

Blueprint for Choirokoitia

Name of the object	Neolithic Houses of Choirokoitia
Recommended ages (from...)	Starting from 12 - high level difficulty
Thematic areas combined (STEAM)	<p>Engineering: Settlement from the Neolithic Age built with stones and clay</p> <p>Mathematics: Cylindrical shaped dwellings have been reconstructed near the settlement</p>
Materials needed	<ol style="list-style-type: none"> 1. Personal Computer with Internet Access 2. Mouse & Keyboard 3. 3D printer 4. PLA (Polylactic Acid) for printing
Instructions step by step	<p>Step 1: Sign into TinkerCad</p> <p>Step 2: Create the cylinder</p> <p>Step 3: Change the dimensions</p> <p>Step 4: Create the interior</p> <p>Step 5: Change the dimensions of the interior</p> <p>Step 6: Move the grey cylinder</p> <p>Step 7: Group the two cylinders</p> <p>Step 8: Create the door</p> <p>Step 9: Group the door</p> <p>Step 10: Create the window</p> <p>Step 11: Create the floor</p> <p>Step 12: Create the ceiling</p> <p>Step 13: Change the colour</p> <p>Step 14: Create your village</p> <p>Step 15: Export / Print</p>

Step by step: how to build the “Neolithic House of Choirokoitia”

Time needed: 1- 1.5 hours

Step 1 - Sign into TinkerCad

1. Open the Tinkercad software on your browser, available at:

<https://www.tinkercad.com/>

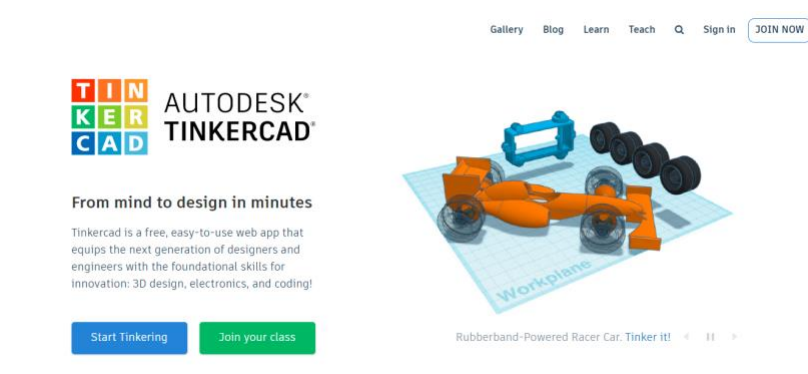


Figure 1:

Tinkercad Software

Click on the button [Start Tinkering](#). Sign in or Create an account on Tinkercad

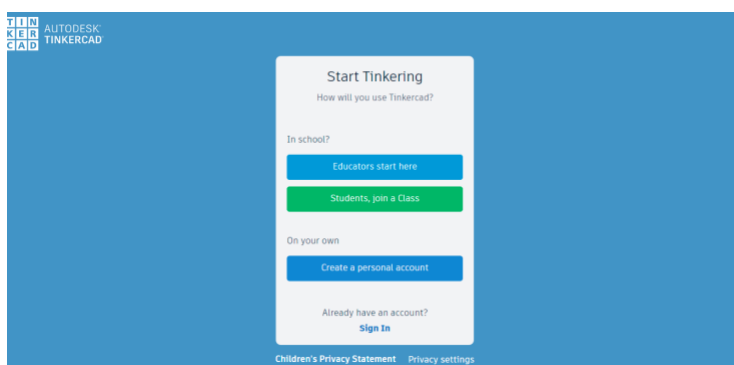


Figure 2: Sign in or Create an account on Tinkercad

2. Click on “Create new design”



Figure 3: Click on “Create new design”

Your Workspace should look like this:

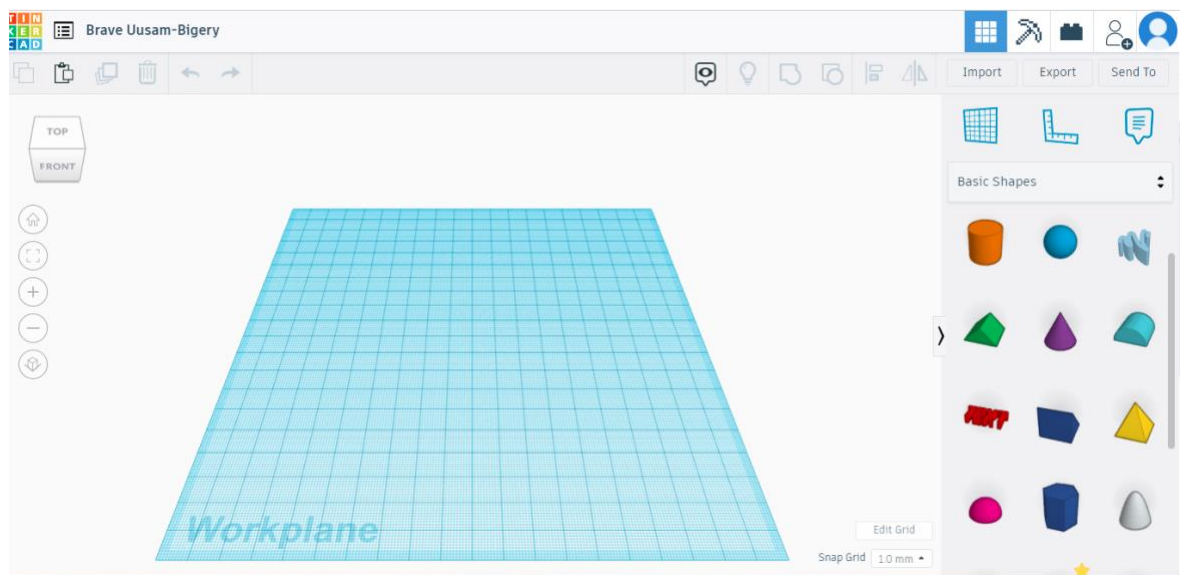


Figure 4: Tinkercad’s workspace

By keeping “Ctrl” pressed and moving your mouse or pressing right click on your mouse, you can have different perspectives/views of your model. “Ctrl” and Scroll Up (with your mouse’s wheel button) allows you to zoom in, while “Ctrl” and Scroll Down allows you to zoom out. For better results, we will use these controls during the creation process.



Step 2 - Select the Cylinder

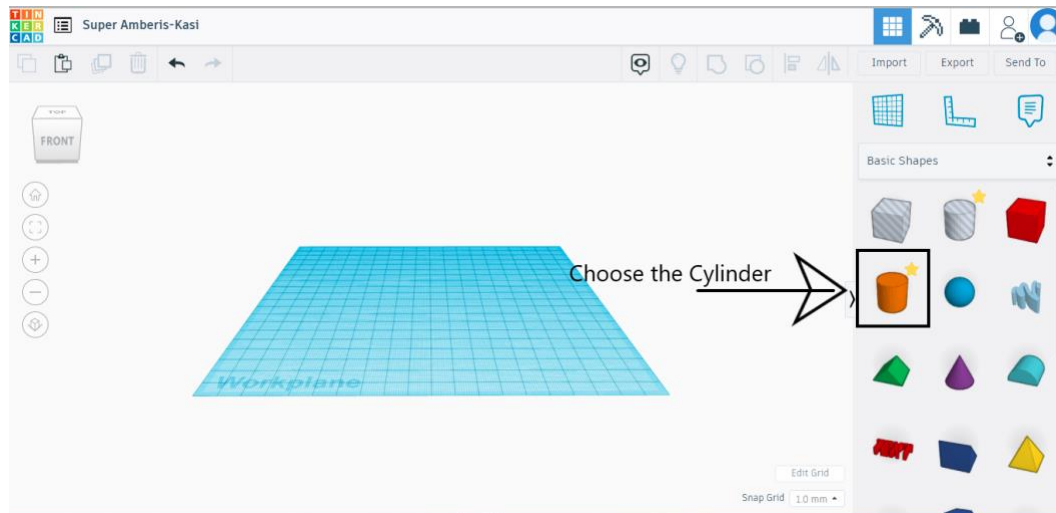


Figure 5: Choose the Cylinder

Select the cylinder from Basic Shapes, on the right side of your screen.

