



# Slime Rancher

**Mochi Miles**

**3D Character Model Art Book**



**Games Development Project**

**Emily Hargreaves**

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# Project Introduction

My project is going to be a 3D model for the character Mochi Miles from Slime Rancher, some focuses of the project will be detailing in the initial model as well as working on shaders and learning how to set them up for a stylized character to breathe life into the character.

The main technical focus for this project is going to be learning on how to create multiple expressions for the character as Mochi is quite an expressive character. The expressions should help to carry her personality throughout the work as well as come through on the renders as well as the initial sculpt.

The main art style of the project is going to mimic that of the Slime Rancher style originally created by Monomi Park. Stylised and chibi-esque features especially with the head shape and features. As well as blending the two versions of Mochi from Slime Rancher and Slime Rancher 2 to make the model feel more unique.



*Mochi Miles Mugshot in Game from Slime Rancher  
By Monomi Park*

# Research and Planning

## Concept Art

Original art from in game Slime Rancher



Beatrix LeBeau 3D Model by Dan Venhardt - ArtStation



Original art from Slime Rancher 2 Early Access



# Research and Planning

## Concept & Material Breakdown

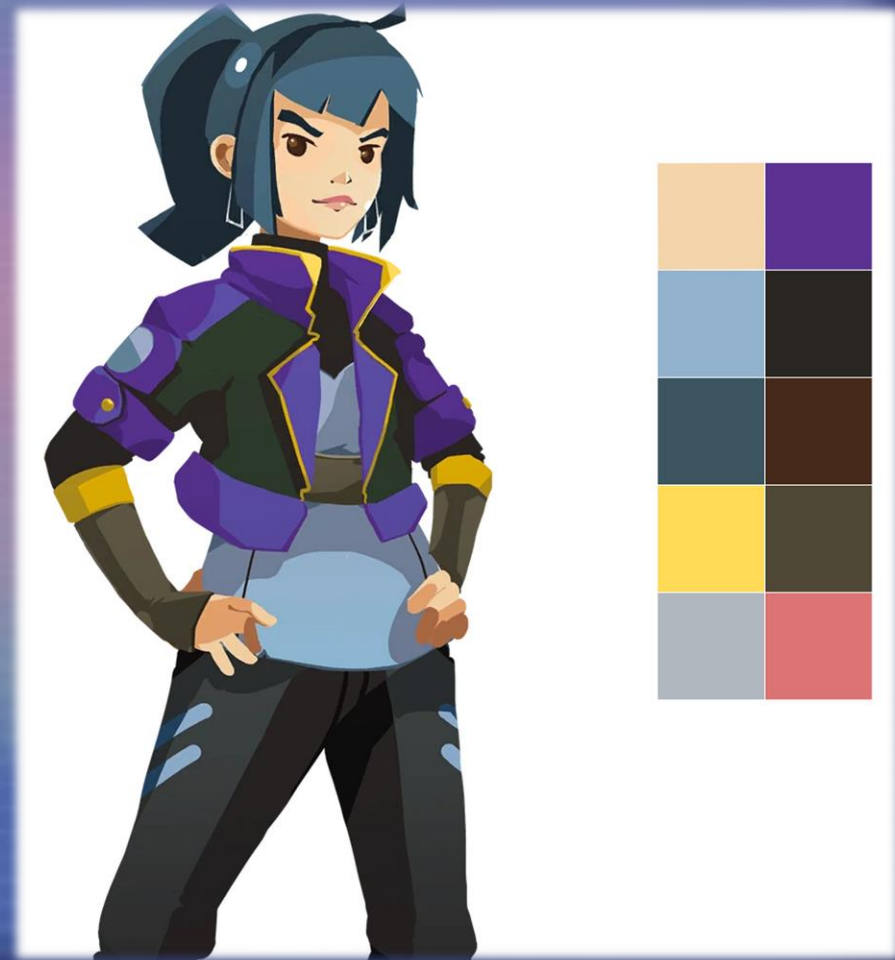


# Research and Planning

## Concept & Colour Breakdown

The colour scheme of Mochi Miles consists of muted greys and blue that range to bold purples, yellow and gold. Colour in Slime Rancher is quite unique in terms of the art style, due to highlighting the npc's personality through their design as well as highlighting backgrounds of areas and the slimes in the game.

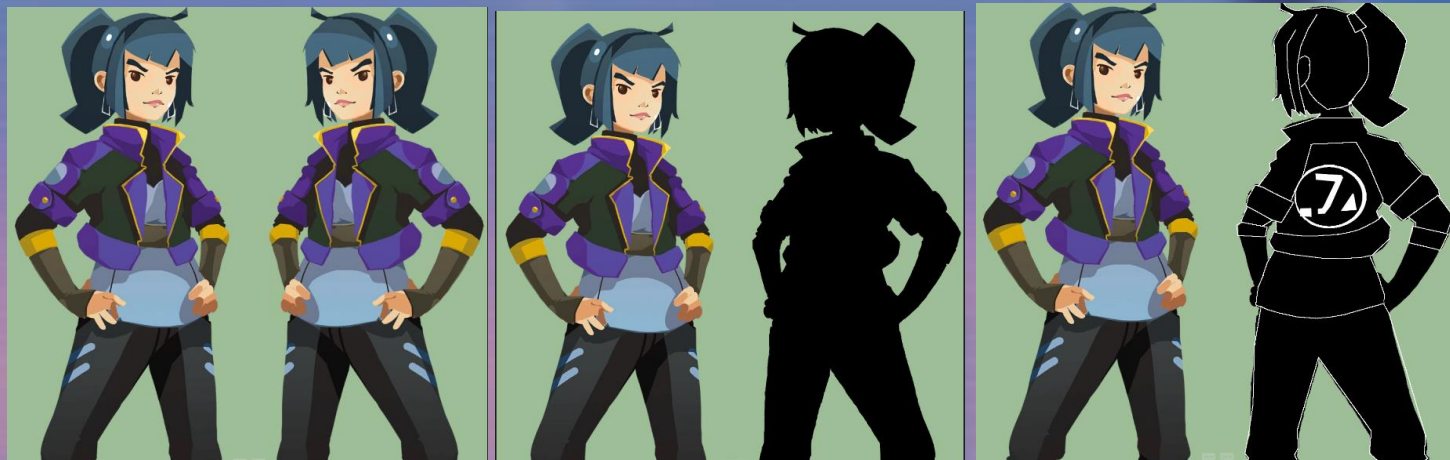
Mochi's background is of a billionaire's daughter, she comes across as snobby and impatient which is highlighted through her design by the bold and rich colours of purple and gold. This then contrasts the muted greys and blue which represent the part of her techy side of her personality where she is always in the know of the plort market as well as being an all-round know it all when it comes to dealing with business.



# Research and Planning

## Concept Breakdown and Changes

Due to Mochi's existence in both Slime Rancher games being purely 2D a back perspective of her had to be imagined and created. This allowed creative freedom in terms of what detail could be added to the model to enhance her and her personality more as well as adding in references from the game that may be relevant to the character and her personality.



Flipped concept

Silhouette

Planning details

Changes made to the original concept are move of additions added to help make the character to feel detailed on par with Beatrix LeBeau (only existing character model in both Slime Rancher games), to keep visual clarity of the games art style and charm.

Changes were done in Photoshop, and by taking the original concept and flipping it to create the illusion for the back perspective.



Finished Back Perspective



# Research and Planning

## Asset List Breakdown

When most of the research was done, to break down the character creation process down into more manageable chunks and asset list was drafted out and then created. Following the pipeline flow of highpoly sculpt to lowpoly baked which is usually standard withing the industry. This was done by utilizing Notion.

This helped to roughly plan out how long each section was going to take, especially for when it came to the technical focus as it is going to take up the most time due to the technical aspect of it being something completely new to learn and understand, and thus needed a large amount of research done.

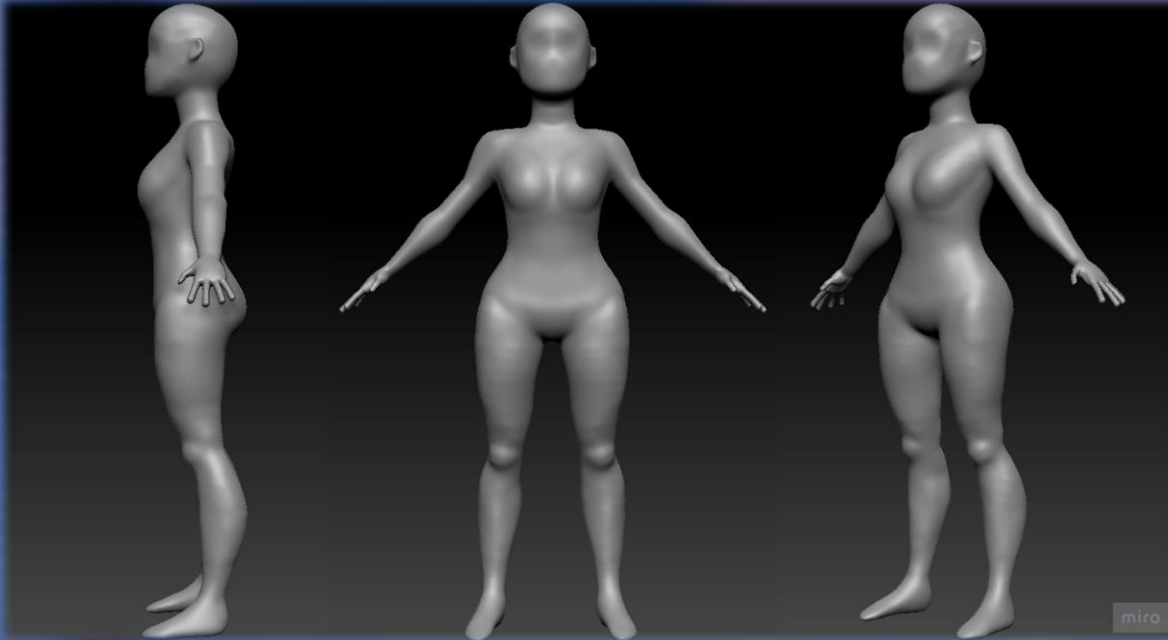
The asset list was then drafted out onto a Gantt chart to help with time management as well as using both to keep on track with the progress and flow of the model.

