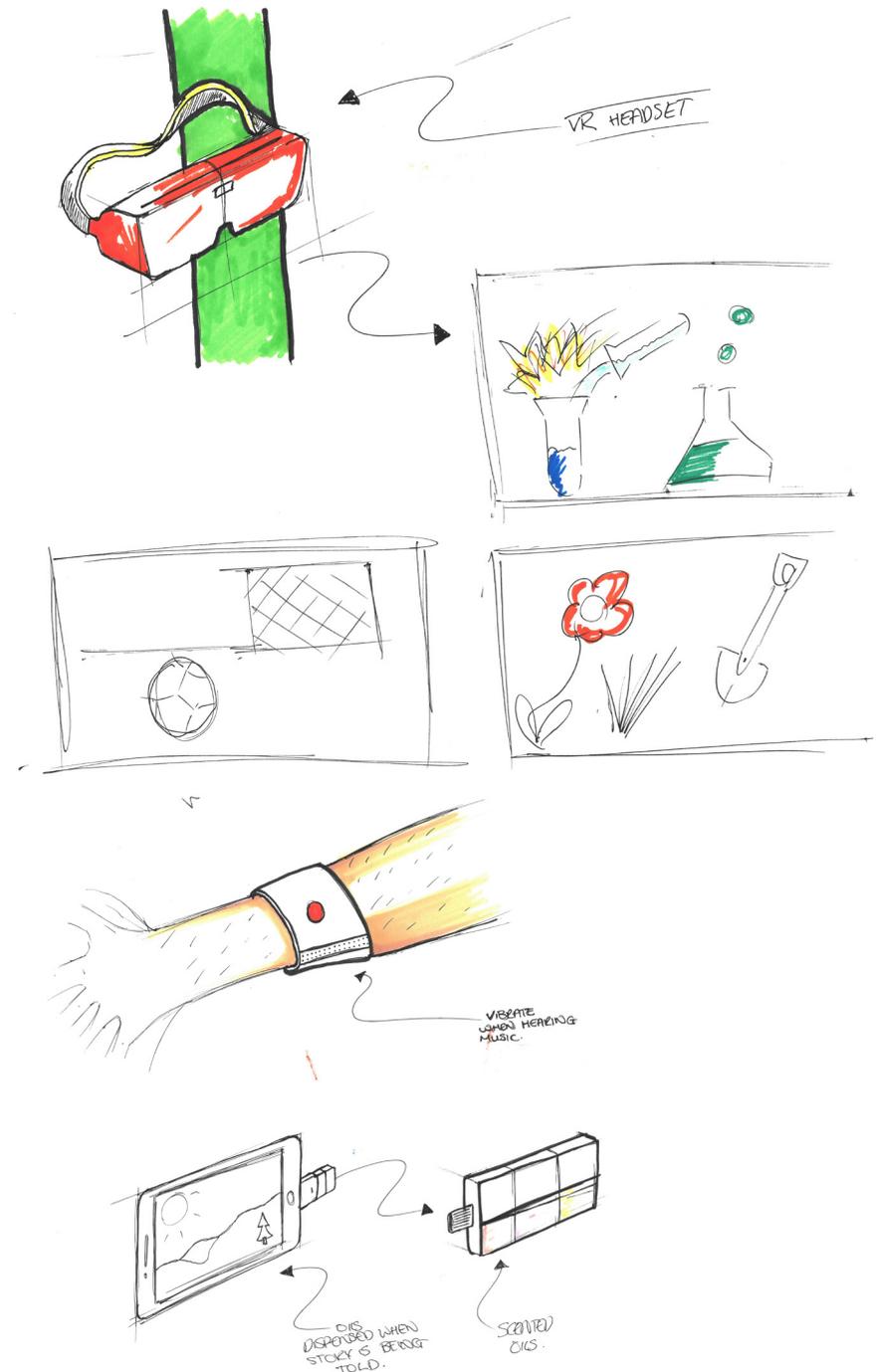
Family Rituals was a big focus in the initial ideas concept generation.

“

“Like, Freya ‘Snapchats’ me a little cool thing of making our son smile, or snoring, or when he’s sleeping he’s doing some giggles in his sleep; so she Snapchats it to me, which is kind of cool. It’s nice, it’s just like a little snippet, it makes me go: ‘oh I want to be there’, but also it’s without going through the whole thing of ‘let’s go on Skype and then holding the phone up’. And just like a little kind of snapshot of my life. My normal life at home I suppose.”

”

Male [worker] – Mobile worker interview



Visits

On Wednesday 12th October the chance was created for the course to meet with Joe Langley from Sheffield Hallam's Research Center. Later in the day we then met with Nathaniel Mills, from TITCH and Professor Paul Dimitri the Director of Research & Innovation at Sheffield Children's Hospital NHS Foundation Trust.

Research Center

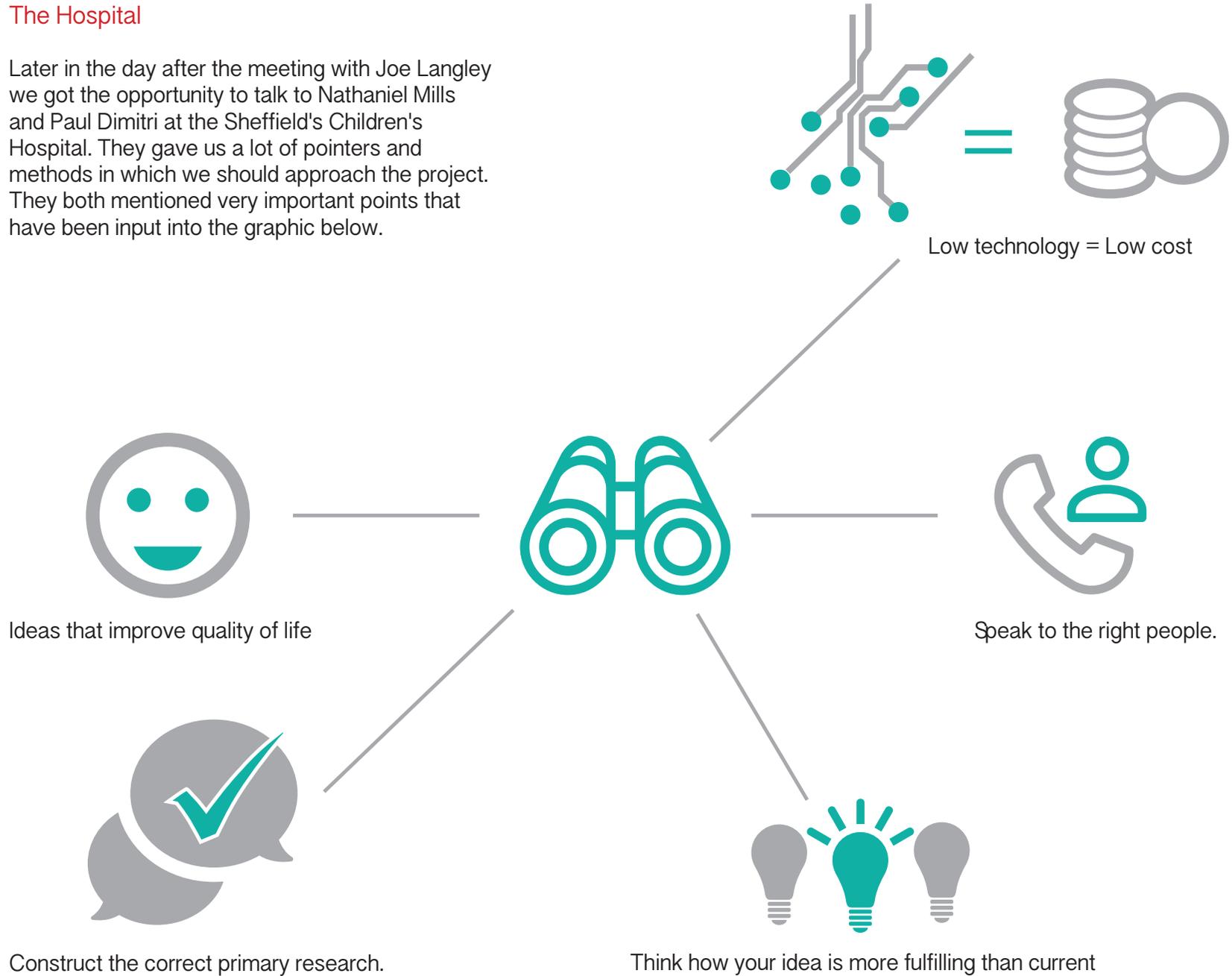
We arrived at the research center and spoke about our interested themes within the medical area. Joe then told us about past examples of people working within a similar area to our interests within the university and how their projects have helped benefit peoples lives especially patients with long-term conditions. There was also an emphasis on the cost of our product outcomes making sure that if possible the outcomes are low costing due to the NHS' current financial state. We stated some of our initial interests that and Joe then recommended some areas that we should look into, these will be explained later in this logbook.



Fig. 04

The Hospital

Later in the day after the meeting with Joe Langley we got the opportunity to talk to Nathaniel Mills and Paul Dimitri at the Sheffield's Children's Hospital. They gave us a lot of pointers and methods in which we should approach the project. They both mentioned very important points that have been input into the graphic below.



After Visit Reaction

After the visit I started looking into my possibilities as a designer and what is feasible for me to achieve in a short project. This means I have to chose a project that I feel I can do a number of things inside.

- 1- Make a positive difference to someones life
- 2- Design a simple solution that can be easily implemented into the NHS
- 3- Design a solution that is validated and proven to do what it is trying to do.
- 4- To make sure my solution is based on relevant research.



Unmet Needs

After the visit we were given a database from Joe Langley which listed a number of unmet needs within the pediatric healthcare sector. These were given to us so we could cross-reference them with our initial themes to see if we could identify a subject area to help solve an unmet need.

