INTRODUCTION TINKERCAD

FOR TEACHERS

EDITED BY INTELLIGENT SYSTEMS LABORATORY
OF THE UNIVERSITY OF THESSALY

This Guide is published as part of the "Climate Change and Natural Disasters Awareness Raisin using Virtual Worlds - VR4Clima". Project funded by the European Union's Erasmus+ programme (2023-1-EL01-KA220-SCH-000155463). This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Title
Introduction to Tinkercad for Teachers

Year
2025

Publisher
Athanasios Kakarountas, University of Thessaly, Greece

Reviewers
Jovana Jankov, Center for Promotion of Science, Serbia
Manolis Voutsakis, National Technical University of Athens, Greece
Sonal Ahuja, VRAcademi Limited, Ireland
Maria Zarkada, 16th Experimental Primary School of Lamia, Greece
Natalia Budinski, Petro Kuzmjak School, Serbia

Design and layout
University of Thessaly, Greece

Licence
CREATIVE COMMONS BY-NC-SA 4.0 DEED
Attribution-Noncommercial-Share Alike 4.0 International

You are free to:
- Share - copy and redistribute the material in any medium or format.
- Adapt - remix, transform and build upon the material.
- The licensor cannot revoke these freedoms as long as you comply with the licence conditions.

Under the following conditions:
- Attribution - You must give appropriate credit, provide a link to the licence and indicate whether any modifications have been made. You may do this in any reasonable way, but not in a way that suggests that the licensor approves of you or your use.
- Non-commercial - You may not use the material for commercial purposes.
- ShareAlike - If you remix, transform or develop the material, you must distribute your contributions under the same licence as the original.
- No additional restrictions - You may not apply any legal conditions or technological measures that legally prevent others from doing anything the licence allows...

Notices:
- You are not required to comply with the licence for material in the public domain or where your use is permitted by an applicable exception or limitation.
- No warranty is given. The licence may not give you all the authorisations necessary for the use you wish to make of it. For example, other rights such as publicity, privacy or moral rights, may restrict your use of the material...

CONTENT

INTRODUCTION

This document presents the Educators' Guide for Tinkercad, which is going to be used in the Erasmus+ project 2023-1-EL01_KA220-SCH-000155463 "Climate Change and Natural Disasters Awareness Raising using Virtual Worlds" (VR4Clima). It is developed in the scope of the work package 3 (WP3: VR Course A3.1 VR Course) of the project.

This document is created by the coordinator of the project, Intelligent Systems Laboratory (ISL) of the University of Thessaly.

VR4Clima project aims to raise awareness in students about climate change and sustainable development. Students' actions and choices can mitigate the climate change from which their countries and local communities have suffered so much. During the project, a sustainable school yard design will be proposed by students. This project aims in using VR and 3d Design in education. Students will learn about serious gaming and will create 3d models themselves. Teachers will have the chance to embed 3d design and Virtual Reality in their classes.

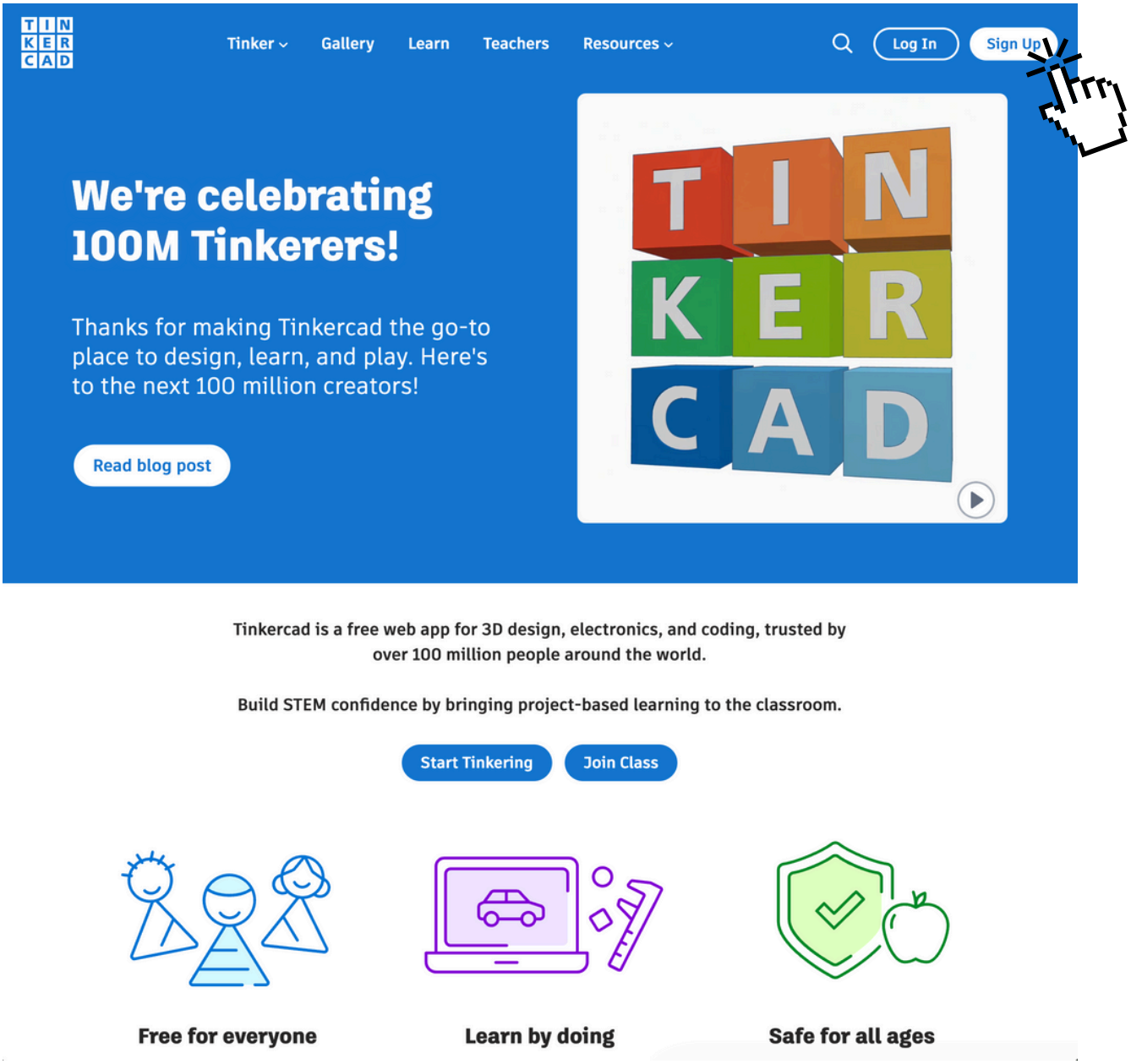
The results of this project will be a 3d game on sustainability and climate change mitigation and school reports about students' choices. Also, 10 animation videos and a chart mapping microclimates. Two VR Courses will be delivered (for Primary and Secondary Education). There, students will design their sustainable school yard and will be able to count it's carbon footprint. Then, they will import their design in Virtual Reality and invite their peers inside their Virtual World. Online workshops for teachers will be organized, to help them embed this technology in their classes. A school contest will invite students all over Europe to submit their designs of sustainable school yards. A report on how to embed this approach in school curricula will also be done and all designs will be uploaded to a Virtual World.

The Educators' Guide for Tinkercad aims to assist educators of Primary and Secondary Education deliver a Tinkercad course in their classes and have their students design a 3d sustainable element. The students will export the design from Tinkercad and insert it in their Virtual World in CoSpaces.

