

# What are these?

These shaders are the vanilla Koikatsu shaders with new features and a few fixes. You should be able to apply these shaders and maintain the vanilla koikatsu look.

These shaders, while designed for Koikatsu, will still work in Sunshine however they won't look exactly like Sunshine's lighting.

Currently there are shaders for main\_skin, hair, hair\_front, eye, eyeW, main\_opaque, main\_alpha, main\_item, main\_item\_alpha (alpha variant of main\_item)

## Changes to vanilla

- Support for multiple lights with a few limitations
  - **Limited to 4 point lights + 1 directional light**, this is due to a combination of how Koikatsu does its shading and Unity's renderer.
  - The additional point lights do not cast shadows to objects with these shaders, similar issue to above.
- Specular based on light color (a red light will give a red specular highlight), this can be disabled.
  - Also adds specular to hair
- Can set the overall darkness with the Custom Ambient property.
- Emission maps
  - RGB channels for color
  - Alpha channel for the mask, black = not emissive, white = emissive
  - Color and Intensity parameters
- Scale for normal maps which can be set higher than 1
- Colored hair gloss
  - Hair gloss can also be set so it's only shows when a light is reflecting it, similar to specular this is off by default

### *New in v1.0*

- Clothing and accessory shaders can use environment reflections via reflection probes
  - Can be used by setting UseKKMetal to 0
  - Clothing shaders have the AnotherRampFull like accessories do. (Sets the entire object to be metal)
- Detail R can be used as specular maps when notusetexspecular is on
- New culling and alpha options, these don't need to be changed unless you're going for a specific effect, details in the next section.
- Clothing shaders now have outline slider like accessories (LineWidthS)

### *New in v1.1*

- Tessellation and displacement has been added
  - For the Skin, Opaque, and Alpha shaders as SkinPlusTess, MainOpaquePlusTess, and MainAlphaPlusTess

- Tessellation adds more polygons and displacement allows for stuff like skindentation or squishy bits

*New in v1.1.5*

- Matcap support, replaces environment reflections any sliders relating to what applies to matcaps
- Shrink values for displacement

*New in v1.2*

- DetailRasSpecularMap should now work in all shaders
  - Affects gloss in hair shaders
- Added outline color
  - Bring outlinecolor alpha value to 1 to use custom outline color
- Added alternate shadow color option
  - Allows shadows to be much darker
  - Bring shadowcolor alpha value to to use custom shadow color
- Added detailnormalmaps to clothing and accessory shaders
- Added displacementFull slider which acts like a solid texture on the displacement map
  - -1 = inwards, 0 = none, 1 = outwards
- Exposed `_Clock` variable which can be used to animate displacements with timeline and render editor
  - `Clock.w` controls displacement
  - `Clock.xy` controls xy offset of the texture

**Fixes**

- Lighting works properly in reflections, aka the mirror assets and reflection probes
  - It also works in 360 captures
- Eyebrows and eyes appearing over hair won't have that colored outline issue, however they will still be a bit pixelated
  - This will depend on the eyebrow texture
- Eye expressions (heart/stars) will follow the iris properly

*New in v1.0*

- Fixed `notusetexspecular` on accessories

## How to use

Simply replace the vanilla shaders with the vanilla plus shaders, you may need to manually set up the render queue to what it was before if things don't look right (mainly applies to hair). You can also try setting the see eyebrow/eyes through hair options again.

- Shader Forge/main\_skin → xukmi/SkinPlus
- Shader Forge/main\_hair → xukmi/HairPlus
- Shader Forge/main\_hair\_front → xukmi/HairFrontPlus
- Shader Forge/toon\_eye\_lod0 → xukmi/EyePlus
- Shader Forge/main\_opaque → xukmi/MainOpaque
- Shader Forge/main\_alpha → xukmi/MainAlpha

- Shader Forge/main\_item → xukmi/MainItem
- Shader Forge/main\_item → xukmi/MainItemAlpha

There are a few shader options available in the various shaders, here is a quick description of what the new stuff does 1 = on, 0 = off

- UseLightColorSpecular (default on): Makes the specular reflections colored depending on light color
- UseRampForLights (default on): This will set it so the point lights's will lit based on Shadow Type in Scene Effects ramp. This is mainly for the sharp shadow options.
- UseRampForSpecular (default off): Same as above but for specular
- UseMeshSpecular (default off). Uses the mesh's specular for hair, similar to notusetexspecular.
- SpecularIsHighLights (default off): Will have the hairgloss only show if it's reflected light a specular light
  - SpecularIsHighlightsPow and SpecularIsHighlightsRange determines how diffused the specular light is (similar to how SpecularPower works)
- ExpressionDepth, ExpressionSize: Pretty self explanatory, affects the eye's expressions (heart/sparkling)

