

PLANNING + REFERENCES



1 (🔗)



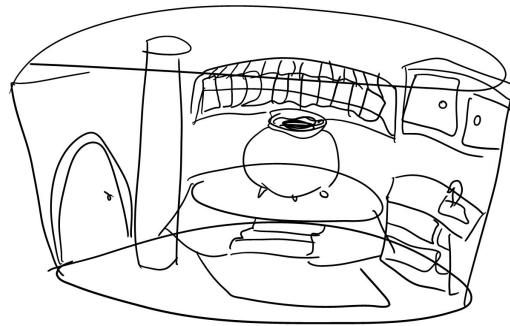
2 (🔗)



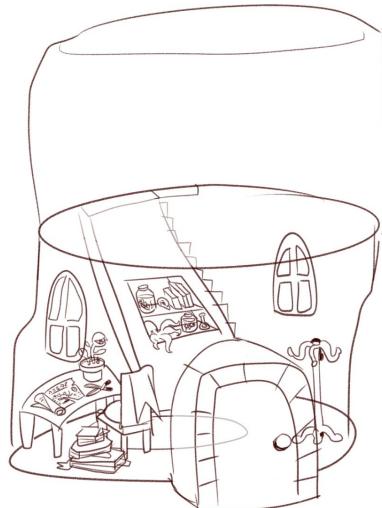
3 (🔗)

As inspiration, I found the above images of a witch's house, and two wizard's towers. When beginning to plan my environment, I leaned towards an interior focused design, being the home of a magical person. Thus, I could use 'magical items' as sources of light, and to introduce interesting elements into my scene.

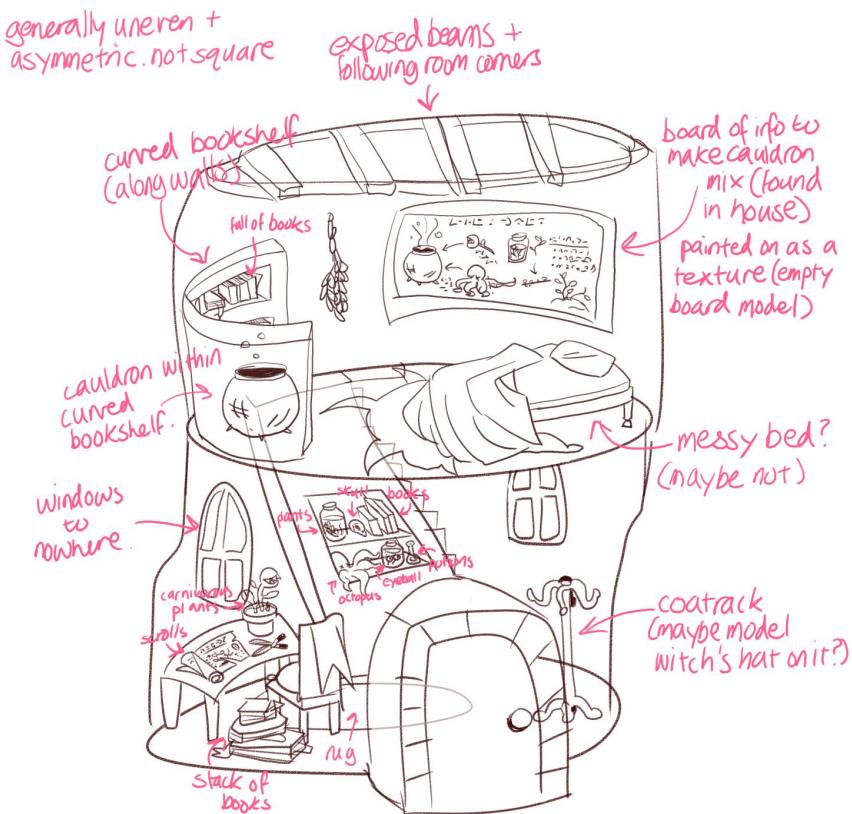
My first idea was a flat, round witch's house, in the middle of a bog. In this, the player character would start outside, before being able to move inside the house to explore its interior.



Then, I had the idea of a two storey wizard's tower, focusing heavily on interior, with no view of the outside. I thought this would allow me to introduce two different elements per floor, and more items could be used.



An initial sketch of the tower.

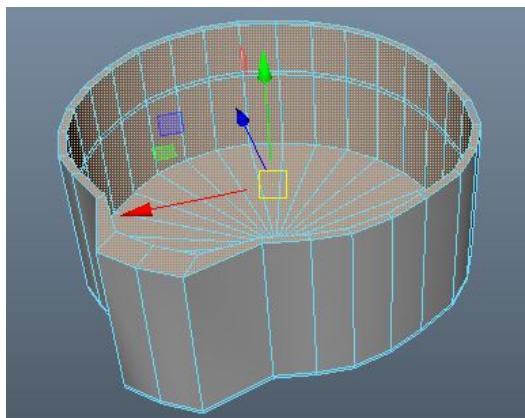


As an attempt to make the tower look more 'lived in', I tried to include a board of planning on the second floor, using ingredients found in their home as an indication of what was in the cauldron.

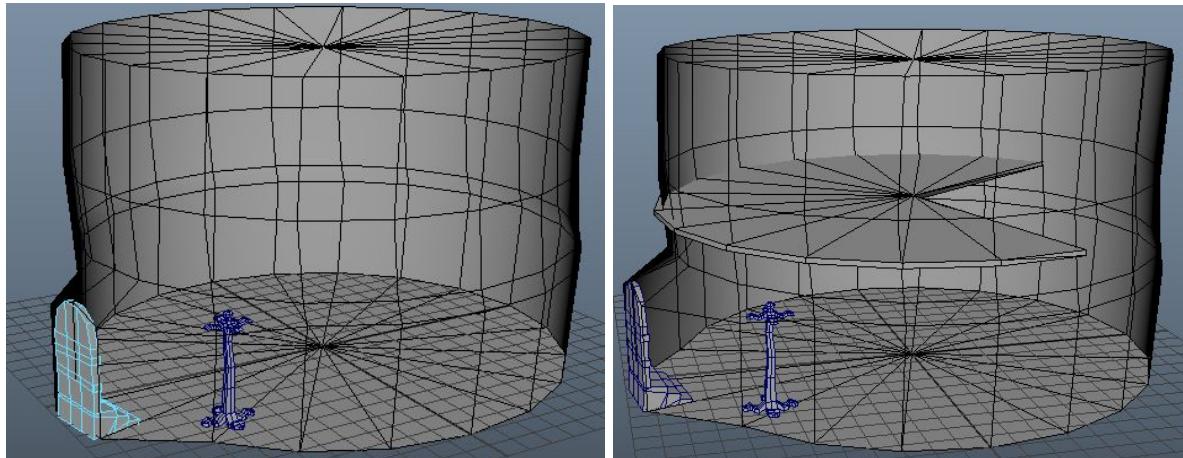
I thought it could be visually interesting to the player character to be able to find all the ingredients listed on the board.

However, this plan acts as a very general design, as I think certain details may be removed or reduced in the final model due to complexity (especially all the drapery/hanging fabric).

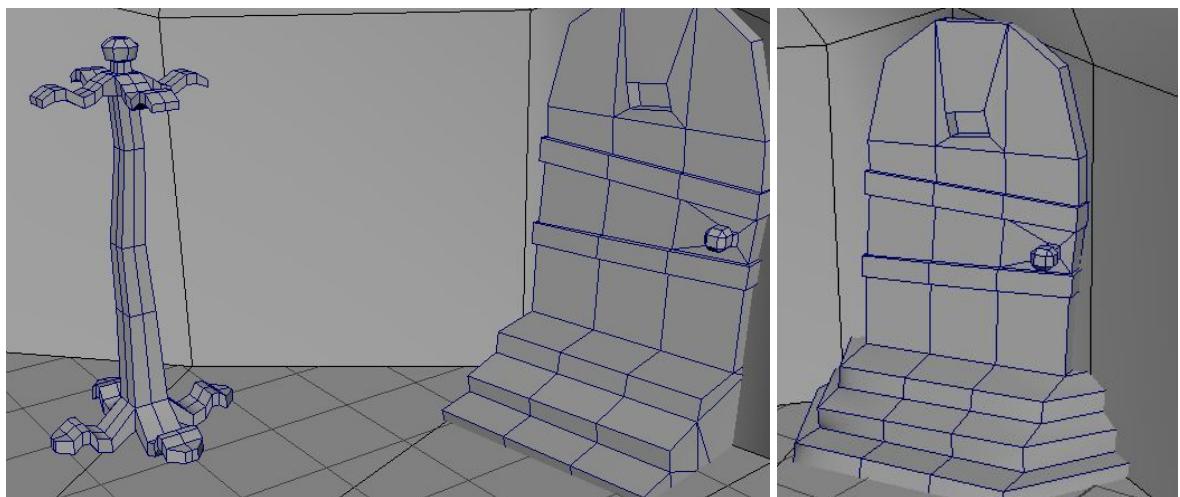
M O D E L L I N G :



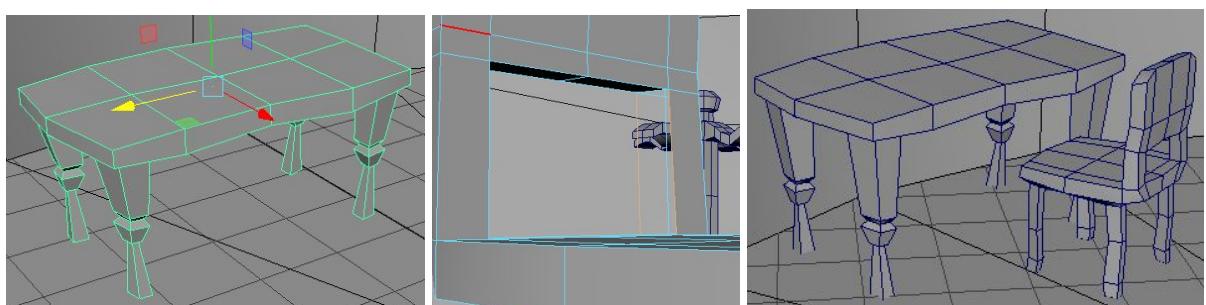
In attempt 1, I tried to execute my drawn plan, a wonky tower, with a slightly tunneled entrance. However I scrapped this as I realised I didn't actually need to model the walls, and by doing so was making the process much harder on myself.



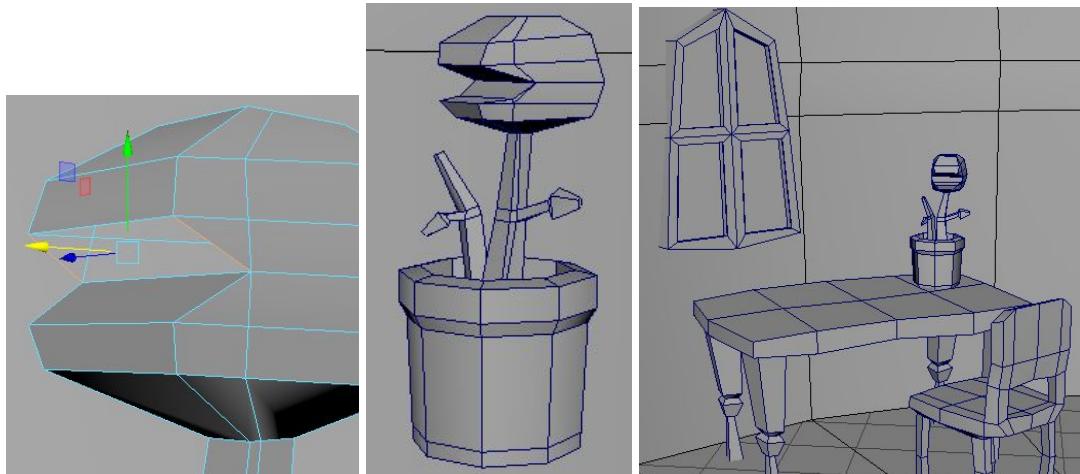
On my second attempt, I shaped a cylinder to create a wonky looking building, then using the reverse tool under mesh display to flip the object to interior. I then used a flat cylinder, cutting the faces and using the fill hole and cut tools to create the second floor.



After establishing the building shape, I made a crooked door and coat rack from cubes. The door began as a cube, stretched and reshaped into a door, with extruded steps and an extruded eye hole. For the doorknob, I simply used a bevelled cube. The clothes rack I used the symmetry tool, using some edge loops to create an uneven shape. I later extended the steps of my door to the walls.



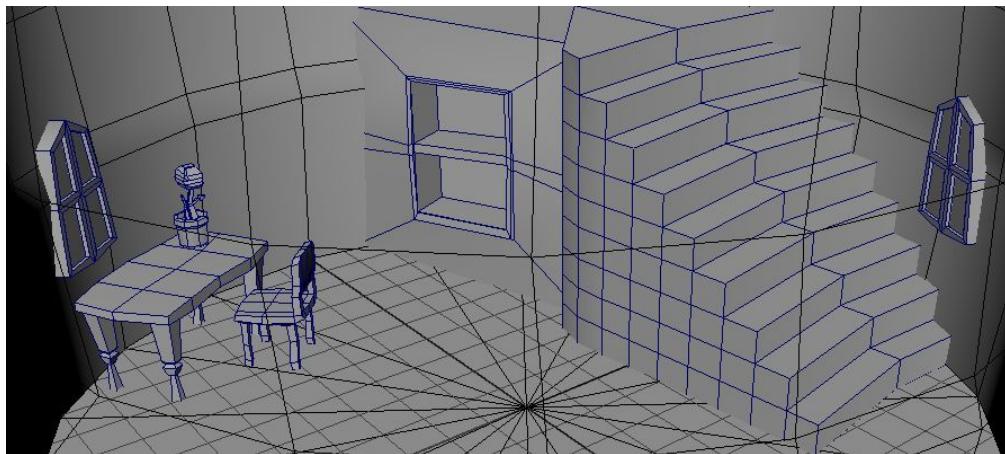
Then I created a table and chair set, using the bridge tool to create a gap in the chair's backing. The table was created from a square, with extruded legs and adding edge loops to make it appear more crooked. For the legs of the table and chair, I used edge loops to have each leg slightly different from each other.