CREATING AN ACCOUNT IN TINKERCAD

Go to tinkercad.com

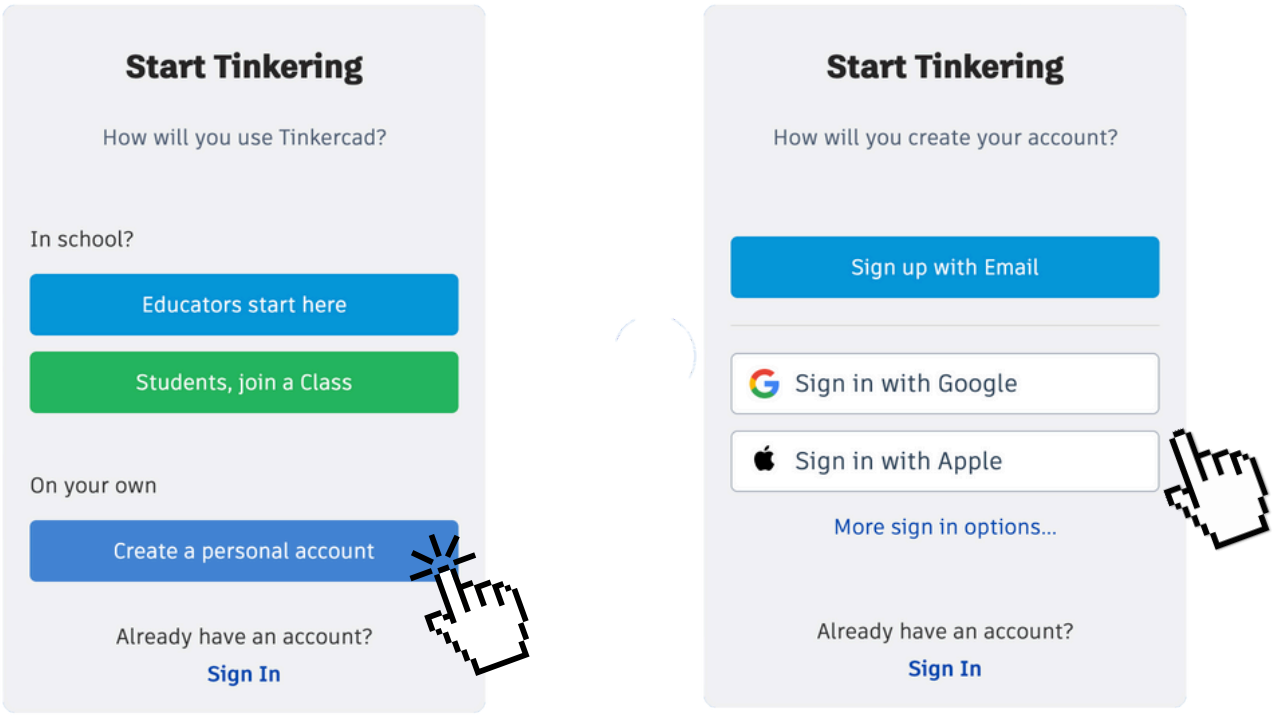
Click on the **Sign Up** button.



CREATING AN ACCOUNT IN TINKERCAD

Click on to **Create personal account.**

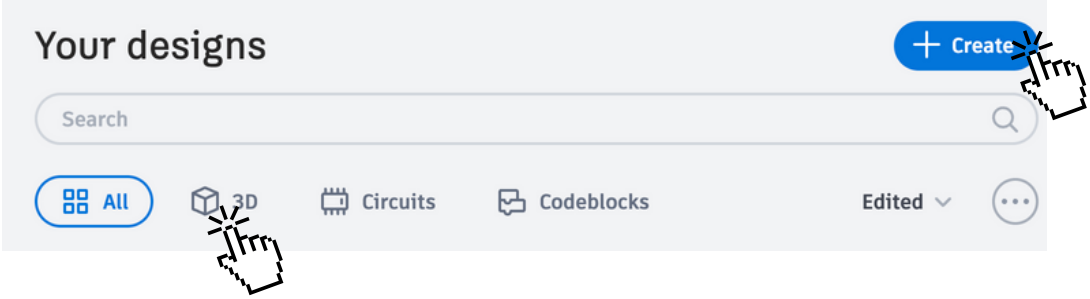
Select a way to sign up, eg. sign in with Google



Follow further steps to create the account.

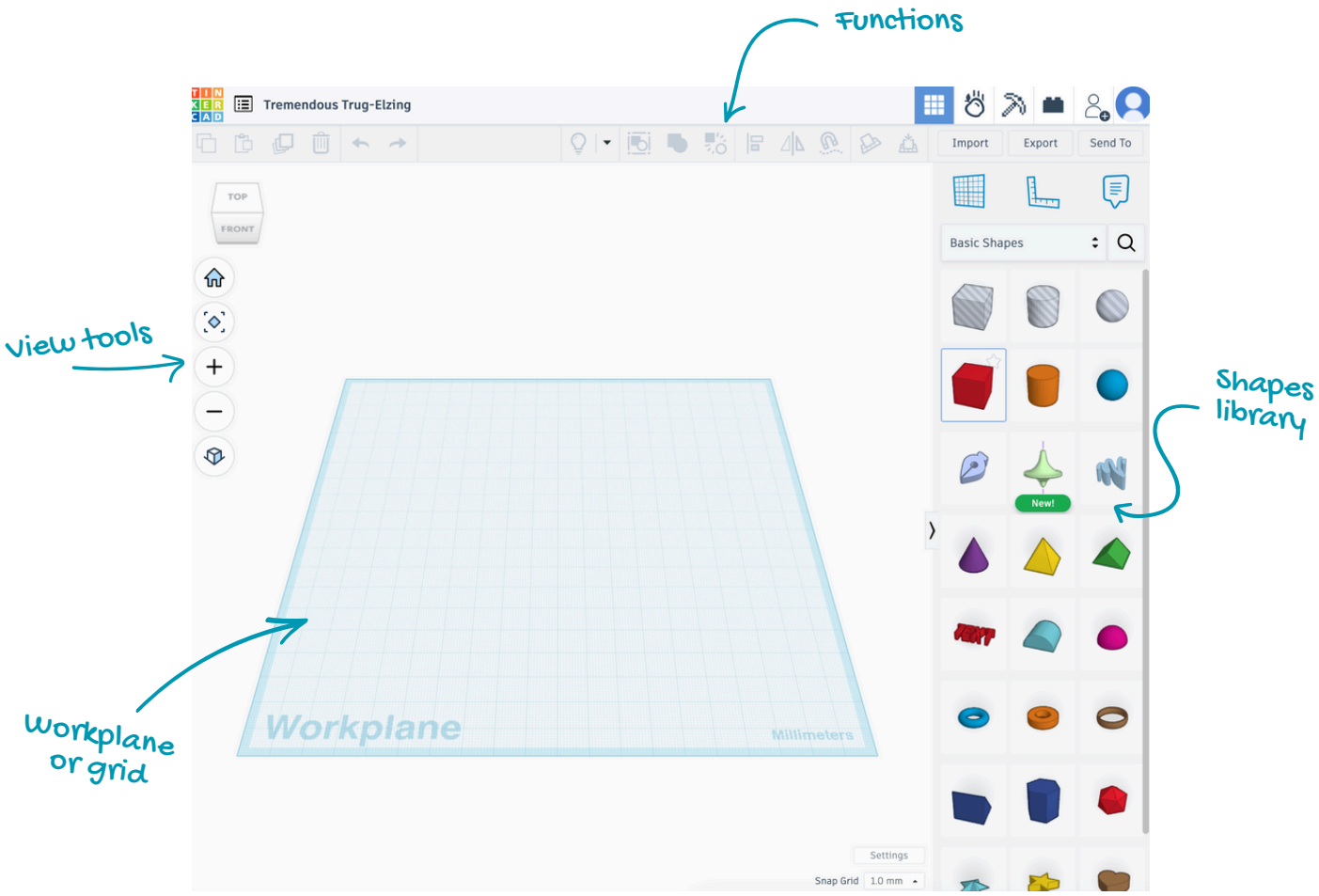
Once in Tinkercad **Home page**, click **Create** button and choose to create your first 3D Designs

Or, on the left side menu go to **Designs**, and from there chose to create 3D.



There is Tinkercad's **Help Center** If you get stuch at this point or If you have further questions.

ONCE INSIDE TINKERCAD...



Functions

	Show all	Ctrl + Shift + H	It shows all hidden shapes
	Group	Ctrl + G	Groups two or more shapes together. You select the shapes clicking Ctrl + each one of them and then you click the group tool.
	Ungroup	Ctrl + Shift + G	Ungroups the shapes that have been grouped together
	Align	L	Aligns two or more objects in the 3 dimensions, so that each one is positioned in the center or one of its edges
	Mirror	M	Reflects an object in the x, y or z axes.
	Cruise	C	First select the shape and by clicking Cruise you can place it on top of any surface in your design.

Note: When grouping two or more shapes together, the shape that is created has one color. If the grouped shapes had different colors and you wish to keep their original color, you click on its color and instead of solid, you select Multicolor.

ONCE INSIDE TINKERCAD...

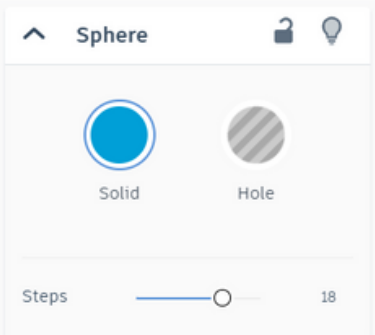
View tools

	View cube		Left click on it and see one object from different angles
	Home view		Brings you back to the first view when you open the project
	Fit all in view	F	Focuses on the specific object you have selected
	Zoom in	+	Zooms in (you can also use the mouse wheel)
	Zoom out	-	Zooms out (you can also use the mouse wheel)
	Orthographic view		Offers a more natural, bird's eye look at the model

Editing tools

	Copy	Ctrl + C	Copies the selected object
	Paste	Ctrl + V	Pastes the selected object
	Duplicate and repeat	Ctrl + D	It remembers your previous action. When you use it, it pastes the selected object but also performs your previous action on it.
	Delete	Delete	Deletes the selected object
	Undo	Ctrl + Z	Undos your last action
	Redo	Ctrl + Y	Redos what you undid.