*New in v1.0*

- AlphaOptionCutoff (default on): Enables or disabled alpha cutoff
- Cutoff (default 0.5): Sets the threshold for alpha values to cutoff the mesh. You can try setting this higher for
- CullOption: Sets face culling for an object, 0 = off, 1 = front, 2 = back
  - 0 is usually for opaque objects, 2 is usually for transparent objects
- OutlineOn (default on): Self-explanatory
- UseDetailRAsSpecularMap (default off): Uses the red channel of detail mask as a specular mask when notusetexspecular is off. Black = no specular, Red = specular
- UseKKMetal (default on): Turning this off will use environment reflections instead of KK's another ramp metallic effect.
- Reflective: Changes how blurry the reflection is 1 = perfect mirror
- ReflectiveMulOrAdd (0 = Mul, 1 = Add): Changes how the blending of the environment reflection works, darker colors work better with Add, lighter colors work better with Mul (also makes lighter colors look more metallic).
- ReflectiveBlend: Changes how much of the reflection to use.
- SpecularHeightInvert (default off): For some hair pieces the hair gloss gets messed up for some reason with the shader unless you turn this on. So only turn it on if the hair gloss different from vanilla.

*New in v1.1*

- TessTex: The tessellation map, use this if you want tessellate only certain parts of the mesh, 0 = no tessellation, 1 = tessellate
- TessMax (default 12): Maximum tessellation value based on view distance
- TessMin (default 1 no tessellation): Minimum tessellation value based on view distance

- TessBias (default 75): Higher values reduces the threshold for tessellation. (Higher it is the further away you can be to use the TessMax value)
- TessSmooth (default 0): Enables or disables tessellation smoothing which rounds out the mesh. Note this can cause clipping because it moves the overall geometry a little bit, it's best used for naked bodies. Or if you're going to displace them anyway.
- DisplaceTex: The displacement map, black = displace inward, gray = no displacement, white = displace upward.
- DisplaceMultiplier (default 0): The multiplier for the displacement map
- DisplaceNormalMultiplier (default 1): Multiplier for the displacement normals, makes the displacement a bit more noticeable the higher this is.

*New in v1.1.5*

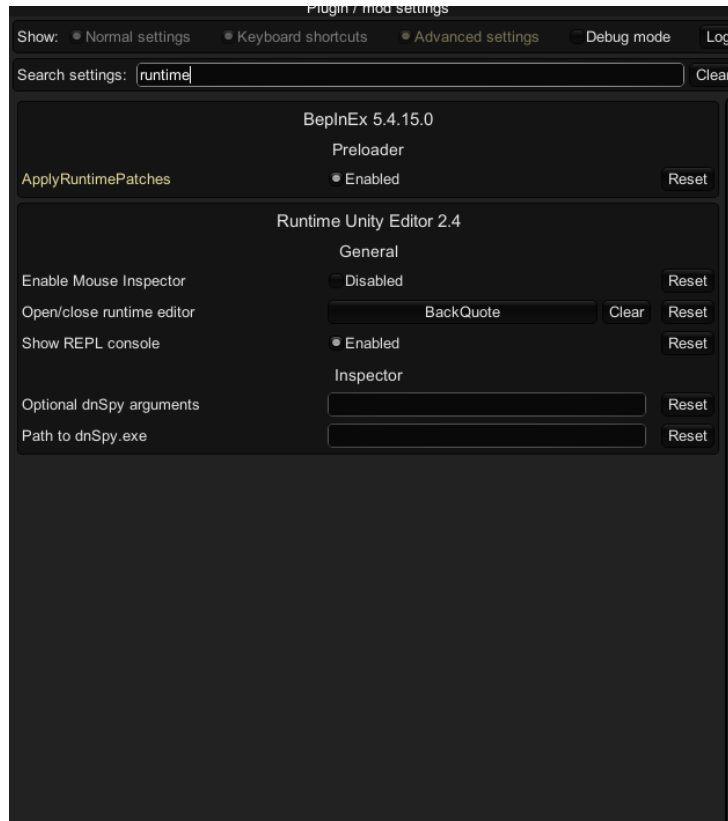
- UseMatCapReflection (default 1): When use KK Metal is set to 0, either uses environment reflections with blend probes or Matcap shaders
- Tolerance (default 0.0005): If you use Tessellation and any triangles get cut out if you get closer to the model turn this up, it is an optimization that prevents offscreen triangles from tessellating.
- ShrinkVal (default 1): Scales the model down, good for shrinking 3D clothing that the displacement slider won't work well with. You will probably need to adjust the vertical position afterward to line up the model again.
- ShrinkVerticalAdjust (default 0): Adjustment for after you shrink the model.