Unmet needs generated from Sheffield workshop **2nd December 2015**

Key: MH - mental health, OB - obesitv, DG - digital, TR - transition (child to adult care) ED - education, AM - assessment, SM - self-Nurs key: AM-holistic assessment of need, NIDM-non invasive diagnostics and monitoring, Ex- experience of care, MT-Improved

Nics Key	Health care stage	Details	Links	Cross cuts with
AM	Primary	GP assessment of baseline patients		AM, OM
NIDM	Secondary, Primary	Instantaneous respiratory rate via non contact methods	Possible I4I project, scoping work being undertaken at present	AM, OM
NIDM	Secondary, Primary	Pulse oximeter for babies, primarily to be used in GP surgeries	Validated by other clinical experts, going forward to the OIW in Feb	AM, OM
Ex	Secondary, Primary	Waiting room processing - communication to parents, managing expectations, missed appointments, self management		ED, SM,
MT	Secondary	Broken gastrostomy ends		AM, OM

After the list was analysed and initial interests under went some basic desk-research it was found that one subject area outlined one of my previous themes of fear. This was Distraction Therapy.

	Secondary	Managing and treating patients with severe mental health issues in an appropriate environment		MH, AM
MT	Secondary, Primary, community	Distraction technologies for children	Highlighted a few times as an unmet need	DG, OM, AM
MT	Primary, community	Accurate/reusable skin thermometer for children (stays in the 'red' book with parents)	submitted this also via the innovation manager	AM, SM
NIDM	Secondary, Primary	Non-invasive diagnostics for children/childhood disease		AM, OM

Distraction Therapy

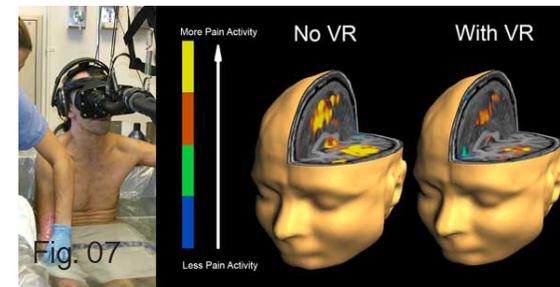
"Distraction therapy is a way of helping a child cope with a painful or difficult procedure. It can also be used if a child is in pain or discomfort. It aims to take the child's mind off the procedure by concentrating on something else that is happening."

(Great Ormond Street Hospital, 2016)

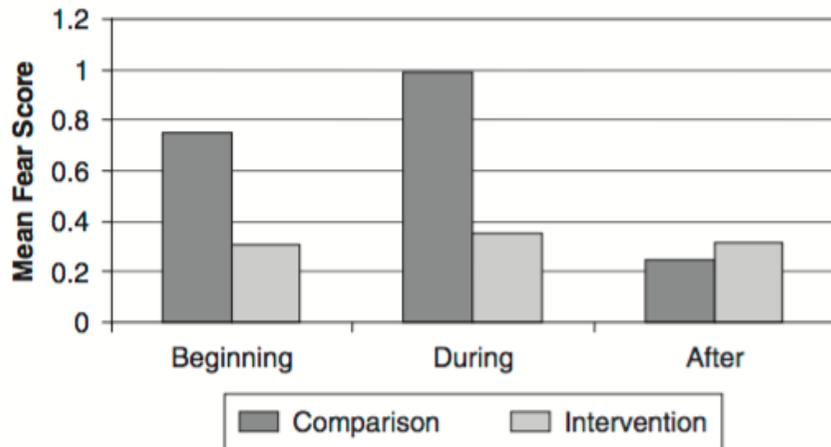
Like the Great Ormond Street definition says distraction therapy is used when a child needs to be distracted to take their thoughts and focus off a medical procedure. There is many different ways to perform Distraction Therapy using techniques like story-telling, toys and controlled breathing. To the right is a simple technique being used, using an iPad as the distraction while a procedure on the child is being done.



Dr. Hoffman in the USA uses distraction therapy alongside Virtual Reality (VR). In this scenario he is used VR as a tool for burns victims, he designed a game for them to play while undergoing treatment. The brain scans to the side show how the distraction is working on a physiological level. The patient is showing less pain signals in their brain. (Hoffman, 2016)

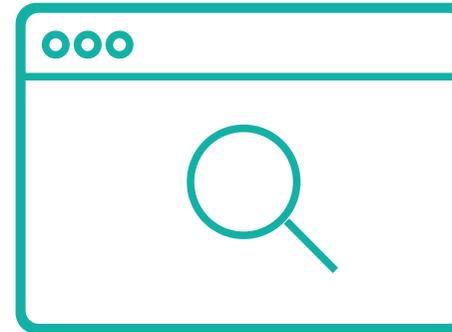


Distraction Therapy



Windich Biermier et al (2007)

When the theme of distraction therapy was identified I wanted to look into how powerful and useful the technique could be. This study by Windich Biermier et al was constructed to do exactly that, his results identified that when Distraction Therapy was used as intervention to treat fear within a hospital setting. His results showed that Beginning and During distraction therapy drastically reduces a patients fear to the situation.



Research Crit

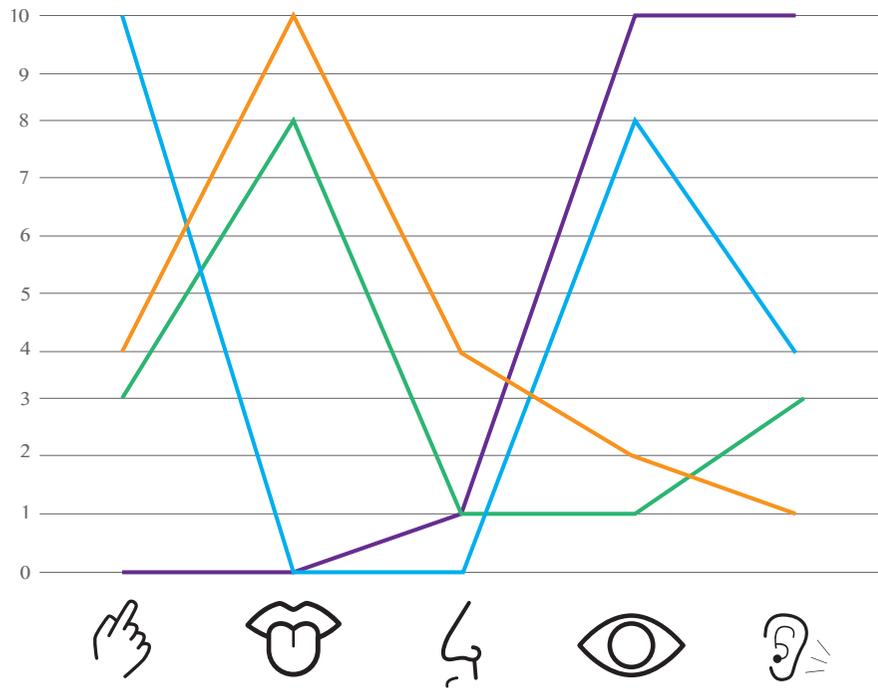
A few weeks into the project it was time for us to present our current findings and research into a presentation so we could gain a fresh look into our subject area and listen to peoples point of view about our project.

Feedback

After my presentation I received feedback from tutors and peers which helped me guide my project in the right direction. There was many different opportunities which arose through the feedback after the presentation. The first was to look into the five senses and to see how a distraction therapy can take advantage of the senses to produce a multi-sensory solution.

I was also told to start talking to experts in the area to gain an insight into what techniques are currently being used to help me identify a solution that will effective in response, the first point of contact would be to talk to a Play Specialist from Sheffield's Children's Hospital. As well as talking to people I identified that I needed to run a workshop with children to identify some of the most distracting therapies.

Design For The Senses



Football

Cinema

Brushing Teeth

Eating Chocolate

Jinsop Lee

Jinsop Lee discussed during a TED convention discussed how design can be heavily influenced by the senses that the product taps into. Jinsop Lee developed this graph to the left.

The graph evaluates experiences in life and rates how they effect the senses out of ten. The idea behind the graph is that more immersive and interesting experiences influence more than one sense. To the left I have plotted some of my experiences from a weekend day. (Jinsop Lee, 2013)



Ernesto Neto - Celula Nave

This was an exhibition piece by Ernesto Neto that looked into how people can interact with an art piece physical and how the senses can be a welcome addition to the experience. (WeWasteTime, 2016)

The User

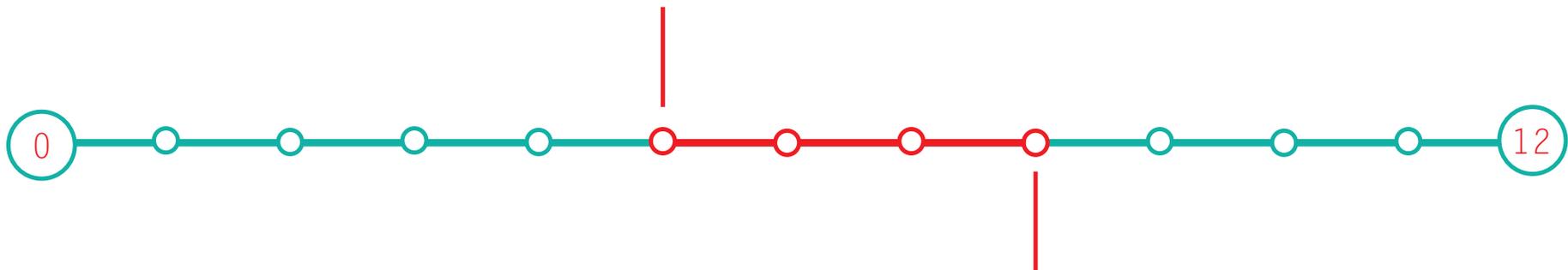
In a Pediatric Hospital it can be hard to identify a user as the age range between patients is so vast. Sheffield's Children's Hospital treat patients between the ages of 0-18 years. Evidently the behaviours of children between 0 and 18 varies a large amount.

For this project an age needs to be chosen so that any ideas can be processed and developed to make sure they are appealing to the right end user.

(Elaine M. Gibson, 2015)

Five

When a child reaches five years old they often show behaviours of playing and making up rules when playing with peers. They are also very curious and enjoy investigating scenarios they face in their life and they seem to be obsessed by rules and targets when playing.



Eight

At this age the child is often demanding attention and wanting people around them to think and act in the same way as them. They often see situations as "black or white" and will also need techniques in their life to reduce their stress levels.