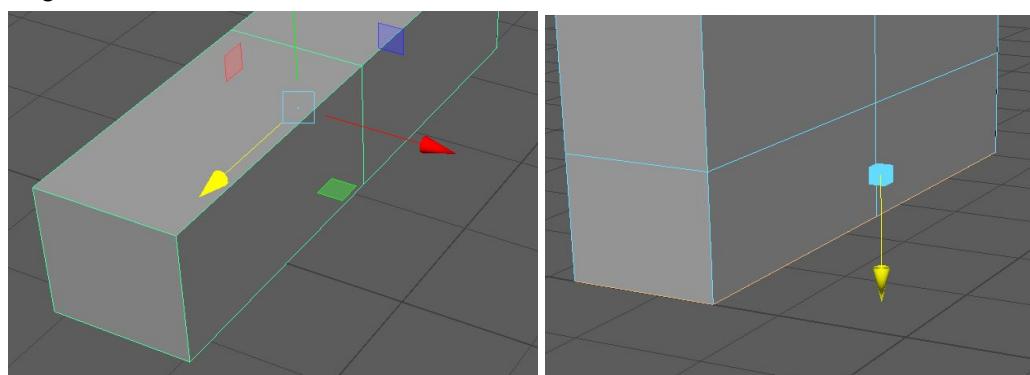
I then began to fill up the desk, starting with a potted plant, beginning with a rectangle, and extruding at the top for the 'head', using the bridge and merge tools to create a mouth. For the sprout, I simply duplicated the original plant, deleted the 'head', and reshaped it, using the move, scale and rotate tools.

The pot was made from a cube, using edge loops to make it rounded, and extrude to make it hollow inside.

Additionally, I also made windows, from a square, extruding inwards for the window panes, and making the windows quite long to extend back to the uneven walls. Then, I duplicated these and scattered them around the house.

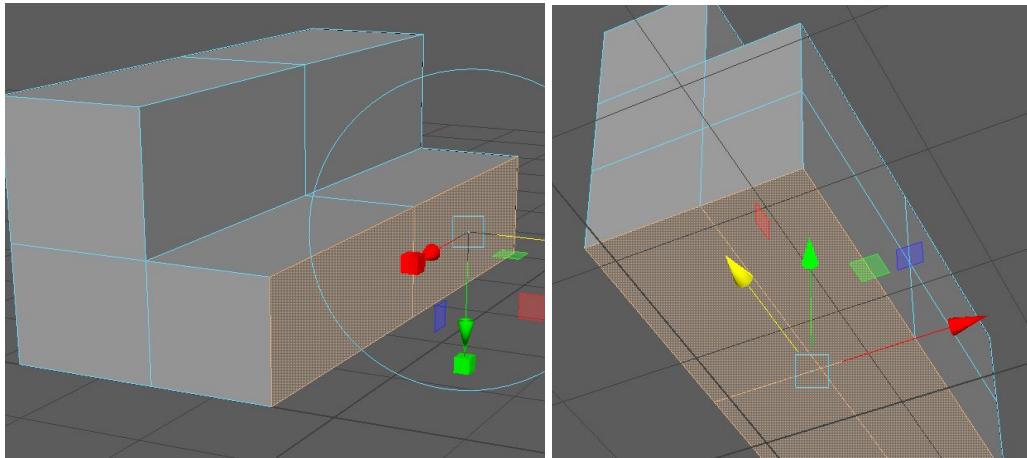


I then added a staircase, and made a cabinet to bridge the gap between the staircase and the existing wall. For the staircase:



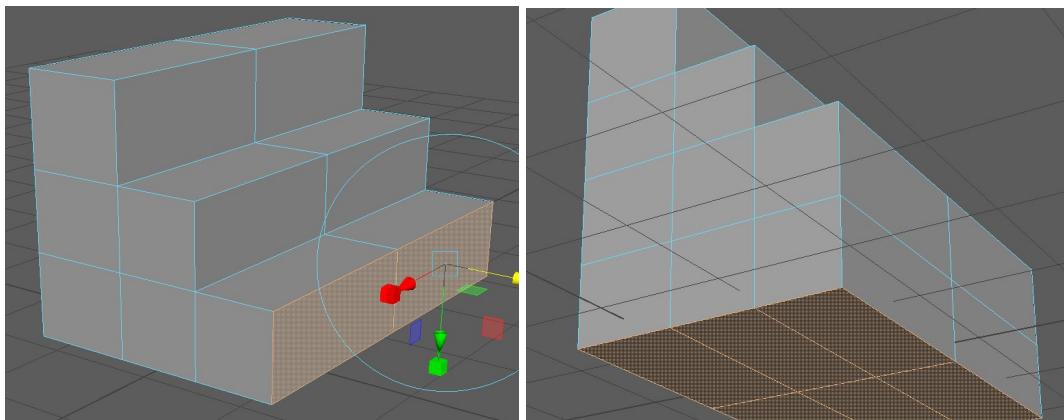
Step 1. Begin with an elongated cube with one edge loop in the middle.

Step 2. Extrude the bottom two faces, to double the first rectangle.



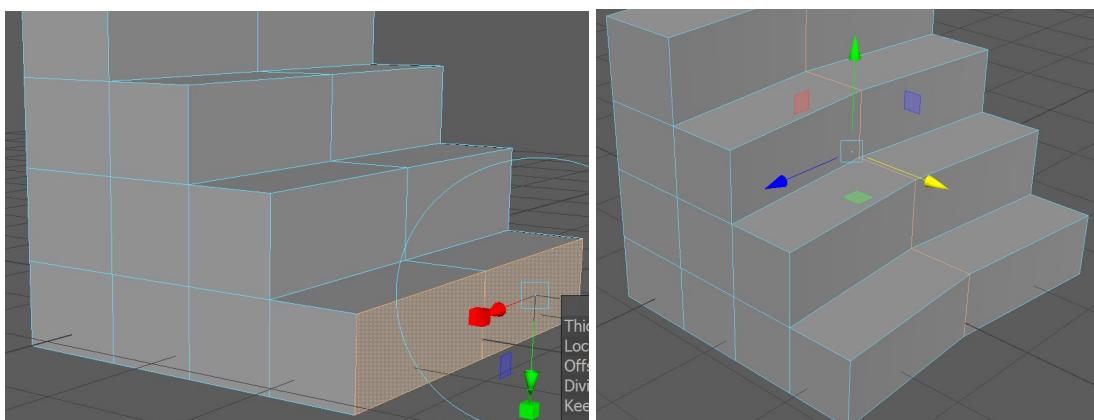
Step 3. From the new extrusion, select the next two faces and extrude outwards (again, around the same size as the two previous rectangles).

Step 4. Then choose the very bottom faces again and extrude down.



Step 5. Select the next two faces down and extrude sideways.

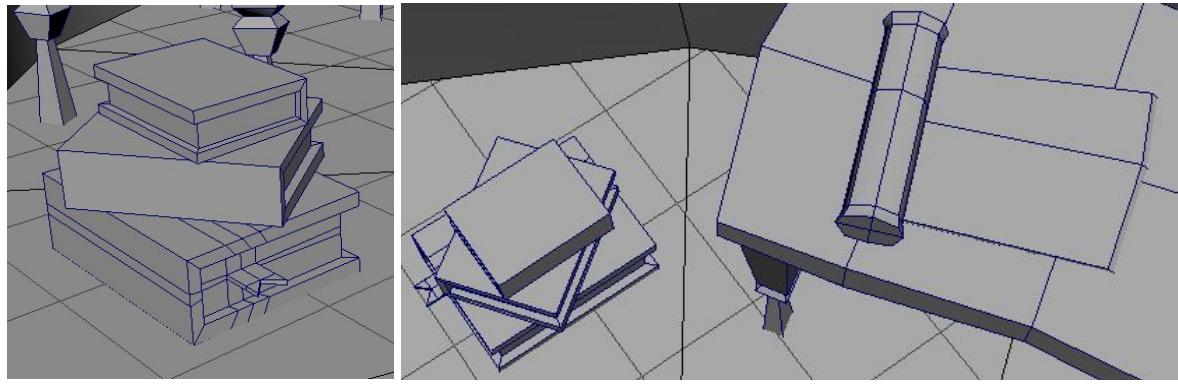
Step 6. Select the very bottom faces and extrude down.



Step 7. Select the next two faces down, and again, extrude sideways.

Step 8. After the stairs are the desired size, I used the edge loops to make the stairs ‘wonky’ looking, and used rotate and move tools to match them to the curve of the wall.

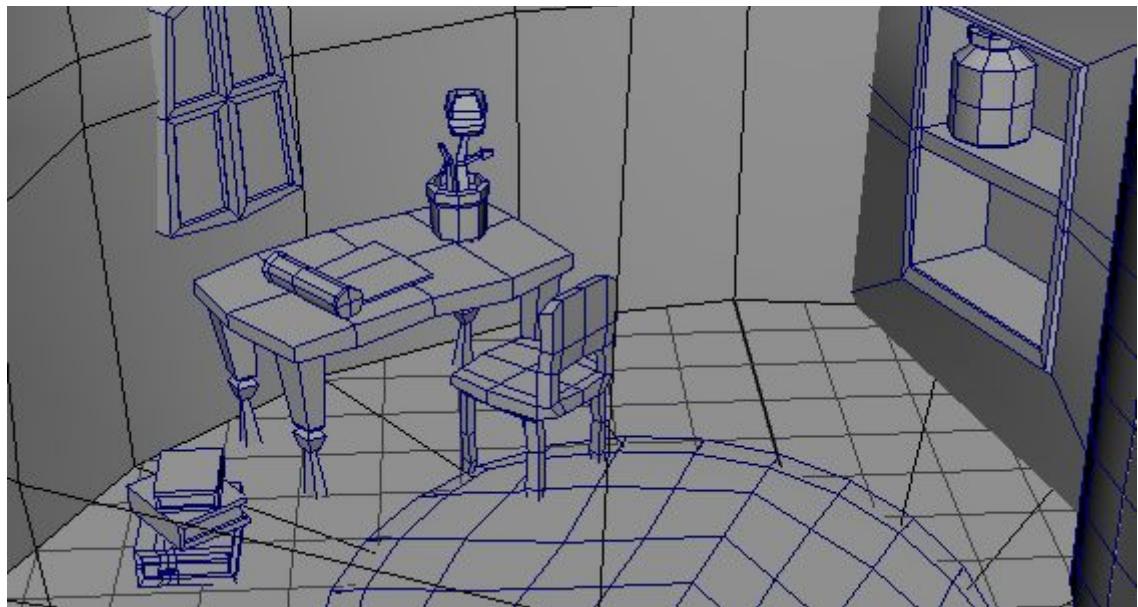
The cabinet was made from a cube, the walls extruded inwards to create the cabinet, and rotate and scale tools used to make the cabinet slightly asymmetrical.



The books were made simply with a cube, extruding outwards for the books' cover, and edge loops were used on some books to either add small things sticking out from the pages (bookmarks, paper corners).

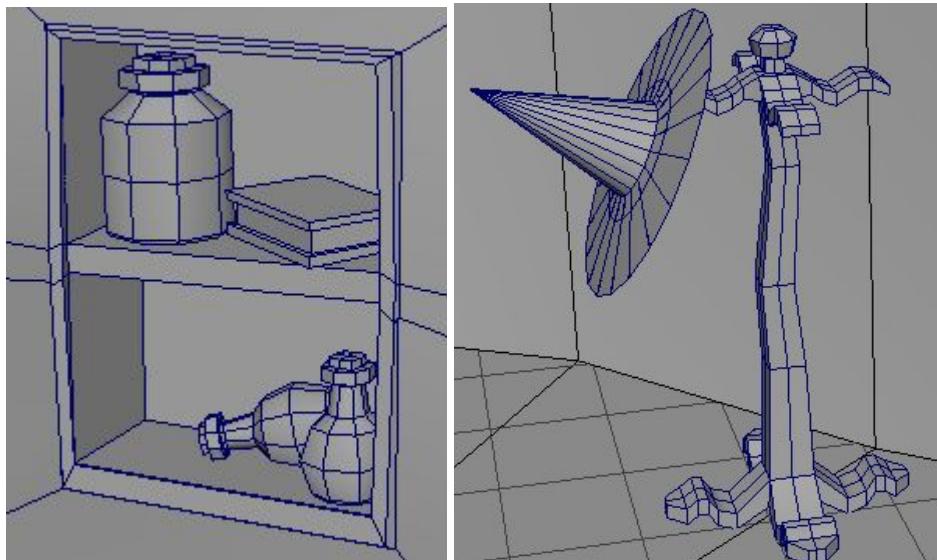
The scroll used a rounded cube with extruded edges, and extra edge loops to create a sticking out page.

I then duplicated the books, using rotate and scale tools to make them appear different.



