

3D Arts

ADVANCED MATERIALS

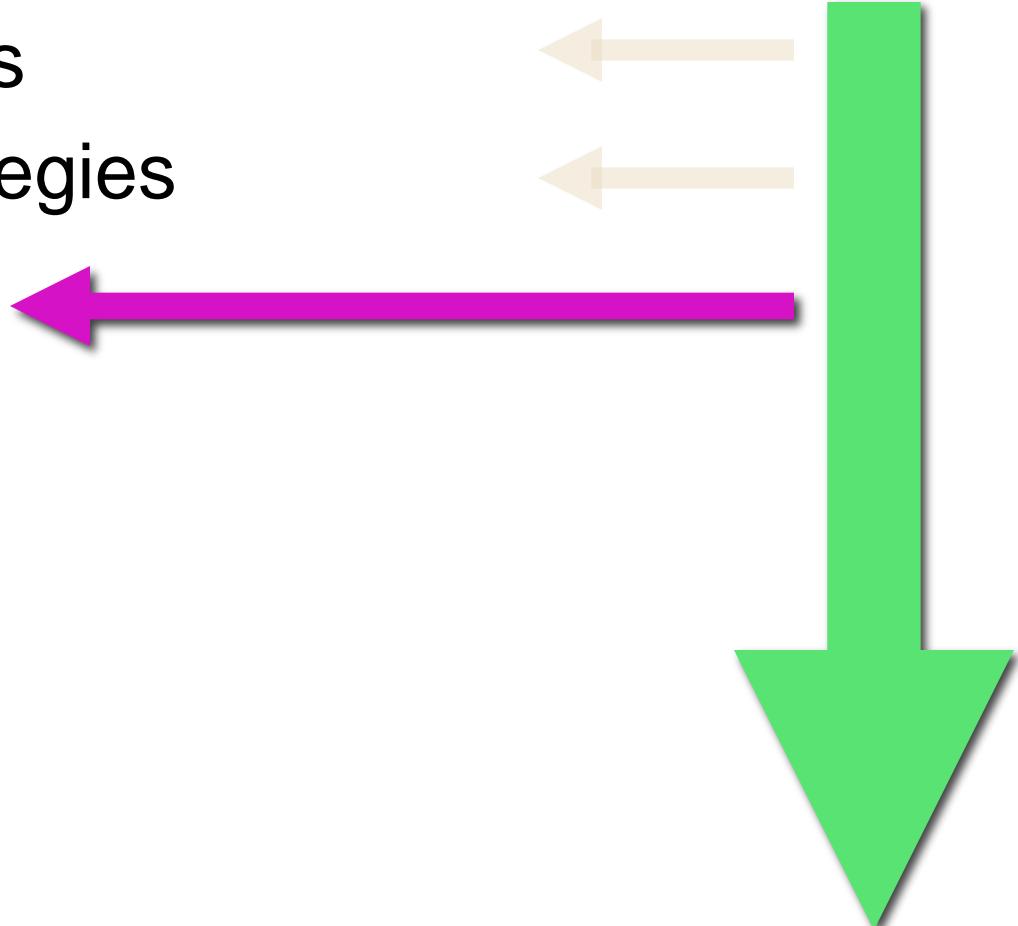
Month 2, Lecture 3

What we are going to discuss today:

- What is a material
- How do materials work
- How to apply materials
- Managing Materials
- Constructing materials
- Multi/Sub-Object Material
- Blend Material
- More UVW Mapping
- Map Channels
- UVW Unwrapping

Where you are in the big picture

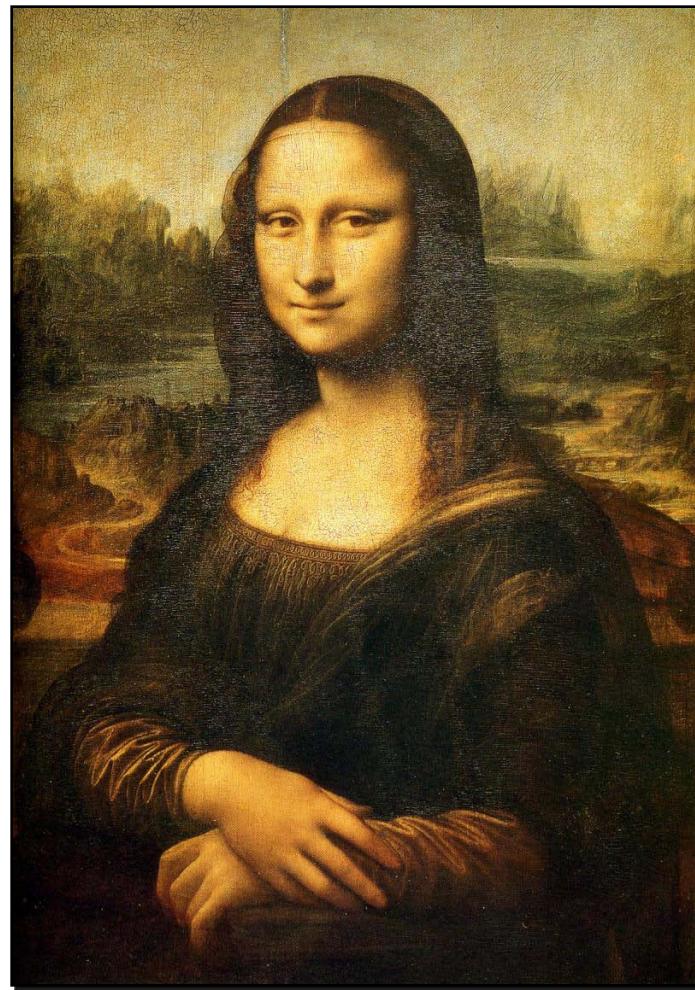
- Modeling tools
- Modeling strategies
- Texturing
- Lighting
- Animation
- Rendering



What Materials Do...

- Add color to the scene
- Make objects look more “realistic”
- Add depth and dimension
- Help define your artistic style
- A Game...