Special Tip: Zoom in to have a better view of your sketch.

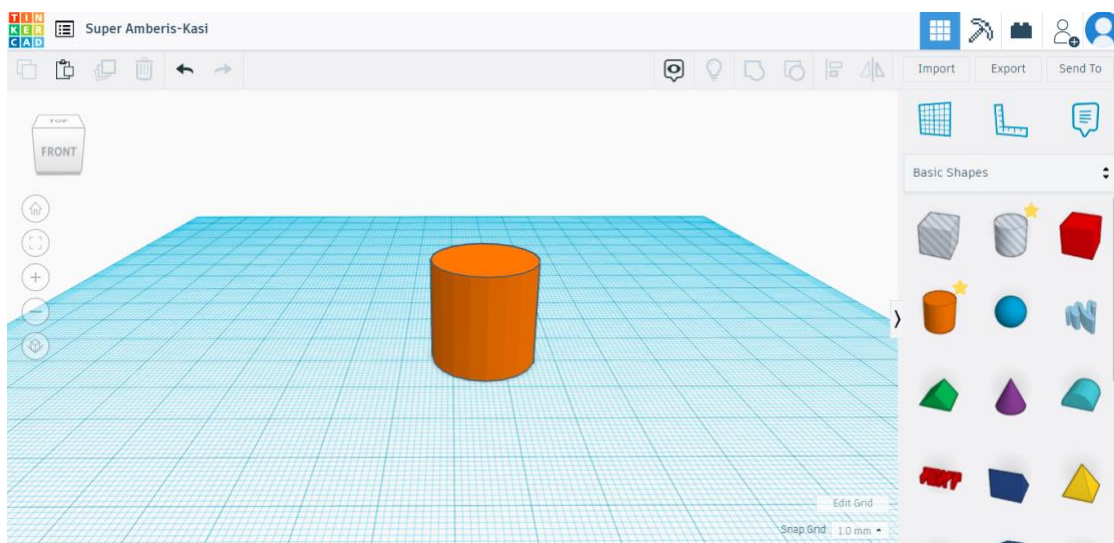


Figure 6: 3D Cylinder

Step 3 - Change the Dimensions

1. Click on the cylinder. A square will appear on its bottom, making the limits obvious. In addition, the weight of the cylinder appears.

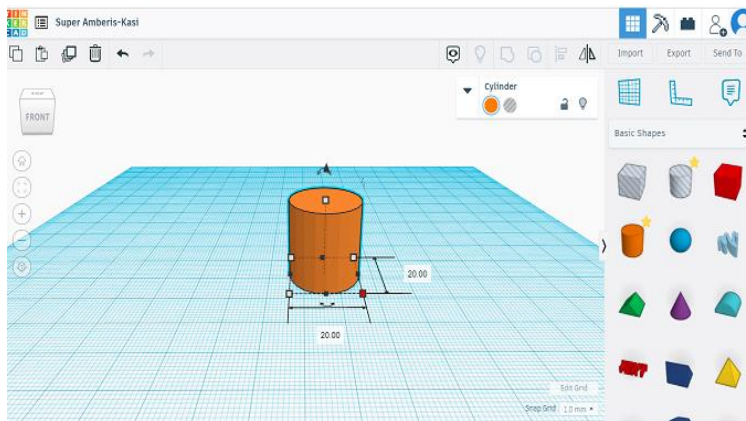


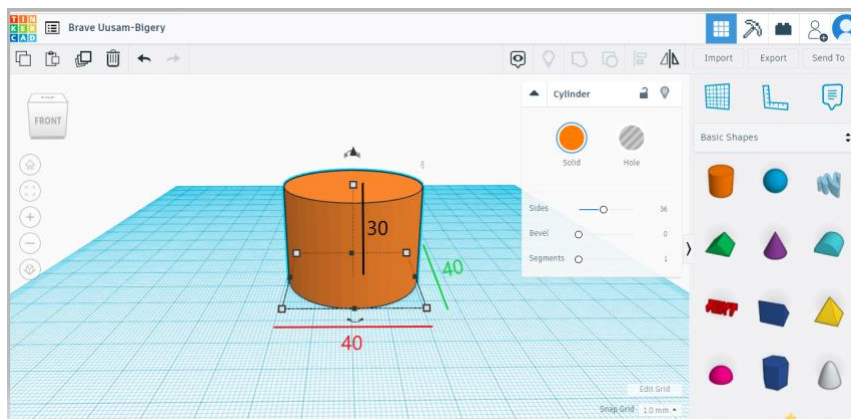
Figure 7:

Dimensions

You can change the dimensions by clicking on the numbers indicated and typing in new ones or by dragging the edges (small squares).

Remember that all the dimensions on the bottom should be the same, in order for the shape to remain a circle.

2. Choose 40mm on the bottom and 30mm for the weight



Figure

8: Change

the cylinder's dimensions: 40mm on the bottom and 30mm

Step 4 - Create the interior

Your cylinder is now solid. However, the interior of Choirokoitia must be empty.

1. You should choose the grey (indicating empty) cylinder from the right side of your screen.

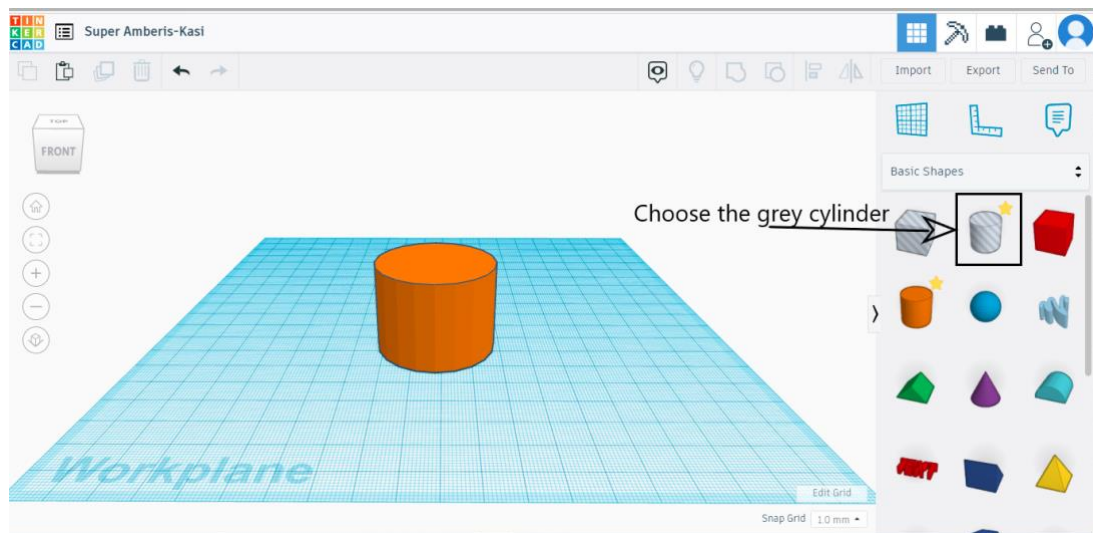


Figure 9: Choose the grey cylinder

Your workspace should look like Figure 10:

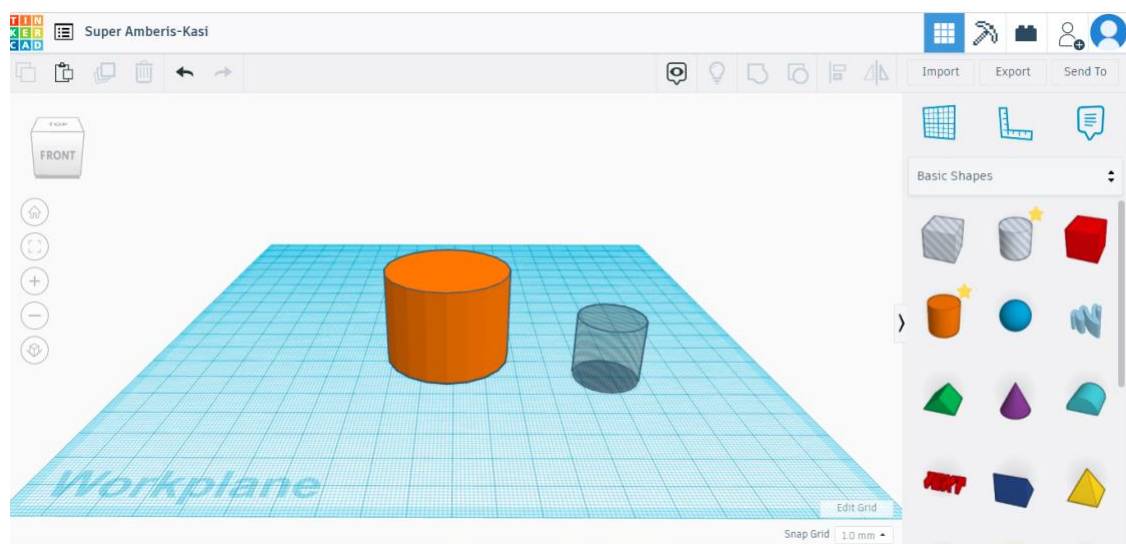


Figure 10

Step 5 - Change the dimensions of the interior

** The dimensions are indicative. Feel free to change them according to your teacher's instructions for a better result **

As in Step 3 - Figure 2, click on the grey cylinder and change its dimensions.

1. Choose 33 mm for the bottom dimensions.

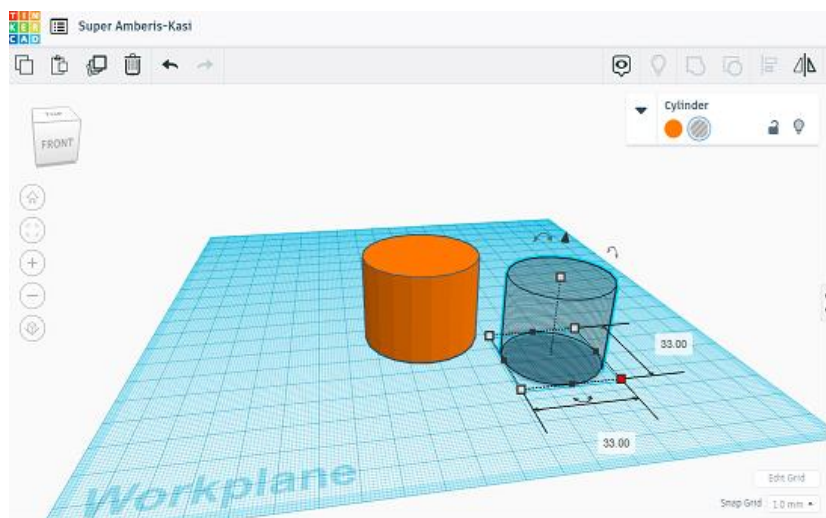
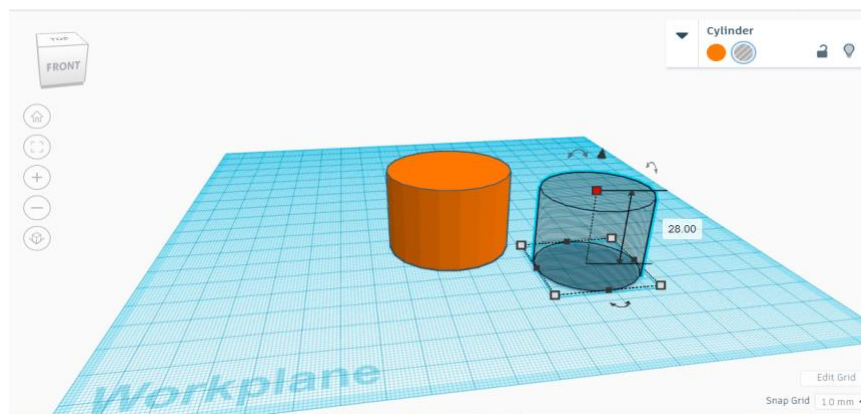


Figure 11: Grey cylinder with bottom dimensions 33

2. Choose 35 mm for the weight



Figure

cylinder with weight dimensions 35 mm

12: Grey



Step 6 - Move the grey cylinder

1. Then move the grey cylinder inside the orange one. To do this, keep pressing the left button on your mouse in order to move the object.

Make sure that the grey cylinder is approximately in the middle of the orange one. To do this, view your creation from the bottom, as in Figure 6.

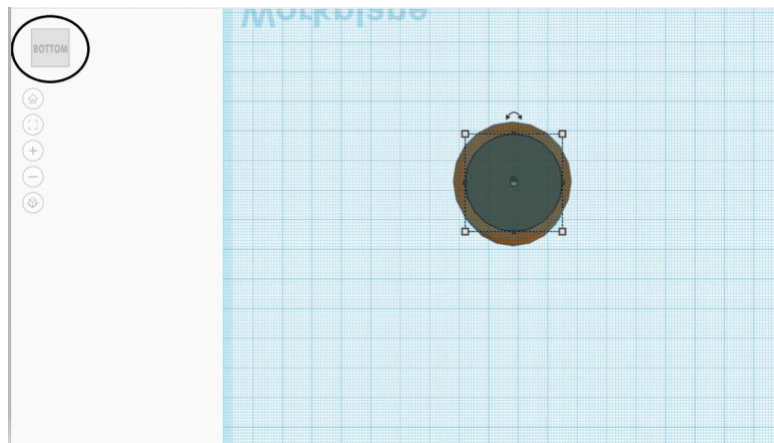


Figure 13: Make sure the grey cylinder is in the middle of the orange

2. Also, the grey cylinder should not be directly on the ground, but a little over it (“floating” above it). Hold the “Ctrl” button and the “Up” arrow button at the same time in order to move your object vertically. Push the arrow button once for the perfect distance from the ground. Your grey cylinder should not be obvious from the bottom.

Smart Tip:

Hold Ctrl & Up together in order to move the object vertically.





Step 7 - Group the two cylinders

Left-click with your mouse to select your creation.

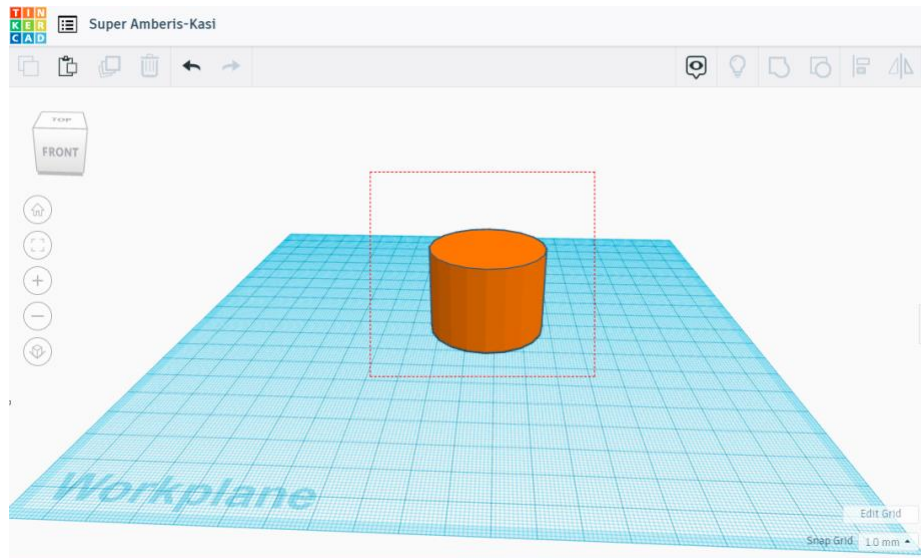
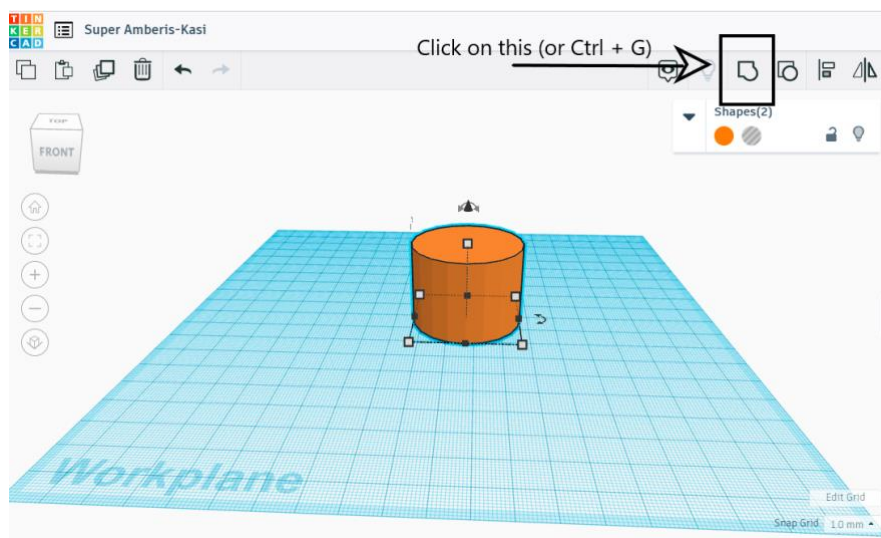