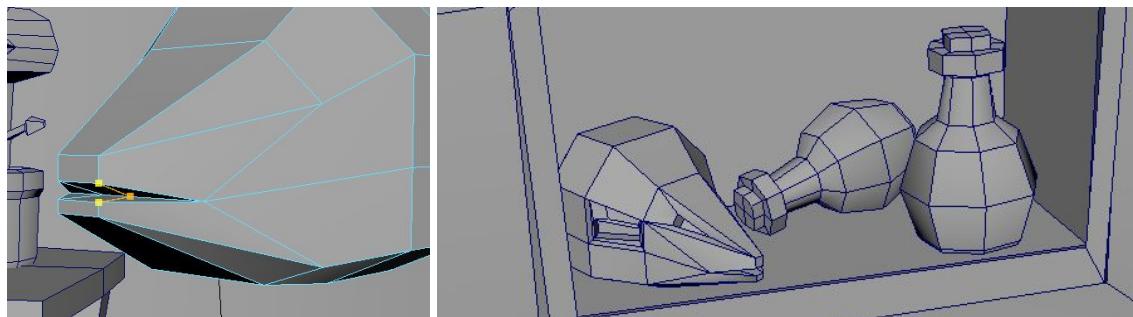
Lastly, I created a bottle out of a rounded cube, using extrude towards the top to make both the neck of the bottle and the cork.

The carpet was simply made from a polygon disc, then extruding upwards very slightly.



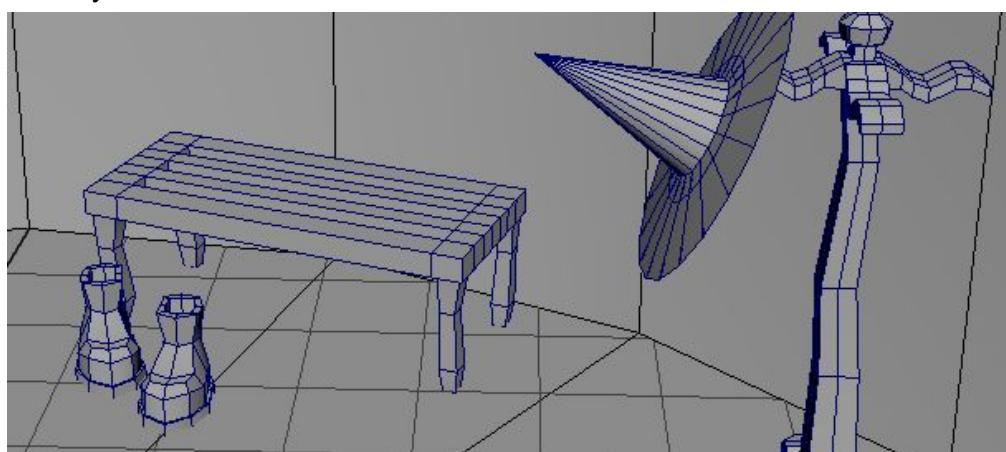
I duplicated the bottle, and used move and scale tools to make them into rounded potion bottles, and added a witch's hat on the coat rack to make it look more lived in.

The witch hat was created from a cylinder, scaling one face down to create a point, and extruding the other face to make the brim.

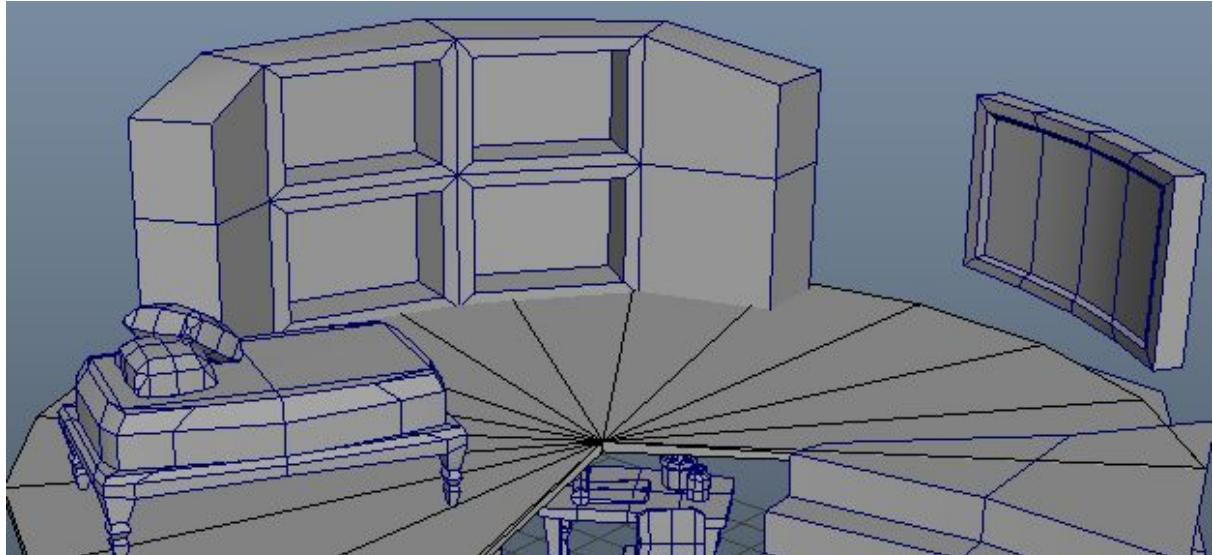


Based on this image ([X](#)).

Based on the reference image above, I attempted to make a large bird skull to put in the cabinet. I used the bridge and cut tools to make its mouth, and used extrude to create the nose/eye holes.



Lastly I added a small wooden bench beside the coat rack, once again making each leg slightly different, and added a pair of boots beside the bench to explain its purpose. The bench was simply a series of squares, using extrude, and deleting every alternate inner face, then using the bridge tool to create a 'grated' bench. The boots I made by firstly adding edge loops to a cube, getting the general silhouette of a shoe from a bird's eye perspective. I then extruded downwards and upwards to create both the top of the boot, and a ridge at the bottom. Switching to a side perspective, I shaped the boots properly using the edges, and lastly used extrude to create the boot hole.

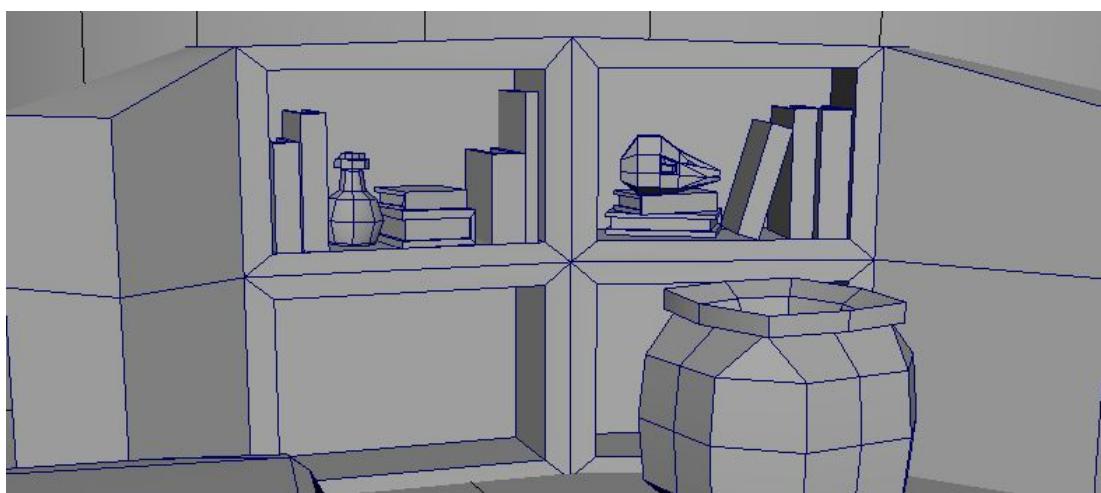


Moving on to the second floor, I began by making a small bed with two identical pillows, then making a bookshelf and a chalkboard through a cube and extrusion tools.

All of these items were made from cubes, the bed created similarly to the desk on the first floor, but extruding inwards on the top to make a mattress.

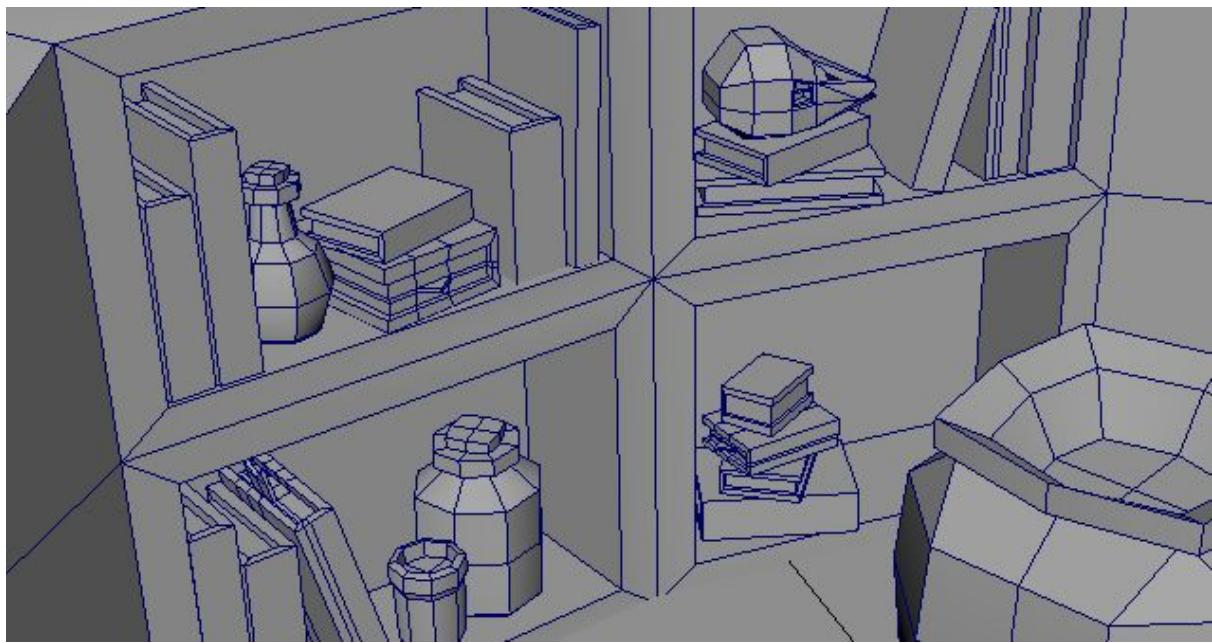
The pillows were a series of edge loops on a cube, using the move and scale tools to give them shape.

The bookshelf and chalkboard were simple, both made of cubes with extrusions, and using the move tool to make them curved.

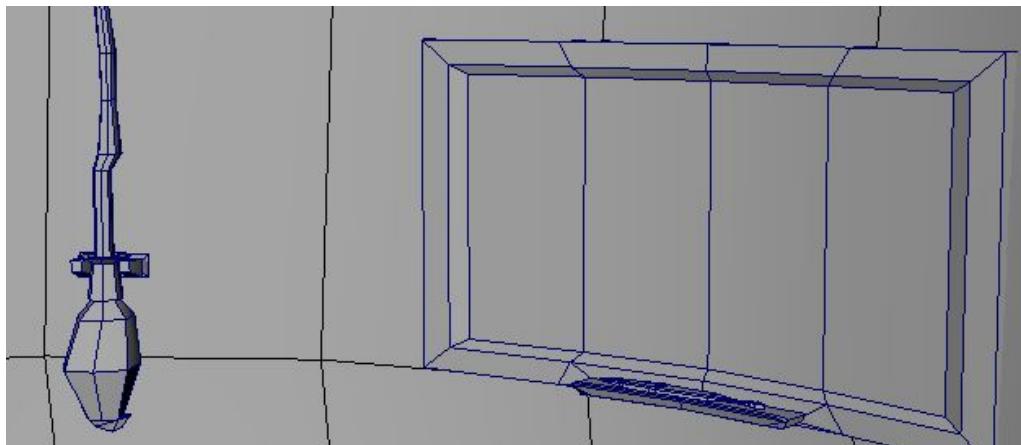


Before filling up my bookshelf, I modelled a cauldron from a bevelled cube, leaving the gap inside the cauldron visible, to be textured as liquid later.

For the bookshelf, I used pre existing models from the first floor, the books, bottles and skull. I used scale, move and rotate tools to make the books appear varied.



