

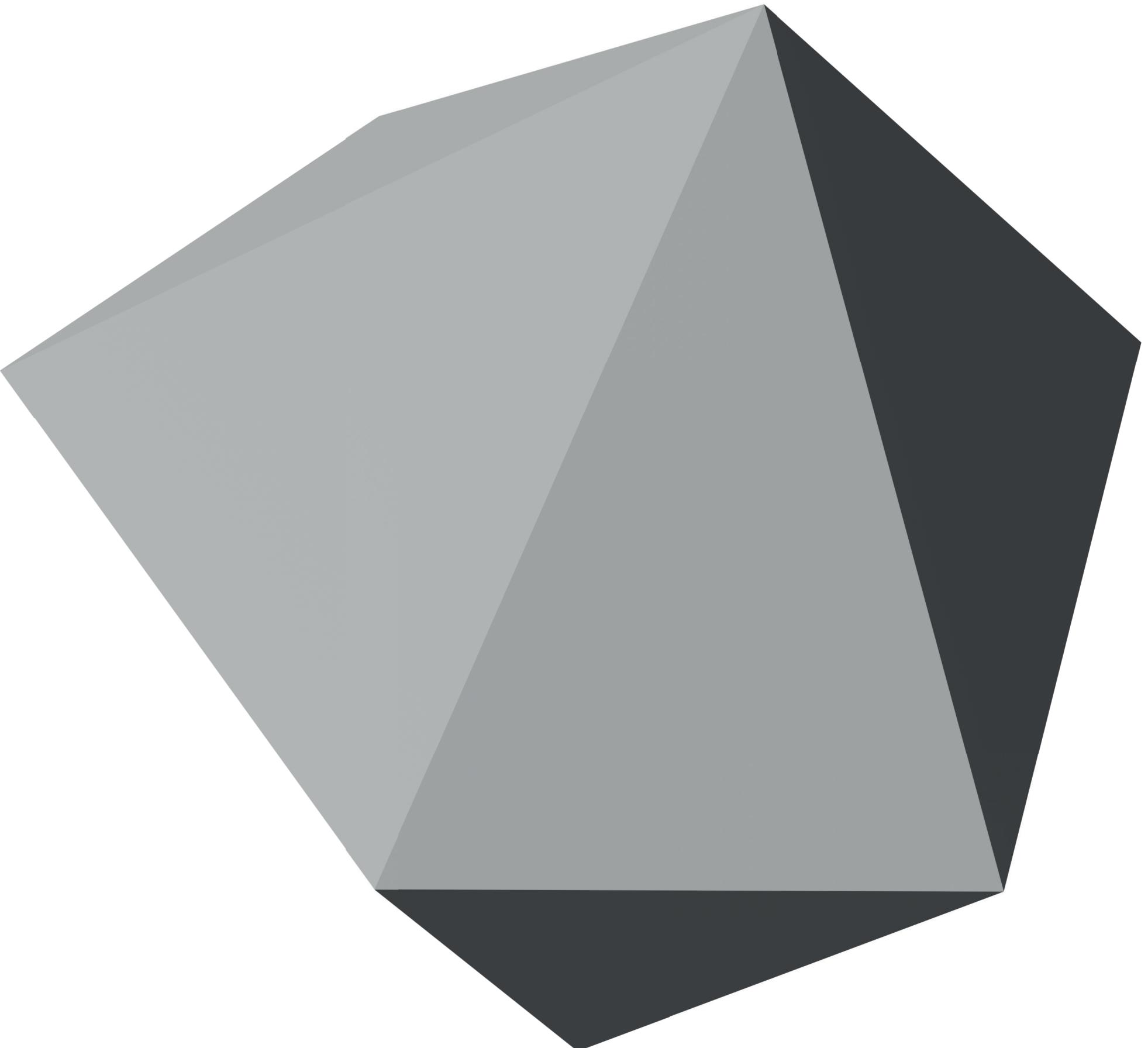
The digital polygon

All digital 3D models are made from polygons, but almost no one knows what they are. With this project I will show you what digital polygons are and what the differences are between a low and high poly count.

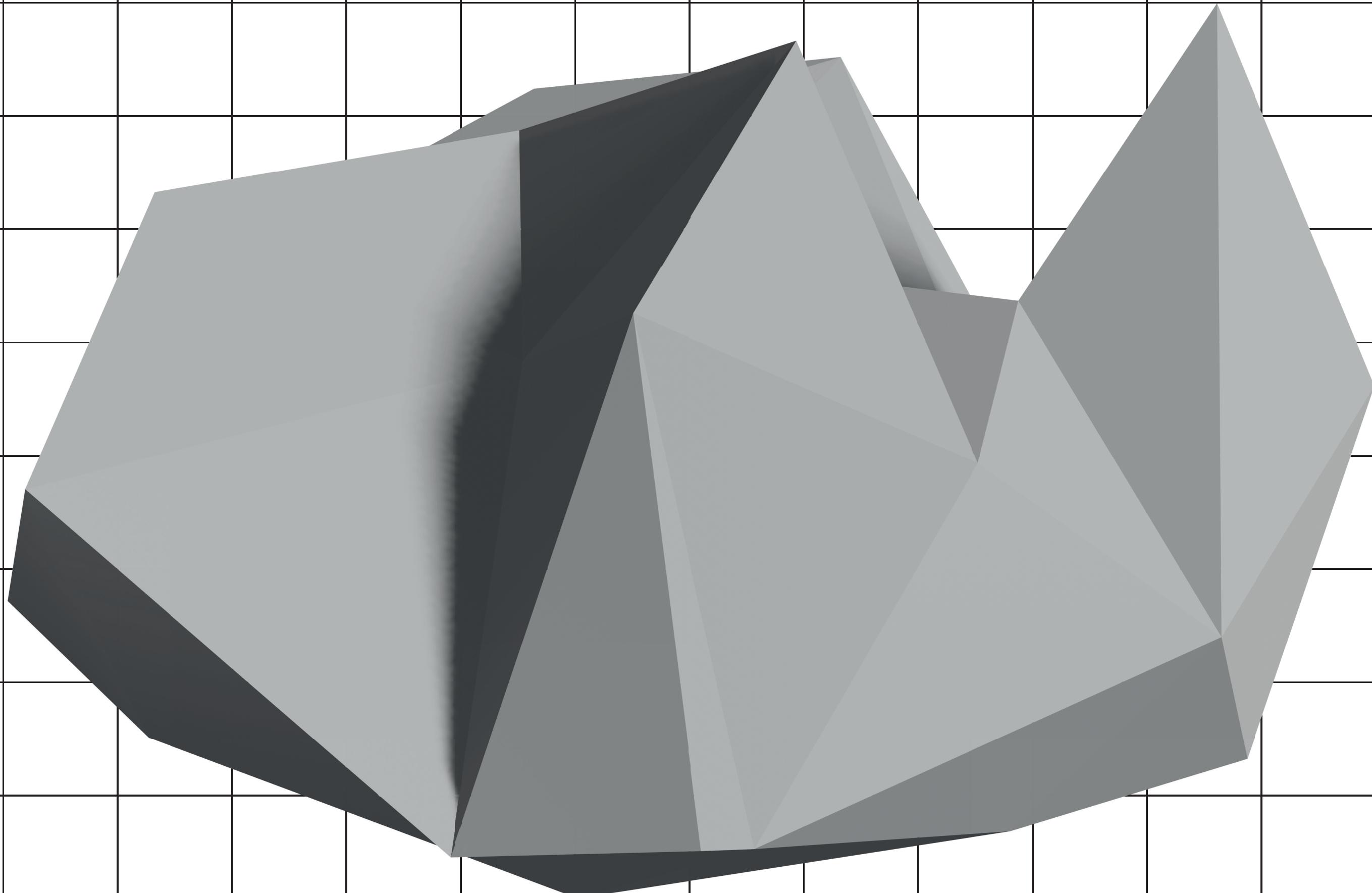
Personally these objects with a lower poly count make me feel nostalgic and remind me of video games that I grew up with. That is why I wanted to explore these low poly shapes that don't really get used anymore, because a high poly count is now the standard.