Tools for shapes



If you click on the lock button, it locks editing, so you cannot change the dimensions of the shape.

If you click on the bulb button, your shape is hidden. To make it visible again you click on the *Show All* button on the main menu.

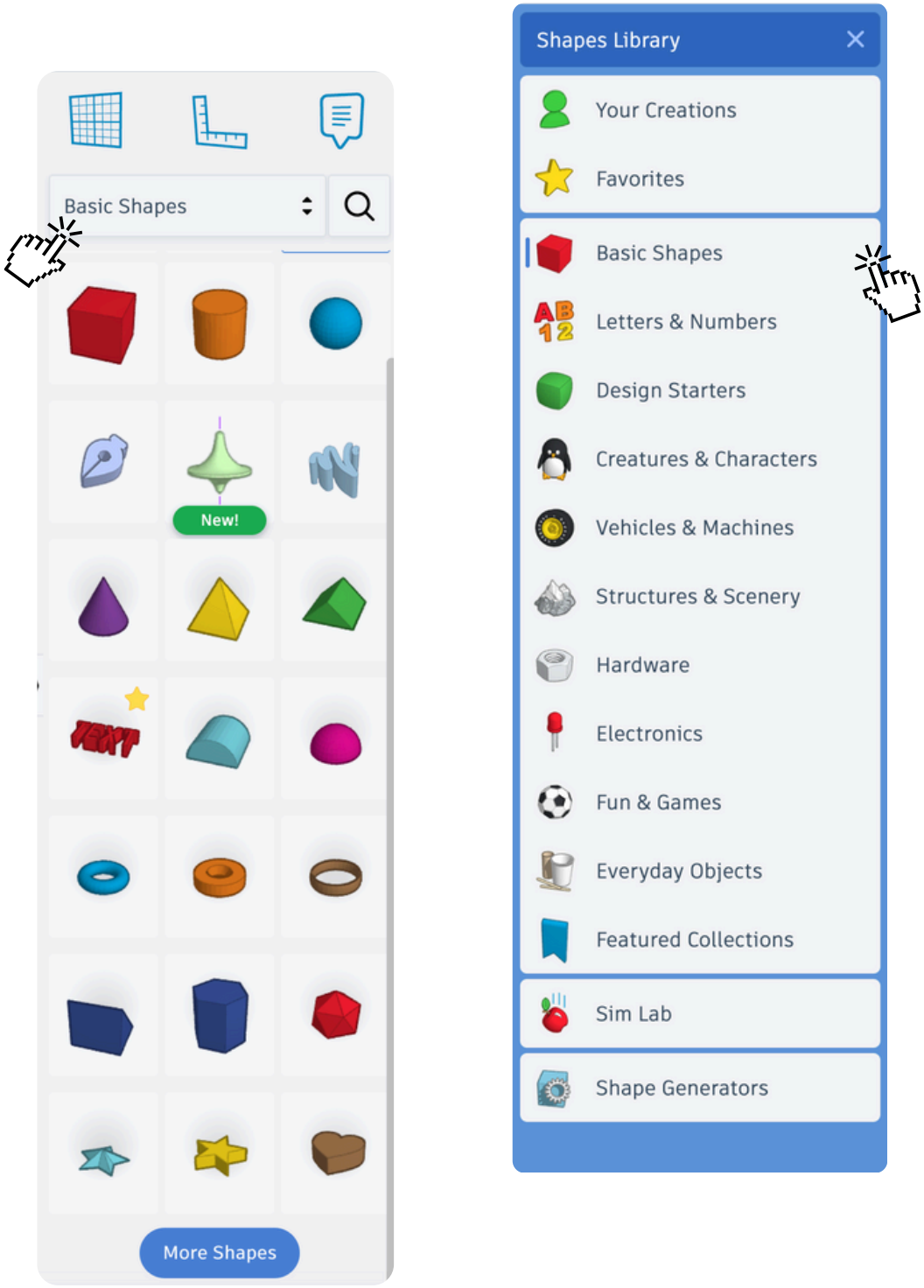
If you click the Hole button your shape will become transparent. If you group it with another shape, the common space of the 2 items will disappear, leaving a hole in this place.

Steps define how smooth your object is. The more the steps, the smoother your object is but also the "heavier it gets".

ONCE INSIDE TINKERCAD...

Shapes library

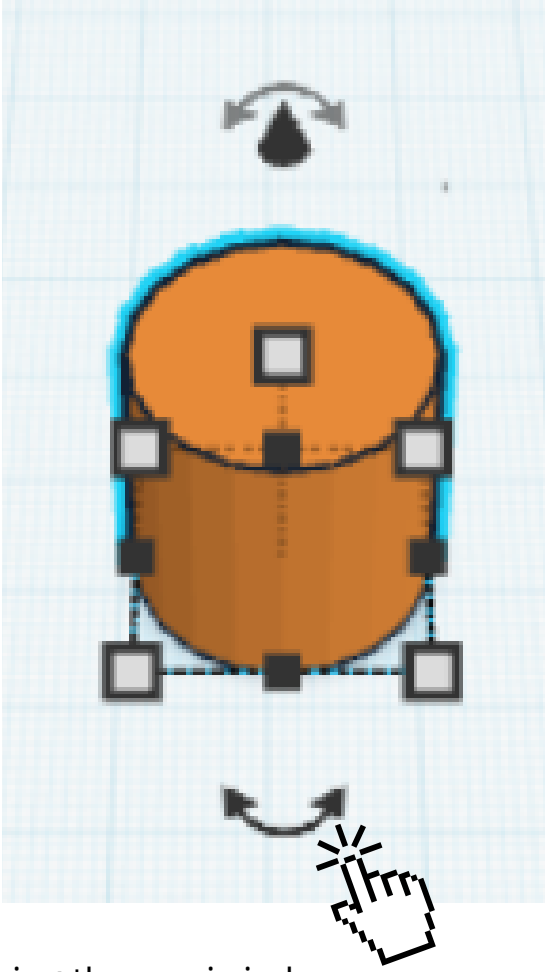
You can choose between several groups of shapes.



In the next charpter we will see how to edit and use them.

EDITING SHAPES IN TINKERCAD

When you click on a shape, these black and white dots appear alongside it.



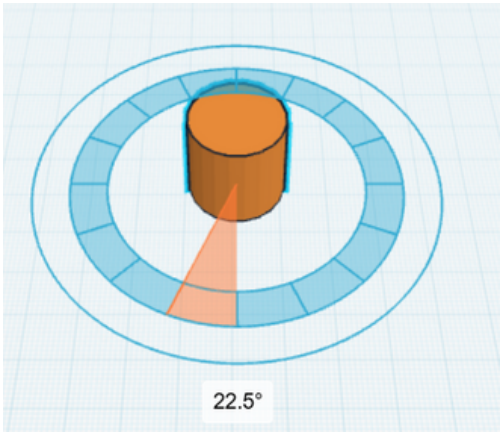
If you drag the white dots by clicking your left mouse button, width and length change simultaneously. NB the white dot in the middle changes only one dimension, the height of the object.

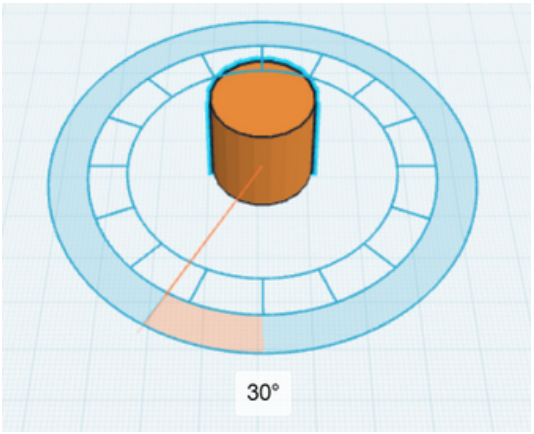
By dragging the black dots you change width or length.

If you want to lift the shape up or down you drag the black cone above the shape. To position it back on the workplane, you click D.

You can rotate the shape in 3 dimensions using the semi circles.

If you click on the inner cycle the rotation step is 22.5°. In the outer cycle the rotation step is 1°.