*New in v1.2*

- OutLineColor: Set alpha to 1 to use custom outline color
- ShadowColor: Set alpha to 0 to use custom shadow color
- DisplaceFull (Default 0): Range between -1 to 1, -1 will shrink the mesh, 1 will inflate it
- Clock: Allows for displacement to be animated with timeline via render editor
  - W controls overall displacement, xy controls the offset of the displacement texture

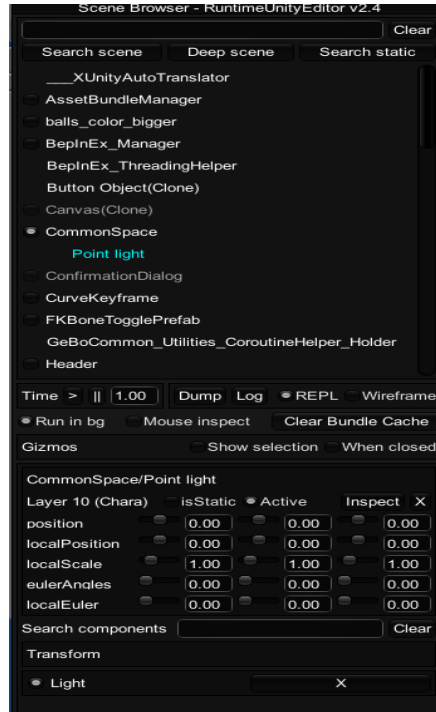
To use pointlights add the P-MODMAP lights under Map Lights

**NOTE:** You may run into issues where a light isn't lighting unless it's close enough or it's a certain color. This is because Unity is internally deciding which lights to use, this can be fixed with the Runtime Unity Editor plugin.

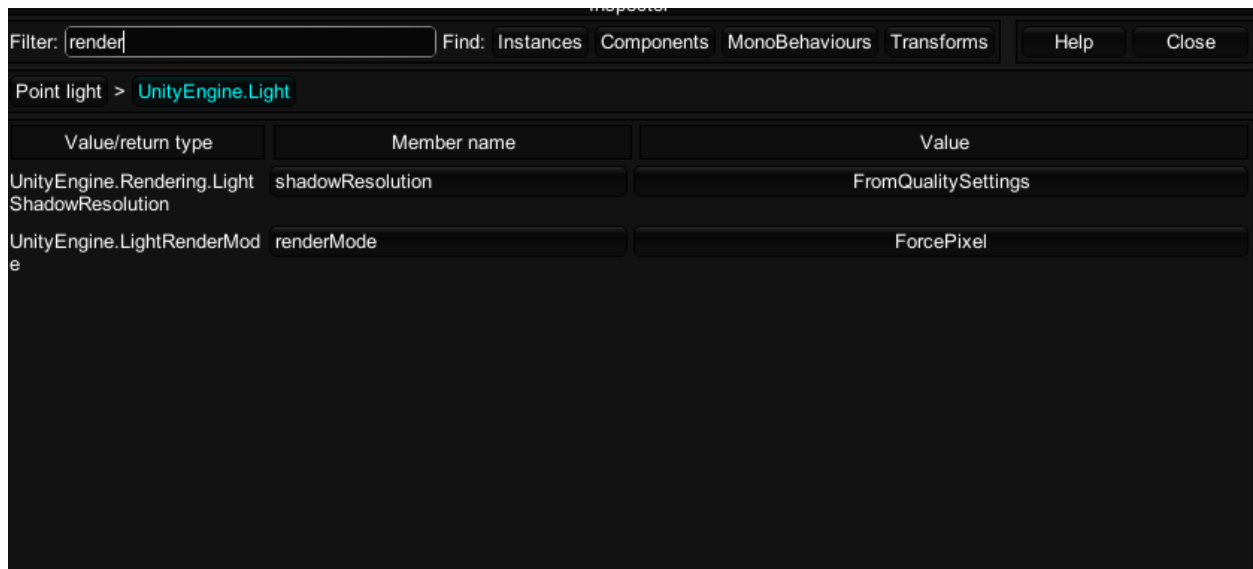


Make sure you can open the Runtime Editor with F1 and see if the hotkey to open it is set.

Once open find *Common Space* and press the checkbox near it to open the hierarchy. That is where studio objects are located and then select the light object (it will be highlighted if selected).