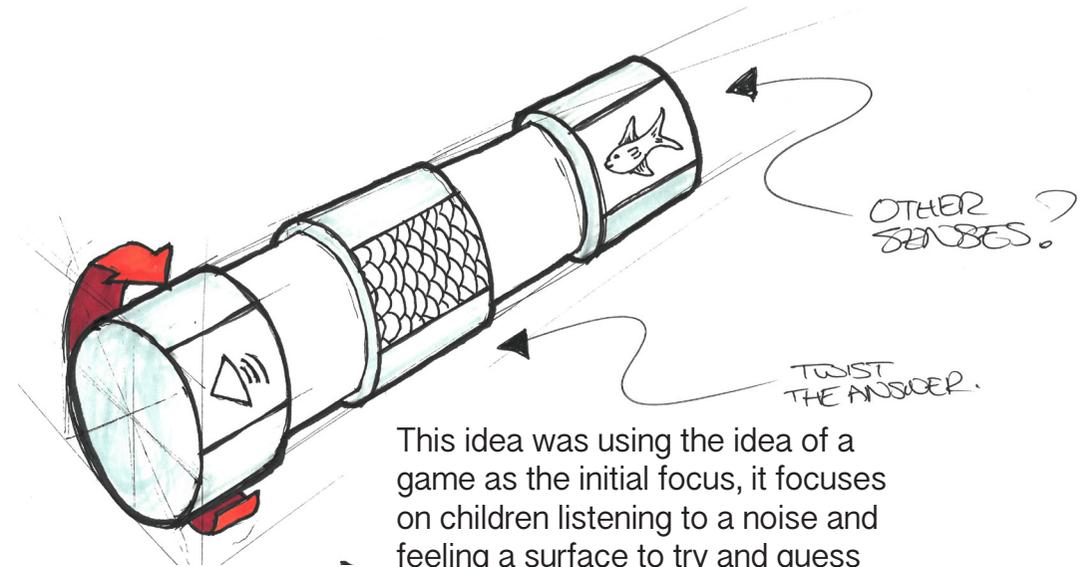
Design Rationale

At this point it was decided that the project needed a Design Rationale. This would allow the project to stay on the right path and allow ideas to be tested to see if they meet what was trying to be achieved in the design rationale.

To develop a product/range of products that aims to reduce stress and anxiety levels in children in a hospital environment using the ideas of Distraction Therapy and also for them to enjoy their time in Hospital and encourage play and cognitive growth. The outcome will explore the possibilities of achieving this possibly using ideas such as games, aromatherapy, audio therapy and other sensory solutions.

Initial Ideas

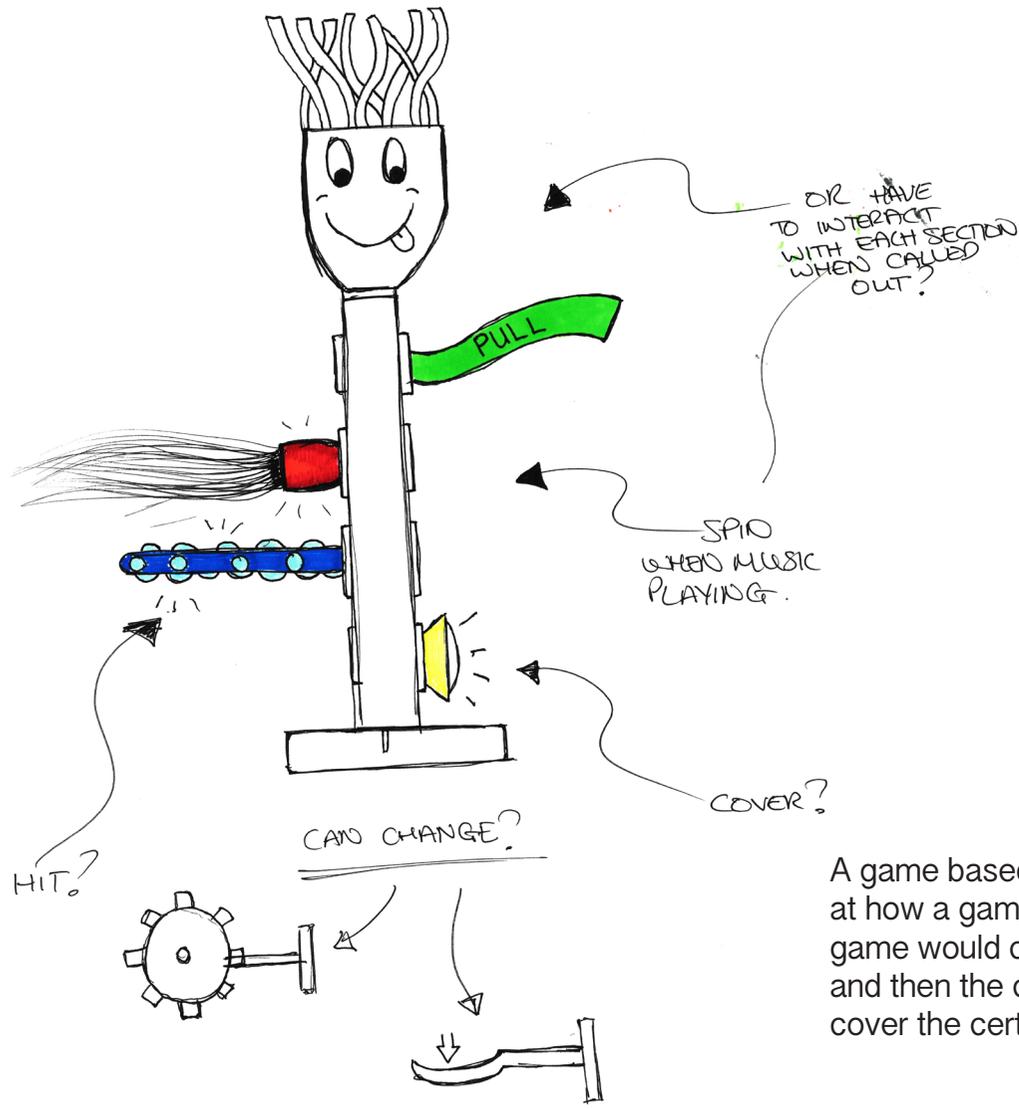
At this point in the project a number of initial concepts were thought of. Most of the ideas were using the idea of creating a sensory toy or interaction method that would allow the child to become engrossed in the distraction.



This idea was using the idea of a game as the initial focus, it focuses on children listening to a noise and feeling a surface to try and guess the answer.



This idea was focused on music playing and allowing the child to squish the handle in beat with the music as a form of distraction.



The idea used storytelling and a mixture of aromatherapy. The child would watch the story while smells were released to allow a greater level of interaction with the child.

A game based design focused on looking at how a game can distract a child. The game would call out an interaction point and then the child would either pull, hit or cover the certain interaction point.

Morag Myerscough

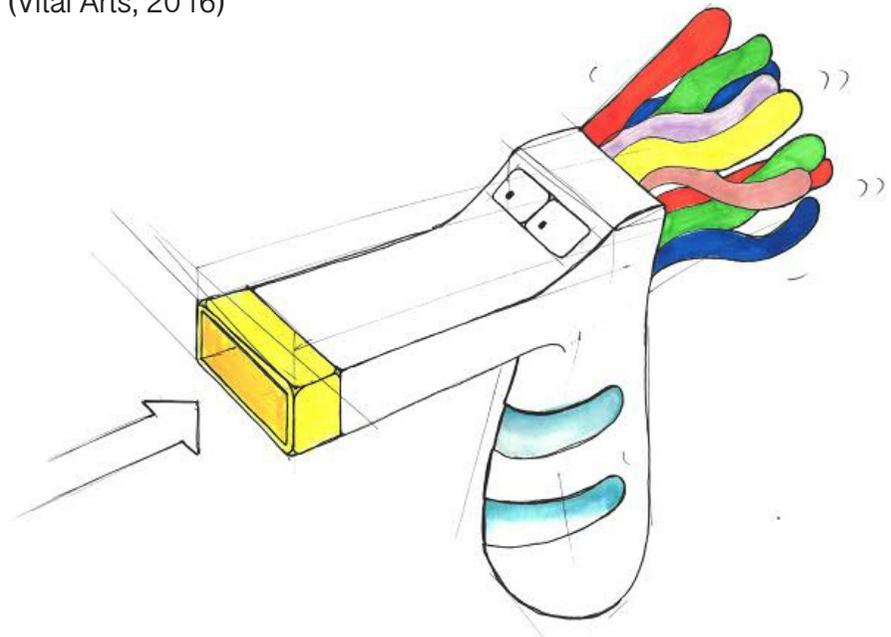


Morag Myerscough is part of a collective of designers called Super Group London. Her designs focus on looking into colour and pattern and how that can help create an environment.

Recently she has been on the team to help design the new build at Sheffield's Children's Hospital. The picture to the left is a centralised structure that will "encourage children to be active and provide vital distraction".

On a similar project by Myerscough she stated how colour and pattern can be used in a way to "bring some joy to the young patients and parents".

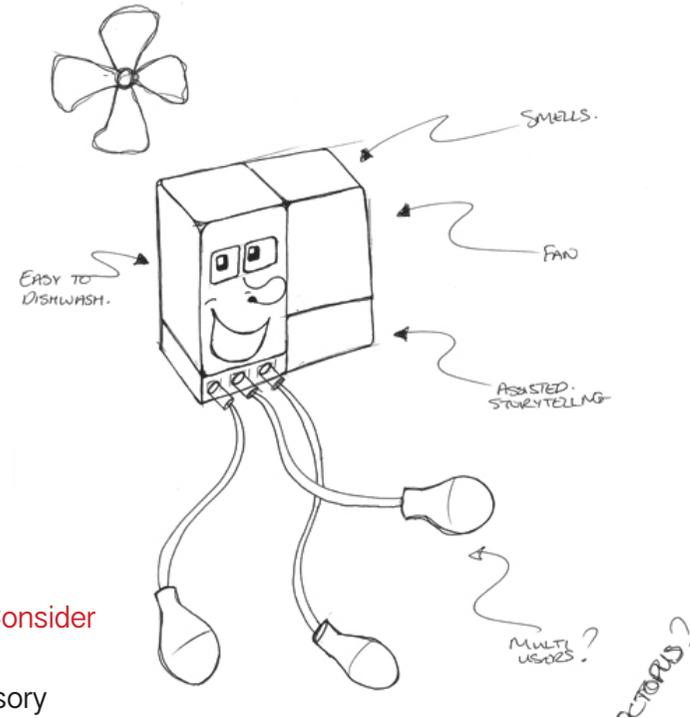
With my work I want to use this as an inspiration and to make sure my design will use the same preliminary focus as the work done by Myerscough. Below is an initial idea using the idea of colour as a main theme in the distraction. The design utilises story telling and breathing techniques as well as colour to reduce stress and anxiety levels. (Vital Arts, 2016)



Current Solutions

There is a number of current solutions to help aid Distraction Therapy, however the current solutions are quite simple in what they try and achieve. Many of the solutions do not focus on how the child will interact with the product in a multi-sensory way, a few of them are also quite simple and boring.

