SEATING IDEAS

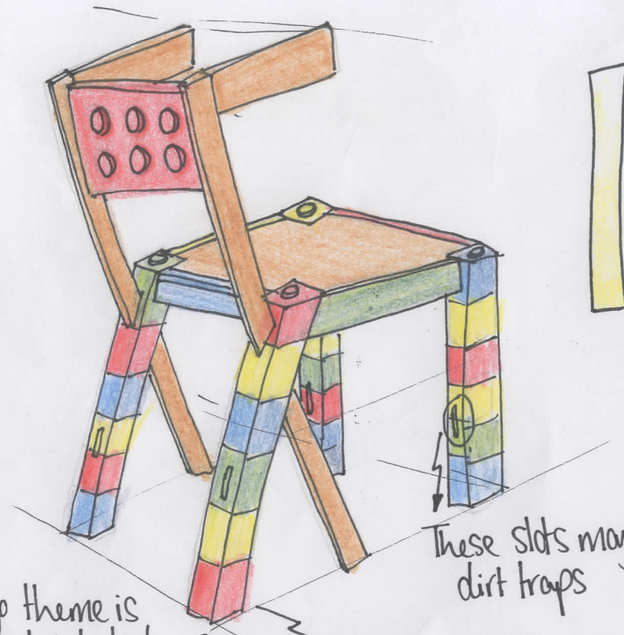
SPECIFICATION

1/ FUNCTION:
- 1.1 - The chair must be stable.
- 1.2 - It must be robust & durable
- 1.3 - It must provide educational/play value.

2/ AESTHETICS:
- 2.1 - Aesthetics must suit the market (3-5 yr olds) in terms of colour/ shape/themes.

3/ ERGONOMICS & SAFETY:
- 3.1 - It must comfortably seat a child between 3 & 5 yrs old.
- 3.2 - It must be lightweight & easy to move.
- 3.3 - It must be easy to clean & maintain.
- 3.4 - It must be safe to use.
- 3.5 - It must be easy to assemble.

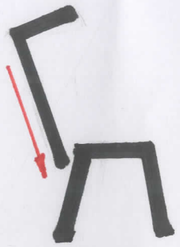
4/ MATERIALS & MANUFACTURE:
- 4.1 - It must be a suitable design to be produced in batches of 500 units.
- 4.2 - It must be made from lightweight materials.
- 4.3 - It must be self assembled using KD fittings.



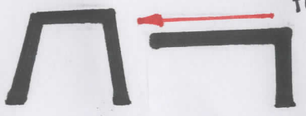
Lego theme is attractive to kids 2.1

These slots may cause dirt traps 3.4

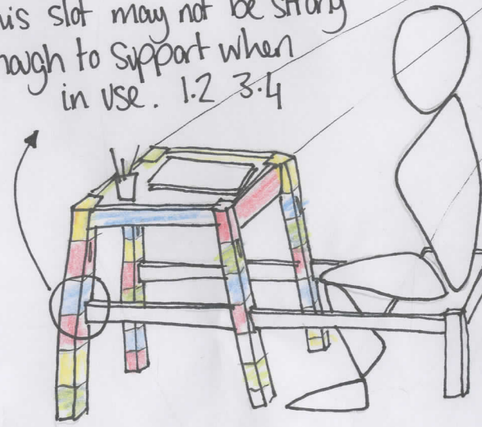
Legs are single piece, with veneers to look like separate pieces. 2.1



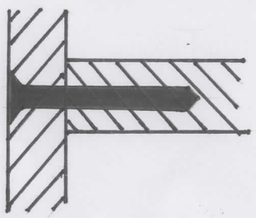
Top easily slides in and out of slots to enable dual function. The design is made from lightweight materials to allow for this. 4.2 1.3



The desk in this design allows for educational value. However, if the chair has been designed to enable maximum comfort, then the stool would be too short. The reach to work surface may cause back pain. 1.3 3.1



This slot may not be strong enough to support when in use. 1.2 3.4

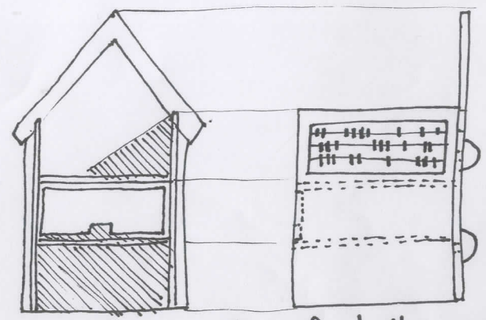


Mechanical fixing could be used for leg and rail construction 4.3

Simple to assemble and provides a strong joint. 3.5 1.2

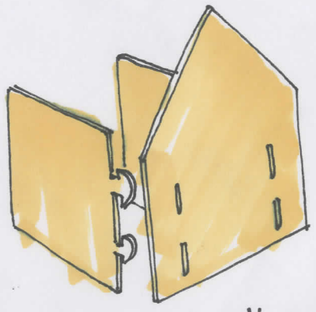
Doll's House Design 2.1

The storage under the chair can hold toys and games. The cut out for the handle prevents finger traps and saves cost for a handle to be applied to the design. 3.4



Abacus feature allows for both educational and play value to encourage development. 1.3

2

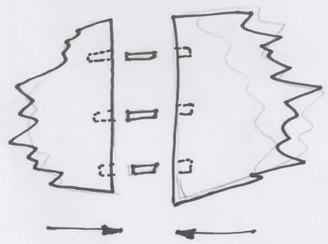


The slot and tab design provides simple assembly and disassembly. 3.5.