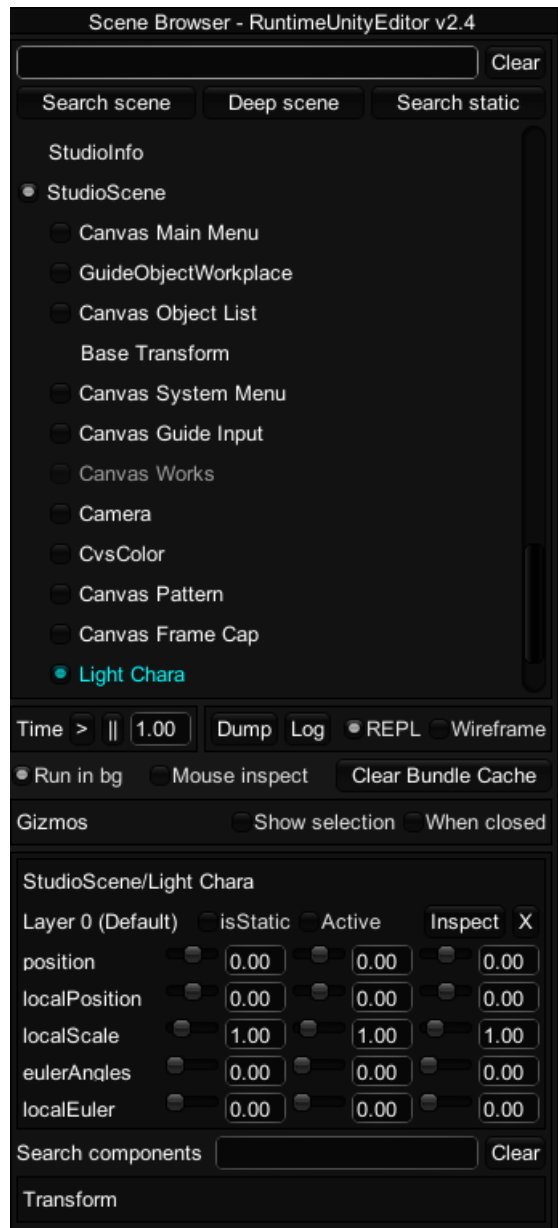


Click on light under transform near the bottom and it should open a new popup, at the top there will be a filter text field look up *render* and set the **rendermode** to **forcepixel** for **every point light**. **This is not saved to the scene**



**ALTERNATIVELY** you can not use any directional lights, you can disable the main directional light by finding StudioScene (not under CommonSpace, usually near the bottom), and finding Light Chara where you can uncheck Active.

**Note:** This persists between scenes so if you load up another scene it will not have Light Chara enabled, you can simply re-enable it or restart the game



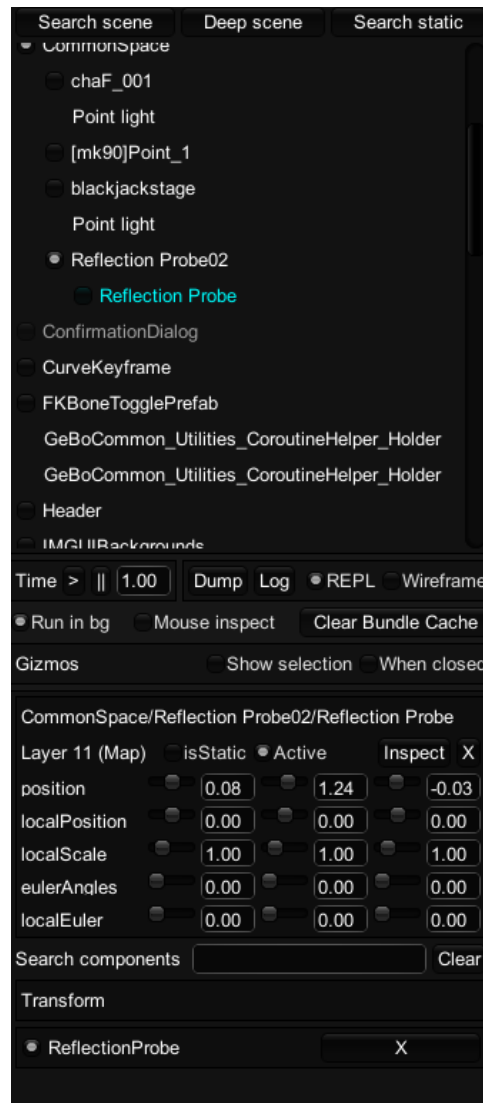
## Reflections

Environment reflections replace KK's metal, the easiest way to make something metallic without making a metallic map is by setting another ramp full to be 1, and then disabling UseKKMetal

Sometimes reflections might not show up, this is because the map/environment does not have a reflection probe. The maker does not have a reflection probe to use.

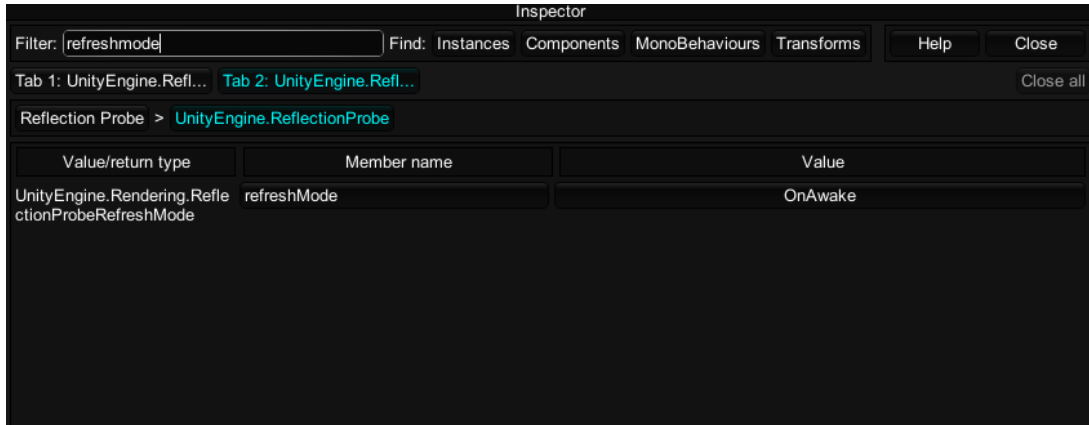
In studio you can add a reflection probe with one of the reflection probe objects.

