

# **Полигональный моделинг в 3dsMax**

# Моделинг

## Hi Poly

Концептуальный

Классический

## Low Poly

Начинаем

с полигона

Начинаем с

примитива

# Hi Poly

## Концептуальный путь

1. Концепт + Анализ
2. Скульпт
3. Ретопология
4. UV Mapping
5. Трансфер (перенос данных на Low-Poly)
6. Текстурирование и настройка материалов (визуализация)
7. Постобработка.

# Классический путь

1. Концепт
2. Сбор информации
3. Определение стиля
4. Анализ самого объекта
5. Упрощение

# Этапы классического пути

Создание базовой упрощённой модели (болванки).

Первичная детализация

Крупные детали. (Базовые элементы).

Обработка финальной формы.

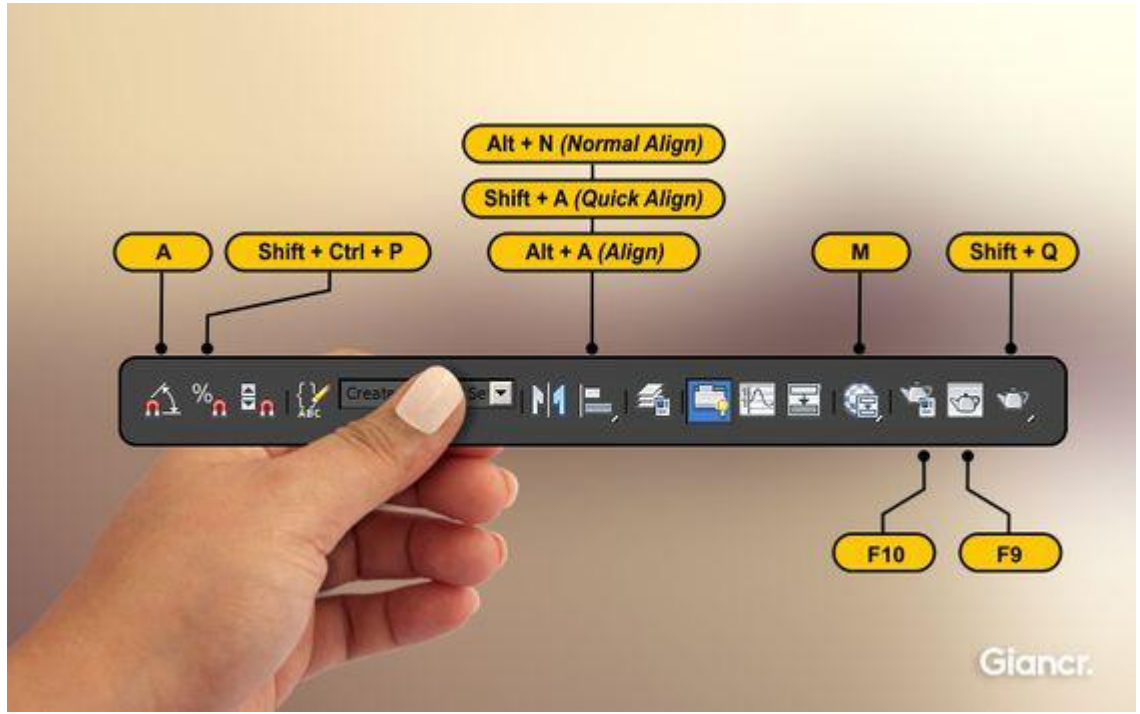
Финальная детализация:

1) 1я итерация сглаживания (4x)