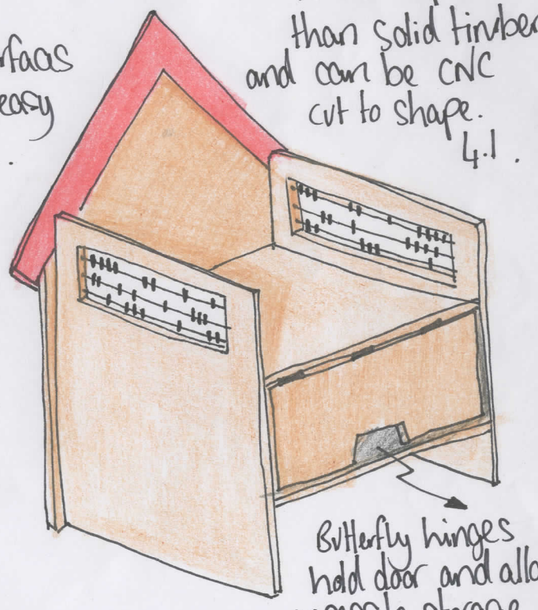
Smooth surfaces are very easy to clean. 3.3.

Dowels can be used to join seat to sides 3.5 4.3.

Plan View



Plywood would be suitable as it is less expensive than solid timber and can be CNC cut to shape. 4.1.



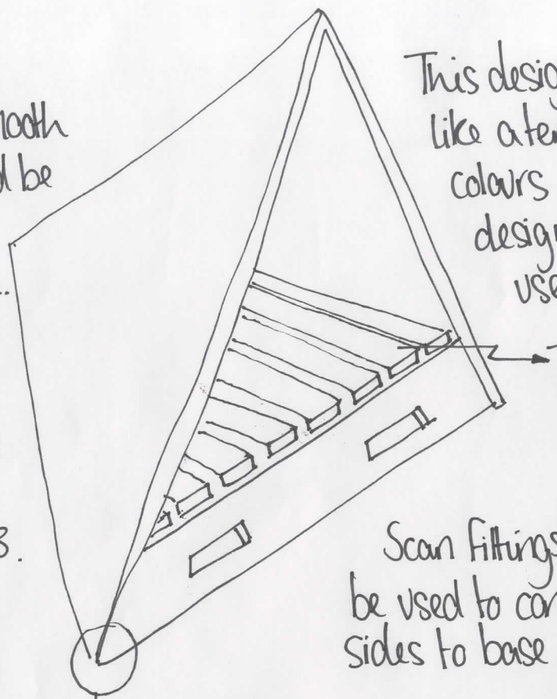
Butterfly hinges hold door and allow access to storage.

SEATING IDEAS

Butterfly Design 2.1

SPECIFICATION:

1/ FUNCTION
2/ AESTHETICS
3/ ERGONOMICS & SAFETY
4/ MATERIALS & MANUFACTURE.



The large, smooth surfaces would be finished with paint & varnish. These would ensure this is easy to clean on the external surfaces. 3.3.

This design is sheltered like a tent. The warm colours & enclosed design makes the user feel cosy.

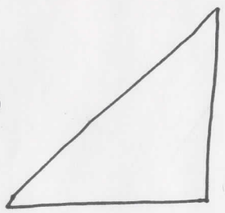
The gaps between the slats would be a bad dirt trap.

Scan fittings could be used to connect sides to base. 4.3.

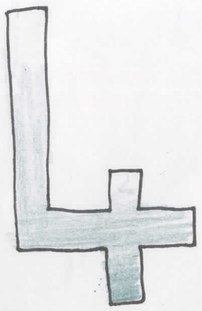
3

SLIDE DRAWER: Provides storage, however it is disfunctional due to tapered triangle design.

Finger trap when closing drawer. Sharp corners would be unsafe. 3.4

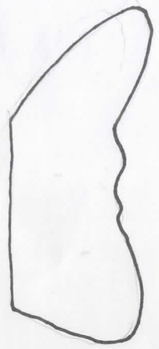


Tapering design would make this design relatively uncomfortable. 3.1



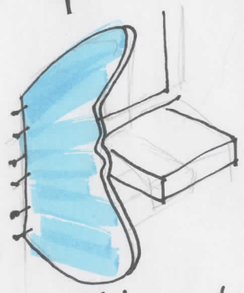
Small butterflys are made from tissue paper.

These are daintly and aesthetically pleasing. They may tear easily. 2.1

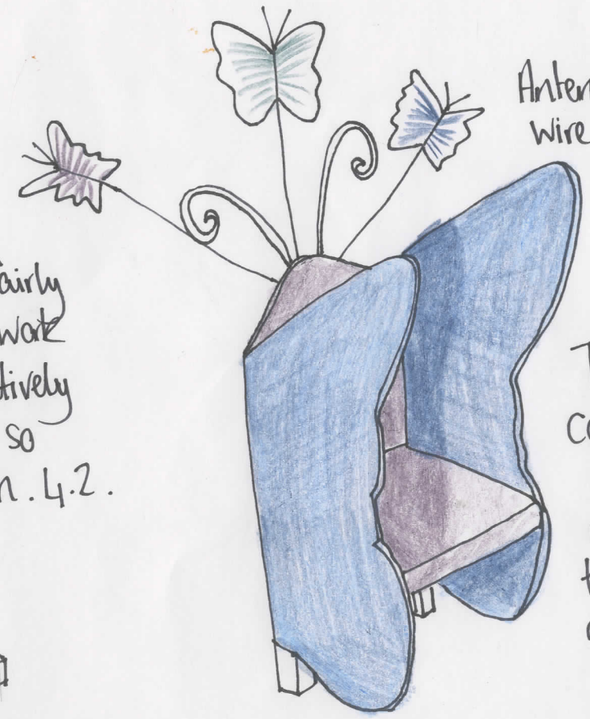


The sides of the chair could be manufactured from plastic, such as polypropelene as it is light and rigid. This would ensure the chair is lightweight to be moved around by a child. 3.2

Scots Pine could be used for the seat, back and legs. It has mechanical properties of being fairly strong and is easy to work with. This is a relatively inexpensive softwood so would keep costs down. 4.2.