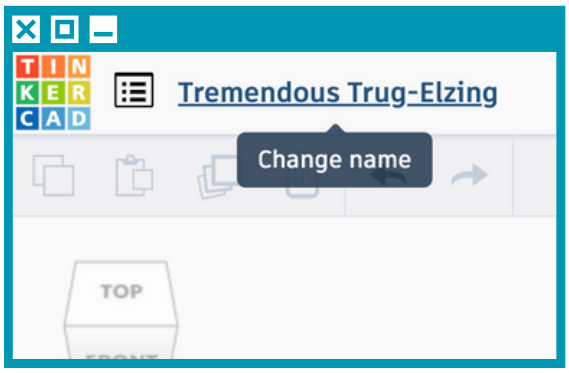




LET'S CREATE OUR FIRST PROJECT!

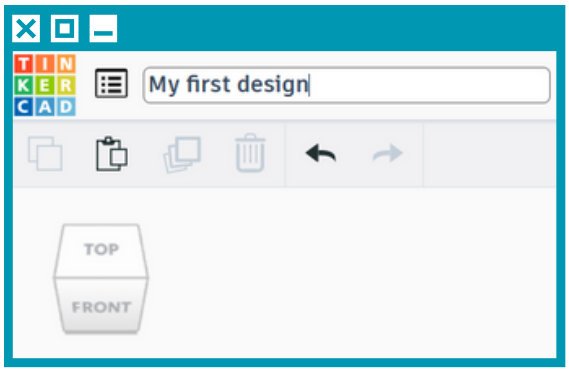
Once in Tinkercad Home page, click + Create

We will create a simple house.

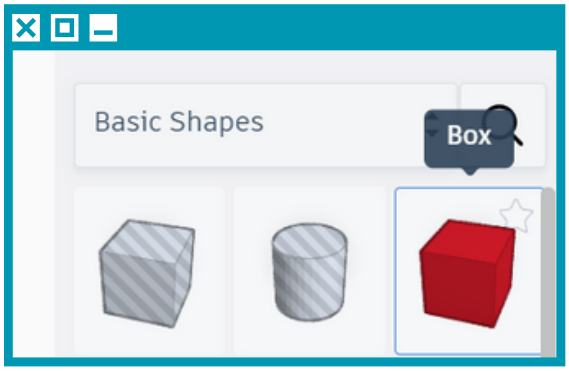


First you change the name of your project.

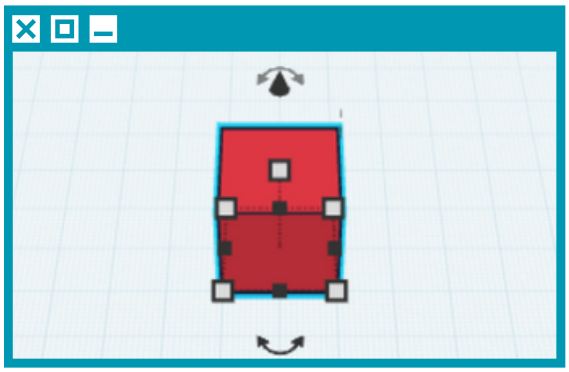
Click on the random name given by *Tinkercad*.



Fill in the name of your project.

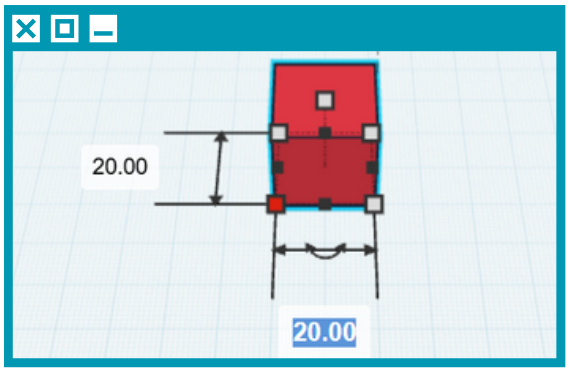


Select the **box** shape from the library of basic shapes on the right.

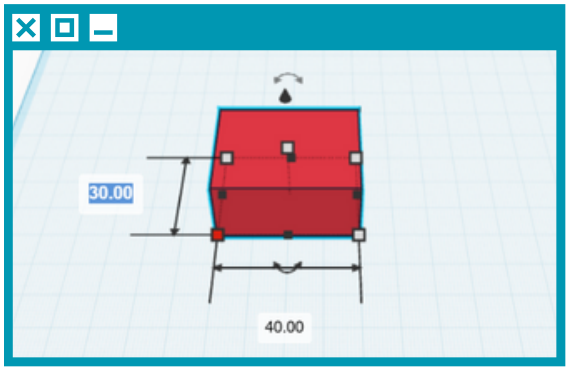


Drag and drop it in the workplane (using the left mouse button).

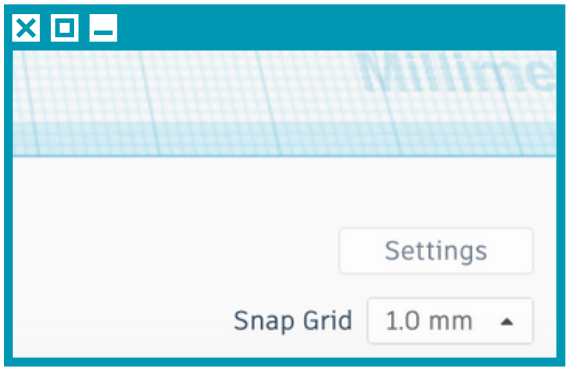
LET'S CREATE OUR FIRST PROJECT!



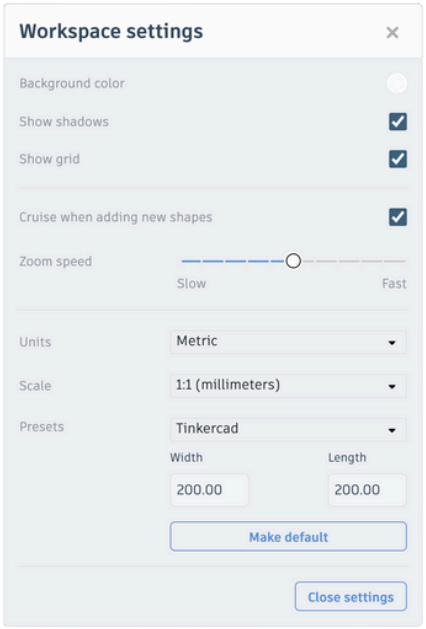
Click on the object in order to change its dimensions.



You can drag the white or black squares until you reach these dimensions or click on one white square and add the dimensions manualy (suggested). Make width 40 mm and length 30 mm.

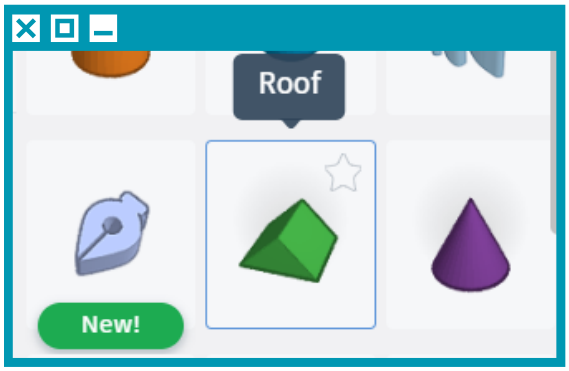


If you wonder why it is measured in mm, go to the settings button on the bottom right corner of your workplane

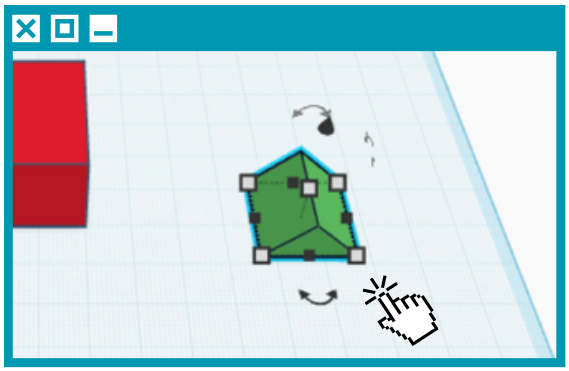


You can see that the units are mm. You can change it to inches if you wish. All your dimensions will be converted to inches.