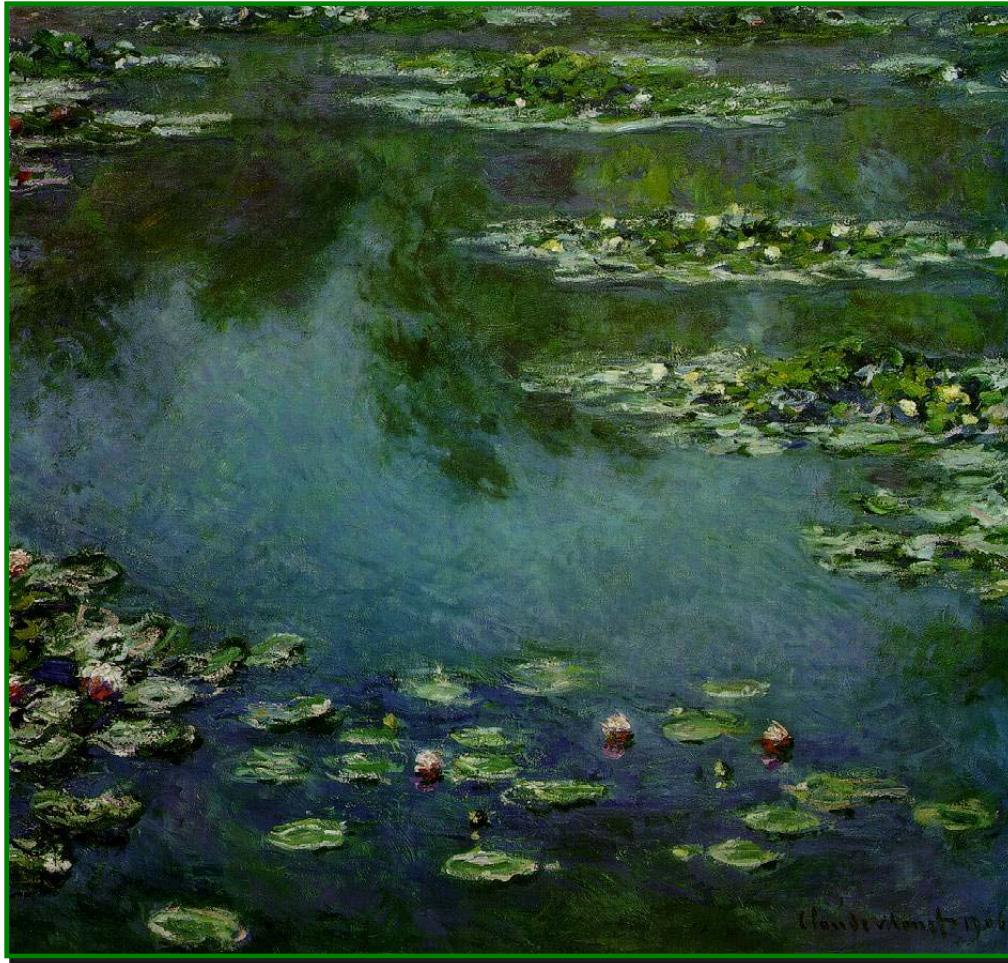
Name the artist do DaVinci



Name the artist...
Rembrandt
Harmenszoon Van Rijn



Name the Claude Monet



Name the artist. Van Gogh



Name the Picasso



My Inspiration Andrew Wyeth



"Christina's World- 1948

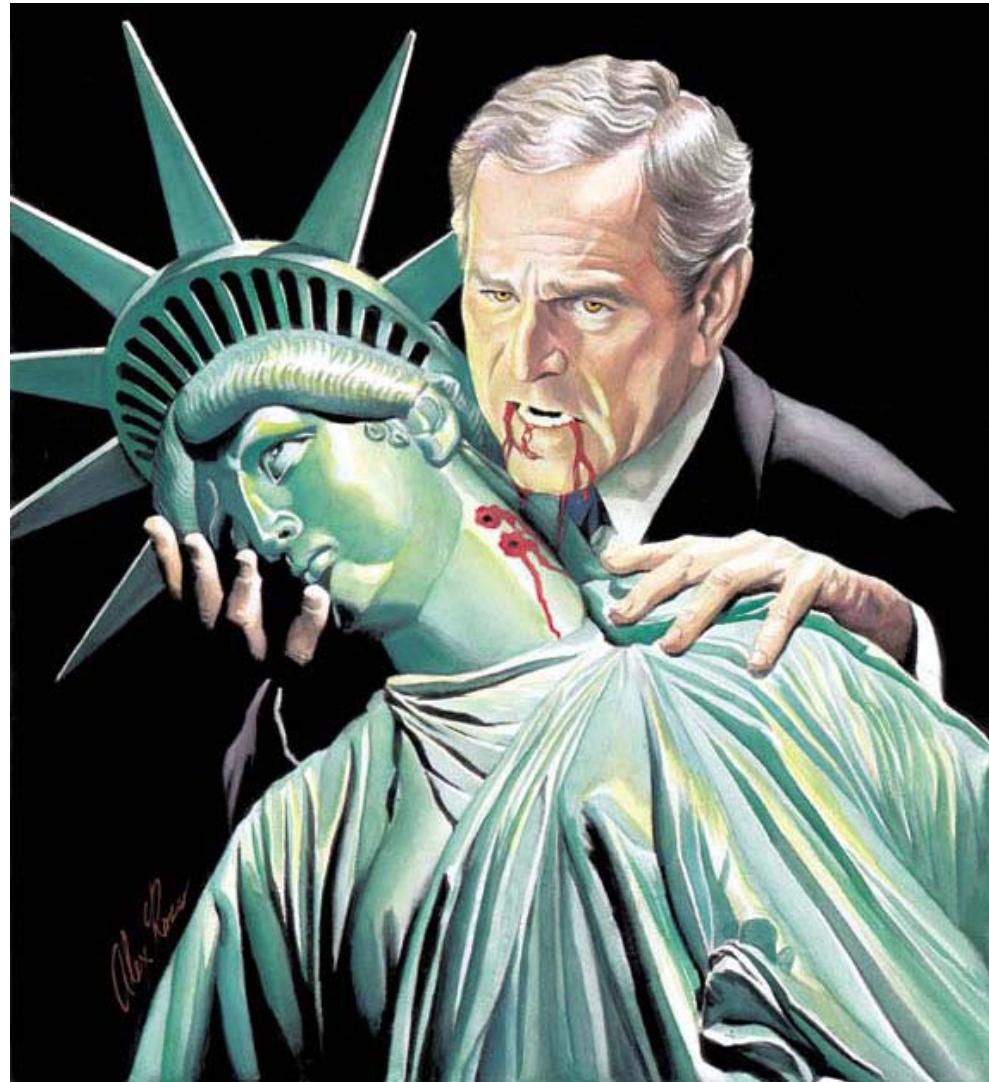
Alex Ross



Alex Ross



Alex Ross



Alex Ross



Frank Frazetta



Chris Bachalo

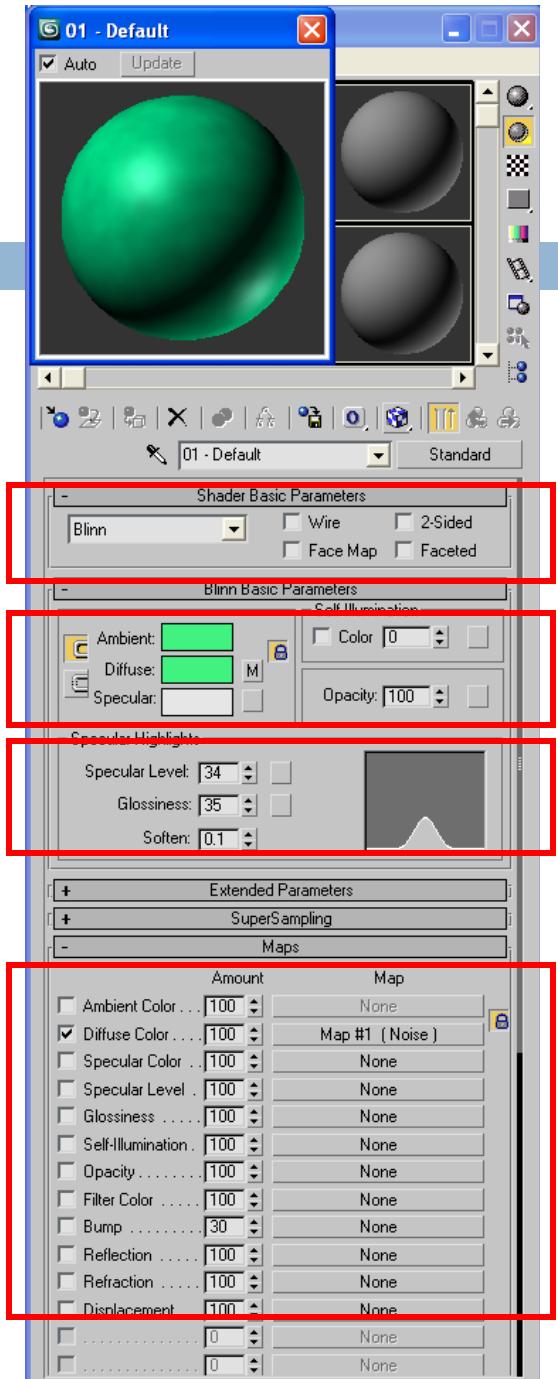


Surface Property Review

Everything we know about Surface Properties

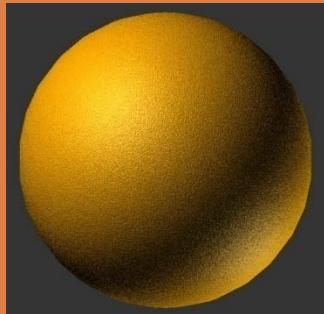
Standard Material Design Review

- Select Shader
- Define Ambient/Diffuse Color
- Define Specularity
- Assign Maps

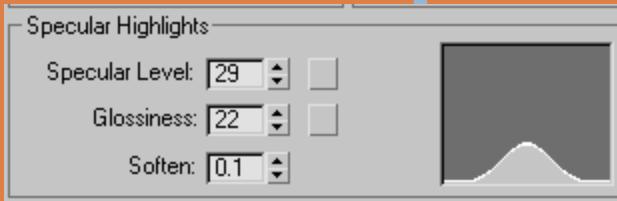
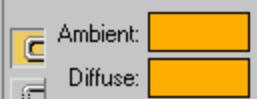


Material Breakdown

Parent Level



Orange Texture
(the fruit, not the color)

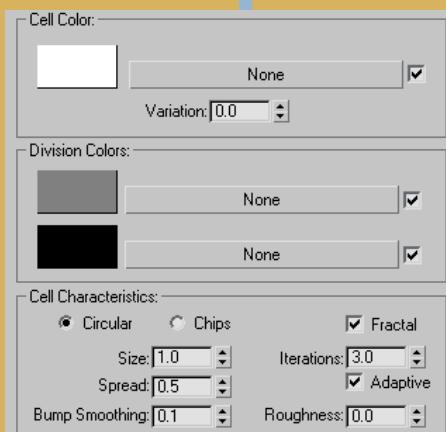


Diffuse – makes up base orange color

Specularity (shininess)
– controlled by specular level

Bump –
created with a cellular map

Child Level



Cellular map:
Default colors
Circular shape
Fractal

Material Application Review

- Drag and Drop
 - Do It In A Shaded Viewport
 - Assign Material to Selection
 - Select ALL Objects You Want It Applied To
-
- F3=Shaded Viewport
 - Show Map in Viewport



3 Rules

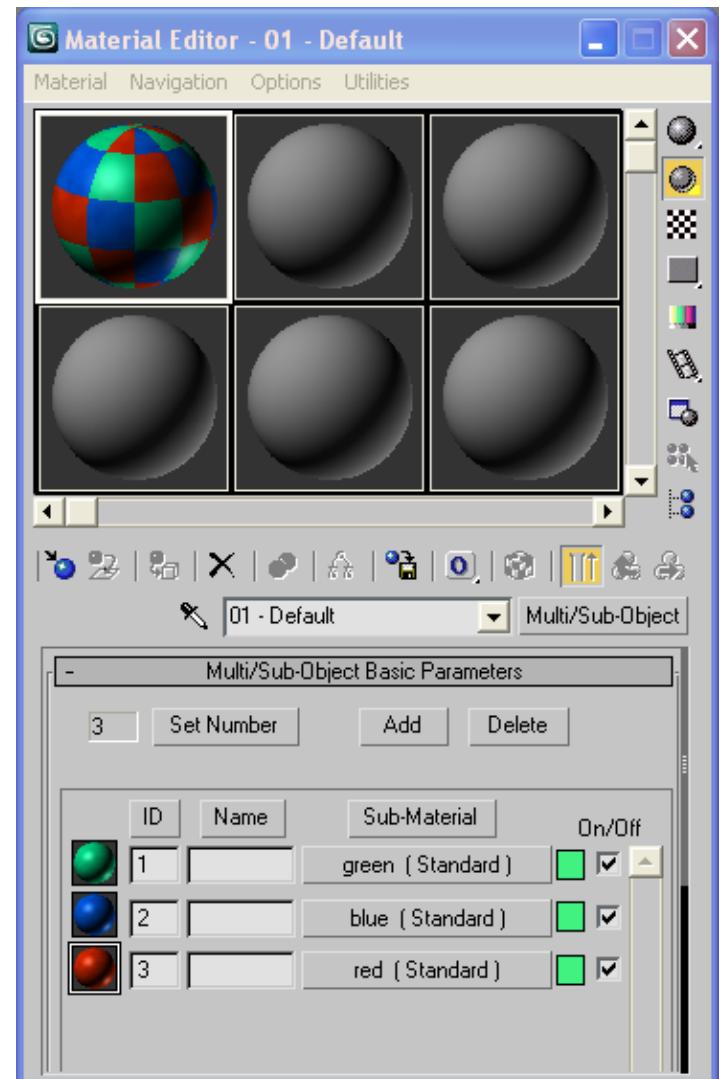
- How many Materials per Object?
 - 1
- How many Materials in Editor?
 - 24
- How many Materials in Scene?
 - Unlimited

Multi/Sub-Object Review

- Gets around first rule
- Still just 1 Material
- Container for multiple Materials
- Managed at sub-object level
- Also used on non-complex Objects
- Material I.D. rules them all

Multi/Sub-Object Review

- Displayed as patchwork
- Naming conventions
- Material ID 2nd column
- Set Number up to 1000
- 1000 x 24 slots



Material Adjustment Review

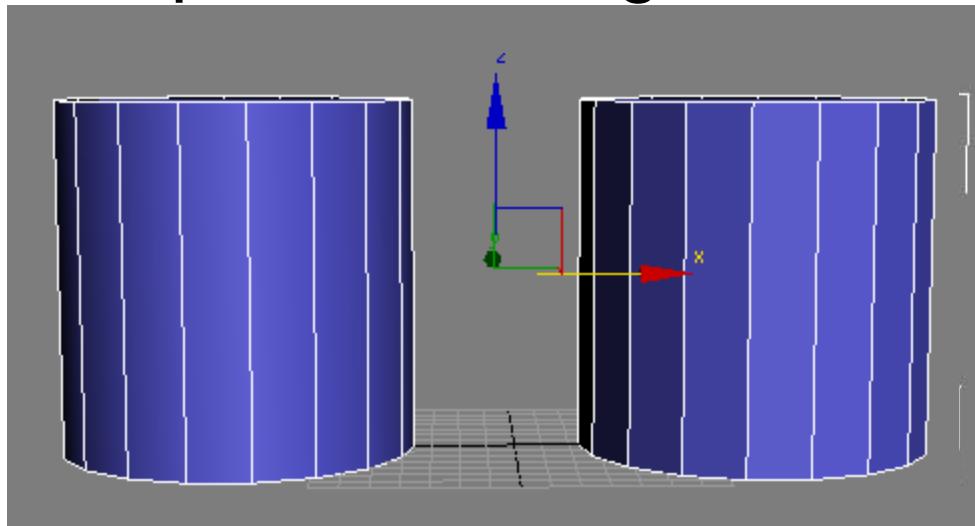
- Apply UVW Mapping Modifier
- Avoid Coordinates Dialog in the Material Editor

Smoothing Group Review

Surface Properties

What are Smoothing Groups?