Aa Name	Type	# Hours	Status
Base Blockout	Zbrush Modelling	4	Complete
Clothing	Zbrush Modelling	5	Complete
Create a back view reference	Photoshop	8	Complete
Hair	Zbrush Modelling	4	Complete
Post Production	Unreal Engine	15	In progress
Research	Miro/Forums	10	Complete
Retopology	Max/Maya	30	Complete
Rigging	Max	7	In progress
Secondary Details	Zbrush Modelling	10	Complete
Tertiary Details	Zbrush Modelling	5	Complete
Textures	Substance Painter	15	In progress
Working on expressions	Zbrush Modelling	20	Complete



# Research and Planning

## Blockout and Set Up in Zbrush



*First merged body blockout*  
Was first built up from pulling and merging  
Spheres, cylinders and cubes into the correct places  
To build up the body anatomy.

### *First Face Sculpt*

*This was to map out where the facial  
Features were going to be as well as checking  
The positions as well as proportions.*

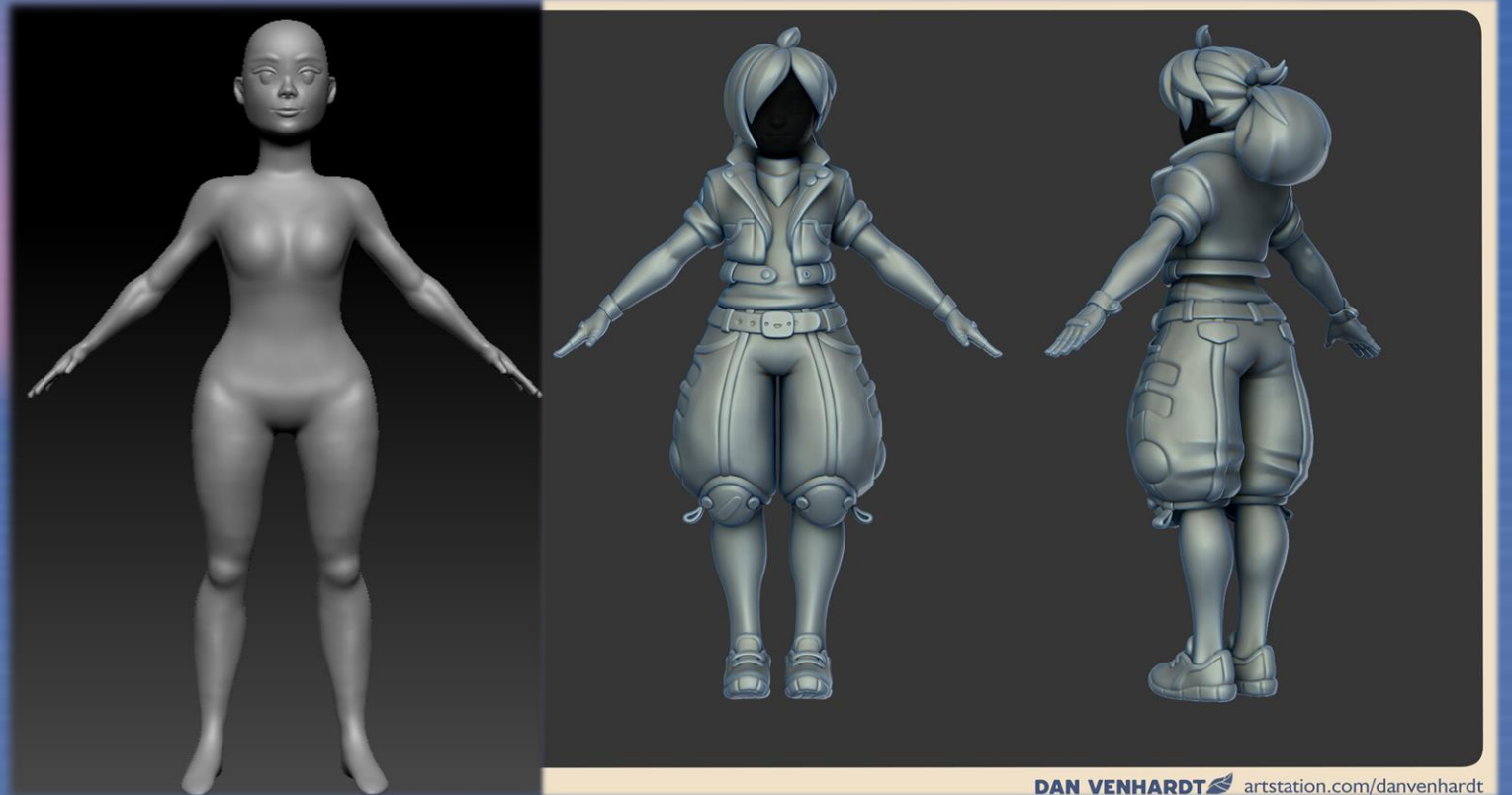


# Main Production

## Highpoly Sculpting in Zbrush

Once the base blockout (*this was built up from the existing character of Beatrix LeBeau by Dan Venhardt*) of the body was fully blocked out and proportions were correct, the facial features are sculpted on. The character is modelled in a 'A' pose as this allows more control on how to model on clothes and gives enough room to sculpt the character as well as being very useful later down the pipeline for retopology.

Due to the style of Slime Rancher being simplistic and chibi-esque the sculpt does not need much of the muscle anatomy to be sculpted in. The main bulk of the muscle is instead defined such as seen in the arms and the bone structure of the face. This is also to only add detail to the parts of the character that is going to be seen.



*My first full body highpoly*

*Beatrix LeBeau 3D Model by Dan Venhardt - ArtStation*

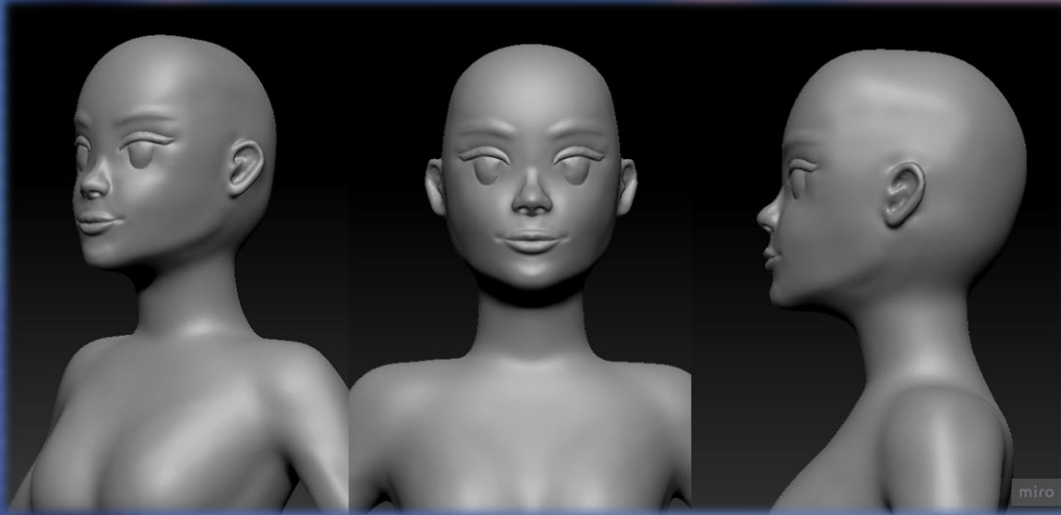
DAN VENHARDT  [artstation.com/danvenhardt](https://www.artstation.com/danvenhardt)

# Main Production

## Highpoly Sculpting in Zbrush

The facial shape and features needed to be revisited and changed due to the proportions being off and the shape being uncanny to look at. This was to help enhance the clarity of the Slime Rancher art style.

*First highpoly head sculpt*



*Revisited and redone highpoly head sculpt*

Changes made were making the shape of the skull/head more rounded as well as pushing out the forehead to make the side profile more defined. The nose needed to be more bulbous as well as defining the bridge where it connects to the forehead. The lips were made to have more volume again to add definition to the side profile as well as connect the bottom jaw to the ear.

