Roman Dodecahedron

Name of the object	Roman Dodecahedron
Recommended ages (from…)	12 to 17
Thematic areas combined (STEAM)	Engineering, Arts, Mathematics
Materials needed	• 3D Printer. • 3D Printer filament (PLA if possible, colour of your choice). • Cura software.
Instructions step by step	We will need to use the Tinkercad program to design the object, so some basic knowledge of 3D design and use of the tool is necessary. **Step 1** – Choosing the Dodecahedron **Step 2** – Creating the holes **Step 3** – Creating the vertex balls **Step 4** – How to print

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Step by step: how to build the Roman Dodecahedron

Step 1 - Choosing the Dodecahedron

Time needed – 10 minutes

When we want to work on 3D design, we must be aware that there are open communities that share many already designed pieces that we can reuse, modify, or adapt according to our needs.

Two of these communities are Thingiverse.com (Image 1) and the community of creators of Tinkercad (the programme we are going to use, Image 2). In these platforms we must obtain the object in *.stl format to be able to import it into the Tinkercad program and work with it.

Other 3D design programs can also be used.

The most important part for our object is the dodecahedron itself.

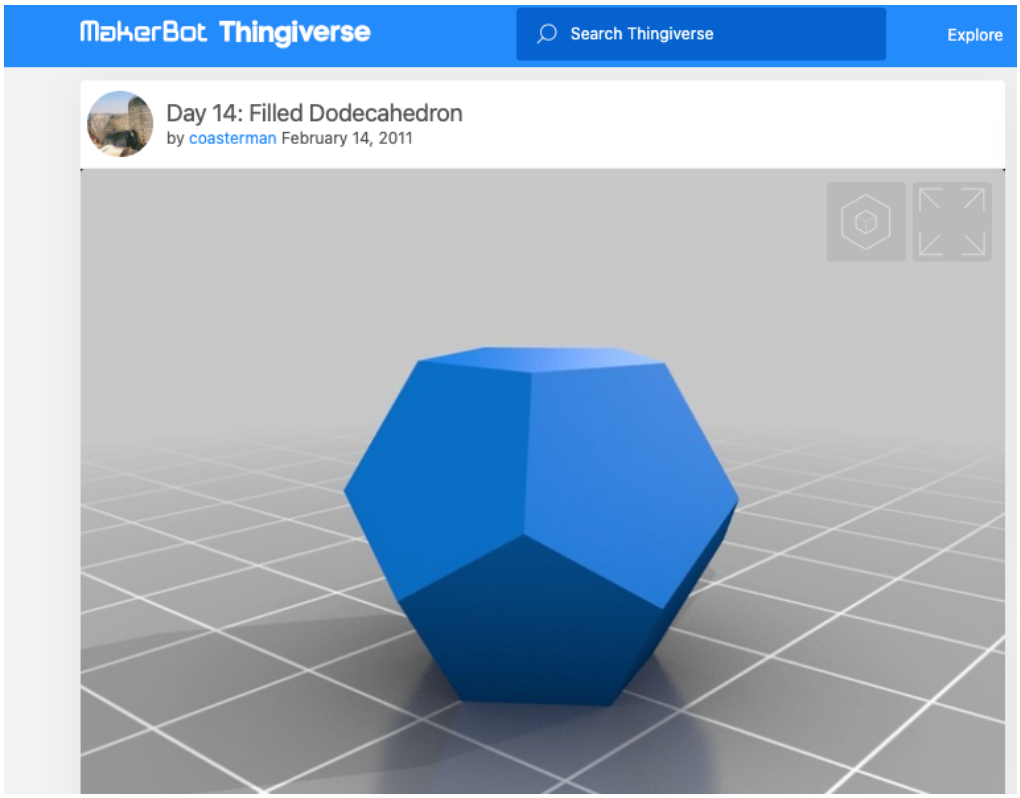


Image 1

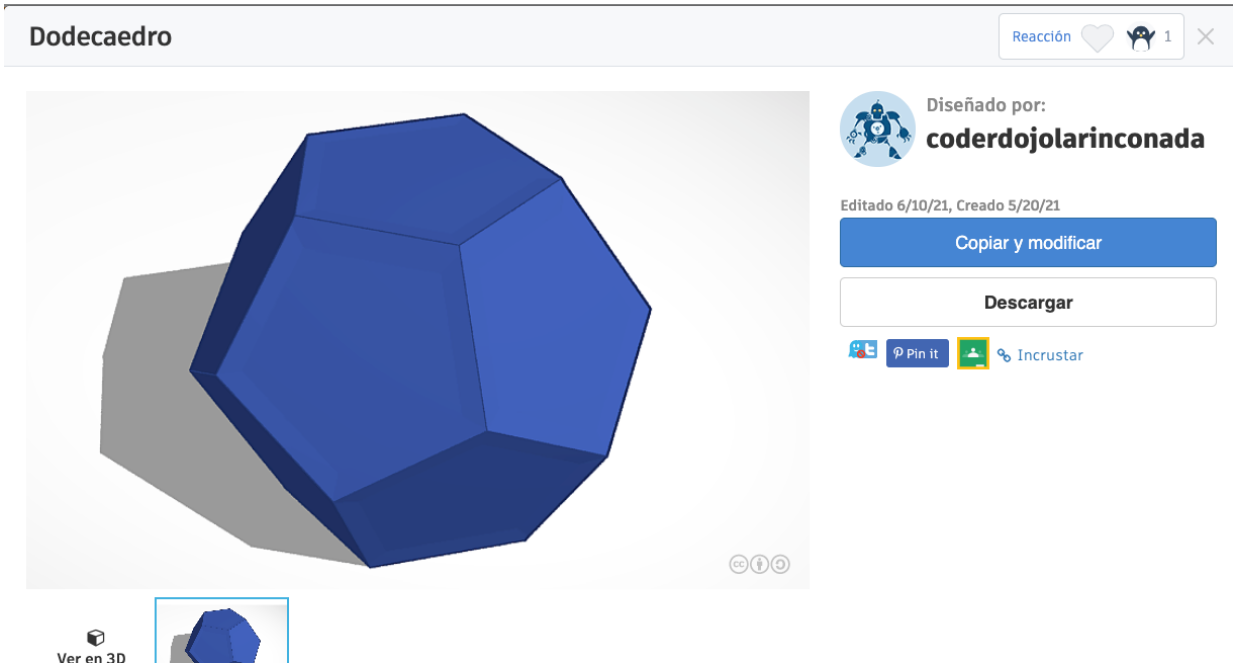


Image 2

Step 2 - Creating the holes

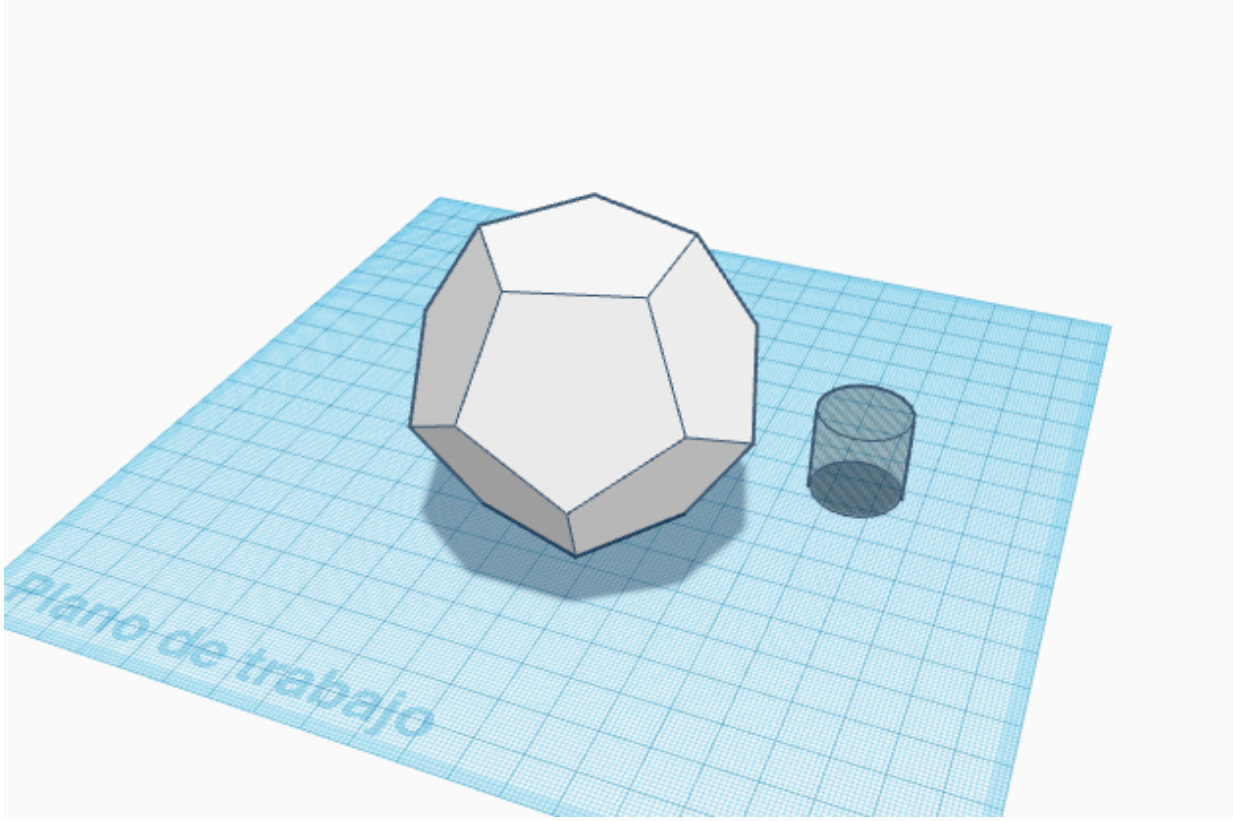
Time needed – from 45 minutes to 1 hour

The Roman Dodecahedron is an important piece of archaeology that has had a recent discovery in its use. At first it was unknown. It is a tool used by weavers to make the fingers of gloves.

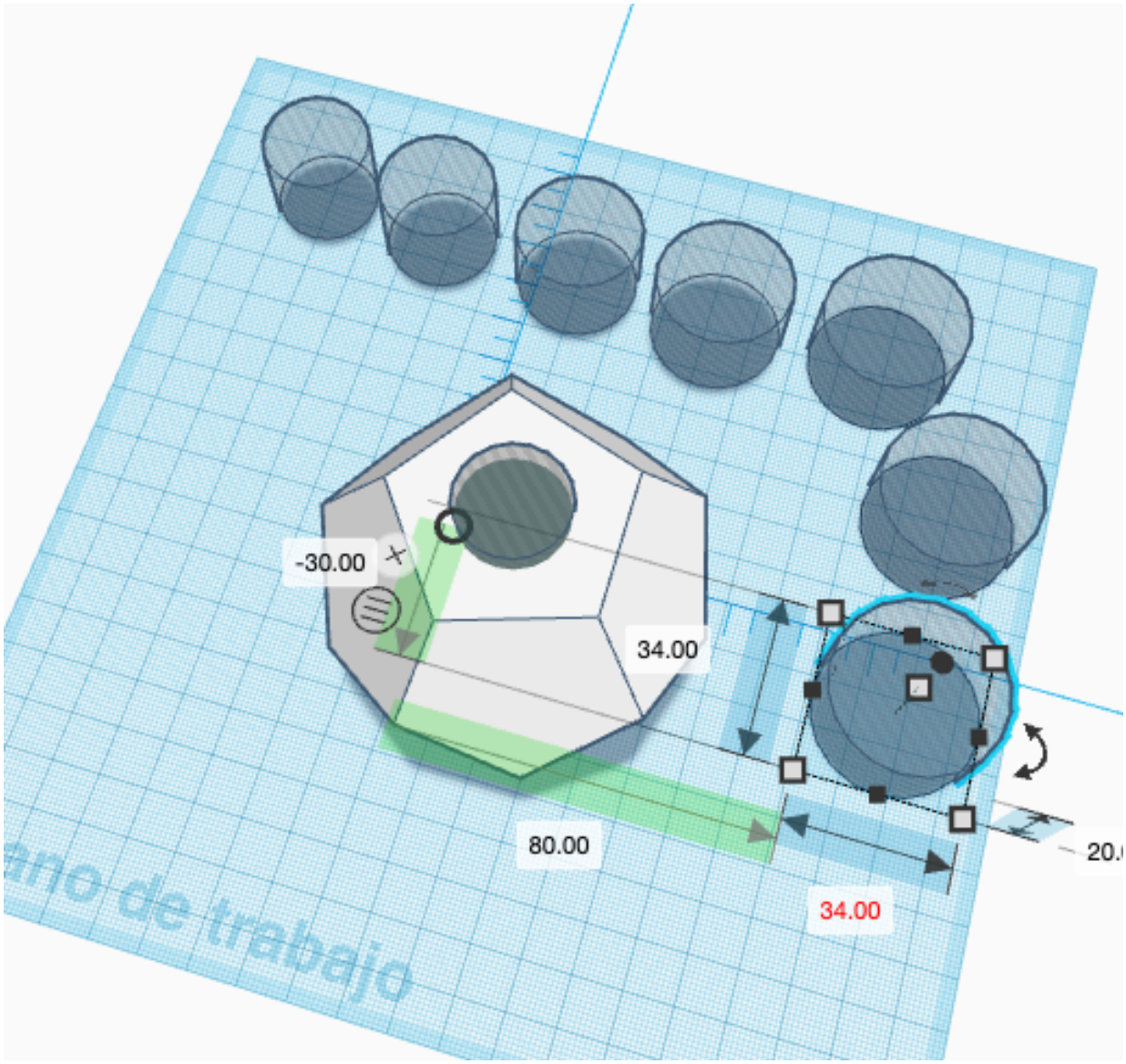
The dodecahedron is composed of 12 pentagons and in each of them there is a hole of a different size to be able to knit the different sizes of fingers.