2) Мелкие детали

3) Финальное сглаживание

# HotKeys





1

Ctrl + PageDown

Ctrl + PageUp

Shift + R

Shift + E

Shift + Ctrl + C

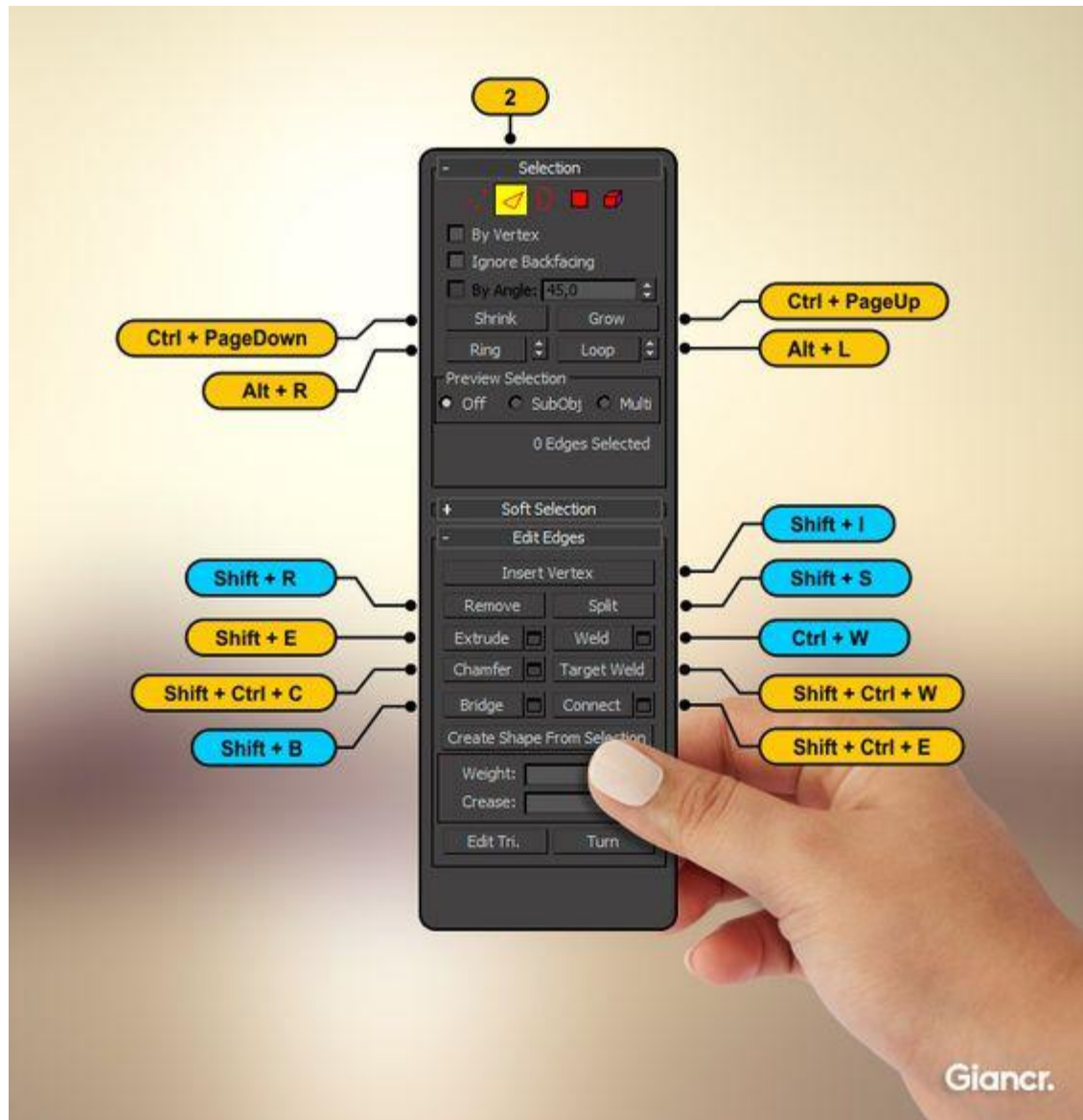
Shift + K

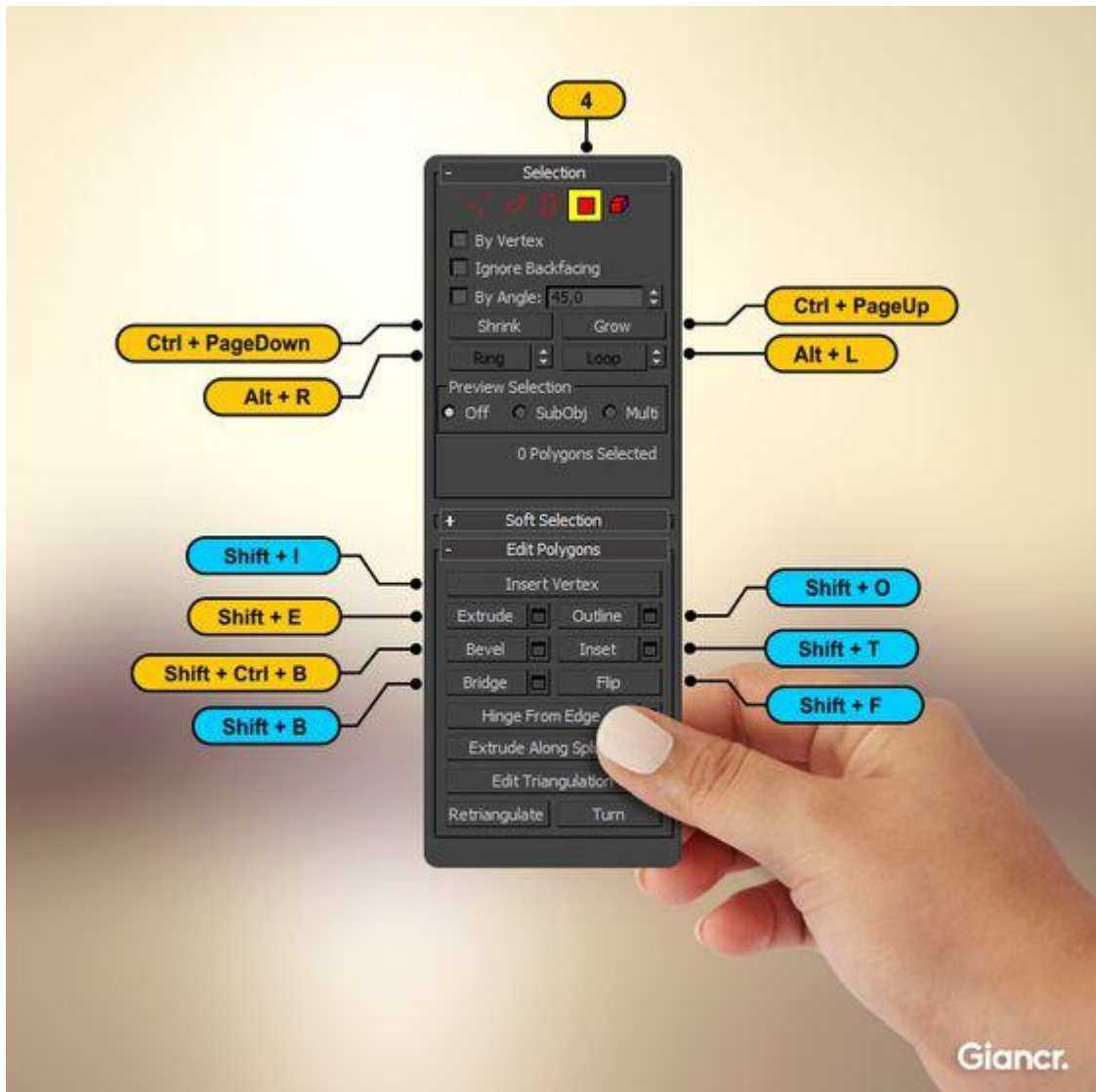
Ctrl + W

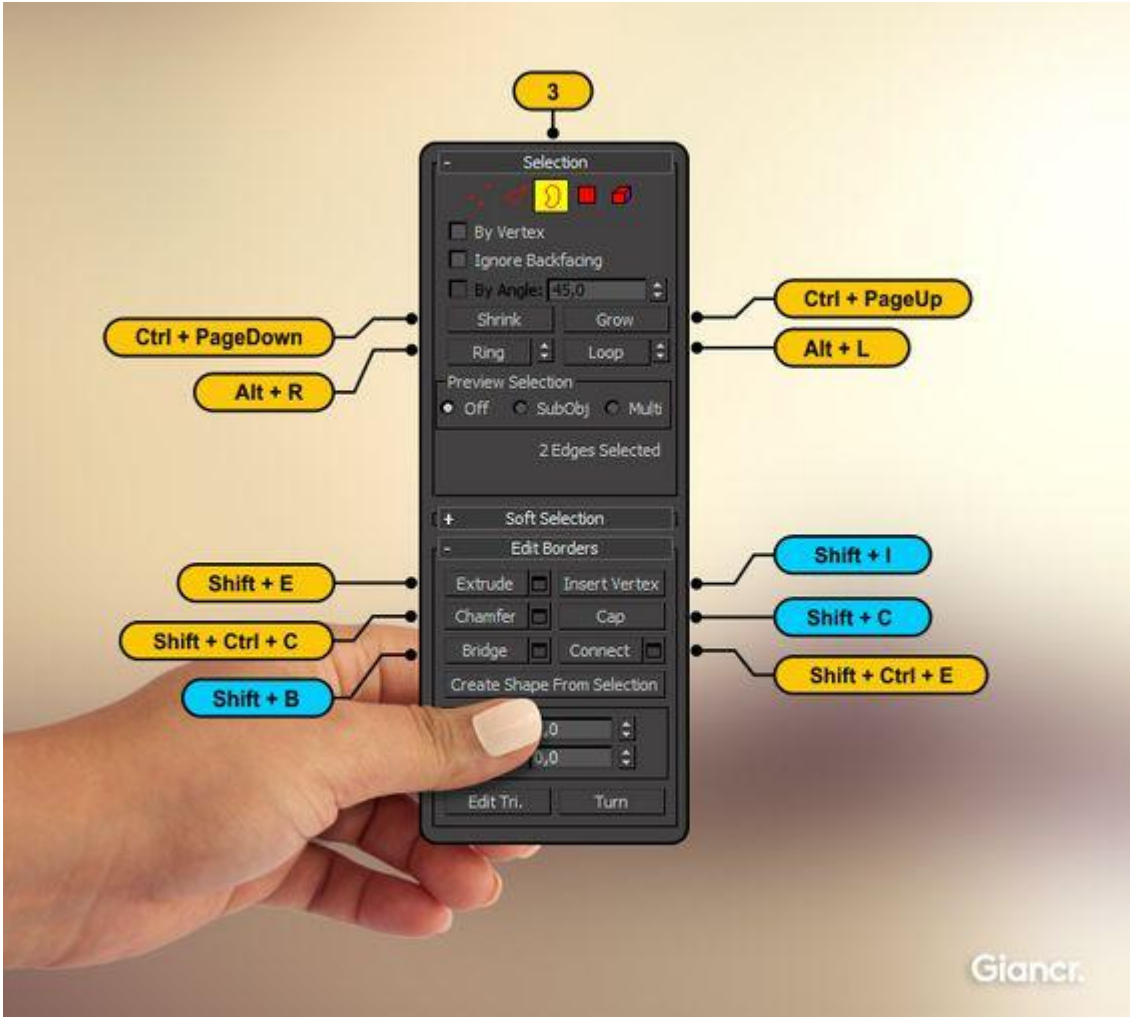
Shift + Ctrl + W

Shift + Ctrl + E









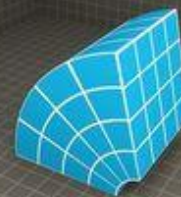


# Модификаторы

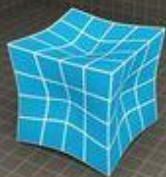
# 3Ds Max Parametric Deformers



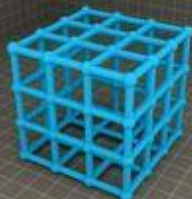
affect region



bend



displace



lattice



mirror



noise



push



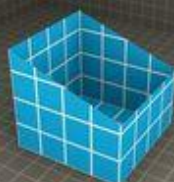
relax



ripple



skew



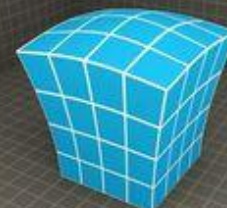
slice



shell



spherity



squeeze



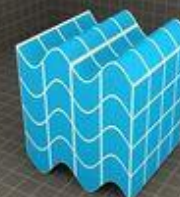
stretch



taper



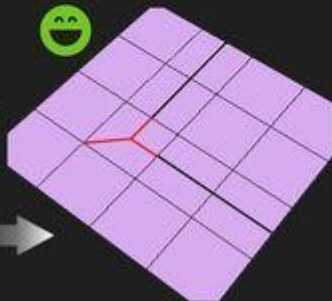
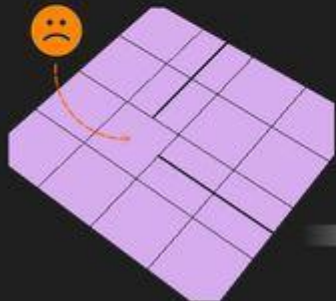
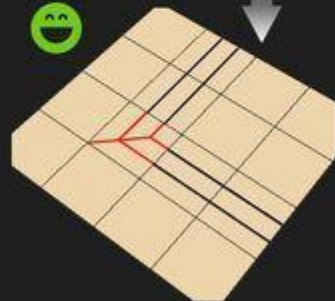
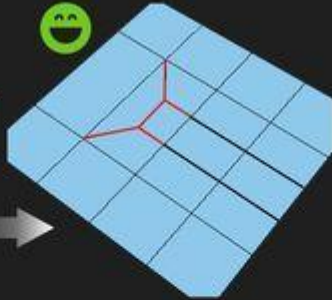
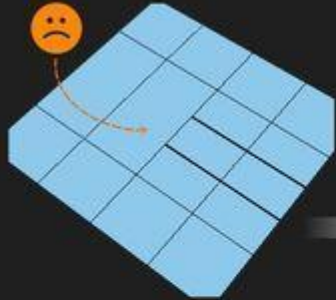
twist



wave

# Полигональный моделинг

Giancr.com



Giancr.com



# Polygon Table for 3D Modeling v0.4

Different mesh configurations within the same boundary

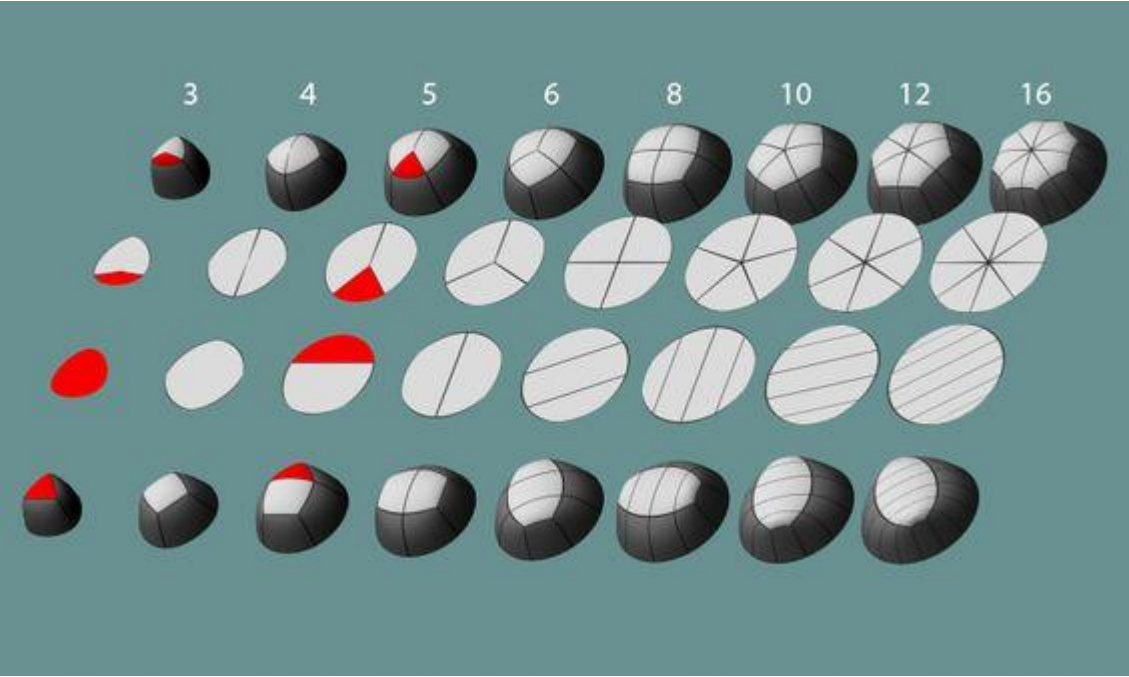
Boundary's Vertex Number	4	5	6	8	10	12	$n$ (Extrapolation)
<b>Central Division</b>							Subpatch Sharp Edges Calculation Each Subpatch Edge needs more than two hold edges to be sharp. So it's a total of three edges per edge. $n - 3 \times$ Enclosed Polygon Vertex No.
<b>Parallel Division</b>							Result in a Triangle $n - 2 \times + 1$ Result in Odd Quads $n - 4 \times$ Result in Even Quads $n - 4 \times + 2$
<b>Grid Division</b>							Result in a Triangle $n - 2 \times + 1$ Result in Even Quads $n - 2 \times$
<ul style="list-style-type: none"> <li><span style="color: blue;">■</span> Quads</li> <li><span style="color: green;">■</span> Squares</li> <li><span style="color: red;">■</span> Triangles</li> <li><span style="color: grey;">■</span> Standing on Element</li> <li><span style="color: black;">■</span> No Vertices</li> <li><span style="color: grey;">■</span> No Polygons</li> </ul>	Central Two Quads sharing two edges. Two FourpointTris.	Odd Boundary's Vertex numbers result in a triangle.	Central The Edge Pole.	Central Mirrored Flow. Lowest number for round meshes.	Central The Edge Pole.	Central Enclosed Square with mirrored flow.	$n$ - Boundary's Vertex Number $2 \times$ - Multiple of 2 $4 \times$ - Multiple of 4 $e$ - Edge Number

## Linear Stepping

A small example of flows resulting of adding different Edge Loops to simple Stepping Elements.

