# Understanding and Planning for UVs



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# Summary



What UVs are and how they are used to apply two-dimensional textures to three-dimensional objects

What a texel is and why texel density is important

How an art asset can be organized to plan for materials prior to laying out it's UVs

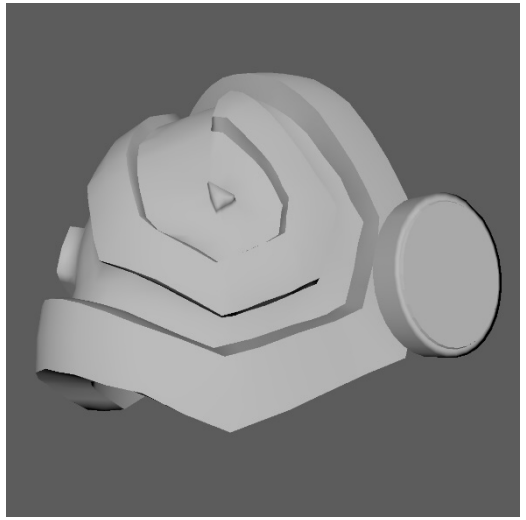
# Understanding UVs and Why They Are Important

# What are UVs?

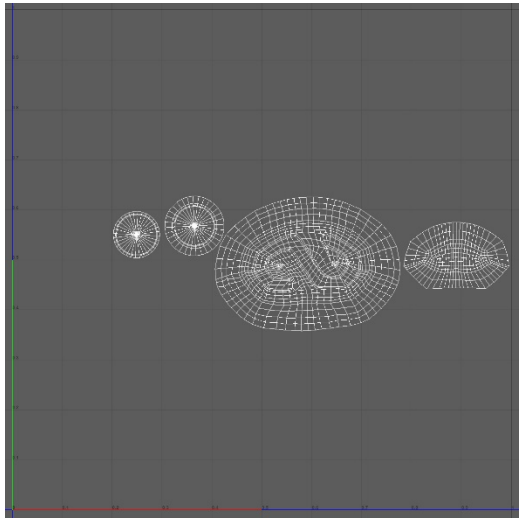
# UVs

UVs are two-dimensional texture coordinates that correspond with the vertex information for three-dimensional geometry.

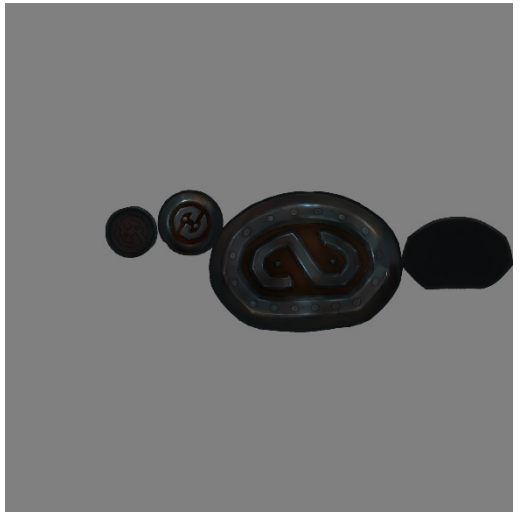
# Example of UVs and Corresponding Textures



**Mesh Objects**
Shown here are two polygon objects.



**UV Layout**
Shown here are the corresponding UV shells for the polygon objects.



**Texture**
Shown here is the texture for the objects that matches up with the UV layout.

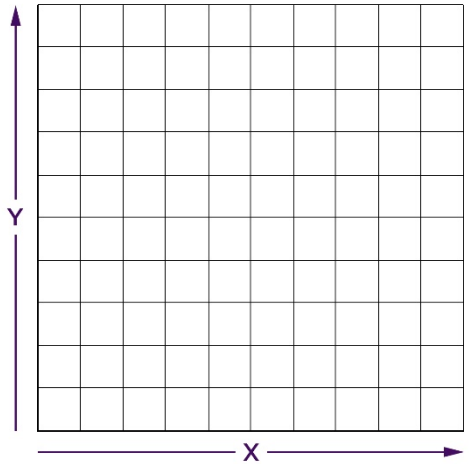
# Resulting Texture Applied to Mesh



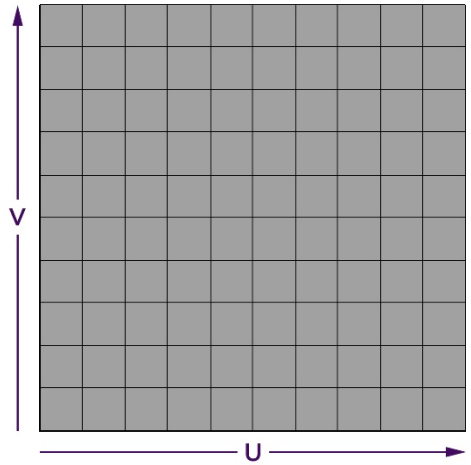
# Where does the term UV come from?



# Two-dimensional Coordinates




**Cartesian Coordinate Graph**




**UV Coordinate Graph**

# What is Texel Density?

# Texel

Texel is a blend word formed from the words **Tex**ture and **el**ement and is the smallest unit of texture space.  Texels, texture elements or texture pixels as they are often called are mapped to a single dot in three-dimensional object space.