- Blends the shading between faces to produce the appearance of a smooth, curved surface
- Allows your objects to have smooth surfaces and sharp, faceted edges



Same number of segments

What do Shooting Groups

Perspective

Total McLaren

Tris: 3,008 184

Verts: 1,678 94

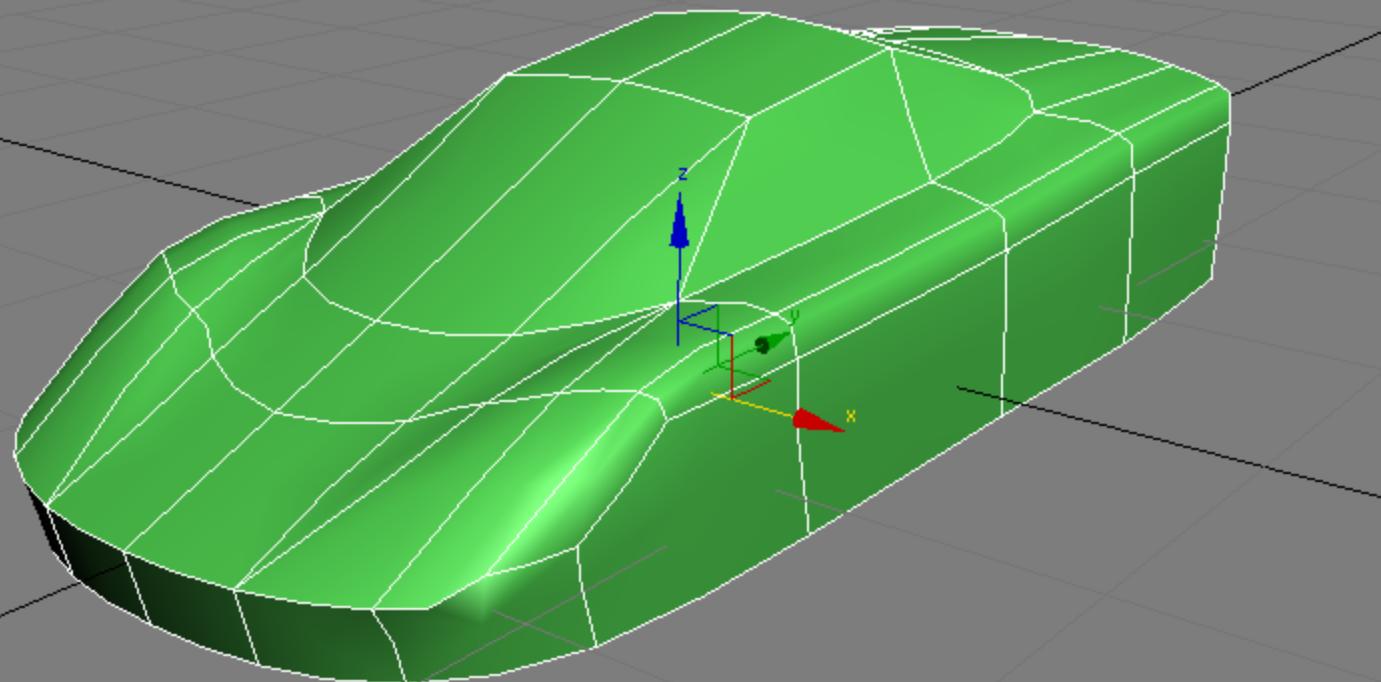
FPS: 127.504

Poly:

Ris:

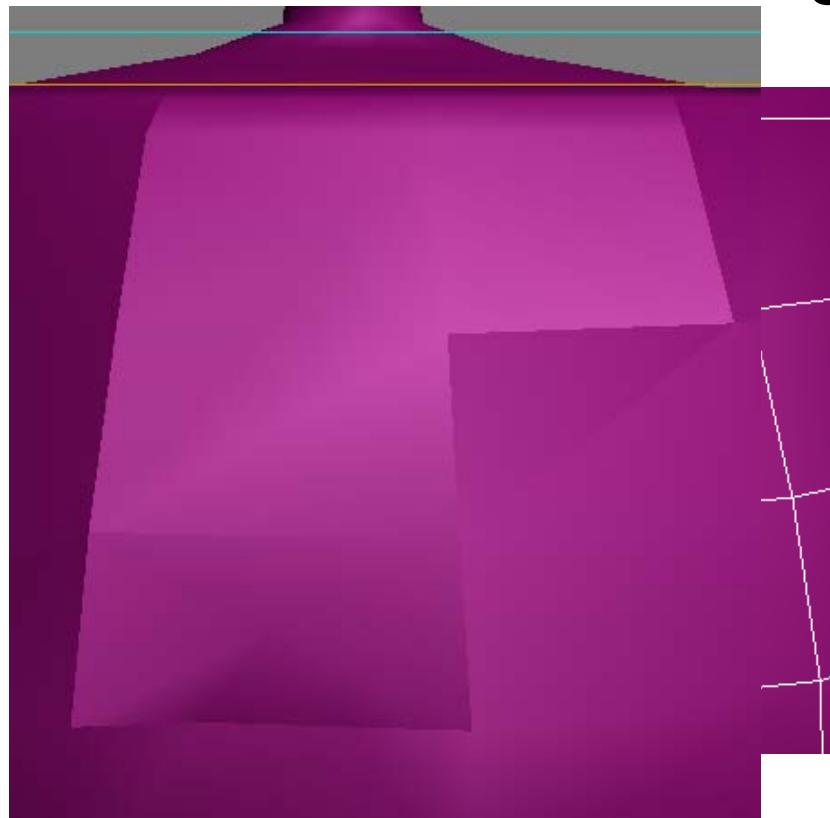
Vert:

PS:



What Smoothing Groups **DON'T** do.

- They don't add polygons.
- They don't work well with bad geometry.



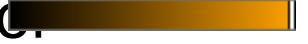


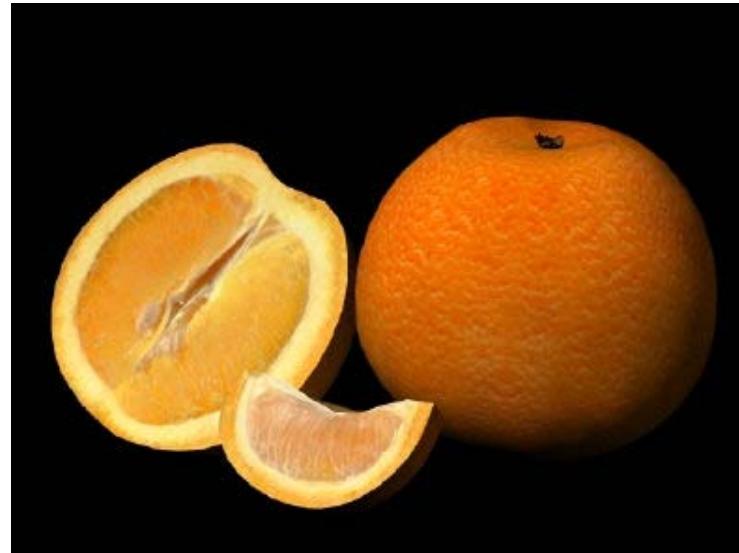
Describe this texture.

Texture Concepts

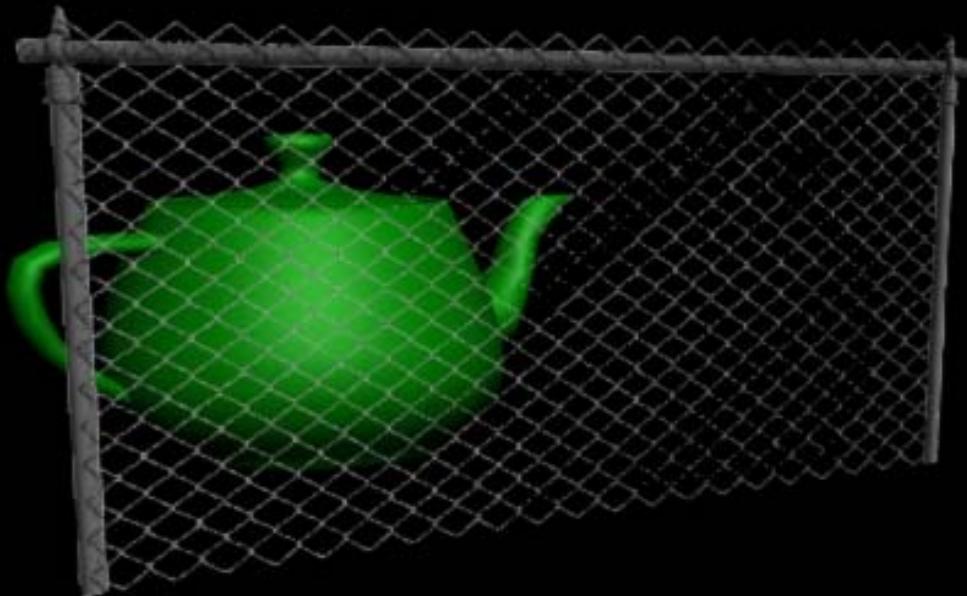
- Color
- Transparency
- Specularity
- Luminance
- Reflectivity
- Bump
- Displacement