Screws could be used to join sides to seat and back. 3.5



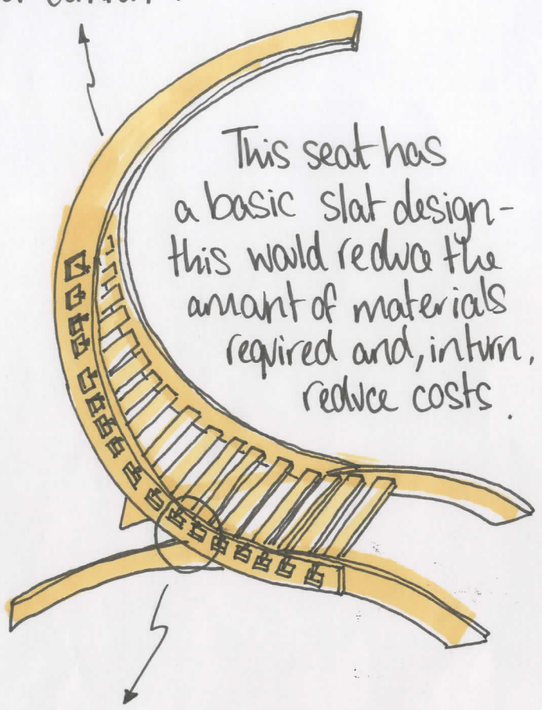
Antenna is made from wire. It is too sharp for kids. 3.4.

The cool, receding colours encourage calm and relaxation in the user. Ideal for a bedroom. 2.1

The leg supports at the back are unattractive. However, they provide good stability for the chair as the front is curved on the side panels. The seat provides bracing at the front. 1.1

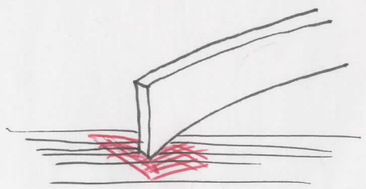
5

Full spinal support provides good level of comfort.



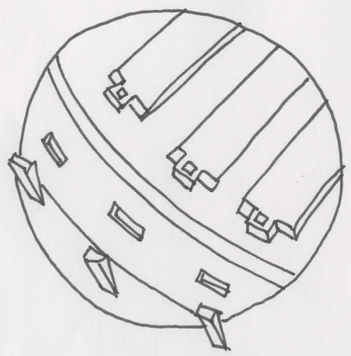
This seat has a basic slat design - this would reduce the amount of materials required and, in turn, reduce costs.

This design would be awkward to assemble as there are so many pieces at slightly varying lengths to suit the tapering design. 3.5.



The back of the leg does not provide good stability. 1.1

This design, although attractive, does not look like a design for a child. I would expect the market niche for this to be holiday makers and the chair can be used at a poolside. 2.1



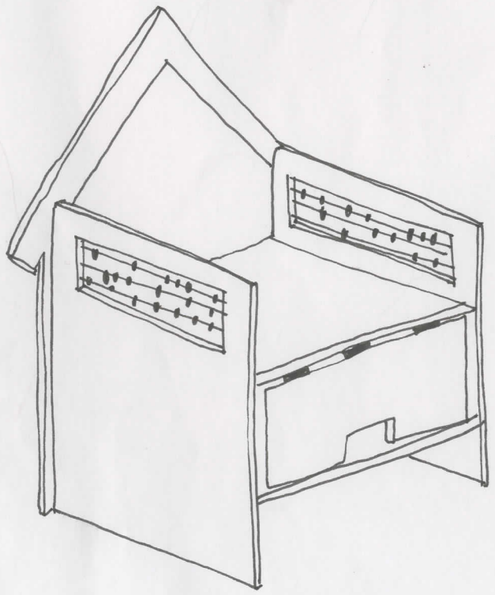
Knock Down Mortise and Tenons.

These may not be secure enough to hold the slats in place when in use and would need reinforced with glue - not suitable for dissassembly. 4.3

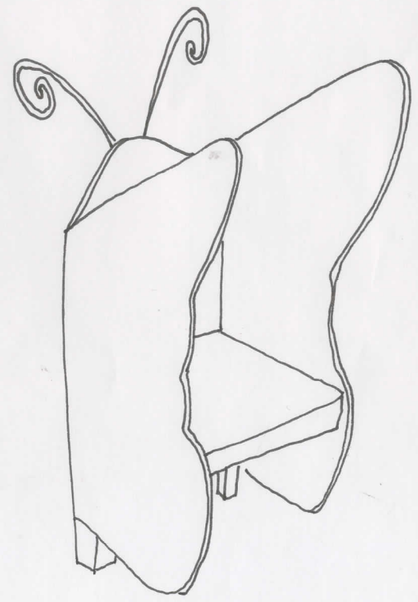
SPEC. POINT	1.1	1.2	1.3	2.1	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3
IDEA 1	3	3	2	4	3	5	4	4	4	5	4	4
IDEA 2	5	4	4	3	5	3	4	5	4	5	3	4
IDEA 3	5	4	4	4	2	1	2	4	3	4	2	4
IDEA 4	1	4	2	4	4	3	4	3	5	5	4	4
IDEA 5	3	3	2	2	3	5	2	4	5	4	4	4

Evaluation and Areas for Development.

Concept 2: This has been designed in the shape of a doll's house. It is large, bulky and robust. The abacus provides play value, however in a superficial way. A more meaningful approach could be taken to this. Space for storage is useful for a child's toys and games.



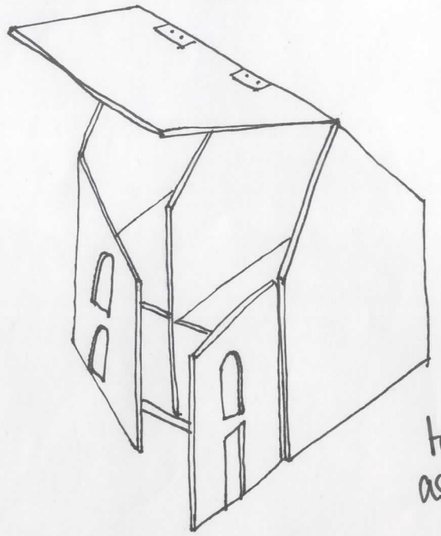
Concept 4: This is aesthetically pleasing, in the form of a butterfly. It is quite enclosed and claustrophobic. This is an unstable design and appears as though it could topple over. I will also consider strength of materials throughout development.