Figure 14: Left-click to select the creation

Then, click on the button indicated in Figure 15 (group button) to merge your two cylinders.



Figure

15: Click on

the group button to merge the two cylinders

Step 8 - Create the door

To create the door, you will follow the same methodology as in Steps 4-7.

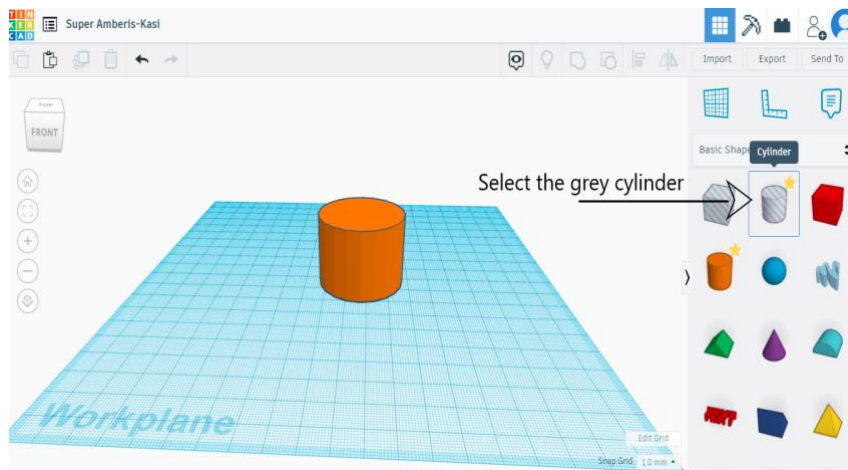


Figure 16: Select the grey cylinder

Like in Step 3 and Step 5, change the dimensions. Choose 13 mm for the bottom dimensions and 10 mm for the weight.

Bottom: 13 mm

Weight: 10 mm

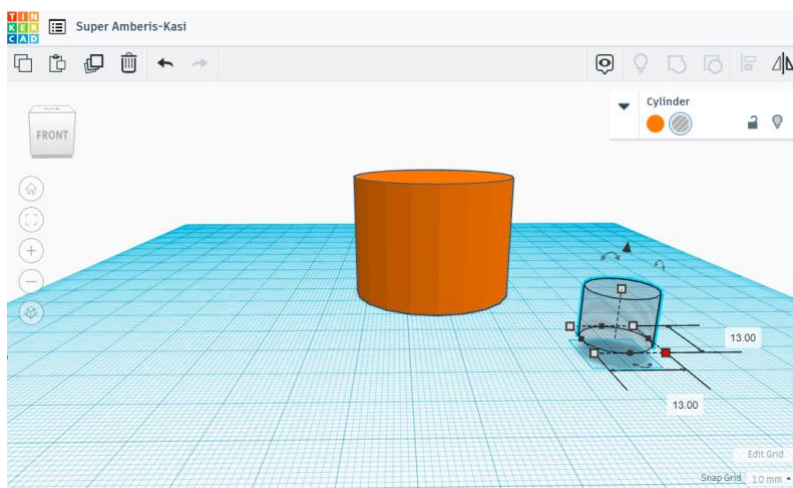


Figure 17:

Cylinder with
bottom dimension 13 mm and weight dimension 10 mm



Then, move the grey cylinder inside the orange one (like in Step 5). Make sure that the grey cylinder is not directly touching the floor, so you should move it up vertically (like on Step 5) (for a better fit, click the upwards arrow 2 times)

Your design should look like this:

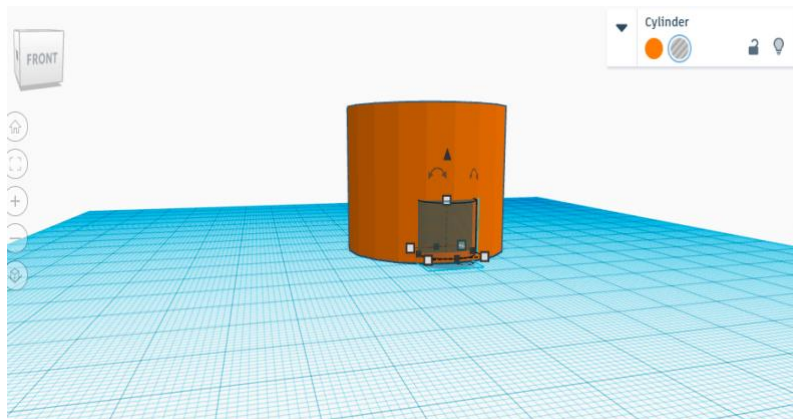


Figure 18: Move the grey cylinder to create the door

Step 9 - Group the door

Follow the same instructions as in Step 6 to group the door with the whole structure. Select your design, then click on the Group Button (or Ctrl + G) and your design should start looking like the one below:

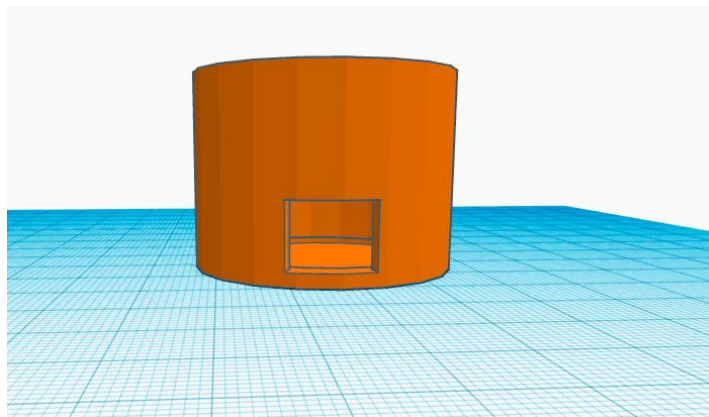


Figure 19:

Group the door



Step 10 - Create the window

Follow the exact same instructions as in Step 7 and Step 8 to create the window.
The only things that will change are the dimensions and the position of the window.
The dimensions will be 8mm for the bottom and 5mm for the weight.