Divina proportione
geometry/proportions/
measurement systems

BA3 Studio Graphic design
Gill Decuyper







The polygon of digital 3D

Polygons are used in computer graphics to compose images that are three-dimensional in appearance. Usually (but not always) triangular, polygons arise when an object's surface is modeled, vertices are selected, and the object is rendered in a wire frame model. This is quicker to display than a shaded model; thus the polygons are a stage in computer animation. The polygon count refers to the number of polygons being rendered per frame.

Beginning with the fifth generation of video game consoles, the use of polygons became more common, and with each succeeding generation, polygonal models became increasingly complex. The answer is simple as ABC. Polygons are popular in the digital world. They can be called a kind of peculiar digital art. Polygons impart your image or text in a unique 3D, retro style. Initially, polygon graphics were used

for creating 3D models and scenes in videogames because of their render speed, which was achieved due to low polygonal resolution.

As a rule (but not always) polygons are triangular. They arise when an object's surface is modeled, vertices are selected, and the object is rendered in a wire frame model. The technique is quicker to display than a shaded model. Skilful digital artists even learn to avoid seams in polygon design.

Print

Mister Copy Antwerpen

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1 is the pixel

*Graphic
designer*

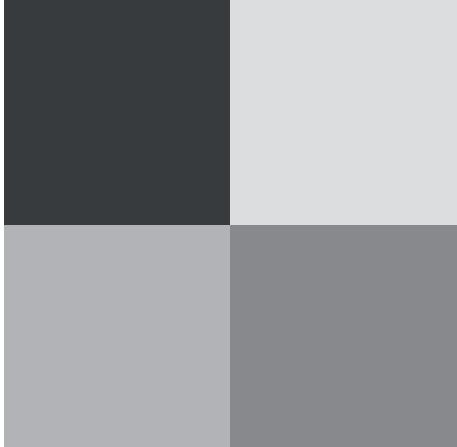
Sources

Gill Decuyper

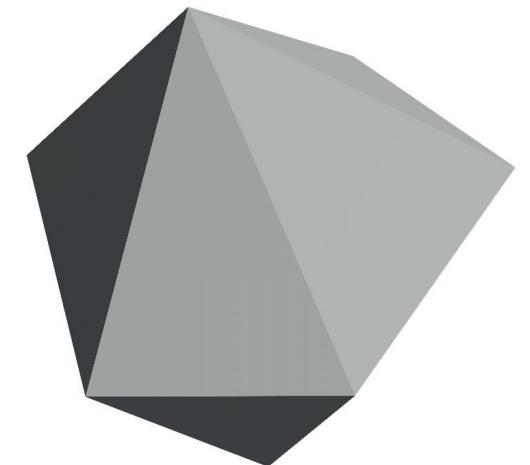
<https://www.gamedeveloper.com/art/why-are-so-many-devs-employing-a-retro-low-poly-mid-1990s-aesthetic>

<https://www.digitalste.com/post/what-is-a-low-poly-style-in-video-games-design>

<https://onextrapixel.com/polygon-graphics-what-they-are-examples-and-tutorials/>



4 pixels



9 polygons

I see the polygon as the pixel of digital 3D, because they both are the building blocks of their medium. The pixel is the building block of digital pictures or other 2D digital work. The polygon is the building block of digital 3D work.

Poly count

What is High & Low Poly in 3D Modeling?

The main difference between high and low polygon modeling is exactly what the name implies: whether you use a high number of polygons in your model, or a low number.

However there are other things to take into consideration when deciding the detail and poly level of each model. Most notably the textures you use in your materials.

Should I Use High or Low Poly?

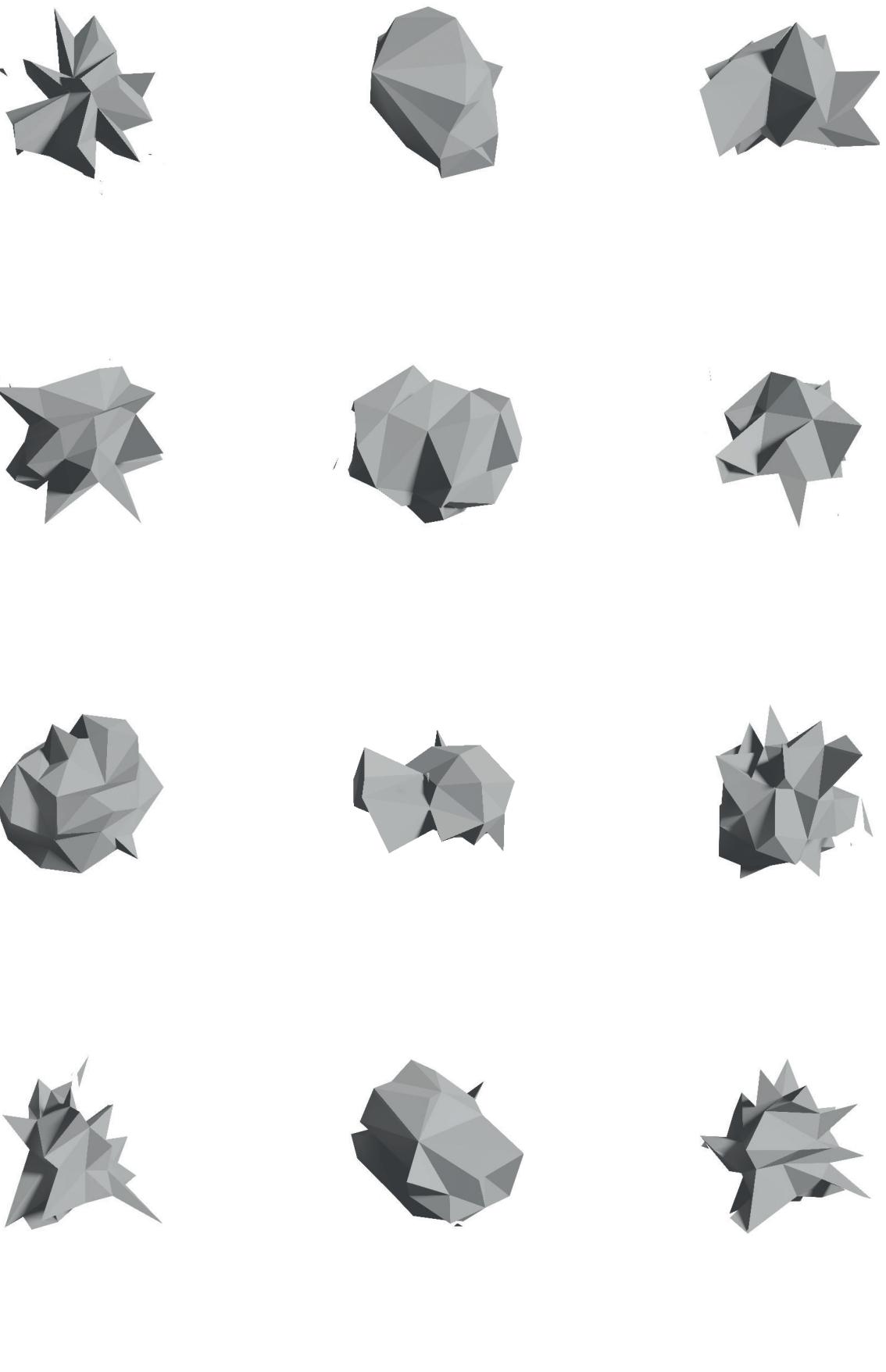
The answer to this question is highly dependent on how you intend to use your model once it's done.