Our design consists of the following dimensions (in millimetres):

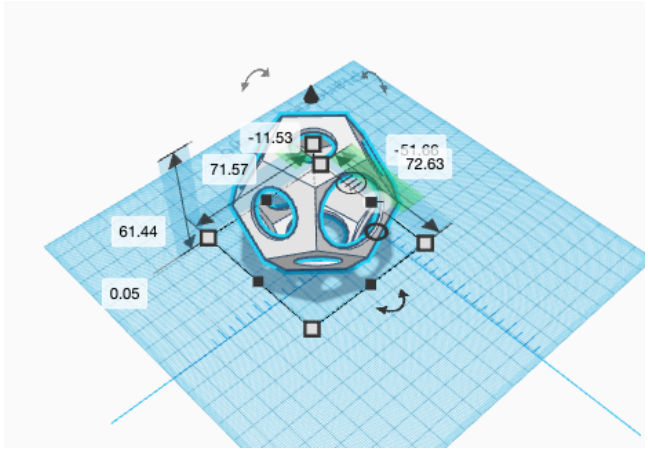
1- 14 mm
2- 16 mm
3- 18 mm
4- 20 mm
5- 21 mm
6- 22 mm
7- 24 mm
8- 26 mm
9- 28 mm
10- 30 mm
11- 32 mm
12- 34 mm



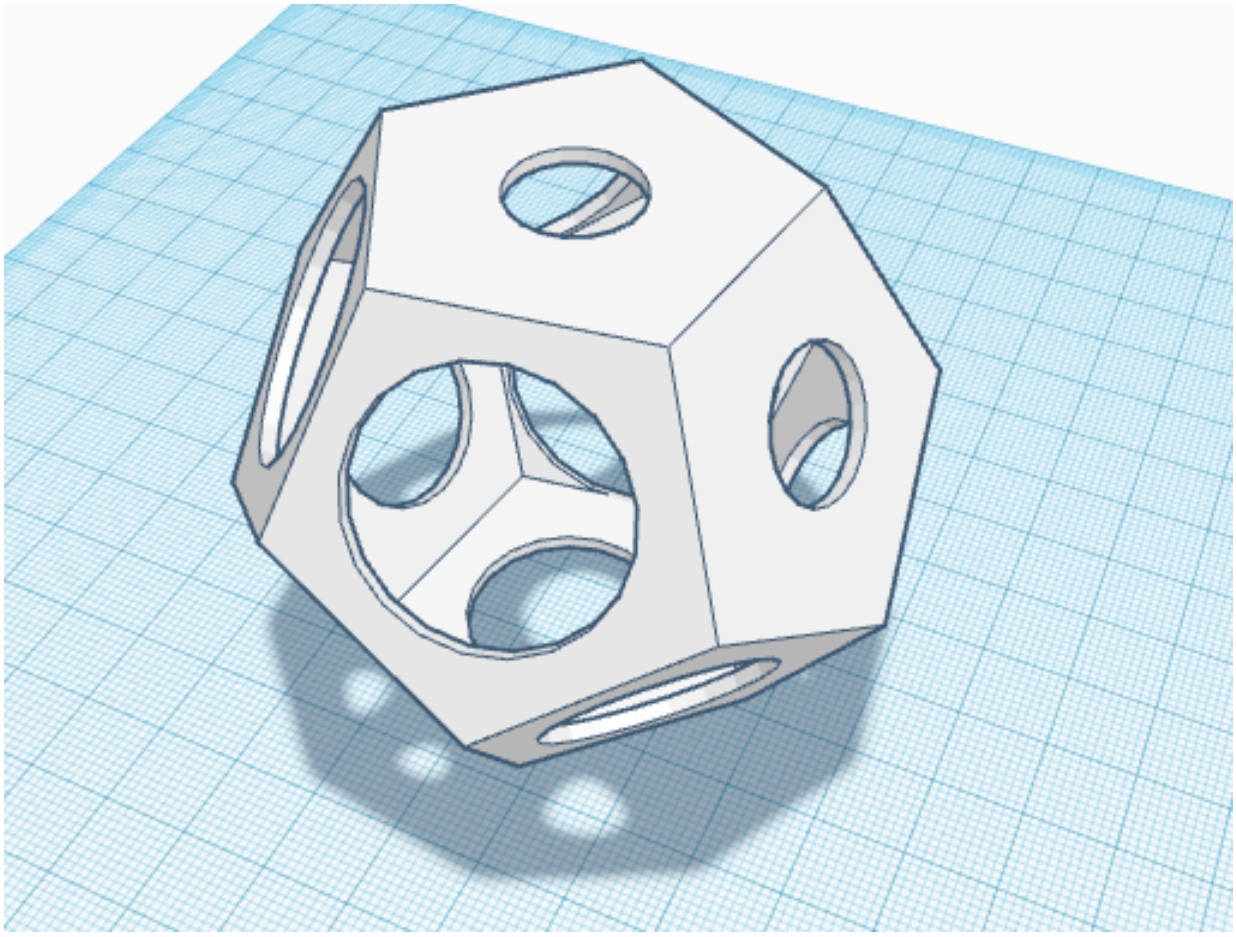
We use the tool figures hole to create the holes. We choose the cylinder to create the holes.