Bottom: 8 mm

Weight: 5 mm

See the image below for reference:

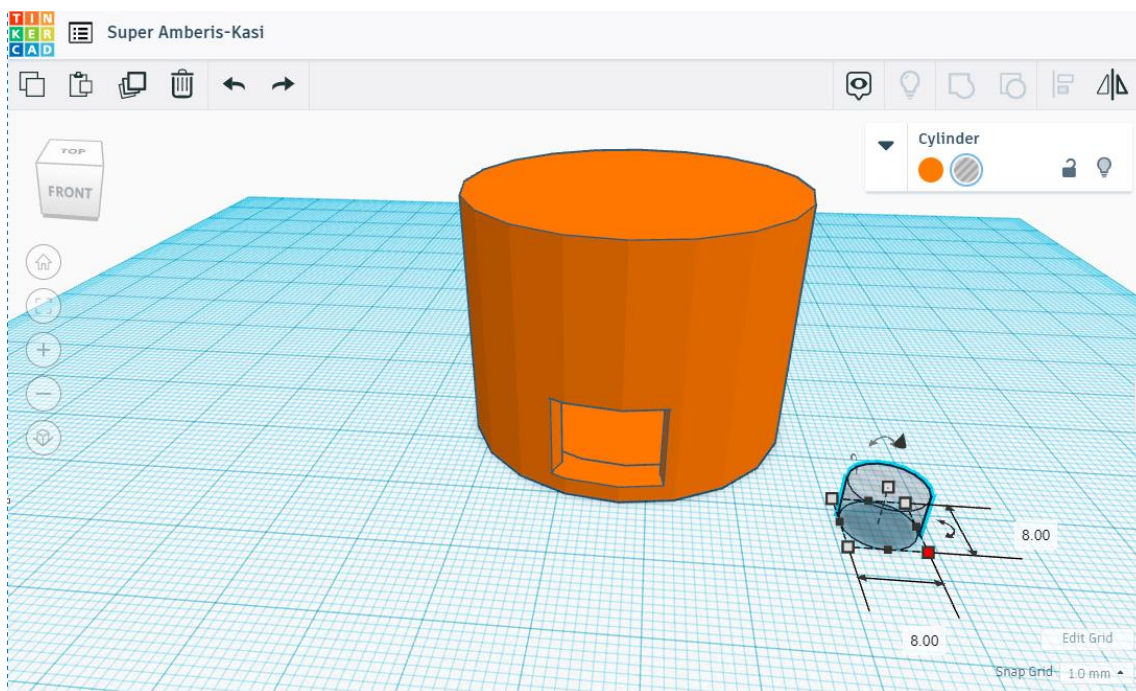


Figure 20: Create the window with 8 mm bottom dimension and 5 mm weight

Then again, select the two objects, group them and the result will look like the one in the Figure 21:

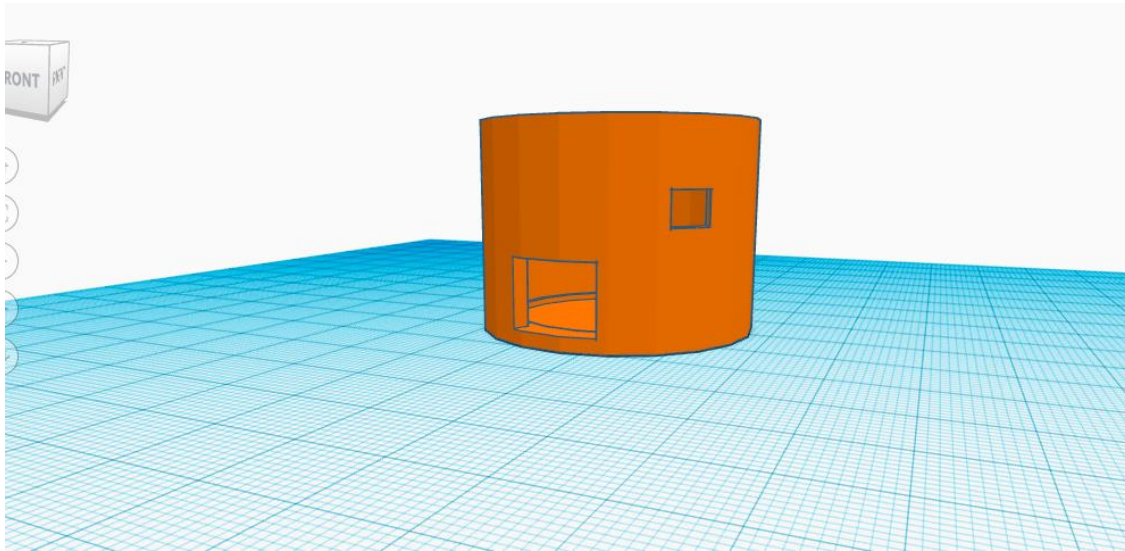


Figure 21: After grouping the windows, your result should look like this

Note: You can choose where you put your window - either on the right or left side.

Step 11 - Create the floor

- 1) To create the floor, choose the tube from the Basic Shapes on the right side of your screen.

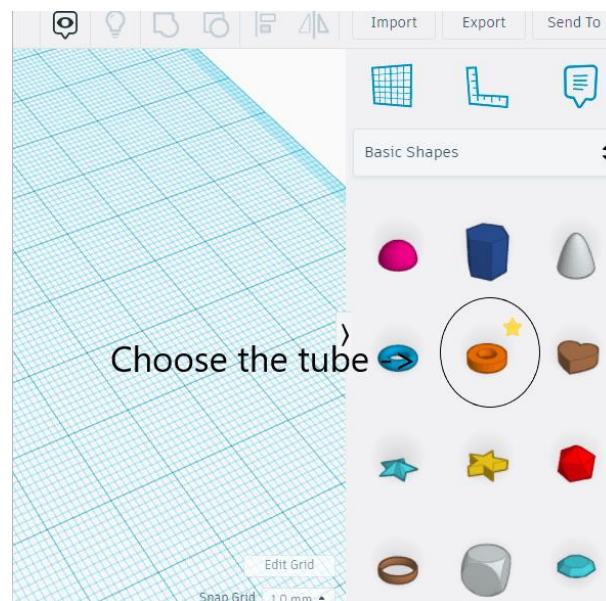


Figure 22: Choose the tube

2) Select the following dimensions:

Bottom: 50 mm x 50 mm

Weight: 2 mm

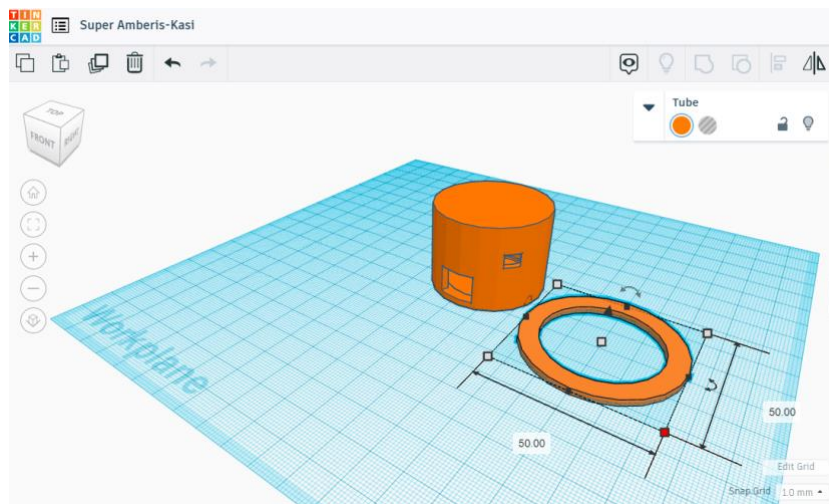


Figure 23: Tube's bottom dimensions 50 x 50 mm

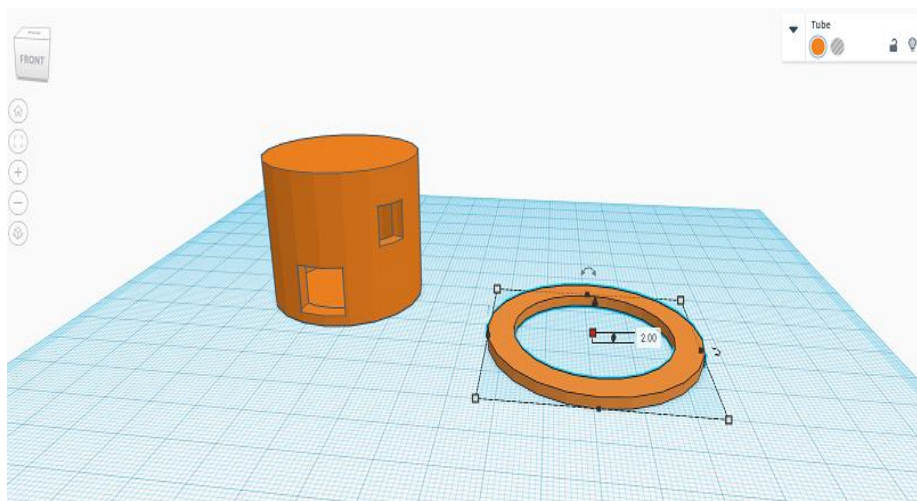


Figure 24: Tube's weight dimension 2 mm

3) Drag the tube to the bottom of the initial model, by continuously pressing left on your mouse. The final result should look like the one below:

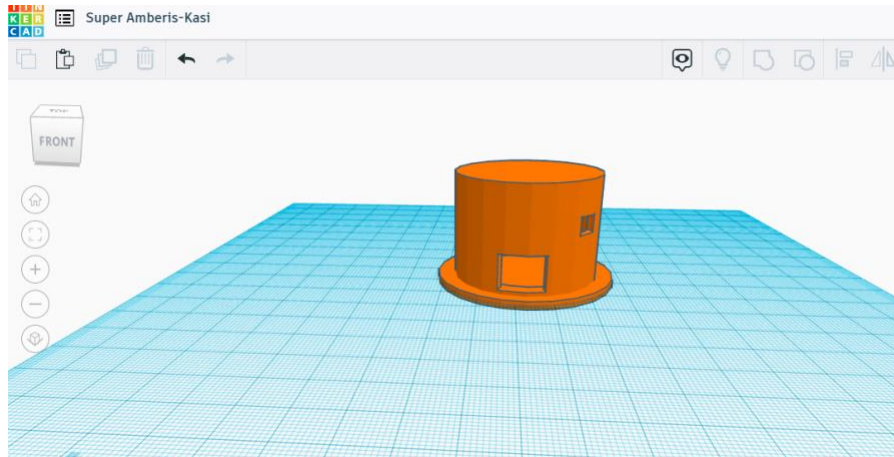


Figure 25: Move the tube to create the floor

Before moving on, group the two objects (main building and floor) by selecting them and clicking on the Group Button (like in the previous steps / Step 8).

Step 12 - Create the ceiling

1) Now it's time to create the ceiling. The creation process is identical to the one above in Step 10. Choose the Tube from the Basic Shapes again.

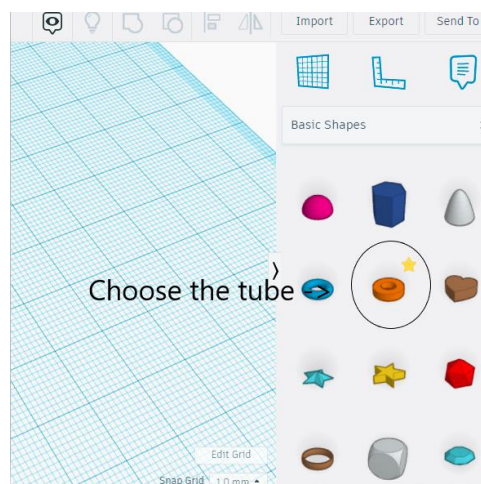


Figure 26: Choose the

tube



2) Select the following dimensions:

Bottom: 50 mm x 50 mm

Weight: 2 mm

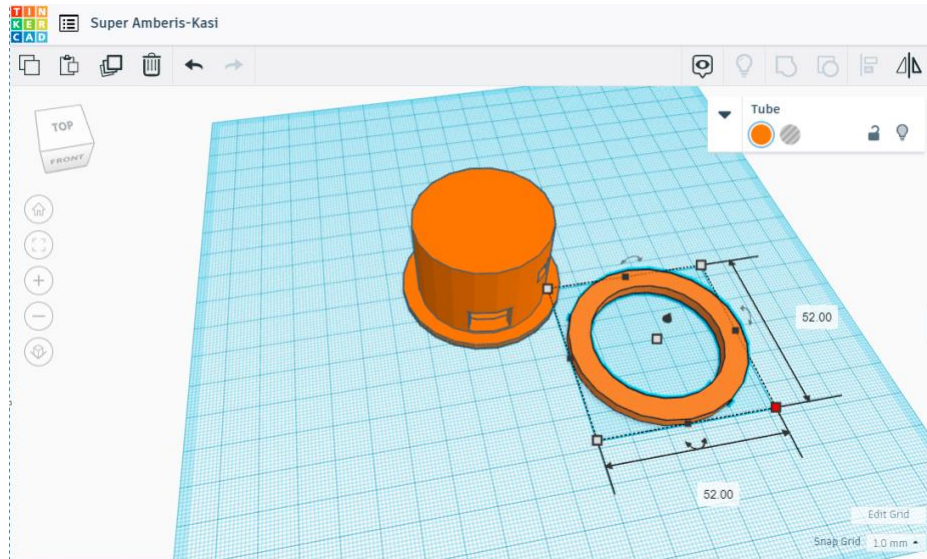


Figure 27: Tube's bottom dimensions 50 x 50 mm

3) Drag the tube on the base of the initial model, as we did in Step 11.

4) Holding the "Ctrl" and "Up" Button together, you need to move the tube vertically, to make it look like this:

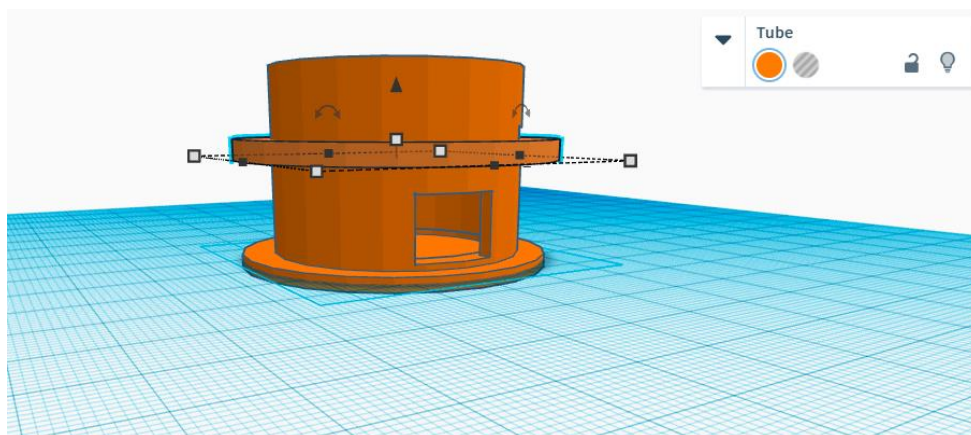


Figure 28: Move your tube vertically by holding "Ctrl" and "Up" Button



Until it looks like Figure 10

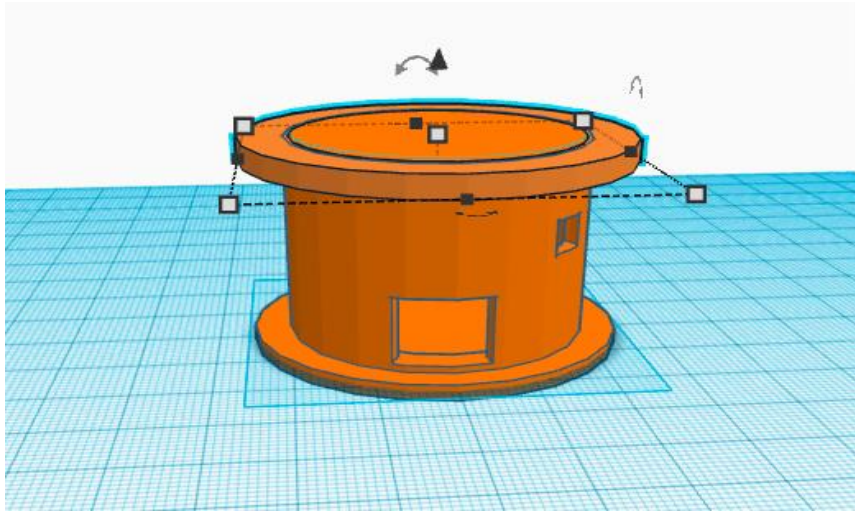


Figure 29: Move your tube vertically by holding “Ctrl” and “Up” Button

- 5) Before continuing, remember to group the two objects (main building and ceiling) by selecting them and clicking on the Group Button (like in the previous steps / Step 8 and Step 10).