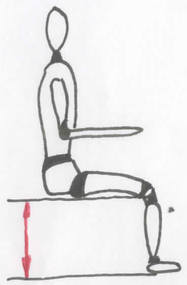
DEVELOPMENT 1

CONCEPT 2

DOLL HOUSE DESIGN



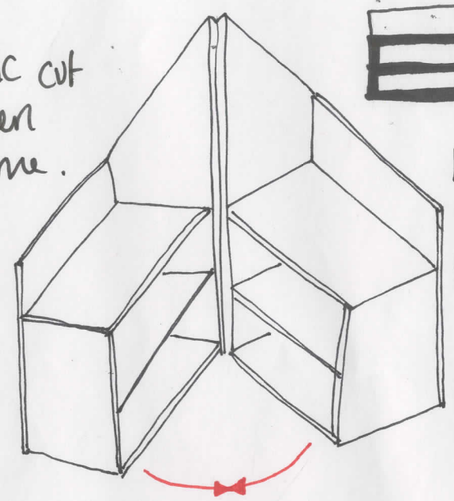
Doll's House design relies on hinges for it's basic function. These allow the design to transform. The open/close feature is fundamental in it's design.



Birch Plywood used - cnc cut to shape and then assembled at home.

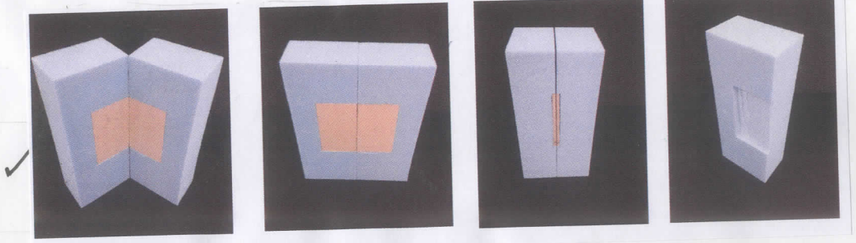
Birch ply is of an excellent quality & light in colour.

Material	Benefits	Weaknesses
Plywood	Strong, Stable large sheets, cheap 1-2	Repair/maintenance can be difficult.
Scots Pine	Fairly strong. easy to work with. 1-2.	Knotty.



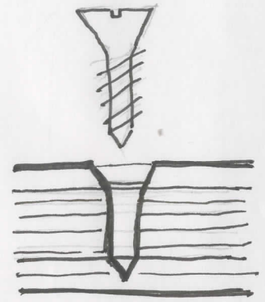
If armrests are flat, the design loses it's hosse shape when opened up, which takes away from the attraction.

HINGE INVESTIGATION

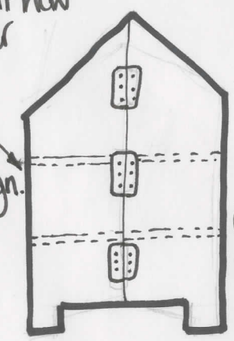


In order for the hinge, at the back edges of the chair, to work properly, they must sit flush with the surface of the plywood. This will allow model to fully open and close.

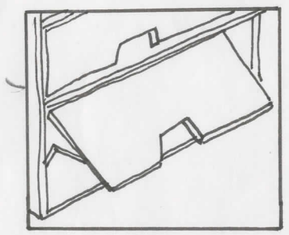
Screws for the hinges must be countersunk for the same reason.

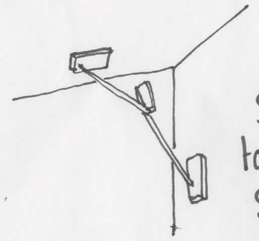


only one shelf now to allow for lighter structure & less bulky design.

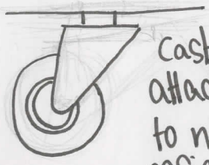


3 sets of hinges to ensure a steady hold.

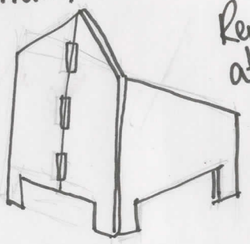




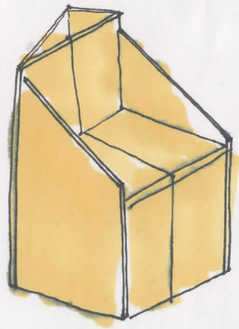
Stays used to control door swing.

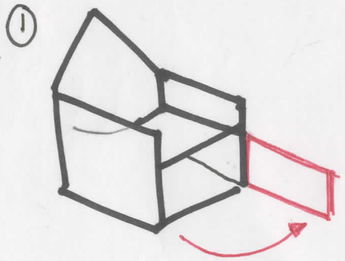


Castors could be attached to base to make open/close easier.

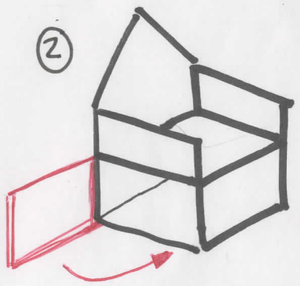


Removal of material at the sides makes the unit lighter to move & open & close, without compromising stability.

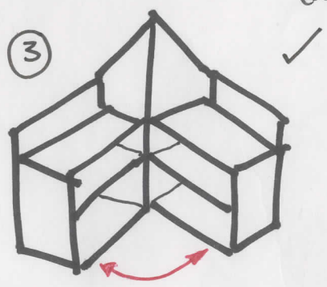




① Door swing open at front may interfere with use.

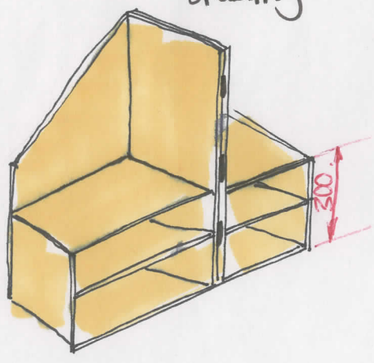


② Side door is not handy to access.