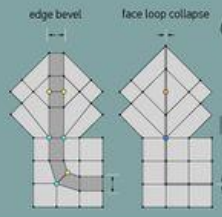
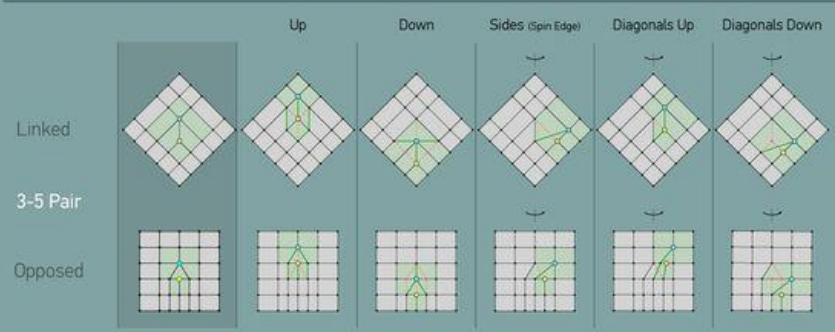
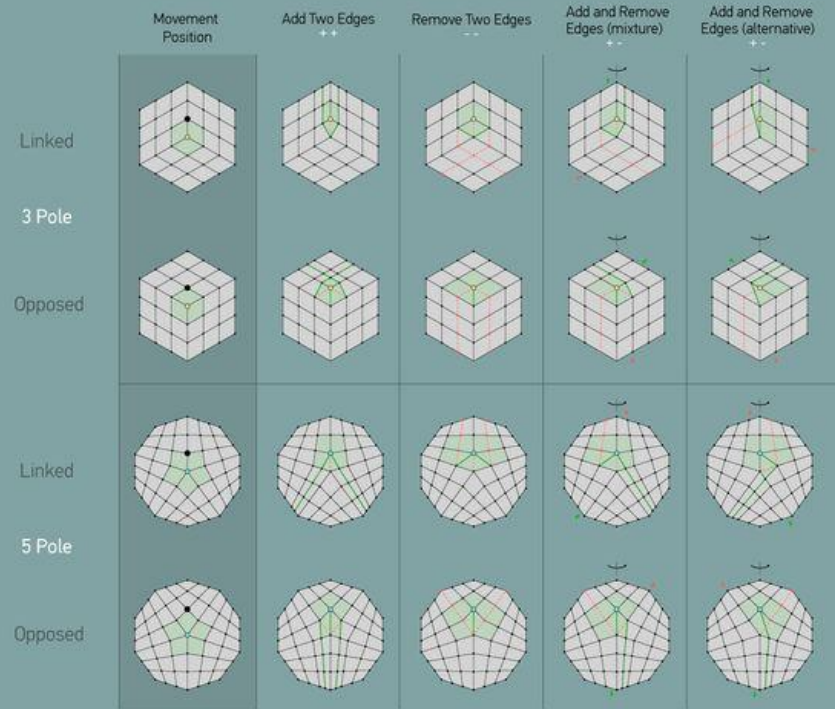
Boundary's Vertex Number	4	5	6	8	10	12	$e$ (Extrapolation)
<b>Odd Step Amounts</b>			Odd Step Amounts result in a triangle inside the margins. This is something to take in account in the whole process of stepping, since a bad connection or division may lead to this.				
<b>FourPointTriangle</b> Adding Link Loops only for Constant Step Amount of 2		Best method for straight flat steps. All other methods create vertices between margins.					No vertices causing pinching between margins. Tough, there will be pinching on the margin. If it troubles, add an Edge Loop between the margin and the stepping to hold the mesh.
<b>Trapezium (works in pairs)</b> Adding Link Loops only for Constant Step Amount of 2		Stable flow, with vertices between margin to shape the mesh.					The placing of Link Edge Loops in or out of the pair of Trapeziums, control the amount of vertices between margins.
<p><b>Stepping Structure</b></p> <p>Stepping Elements  <span style="color: orange;">■</span> FourPointTriangle <span style="color: blue;">■</span> Trapezium</p> <p>More Edges Margin (M) <math>M - L = \text{Step Amount}</math>          Less Edges Margin (L) <math>\frac{M}{L} = \text{Step Factor}</math></p> <p>Edge Loop Types  <span style="color: blue;">■</span> Close Loop <span style="color: green;">■</span> Link Loop</p> <p>Basic Flow, Plus Edge Loops to control Stepping's Amount and Factor.</p>		For modeling between margins there are many solutions, depending of the desired flow. Here are some examples but the possibilities are infinite.					 Link and Close Edge Loops  Link and Close Edge Loops  Close Edge Loops increase the Step Amount and Factor
							<p><b>Random Example of Combining Steps</b></p> 

Many times it's easier and better to divide the stepping operation in small ones. So there is more control of each area's shape and the mesh gets easier. Divisions might create two Odd Step Amounts from one Even Step Amount, so they have to be well placed.



# Moving Poles v0.2

Examples of modeling procedures to change Poles' location



What to expect from (Linked) vertices Merge and Split operations

4 + 4 = 4

3 + 3 = 2

5 + 5 = 6

5 + 3 = 4

A + B - 4 = C (In All-Quads 4 is baseline)

For single Poles the procedure requires global changes in topology by adding and/or removing edge loops.

To diminish that effect one can try to operate across symmetry lines or dump the changes to occluded areas, holes or N-Gons.

For pairs of 3-5 Poles the procedure is quite easy and changes are only local.

Some procedures can be also applied across the Mirror Axis, which is always vertical here for easy display purposes.

144 tris      94 tris



80 tris      60 tris      40 tris



184 tris      114 tris

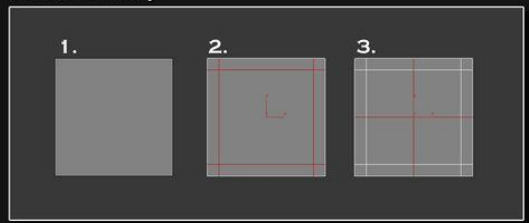


optimisation examples  
muz

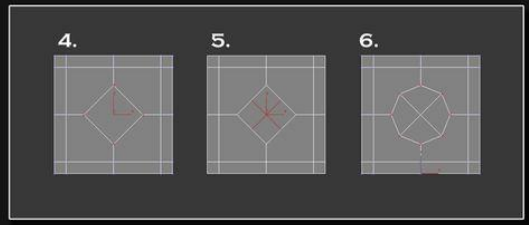
# Cutting Holes Into Meshes

seanvangorder.wordpress.com

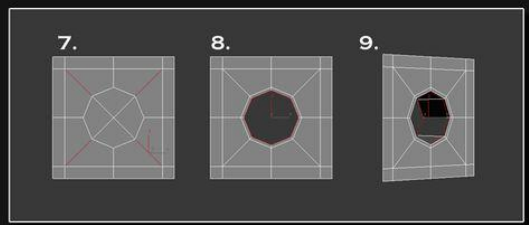
## Flat Geometry



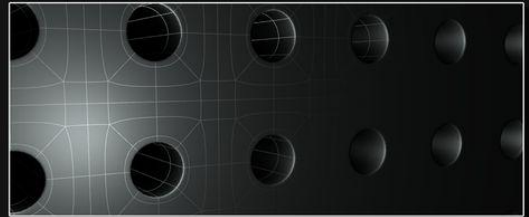
1. For the sake of demonstration I will be using a simple plane. This method can be applied to any flat surface on objects of any complexity.
2. Begin by adding supporting edges in which the hole will be created. This step is not absolutely necessary, but it will help avoid subdivision problems later on by keeping inset edges away from the borders of the flat surface.
3. Use "Connect" to add two perpendicular edges crossing through the center of where you want the hole to be.



4. Select the center vertex created in the last step and use "Chamfer" to create a square.
5. Use "Connect" to create perpendicular edges in the square.
6. Select the eight vertices on the border of the square and apply a "Spherify" modifier to round the edges. Collapse the modifier.



7. Use "Connect" to create edges between to preserve quads around the hole.
8. Select the four inner faces and use "Inset". Then delete the faces. This creates a supporting edge for subdivision.
9. Select the center border, hold shift, and drag out another edge. Do this twice to create a supporting edge for subdivision. Add a "TurboSmooth" modifier.

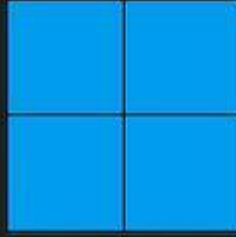


Final result, duplicated and welded together with a turbosmooth modifier applied.

3



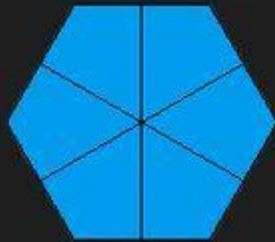
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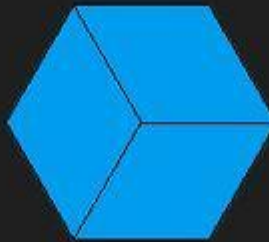
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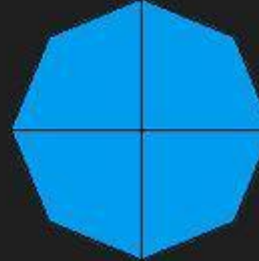
6



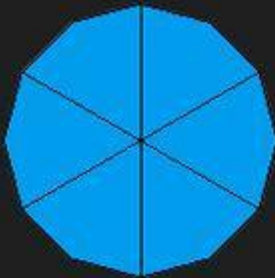
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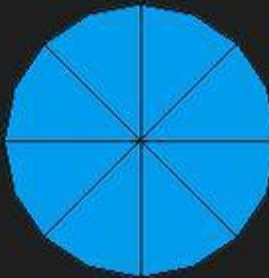
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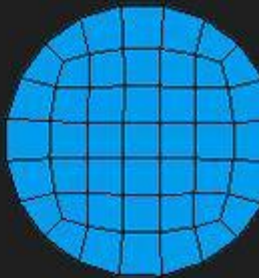
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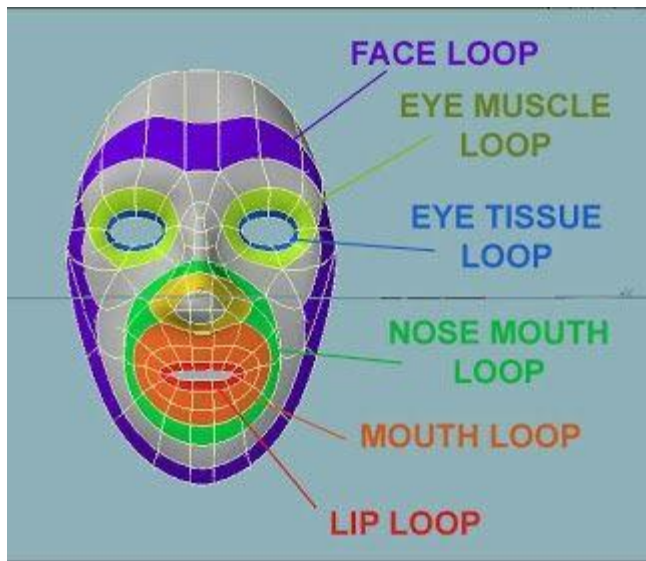
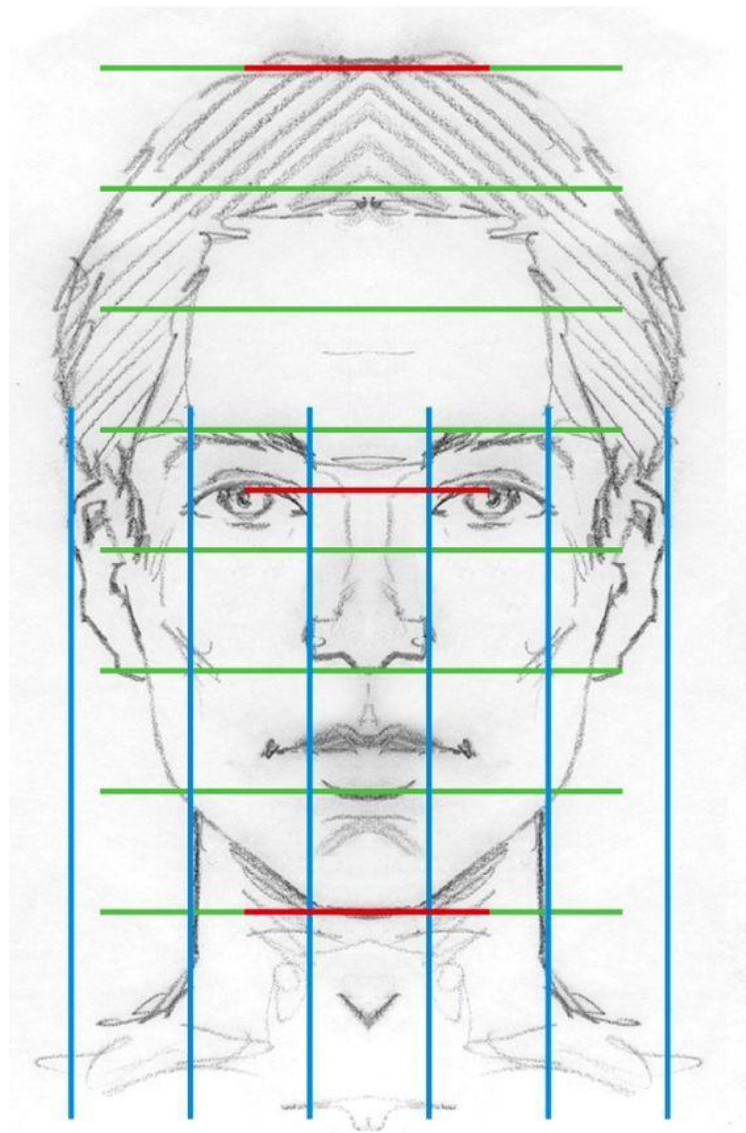
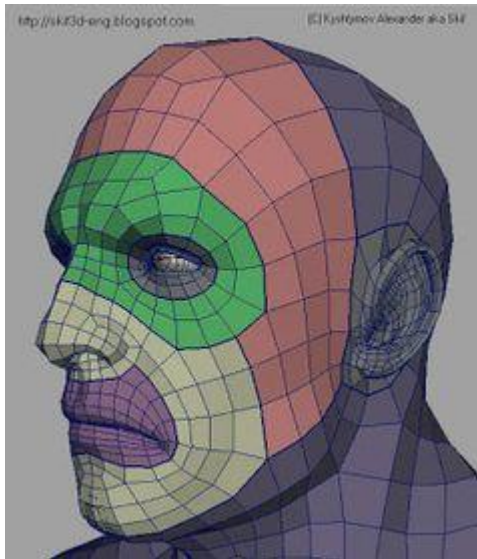