Color (Diffuse)

- Hue- the color 
- Saturation- intensity of the color 
- Value- the light or dark quality of the color 
- Controlled in 3DS Max by the diffuse property 
- You rarely want a pure solid color, for realism use variance in hue, saturation, and value



Transparency



Specularity



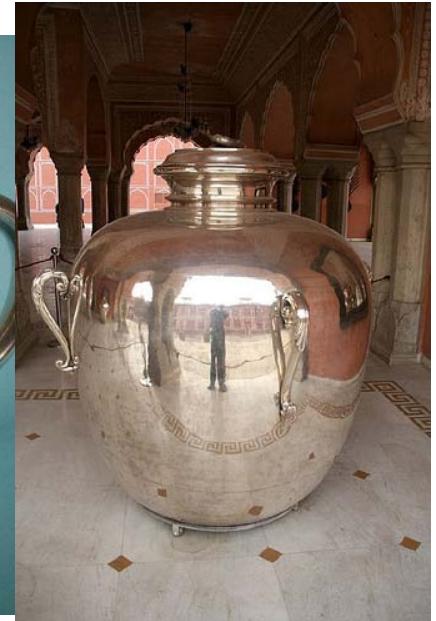
Luminance

- Describes the self-illuminating properties of a material
- Also known as ambience
- Controlled in the self-illumination channel



Reflectivity

- How much and what is being reflected
- Can use a reflectivity map to designate areas that are more reflective than others
- Also used to tell the viewer where the object is located
- Controlled via the Environment Map



Bump

- To see
 - Does
 - Con-
 - Can
 - Blac
- 
- (in)

Displacement

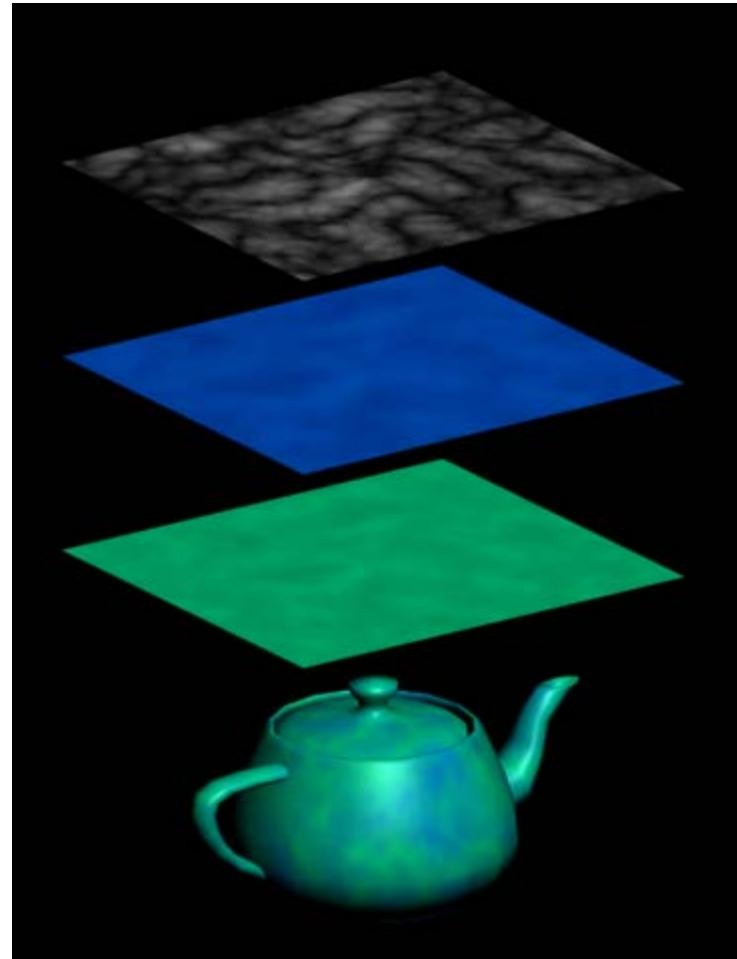


Let's break down some textures.

- Color
- Transparency
- Specularity
- Luminance
- Reflectivity
- Bump
- Displacement



Blend Material / Mix Maps



Mix Maps

- Combine 2 surfaces on a single polygon
- Similar to blend but applied in the map channel vs. as a material type
- Not visible in the viewport
- Great way to add posters and dirt to walls

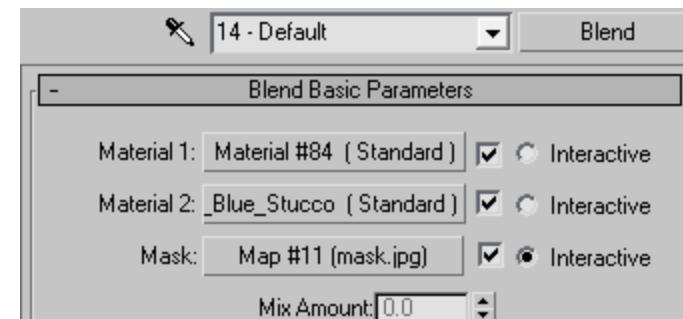


Blend Materials

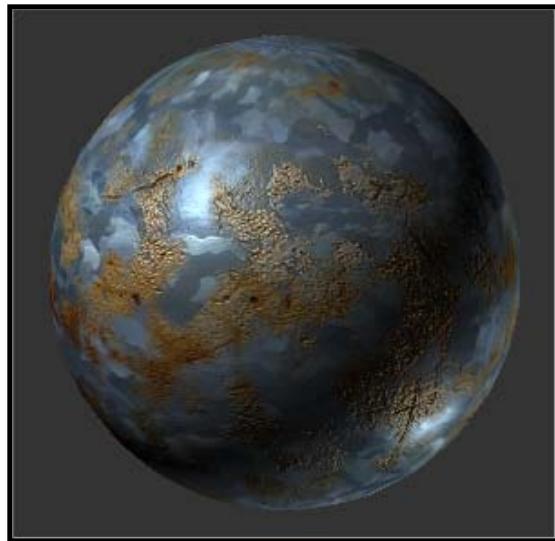
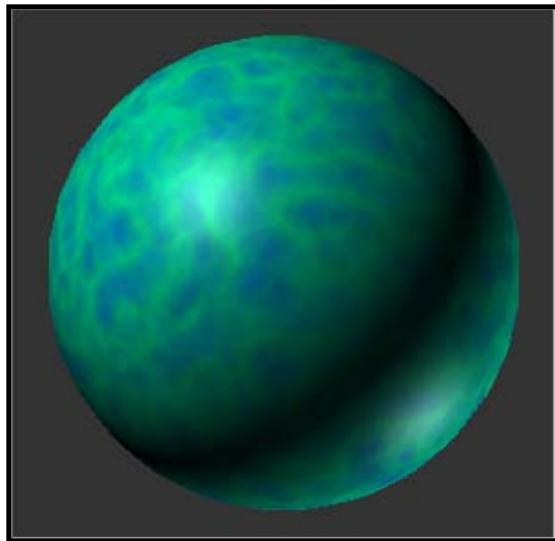
- Combines materials together using a mask to blend
- Similar to Mix Map but is a shader type
- Mixes 2 entire Materials together



Important part

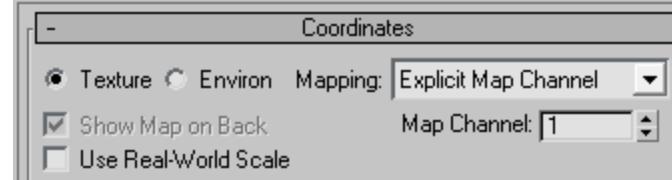
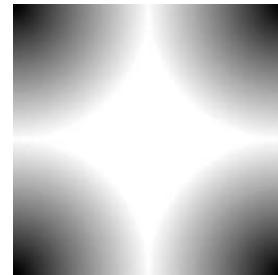