This may be very laggy because it is writing a new reflection every frame, you can help mitigate this by using Runtime editor and finding the reflection probe object in CommonSpace and find the light probe component (you may have to go deeper into the object's hierarchy)



Like for the light click on the ReflectionProbe component under Transform which should open the window. After that search refreshmode and set the **refreshMode** to **OnAwake**, this will stop updating the probe and give you your frames back. Again this is not saved to the scene



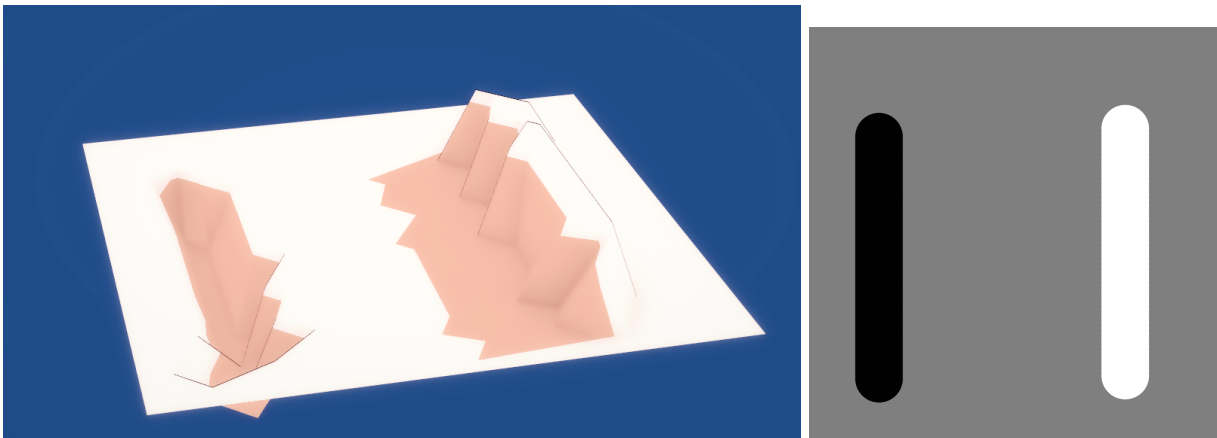


## Displacement

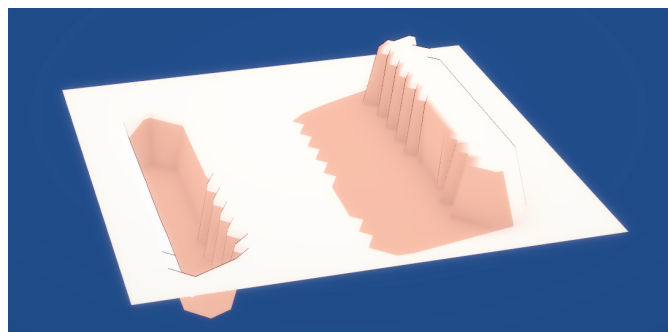
I **HIGHLY** recommend using a 3D paint program for this, it will make your life much easier. Not going to teach you the entirety of blender so look up some tutorials if you're lost.

First off to explain the displacement maps, you can imagine the displacements going from -1 to 0 to 1, black to gray to white

-1 moves it inward, 0 keeps it the same, and 1 moves it upward

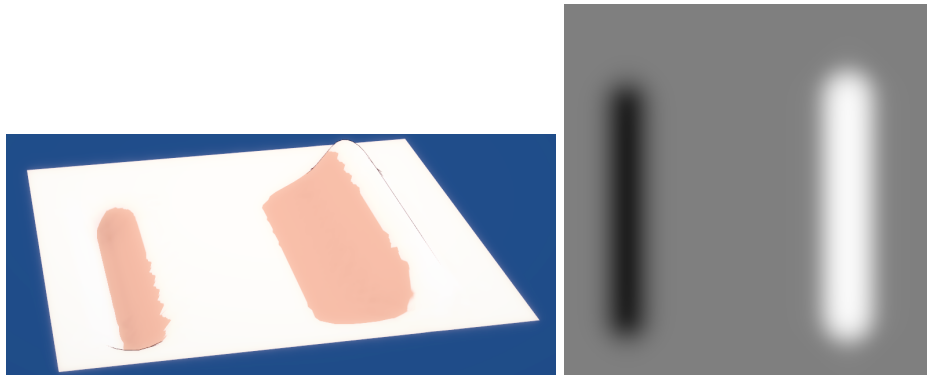


You'll notice it is very jagged, this is because there's not enough geometry you can fix this by messing with the tessellation settings so there's more geometry. If you're lazy just increase TessMin, you can enter values beyond the slider max in Material Editor by typing values in.