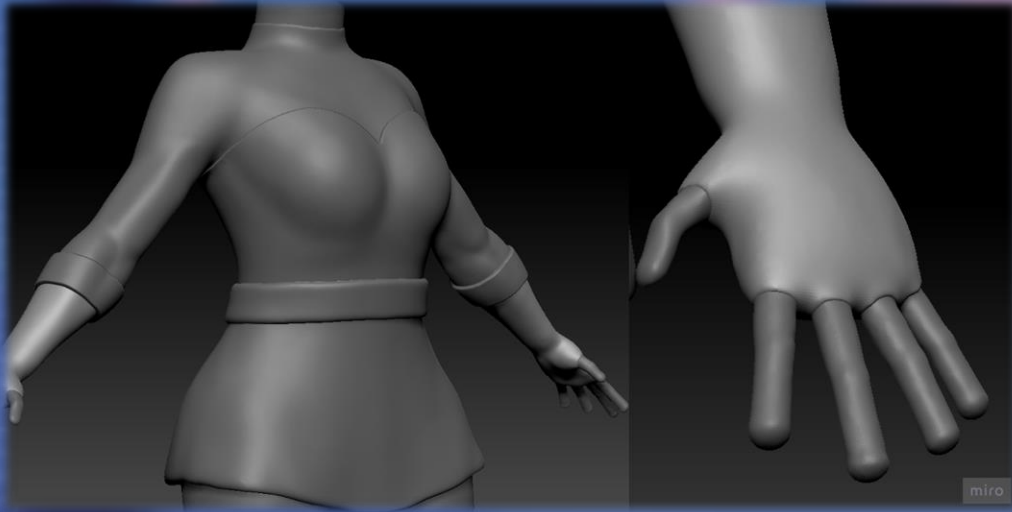
# Main Production

## Highpoly Sculpting in Zbrush

Clothing was created for the model by using Zbrush's extract. This technique was done due to wanting the clothes being fitted in some areas, so it was much easier to mask out the shape of the clothes and then extract that mask to then push and pull into shape.



Polypaint was also utilised for this stage to help map out the clothes as well as it tying in for an added feature that isn't on the original concept art.

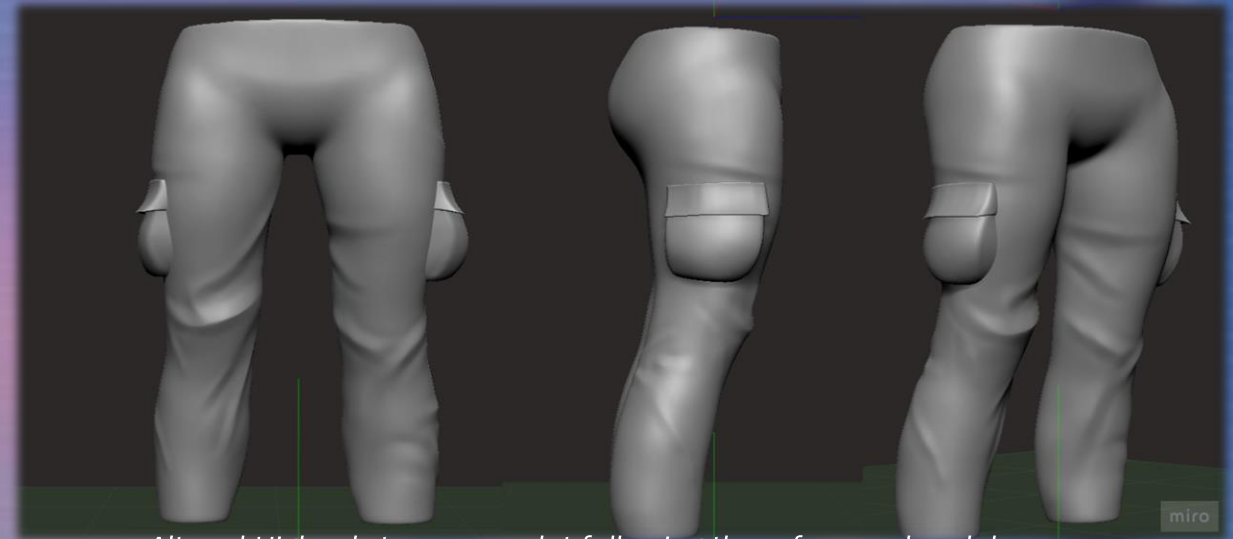


# Main Production

## Highpoly Sculpting in Zbrush

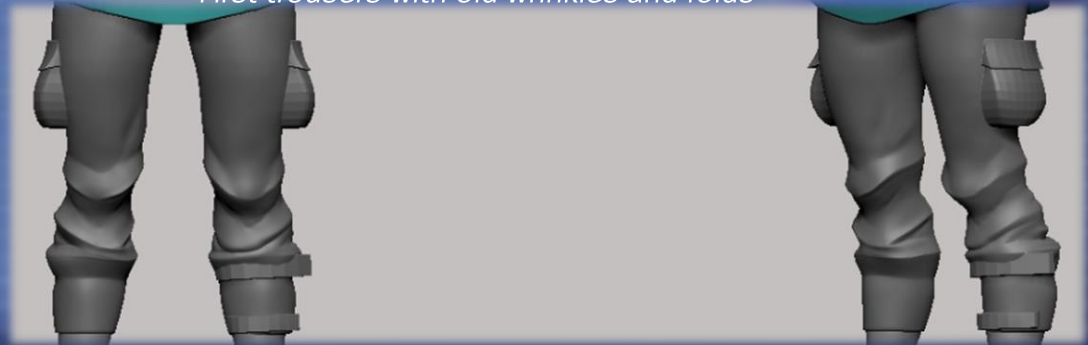
Getting the creases correct on the trousers took a while as they needed to have sharp and crisp edges to be able to tie in with the rest of the clothes. References were followed and broken down in order to get used to the style of trouser and to learn how the material would behave in terms of wrinkles and folds.

*Reference breakdown of straight cut trousers highlighting edges and wrinkles*



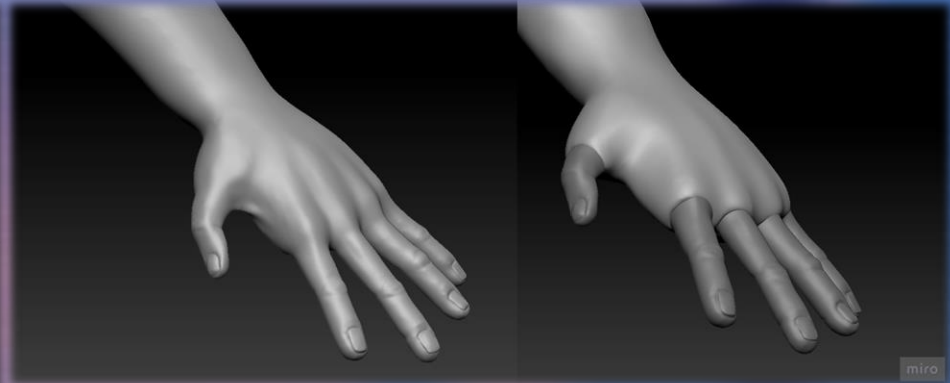
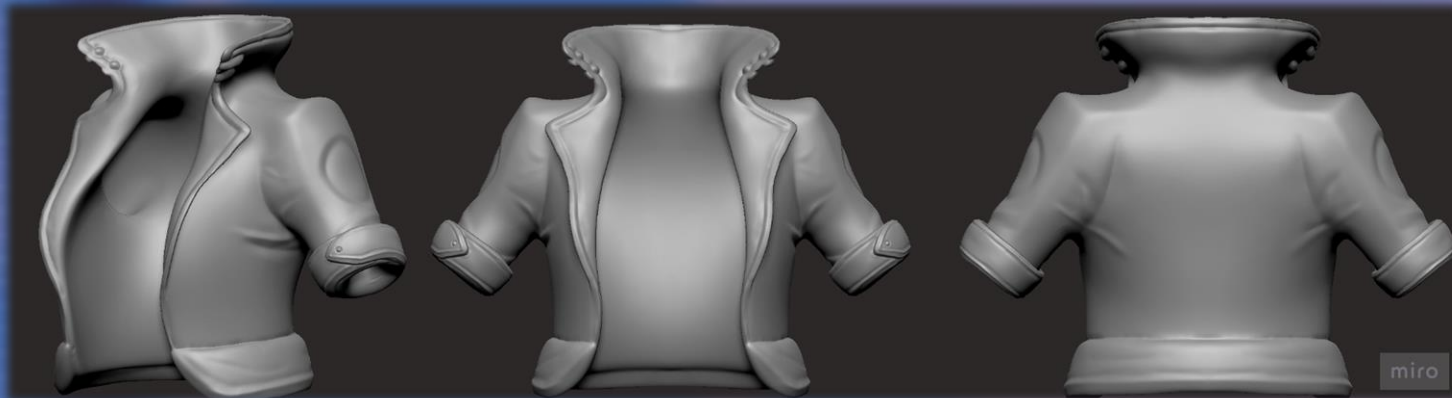
*Altered Highpoly trouser sculpt following the reference breakdown*

*First trousers with old wrinkles and folds*



# Main Production

Highpoly Sculpting in Zbrush



# Main Production

## Highpoly Sculpting in Zbrush

Additions to the original concept art such as the belt and belt buckle was inspiration from Beatrix Lebeau's belt buckle have a slime face on. The middle of the middle if the model looked quite bare in comparison with the rest of the model and so I decided to add to the existing belt in the concept and change it to represent a slime that better matches Mochi's character and personality.



Alternative styles of the slimes

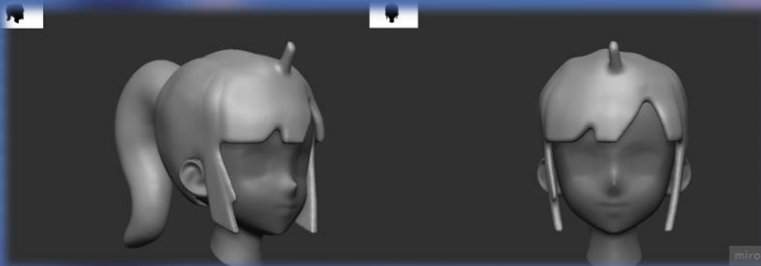


# Main Production

## Highpoly Sculpting in Zbrush

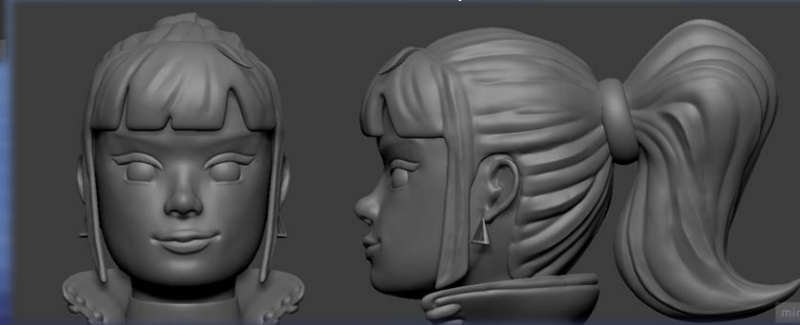
The hair was first blocked out using the Live Boolean tool in Zbrush. This was to get the sharper angles in the shape of the hair as well as the straight choppiness that are the bangs and the side parts of the hairstyle.

