Use 3D Scanning to Make Low Poly 3D Models

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https://learn.adafruit.com/use-3d-scanning-to-make-low-poly-3d-models

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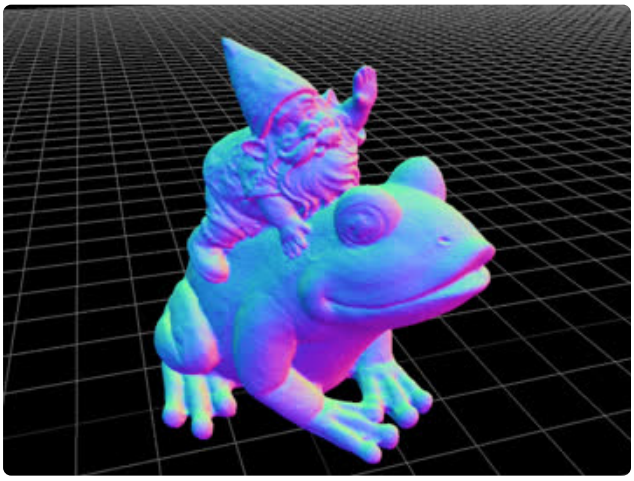
Overview

Low poly art is a unique and interesting style that is ideally suited for 3D printing.

If you've ever been interested in making a low poly model of your own but didn't know where to start, this project is for you!

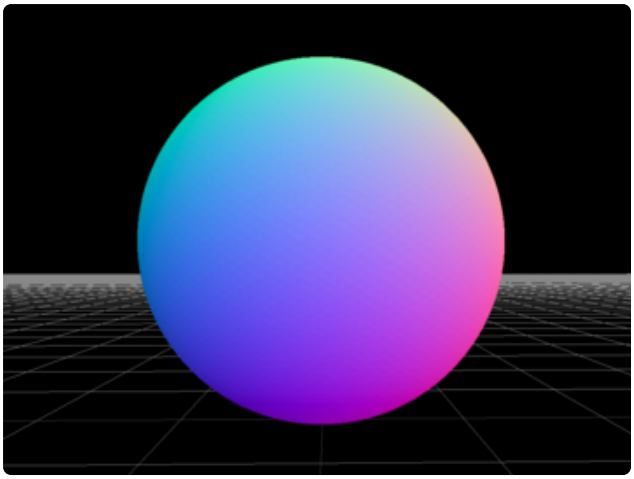
In this project, you'll create a 3D scan using your phone and convert it into a low poly model perfect for 3D printing or displaying in VR/AR.



If you're not interested in 3D scanning, you can also skip straight to the 3D Low Poly Generator step to make your own low poly models using 3D files downloaded from sites like printables.com (https://adafru.it/10fq) and thingiverse.com (https://adafru.it/10fr).

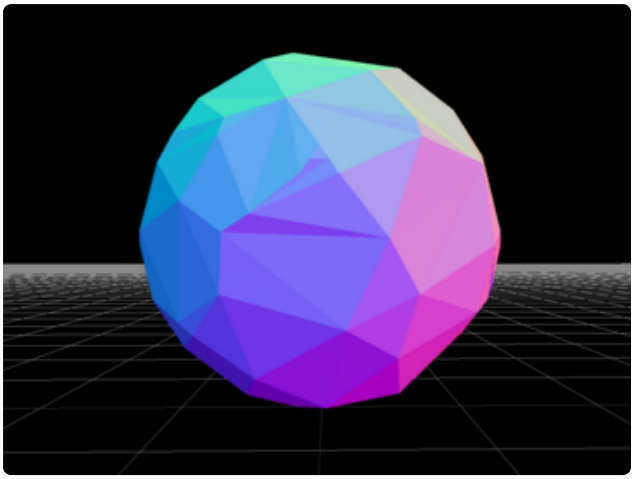
What is low poly?

Low poly (short for Low Polygon) is a term used for polygonal mesh models that have a reduced number of polygons (also referred to as facets, triangles, or faces) compared to other models. For example, here is a mesh model of a sphere, composed entirely of triangles.



This sphere is composed of 12,600 triangles.