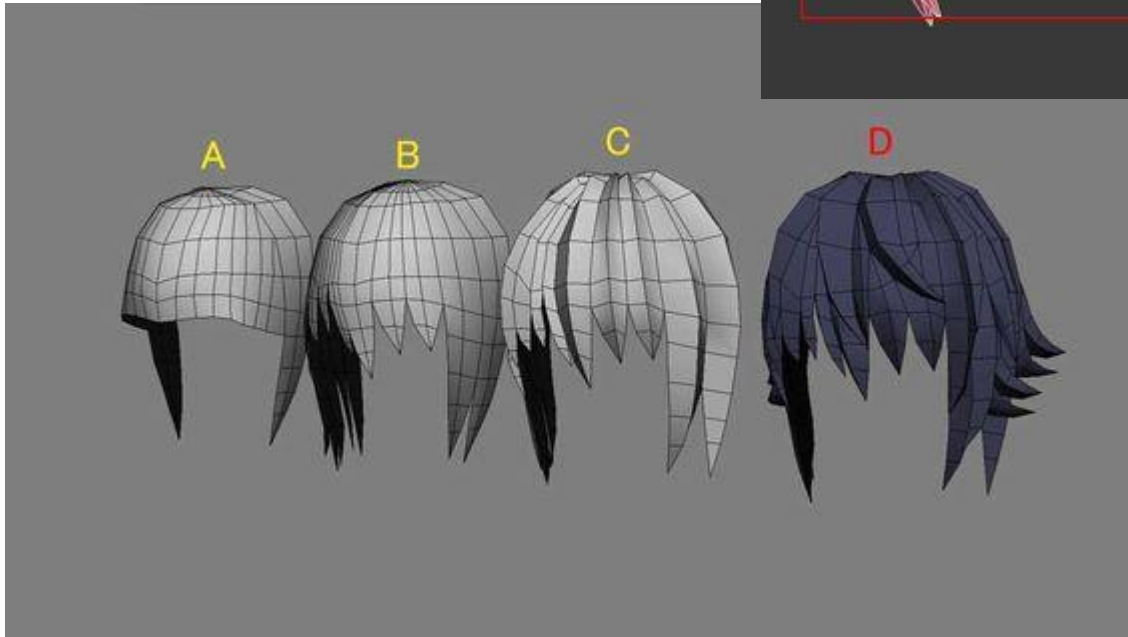
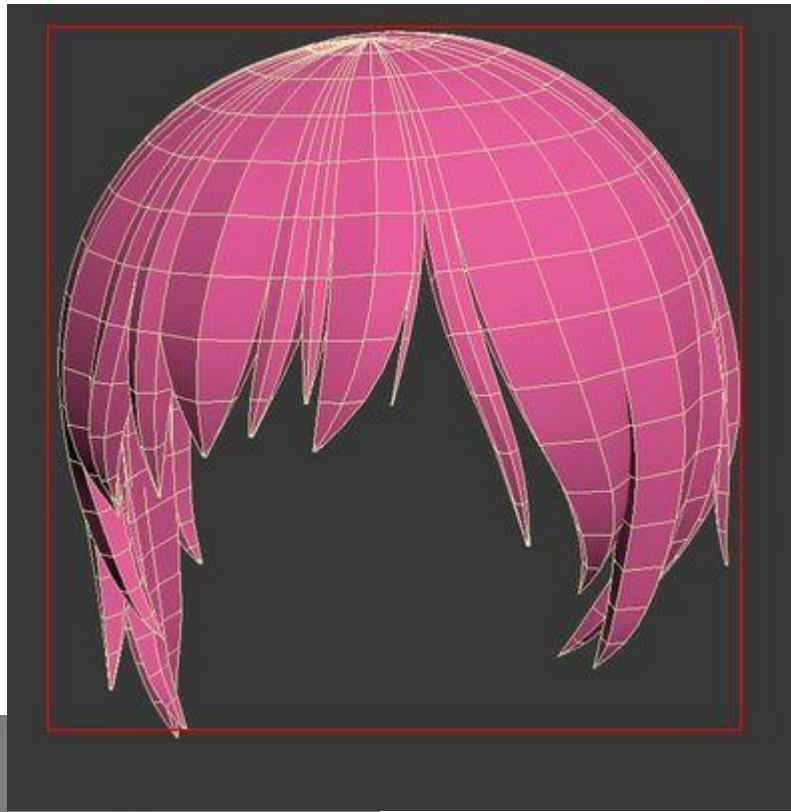
16