In order to add detail for the hair the approach for the style was to be that of Fortnite, mimicking the bigger chunks of strands that are defined by harsh dam standard lines and negative space to build and add definition.



First blockout of the hair with Live Boolean

Final hair sculpt

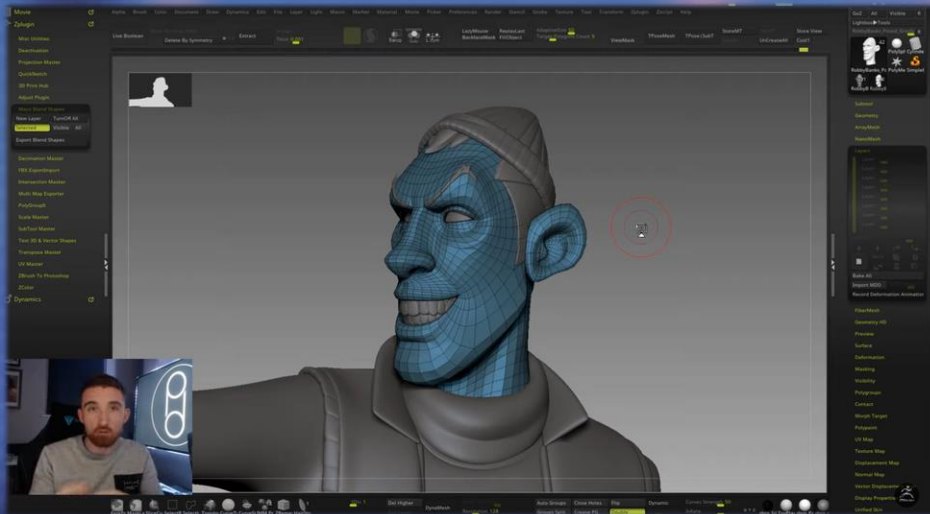




# Technical Focus

## Creating Expressions through Layers in Zbrush

Before altering the face, a decision had to be made to narrow down the concepts and references to a few that best represent Mochi in terms of expression. Ultimately the smirk and peevish expression were decided on to express the snobby and impatient side of Mochi and her background. Then for more natural expressions a sad one was also added for extra range and experimentation.

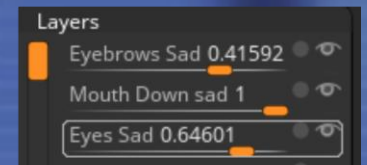
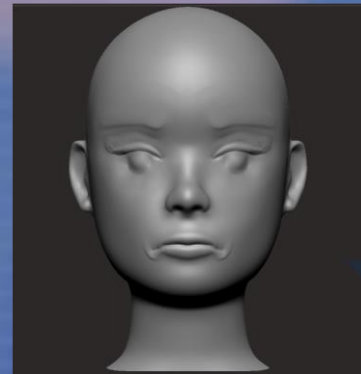
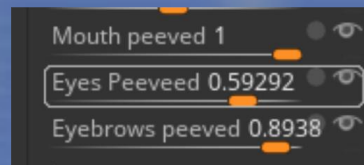
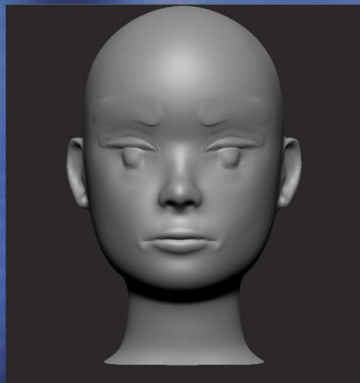
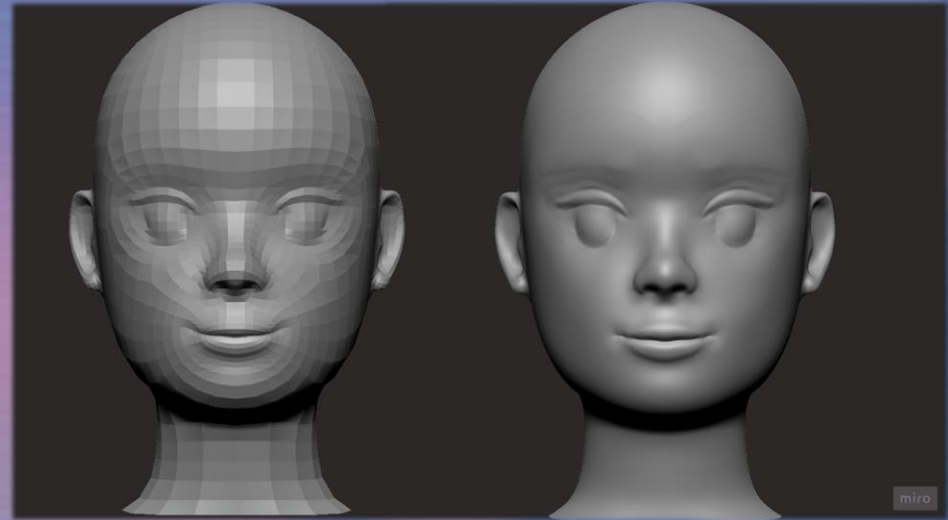


Paul Deasy tutorial for blend shape and layers in Zbrush

# Technical Focus

## Creating Expressions through Layers in Zbrush

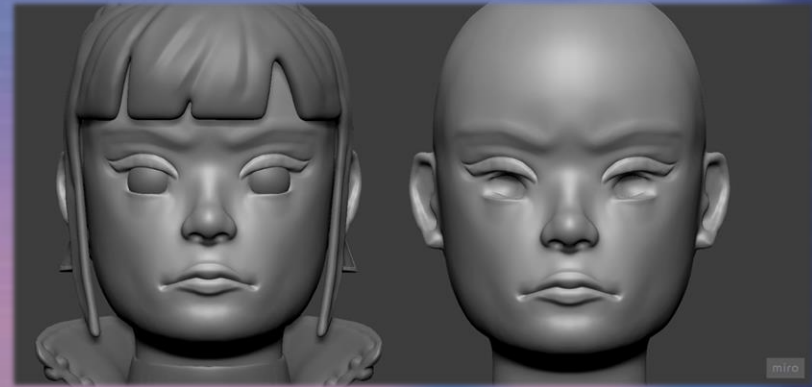
The highpoly head was taken out to be retopped so that the face loops are there and easier to manipulate within Zbrush. However, even with subdivisions reintroduced the face stretched and warped which would cause issues further down the line when it came to baking the highpoly. So, I revisited the guide from Paul Deasy and instead decided to try without the head being retopped.



# Technical Focus

## Creating Expressions through Layers in Zbrush

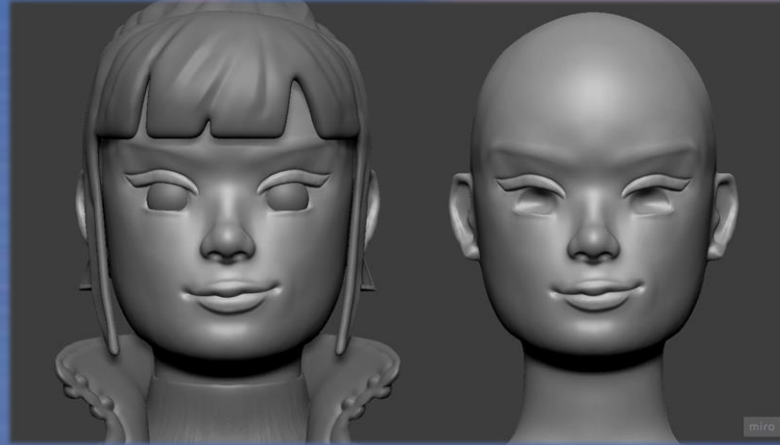
Working on the expressions straight from the highpoly worked a lot better as the results were smoother when changing the intensity of the layers and the lack of arte-facting seen on the face. The face looks a lot more cleaner with not stretching of the model and each expression varies from the other and stands out being easy to read.