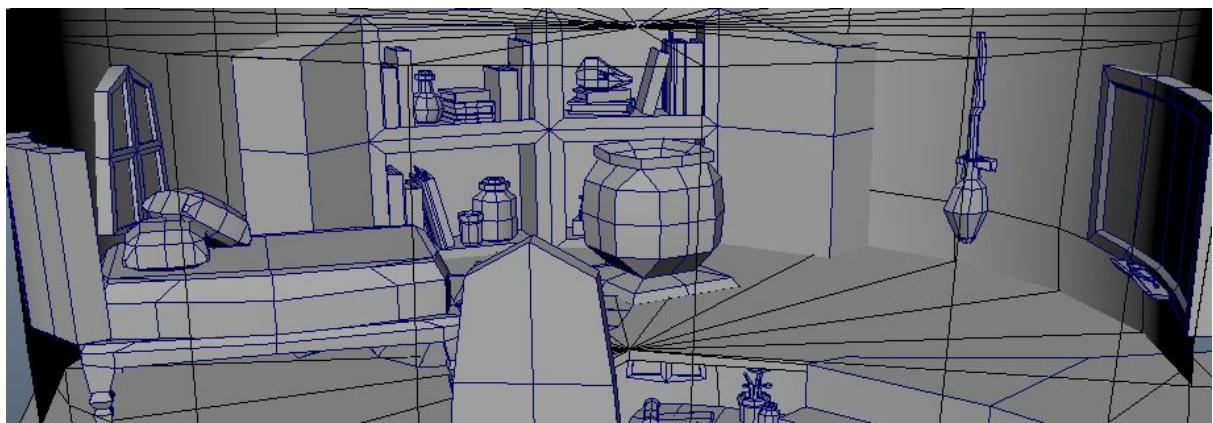
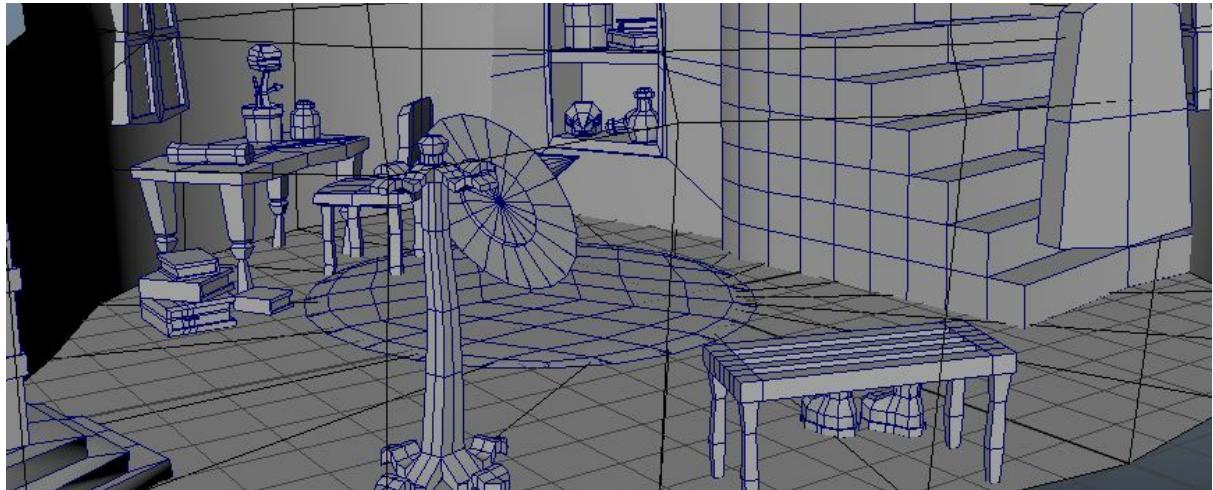
I continued using existing models, especially books to make the bookshelf appear cluttered, leaving one corner empty as I felt it wouldn't be able to be seen behind the cauldron.



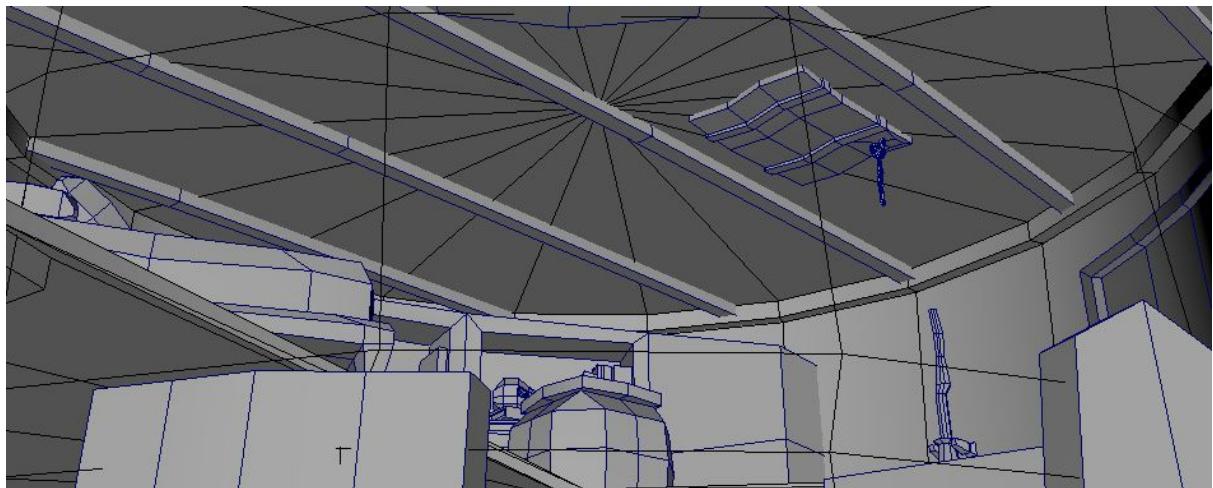
Lastly, I made a broomstick to hang off the wall between the bookshelf and the chalkboard, and a quill, used both upstairs at the chalkboard and downstairs next to the scroll.

Both were made from a cube, the broomstick using additional edge loops to appear more rounded, and the broomstick holder made from a rectangle with two extruded squares.

The quill was made from a cube too, but flattened on the feather area.



Shots of both levels, with all planned items made.



I then added some exposed beams of wood above the second floor, with a trapdoor to imply the existence of more floors, as my 'tower' appears quite short.

Both were made from cubes, the beams of wood simply an elongated cube, with edge loops to make each of them slightly different.

The trapdoor on the ceiling used a flattened cube with edge loops to make it uneven. I extruded certain faces to give it 'wrapping'.

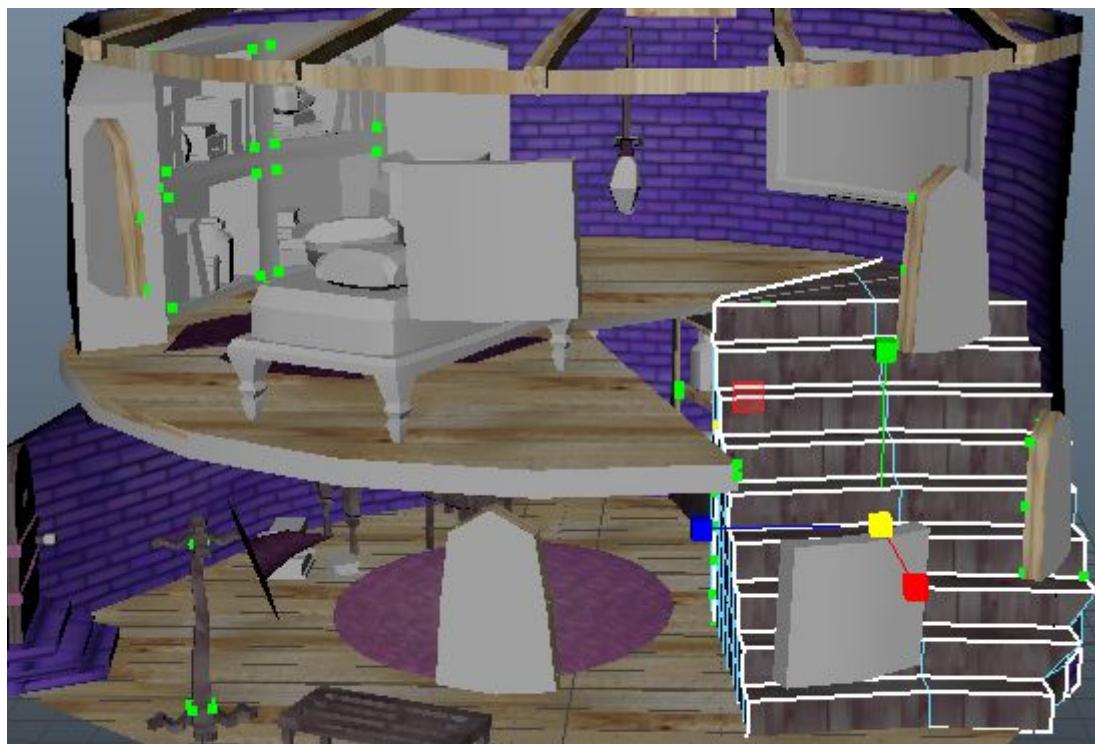
The metal latches I created a torus, turning down the subdivision axes from 20 to 10 to make it look more low poly. The rope was a simple cylinder with extrusions to create the knots.



I added these wooden beams on the lower floor too, between the cabinet to break the monotony of bare exposed walls.

These were simply duplicates of the exposed beams from the second floor, rotated and scaled down to fit between the two floors.

C L E A N U P:



Scanning my model with the cleanup tool, I soon identified the main problem being non-manifold geometry, especially in the corners of objects.



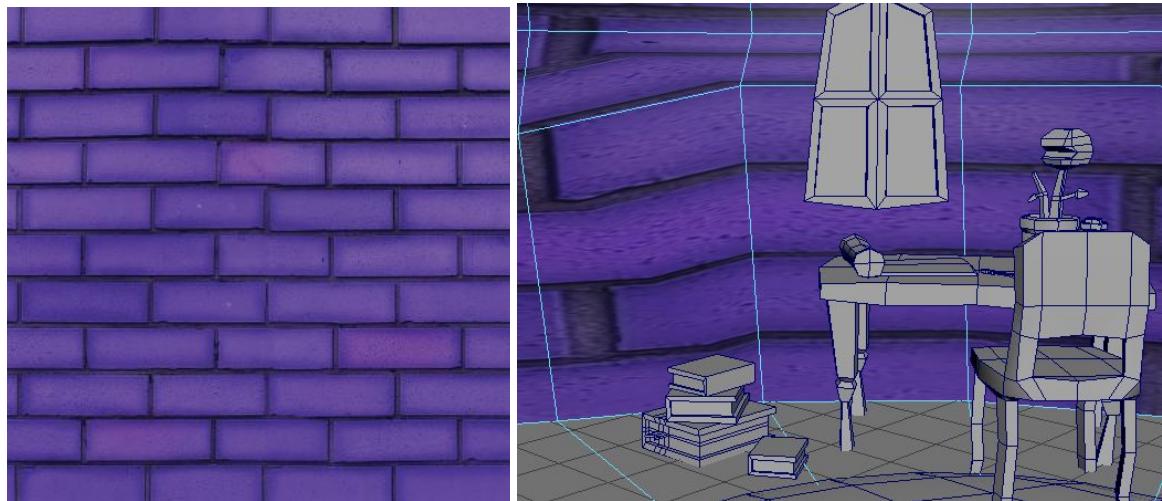
Simply setting the cleanup tool to actually ‘clean’ the problem (instead of scanning it) removed most of the issues, though what remained was apparently issues in the UV map, which I could not figure out.

The inner corners of one window and the outer faces of the bookshelf had problems, though experimenting with the merge tool, trying to identify issues in the UV map, and transferring attributes from other windows all didn’t work.

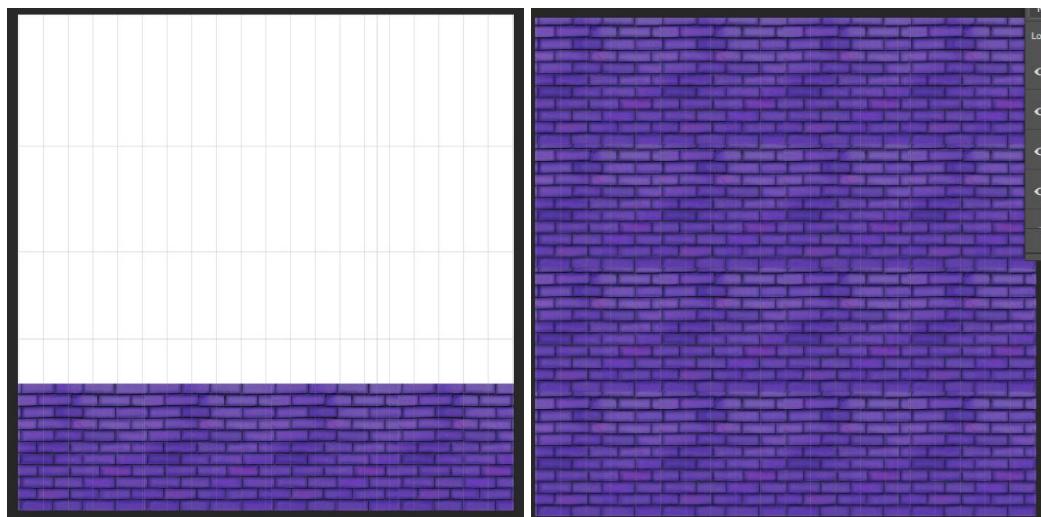
TEXTURING:



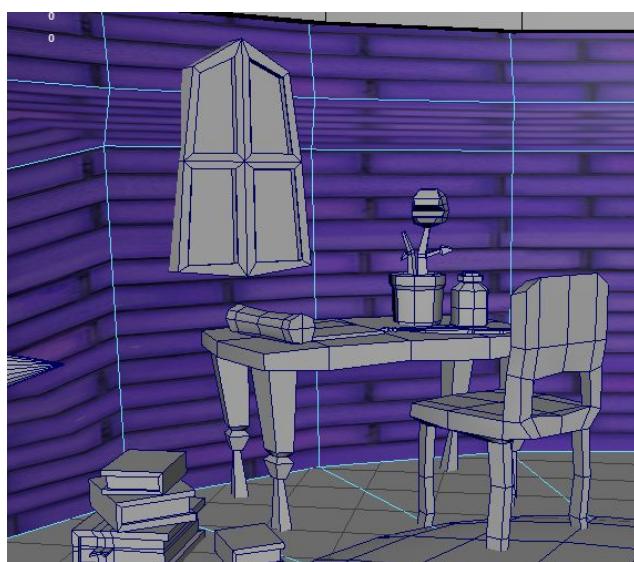
I began with this plain yellowed brick wall, using the offset and mask tools in photoshop to make it seamless. Then, I used brightness/contrast and hue sliders to make them purple, as I was going for a more fantasy vibe. Lastly, I used an airbrush tool on the gaps between the bricks to make them pop out, to appear more stylised.