We create the different cylinders.



With all the holes created.

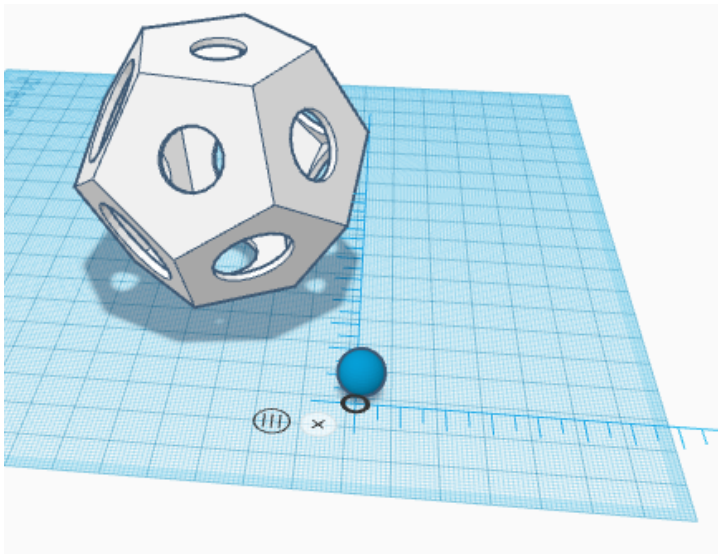


We must get an object like this.