Below is a picture of the most commonly used product at Sheffield's Children's Hospital for Distraction Therapy. Created by Starlight, the Starlight Box is effectively a mini-tool box for a Play Specialist to carry round with them to allow them to have a large number of different toys for the children to engage with.



Areas to Consider

Multi- Sensory

Designing a tool for the imagination

Inter-ward activity

Cost effectiveness

A fun solution

Play Specialist

On November 11th a meeting with a Play Specialist was arranged at Sheffield's Children's Hospital. The Play Specialist (Nicola Ryan) spoke to me and showed me how she works and her job role within the hospital. We had a long conversation about her job role and the positive aspects to current solutions and the limitations she has with them.

Job Role

The role of Play Specialist is to provide play and recreational opportunities for all patients. They also have the responsibility of making sure children are prepared before and after any medical procedures, they may have to endure. However their main aim is making sure children have a child-friendly environment in the hospital and to make sure they continue to learn, grow and have fun in hospital.

Why?

Children attend hospitals all over the country everyday and when children attend hospitals it tends to directly affect their behaviour causing them to digress. This can be affected by being in pain, being scared, upset, the unknown or from traumatic experiences. This is why the role of the play specialist is so important for the children.



Fig. 10

Findings

Cleaning

One finding that was found that needs to be considered was the cleaning of the products that the children use. Any product that uses materials that susceptible to infections have to be thrown away after one use. For example Crayons can only be given to one child before being thrown away. All multi-use products have to have the ability to be washed in the dishwasher.



Positive Reinforcement

Nicola mentioned how Positive Reinforcement is a big aspect of the Play Specialists job role and making sure the child is rewarded for undergoing a procedure is also as important as them doing it in the first place.

Whats Available?

One observation I did see was that current products that aim to use Distraction Therapy come in a tool box like kit. Nicola mentioned how its sometimes hard for the children to pick what they want to play with.

Other Considerations

One Handed

Cleaning

Use Imagination as
a tool

Distraction Kit

Make sure it's Fun!

Scenarios

Scenario 1 - The child is in need of four stitches on their wrist due to an accident at school. The child is very frightened of any type of sharp and a form of distraction is needed to help the child cope with their anxiety levels.

Reaction - The child in this scenario will need a distraction that will gain their attention immediately and keep them fixated on the distraction for the short term. Whether this uses the senses as a forefront or any other method of distraction is to be developed.

Opportunity - This could be done using colour, taken inspiration from Morag Myerscough as well as the senses and taking inspiration from Jinsop Lee and his work in to the senses to understand what could be designed to easily and quickly distract the child.

Scenario 3 - The child is new on the ward and is finding it hard to interact with the other children on the ward.

Reaction - Making sure children are being included within activities and helping them make friends is a big part of hospital life and will make their time in hospital a much more enjoyable and less stressful experience.

Opportunity - Looking into co-operative play and how I as a designer could possibly design a game or a system which will allow the children to interact with each other encouraging play in the hospital.

Scenario 2 - The child has been in the Hospital for some time and is expected to be in the Hospital for two more weeks. They have been getting bored in Hospital and a Distraction Technique is needed to relieve boredom and to help stimulate growth and play in the hospital environment.

Reaction - Growth and play is an important part of a child's development and being in hospital should not hinder this.

Opportunity - A product could be designed to help stimulate learning and growth possibly looking into areas such as storytelling and other stimulating activities.

Understanding where distraction therapy can be used in hospital and creating scenarios has enabled more concepts to be designed. It will also help me to understand what limitations will be in place. For example from undergoing this exercise I have noticed what ever I design needs to be transportable so that the play specialist can travel with it from patient to patient.

Concept



These concepts were created, the idea is based on three interaction modules that will be used to help the child tell stories as a form of distraction in hospital. The left module features a pull mechanism that will allow the child to release a scent. The middle will use a push mechanism to allow the children to blow bubbles from center of the module. The final module on the right uses a twist operation to release music.

Interaction Modules

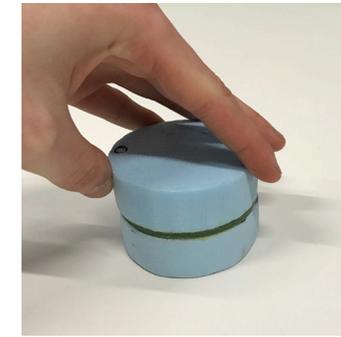
A series of interaction modules were created to look into the process of interaction. The three modules each have a different interaction method. The first one being push, the next being pull and the final one being twist. The models were created and then given to individuals so an observation could take place.

The models were given to see if people enjoyed the interaction, although being quite simple the idea is that the simple interaction will be used as a tool for children so they can be used to create stories as a form of distraction. These modules when developed will take on the form of a character to help aid the distraction for the child.

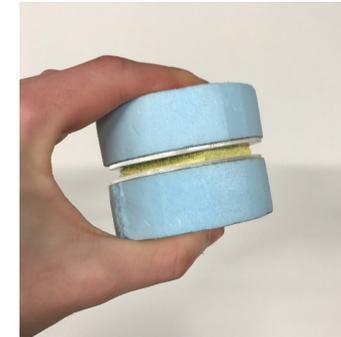
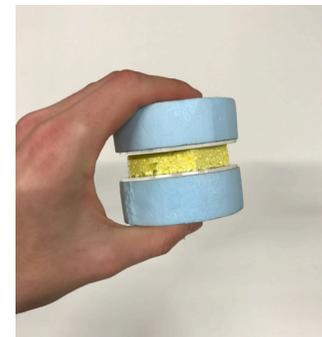


26.

Twist



Push

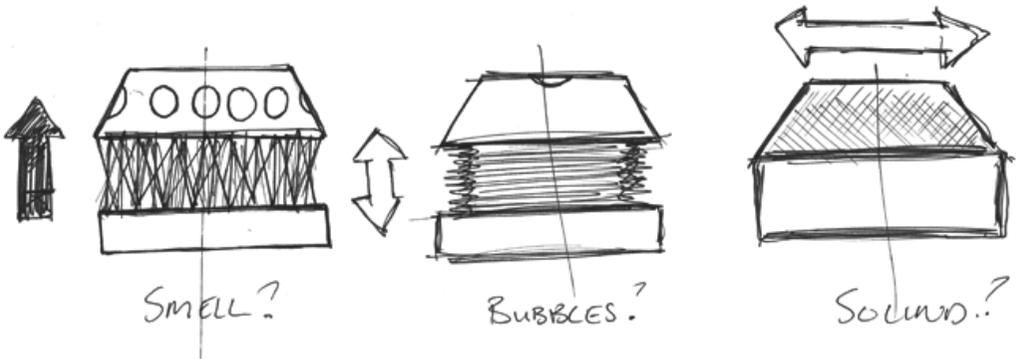


Pull

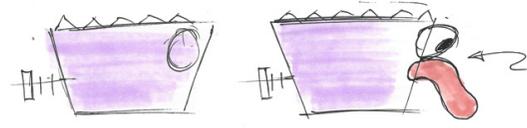
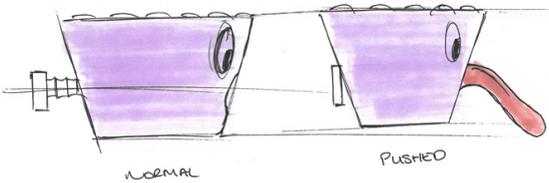
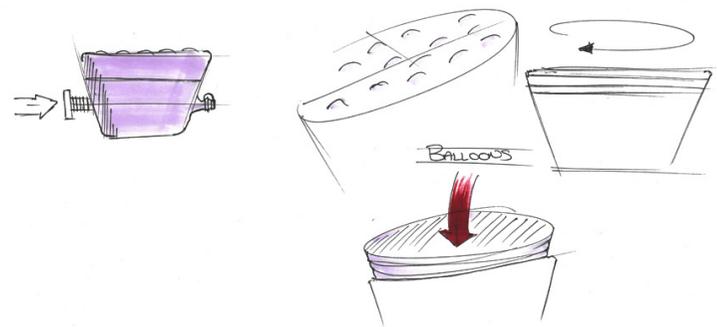
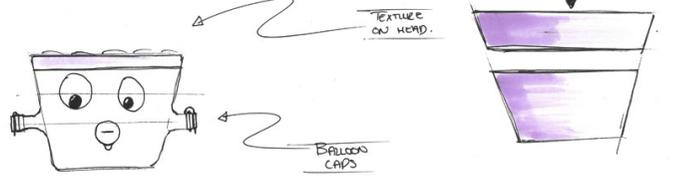
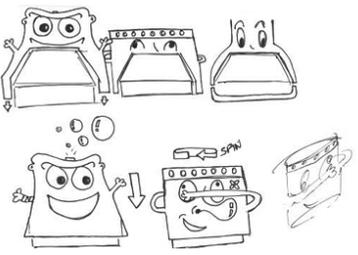
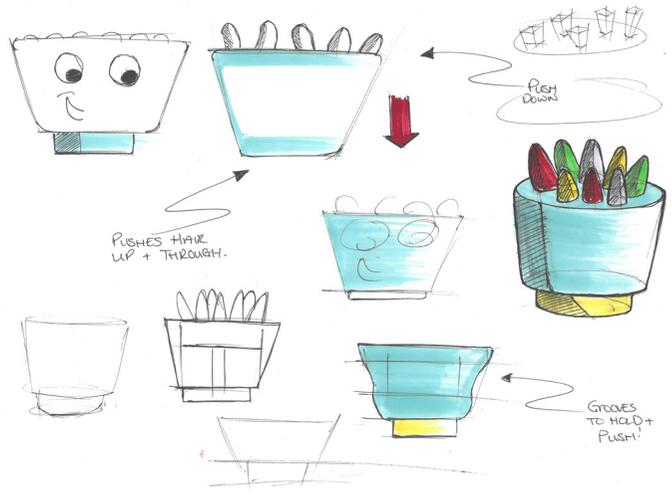
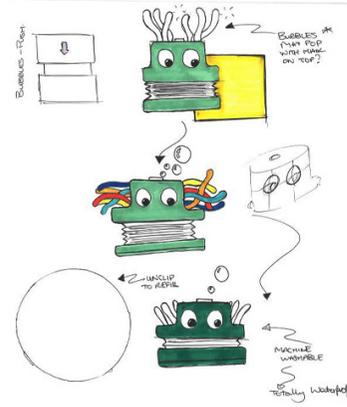
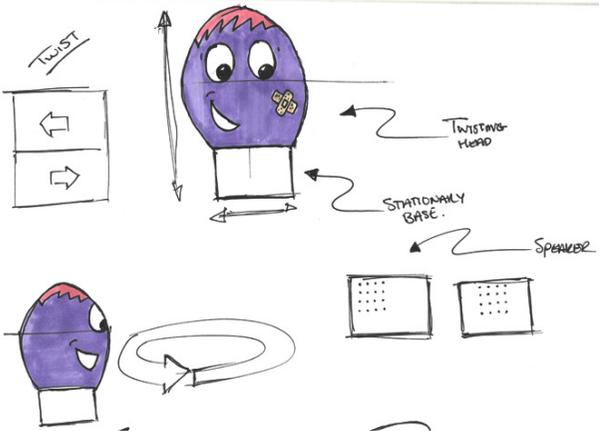