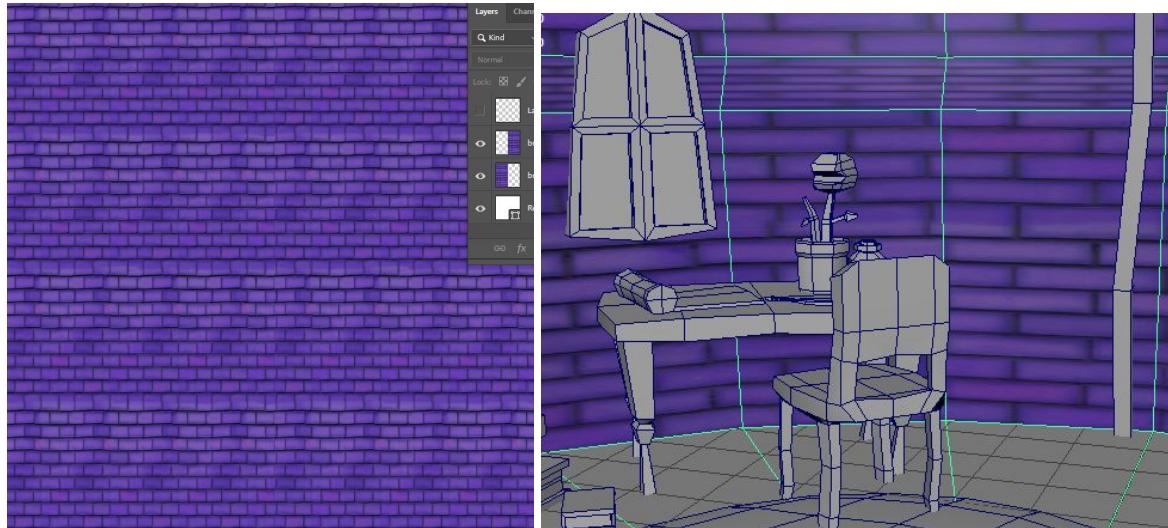
Lastly, I used the overlay tool to colour random bricks (using a pink and darker purple hue), for some variation in the pattern. Placing these directly onto the walls, by assigning a new material (Blinn, the colour seems good but the bricks are far too big.



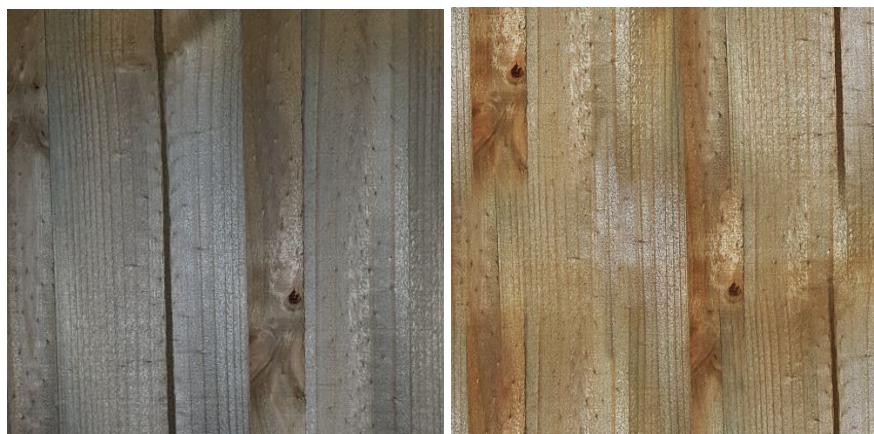
Using an exported UV map of the walls, I duplicated this seamless brick pattern to make them smaller.



With the new pattern applied, the size is better but the bricks are still too long.



Lastly I squished the existing pattern into half vertically, and duplicated it to make the bricks shorter. I doubled the original pattern vertically to squish the bricks.



Next was a wood, to be used as wooden planks on the floor. I firstly used hue and saturation sliders to make them lighter and less 'dead' looking, and then the offset tool with the mask layer to create a seamless pattern.



Placing the single texture on the wooden planks, I find that it works without needing to be resized. Same with the windows.



However for the floors, the pattern looks stretched, so I used the seamless pattern to create an image with more tiles, thus changing the pattern of the vertical beams.

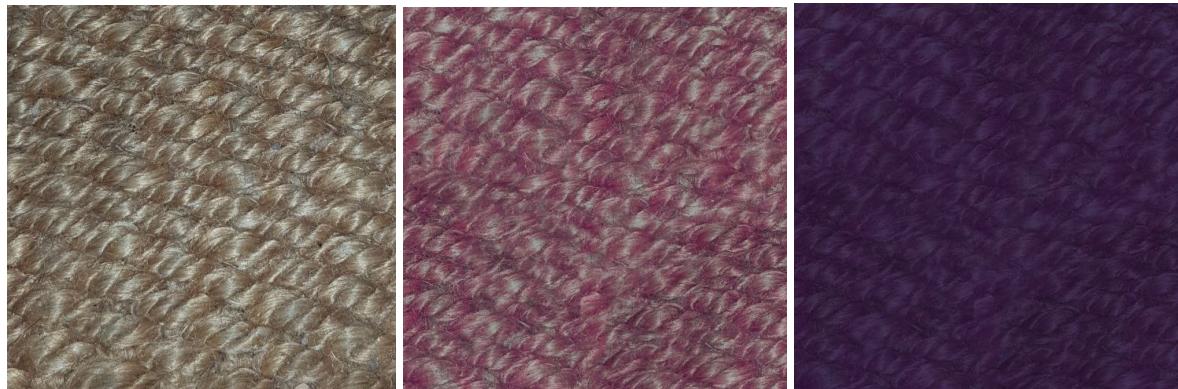


For the windows, I didn't want the player character to be able to see outside, as that would require modelling of both the tower's exterior (as it could be viewed from some angles), and the creation of terrain to be seen from inside the window.

Thus, I settled on a 'reflective glass' pattern, made of a solid colour with airbrush around the edges, and white streaks as the glass' reflection.



I found the previous glass worked though it looked too similar in colour to the walls. So, I edited the main colour of the glass to more of a pink, and also added an extra gradient towards the bottom for more depth.



Next I used the offset and mask tools on a carpet to make a fabric material, using the clone stamp tool to erase the small gaps in the picture. Firstly I edited the picture using hue, saturation and brightness sliders, though I find that the shine of the fabric reflects back too much and makes the pattern look uneven. So, I used an overlay layer to both reduce the highlights and darken the colour.



I settled on a dark red-purple colour, then applied it to both the witch's hat and upstairs carpet.



For the downstairs carpet, I planned to use the same texture, but recoloured with surrounding gradients to accommodate the circled carpet.



The yellow fabric applied to the carpet.



Next I used the wood pattern, reduced its saturation and changed the hue, and brightness to create a dark wood pattern.



With the new dark wood, I found that the yellow carpet didn't suit the wood on top of it. So, using hue and saturation sliders, I changed it into a pink fabric instead.



I then applied the pink fabric to the door's wrappings, the dark wood to the door, and the brick pattern to its steps.

For the eye hole of the door, I used the reflective pattern of the windows, though due to its scale it's hardly recognisable.



I then used the dark wood pattern all over the first floor, on the desk, and cabinet wall. I used the wooden plank material on the outside faces of the cabinet, and bricks inside it.



For the stairs, I used the dark wood pattern, and applied the bricks to the outside face of the stairs. I split the stairs object into two UV maps - the stairs themselves and the staircase outer face.



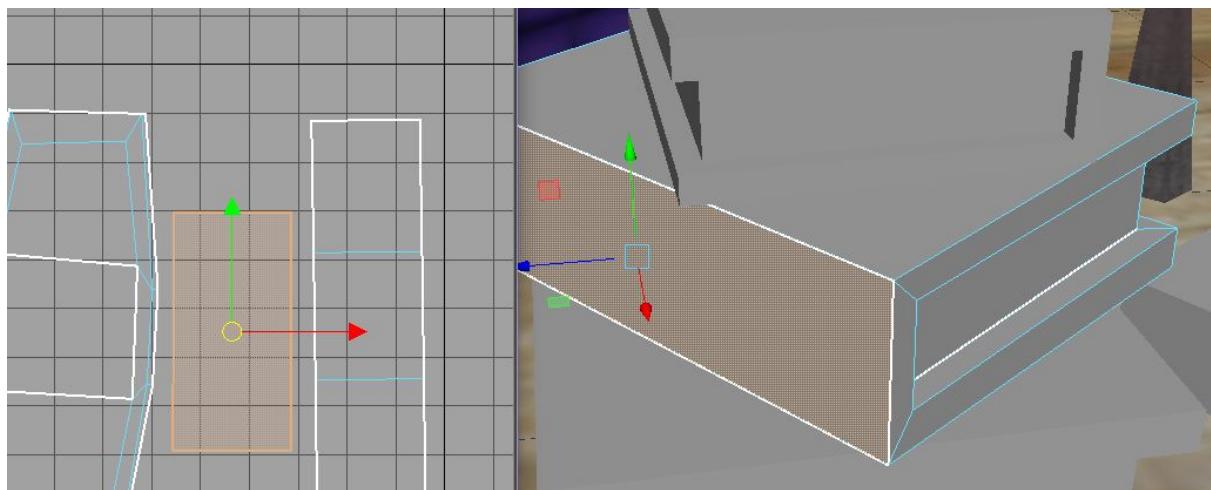
Moving to the second floor, I used dark wood on the ceiling, wood planks on the exposed wooden beams and trapdoor, and the pink fabric on the trapdoor wrappings. I simply divided the object into three UV maps - wrap 1, wrap 2 and the trapdoor, and assigned materials to each one.



I couldn't find any metal that really suited the look I was going for, so after making the wood pattern seamless, desaturated and edited the image to appear more blue-grey, and used the clone stamp tool to remove some of the wood patterns.

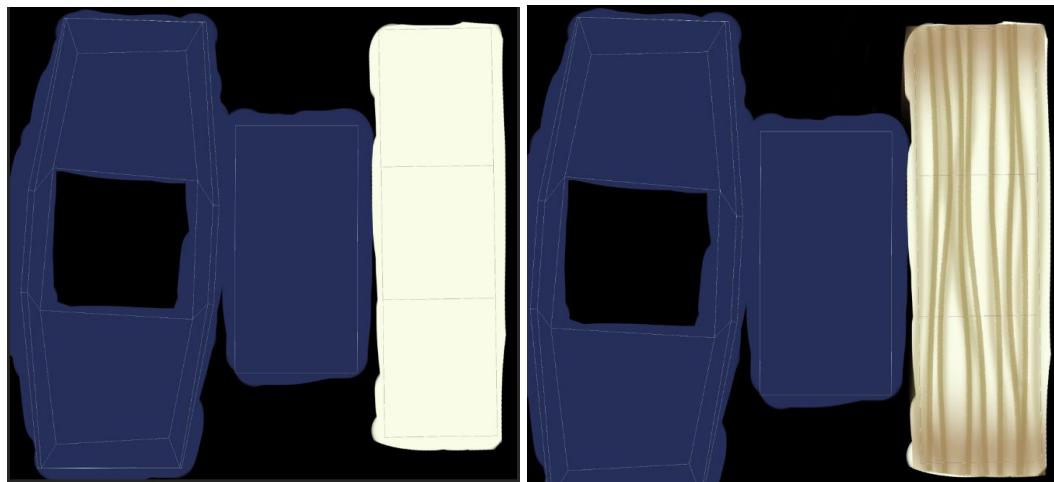


I first applied the metal to the face of the staircase, as I felt the purple popped out unnaturally among the scene.



I then moved on to the books, which required precise UV unwrapping (compared to the others, which could be roughly estimated, and workable using planar projection from either of the three axes).

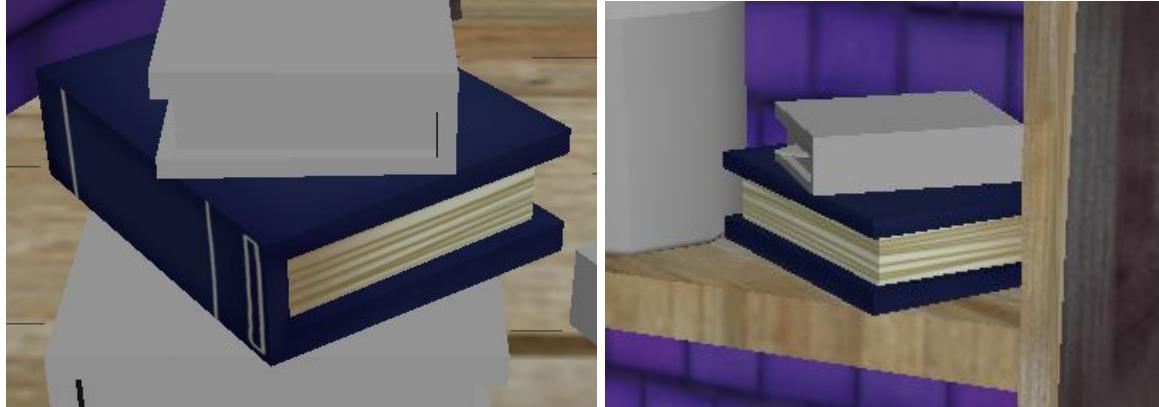
I broke the book into three UV maps, the cover, spine, and inner pages.