File size: 640 kb

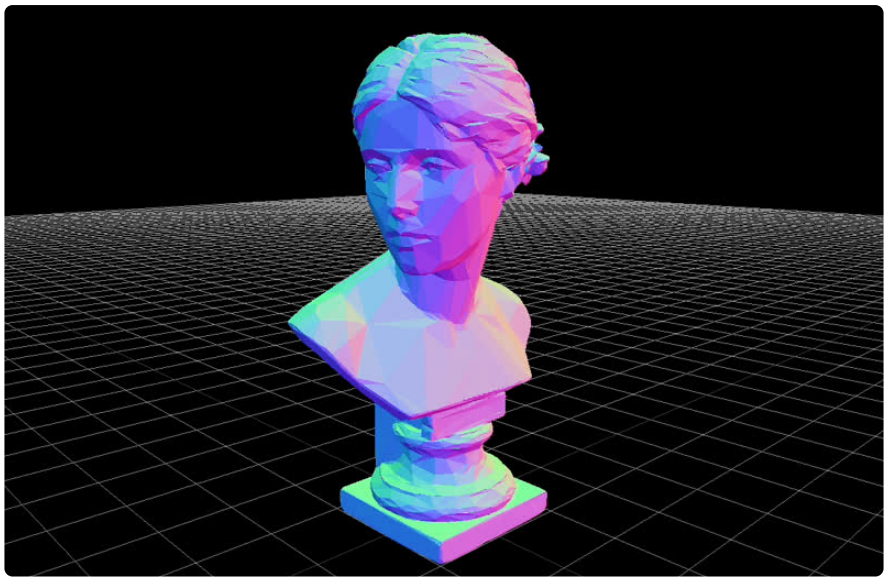


This sphere is composed of 86 triangles.

File size: 11 kb

As you can see, the difference in the number of triangles used makes a big difference in the appearance as well as the file size of a part.

Using the 3D Low Poly Generator (https://adafru.it/10fo) website, you can reduce the number of polygons on a 3D model and make your own low poly masterpiece, no 3D modeling experience required!



Creating a 3D Scan

Creating a 3D scan is a simple and fast process, and can be done with only a mobile phone.

I'm using Polycam (https://adafru.it/10fu) (available for iOS, Android, and web) in this guide, but there are many 3D scanning apps available for mobile devices that you can select from.

Polycam offers a Photo Mode for creating detailed 3D models using a set of photos, ideal for small objects with fine features.

Create Photo Set

Your 3D model is only going to be as good as the pictures used to create it. Keep these bullet points in mind:

Clean, even lighting
Matte surface on model
Steady hands (or tripod) for the phone
Turntable for steady movement

Photo Mode

Polycam offers a Photo Mode for creating detailed 3D models using a set of photos, ideal for small objects with fine features.

I took 123 photos of this gnome riding a frog, but anywhere from 50-150 photos should be sufficient for most models.

Process 3D Scan

Once you've captured all sides of the model, upload the photos in Polycam for processing.

If you're using a turntable or moving the model during the scan, make sure you've selected Object Masking so Polycam can isolate the 3D model.

At this point, it's a good idea to take a look at your model and go through the following checklist:

- Are there any holes in the model?
- Did any shiny or reflective spots not show up?
- Does the model look complete?

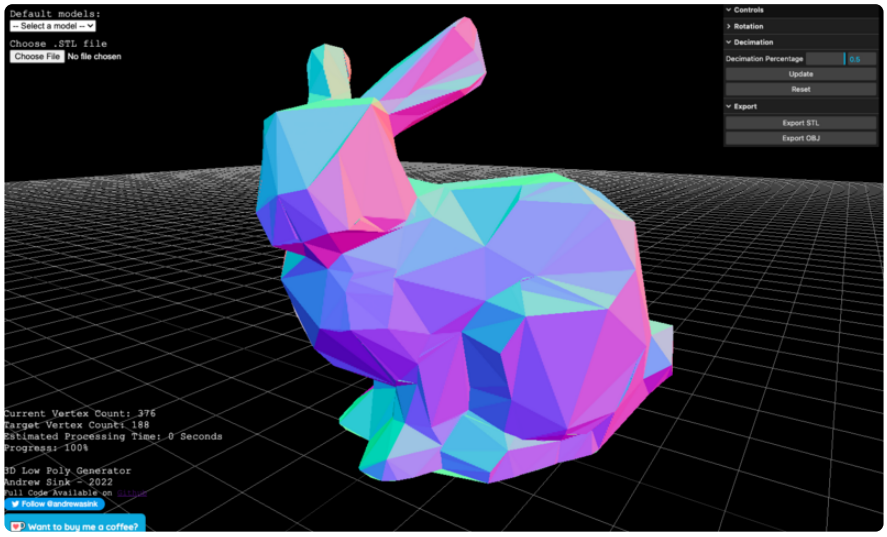
If the answer to any of these questions is **NO**, consider trying another scan. Issues with the model can be much harder to fix after it has been exported.