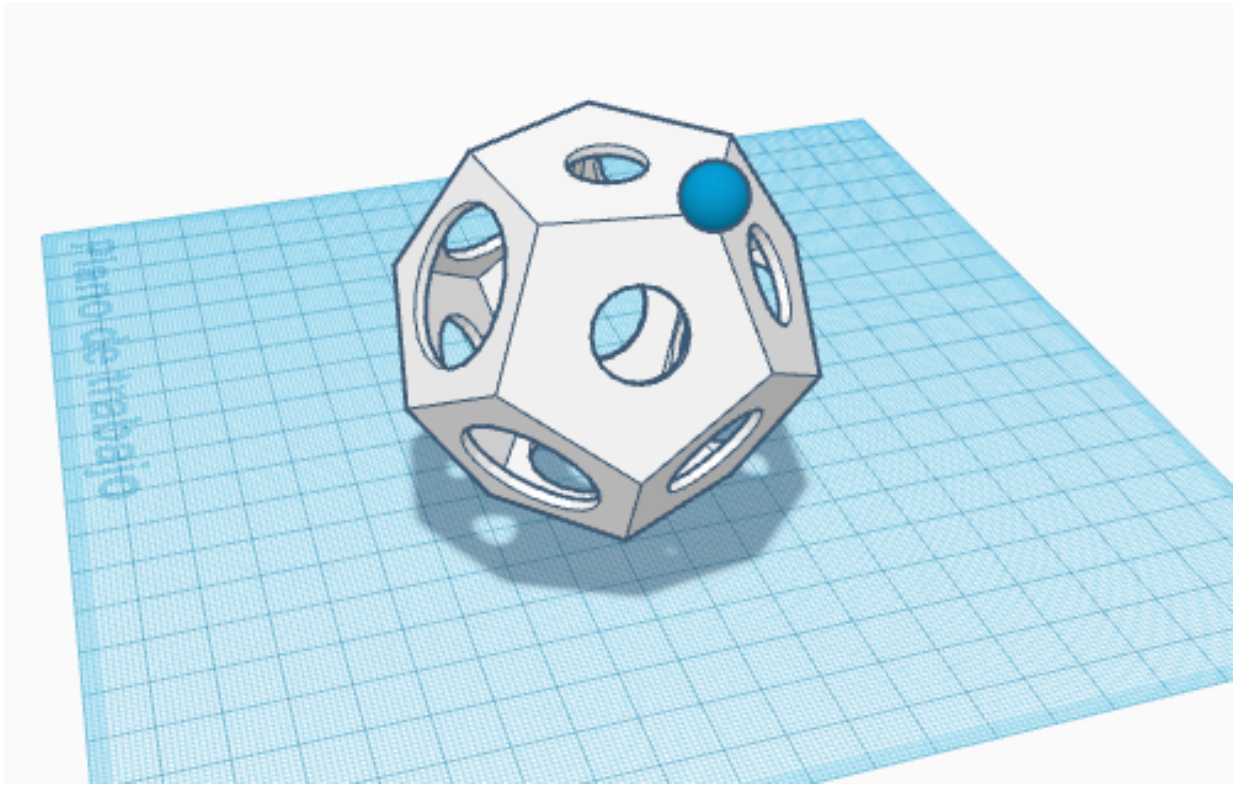
Step 3 - Creating the vertex balls

Time needed – 30 minutes

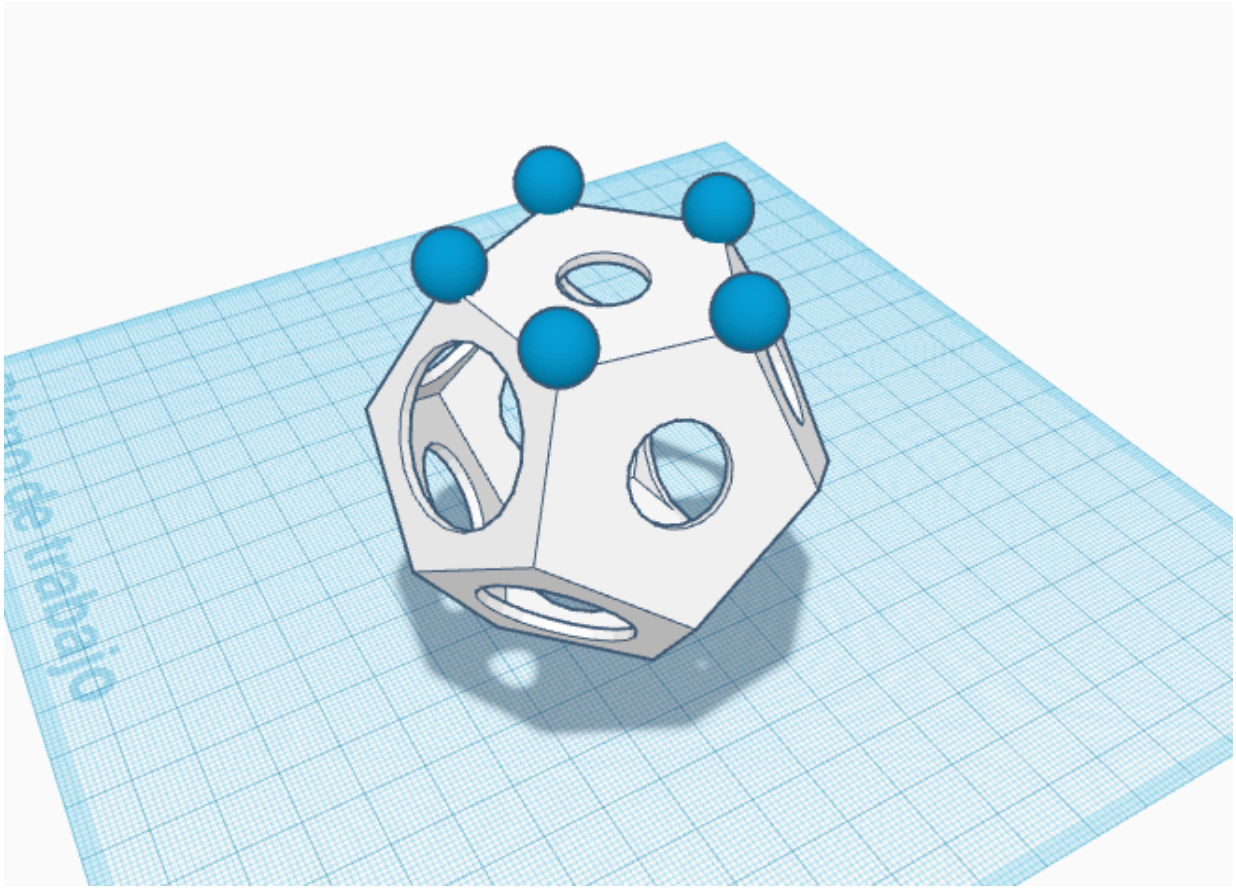
One of the most important parts of our piece are the balls at the vertices of the dodecahedron. This is what will help us to weave.