20

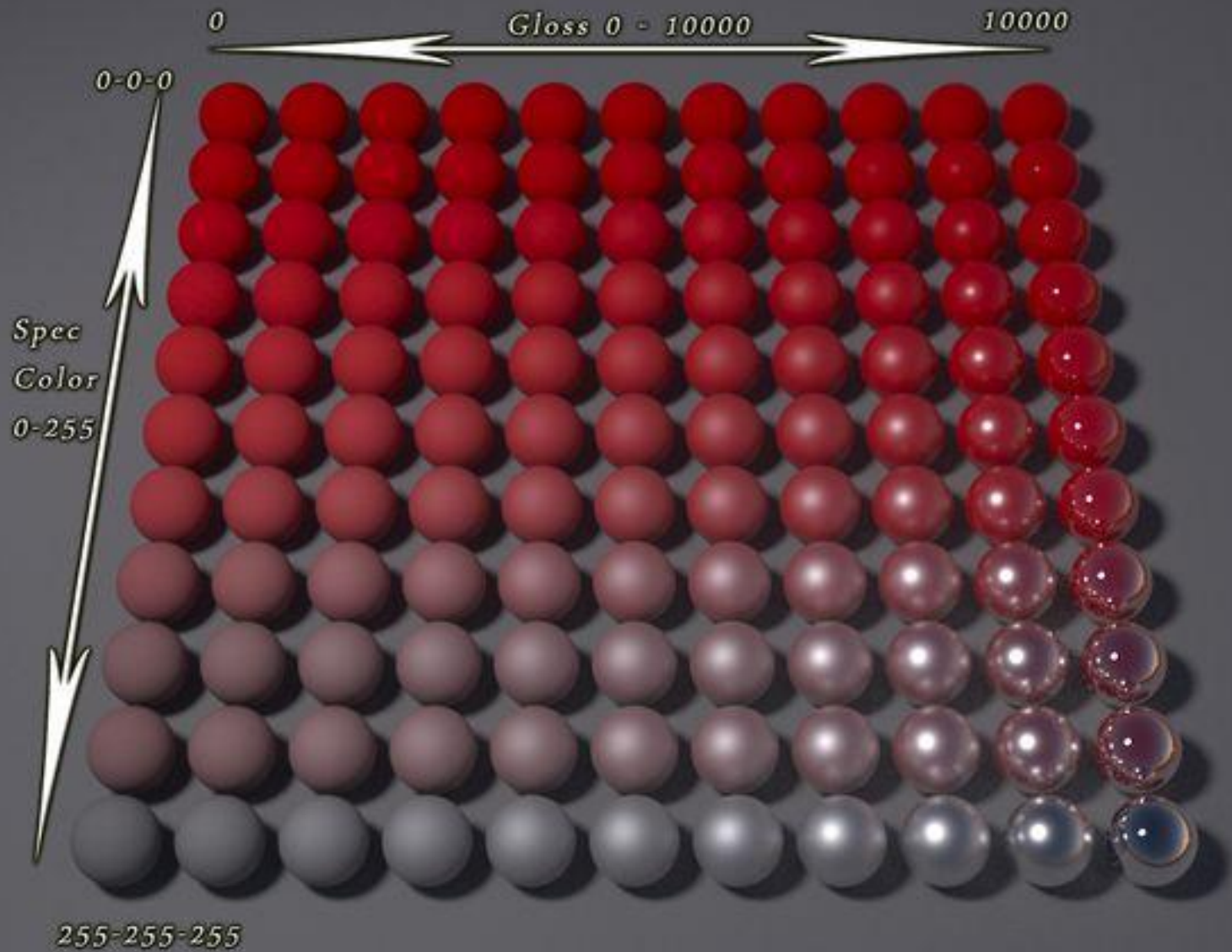






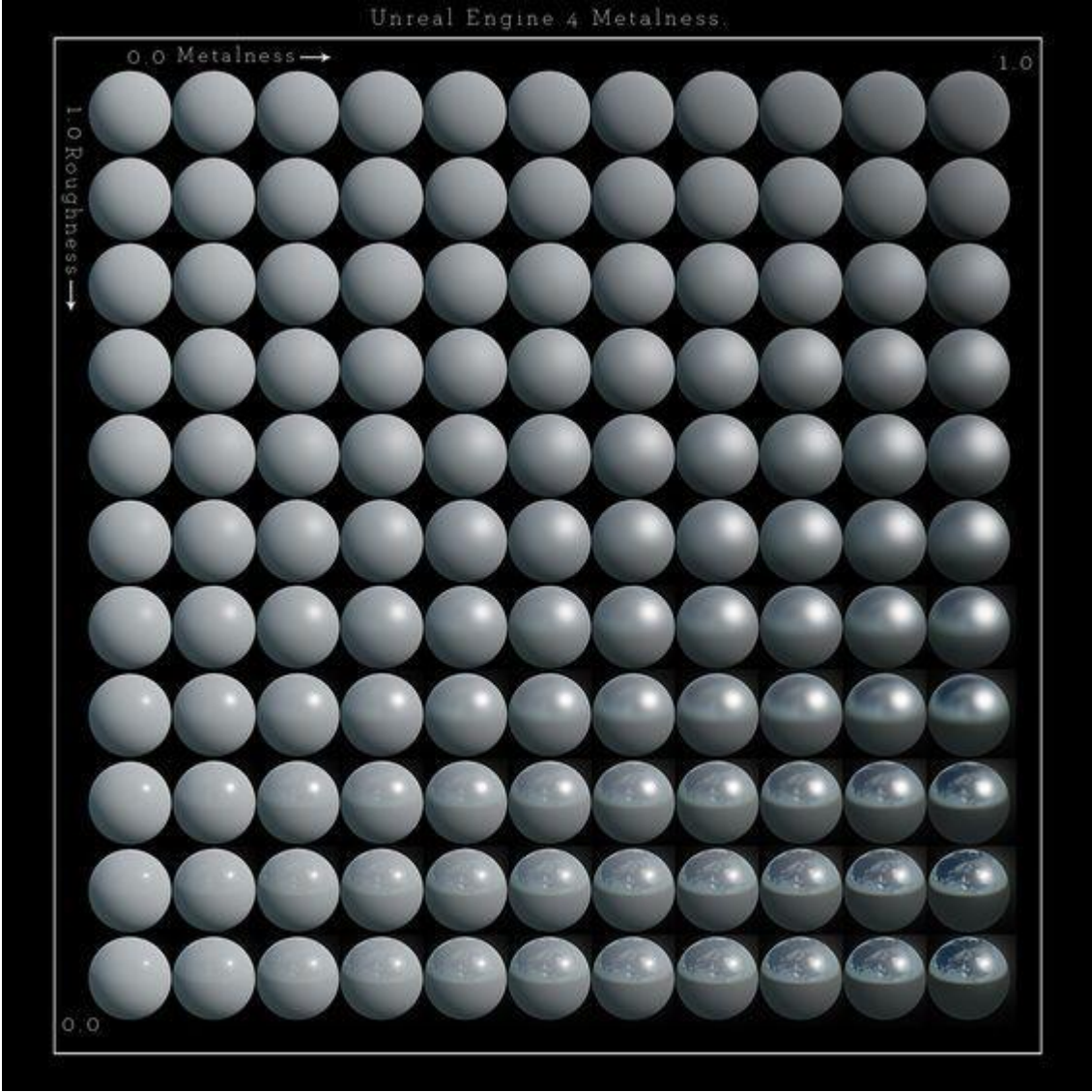
*Specular Color vs. Gloss Guide*

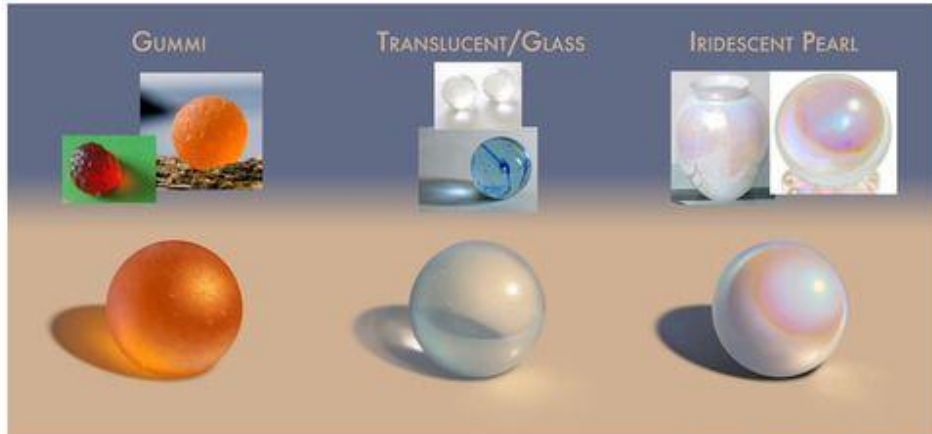
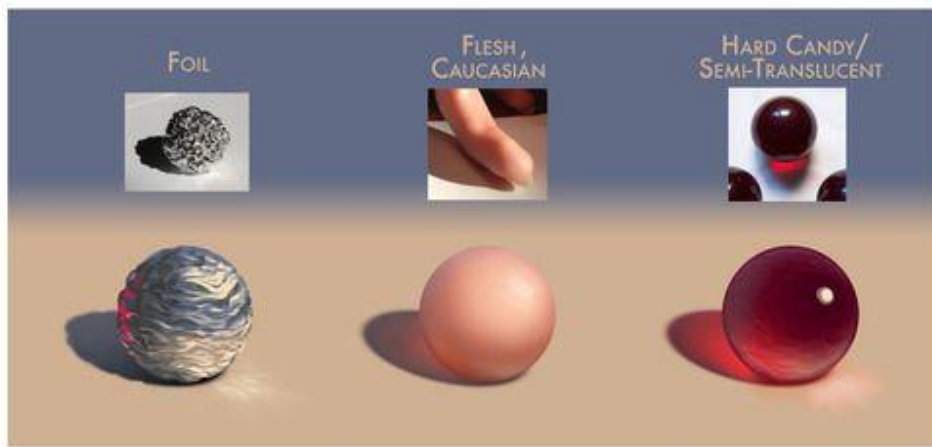
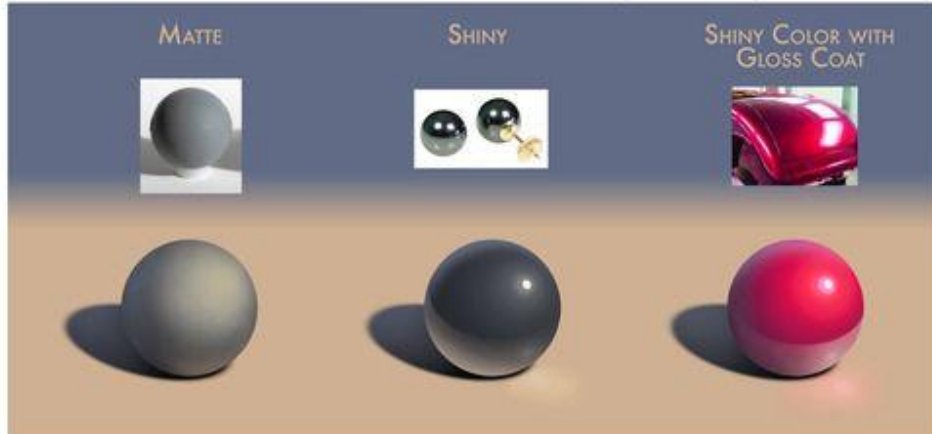
*Diffuse Color 220 - 0 - 0 (Red)*