Export 3D Model

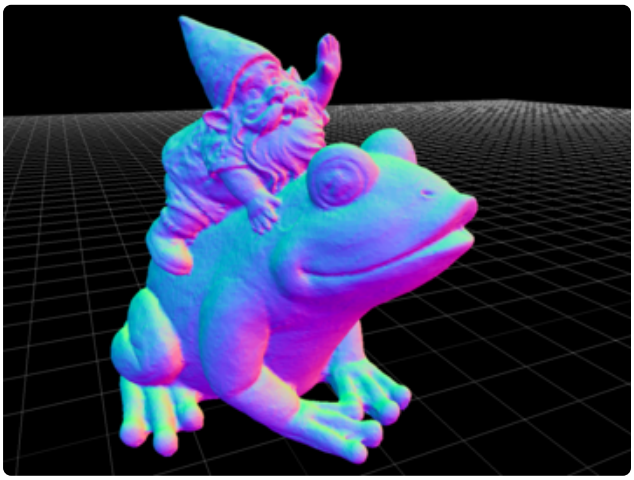
Polycam can export both .obj as well as .stl files. The .obj file includes the color texture as well as the mesh, which you don't need if you're only going to be editing the mesh.

Export the model as an .stl file from Polycam, which can be used by most CAD and mesh editing programs.

Creating a Low Poly Model



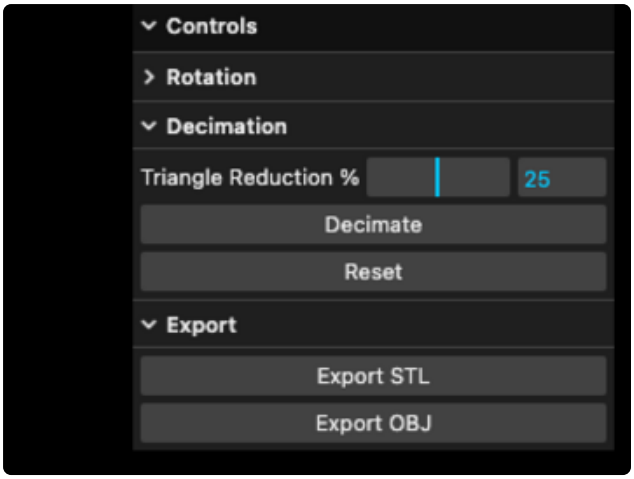
Using the 3D Low Poly Generator (https://adafru.it/10fo), models can be decimated (triangle count reduced) to quickly and easily create a low poly model. This generator runs completely in-browser, with no additional software download required.



Import 3D Model

Click Choose File to select your 3D model. The 3D Low Poly Generator supports .stl files.

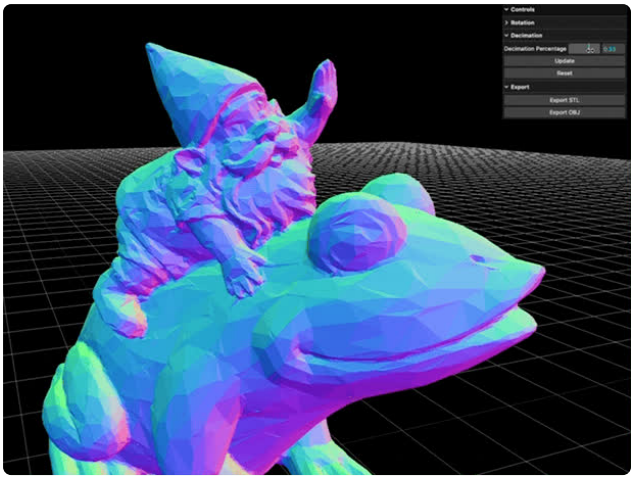
You can import your 3D scan here, or any other .stl model downloaded from sites like printables.com (https://adafru.it/10fq) or thingiverse.com (https://adafru.it/10fr).



Adjust Decimation Amount

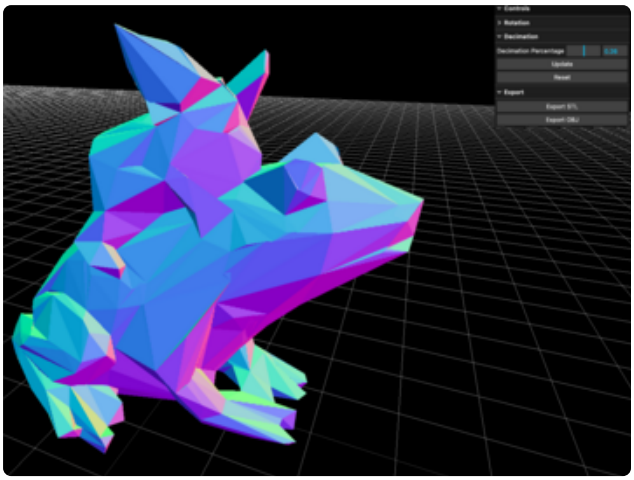
Triangle Reduction % controls the percent reduction (50 will remove half the vertices, 10 will remove 10%).