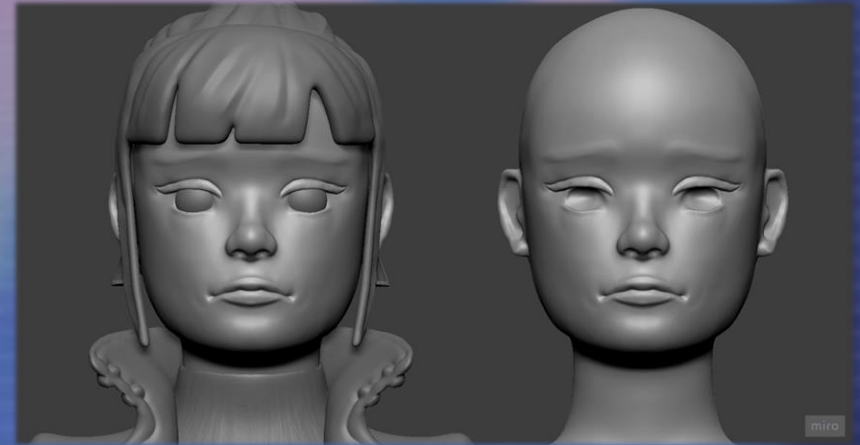
*Final Peeved Expression*



*Default Head/Expression*



*Final Smirk Expression*



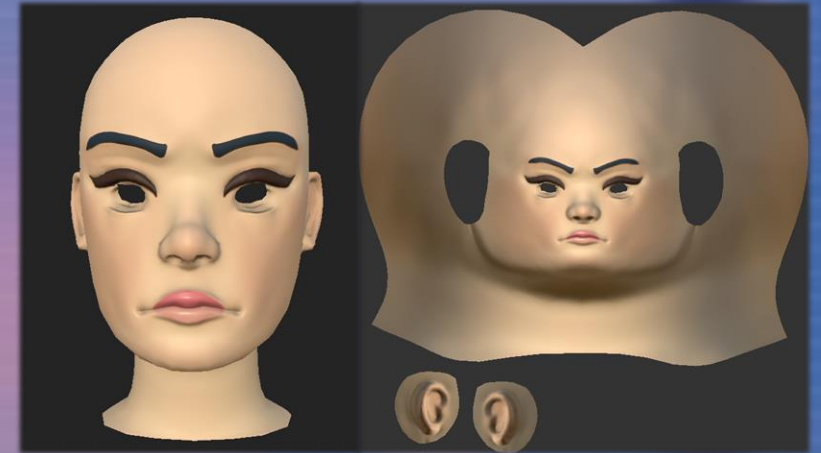
*Final Sad Expression*

# Technical Focus

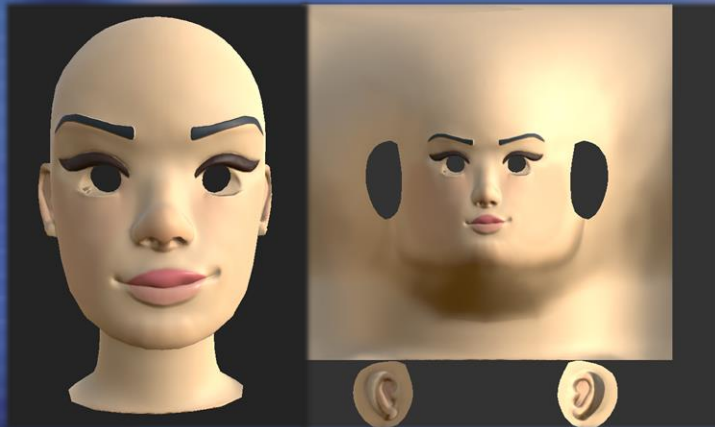
## Implementation into Engine

Due to not having much experience in rigging and animation in general a decision was made to have the head be separate and then change them in engine to either match the pose and to change head.

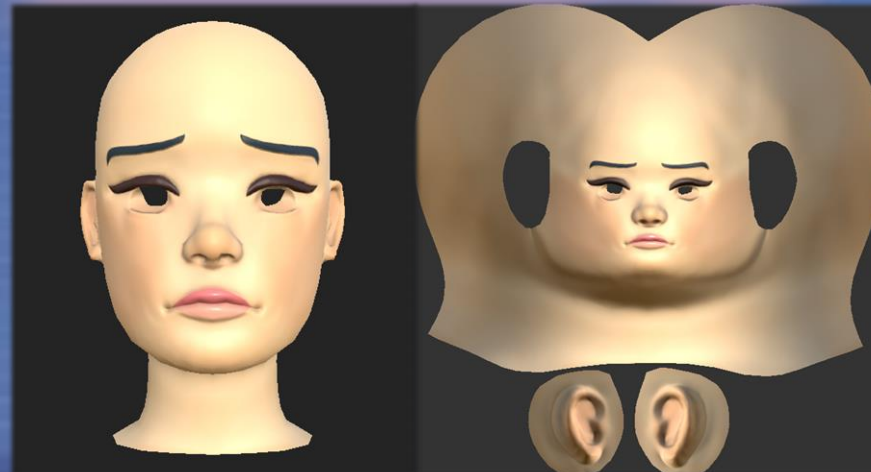
This does mean however that, that approach wasn't industry or cost friendly due to each expression having its own UV and texture set to be implemented into engine.



*Texture set for peevish head/expression*



*Texture set for smirk head/expression*



*Texture set for sad head/expression*

# Finished Highpoly

## Rendering in Zbrush

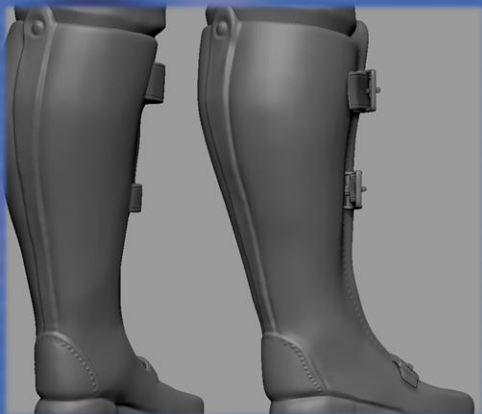


miro

*Finished Highpoly Sculpt in Zbrush*

# Finished Highpoly

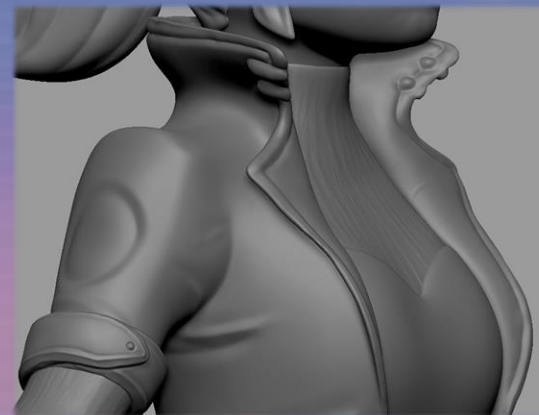
## Rendering in Zbrush



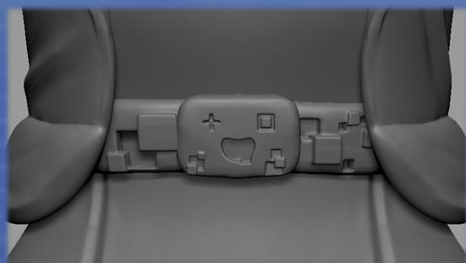
*Back Boots Details*



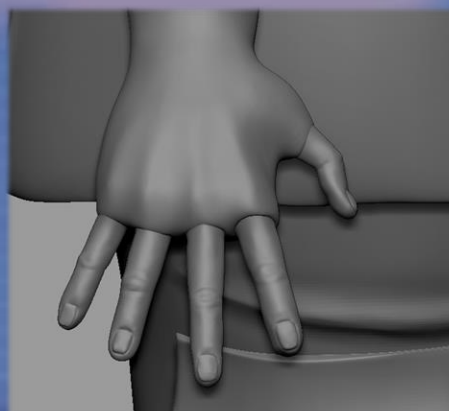
*Front Boots Details*



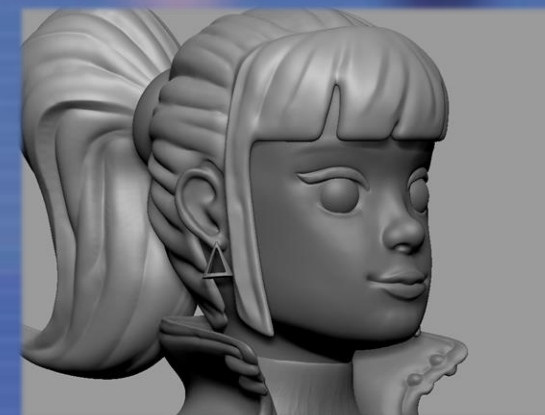
*Jacket Details*



*Belt Details*



*Hand Details*



*Head and Hair Details*

# Retopology

## Retopology in Maya

Working on the lowpoly started with decimating the highpoly to be around 100,000 polys and below to export them into to Maya and start the retopology process.

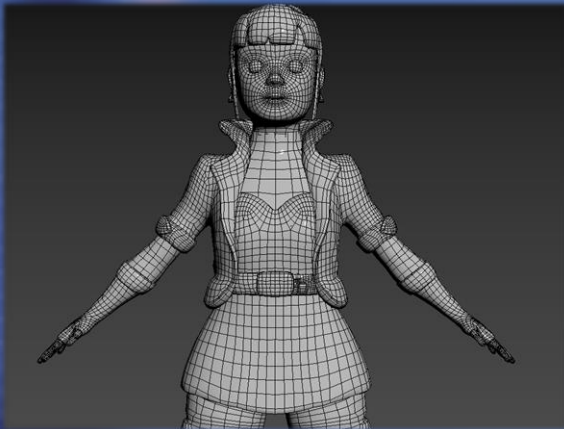
Generally a stylised characters lowpoly count should be around 10,000 – 30,000 polys as that is what's standard withing industry, which is now the target goal of polys in the retop for Mochi.