Above is the set of three modules that have been modeled to test whether the interaction is tactile enough and whether it makes the user interested in playing with the modules.

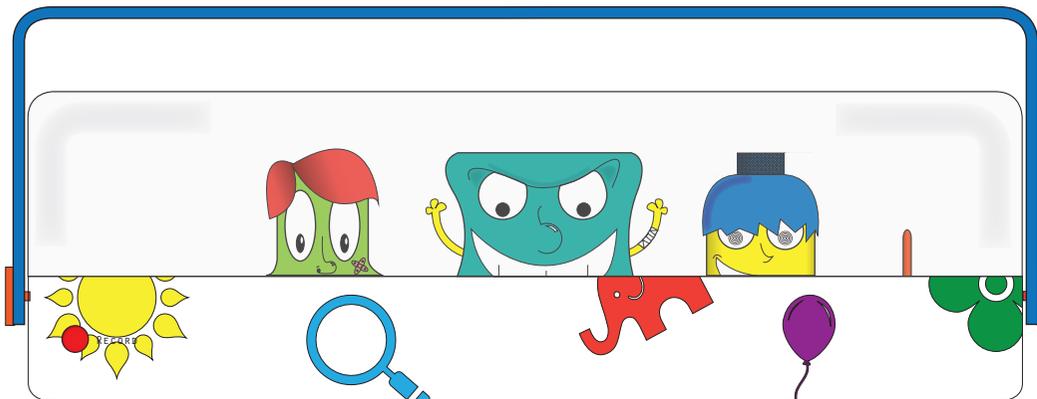
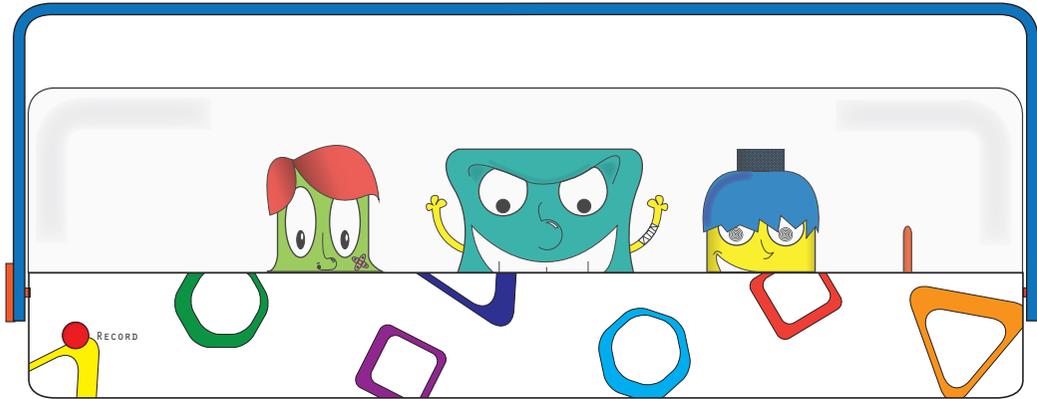
Concept Development



After the modules were modeled it was found that the designs needed to be developed to add more character so it would be easier for a child to gain a rapid attachment to the product within a distraction scenario. The most evident way of doing this was to create three characters that the child will interact with



Enhancing Growth



Characters and stories play a vital role in the growth and development of children. Making up stories and using characters will allow children to understand aspects of their lives in the future.

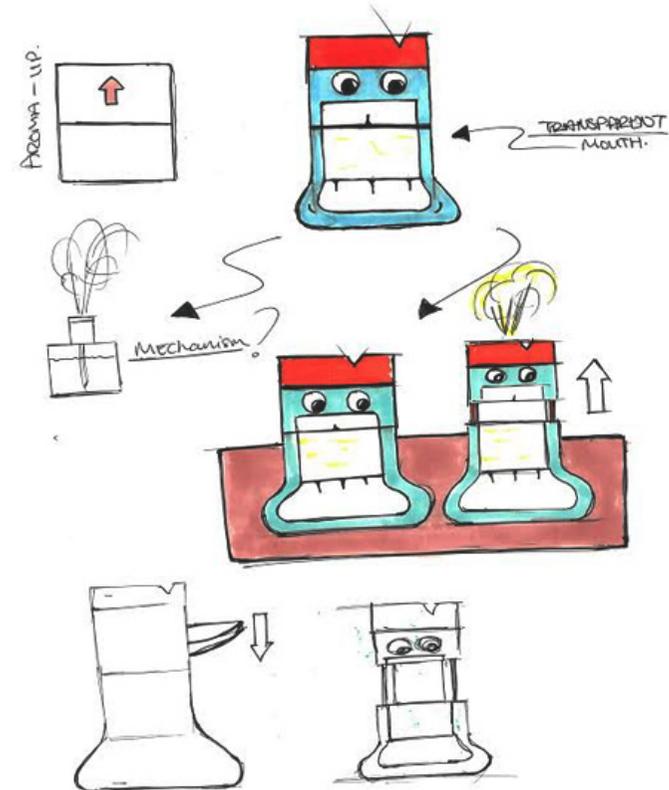
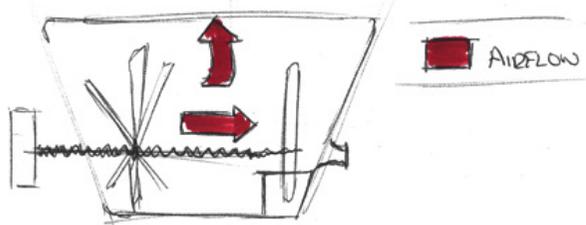
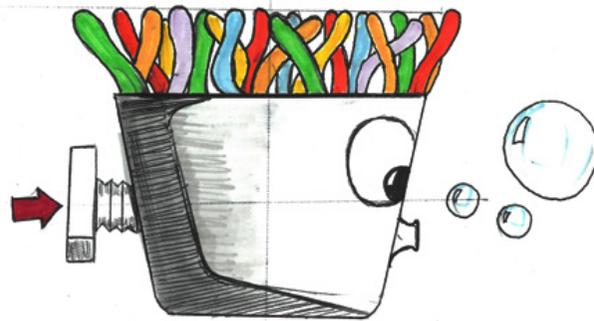
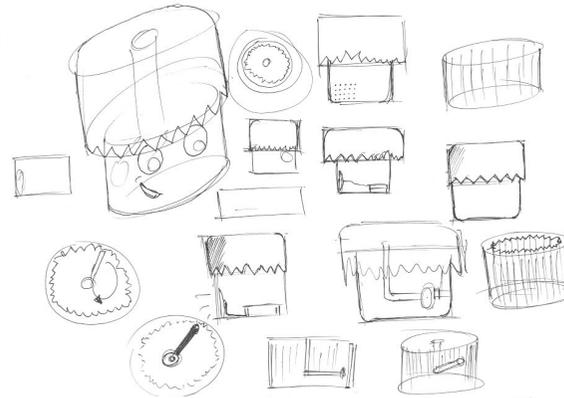
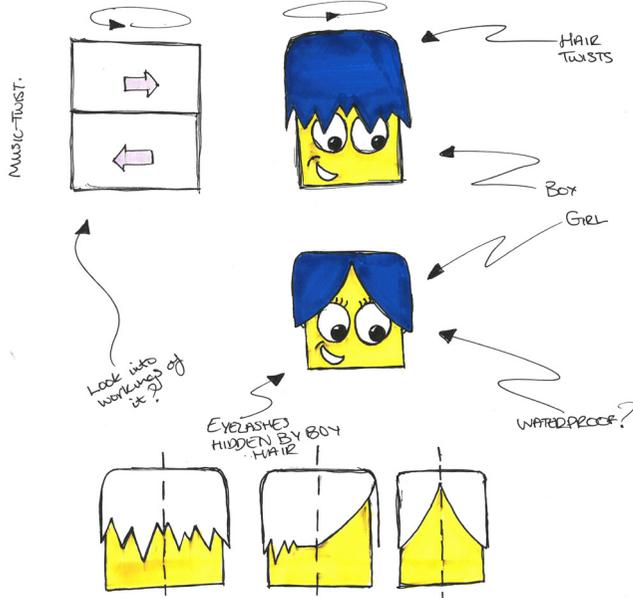
Stories can also help enhance language and allow children to express themselves using characters as a forefront. It allows them to talk about any issues they may have.