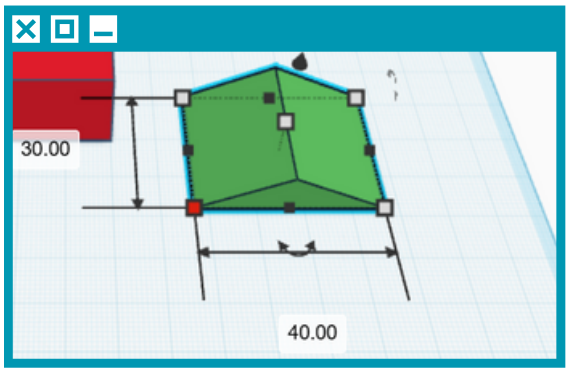
LET'S CREATE OUR FIRST PROJECT!



Select the **roof** shape and drag and drop it to your workplane, next to the box.

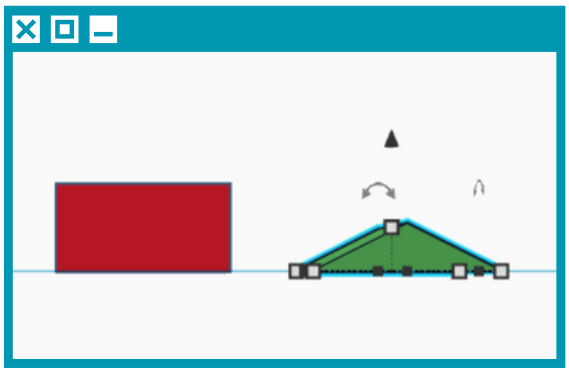


Click on it to change its dimensions.



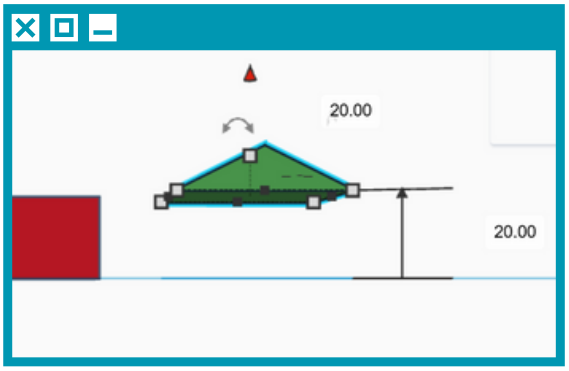
The dimensions should be the same as the house if we want this to fit to the box completely.

Click on the front side of your view cube.



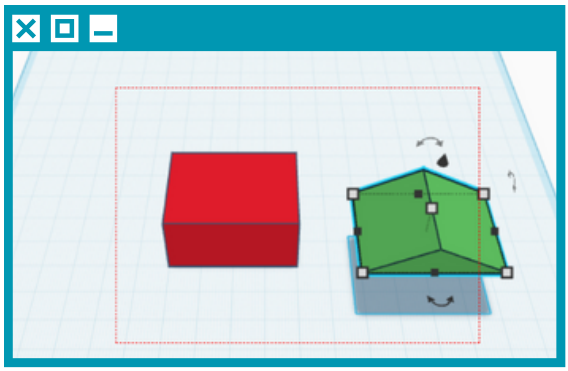
You now see the front side of your design. You have to lift the roof at the height of the box, which is 20 mm since we haven't changed it

LET'S CREATE OUR FIRST PROJECT!

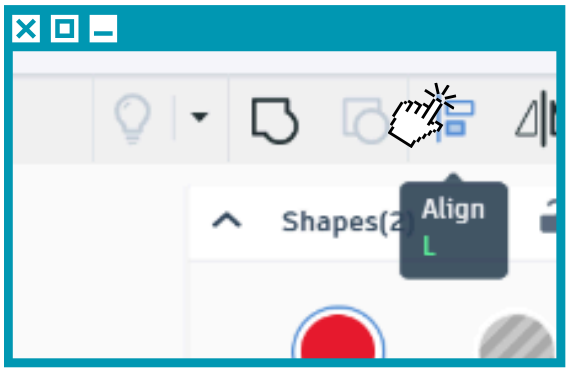


This shot shows you that you have lifted the Roof 20 mm.

Click home view in your view menu to get back to your initial view.

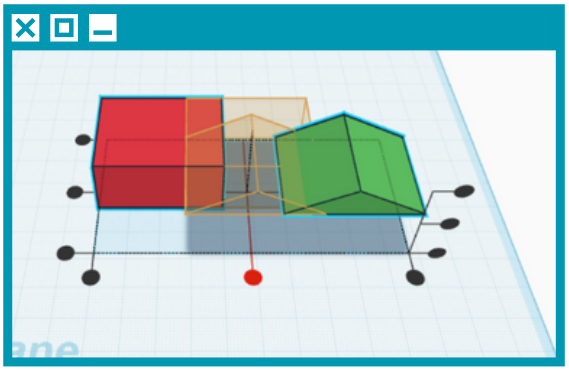


Select the two shapes by placing your mouse on the top right side next to the box and drag it until the bottom right side of the roof.
Another way to select more than one objects is to select the first and then Ctrl + Click each of the rest.



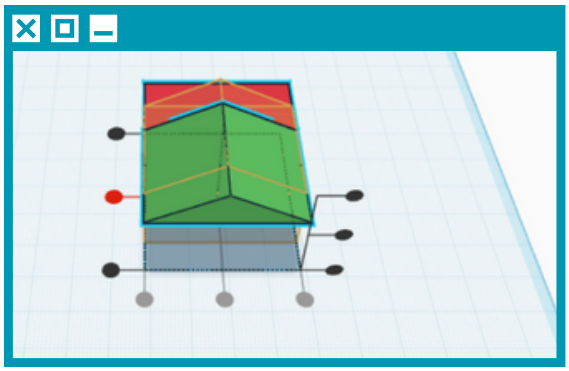
The two shapes have been selected.

Click on the align tool on the top right of your screen.

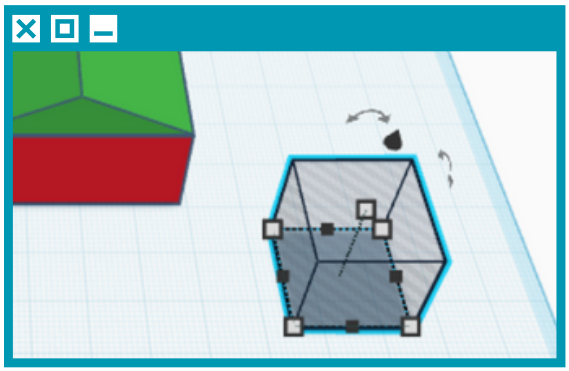


Click on the front middle cyrcle to select it. The items will be aligned in the middle. You can see the final result in transparency.

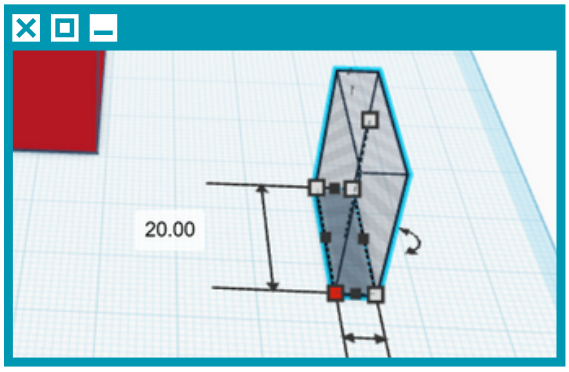
LET'S CREATE OUR FIRST PROJECT!



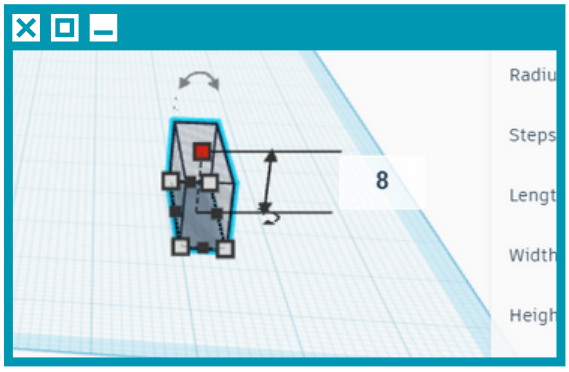
Click on the side middle circle to select it. The shapes will be aligned in the side middle.



Once you have aligned the two shapes drag a hole box in your workplane. You are going to shape the door of the house with it.

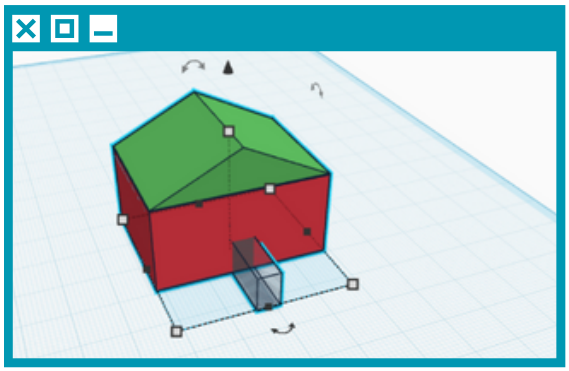


Change the width to 5 mm or more, if you wish your door to be wider.