Blend Examples

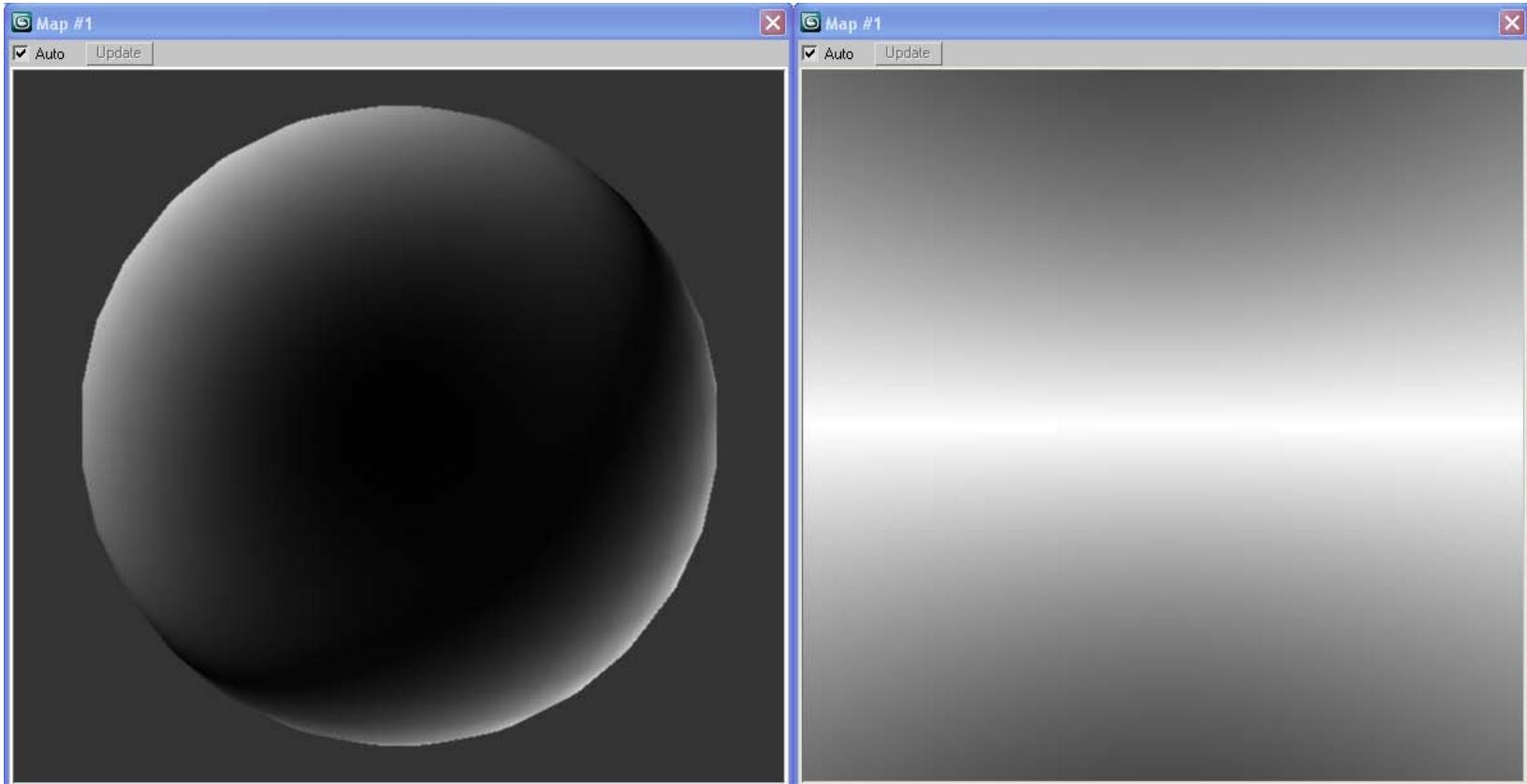


Controlling Blends

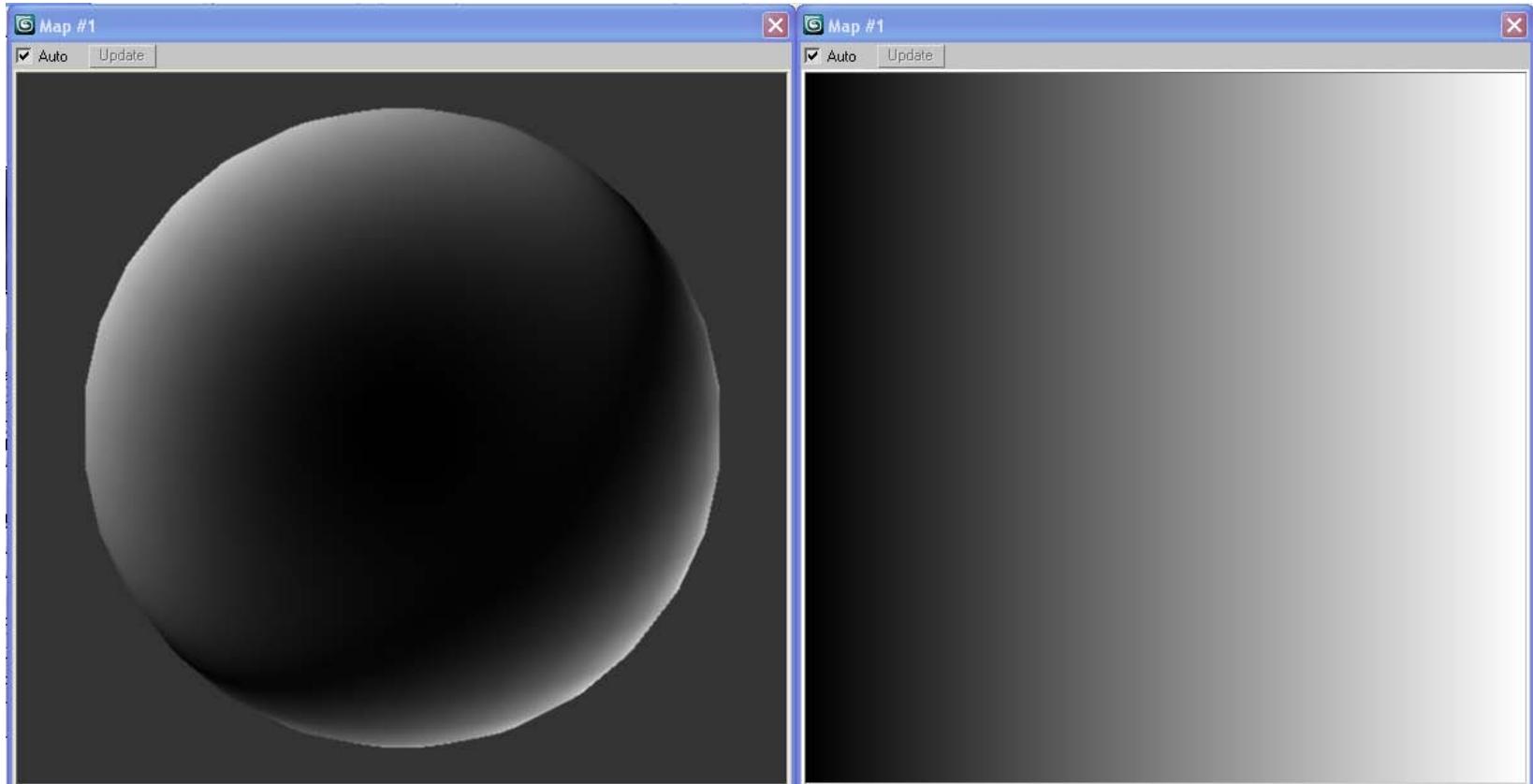
- Mix Amount
- Masks
- Map Channels



Falloff



Gradient Ramp



Map Channels

- How many UVW Mapping modifiers can be applied to a single Object?

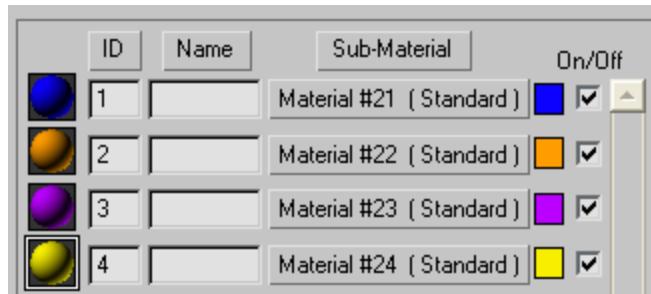
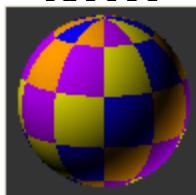
1

99

Name Confusion: Part II ID's

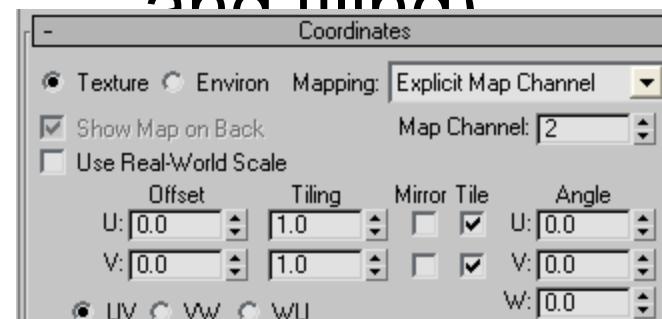
Material ID's

- Tells the computer which Material to use

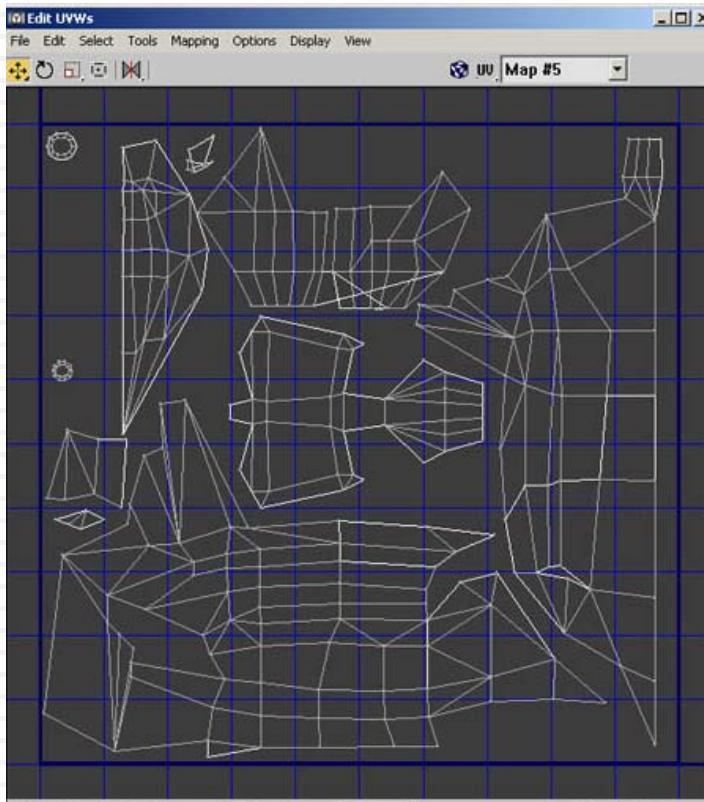


Map Channel ID's

- tells the computer which UV Map to use
- (affects coordinates and tiling)



UVW Unwrapping



Unwrapping UVW Introduction

- What is UVW anyway?
- Difference between UVW Mapping and Unwrapping

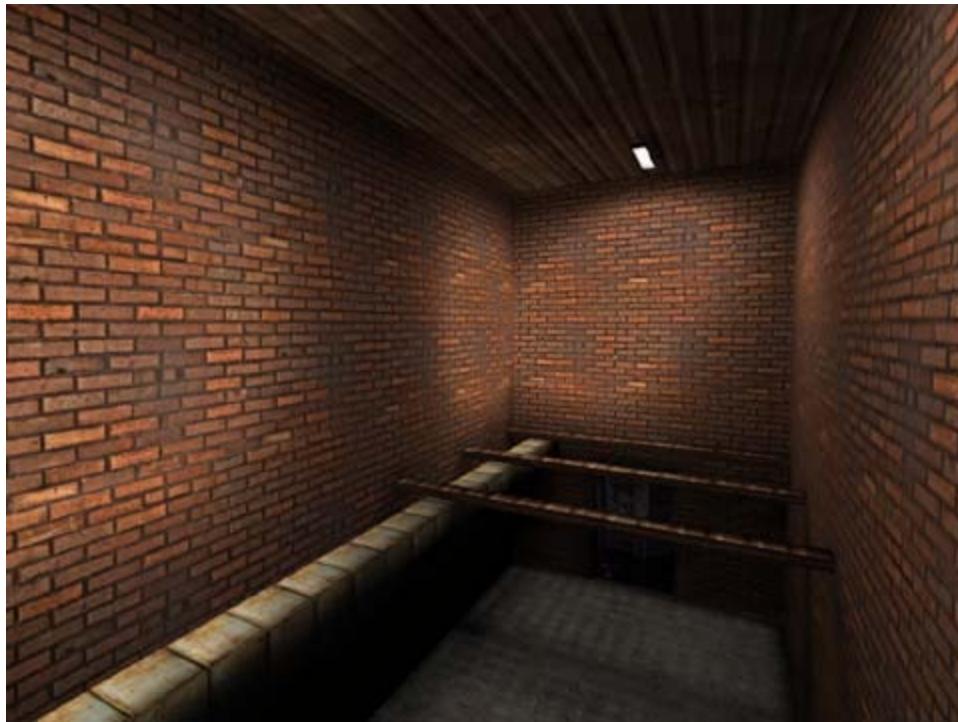
UVW UnWrapping – Process

- Why do it?
 - To create a template from which a texture map can be created in Photoshop.
 - To get very complex or rich texture maps on 1 object with 1 material
 - Baking shadows or ambient occlusion maps