They can also be a great relaxation technique that allows children to forget about the issues they have and escape into a world of fantasy. (WritersBureau, 2016)

The aspects to storytelling and characters make it perfect for a distraction therapy, my current design to the left features three characters that can be used as tools for the imagination and storytelling, the characters need some development to allow them to gain more character, however the final concept characters will have an aim to be a "blank slate" so the child does not gain any prejudging stigma. This means the characters can be transformed into anything the child imagines them to be.

Character Development

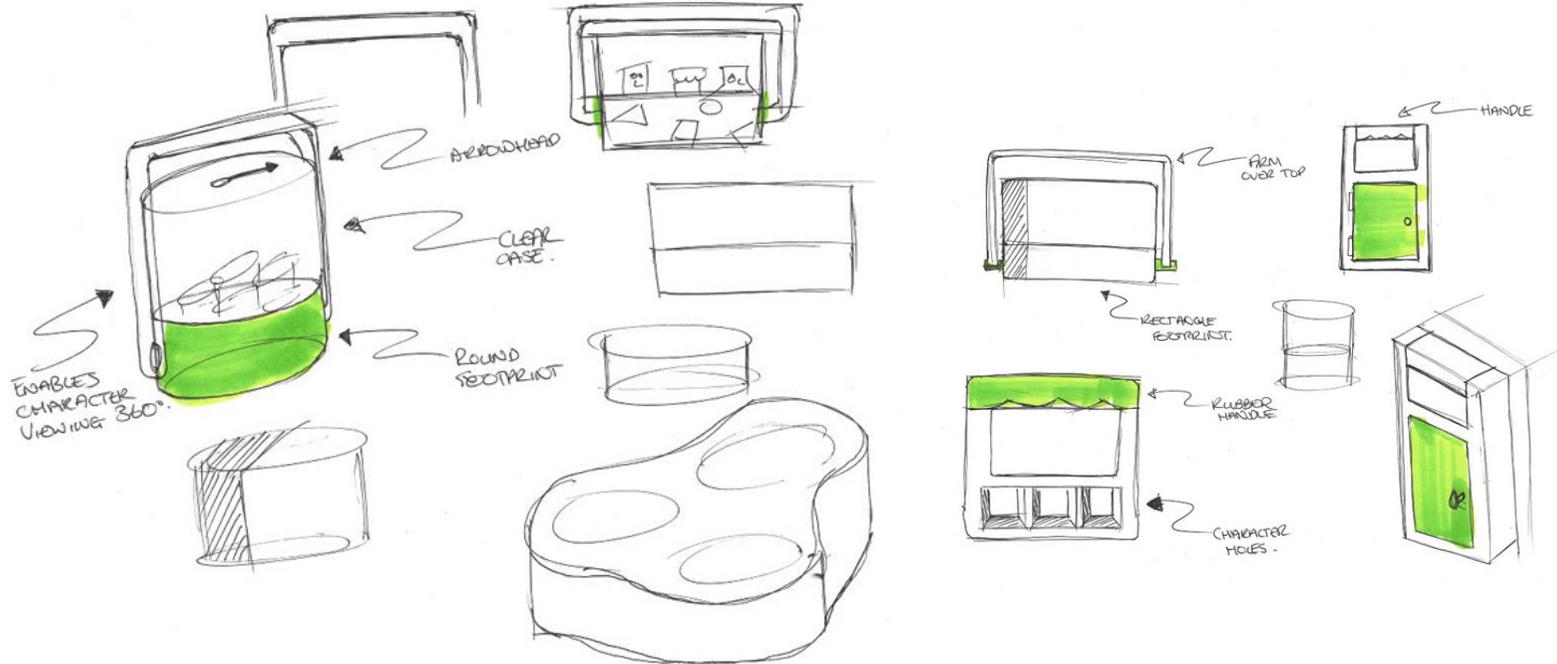
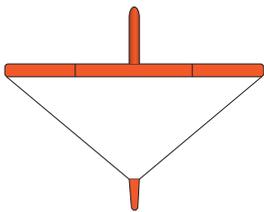
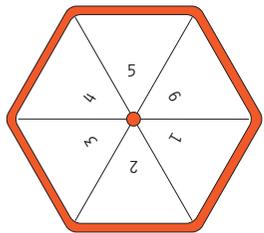
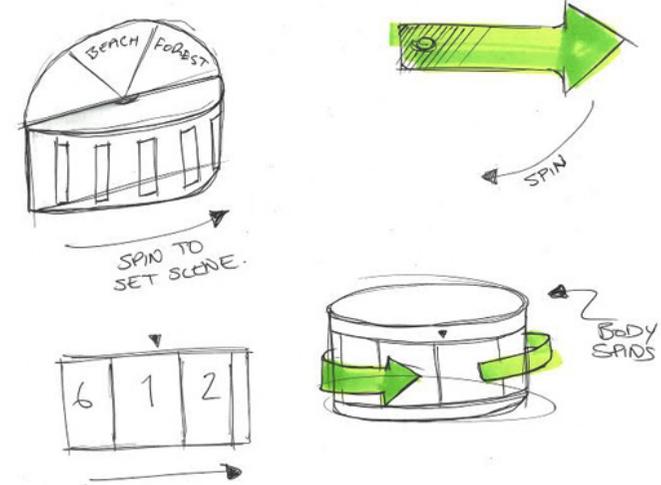
The characters need to be developed so they are easy to clean, easy to use and have the ability to be used in any story scenario. This will be done by simplifying the silhouette of the characters and removing any crevices where germs could attach.



Carry Case

The carry case has been designed to achieve a number of jobs. The first thing the carry case is designed to do is carry each character to keep them within a set and to make it easy for the play specialist to carry around the hospital.

The other role of the carry case is to set the scene for the story telling. A number of ways were thought of to achieve this and explored. One way was to create a spinning top that would sit alongside the characters in a carry case. Another way was to have a spinning arrow on top of the carry case. A number of different ways were explored.