I started with base colours, then used a rough charcoal brush for the pages. I then used airbrush tools around the page lines, and near the spine of the book, for more dimension.



I then circled the book's cover with an airbrush tool, putting shadow into the inside of the cover, and around its edges. Lastly, I added some designs to the book's spine, keeping it generic enough to duplicate, using the same rough brush used for the pages to maintain a style.



I then used the transfer attributes tool to copy more blue books on both floors, by first selecting the completed book, then the desired book to transfer, then applying the blue book texture to the new book.



I did the same for the red book, simply using hue sliders on the cover and spine for the red, and redrawing a new spine with the rough brush.

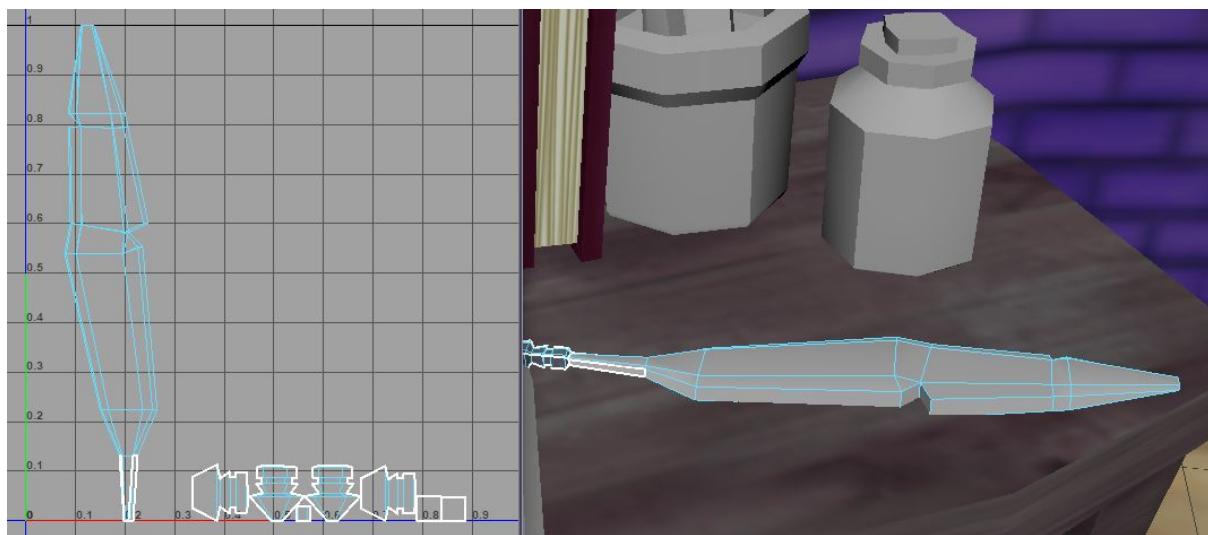


Similarly to above, I used hue sliders to make the covers brown and teal, then the rough brush to create a new pattern for each spine.



With all books with attributed transferred and materials applied, the bookshelf is mostly complete.

However with books with page corners and bookmarks sticking out, a new UV map had to be created for both types, then the same three (spine, cover, pages) attributes resized to fit over the existing ones. For the bookmarks and page corners, I cut these into a separate UV map, and simply applied existing fabrics (pink, purple, or cream after it was made).

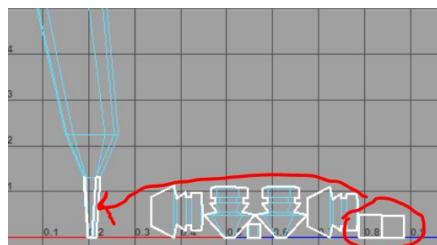


The quill I had to divide into 5 UV maps, the quill itself and the four sides of the nib. The nib I assigned metal to it, and toyed around with planar projection from either an X, Y, or Z perspective. The quill I simply displayed from one angle, as the bottom wouldn't be seen anyway.

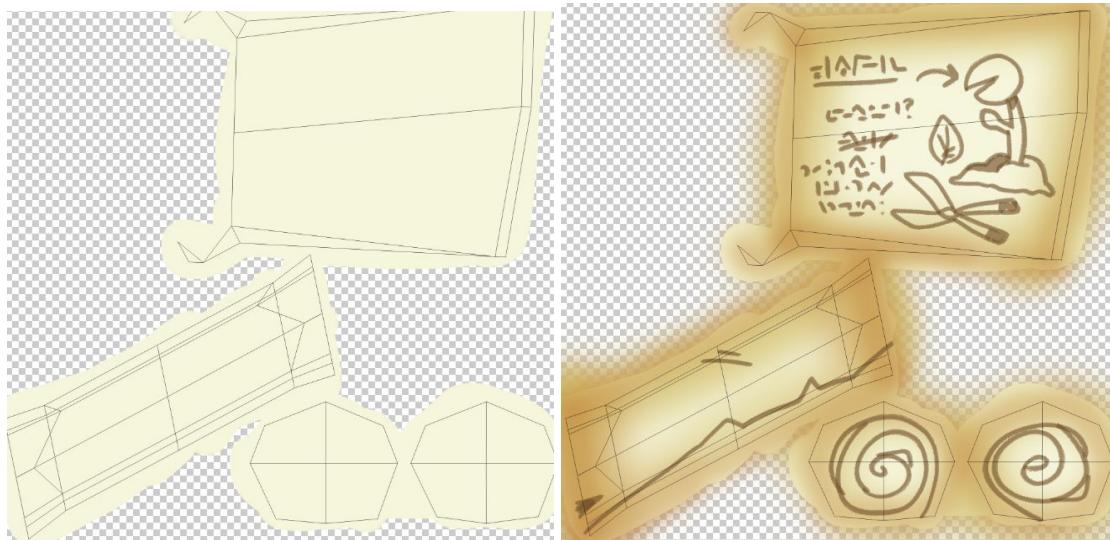


For the quill I used a cream colour, and rough brush to create the feathers, and used an airbrush to create dimension and a gradient towards the bottom of the feather, towards the nib.

Then, I found that two faces of the quill had somehow become separated from the feather's UV map, making them appear white. I fixed this by simply scaling these faces down, and moving them towards the bottom of the quill, to represent where they were meant to be.



These two squares were moved within the bottom of the feather's UV map to fix its colour.

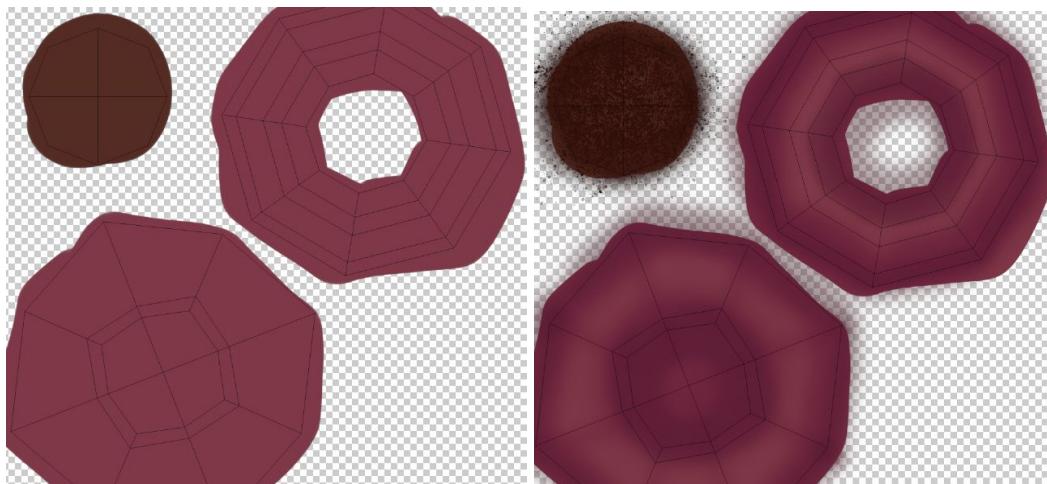


For the scroll, it was separated into 4 UV shells, the open scroll, rolled scroll, and side view. I started with a heavy airbrush around each shape for an old and faded look, using oranges and brown to 'age' the paper.

I then used the rough brush to paint the paper roll on each side, the folder paper on the main scroll, and written notes to indicate what the scroll contains - A study of the very plant found on the wizard's desk, in an unknown language.



I then applied more browns to make the scroll look even older, and to provide more contrast, especially on the very left of the scroll as a shadow.

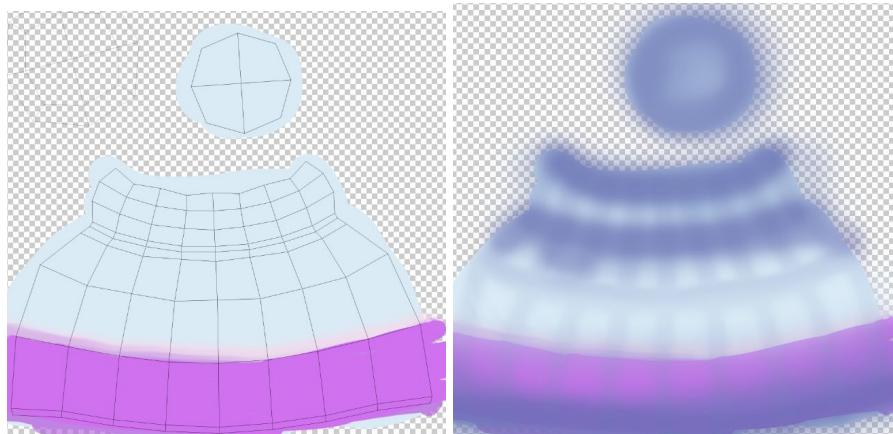


Next I broke the pot into three UV maps, the body, extruded neck and dirt. I wanted the pot to be fairly smooth, while the dirt appeared textured.

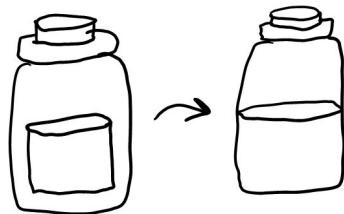
So, I just used an airbrush around the edges of the pot, using heavy colour around the base, underneath the neck, and inside the pot.

Then, I used a speckle brush in a dark brown to make the dirt appear more flecky and textured.





The bottle of the potions were hard to approach, as I wanted the liquid to appear within the glass, though lacked the ability to do so from a 2D UV map.



I wanted the potion bottles to appear like on the left, but really had no idea how to do so on a 2D UV map, so settled for the one on the right.

I started simply by painting a pink solid colour along an edge loop (as it made it easier to keep the line straight, along the cut at the back), and blending it slightly. Then, I used the airbrush tool to paint shadows beneath the bottle's neck, and around the bottle's cork. I also used the airbrush tool to draw along the bottle's edges, to make the liquid appear more behind the glass.

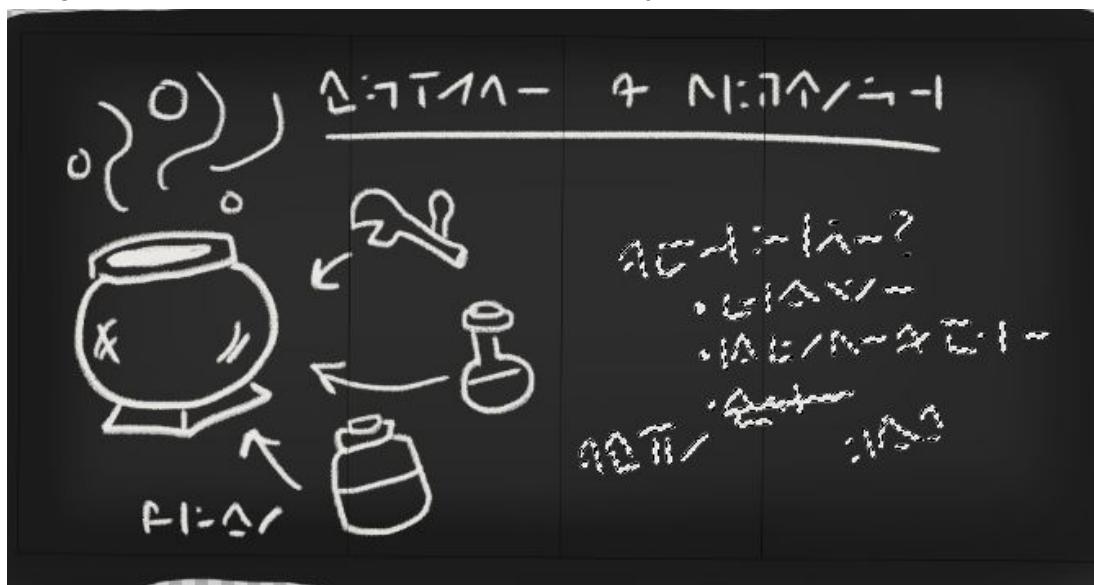


I then applied the wood texture to the separate UV map of the bottle's cork, and used hue sliders to make 4 different textures (pink bottle, green bottle, pink potion bottle, purple potion bottle), and separated the bottle and potion bottle into two UV maps, using transfer attribute between them, then applying different materials.

For the potion on its side, I simply rotated the UV map of the bottle to make the liquid appear on the side, as the back of it wouldn't be seen.