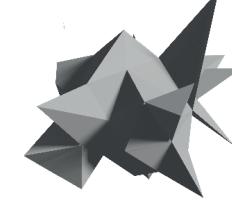
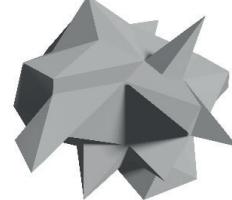
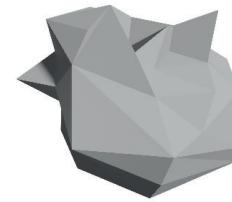
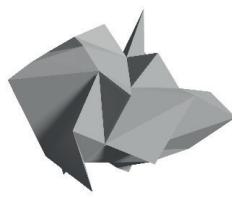
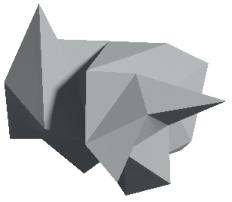
If you are making a model that you intend to use in a game,

or render in a real time engine such as Unreal or Unity, then you need to be heavily using low poly modeling. Low poly models tend to use less computational power to render, so they are more suited for these kinds of engines that need to rapidly calculate how your model reacts in the virtual environment.

However if you're producing a high quality render, maybe for marketing reasons, then you will often use high poly modeling.

The main strength of low poly modeling was briefly touched upon in the last section: ease of use. The lightweight size of these models can make them easier to work with if you're





doing a lot of on-the-fly rendering(common with game development).

This counts for both you and your workstation too. Low poly models can be a lot easier to load, view, and edit on your machine. This also generally leads to quicker render times. These models can also be easier to work on from a modeling perspective as well. It's generally easier to make edits to a less complicated mesh, compared to a mesh with millions of polygons.

The downside of low polygonal meshes is that it's difficult to achieve the high level of detail you may want in your finished product. Because you are using fewer polygons, you have less geometry that you can manipulate into certain shapes. This means things like creases on clothes cannot be made in the mesh.

However there is a way around this. Using normal maps and height (or displacement) maps can simulate the way light behaves on the object in the render. This can give the illusion of details being on the model directly.

Low poly art

Why is low poly back?

A new sort of “retro” visual style has crept into indie development.

The flat 8-bit pixel art revival has been with us for some time now. It’s sometimes employed for a self-consciously nostalgic feel, harking back to the touchstones of the developer’s childhood in the 1980s. Sometimes, it’s used to convey ironic detachment. But most developers employ the style because they simply love the stark simplicity of the constraints it imposes.

But lately, there has been a rise in a low-poly aesthetic, similar to that of early PS1, Sega Saturn, and N64 game graphics.

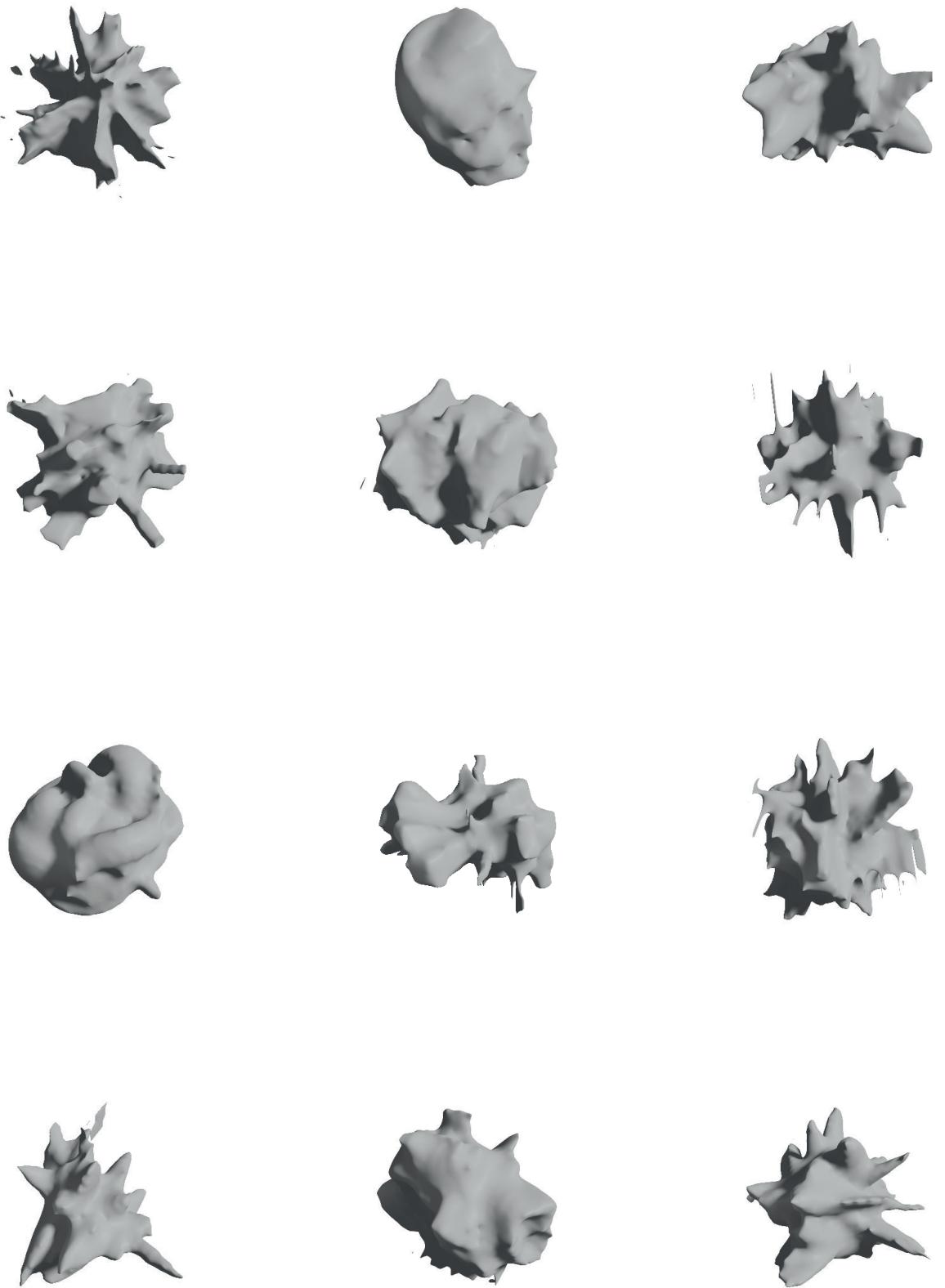
This emerging trend evident in games like Back in 1995, MacBat 64, Racing Apex, morphē, and Else Heart may simply be a younger cohort of indie developers who want to celebrate or emulate the titles that made them fall in love with

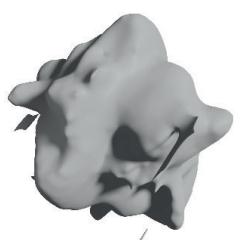
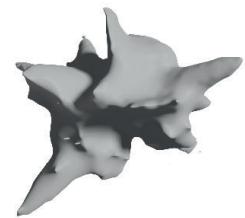
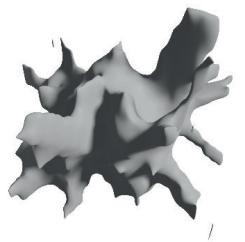
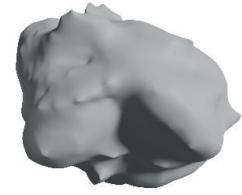
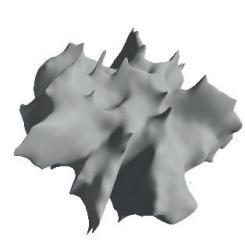
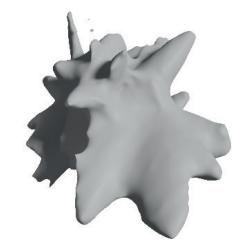
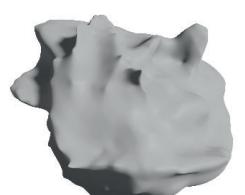
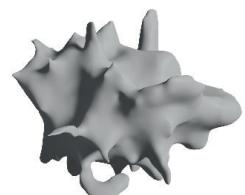
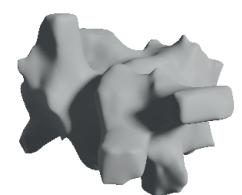
games. But like pixel art before it, it’s not as simple as wanting to recapture childhood.