<b>Total</b>	<b>16 Objects Selected</b>
<b>Polys:</b> 21,159	21,159
<b>Tris:</b> 42,209	42,209
<b>Verts:</b> 22,198	22,198

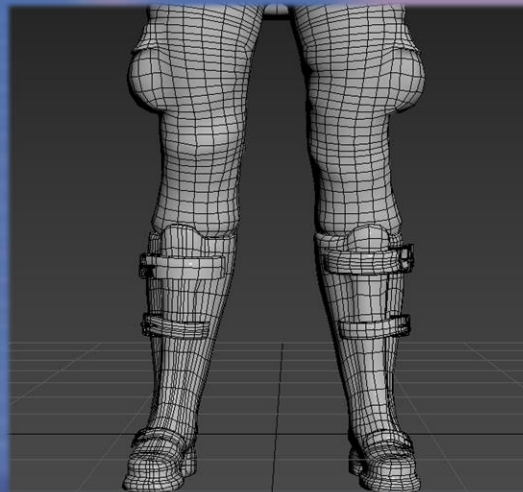
*Polycount without extra heads*

<b>Total</b>	<b>18 Objects Selected</b>
<b>Polys:</b> 25,760	25,760
<b>Tris:</b> 51,357	51,357
<b>Verts:</b> 26,820	26,820