*255-255-255*







# GOLD

MATERIAL STUDY



GOLD

DIFFUSE 0%

SPEC 100%

GLOSS / SPEC ROUGHNESS



GOLD ROUGH

DIFFUSE 0%

SPEC 100%

GLOSS / SPEC ROUGHNESS



GOLD PAINT

DIFFUSE 0%

SPEC 100%

GLOSS / SPEC ROUGHNESS



GOLD PAINT CRACKED

DIFFUSE 0%

SPEC 100%

GLOSS / SPEC ROUGHNESS



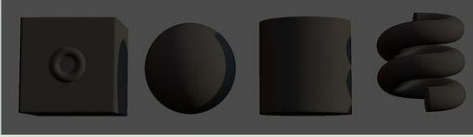
GOLD FOIL ROUGH

DIFFUSE 0%

SPEC 100%

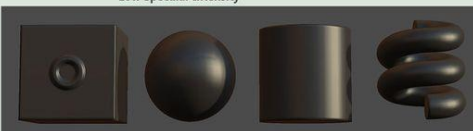
GLOSS / SPEC ROUGHNESS

Diffuse Only

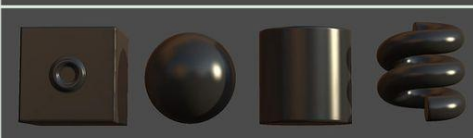


Low Specular Intensity

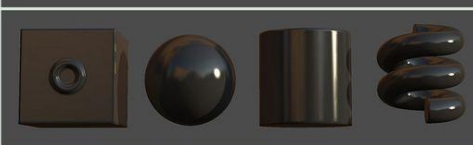
Low Gloss



Med Gloss

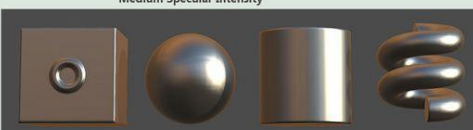


High Gloss

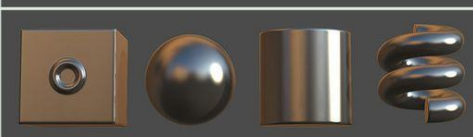


Medium Specular Intensity

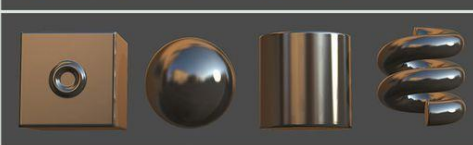
Low Gloss



Med Gloss

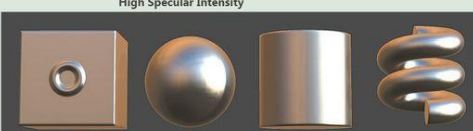


High Gloss

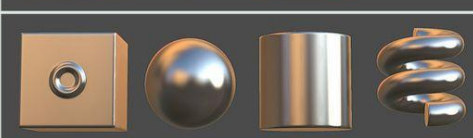


High Specular Intensity

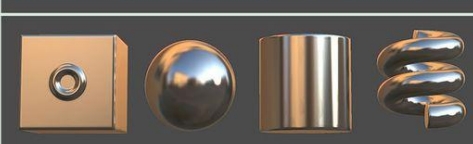
Low Gloss

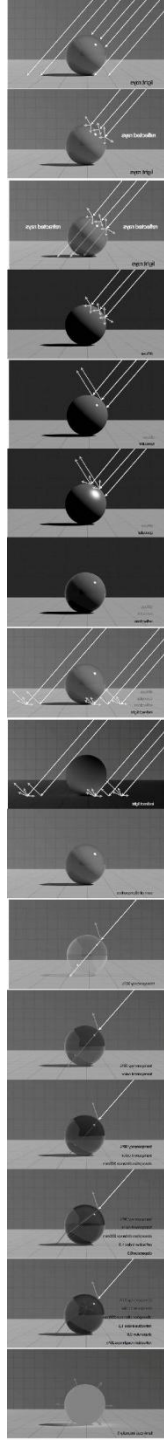


Med Gloss

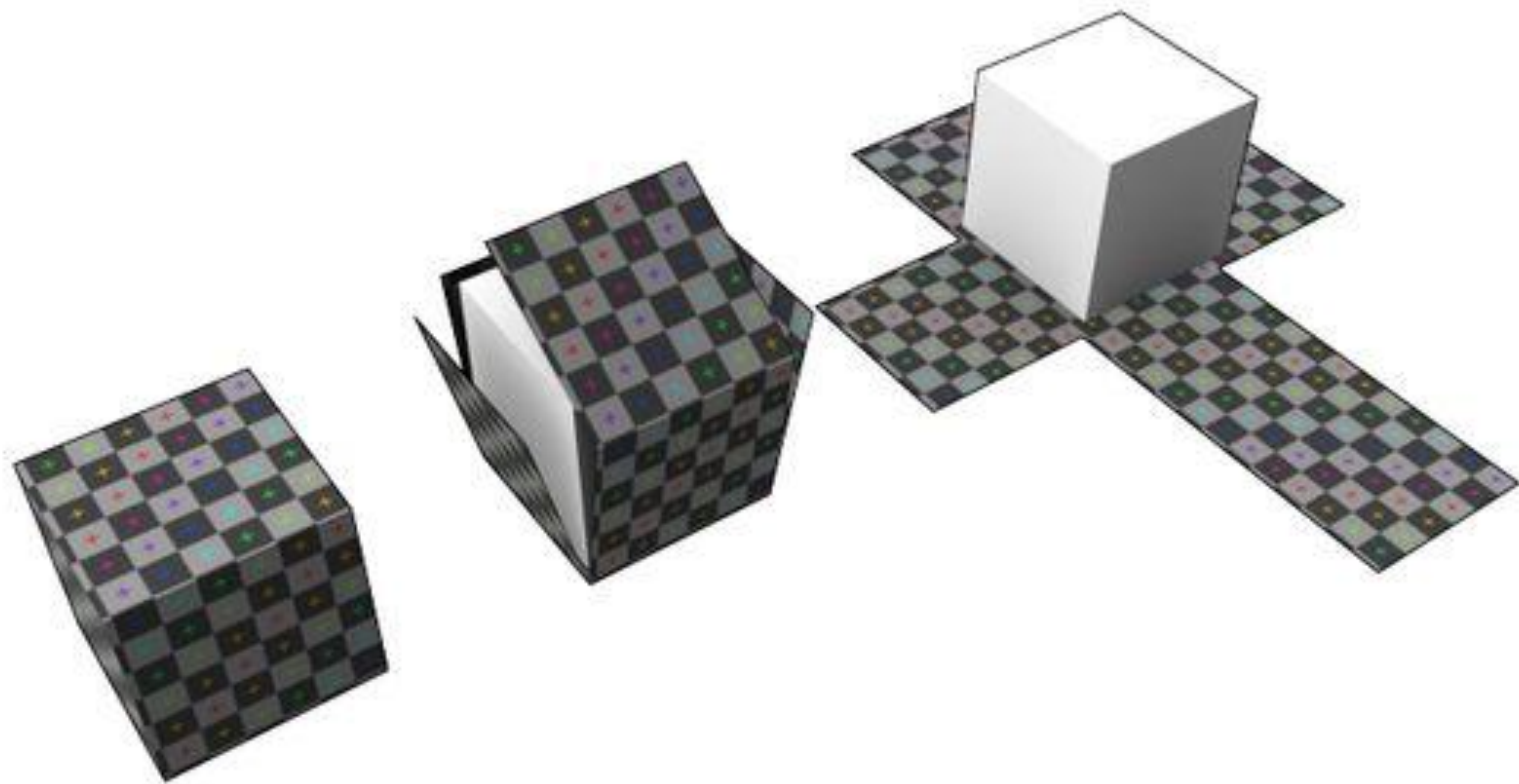


High Gloss





# UV Mapping & Texturing

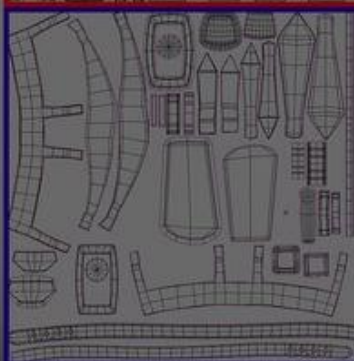
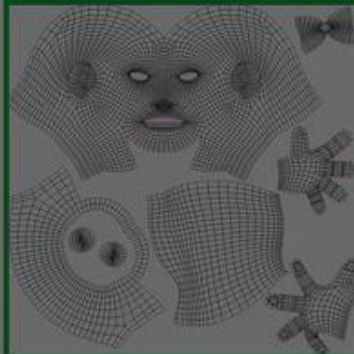


# Wireframe and Textures

Showing the diffuse textures only

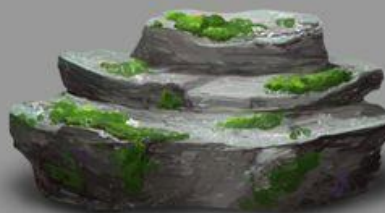




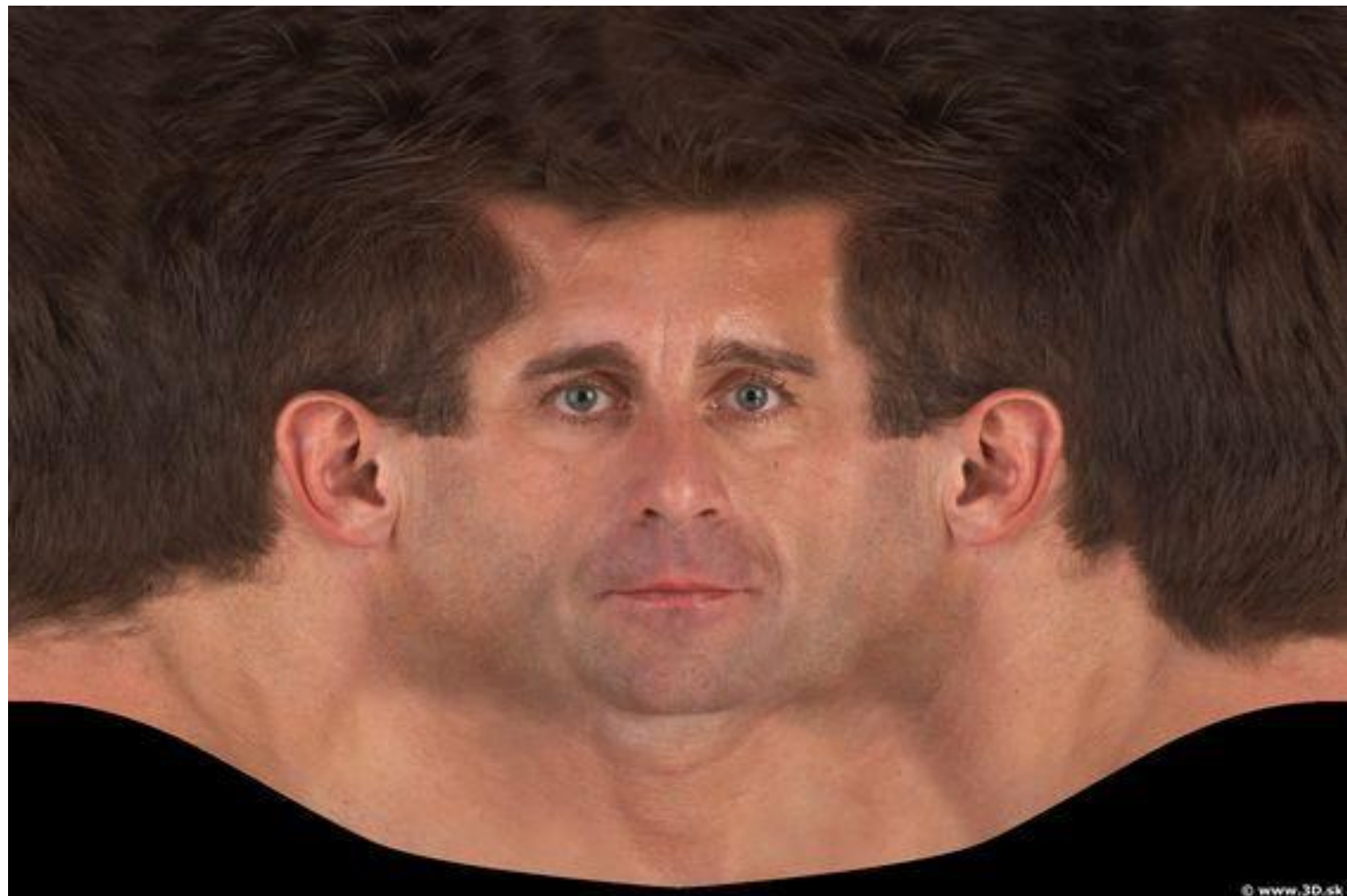






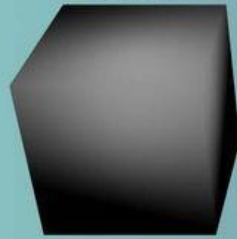






## The Shading

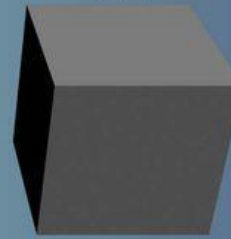
smooth



hard

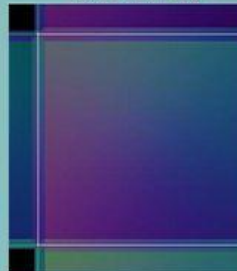


hard



## The UV/Normal

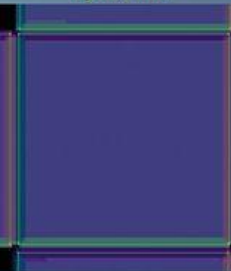
stiched UVs



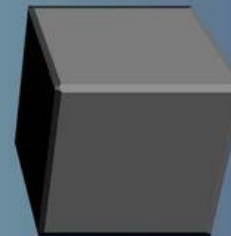
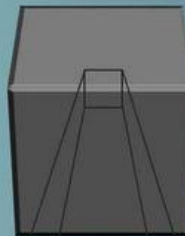
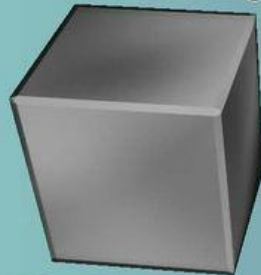
stiched UVs



split UVs



## The Rendering



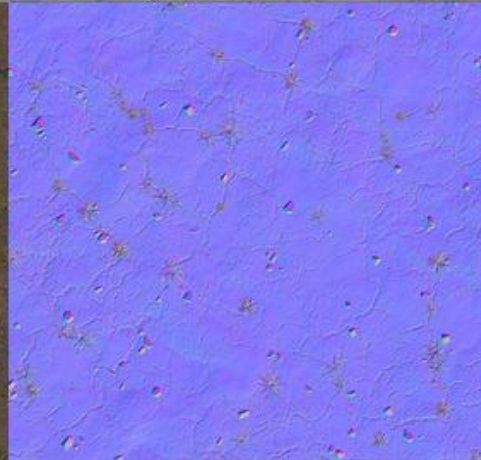
## The Result

In some game engines you get this. You can see this ugly gradients on the model.