Your Chirokoitia structure should now be almost ready...

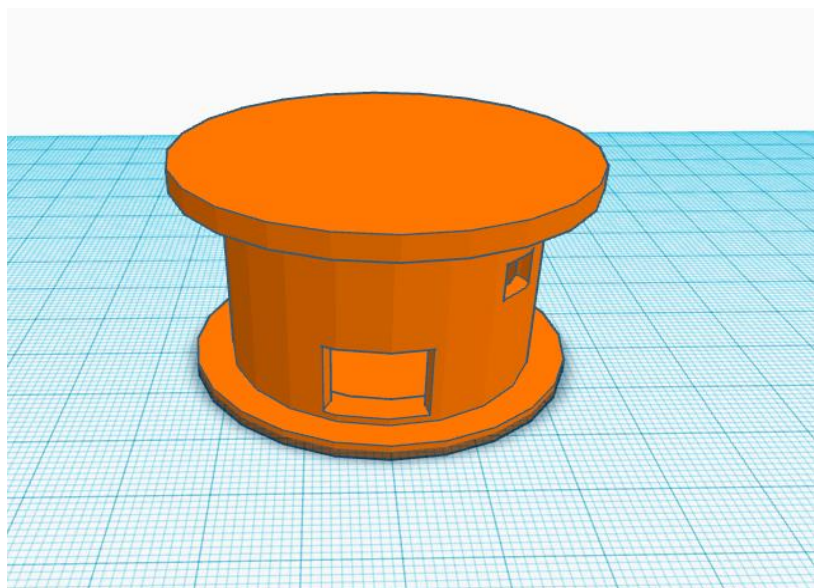


Figure 30: First look at the Chirokoitia after grouping the floor and ceiling



Step 13 - Change the colour

Change the shape's colour in order to make it seem more realistic.

Select your Choirokoitia structure, and then click on "Shape" to see the different colours.

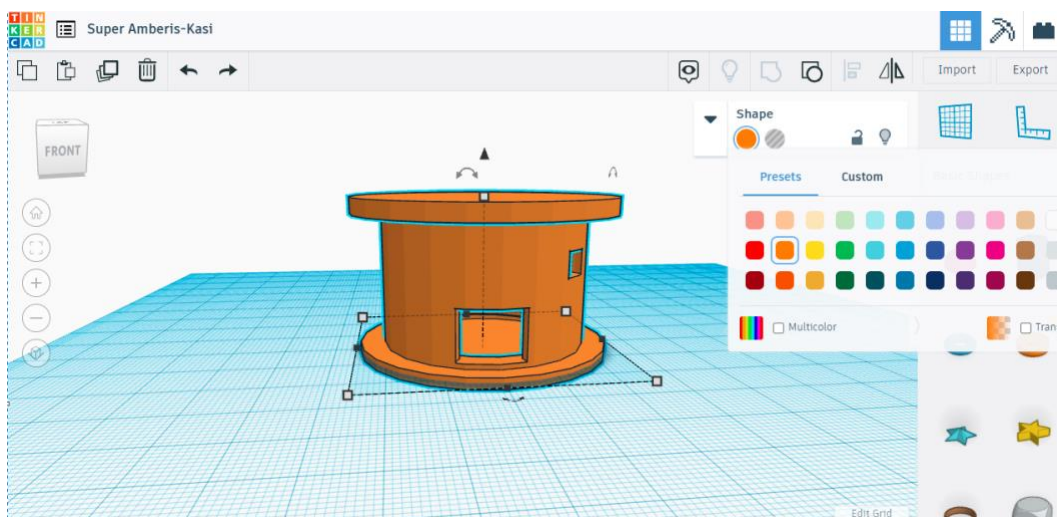


Figure 31: Different colours provided

It is suggested to select a nude (or brown) colour for your model.

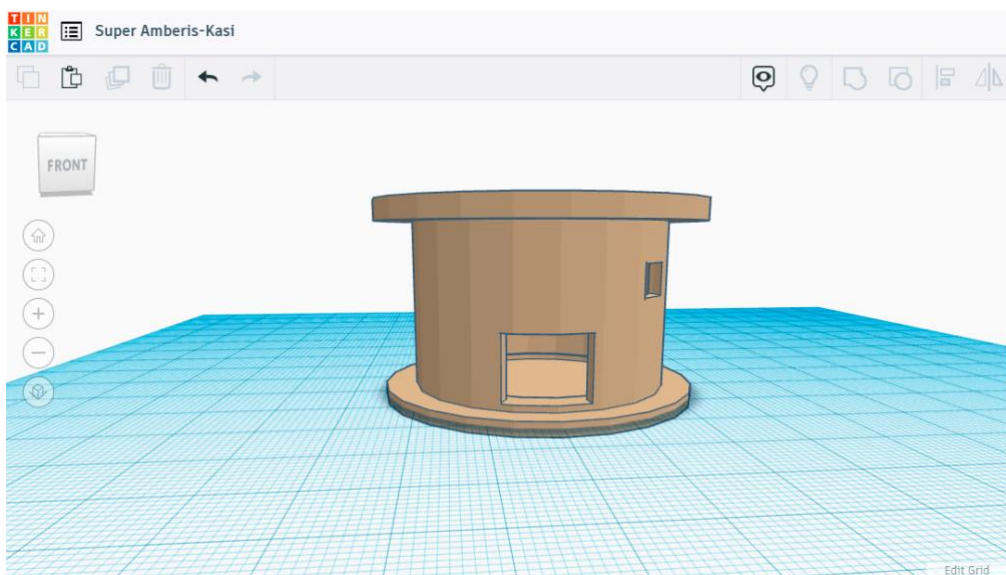


Figure 32: Preferably choose a nuder or brown colour



Step 14 - Create your village

In order to create a small village of Neolithic Houses on your Tinkercad working space, you can simply copy and paste the existing model that you created.

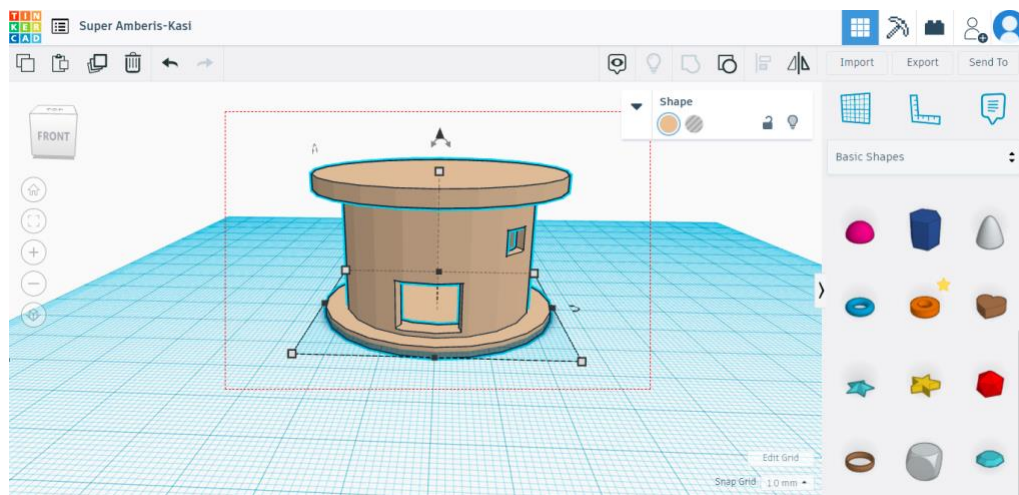
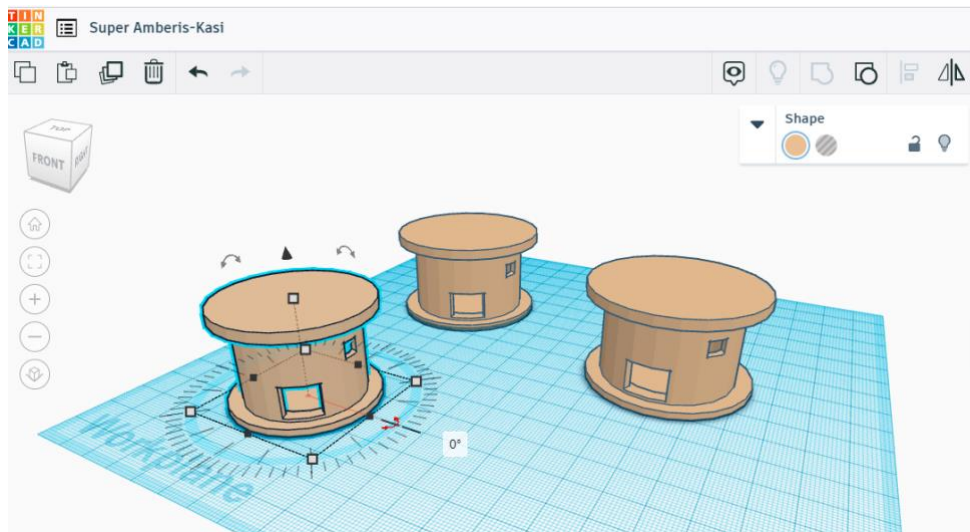