The deliberate choice of a minimalist low-poly art style is a movement toward making the player use their imagination. It’s a way of creating a visual style that simplifies and clarifies aspects of the game. It’s yet another tool that lets developers keep a clear vision of what their game should be.

Activating imagination

A mid-1990s visual style also harks back to a time when players were required to smooth out the blocky textures wrapped around the spiky character models in their heads.





Aesthetic

"For me, a very important part about games was always that they left some room for your own imagination," says Horn. "If a game tells and shows you every little detail, it's just not memorable enough. It becomes somewhat boring over time."

A game's visual style needs to convey many things. It needs to tell you what the world and its characters look like, but also hints at how the player interacts with this place. It needs to clarify what you are doing and what you are looking at. Since gaming's inception, players have needed to fill in some of the gaps.

A character made up of a few dozen polygons takes the player in this way, though not as much as a character made up of a few dozen pixels.



Nostalgia

While the low-poly style does have many different utilities for developers, many admit to feeling a little thrill at creating games that look like the ones they used to cherish.

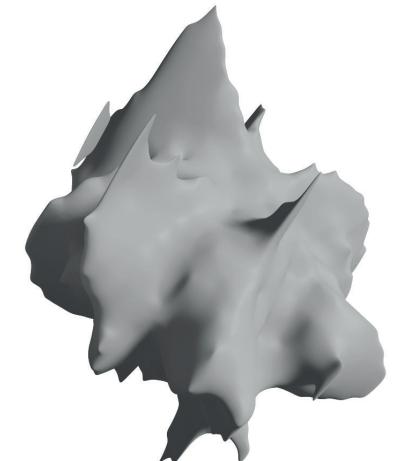
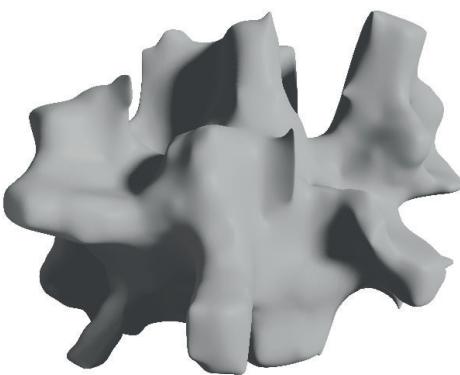
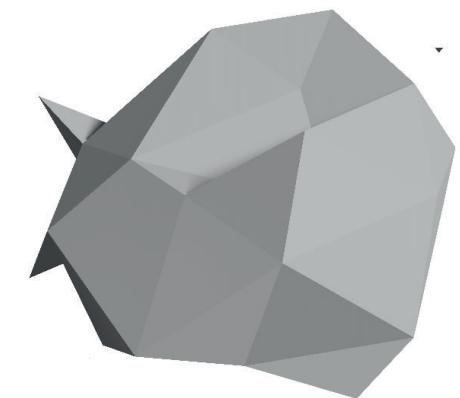
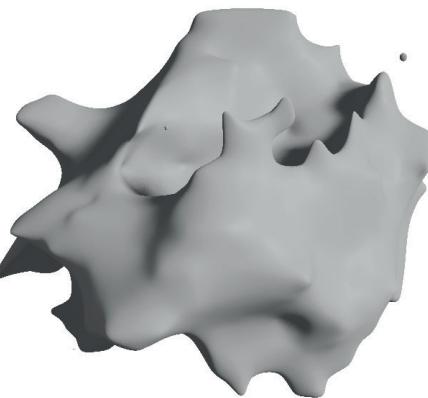
Many players can likely remember the first time they felt that gaming be a big part of their lives. That first spark that drew players to games is often an important memory, and aspects that touch on that, such as a similar art style, can draw out that feeling from them again, creating a pleasant nostalgia.

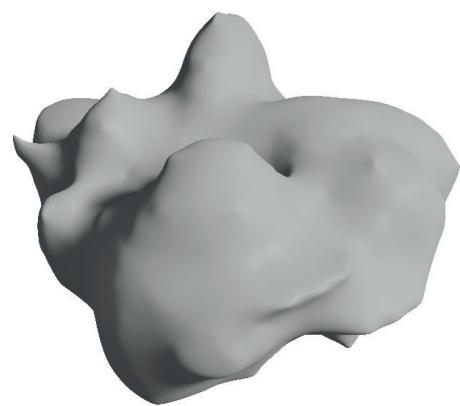
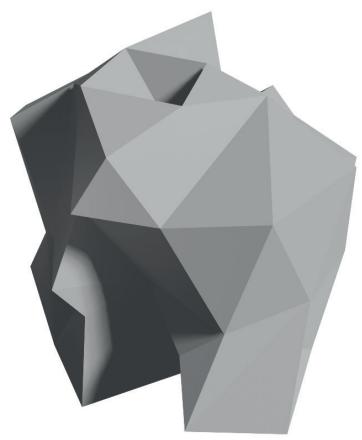
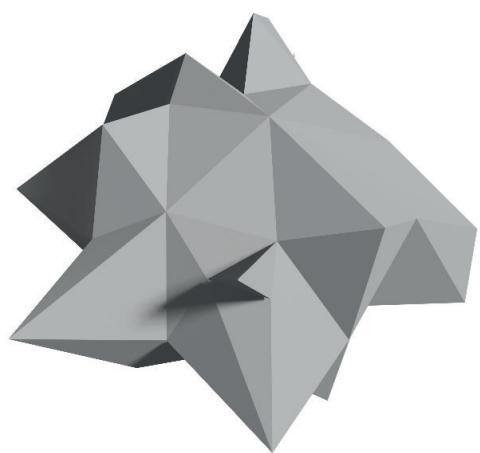
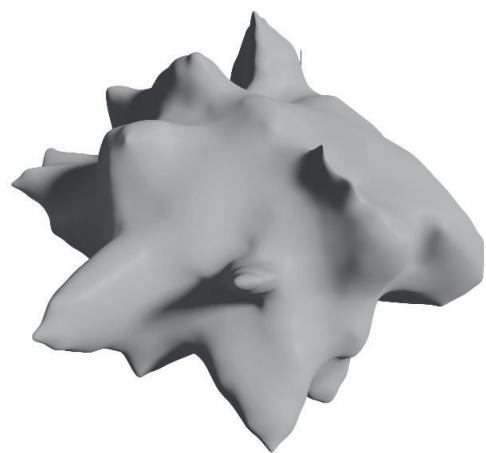
"This is the style I grew up with in my teens and I'm really fond of it." says Takaaki Ichijo, developer of *Back in 1995*, a mystery game heavily-inspired by the original 1990s *Silent Hill*'s look, play style, and story.