③ Hinges on back allow dual function as a play doll house when open.

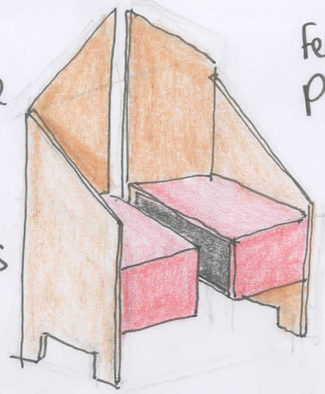
Magnets used on plywood to ensure seat stays closed.



This concept can act as a chair when closed, As well as functioning as a doll house when opened up. This brings good play value to the design.

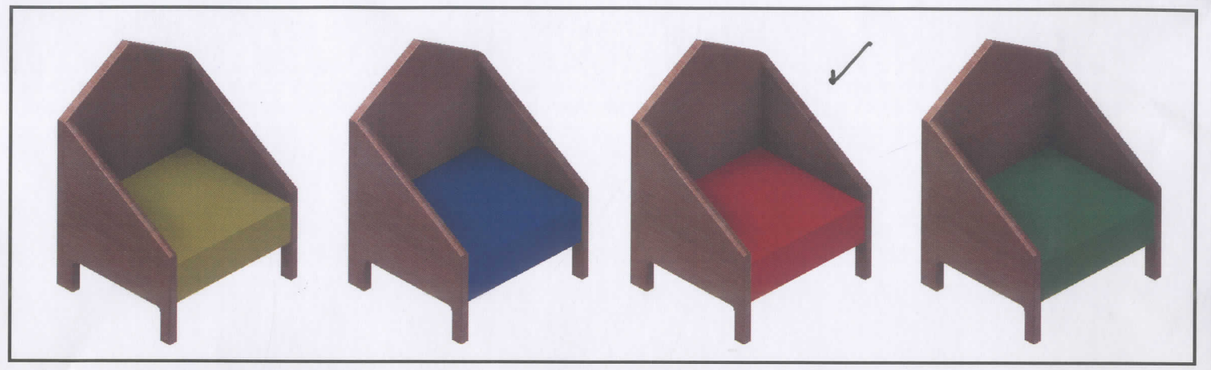
DEVELOPMENT 2 CONCEPT 2

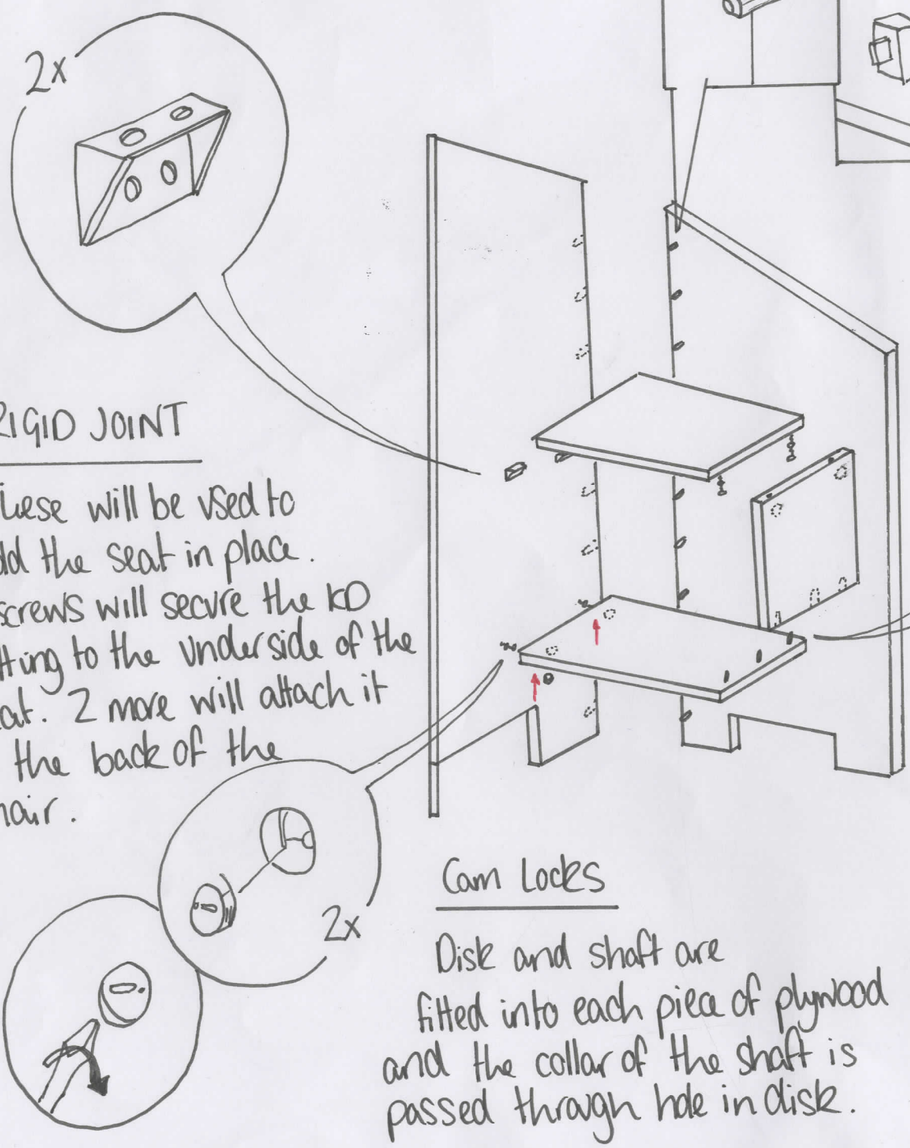
2x the same piece for manufacture as chair splits in half.



features such as the pre-drilled holes will be made as a mirror image for the 2 halves of the chair.

Having tested the application of different colours in this computer model, I feel that red stands out the most and will enhance the aesthetics of the design to attract kids.





RIGID JOINT

These will be used to hold the seat in place. 2 screws will secure the KD fitting to the underside of the seat. 2 more will attach it to the back of the chair.