Moving the slider will adjust the percent reduction.



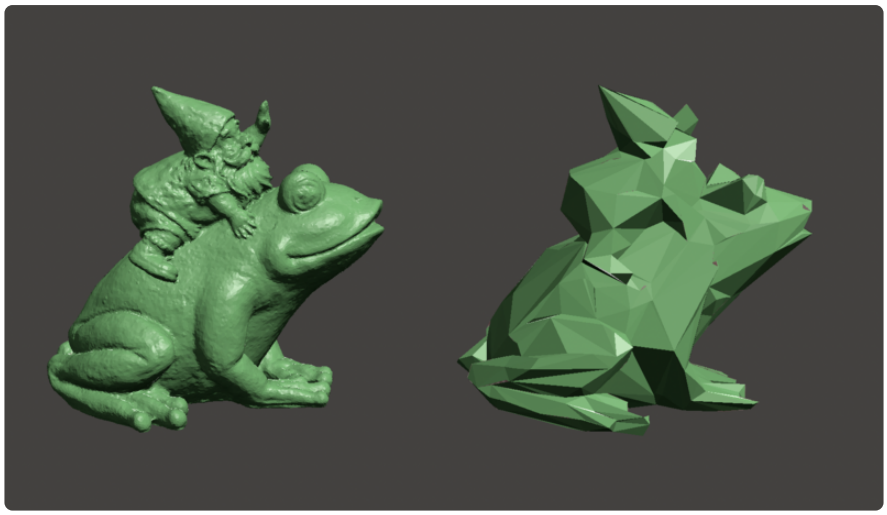
Updating Model

You can select Update multiple times to continue removing triangles until you are satisfied.



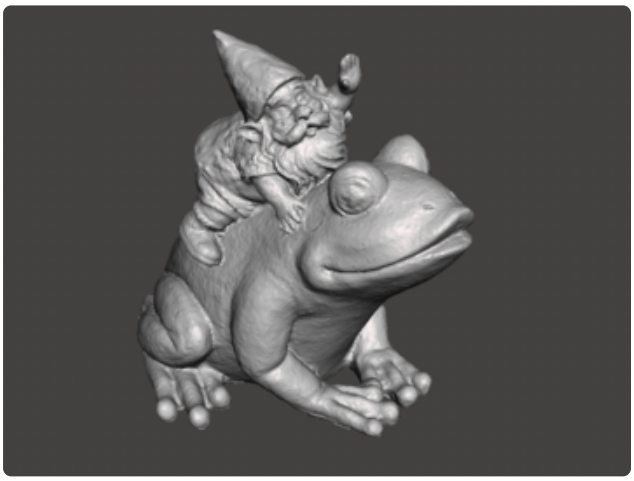
Export 3D Model

Export STL will export an .stl that can be imported into a mesh editing program for further processing or sent directly to a 3D printer.



Open the model in Meshmixer and rotate / scale as needed.

Putting the original and low poly models side by side clearly shows the difference, and you can adjust the amount of reduction to suit your project.