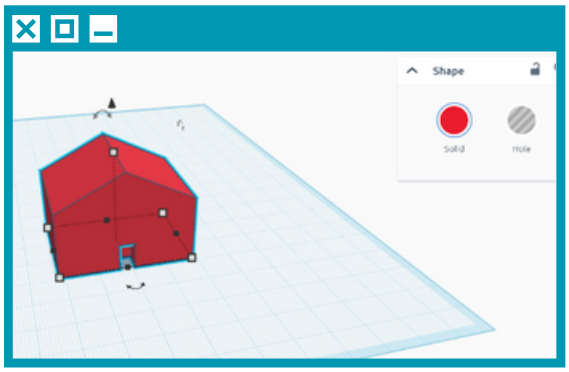


Change the height to 8 mm or more, if you wish your door to be taller.

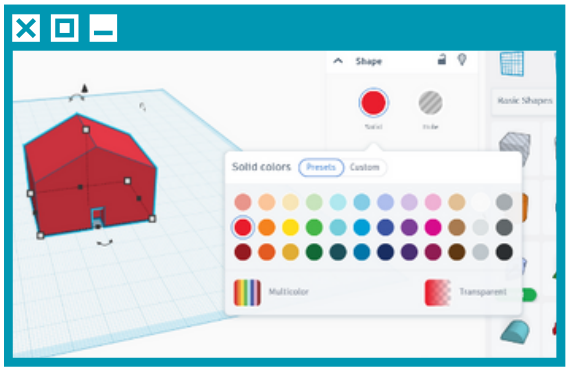
LET'S CREATE OUR FIRST PROJECT!



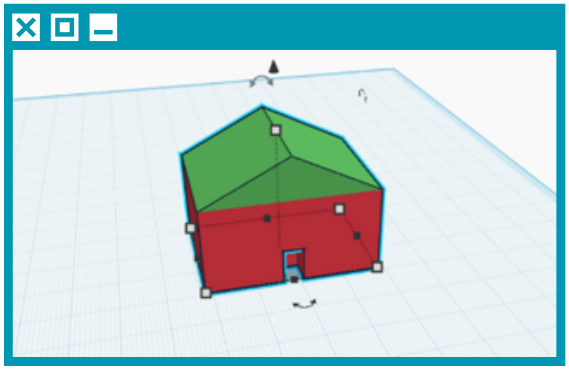
Place the hole shape on the point where you wish the door to be.



Select the tree shapes and group them together. You will notice that the grouped shape is monochromus.



If you wish to retain the original colors click on the solid color and select multicolor.

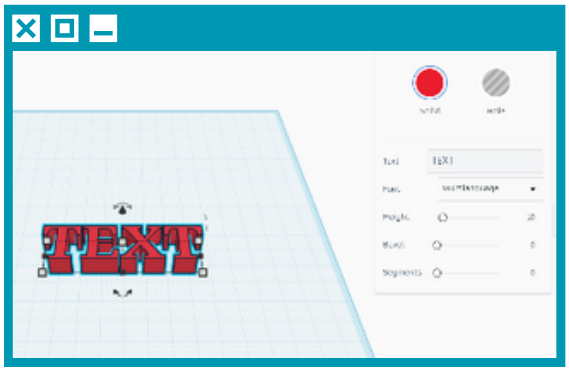


Here you are!
Congratulations on
building your first house!

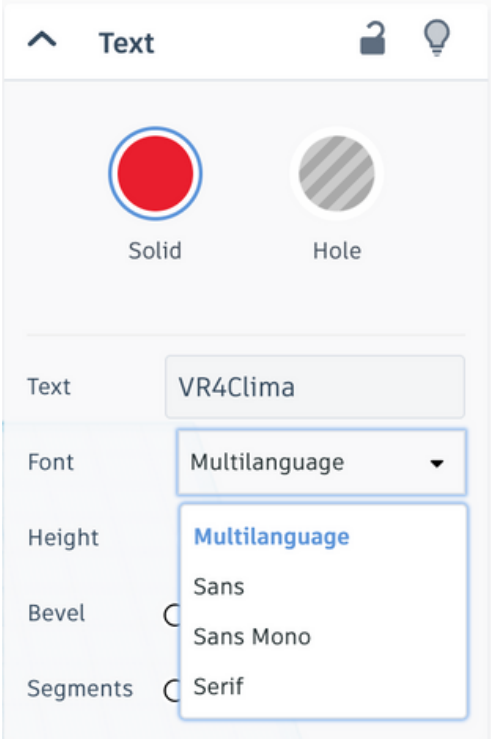
WORKING WITH TEXT AND CUSTOM SHAPES

The Text tool is easy to use when you want to create 3D texts

Select the **text** tool from the library of shapes and drag it at the workplane.



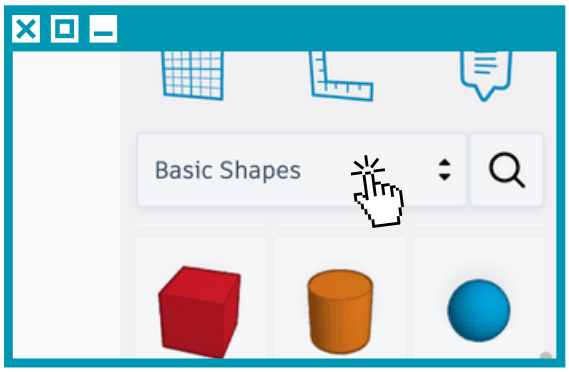
When you click on it - pop up window will open and you can change the text to your own.



Here’s our choice.

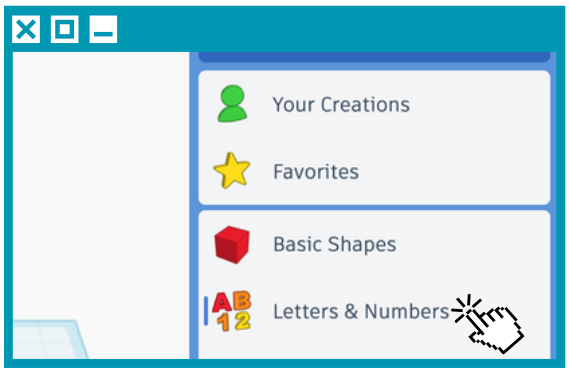
You can choose the fonts you prefer.

WORKING WITH TEXT AND CUSTOM SHAPES

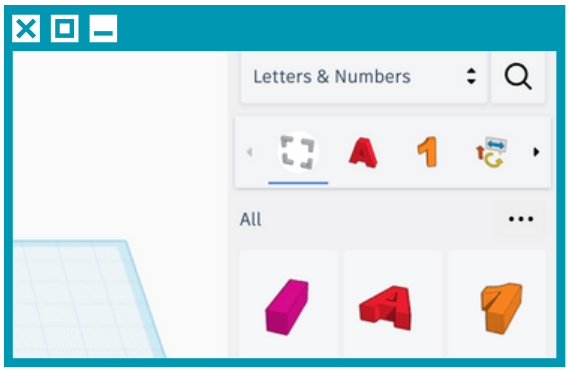


You can choose individual letters from shapes as well.

You go to the shapes library.



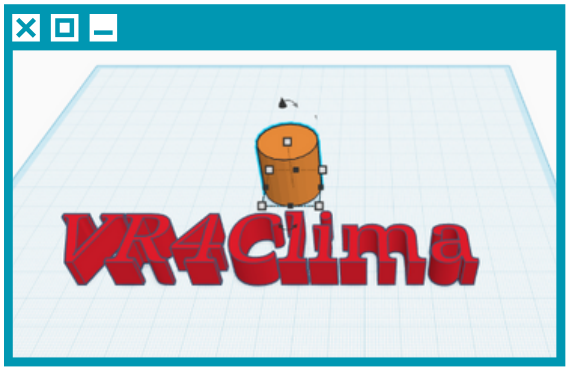
Select option for letters and numbers.



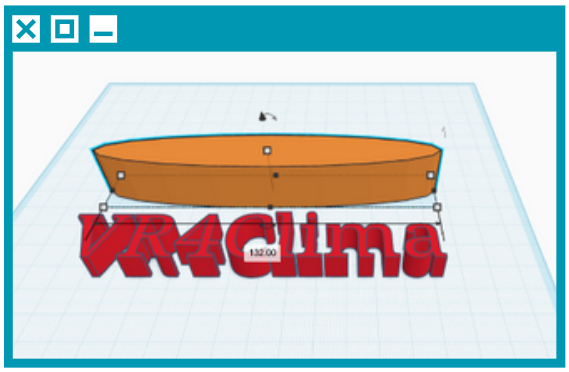
You can choose from a variety of letters and numbers.