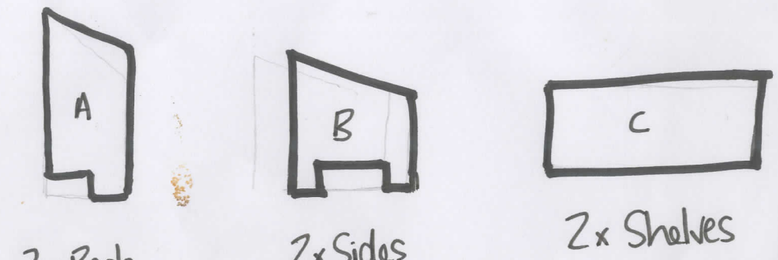
DOWEL JOINTS

Dowels are secured into pre-drilled holes. Design will be more difficult to disassemble but will be strong.

Cam Locks

Disk and shaft are fitted into each piece of plywood and the collar of the shaft is passed through hole in disk.

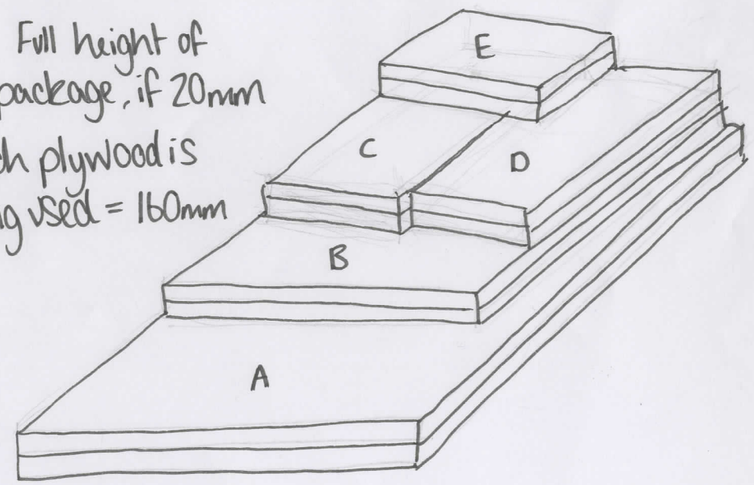
The 2 sides are securely fitted together when the disk is rotated with a screwdriver.



2x Back | 2x Sides | 2x Shelves | 2x Seats | 2x Fronts.

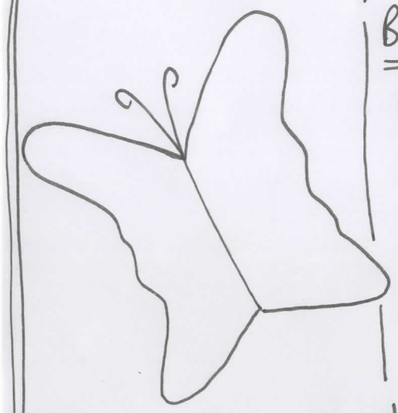
FLAT PACK - TRANSPORTATION

Full height of package, if 20mm birch plywood is being used = 160mm



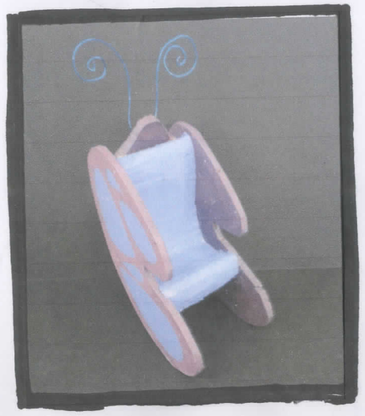
DEVELOPMENT 3

CONCEPT 4



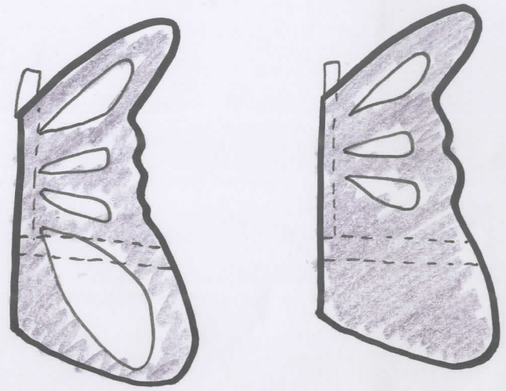
BUTTERFLY DESIGN

Butterflys have large, brightly colored wings. They are characterised by their scale covered wings, which can be black, browns, blues & greens.



This model highlights the instability of the design. The leg & rail is insufficient.

Rocking Chair & Side Panels.

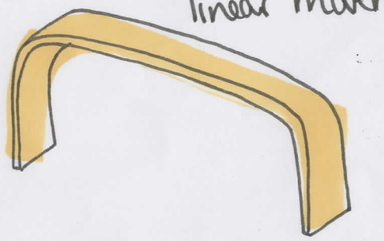


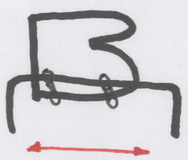
Side Panels made from plywood. CNC cut.

Rocking Chair will encourage calm and peacefulness in user.

Wing detail – cut outs represent scales but also allow more light & prevent user feeling too enclosed. The cut outs make chair lighter to help moving around.

Painted mild steel frame could be extruded & bent to shape. Very stable. Components would allow linear movement through use of an axle

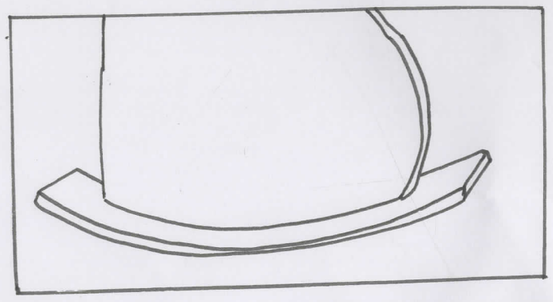


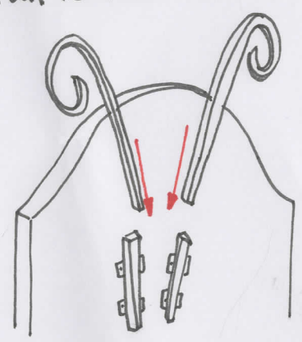


Mild steel is not required for a kids chair as weight would be light ∴ not necessary for strength properties.