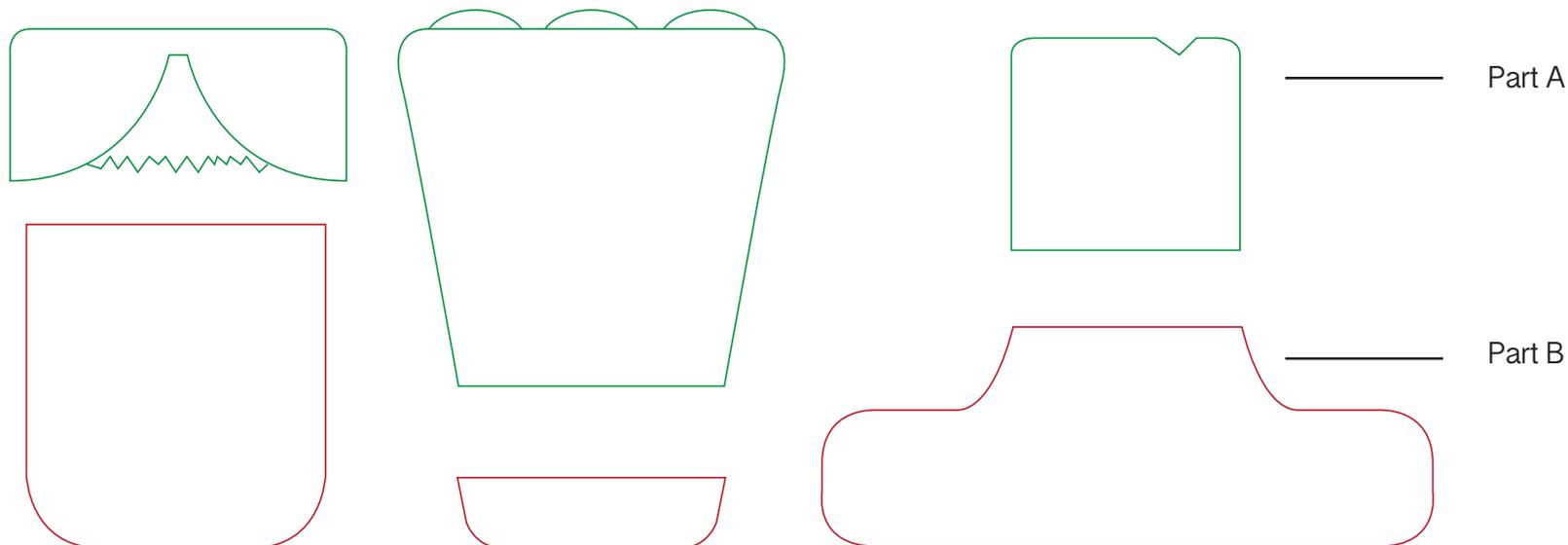


Manufacture



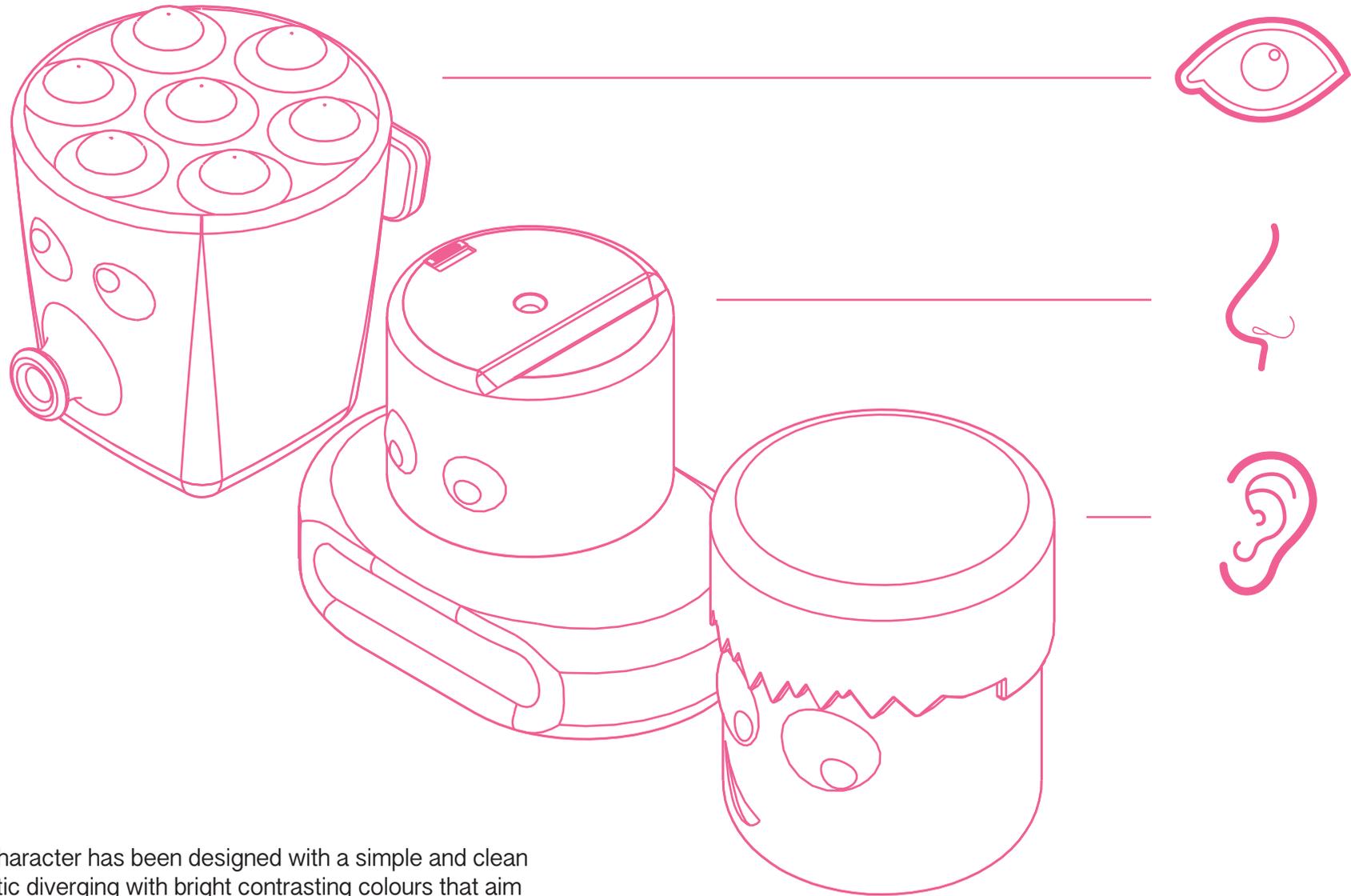
Fig. 11

Each character will be manufactured from Polypropylene and be designed using a 2 part mould shown at the bottom of the page. The toys will be manufactured using an injection moulding process and the tooling required will be fairly simple due to the aesthetics of the characters developed being easy to clean. The characters have been designed to allow them to be split into two separate bodies to allow the play specialist to get inside each character to either change the beads, refill the bubble solution or to change the scented oils. One of the characters will be 3D printed to prototype the wall thicknesses and to check the products manufacturing validity. The product will also be manufactured and then modified with a microban surface protector. The microban on the surface is used to kill bacteria to help prevent the spread of bacteria within the hospital. (Microban, 2016)



Final Concept





Each character has been designed with a simple and clean aesthetic diverging with bright contrasting colours that aim to gain a child's attention as quickly as possible to form a distraction. Every character has been designed to aid storytelling and to operate using one of the senses. The three senses approached by the design are sight, smell and sound.

Music

The first character that has been designed using the sense of hearing as the main feature. The characters main element is the purple hair that can twist. A beater attached to the characters hair will create noise by striking the characters main body internal zig-zag moulding, this has been inspired by a latin percussion instrument called a Guiro. It will also be filled with small beads to allow the character to be used as a percussion shaker. The hair that can twist has two different hair cuts allowing the character to be used as either a male or female character for the children during a story telling scenario. The main body of the character (yellow mould) also features 9 holes to allow any water to drain from the character when washing.

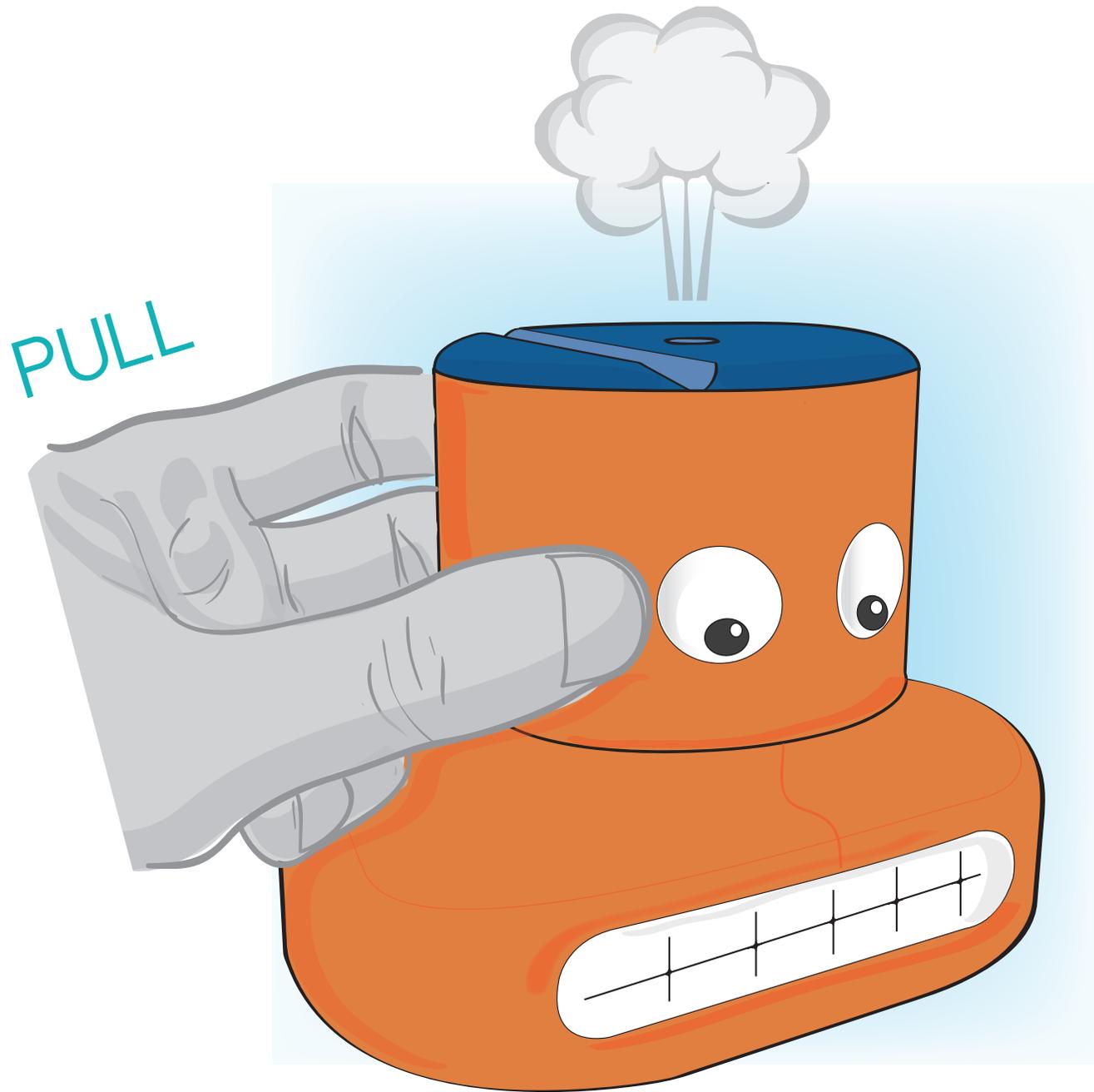




Aroma

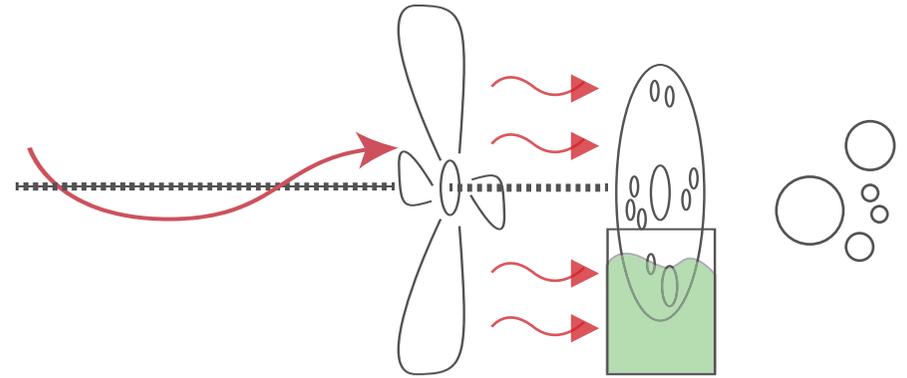
The aroma character is based on a pull interaction. The character has a split body to allow the child to pull the characters upper body upwards. This pulling action forces a reverse action internally pushing a scent diffuser. The scent is dispersed from above the characters head allowing the child to experience smell (the most powerful sense) and use it within their stories. The character features a simple slide button on the top which allows the scent diffuser to be changed once it has emptied due to a hinge mechanism. The aroma character also features like the others nine holes on the rear to allow the product to be fully cleaned using a dishwasher.