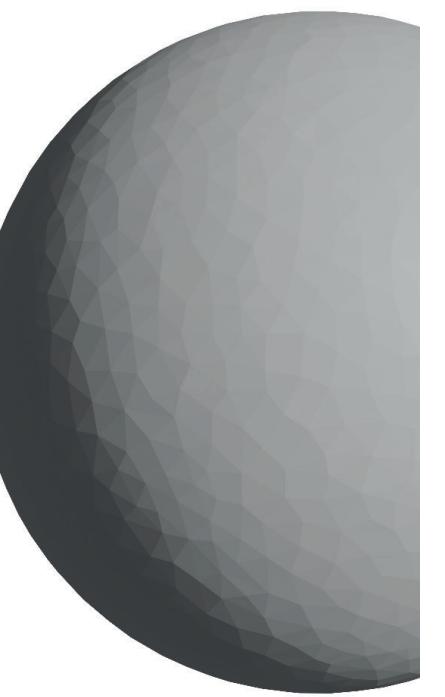
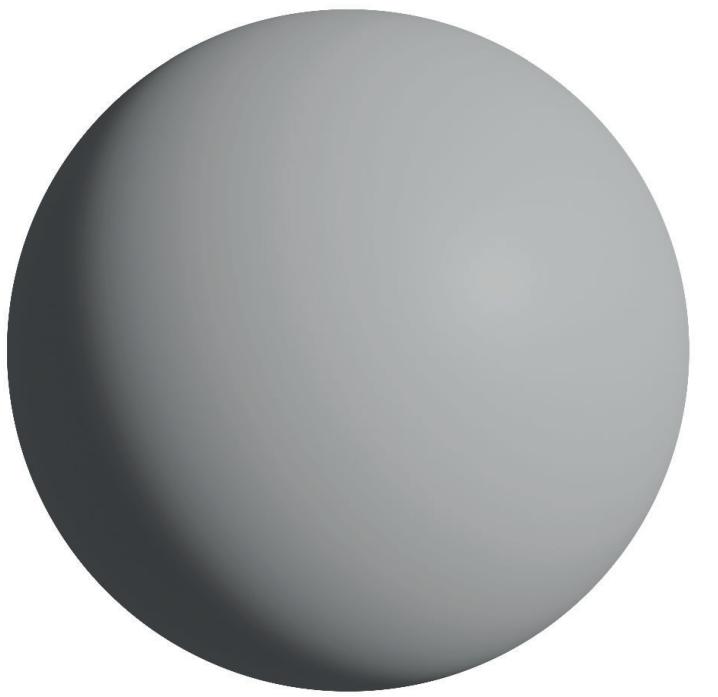
Not only does this look back give a sense of nostalgia to these developers, but it is also an important means of conveying the history of the medium.

Models that are said to be low poly often appear blocky and simple while still maintaining the basic

shape of what they are meant to represent. With computer graphics getting more powerful, it has become increasingly computationally cheap to render low poly graphics. Some artists use the resulting low-detail from a low polygon count as an aesthetic rather than as an optimization technique. They are often used by indie developers due to being faster and cheaper to create. In addition, there is an element of nostalgia to low poly styles, hearkening to older video game consoles such as the Nintendo 64 or the PlayStation. Since they often achieve a certain retro style, serving as a 3-Dimensional analog to the 2-Dimensional pixel art









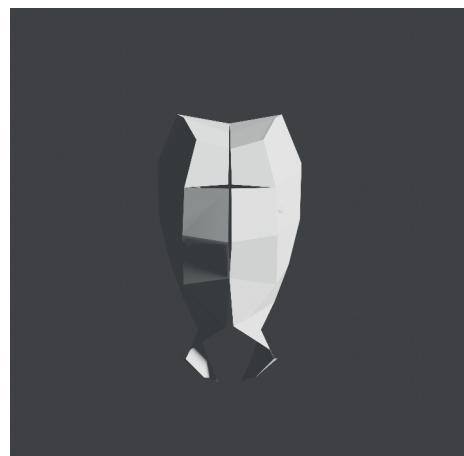
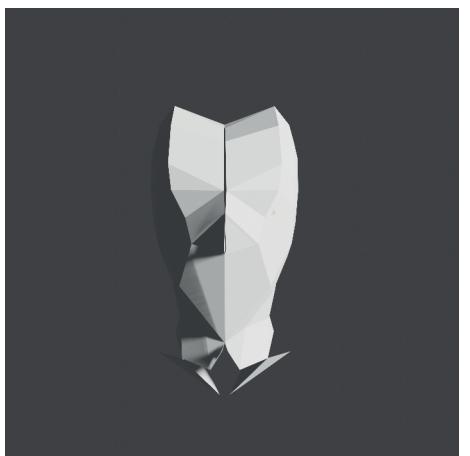
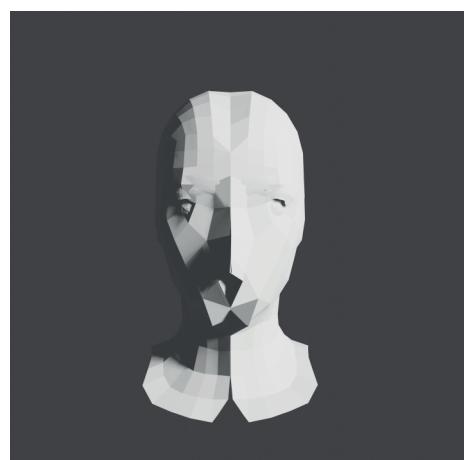
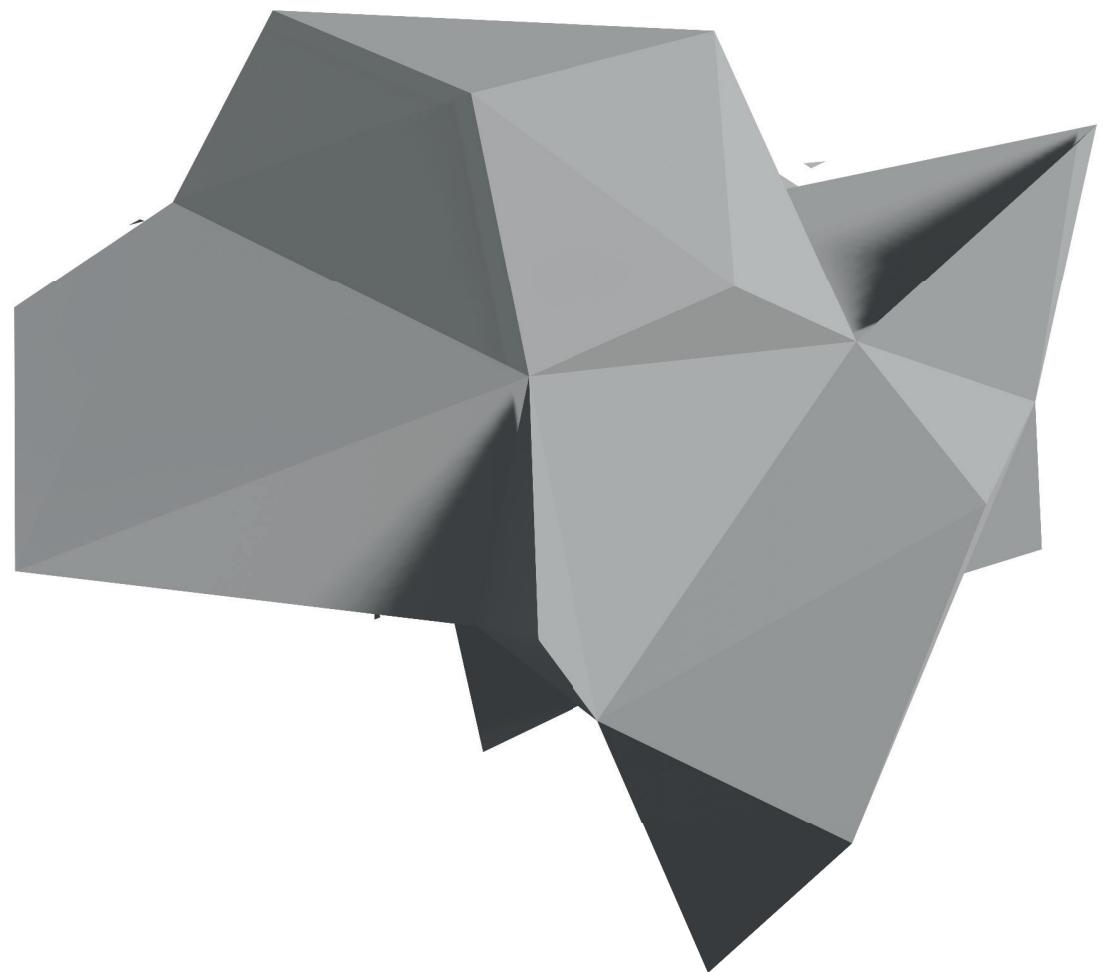
Poly count