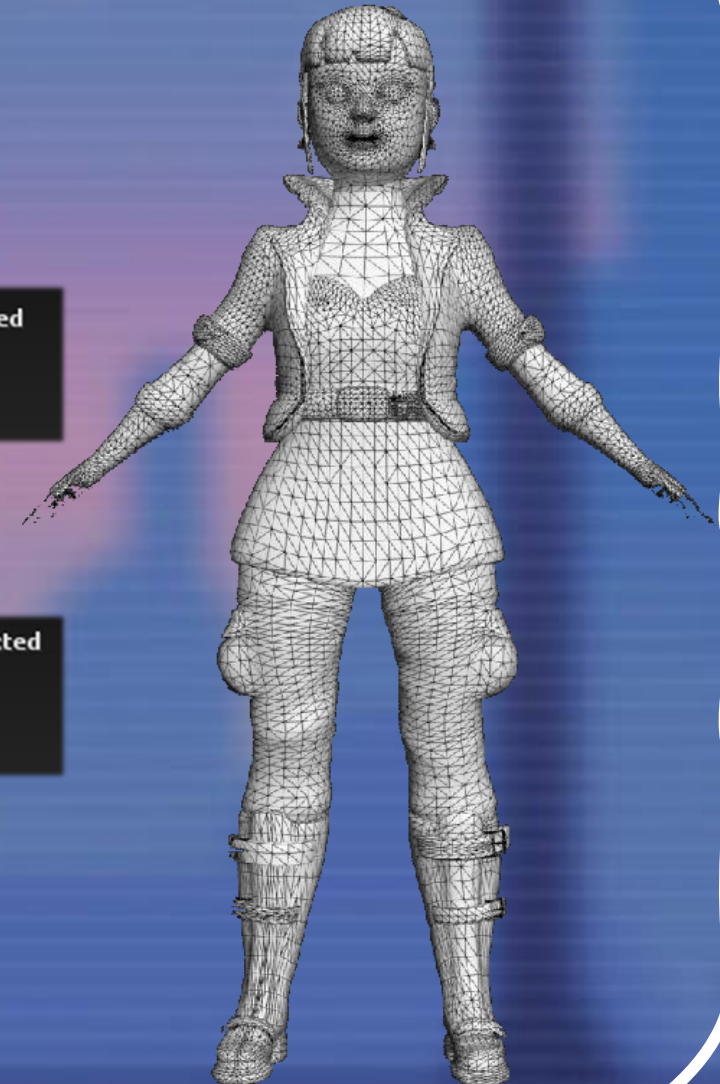
*Polycount with extra heads*



*Top half retop*



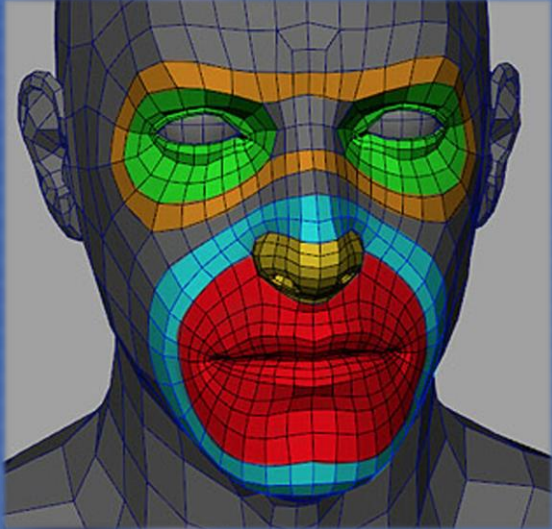
*Bottom half retop*



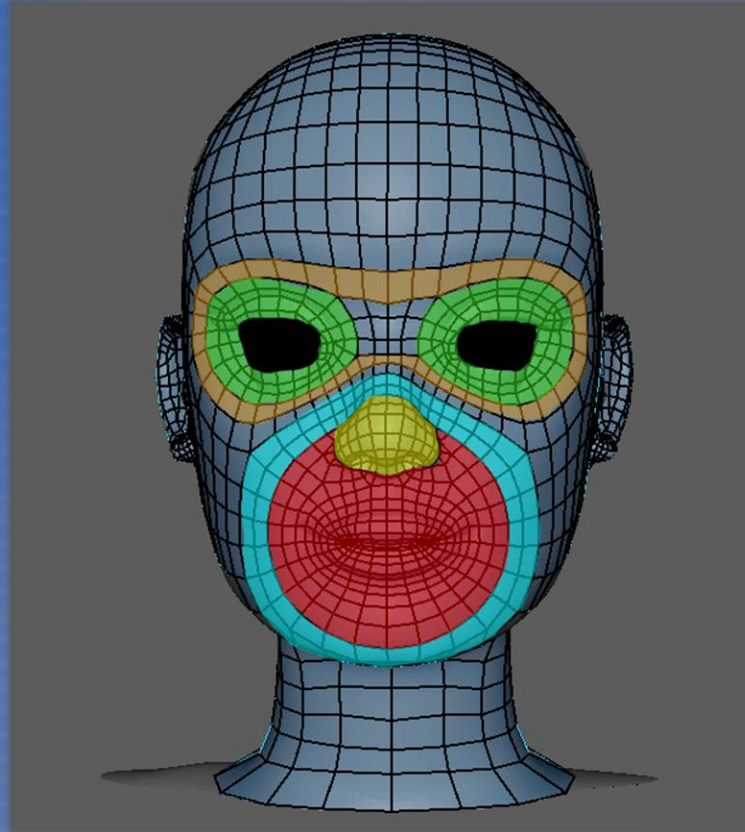
*Lowpoly render in 3ds max*

# Retopology

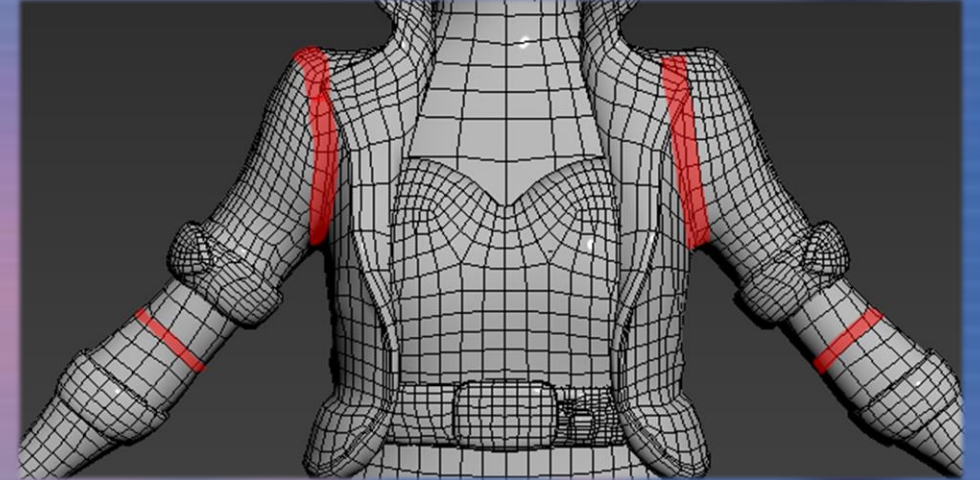
## Retopology Loops



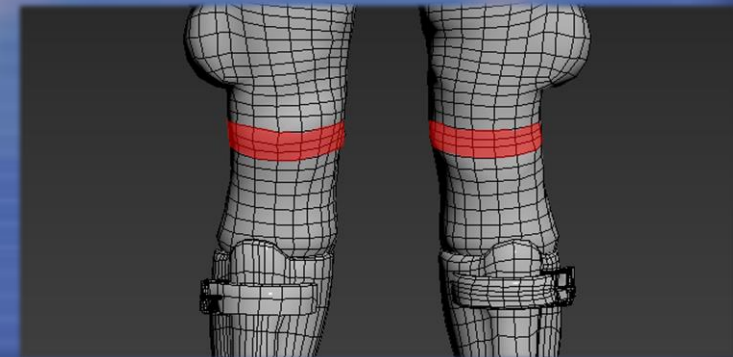
*Retopology guide*



*Mochi face retopology*



*Extra loops to prevent clipping upper half*



*Extra loops to prevent clipping lower half*

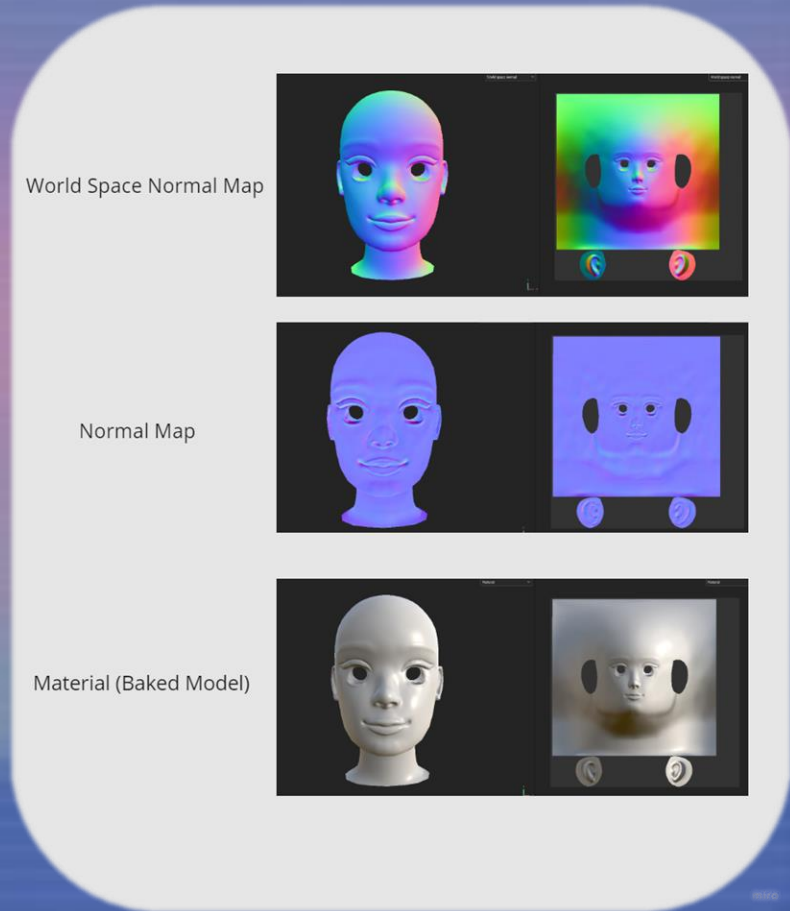


# Baking

## Baking in Substance Painter



*Final Full Model in UE5 Baked Model Render*



*First Bake test to see if there are any errors in whether the lowpoly or highpoly models*

# Textures

## Creating Textures in Substance Painter

After the high and low poly are baked together as we'll as resolving any baking errors, textures can start. Due to the art-style of Slime Rancher being a stylised and simplistic cosy aesthetic there wasn't overly a lot of detail when it came to normals and that sort of definition (this is not applicable to the jacket as normals were manipulated for a leather look).

Most of the texturing layers consist of fill layers for the base colour with a black mask layer above which either consists of a light or darker shade of the base colour that has generators and filters applied to enhance the simplistic detail.

The generators that are applied were ambient occlusion and curvature. Ambient occlusion added more of a shadow gradient within the clothes and curvature was used to create a sense of worn to the clothing to avoid a plastic and fake feel. Height was used in some paint layers to help some elements pop out, like the 7Z Logo on the back and the sleeves.



Material render in Substance Painter showing the leather detail



7Z arm patch



7Z back patch

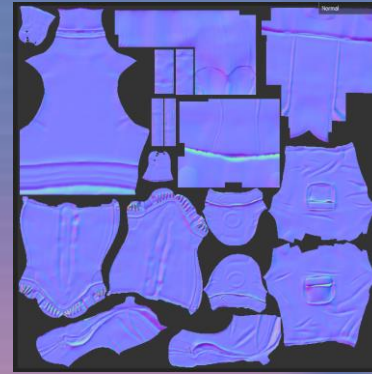
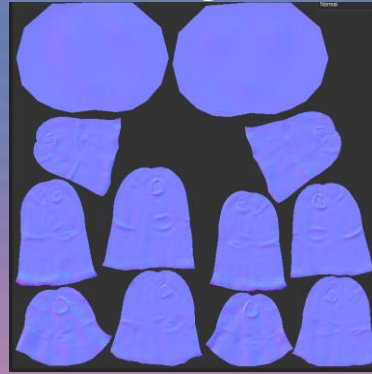
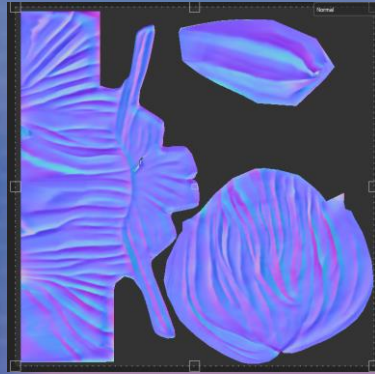
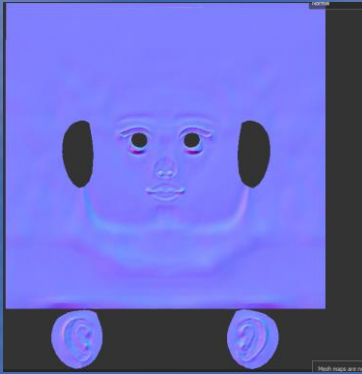


Full textured model in UE5

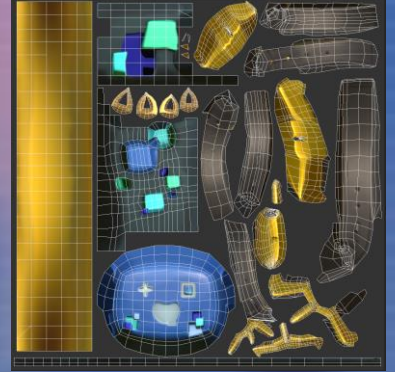
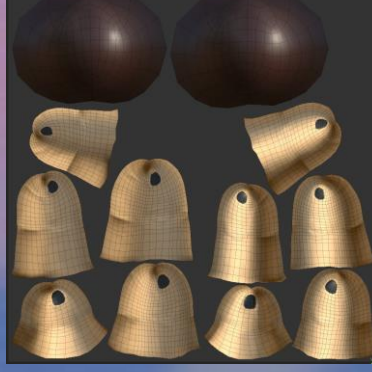
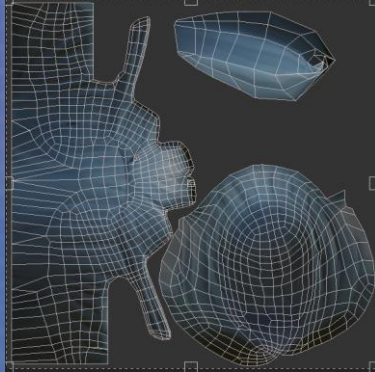
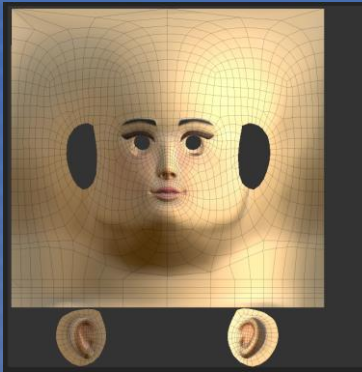
# Textures

## Texture Maps

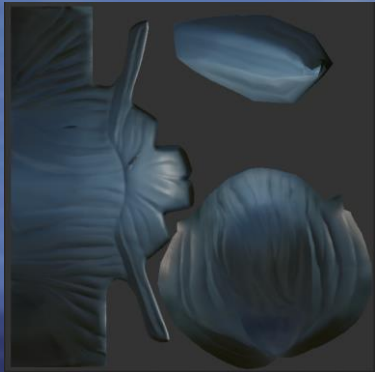
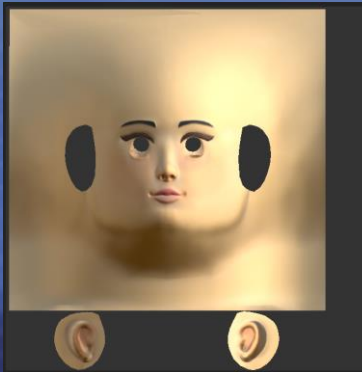
Normals



Retopology and Unwrap UV's



Final Material Textures



# Rigging

## Rigging in 3DS Max

Rigging is something that had to be learnt quite quickly to pose Mochi. There are a lot of errors that need to be revised such a weight painting and getting the limb and appendages closer to the bod to look more natural.

To start with the CATRig was built, added and placing the bones in the correct places. Extra bones were added in to the ponytail so that it wasn't warping and distorting when posing and moving the model.