UVW UnWrapping – When should it be Used

- UVW Mapping
 - Tiling textures
 - Textures that cover an entire object
 - Single colored objects
 - Simple elements of complex geometry
 - SUB Object mapping will suffice (per polygon)
 - Procedurals
- UVW Unwrapping
 - Textures that have specific areas for specific geometry
 - Textures that need to be created with a template
 - Detailed bitmaps
 - Complex geometry that is contiguous

Tiling Textures – UVW Mapping



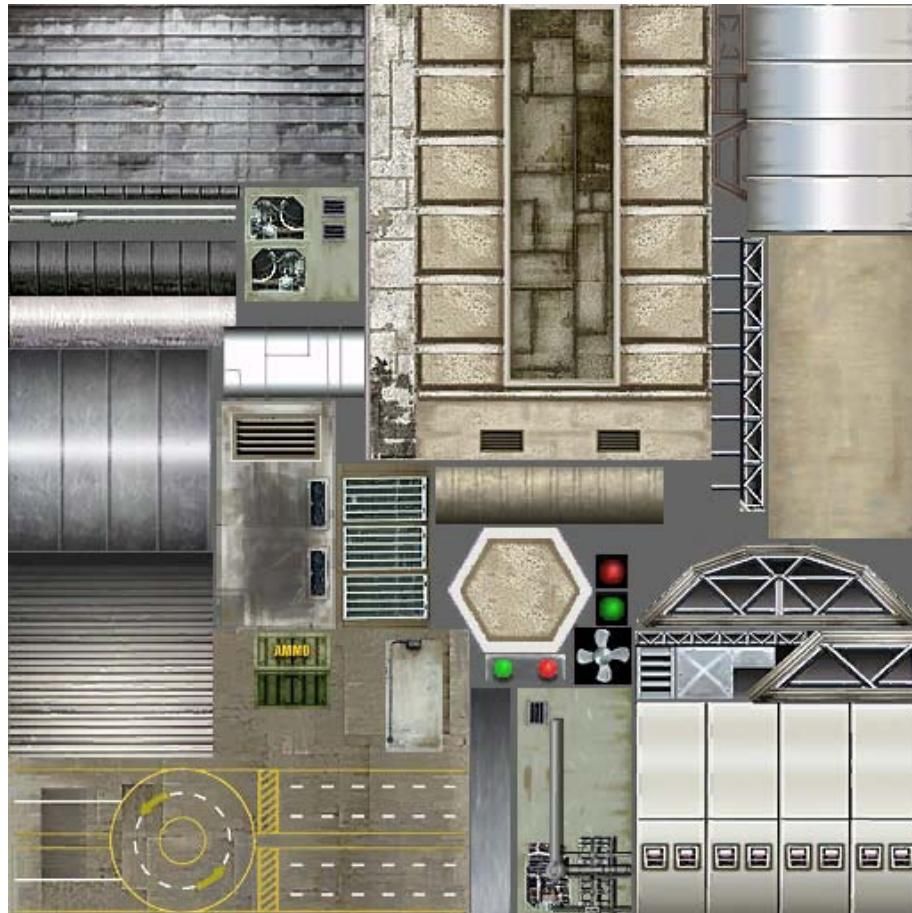
Tiling Textures – UVW Mapping



Textures that are a solid color – UVW Unwrap



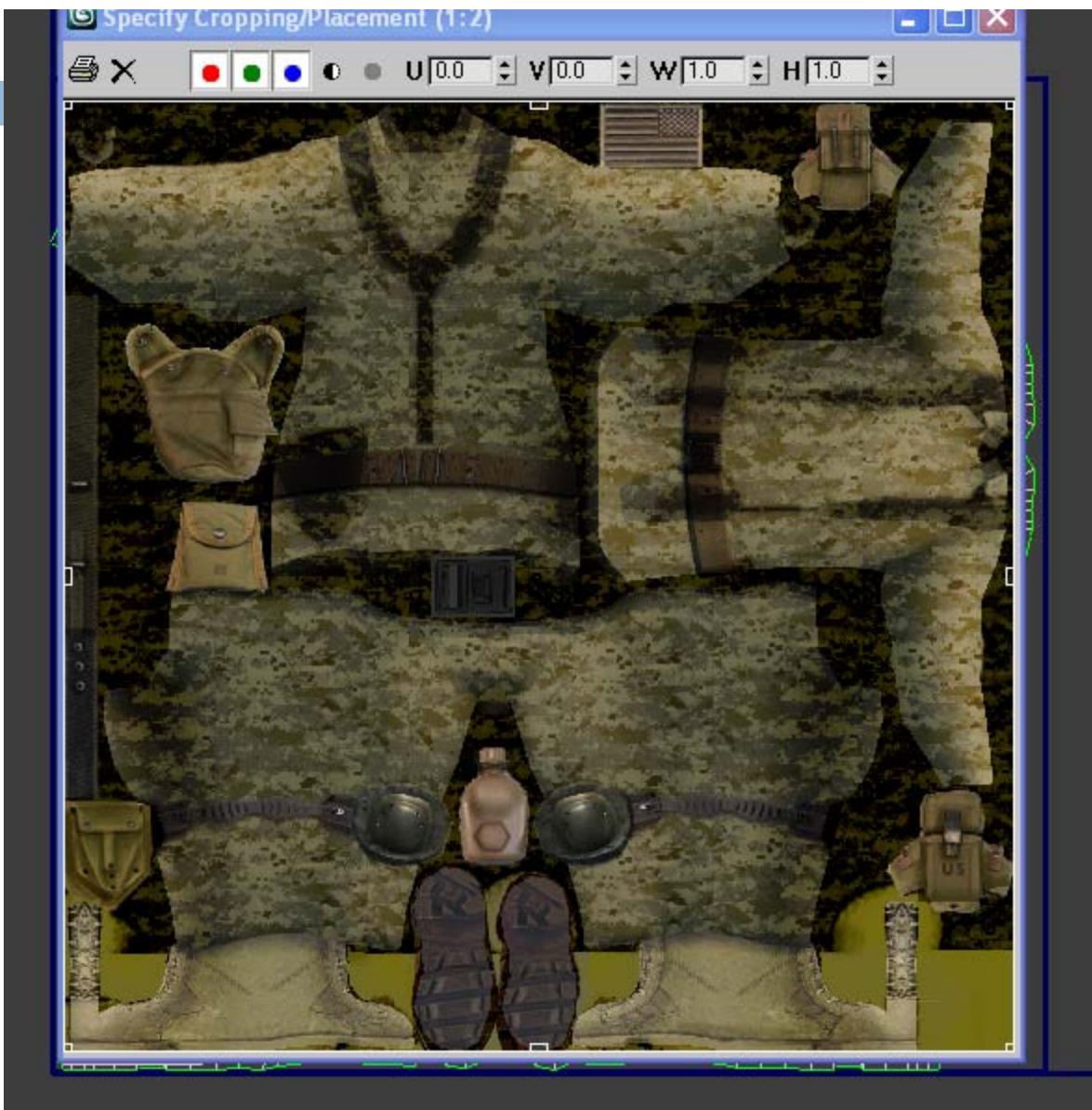
Detailed bitmaps – Unwrap UVW



Textures w/ specific areas for specific geometry- Unwrap

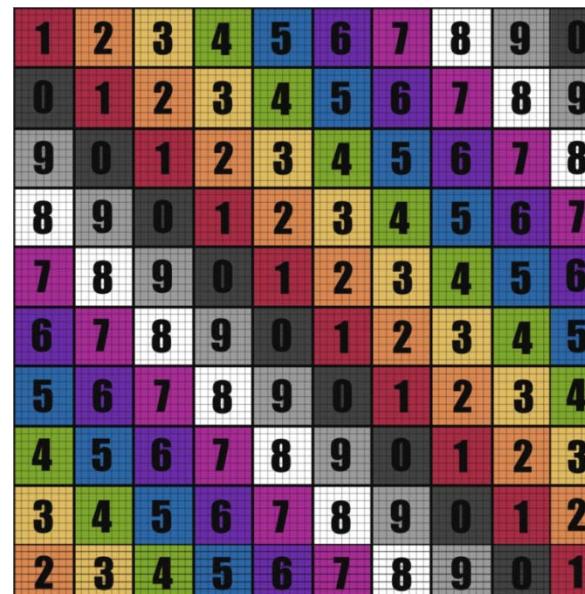


Textures that need to be created with a template – UVW Unwrap