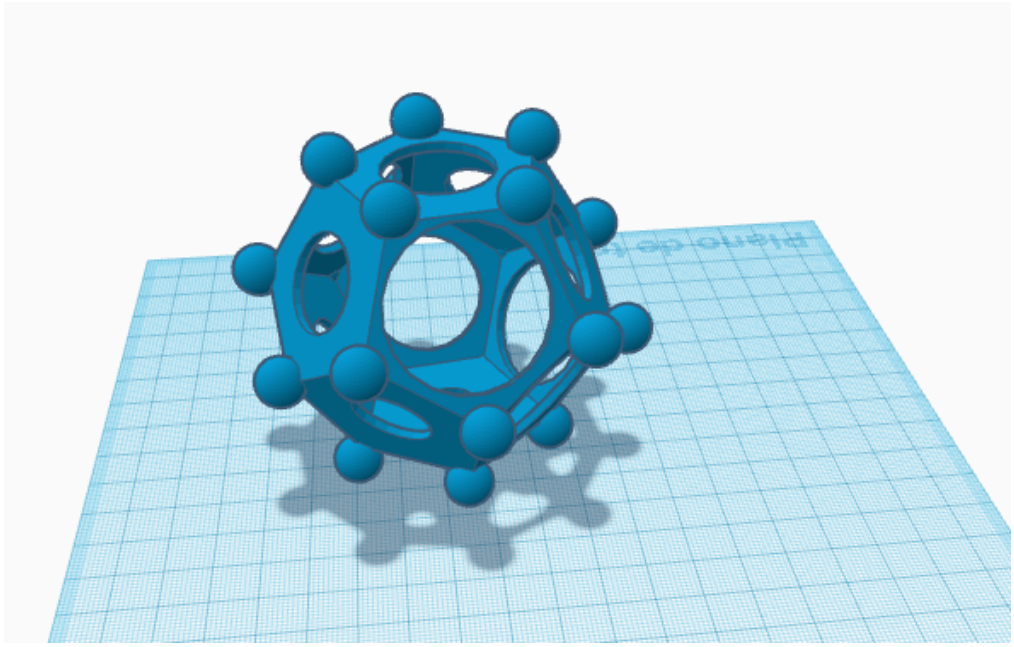
A simple ball.



Ball on the vertex.



Put one ball on every vertex.



The final object.

Step 4 – How to print

Time needed – 15 minutes to define settings to print.

The duration of the 3D printing process depends on the parameters we have defined but can range from 2 hours to a little more.

First, we must download our file in *stl format. (Image 3)

Second, we import the file into the Cura programme to send it to the printer. (Image 4)

Finally, we define the print parameters. (Image 5)