# Texel (con't.)

Texels are not necessarily equal to pixels.

One screen pixel may be determined by many texels. (minification)

One texel may cover many screen pixels. (magnificiation)

# Texel Density

Texel Density is the amount of texture resolution on a mesh.

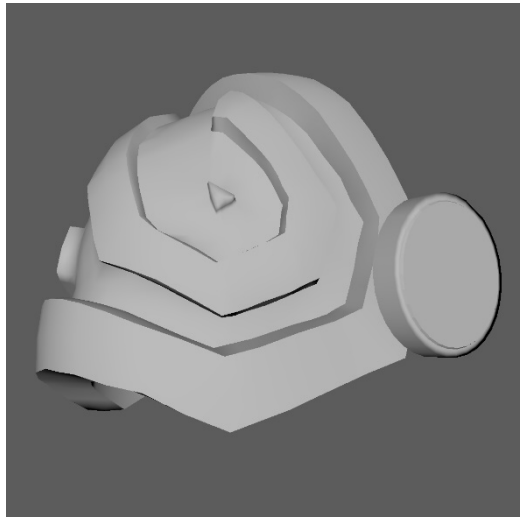
# Three Factors Which Impact Texel Density

**Mesh size**

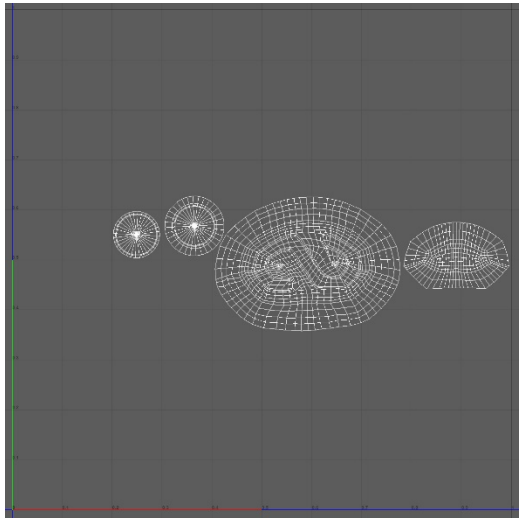
**UV shell size**

**Texture resolution**

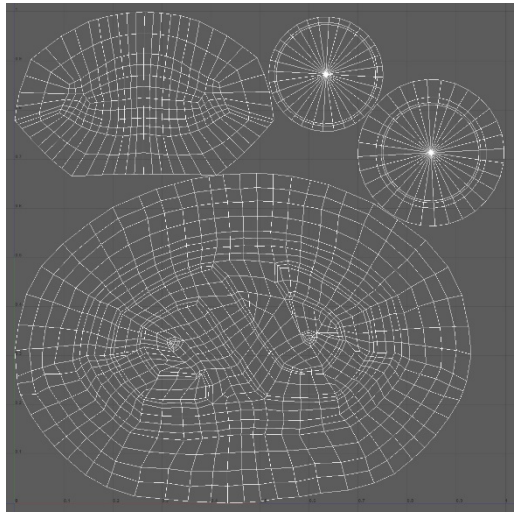
# Efficient Texel Density



Target Objects



Inefficient Texel Density



Efficient Texel Density

# Summary



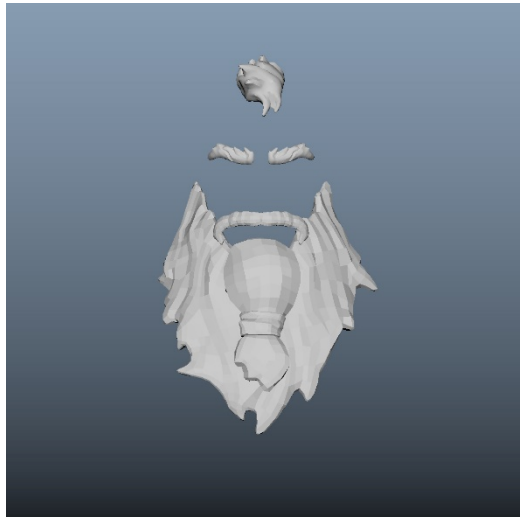
What UVs are and why they are important for game assets

What a texel is and why texel density is important when creating UVs

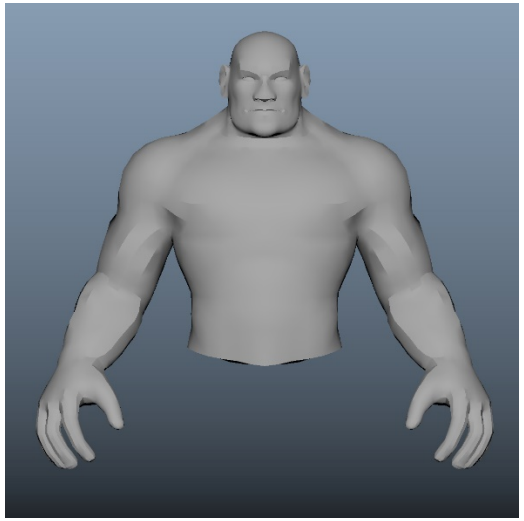
How to organize the pieces of our asset with their usage in Unity in mind using display layers and Maya materials

# Challenge

# Materials



hair



body



clothing