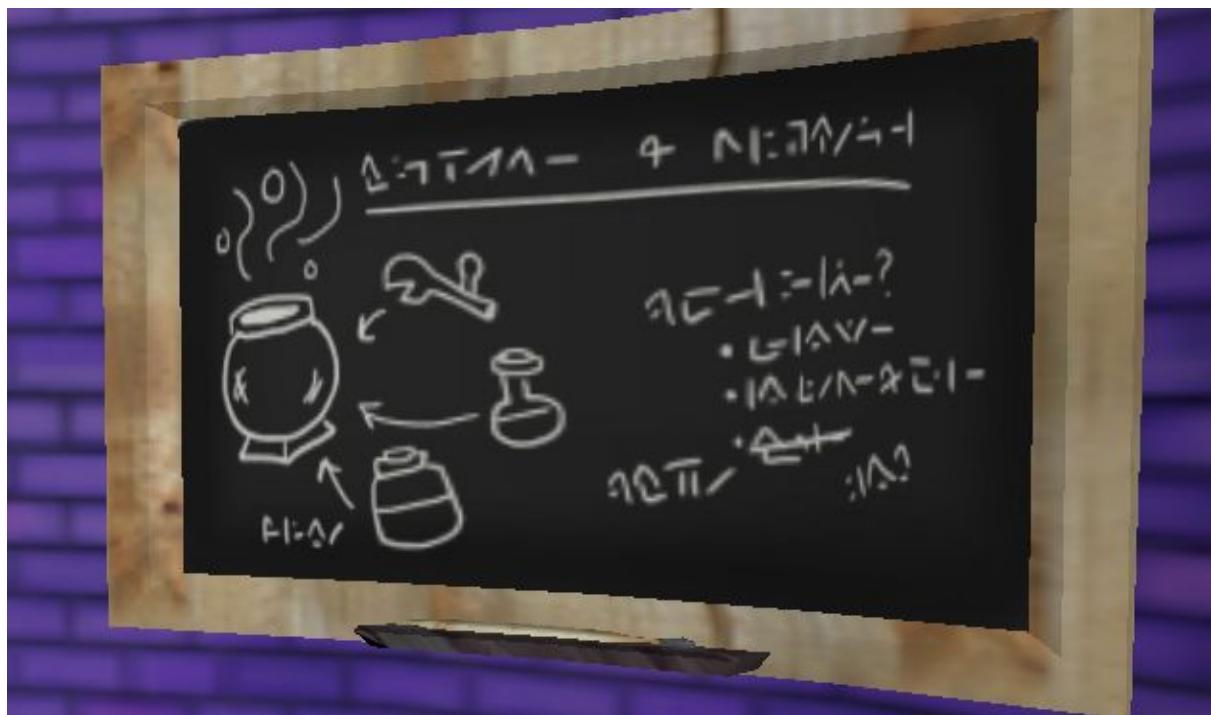
I then applied different textures to bottles upstairs, and added more beside the cauldron, using scale tools to make them appear as new objects.



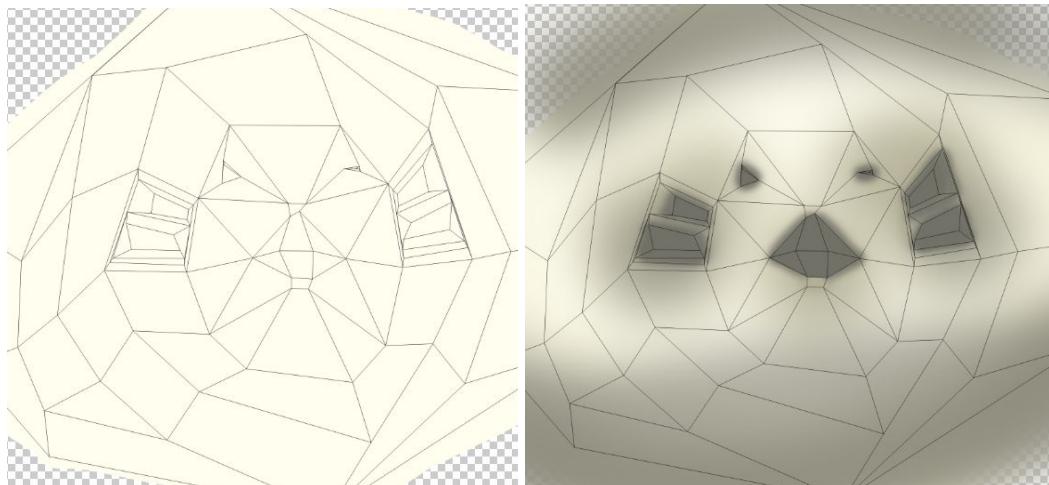
Then, I separated the chalkboard into three UV maps, the one above being the face of the chalkboard.

For this, I used a solid gray colour, using the airbrush around its edges, and the rough charcoal tool to write notes and a diagram on the board.

For the notes, I wanted to include items around the house, as a fun detail for viewers, and an indication of what was inside the cauldron.



The chalkboard with the material applied to it. The resolution drops, though it achieves its desired effect.

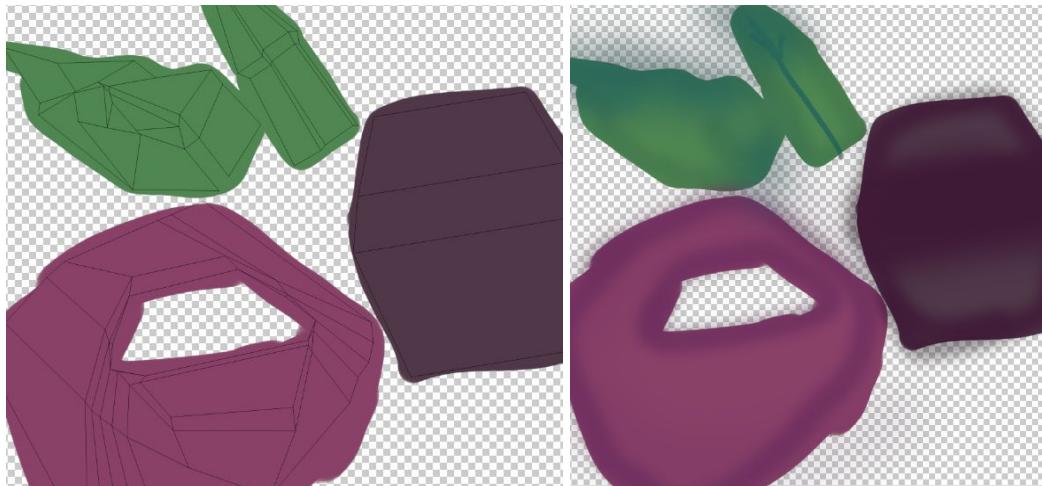


For the bird skull, I cut one line across the back of the model and unfolded it to make its UV map. I then used a dark unsaturated gray for the skull's holes, first with solid colours (nose, mouth and eye holes), then an airbrush for an old look.

I also used the airbrush heavily towards the top and bottom of the skull as shadow, and for depth.

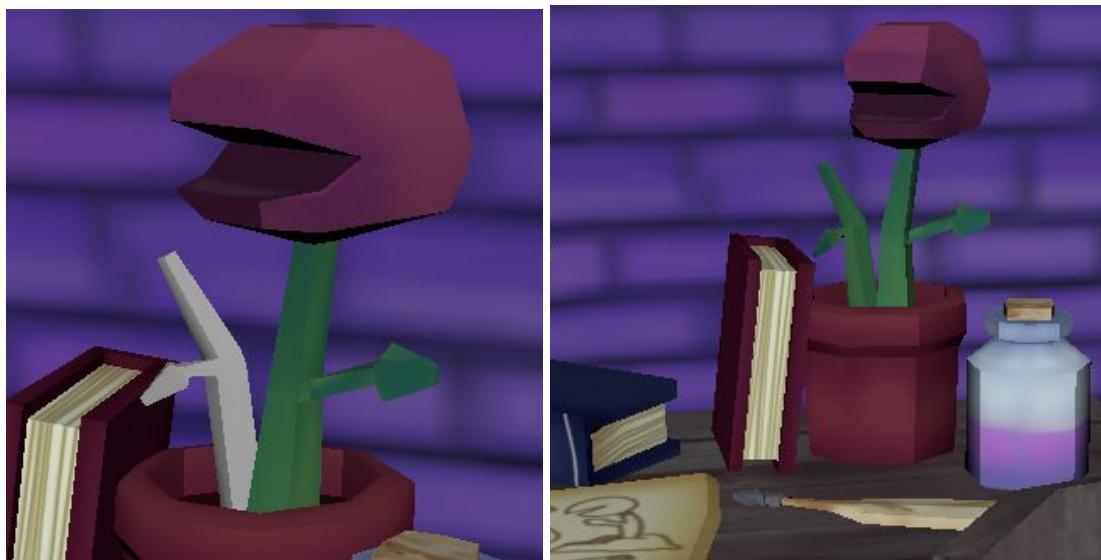


The skull with textures applied to it.

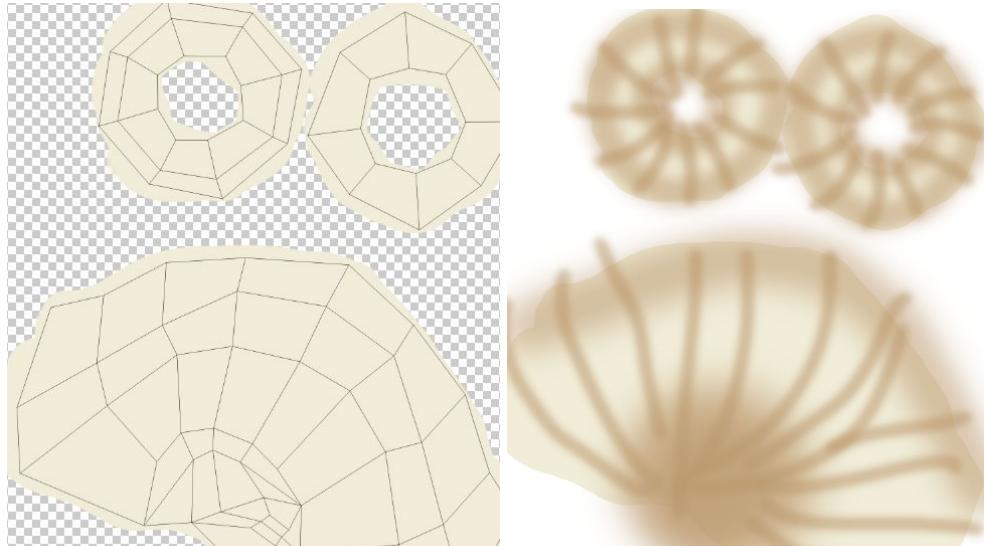


Next was the potted plant, separated into stem, leaf, head, and mouth.

After applying the base colours, I simply used an airbrush tool and a rough brush for the leaf, with strong airbrush around the base of the stem, connecting to the head.



The plant with textures applied to it. For the headless stem beside it, I cut the stem into very similar UV shells (minus the head and mouth), applied the same material to it, and just reshaped and moved the UV shells until they displayed the same pattern.



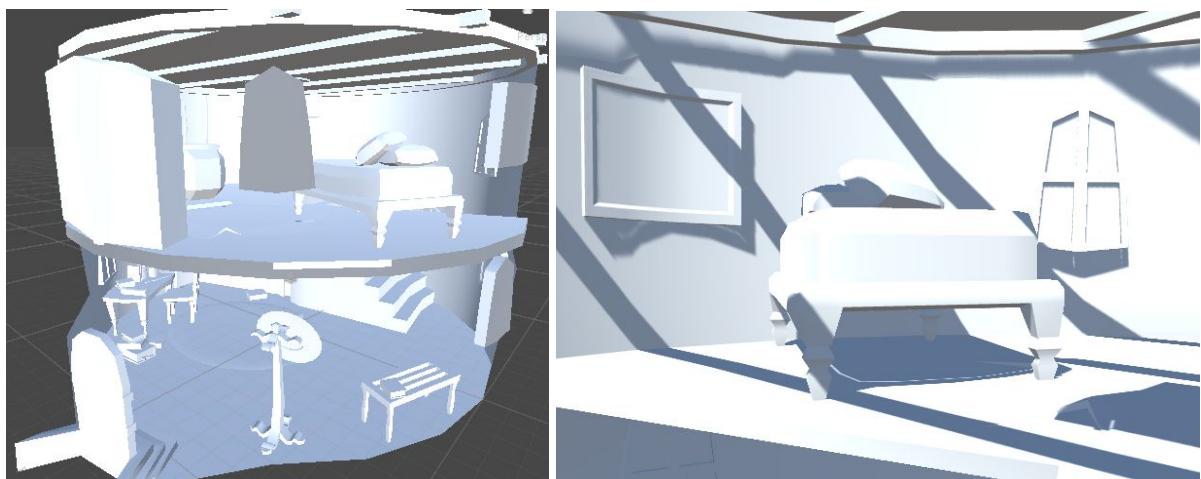
For the broomstick, I separated it into 5 uv shells, 2 of which I just applied existing textures onto, the wood of the broomstick handle and the fabric wrap. For the straw area, I unwrapped in into the inside, and outside of the straw at the top, and the complete straw at the bottom, unfolded by one cut at its side.

I heavily used the airbrush towards the bottom of the broomstick, for a better transition from lines of 'straw' to the curved bottom.



The textured broomstick.