LET'S CREATE A SIGN

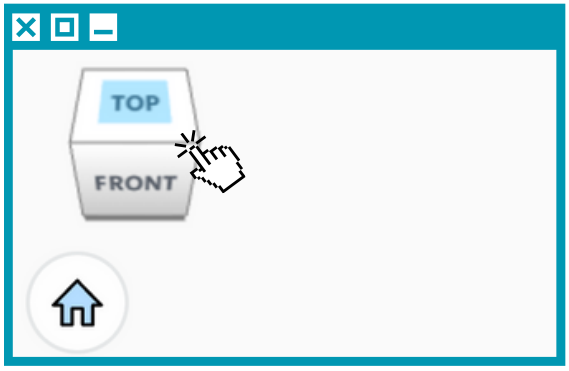
Drag the text sign inside the workplane and write the text you wish.



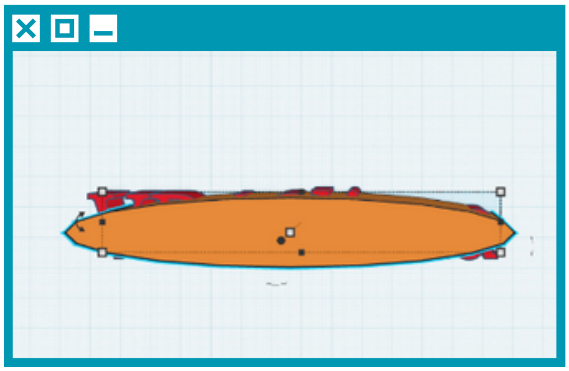
Insert a **cylinder** in the workplane, next to your text.



Drag the edges of the cylinder so that it is long enough to cover the text.

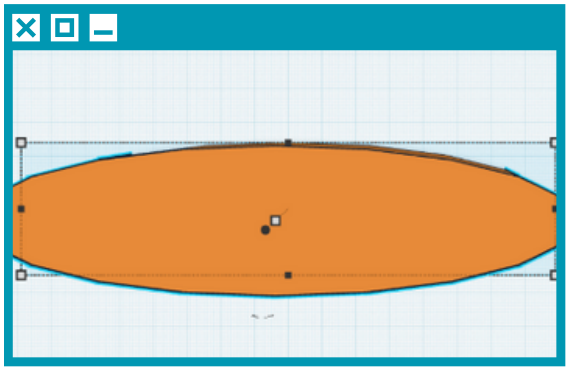


Click the top side of your view cube.



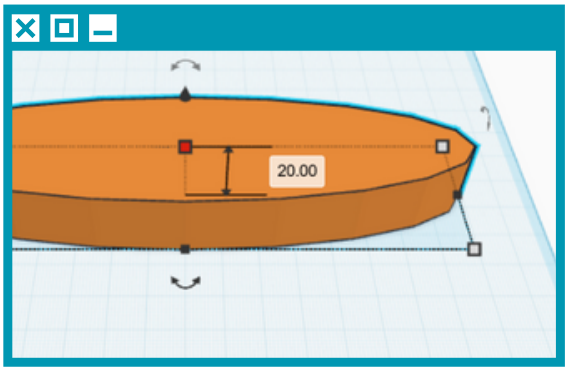
Place the cylinder above your text.

LET'S CREATE A SIGN

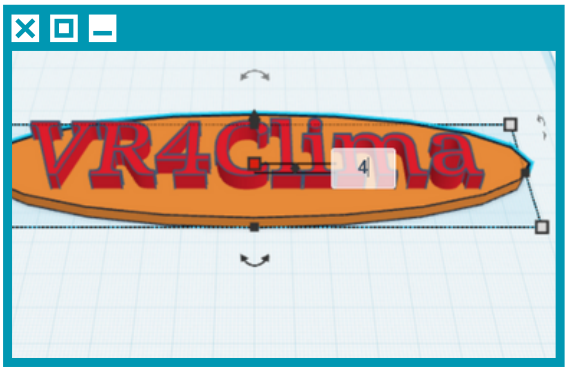


Drag the sides of the cylinder so that the text is covered completely.

Click home view in your view menu to get back to your initial view.



Click on the middle white square of the cylinder to select the height.

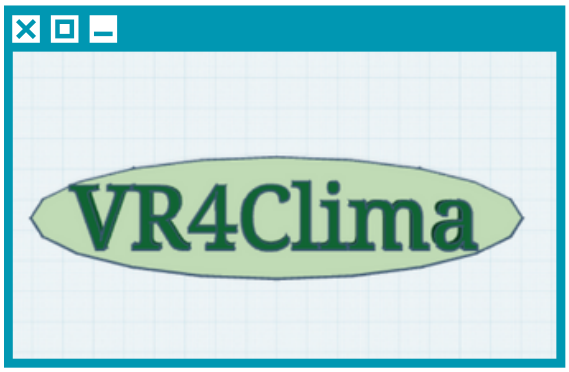


Select the height of your cylinder, so that the text is visible and clear.

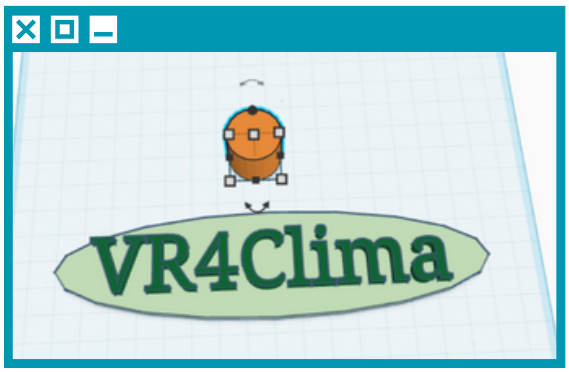
Click on the top side of your view cube.

Select the colors you like for your text and cylinder.

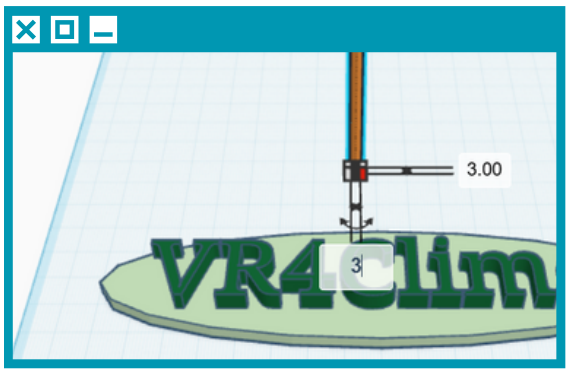
LET'S CREATE A SIGN



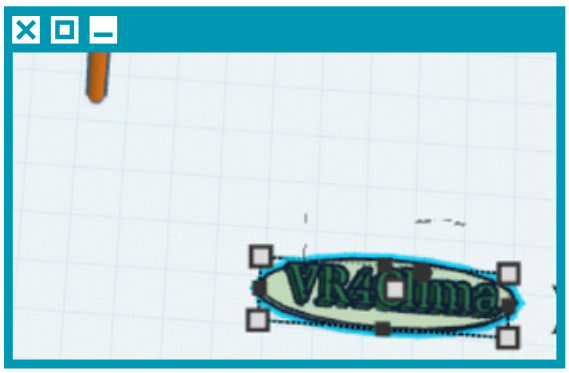
It should look like this.



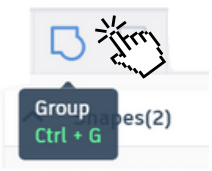
Next, drag a cylinder next to your sign.



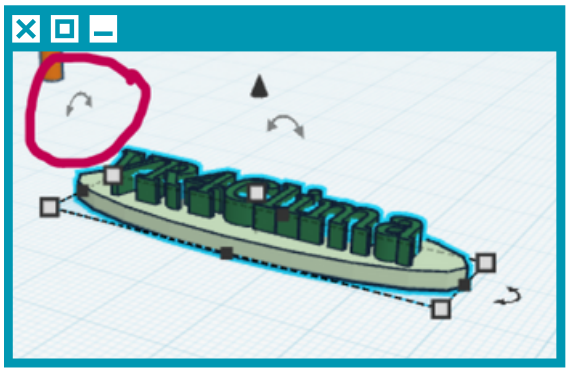
Drag the height of your cylinder as much according to how tall you wish your sign to be.