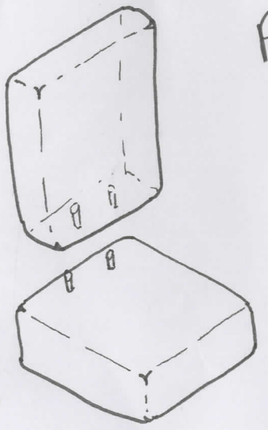
Stops on front & back allow for rocking movement to be controlled.

Flexiply can be used for base of rocking chair. Wide Panels make for a more stable design.

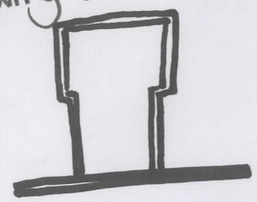




Nylon shaped into spiral & can be removed from slots on back.



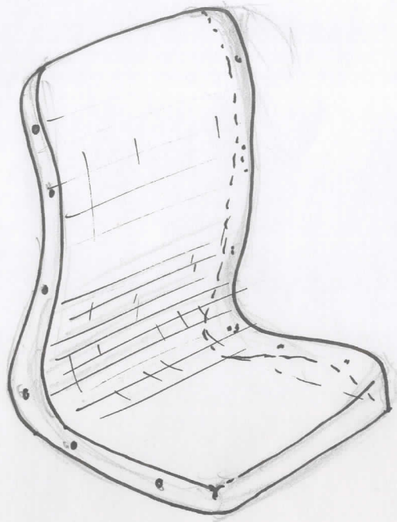
Polypropylene is lightweight for moving chair around.



Polypropylene back & seat can come in variety of colors.

Hollow Rotational molded pieces – lightweight for moving around.

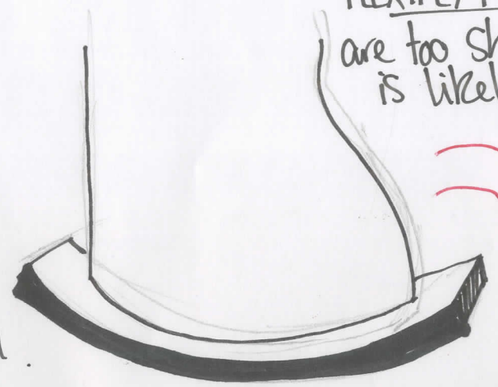
DEVELOPMENT 4



Seat component to be a one-piece construction.

This is a much more ergonomic design & follows the form of the spine.

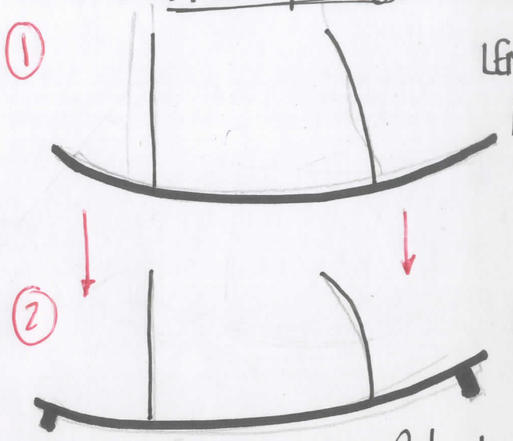
This will be a much more comfortable sitting position.



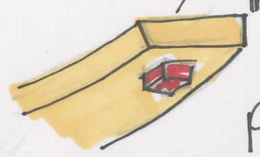
FLEXIFLY ROCKERS are too short & design is likely to swing over.

Slot for sides

IMPROVING SAFETY



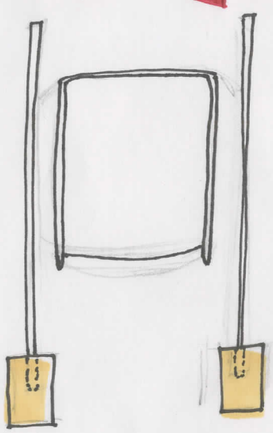
Red colour to improve psychology.



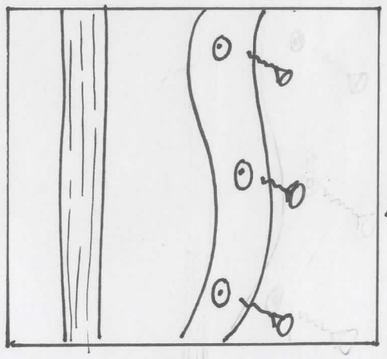
Rubber provides good grip to hard floors.

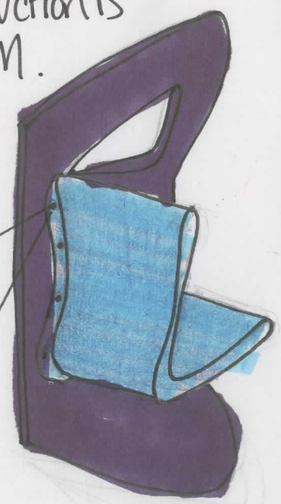
Rubber will prevent chair tipping.

Seat will be screwed onto side pieces.

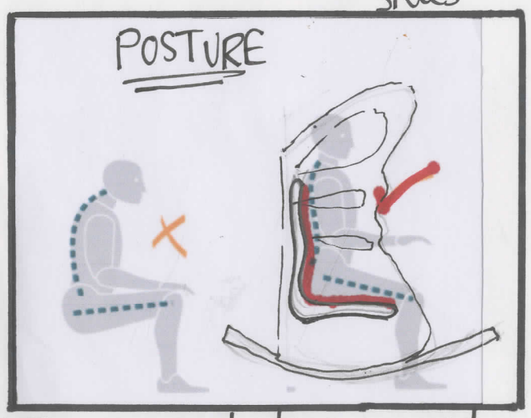


The seat could be made from polypropylene due to it's lightweight properties. It is also a suitable material for injection moulding. The one piece construction is ideal for I.M.