Tess Min 30

You'll notice that it's still super jaggy, this is because the displacement map doesn't have a smooth gradient, if we blur the texture we get this.



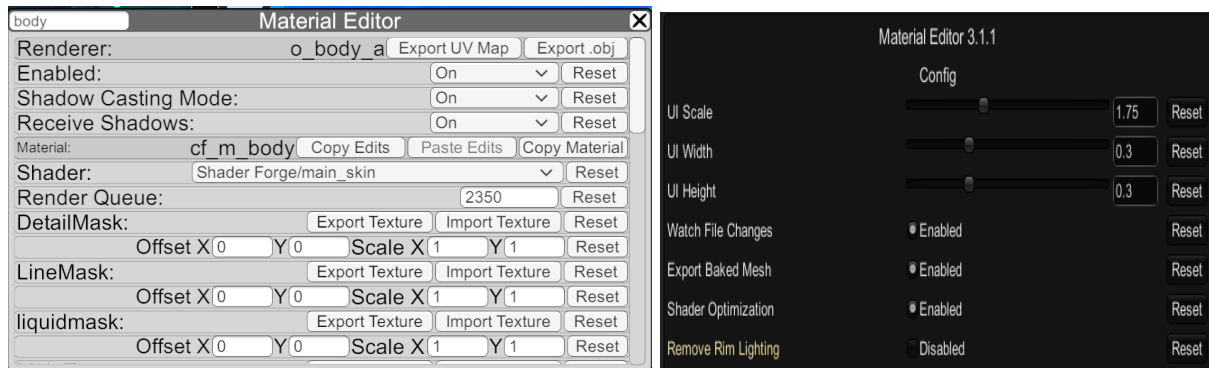
When making displacement maps it's very important to not have hard edges.

### Skindentation

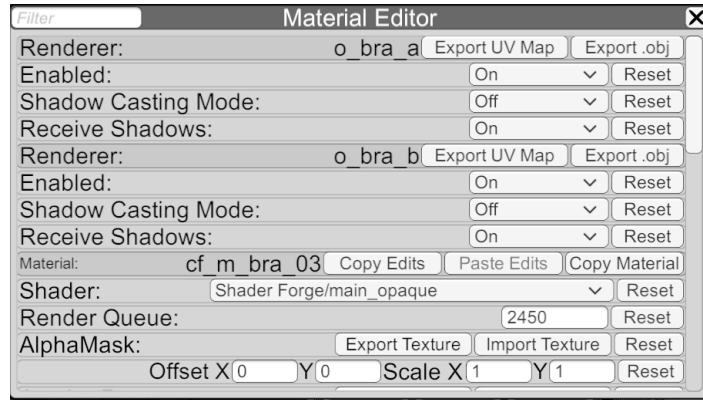
There is a lot of ways to do this, this is the easiest way I've found but there's probably a lot of other ways to do it. I'm going to do this with the triangle bra.

**Note** because you're modifying the body shader it will only work for one outfit unless you load the displacement maps manually.

First you want to export body mesh as an obj, make sure you have **Export Baked Mesh** enabled in your plugin options, and before you export have your character in a T-pose to make it easier



Then export the obj of the bra or whatever clothing you want skindentation with, some outfits hav multiple renderers you usually just want the one labeled `_a`

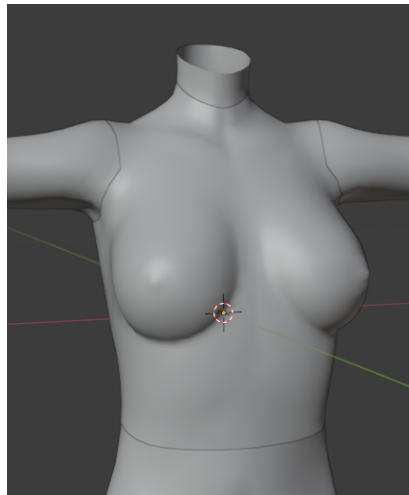


Now open your 3D painter, I'm using blender 2.9 but you can use whatever and import your objects, if your 3D painter only supports one object at a time you can use blender to combine them and export it as one object.