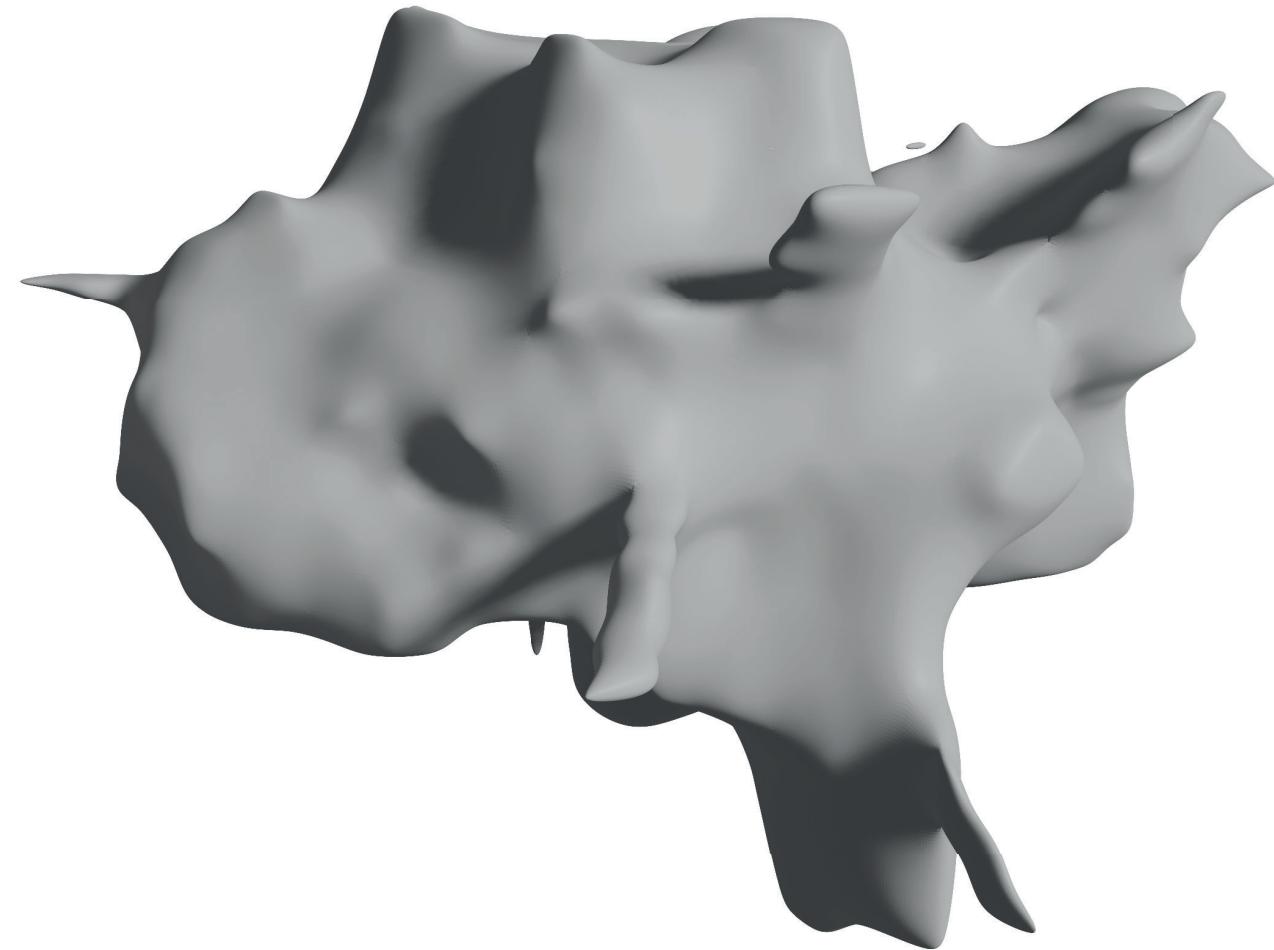
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51 polygons