CATRig built



Moving the bones to pose the model, this makes it easier to sort out the weights

# Post Production

## Setting up in Unreal Engine



*First Camera Set up – Models are in front of a infinity wall  
The only lighting in the scene is a direction light just to place  
backgrounds and characters.  
Background texture on the infinity wall is Mochi Miles' Background  
In Slime Rancher 2*



*Same set up as the other but this focused more on changing the camera settings  
to find what lens and mode as well as depth of field is going to be needed.*

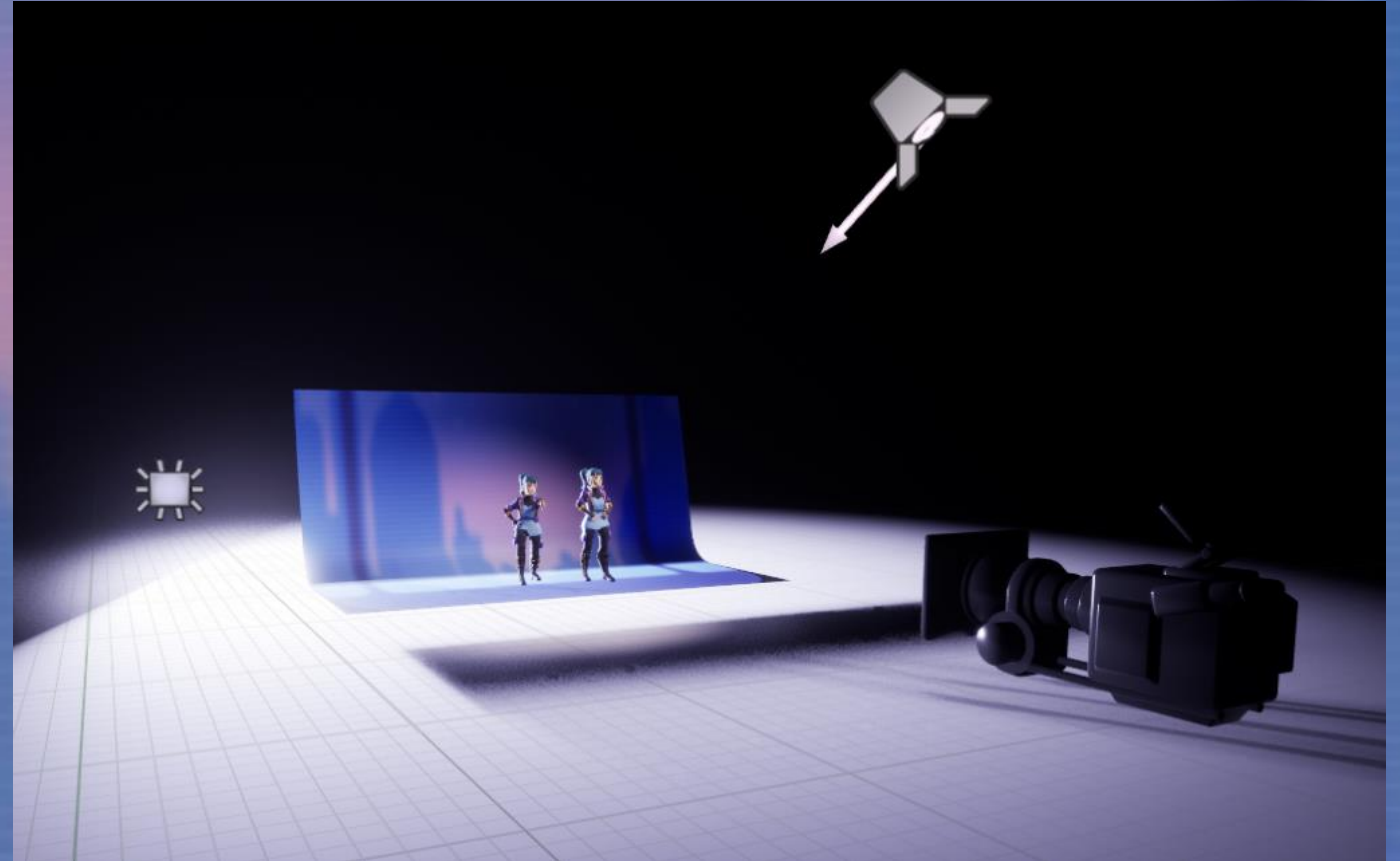
# Post Production

## Lighting up the Scene

Once the camera and model set up was satisfactory the directional light was deleted from the scene as it better to build up the light from nothing (i.e. from a dark scene).

Spotlights are used to light up the front of the character the aperture was changed to soften the light as well as adjusting the colours and temperature of the light accordingly.

Rect lights were introduced to the scene to give a sharp and crisp light to the back of the model to mimic the depth of the character as well as helping the model pop out from the background.



*In engine set up of the lighting system as well as camera system*

# Beauty Shots









*Default expression*

*Peeved expression*



*Sad expression*

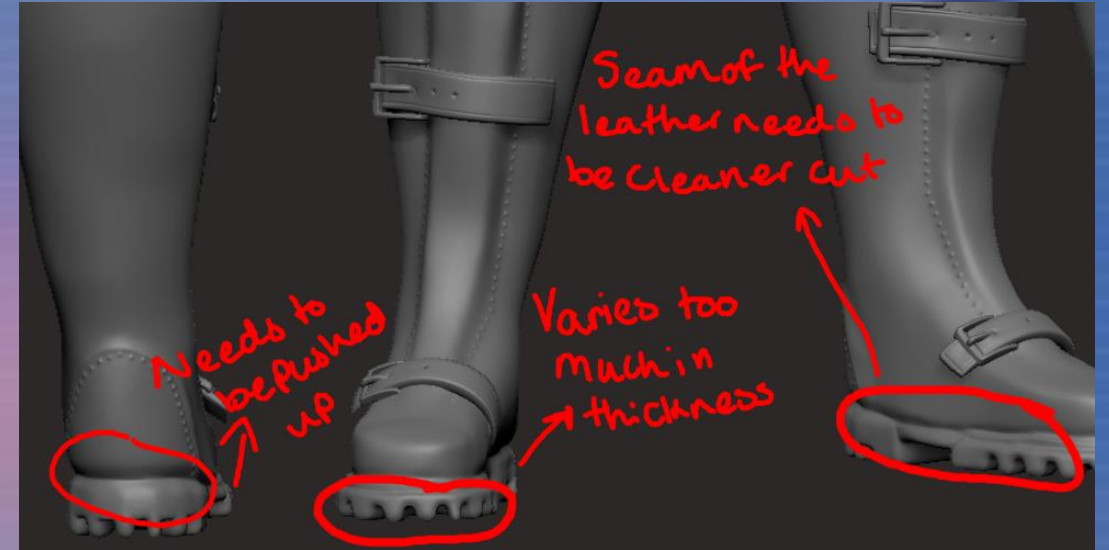


*Smirk expression*

# Critical Evaluation

The set goal of the project was to create a game ready character model of the Slime Rancher character Mochi Miles, whilst also aiming to utilise Zbrush layers to emulate different expressions. This was achieved as documented throughout this book, however there is a lot that can be improved especially when compared to that of industry.

For the modelling process some of the models are too blobby and does not convey the material it is supposed to represent as seen on the boots. The main material of the boots are leather for the top half and buckles whilst the soles are a harder plastic sort of material just like boots are in the real world. The sole needs work done to look more stable and shoe-like as shoes are meant to be walked in and requires a stable sole to function like a shoe.



# Critical Evaluation

In terms of visual clarity of the character the silhouette and style of Mochi Miles' character model reflect that of her in game of both Slime Rancher and Slime Rancher 2, especially when compared to an existing 3D character model from the game. Mochi's model and textures mimics that of Beatrix Lebeau which is created by Dan Venhardt, complimenting the style of the game and imagining Mochi being placed as the player character or as a live 3D version of herself that could appear in the game.



yellow or white brow

red cheeks and nose

blue, green, or gray chin

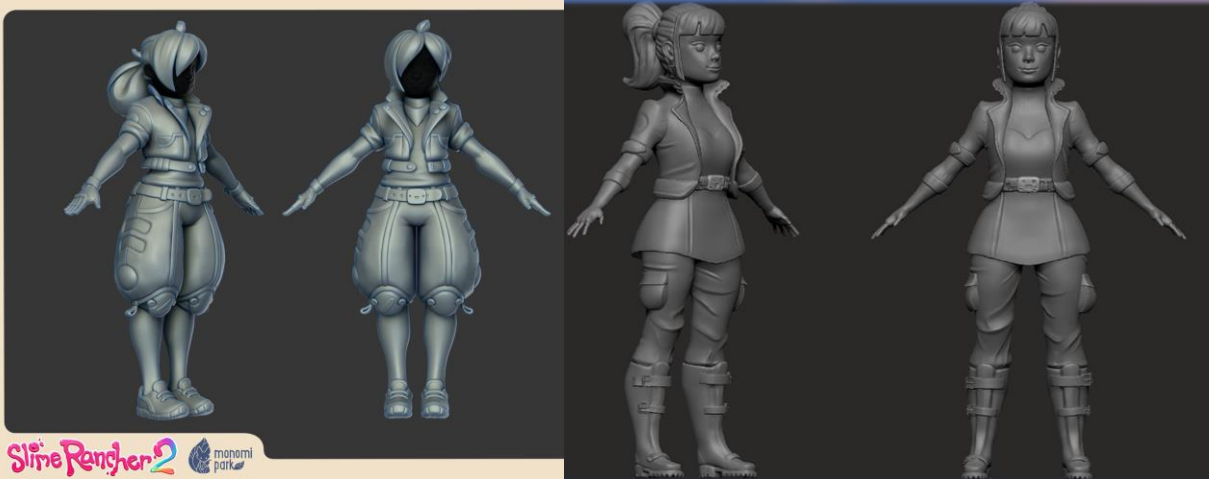


Edited to Show where the Zones Can be enhanced

Needs more Warmth in the middle of the face

More neutral Yellow tones

Needs more blue to her as the skin is quite Dull



However, the textures can be pushed further especially with the shading in her skin tones by generating shadows on the skin layer and blending them in as well as enhancing the different facial zones in terms of warm and cooler tones to make her skin feel more like skin and to give her the illusion of a living being. This would help with the skin not being so washed out when lighting up the character in engine.

# Critical Evaluation

The rigging of the character needs to be worked upon as there is clipping as well as ugly tears in some of the model which looks ugly to see. Yes, this can be edited out in post-production, however it's better to keep learning on the proper way to rig and skin the character to prevent this kind of issue from happening.

The posing of the character also need to be worked upon as you can see that the character is not touching her body, when if she was doing that kind of pose in real life your hands would be on your waist and touching making no weird shadows of your hands on your body.



Once these issues is resolved the character can have more dynamic poses as well as having a facial rig so that multiple heads aren't having to be retopped as well as textured and imported into engine as that is not cost efficient when it comes to making characters for games.

Thank you for reading my art book for Mochi Miles character model creation.

Emily Hargreaves

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