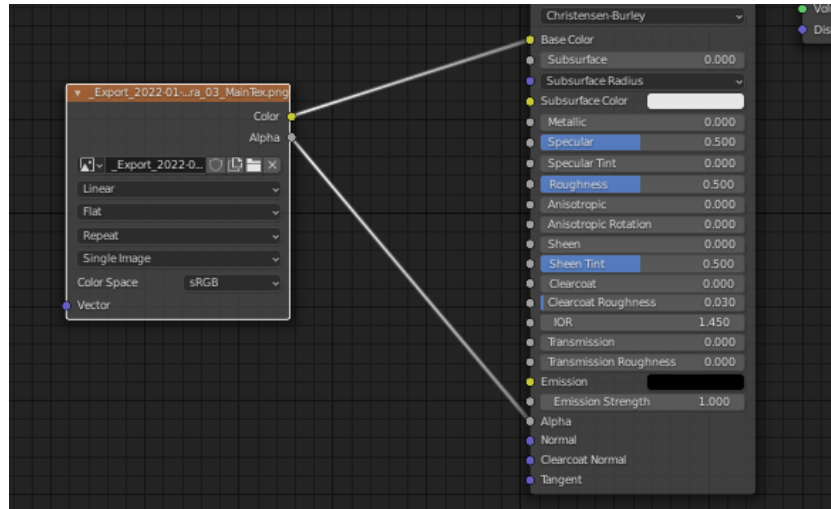
To import an obj in blender go to file -> import -> obj.

*This next step is optional depending on what item you've exported*

You'll notice that the bra imported as a sort of tank top, some of the bras and underwear are like this so you'll need to export the MainTex of the clothing as well



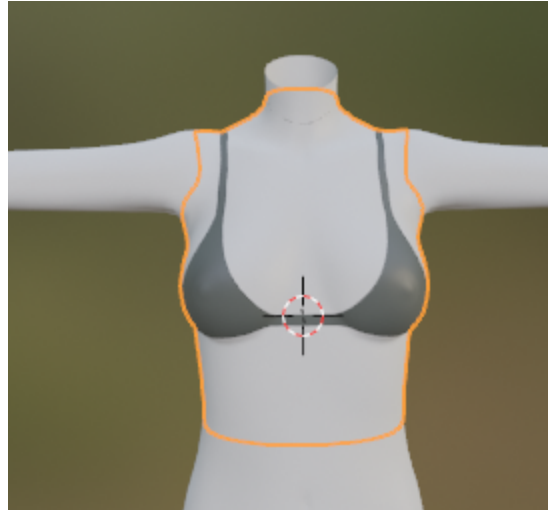
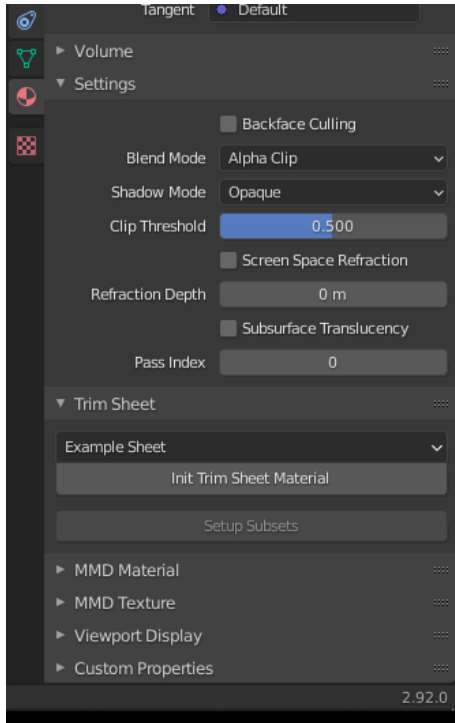
To apply the texture go to the shading tab at the top, select the underwear and in the graph below hit shift+A and search for image texture hit open and find the item's texture. Then wire Color to Main Color and Alpha to Alpha



Now your mesh will look something like this

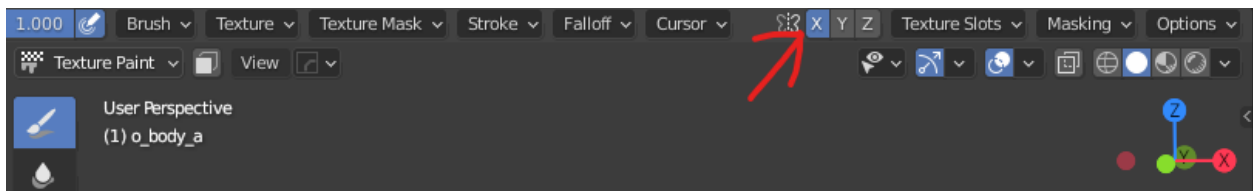


You'll need to set alpha clip in the material properties on the right click on the dotted sphere at the near the bottom and make sure settings is expanded and set the blendmode to Alpha Clip and it should look normal again.