Poly count

86145 polygons
1518 polygons
87 polygons
9 polygons





Poly count

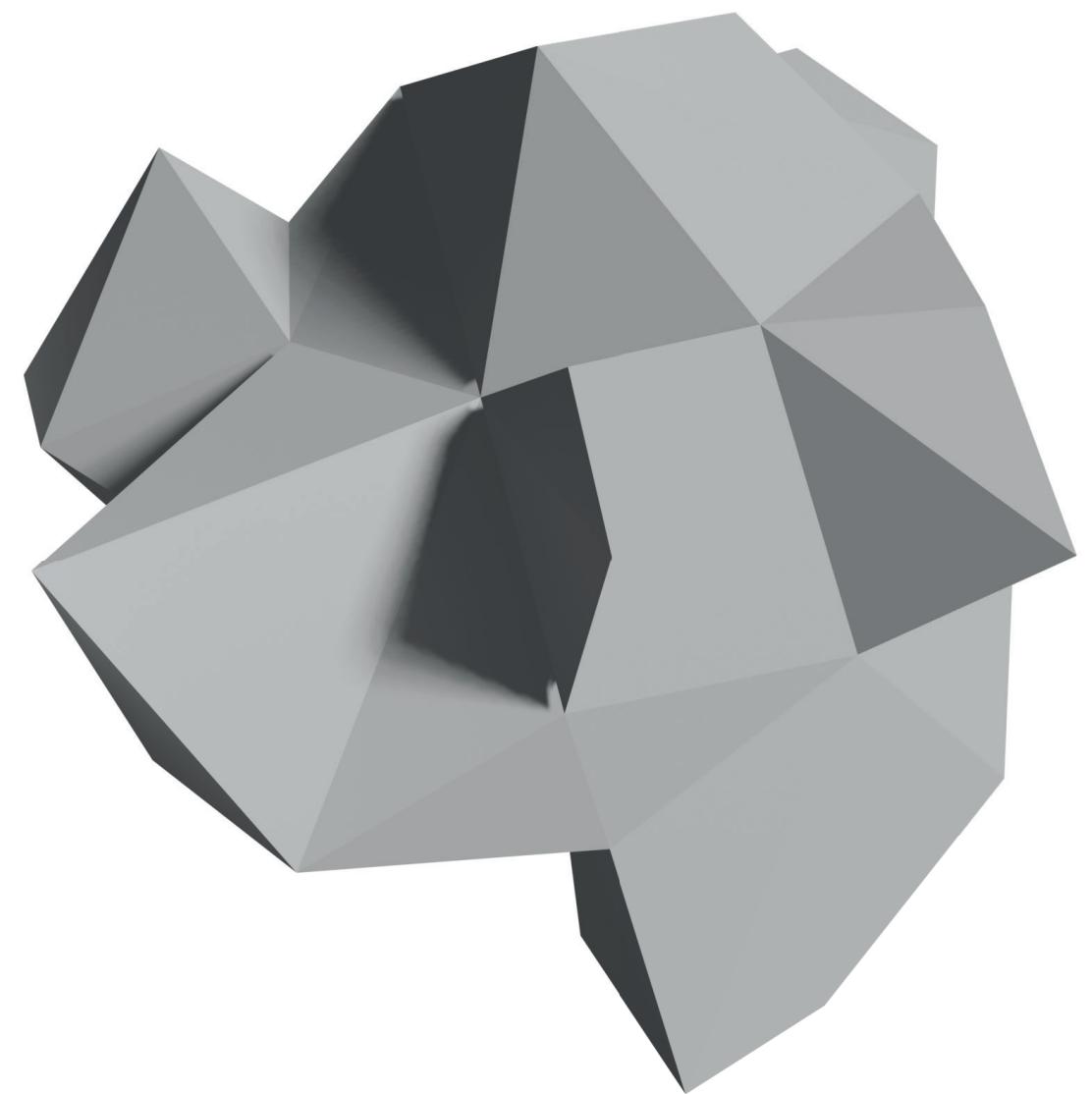
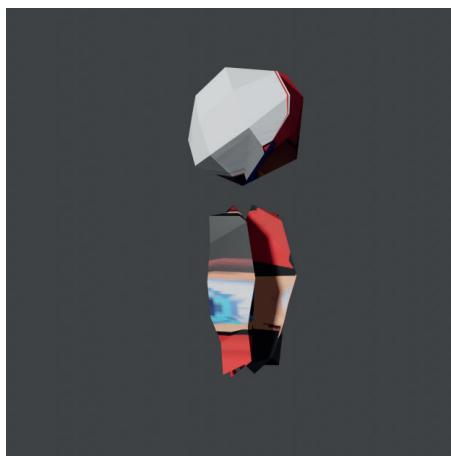
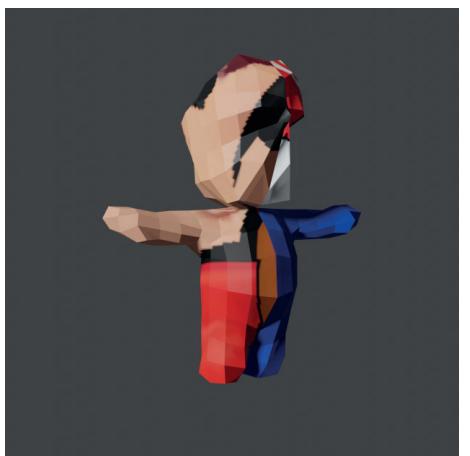
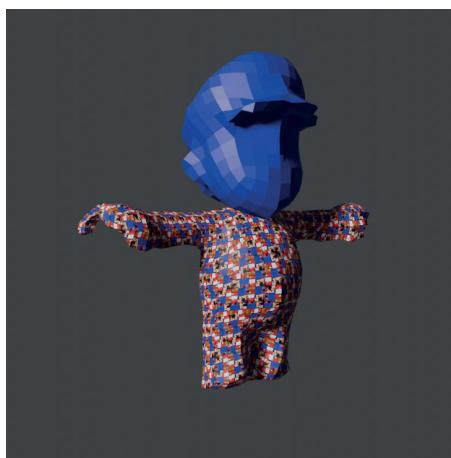
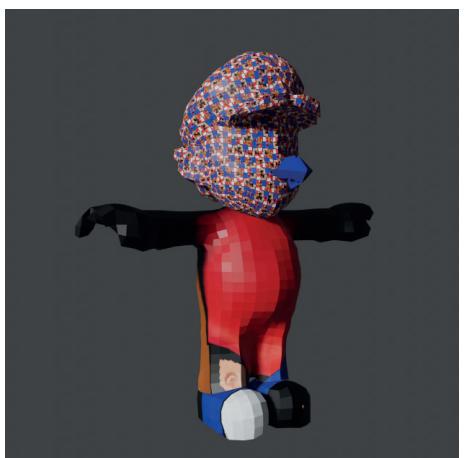
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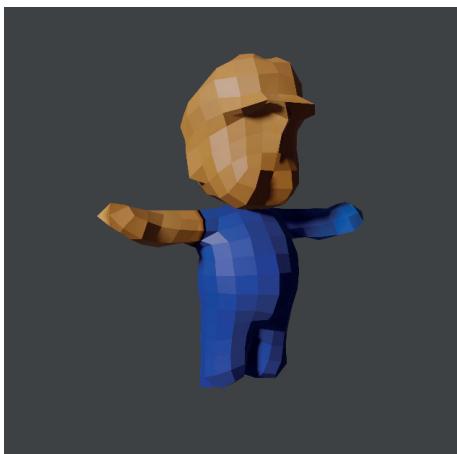
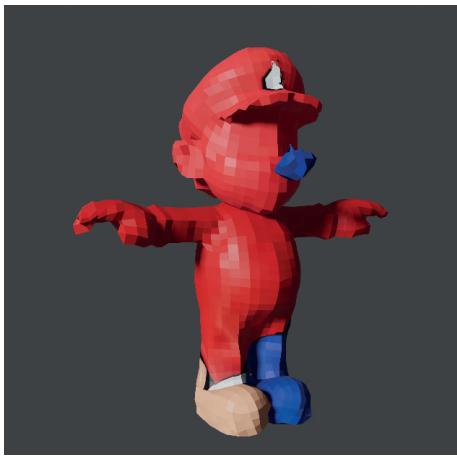
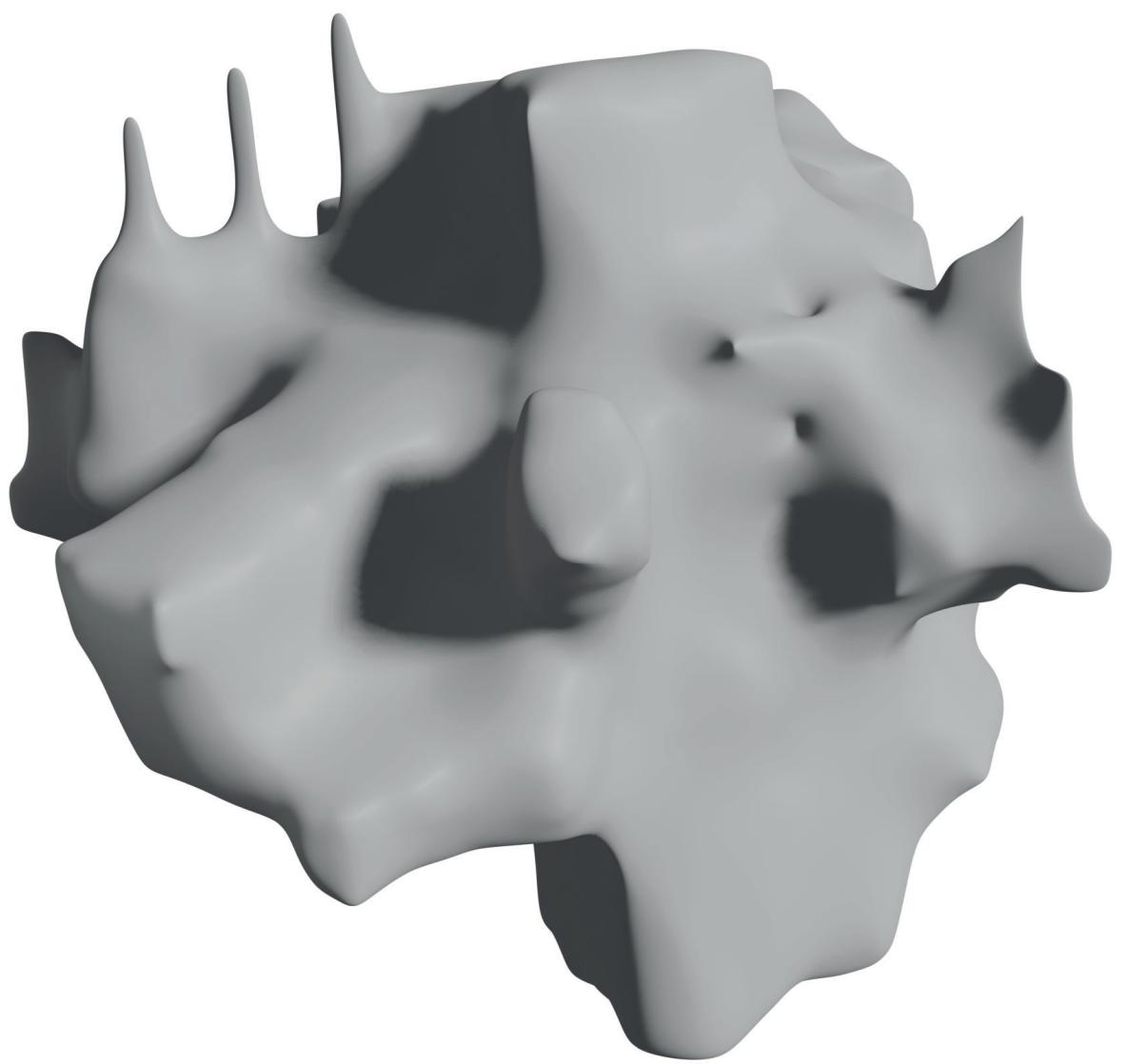


