

# HIGH POLY TO LOW POLY

There are multiple ways of making a high to low poly; however, I find making it this way easiest.

I will be creating a high poly model for the object's details, then the low poly that will be used in-game. Next, I will unwrap the low poly and make a normal map for it using render to texture. After that I will texture in Photoshop, and bring it into unreal.

Process:

1. High poly
2. Low poly
3. Unwrap
4. Projection
5. Render to texture
6. Photoshop (texturing)
7. Unreal

1. Make a high poly model.
  - Unreal works best with polygons of fours vertices, but this can be ignored.
  - It's all about edge flow; hold the ctrl key down to get rid of vertexes when removing them.
  - The high poly is only for details, it doesn't matter how many polys it has.
2. Make a low poly model around the high poly.
  - add chamfer to the sides of the object to make it have smooth edges
  - Make it slightly bigger than the high poly. The projection modifier will project outwards from the high poly onto the low poly's unwrap.
  - You can model individual pieces with the low poly. You need to "attach" the pieces together and make it a single group.

- To check for object stats press 7. It depends on the object over how many polygons it can be. Complex models have more polygons than easy objects. It's all about edge flow, if there's no purpose for a segment than remove it.
  - Make sure it's not touching the high poly model.
  - If a model is done by primitives (shapes) then it's concluded as a low poly.
  - ALT X for x-ray mode
3. Using the low poly model around it, duplicate it and call it "**UCX\_name**". Unreal registers this as collision. Then you want to hide it.
- You can use multiple collisions as long as they are "attached" to each other.
  - Not all objects need collision, only the ones that will be affecting game play. If it's in the background and the player isn't going to interact with it, leave it without collision. Collision affects frame rate.
4. Once you are done creating the low poly, you need to unwrap it. Add an **unwrap** modifier and click **edit**. Next chose choose **mapping** and press **flatten mapping**. Keep it at default (face angle thresh hold 45.0, spacing 0.02.)
- Unwrapping is easy even with hundreds of pieces. The process is making groups of recognizable pieces, so it's easier to texture. Also you need to try and hide the seams (bold light green lines).
  - Right click to stitch and break pieces. With the "edge mode" selected stitch other pieces together to make recognizable groups. The objective is to hide the seams as much as you can while making groups of recognizable data. If you want to change a piece, "break" the piece in "poly mode".
  - Try and hide the seams under or between places on the model so the player can't see it. However, if you can't hide it, it doesn't matter, unless if the seam is visible.
  - Only add the pieces that the player will be seeing, into the square area. Pieces that the player can't see can be left out.
  - Make sure you make the unwrap in one direction so you know the direction the texture will apply to the model.
  - Scale the pieces together to prevent texture stretches and size issues.
  - For n00bz
    - "Stitch" puts pieces together and "break" breaks them apart. After flattening the maps into pieces, select the "edge" mode in the tab bellow the work area. Right