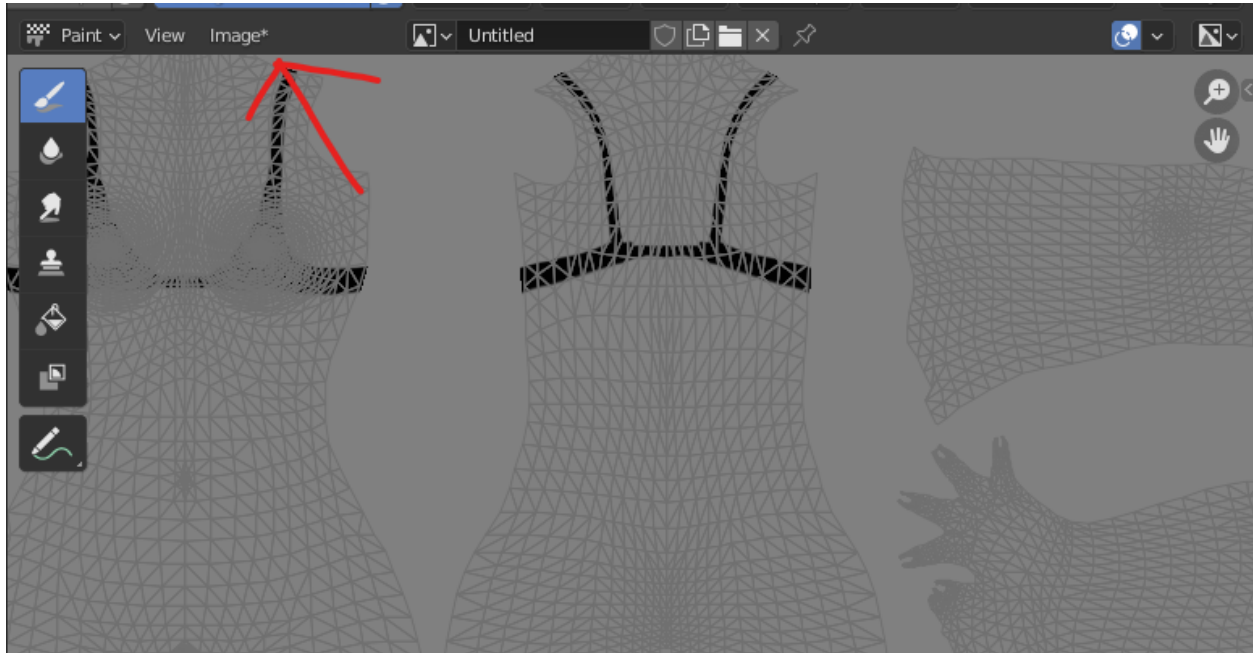
Now click on the body mesh, shift+A and make a new image texture node again. Hit new texture and set the color to **exactly** gray, You can do this easily by setting the HSV's V value to 0.5 and 0 in every thing else.

After you've created the texture hit the texture paint tab to begin painting make sure the body so you can paint on it. Set your paint color to pure black, you can do this in the color picker on the right. To make this easier you can also enable mirror mode in the top bar (you may need to scroll on the bar to see it)

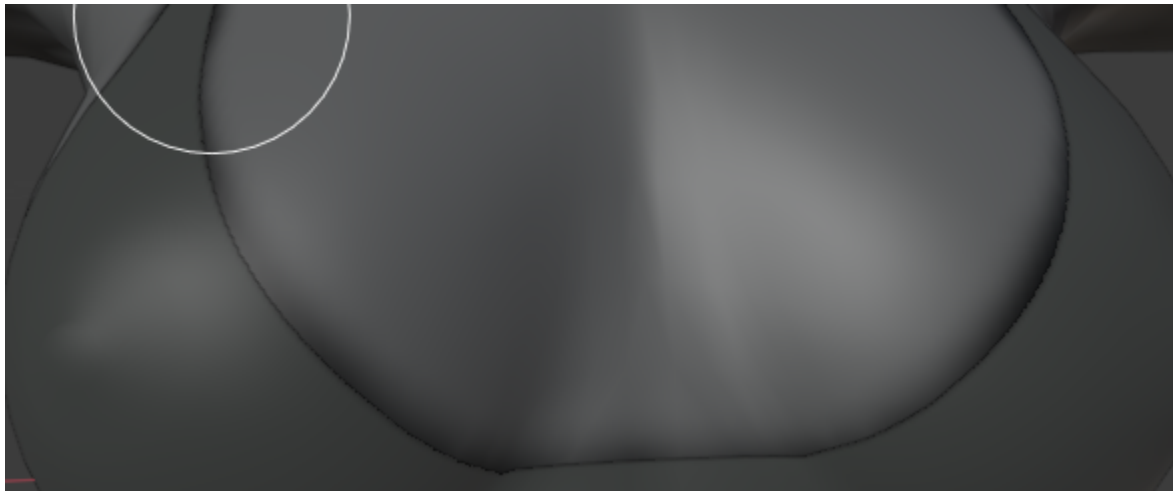


Now just trace the bra, if you hit ctrl+x you can enter xray mode to see where you're painting. You don't have to make it perfect since we will be blurring this afterwards.

**Note:** Blender does not save your images in the project file, make sure you save your image by going to the image tab and manually saving on the left screen/2D view



After you're done you can blur the image either in an image editor or use the soften brush (the water droplet) You want some of the texture to bleed out



Back into Koikatsu, if you haven't already add the tess shader to the body and bra in this case. Add the displacement texture onto the body and then In the bra's material add a pure black displacement texture so we can shrink the entire bra.

Play with the displacement multiplier values in the bra and body to adjust it to your liking, you may need to mess with the texture again.