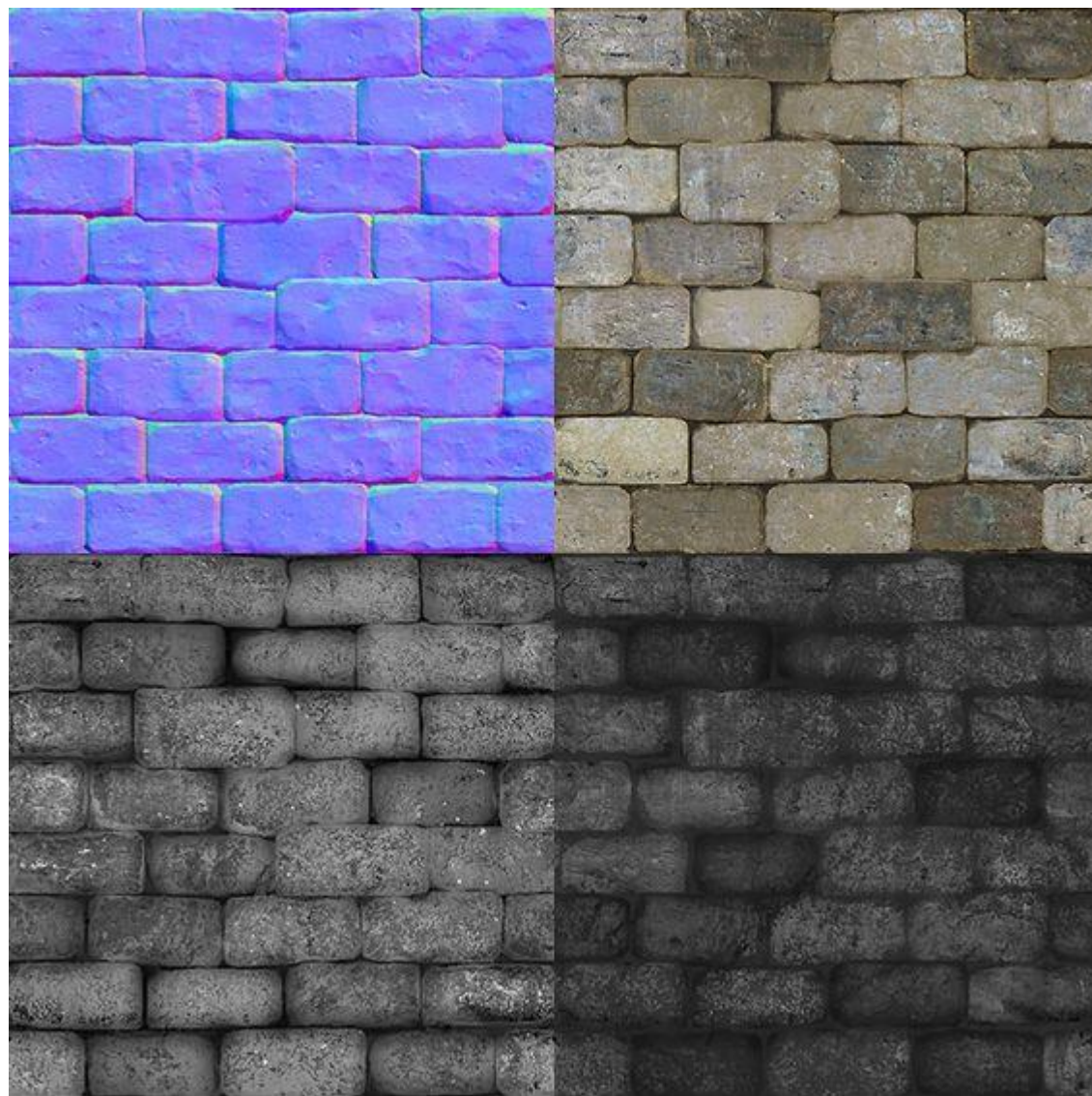


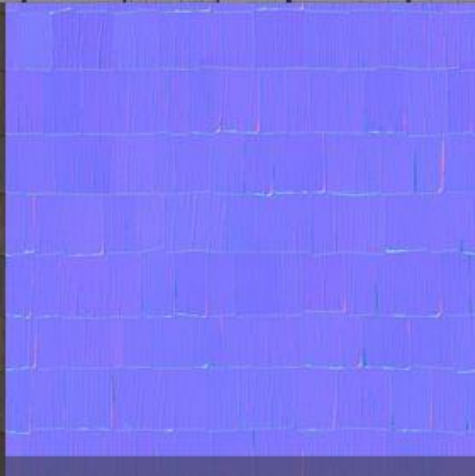
In my opinion the best result: hard shading, no normalmap gradients but a clear defined normal edge. The only problem: the upper part of the lightedge is also visible at the end of the box.

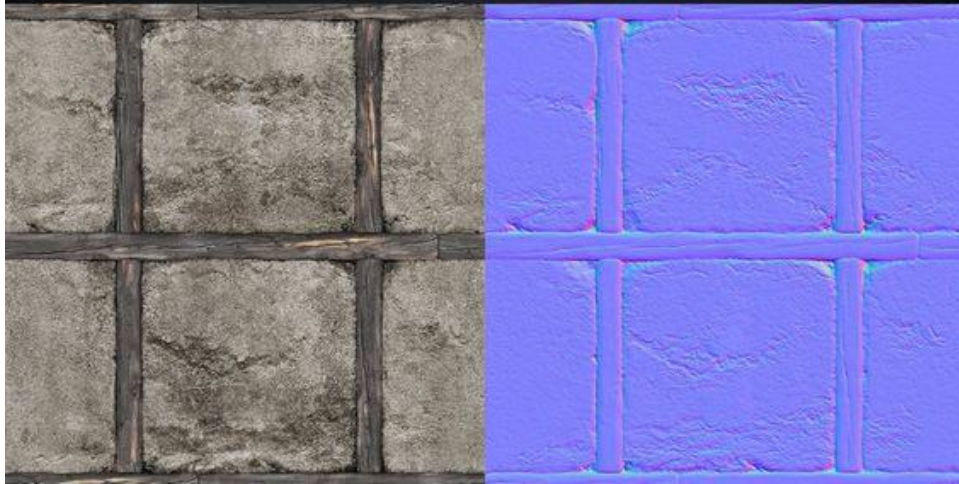
If you just activate hard shading, you will get this annoying edge.