Polypropylene pre-drilled & counter sunk for screws to attach seat to MDF sides.

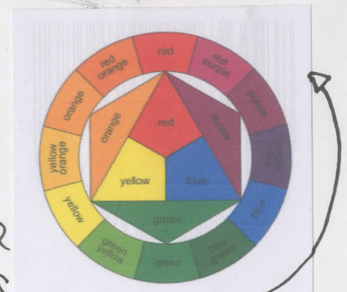


The new seat design provides much better back support & encourages good posture for the children.

FOR SIDE PANELS ONLY

Material	Benefits	Weaknesses
MDF	Strong doesn't warp. Paint is taken well.	A lot of glue - not environmental
Chipboard (veneered)	V. Cheap Relatively strong	Heavy, warps easily.

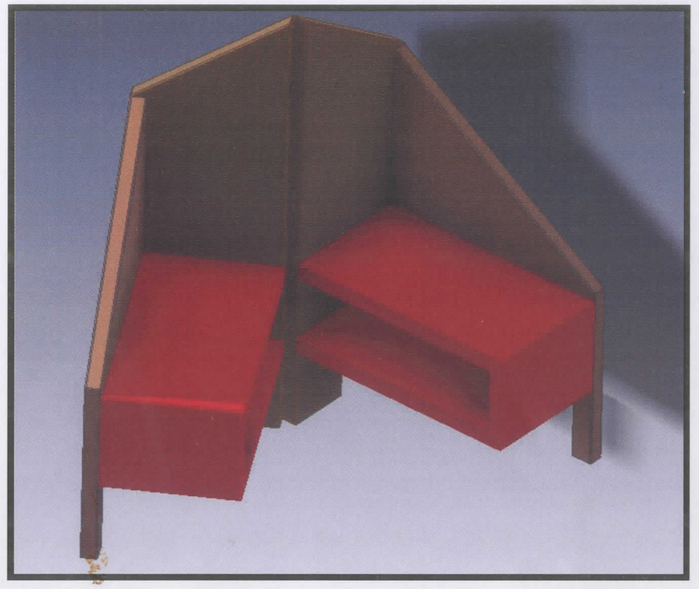
Final Design

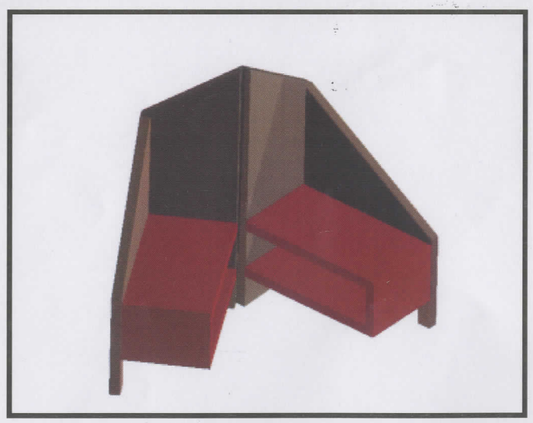


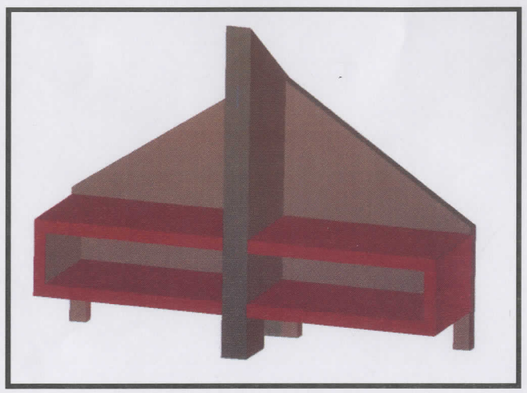
Receding colors have been used in my design to encourage calm & peacefulness.

Acrylic paint will be applied to the MDF.

DESIGN PROPOSAL







FUNCTION

The function of the Doll's House chair in my final proposal fits the specification well. As stated in specification points 1.1 and 1.2, the chair is stable, robust and durable. The good quality birch plywood was chosen with longevity in mind. The simple, square shape of the base has ensured a stable structure. These, along with the castors and magnets make this product simple and easy to use to its full potential, both in a doll house form and when in its primary use as a chair.

AESTHETICS

The Doll's House chair looks very appealing both as a chair and as a doll's house.
The colour scheme chosen was neutral to suit both male and female users. The addition of stickers for the windows and doors of the house enhanced the overall look and add a unique aspect to the design for the child/user.
The chair was given a more modern look by filleting the edges as well as removing unnecessary material from the sides of the design.

ERGONOMICS AND SAFETY

The anthropometric data gathered for this design was with the intention to enable as many children between the ages of 3 and 5 to use this product comfortably. The width of the chair was designed in accordance with the 95th percentile of 5 year old girls hip widths, allowing the largest children to be able to use the chair with maximum comfort.
Birch plywood was the chosen material for the chair as it is lightweight and so the child would be able to open and close the design with ease, which in turn improves the safety of the deisgn. There are no dirt traps or difficult to reach areas of this design and so the chair is very easy to clean and maintain. There are no sharp edges, finger traps or choking hazards in this design and so it is safe for a child to use.

MATERIALS AND MANUFACTURE

The materials used to manufacture this chair have been specially chosen with the user in mind. As aforementioned the chair has been made from birch plywood. This has been chosen for many reasons: It has a significantly lower cost than solid timber, but maintains a high quality over time; it comes in large sheets and so is suitable for the wide shapes of the different components in this design; it is strong and will easily support a child's weight when in use. The separate pieces of the chair would be CNC cut to shape and then simply packaged together for transportation, along with the relevant KD fittings.
The proposed assembly would utilise use of CAM lock fittings for the seat and shelves to connect to the vertical sides. Brass butt hinges would allow the open/close design at the back of the chair. The brass would improve the aesthetics of this feature. Dowels connect the side of the chair to the back as this is easy to assemble and creates a strong hold.