- click on “Stitch” to put together pieces into recognizable groups, and select “poly” mode and right click “break” to separate them.
  - o Work in the “perspective” view port on the main interface, and work inside the unwrap editor to get an idea what you are doing.
  - o Select all the pieces and drag them outside the square. The pieces that are pieced together, place them back inside the square.
  - o You’re trying to hide the seams (bold green lines).
  - o If you get an odd connection while stitching, just hit undo and select one edge.
  - o Don’t half ass the job, because it could come back to get you. (one mistake can make you redo the process over)
  - o Think about unwrapping as a puzzle game. Stitch and break to get the perfect groups of pieces for texturing later. With practice, it becomes a fun and easy process (depending on how complex the model is.).
- 5. Next, you need go to “tools” and click “Render UVW Template” set the object 1024x1024; or 1024 x2048 if it’s a rectangle. Leave the rest as default. (this step is critical) All textures must be made in powers of two. Next “Render UV template”; save to a desired location, and chose **Bitmap** as the file format. (we are going to take this into Photoshop later)
- 6. Add a “projection” modifier. Go to “Reference Geometry” chose **pick** or **pick list** and add the high poly model. Next go to “Cage” and check “shaded”. Then “push” the “amount” out a little.
- 7. Now the fun crap. Press 0 for “Render to Texture” (Rendering tab, and select Render to Texture). Go to “Render Setting” under General Settings, and click on “Setup”. Go to the bottom in the “Common” tab and “Assign Renderer”. In Production chose “Mental Ray” (make sure you are not using any materials; all materials must be at default) Next go to the “Render” tab, in “sampling quality” change the “Samples Per Pixel” to **Min 4 (or ¼)**, and **Max to 16**. Then close out of the window.
- 8. Back to the Render to Texture window. Go to “Selected object settings” and check “enable” Next go to “Projection Mapping” check “enable”. Make sure it says “projection” in the tab next to enable. In the “Options” menu (if you want), you can check **Ray miss check** to see if you have any errors (all errors or holes will appear in red, and make sure you turn it off in your final render). Go to “Mapping coordinates” in the Render to Texture window. Select “Use Existing Channel” for both Object and sub object. After that go to “Output” and “Add” any maps you need. Preferably Normal map and ambient occlusion (you can use ambient occlusion for test). In **Selected Element Common Settings** use **1024 x 1024** for sample and **2048 x 2048** for final. Next go to “Select element unique settings” and select “output into normal map”. Then close the render

tab and re-open it. Go back to “**Select element unique settings**”, set the samples to 32, but for final set it to 64.

9. NOW **RENDER!!!** What you see in the final render window isn't the map you're looking for. The maps you are looking for is where ever it was saved. You can preview the occlusion map, or bump map by adding them in the material editor under maps. (Put occlusion into diffuse and make sure when adding your normal to set bump to 100%). It's ok if it looks bad; as long as you get the desired maps you're in the right path) Now that the hard part is done, it's off to Photoshop!
10. Open **Photoshop** and bring in the Unwrap from step 5. It's supposed to have black with green and white lines. Many people use different methods of texturing; however, mine is the easiest. Double click the layer to unlock it. Then simply go to **Image, Adjustments, and Invert** (or ctrl I). Add a **new layer** and start texturing! (keep in mind how you did your unwrap) Also you can tweak your normal map. Not every render is perfect even if it's done correctly; usually the final results are edited in Photoshop.
11. When you are done save it as a **Targa** file with **32 bits/pixel**. This will be your Diffuse map (since the size of the unwrap is in powers of two it'll be easy getting it into unreal) Usually an object has 3 properties when bringing it into unreal a diffuse map, specular map, and a normal map. The diffuse acts as the main texture, the specular is a grey to black texture for reflections,
12. Go back into 3ds Max and place your new texture in the diffuse map in the material editor. See what the object looks like. If you're not satisfied you can always go back and tweak the texture.
13. Now remove the material from the object (and projection modifier) and save the model. Go to “**Export**” and export it as an **ASCII scene export** (.ASC). Make sure the first 3 options are checked, but I would check them all just to be safe. (it's a common mistake when Unreal refuses an object or the material references to the object)
14. Now Open **Unreal** or **UDK** and create a new package (or open one that you already have). Left click on the package and click import (or select the import button) Import the ASC file and then import the textures. To apply the materials to the object you have to create a material. You can do this by right clicking the empty space inside the editor and selected **new material**. Open the material editor and select a texture you want to open in the generic browser. After it highlights, go back into the material editor and scroll down the list to **texture sample**. Drag out the texture sample and the texture from the generic browser will appear inside the square. Link that with the channel you want with the material. Do the same with all the other textures. After you are done save using the green check mark, and open the object in the generic browser. In the objects menu, go to the objects properties and click the **LOD** properties. Click down from all the settings to

where it says material. Select the material you have created in the generic browser and go back into the object properties and add the material. If everything is done correctly the model should have the textures applied correctly. And Done!