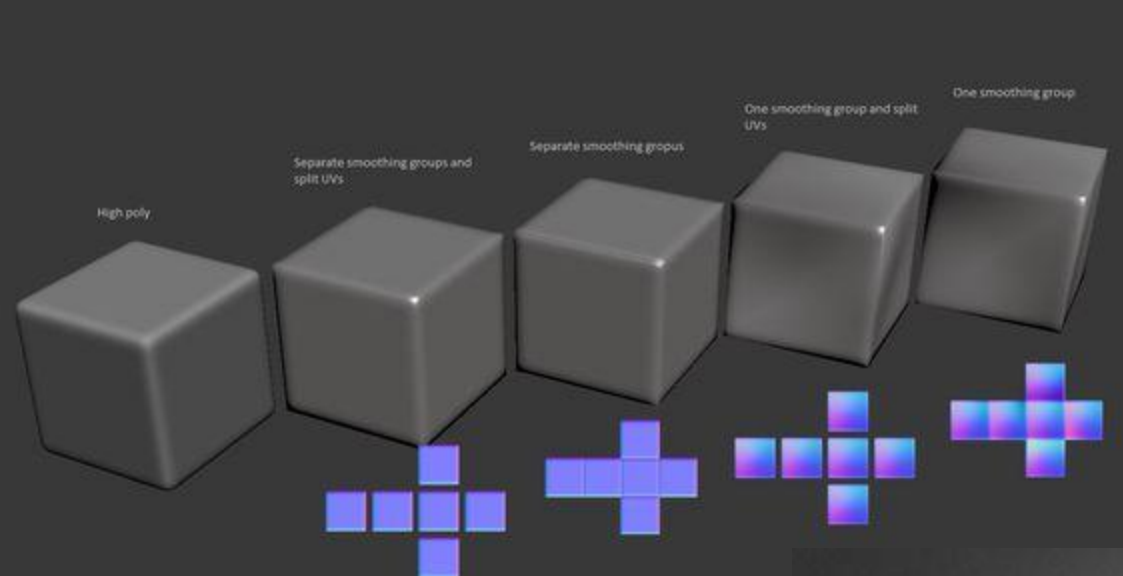


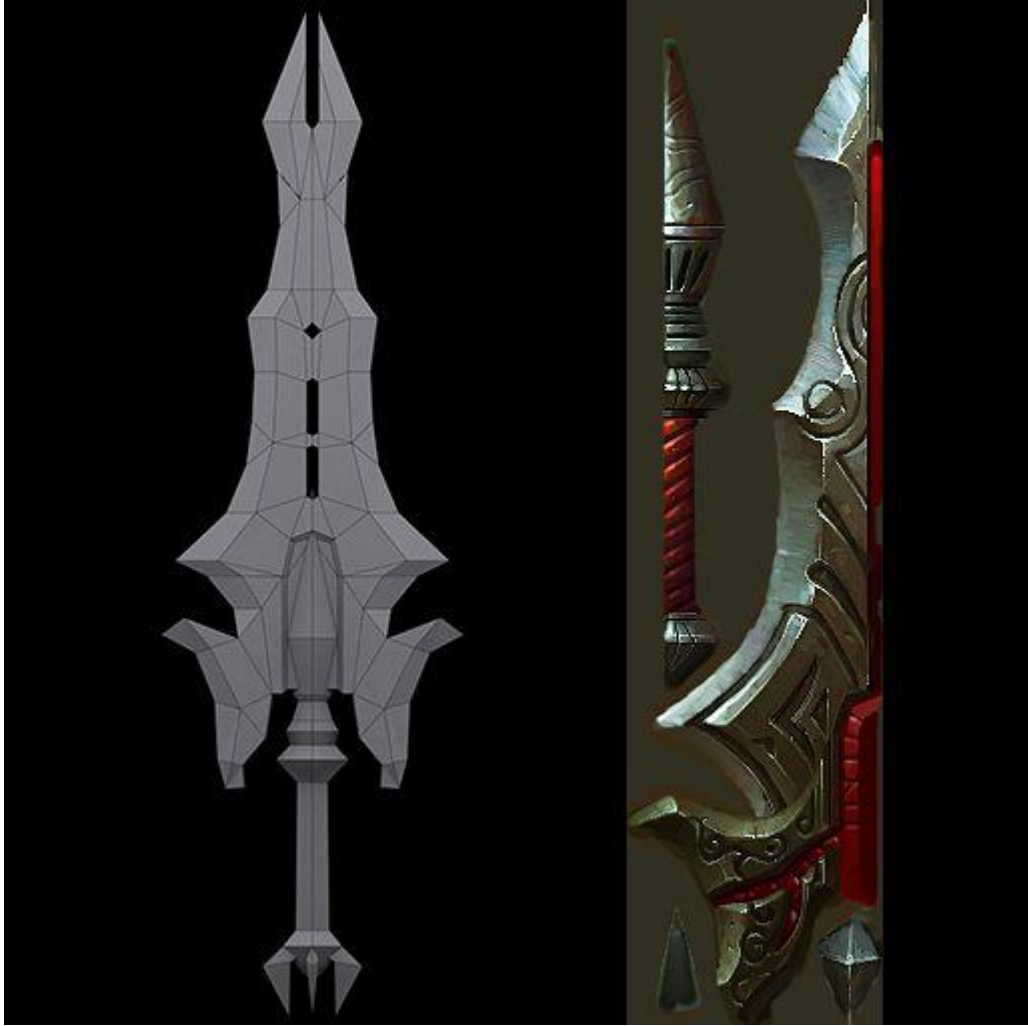




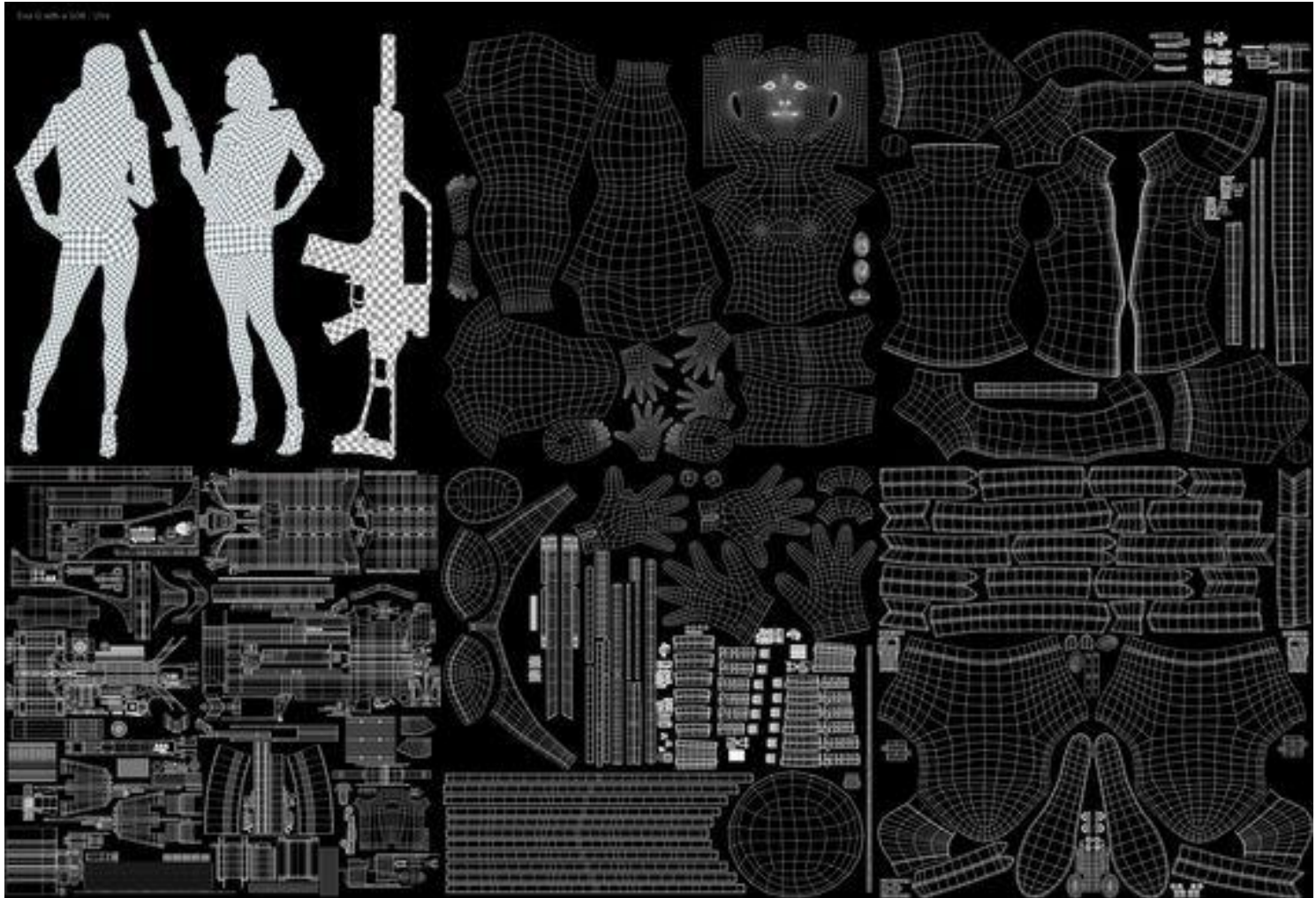


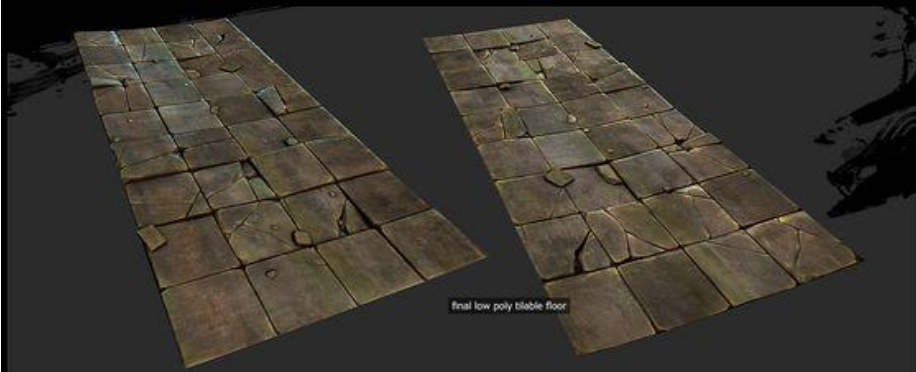




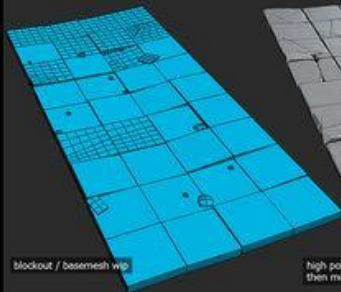




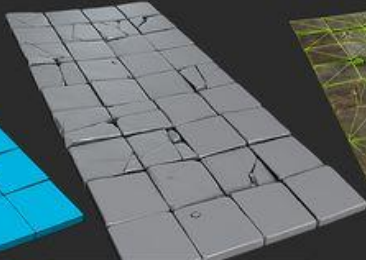




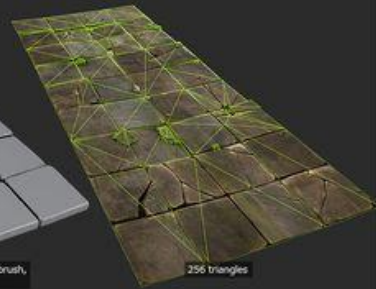
final low poly table floor



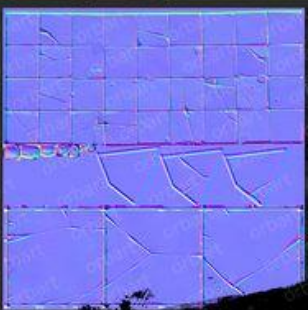
blockout / basemesh wip



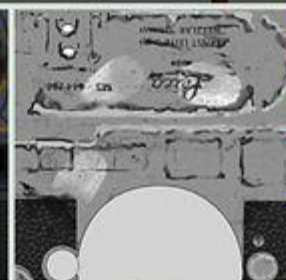
high poly done in 3dsMax using 5 slabs made in zbrush, then modulated with max



256 triangles







Diffuse

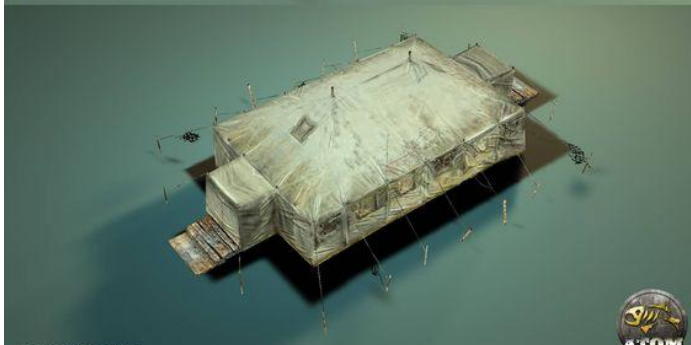
Specular

Gloss

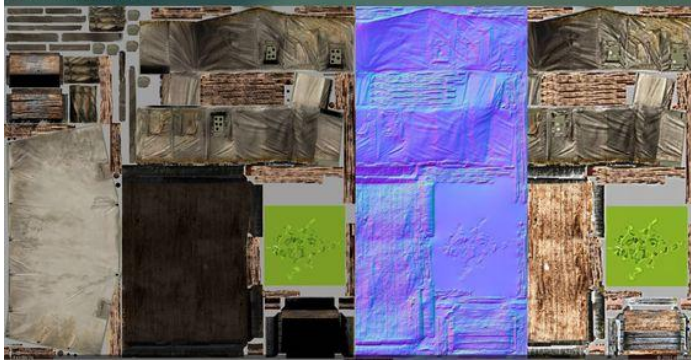
Normal



Палатка армейская «Ус-56»



punkvideo3d@gmail.com



# Battle Axe

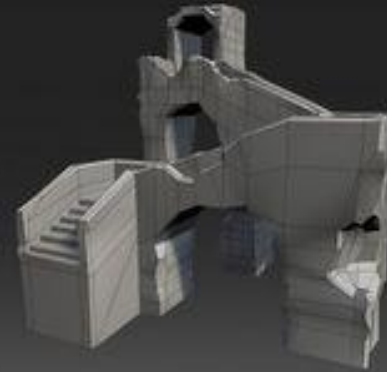
384 Triangles, 1024 Diffuse, Specular, Normal

[sauder.benjamin@googlemail.com](mailto:sauder.benjamin@googlemail.com)

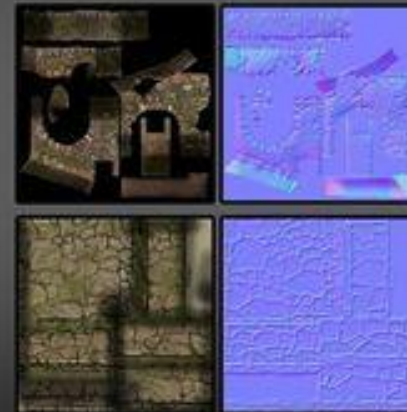




Modular Stone Stairs  
3370 TRIANGLES



Modular Texture Examples

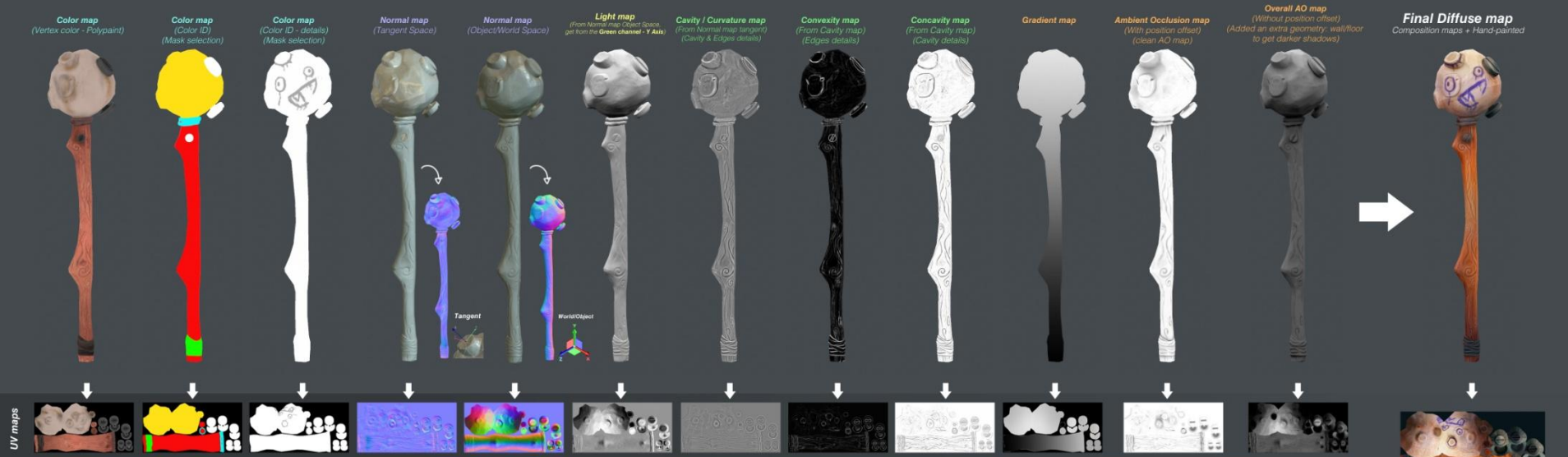


Nathanial Castronovo



NateTheArtist@gmail.com

# Orc Warrior - Breakdown - Textures maps (Staff)



**Color map**  
(Vertex color - Polypaint)

**Color map**  
(Color ID - Mask selection)

**Color map**  
(Color ID - details - Mask selection)

**Normal map**  
(Tangent Space)

**Normal map**  
(Object/World Space)

**Light map**  
(From Normal map - Fake lights get from the Green channel - Y Axis)

**Cavity / Curvature map**  
(From Normal map tangent - Cavity & Edges details)

**Convexity map**  
(From Cavity map - Edges details)

**Concavity map**  
(From Cavity map - Cavity details)

**Gradient map**

**Ambient Occlusion map**  
(With position offset)

**Overall AO map**  
(Without position offset)

**Final Diffuse map**  
Composition maps + Hand-painted

**For what are they used for?**

- + Base colors
- + Mask selection (Polypaint / Vertex colors)
- + Get lights information
- + Show modeling details (Real-time lights)
- + Enhancing general details
- + Get micro details (Cavity & Edges)
- + Mask selection
- + Get lights information from the Green channel - Y Axis (Fake lights)
- + Get major volumes
- + Contact shadows
- + Lights information (Fake lights)
- + Saturation control
- + Mask selection

**Final texture map**

Please note, this is just a documentation of my workflow and creation process. Above are some descriptions regarding some textures maps I use most to create this final Diffuse map. There are many ways to create/use those maps and each model or style might request different approach or skills. :)

Artstation.com

Pinterest.com

CGSpeak (Youtube.com)

<https://lazaruz.carbonmade.com>

Render.ru