Original Model

Triangle Count: 86,018

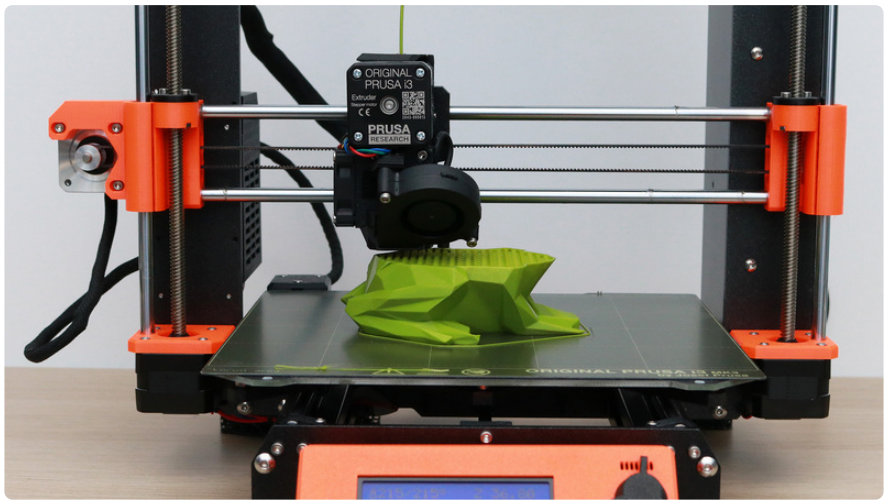
File Size: 4.3 MB

Low Poly Model

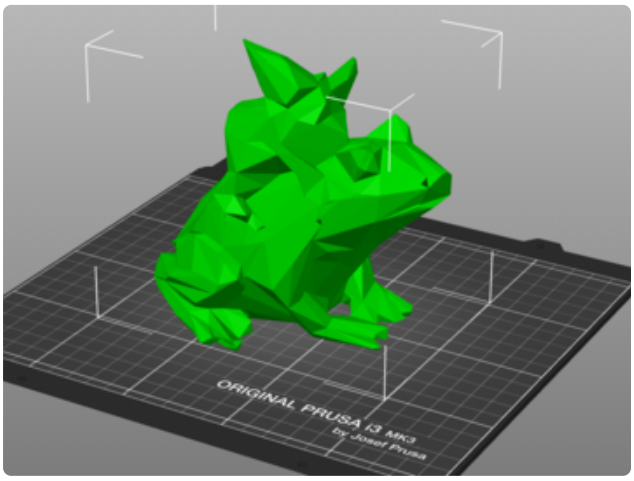
Triangle Count: 1,042

File Size: 52 KB

3D Printing

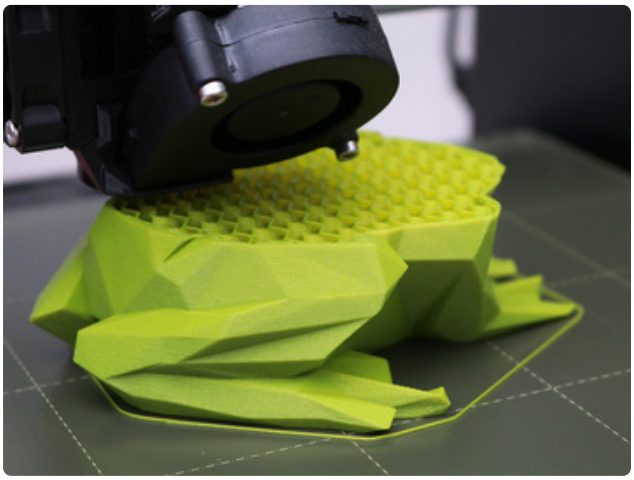


Once the model has been exported from the 3D Low Poly Generator, it can be brought into a slicer program to prepare for 3D printing.



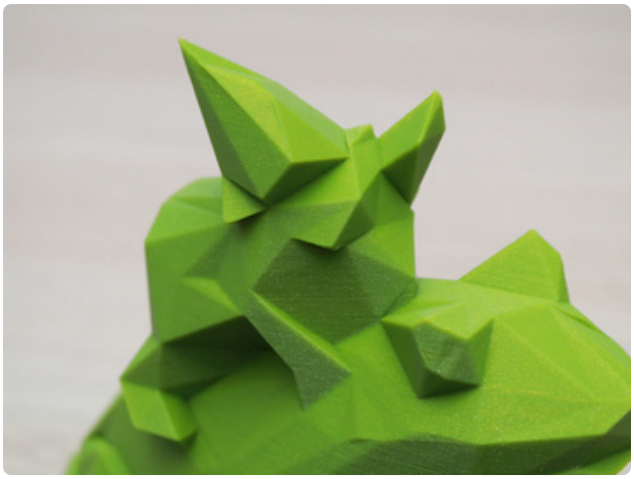
Slicing Settings

Sliced with PrusaSlicer, this model was prepared for PLA material on the Prusa MK3S+ (https://adafru.it/10fs) using the default .2mm **Quality** print profile.



Printing Model

Printed using Printed Solid Slime Green Glitter PLA, (https://adafru.it/10ft) this model printed using no support material.



Printed Model

The low poly model has clearly visible triangles, but is still clearly recognizable as the original model.

You can experiment with reducing the triangle count even further to see how far you can go while keeping the model recognizable!

Try it Yourself!

This process is a great way to create unique objects and interesting remixes.

Try it yourself to create low poly sculptures, models, and other fun projects!