Tools Used in UnWrapping

- 3dsMax > UVW UnWrap Modifier
- Photoshop > all tools
- TestMap.jpg



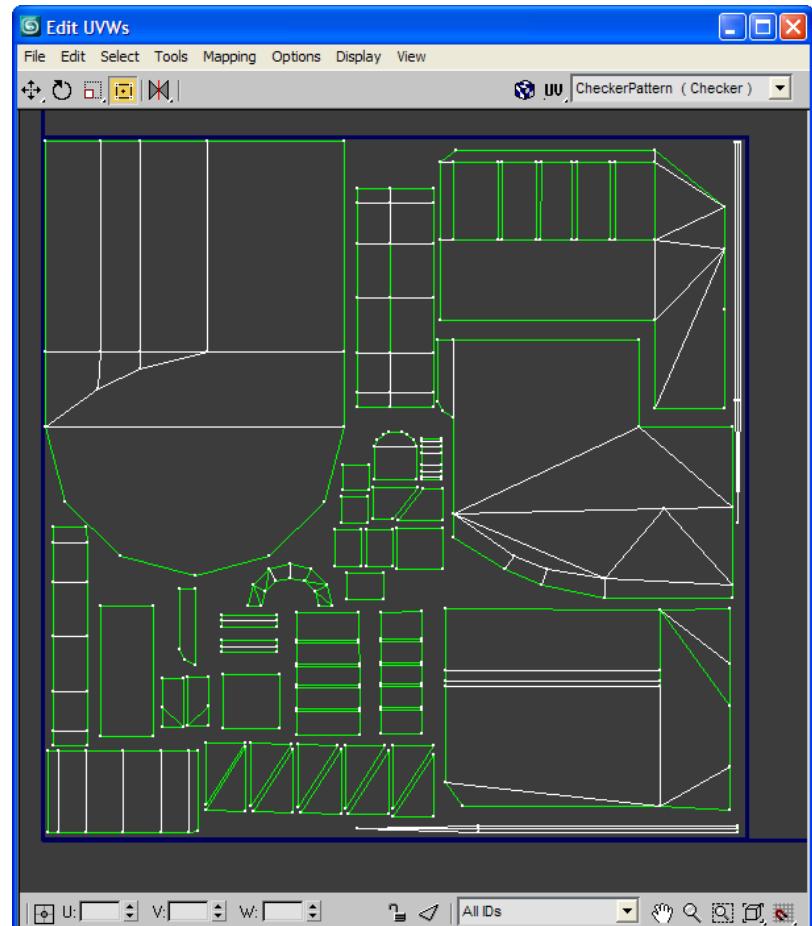
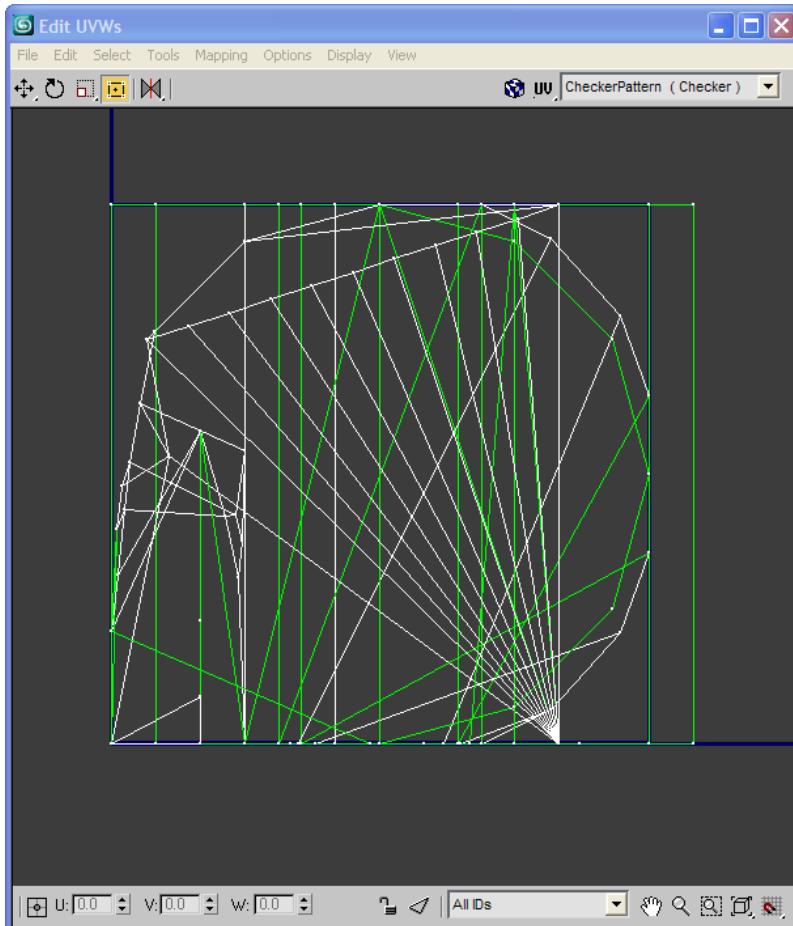
UVW UnWrapping – Process

- Step 1: Unwrap the object
- Step 2: Prioritize the UV's
- Step 3: Repack the UV Space
- Step 4: Export template and Paint
- Step 5: Put material/texture map back on object

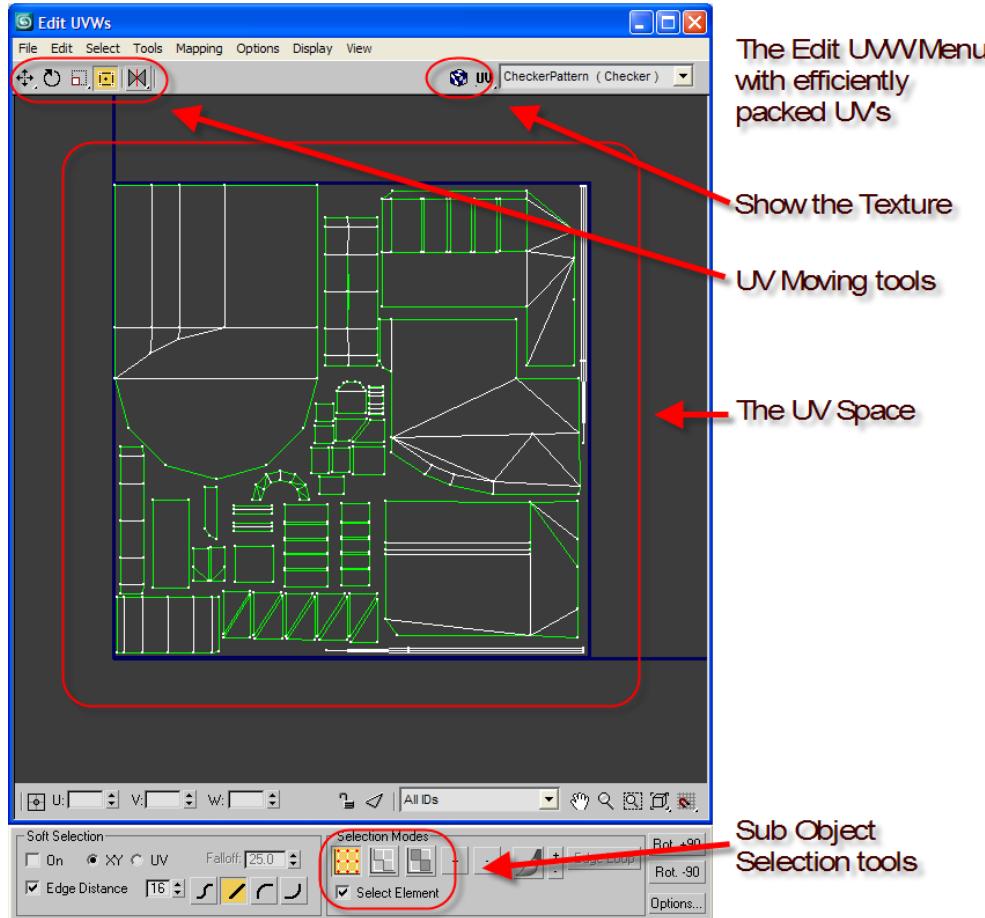
From this...

this

...to



Edit UVW Interface



To Manually Unwrap

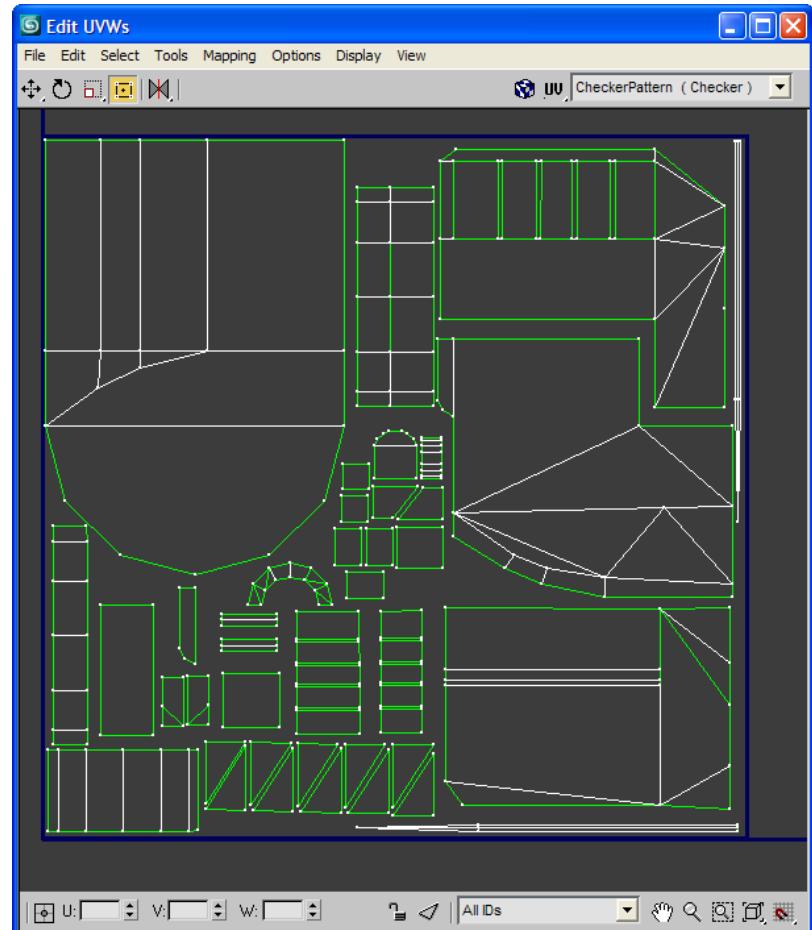
1. Choose the most obviously visible surface area
(or the area that will be a specific material)
2. Select faces
3. Peel the UV's off
 - i. Planar Mode
 - ii. Align (XYZ, Best)
 - iii. Exit Planar Mode
 - iv. Set Aside
 - v. Repeat from Step#2