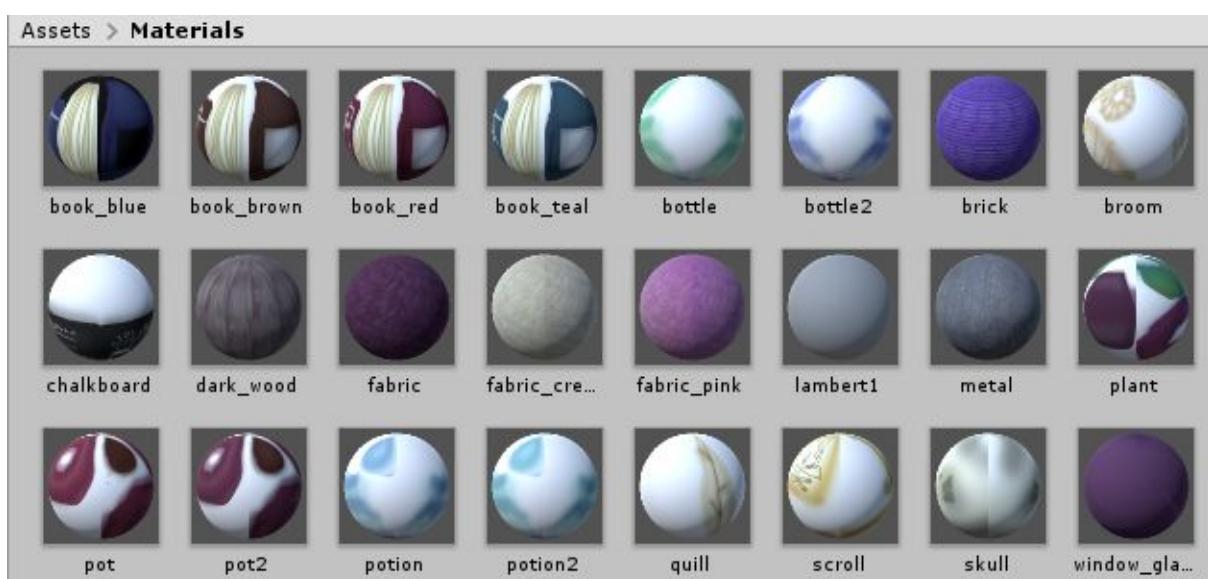
UNITY:



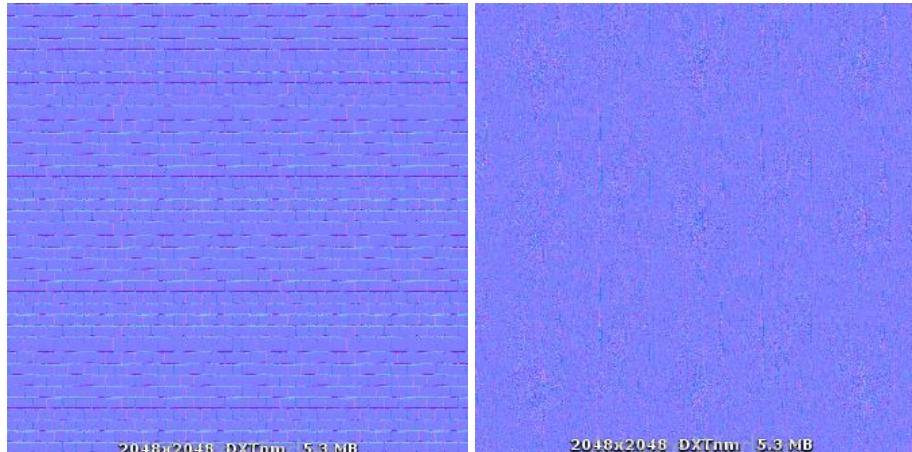
Importing my model into Unity, all materials have disappeared, though directional lighting gives a really interesting effect.



Still unable to figure out why my materials aren't loading, I read a suggestion to import all textures into the texture folder before importing, so after deleting the model, I imported all my material files into a new folder named Textures.



I then assigned all texture patterns to its corresponding material.

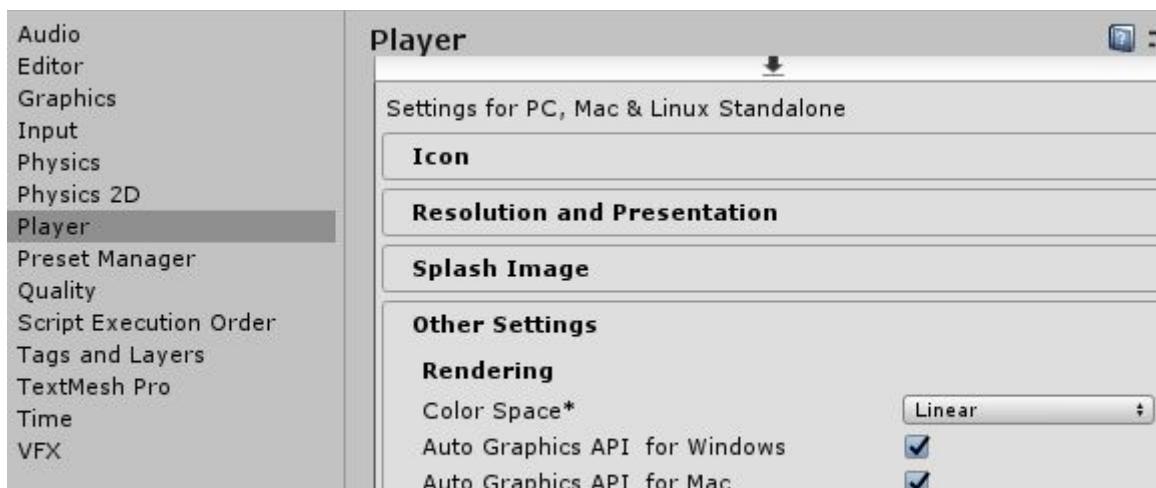


For the bump maps I had previously made, I changed the texture type to 'normal map' and checked 'create from grayscale' to create a normal map from each.

Then, like with the materials, I applied each normal map to applicable materials.



Shots so far of the bottom and top floors, from the player's POV.



I then changed the color space settings under rendering to linear, from a suggestion to solve washed out colours.



With the linear color space, new shots of the environment.

However, at this point I realised, though directional lights gave a really cool effect, it didn't make any sense considering I had modelled an interior environment.

L I G H T I N G :

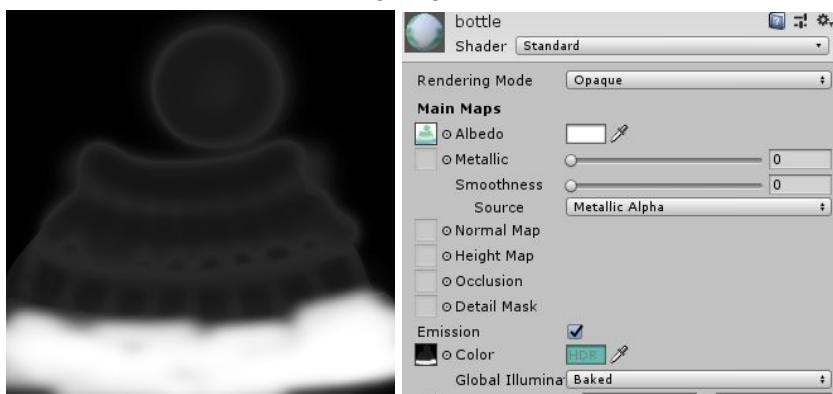


I firstly used the default pale yellow light, before changing to a warm orange (below).



Then, I used two point lights (one in the middle of each floor) on a low intensity for subtle lighting, as I had the idea to use my potion bottles as light sources.

Above, I just placed a point light in the same colour as the bottle in front of it, though it doesn't achieve the look I'm going for.



Thus, I created a really quick emission map for the bottles, assigning this to its material to test emission lighting.



Though the emission map works, and makes the object appear glowing, I'm not sure this is what I was going for, as I wanted each bottle to emit its own light source.



From a lot of experimenting to make the bottle glow, I realised at this point that though I had assigned the normal maps to the materials in Unity, the original materials assigned to my objects in Maya actually still lacked a normal map.

I found that I could simply drag the materials from the materials folder onto the scene, and the original material would be unaffected as I had already UV mapped my materials.



The desk and chair with a normal map, though very subtle, there's a slight difference in texture compared to above.

I then applied each material to every object in my scene with normal maps (brick, fabric, pink fabric, cream fabric, metal, wood, and dark wood).



Next, I assigned pre existing normal maps to other objects, all four variations of books using the fabric bump map for a slight texture.



For the chalkboard and both pots I used the metal bump maps, and the quill and scroll I used the metal bump map.



Back to lighting, I found I could use point lights to make my bottles glow, though it focused heavily on only one point. Then, I placed the point light in the middle of the object, meaning the light would escape from the bottom of the bottle.



I applied this same point light method to the second blue bottle, and though its not exactly what I wanted, it creates an interesting light source as well as just making my scene more visually interesting.



I then added a point light within every single bottle, typically with an intensity of 3, and a large range. Each bottles' light generally matches its colour, with a higher saturation.

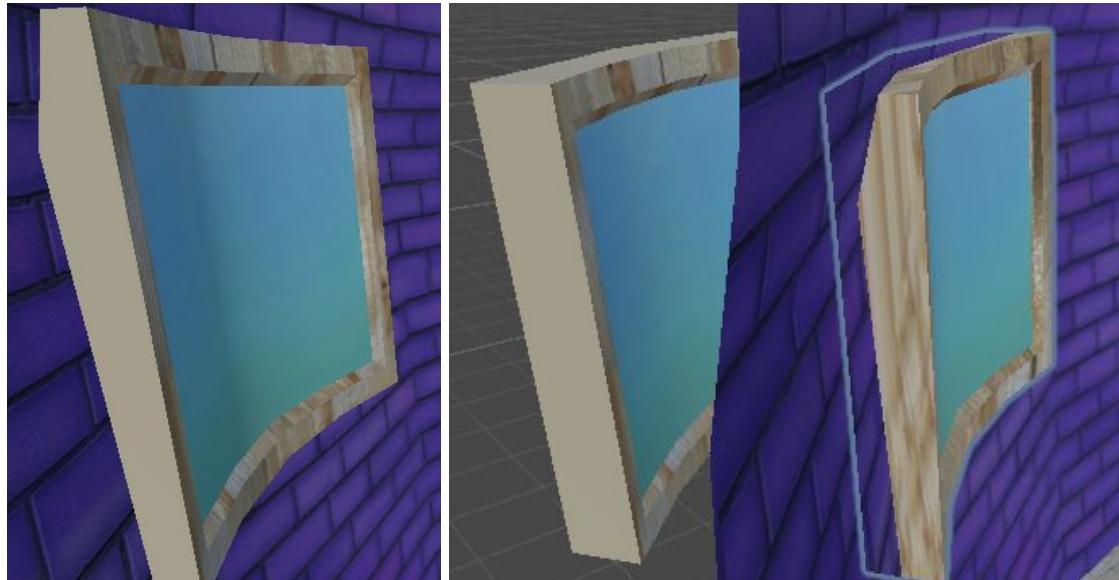


For the inside of the cauldron, I used a spot light in a high intensity, shining it into the cauldron to give it the impression of giving off light.



The positions of all lights in the scene.

LAST CHECKS :



After continuously playing my Unity scene, I soon noticed that both my paintings didn't have material assigned to its outer faces. Fixing both of their UV maps back in Maya, I selected both of them and exported my selection to Unity, then dragging the broken paintings to the outside of the tower as I couldn't delete them.

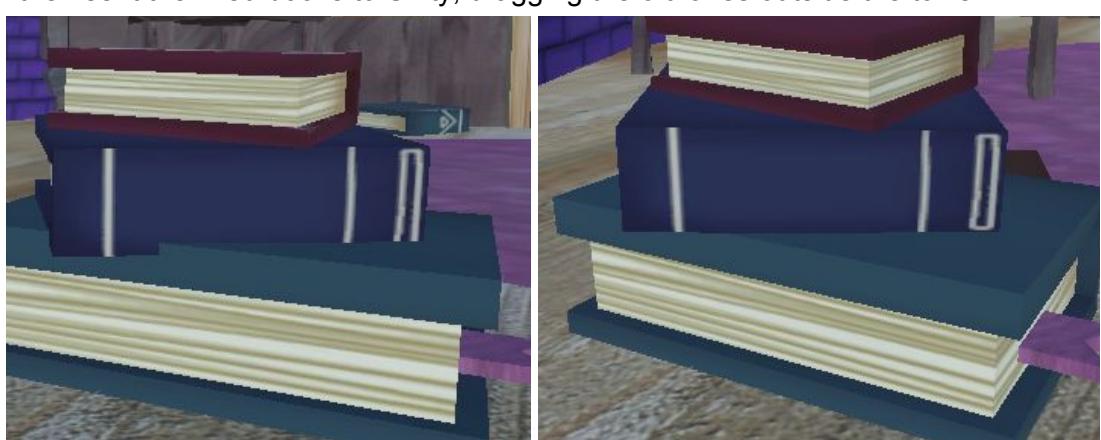


Next, I spotted problems with the books with bookmarks or page corner sticking out, as these used the same UV maps as those without these extra elements. To fix this, for example, I simply dragged the face circled above, and moved it up to fit within the painted texture.

For each book, I highlighted the problematic faces, then used the UV editor to drag these faces back into the texture.



I then sent the fixed books to Unity, dragging the old ones outside the tower.





Then, I fixed issues with objects clipping through each other, using the rotate and move tools in Unity.

I also spotted these miscoloured faces, fixing these by simply dragging the desired material to these faces.



The last issue I spotted were in these wooden faces, mainly by my own preference. I found the wooden beams were slightly too stretched, causing them to look a bit odd, while the chalkboard had a similar problem on its very bottom face.