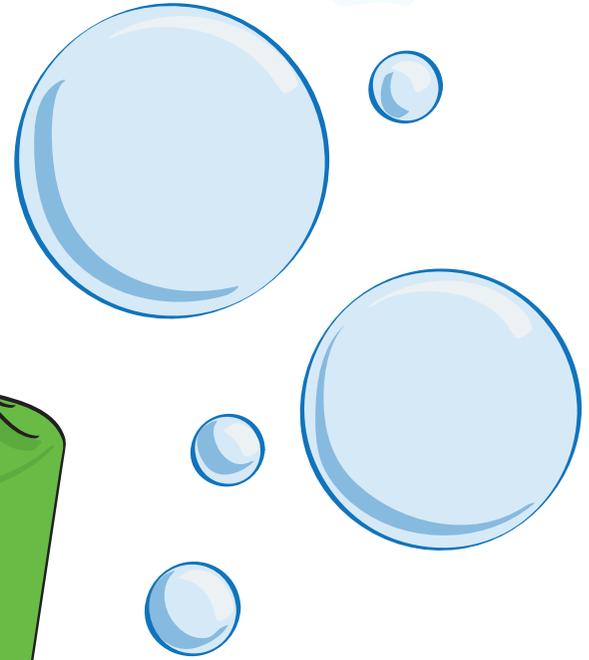
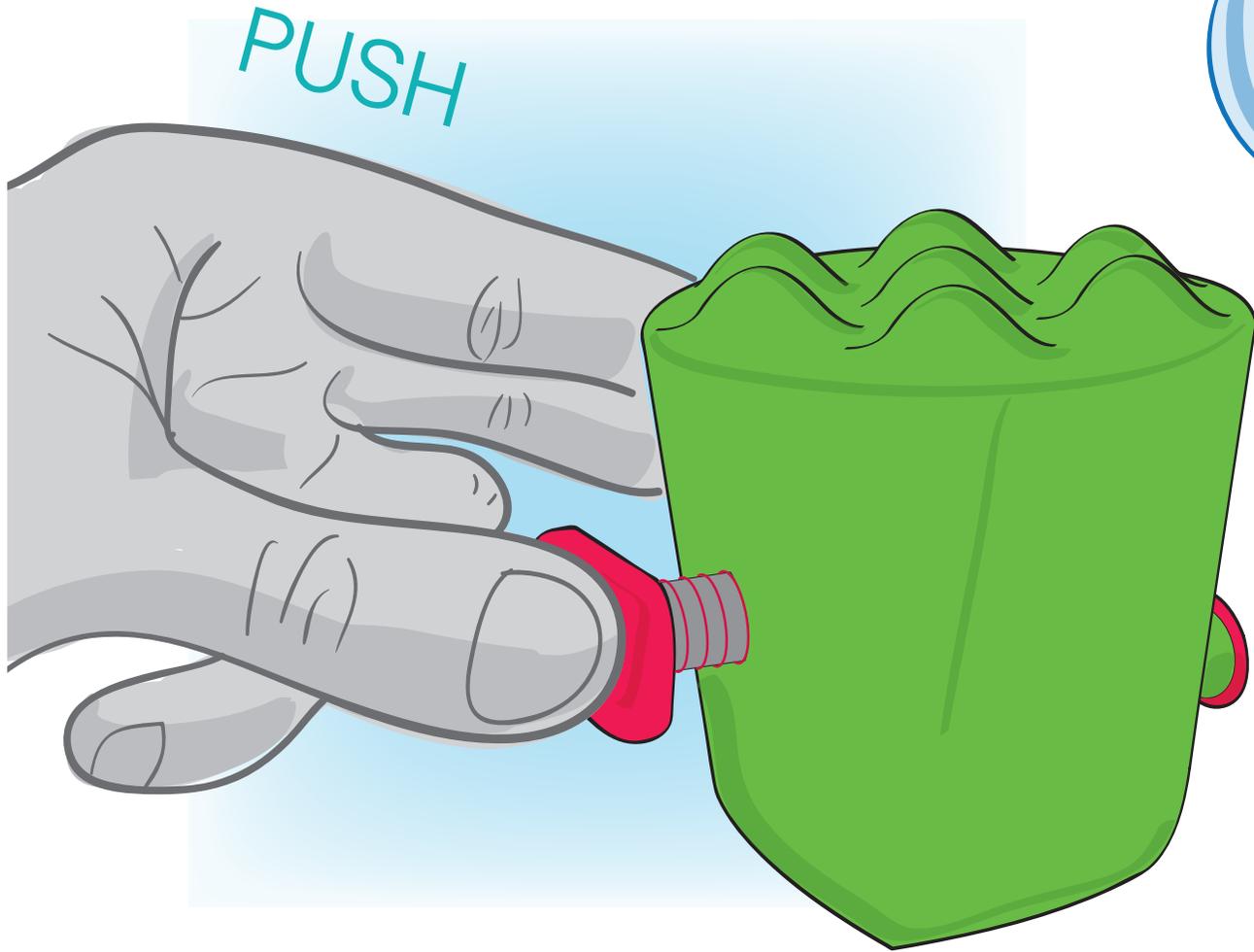




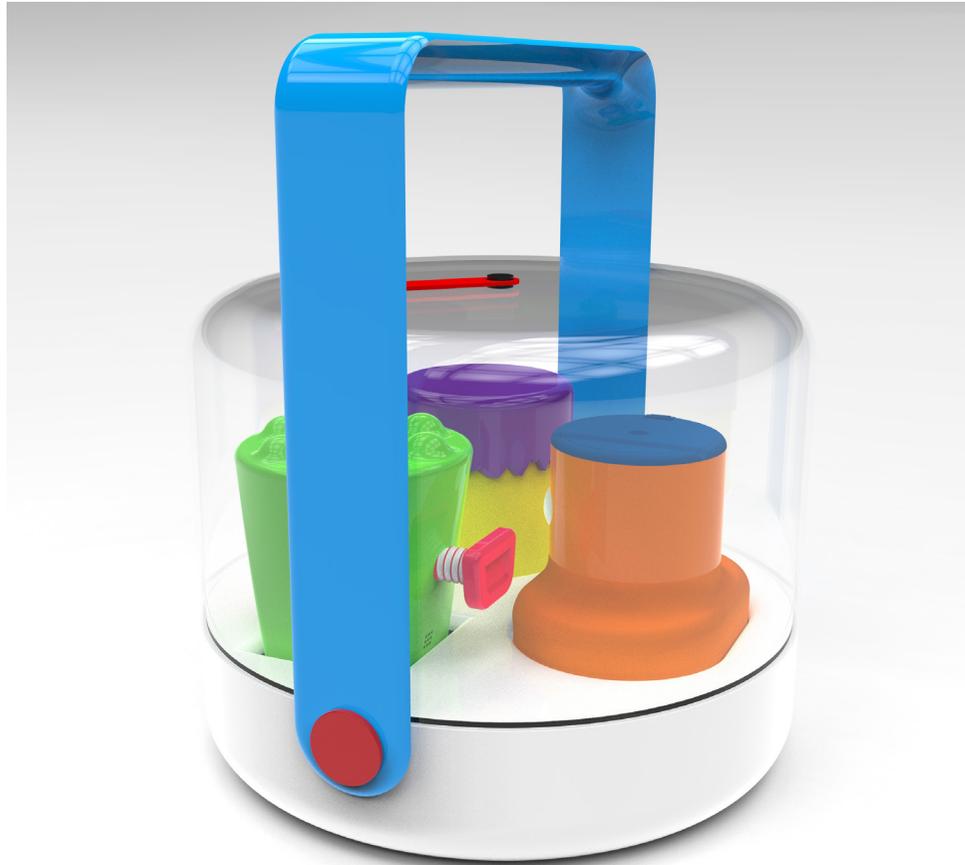
Bubbles

The bubble character has been created using a simple tapering form with a split body. The product has a split line at the bottom to allow the play specialist to refill the bubble solution. The bubbles are pushed out of the characters mouth using the push button on the back. The button would be pressed by the child which would be attached to a thread. As the button is pushed the thread will help spin a fan and a disc. The disc will spin into the bubble solution in from of the fan which will blow bubbles through the characters mouth, once the button has been pressed it will spring back. The product also features seven round moulds on the top to add to the tactile aspect of the design.





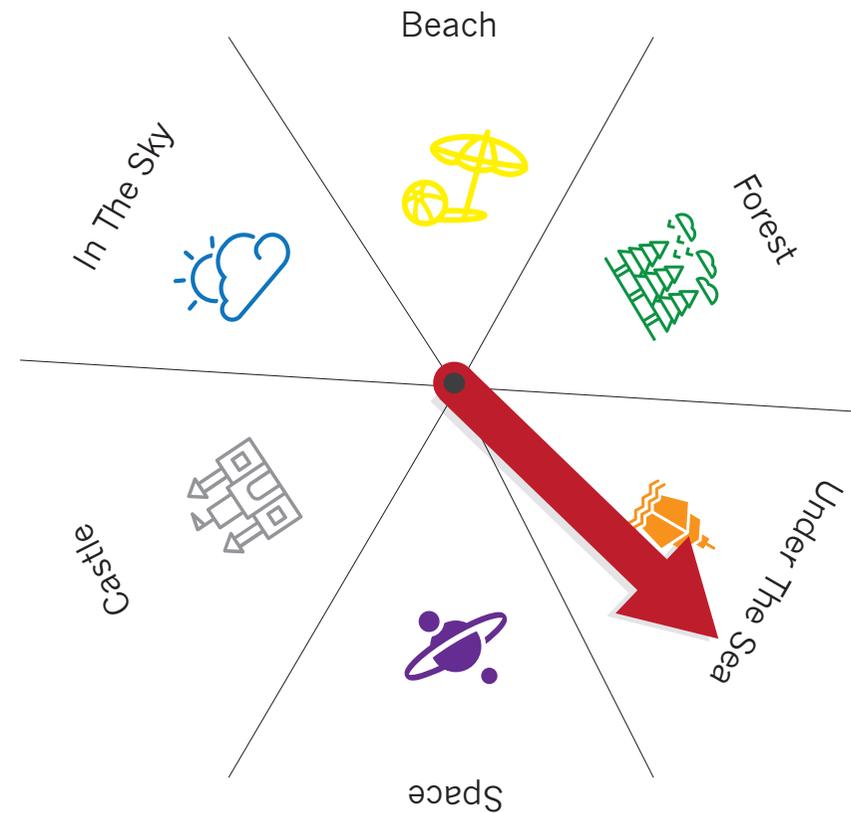
Carry Case





The carrier has been designed to achieve a number of goals. It has firstly been designed to physically carry the characters. Each character has a slot in which they sit so they can be presented to the child. The carrier has been manufactured with a clear polypropylene lid that allows the child to see the characters even from distance to aid an immediate distraction. The carrier will also feature a scene setting rotary system on the top of the carrier. Using an arrow that will be spun round the child will be able to see what scene could be randomly selected for their story.

The design has been to aid the aesthetics of the characters. It has neutral colours with a high gloss finish to show off the characters so they become the distraction and the point of interest for the child.





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