To Manually Unwrap

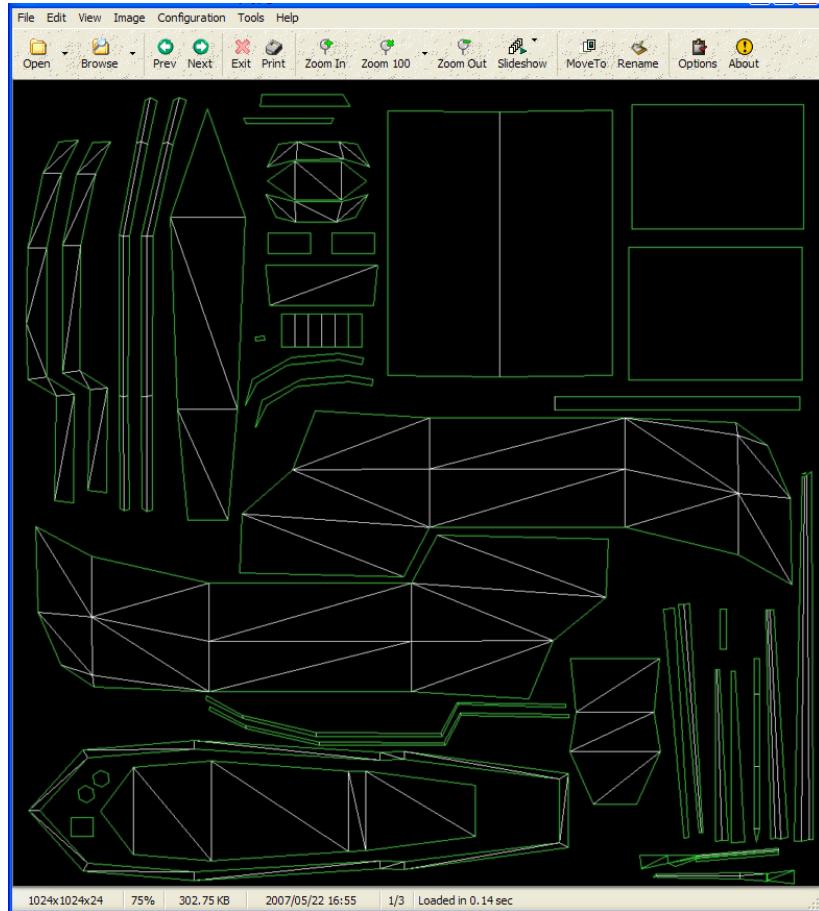
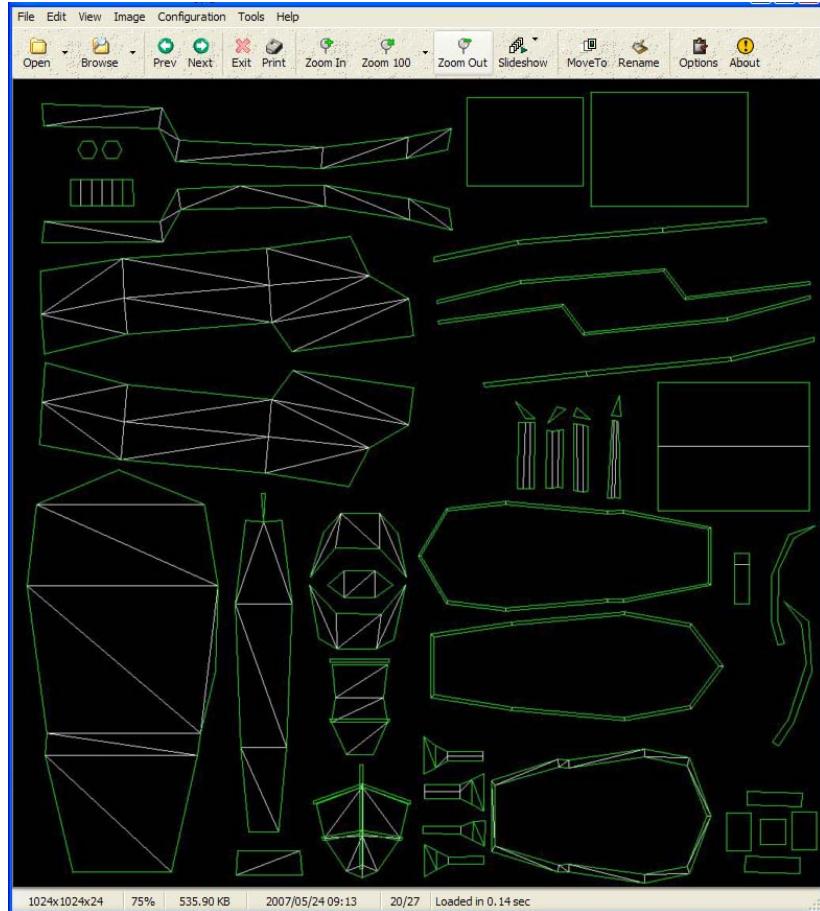
- Prioritize UV's
 - Give priority to UV's that need the most texture detail
 - UV's that need detail get "real estate" priority in UV space
 - Use the TestMap.jpg to judge spacing and clarity

REMEMBER!!

- Pack as tightly as possible to maximize real estate
- Give important areas more space than unimportant areas



Which one is better?



Lynda.com Suggestions

- Bump maps 6:37
- Reflection maps 2:54
- Opacity maps 3:57
- Editing maps 9:53
- Building a multi/sub-object material 9:08
- Using material libraries 8:39
- Mapping coordinates 12:34
- Sub-object mapping 9:34
- The Unwrap UVW modifier 10:58
- Using Photoshop to edit maps 8:03
- Project: Applying materials to a scene pt. 1
- Project: Applying materials to a scene pt. 2

What You Should Know After Today:

whether you realize it, or not...

- What is a material
- How do materials work
- How to apply materials
- Managing Materials
- Constructing materials
- Multi/Sub-Object Material
- Blend Material
- More UVW Mapping
- Map Channels
- UVW Unwrapping

2D Map Types

- BMP, JPG, TGA, PNG
- HDR, PSD
- RLA, RPF
- IFL (Image File List)
- MPG, AVI, MOV
- Lots More With Plugins

When To Use 2D Maps

- Man-made Patterns
- Realtime Applications
- Specific Objects
- Know Your Strengths

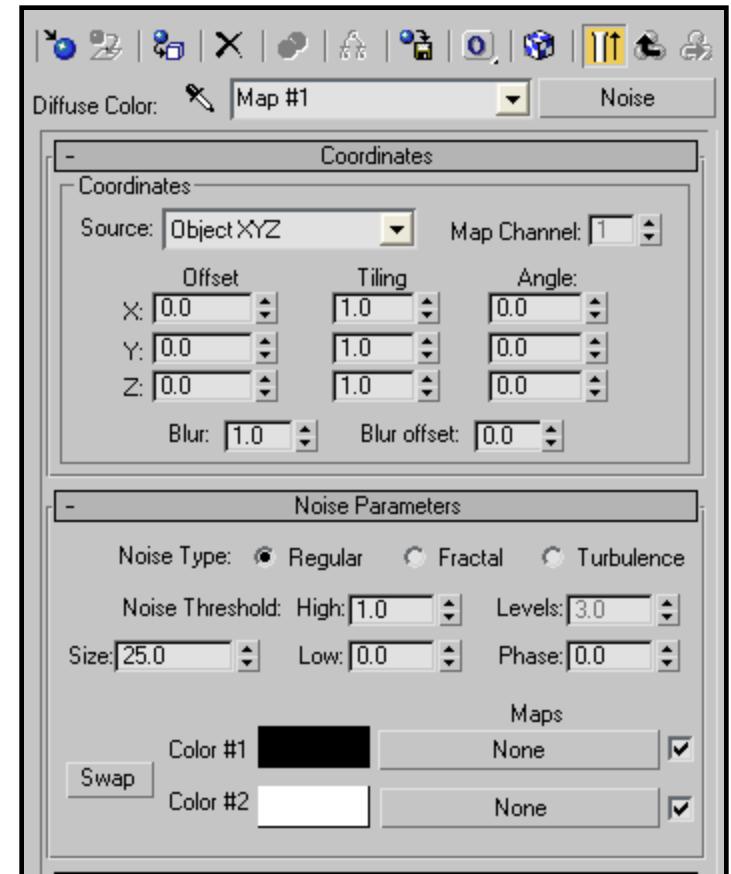


Procedural(3D) Maps

- 3D maps are patterns generated procedurally in three dimensions.
- Random/Chaotic Patterns
- Not specific, but more natural
- Longer Render Times
- Much Higher Detail
- More Combinations
- Don't have to worry about tiles

3D Map Coordinates

- Material Editor Coordinates
- World Or Object XYZ



3D Maps

- [Cellular](#): Generates a cellular pattern that's useful for a variety of visual effects, including mosaic tiling, pebbled surfaces, and ocean surfaces.
- [Dent](#): Generates three-dimensional bumps over a surface.
- [Falloff](#): Generates a value from white to black based on the angular falloff of the face normals on the surface of the geometry. The Falloff map provides greater flexibility when creating opacity falloff effects. Other effects include Shadow/Light, Distance Blend, and Fresnel.
- [Marble](#): Simulates the grain of marble with two explicit colors and a third intermediate color.
- [Noise](#): Noise is a turbulence pattern in three dimensions. Like Checker in 2D, it is based on two colors, either of which can be mapped.
- [Particle Age](#): Alters the color (or map) of a particle based on the particle's life.
- [Particle Mblur](#): (MBlur is short for Motion Blur.) Alters the opacity of the leading and trailing ends of particles based on their rate of movement.
- [Perlin Marble](#): An alternative, procedural marble map with a turbulence pattern.
- [Planet](#): Simulates the contours of a planet as seen from space.
- [Smoke](#): Generates fractal-based turbulence patterns to simulate the effects of smoke in a beam of light, or other cloudy, flowing mapping effects.
- [Speckle](#): Generates a speckled surface for creating patterned surfaces that can simulate granite and similar materials.
- [Splat](#): Generates a fractal pattern similar to splattered paint.
- [Stucco](#): Generates a fractal pattern similar to stucco.
- [Waves](#): Creates watery or wavy effects by generating a number of spherical wave centers and randomly distributing them.
- [Wood](#): Creates a 3D wood grain pattern.

When creating materials...

- “What does it feel/look like?” = Pick a Shader
- “What color is it?” = Pick a Diffuse/Ambient Color
- “How shiny is it?” = Set Specular and Glossiness
- “Is it transparent?” = Set Opacity
- “Does it have a pattern?” = Add a Map
- “Is there a surface texture?” = Add a Bump Map