Image 3

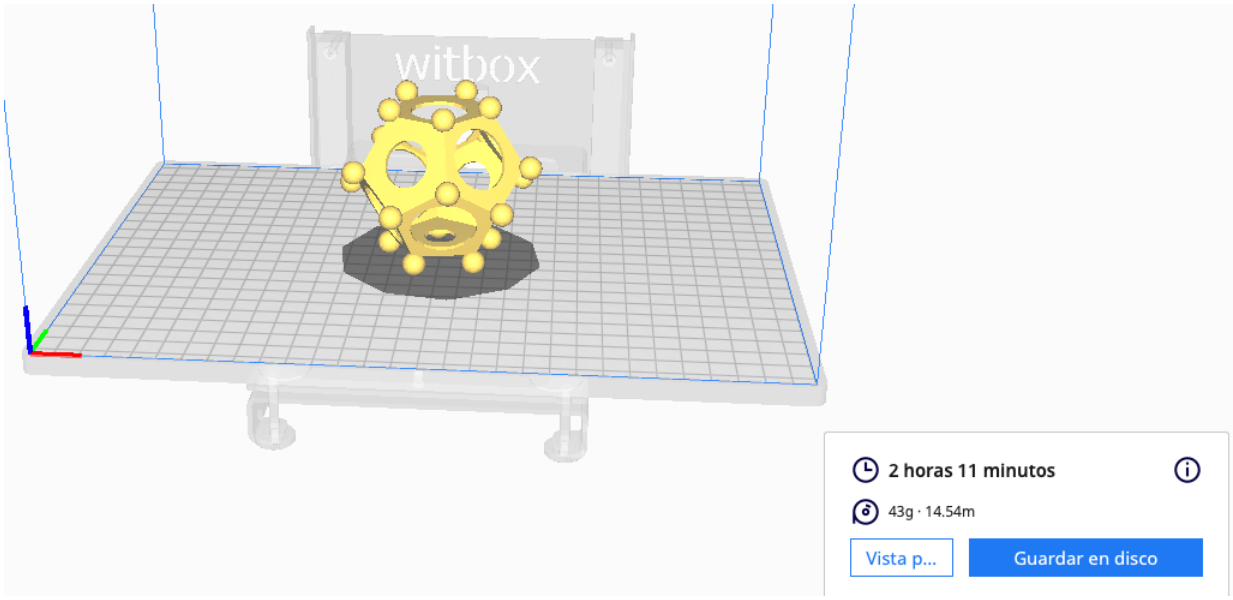


Image 4

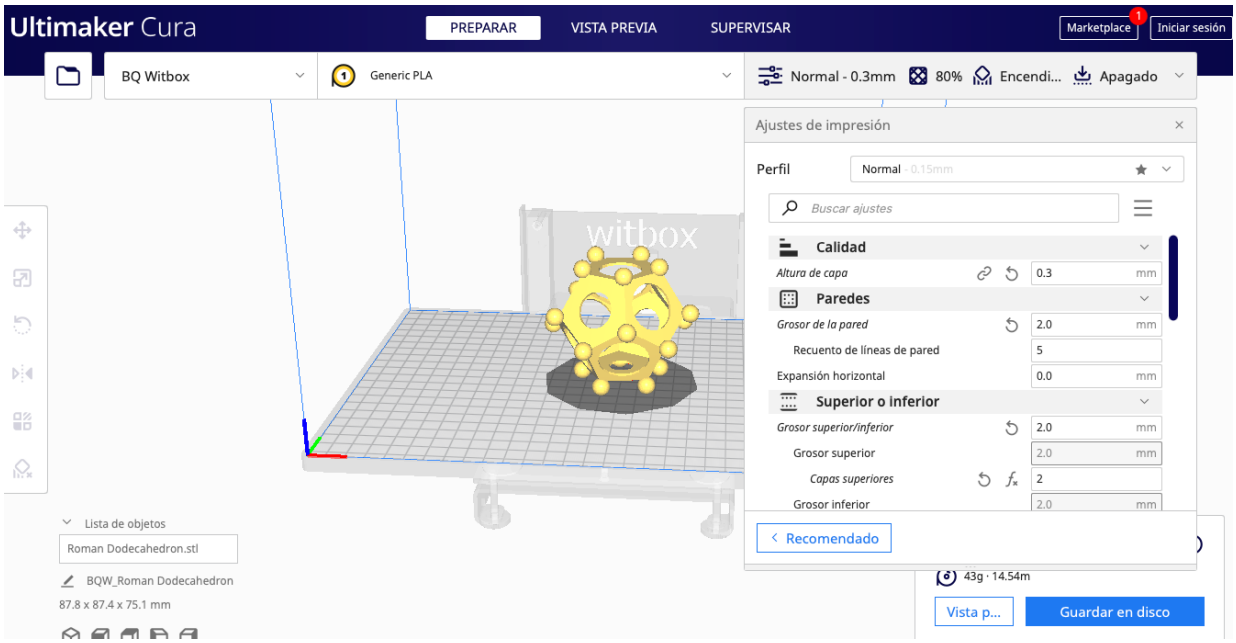


Image 5