Figure 33: Choose Chirokoitia by Right Clicking

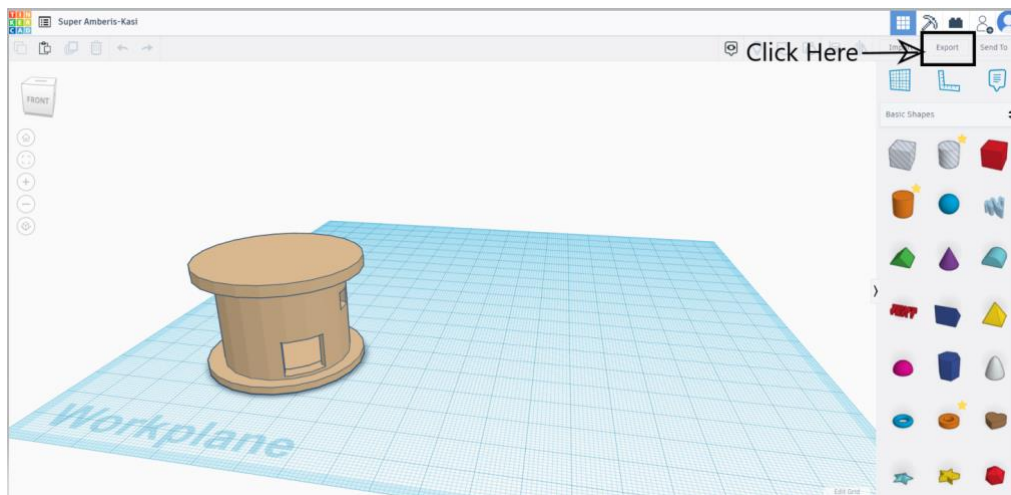
To do this, click “Ctrl” + “C” simultaneously to copy the model and then “Ctrl” + “V” to paste it on your workplace.

You can rotate each building according to your own preference with the protractor provided.



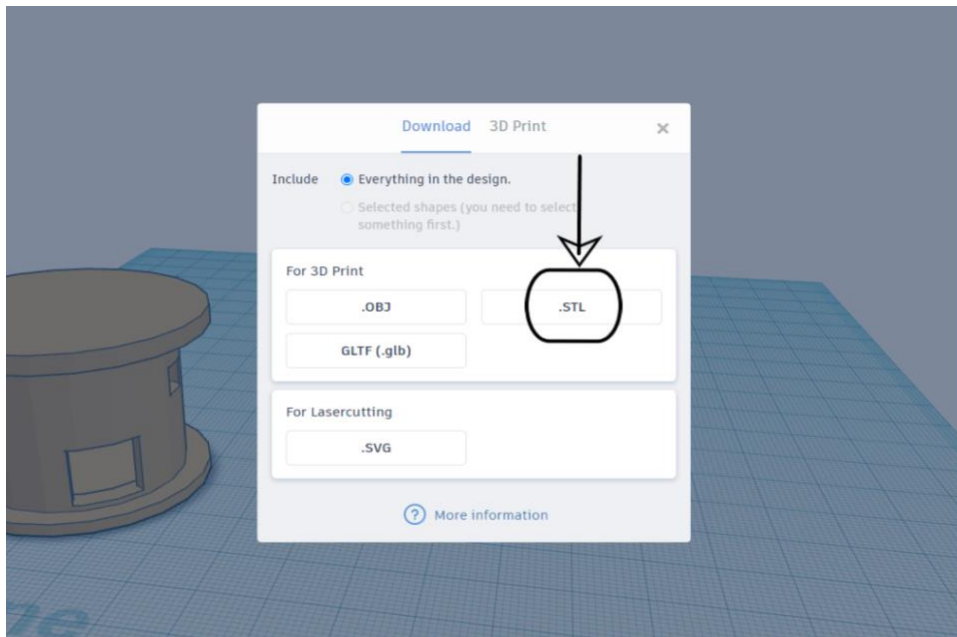
Step 15 - Export ...

Now, it's time to 3D-Print your model! Remember that you have to print your models separately to create the village of Choirokoitia.

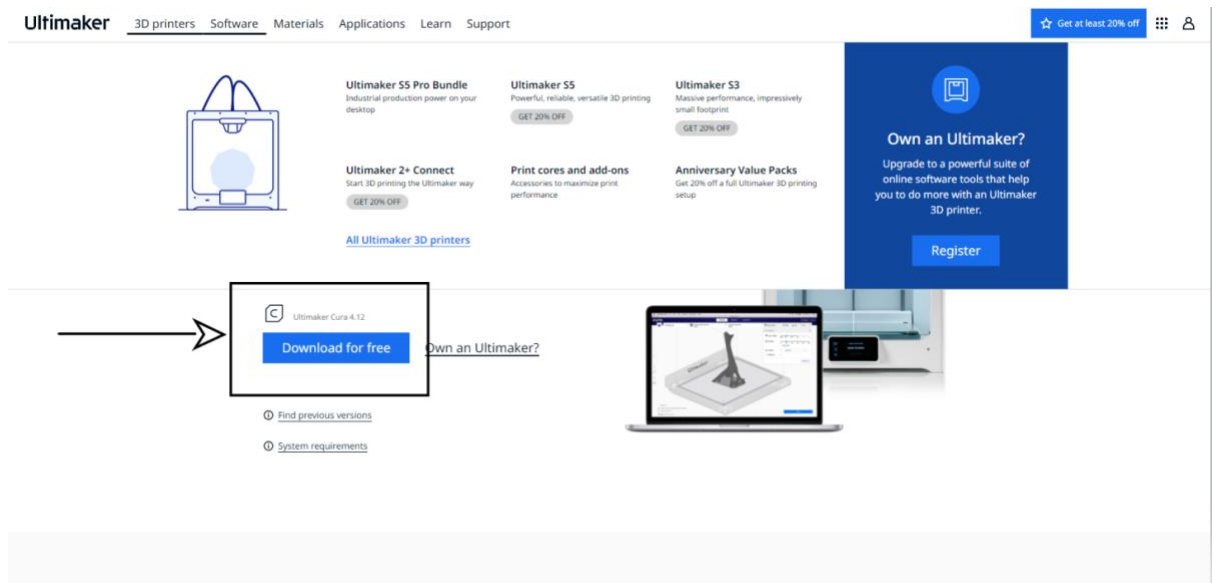


- 1) Click on Export Button on the right of your screen

2) Select the .STL version to download your design



3) Before you continue, you have to download the [Ultimaker Cura Program](#)



Your Choirkoitia is ready!