Early experiments

From a high to a low poly count, using models found online.



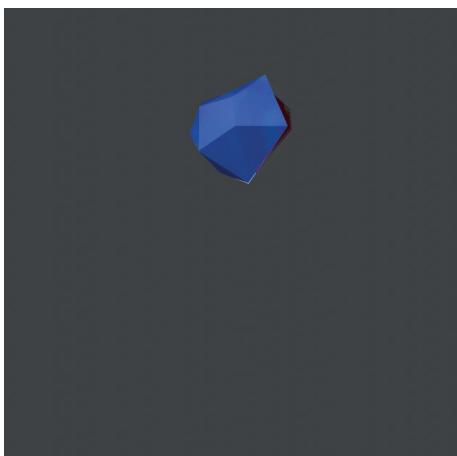


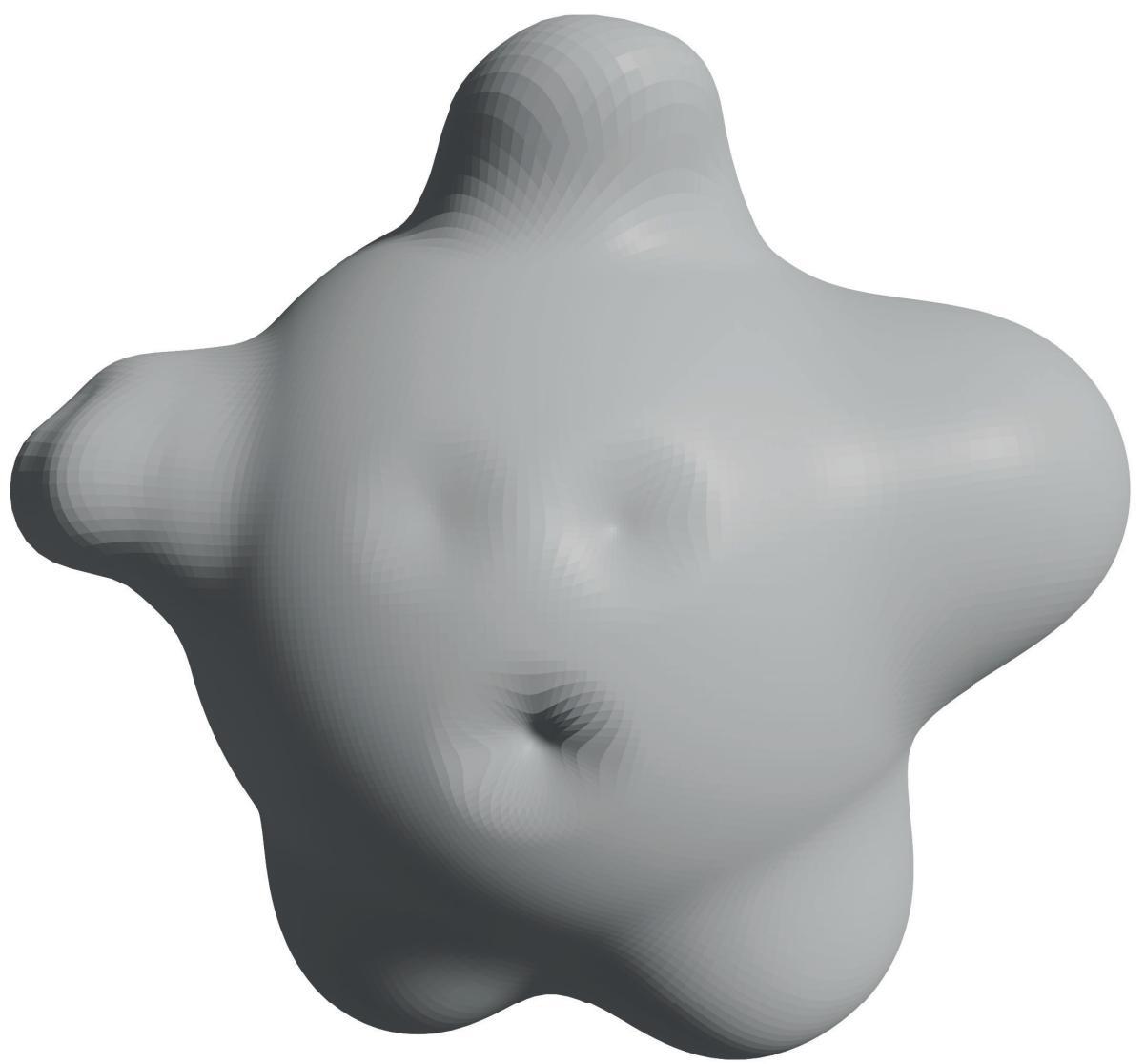


Poly count

61512
42

polygons
polygons

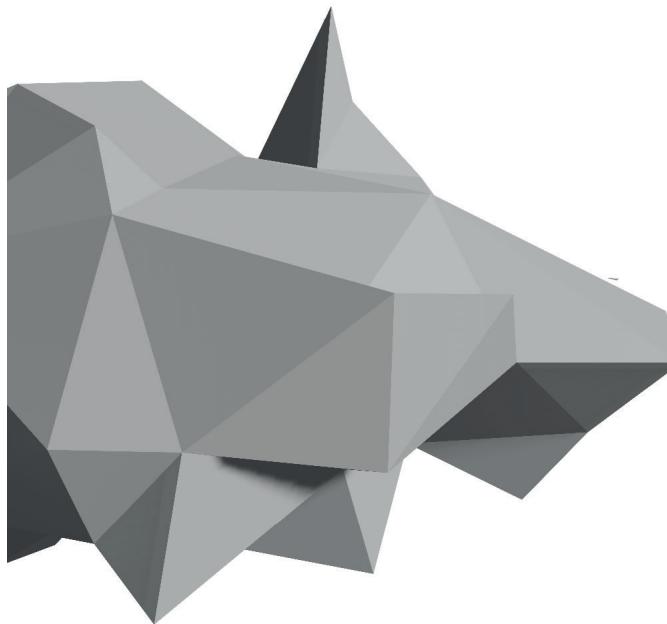




Sculpting

My goal is to show the beauty of the low poly aesthetic and the loss of detail. Instead of taking online models I wanted to experiment by making my own models in blender with the

sculpt function. On the left you see the shape with a high poly count, and on the right you see the same shape but with a low poly count.



Generative design

1. You can see that I randomized a bunch of cubes via coding in blender with geometric nodes.
2. Then I used the remesh modifier to make it one solid mesh.
3. I apply a subsurface modifier to smooth out the model. This modifier subdivides the polygons to give it a higher poly count.
4. I apply 2 decimate modifiers to lower the poly count to achieve the desired simplistic model