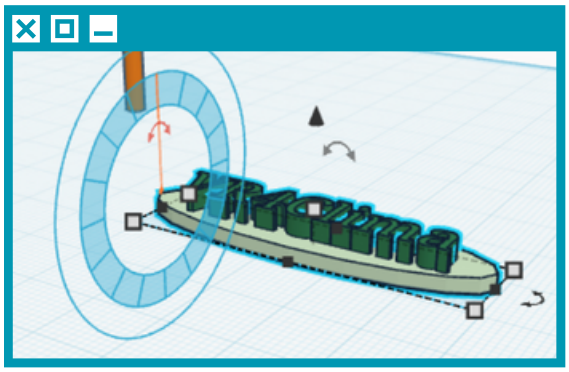
Select the two first shapes either by right clicking your mouse and making a rectangle above them or by left clicking the first and then Ctrl + Click the second. Then group the shapes together.



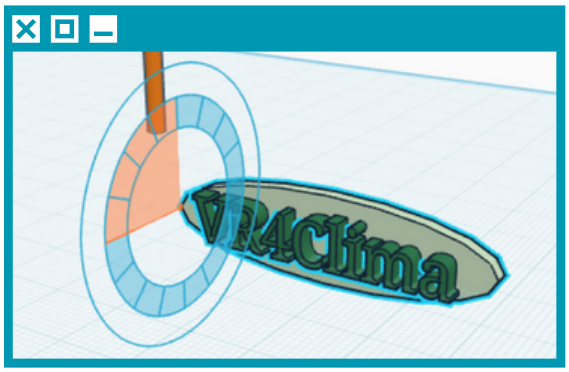
LET'S CREATE A SIGN



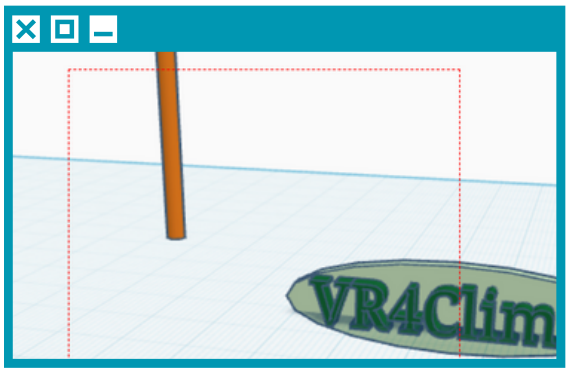
You want to rotate the sign so that it is faced forward. You have to select the correct dimension to rotate.



Use the inner side that is scaled to 22,5°.

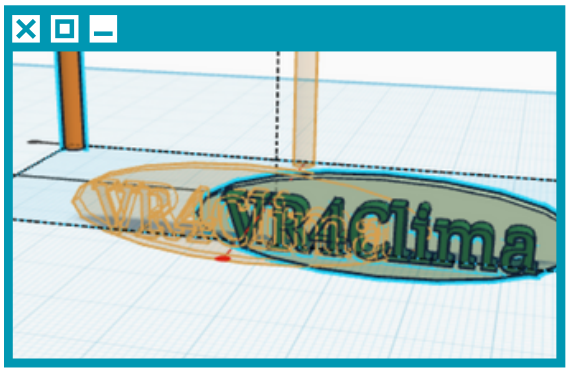


Rotate it by 90°.

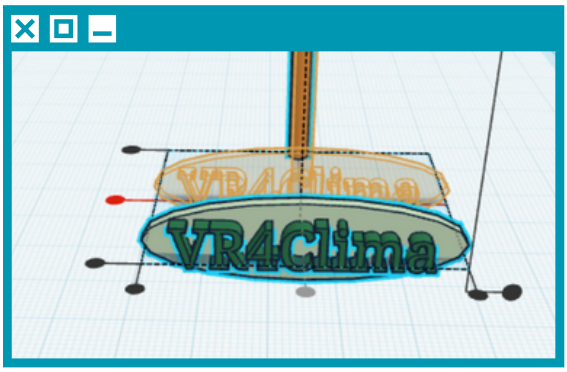


Select the second cylinder and the sign.

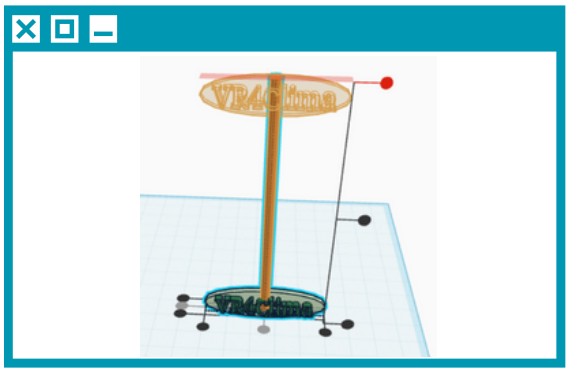
LET'S CREATE A SIGN



Align them in the middle from the front side.

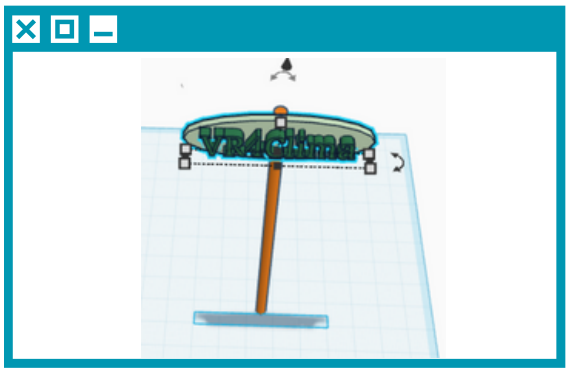


And from the side.



Last, align on the top of the height.

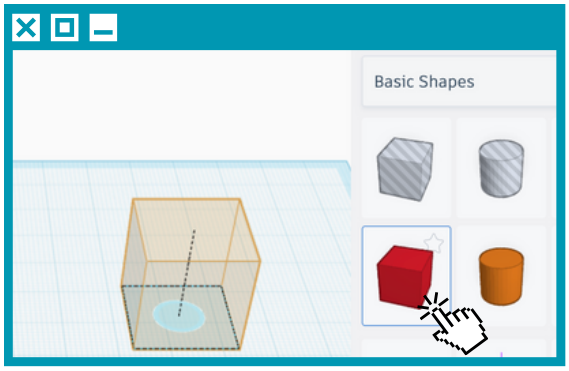
You have to click 3-4 times the down arrow so that the sign comes in front of the second cylinder.



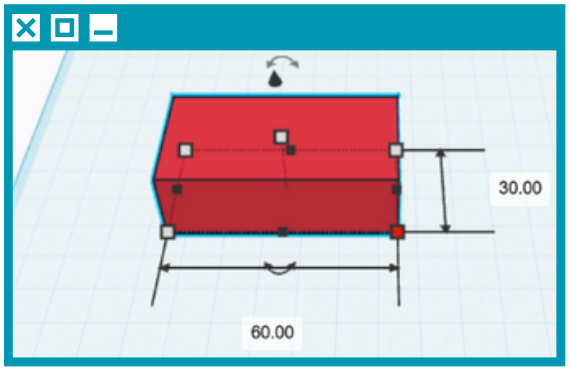
Congratulations!
You have created your first sign!

LET'S CREATE A GREENHOUSE!

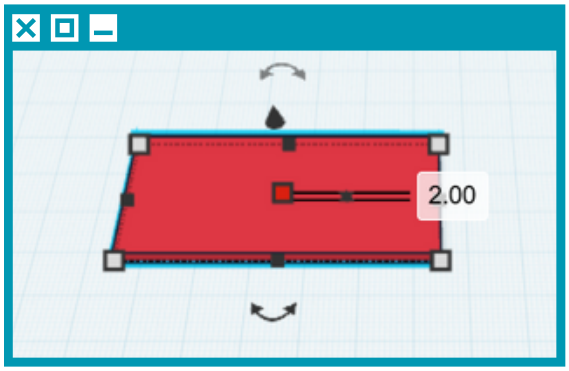
In this example we are going to use the "Duplicate and Repeat" function in a different than usual way.



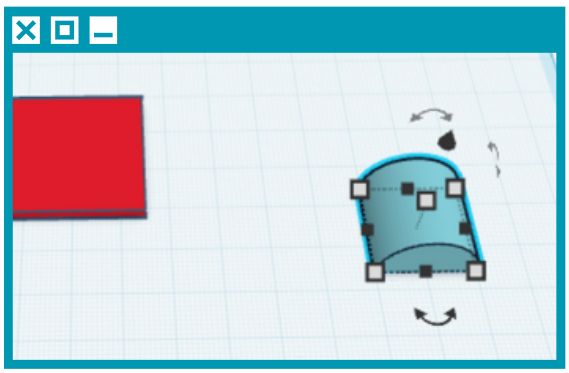
Insert a cube **box** inside your workplane.



Change the dimensions of length to 30 mm, and width to 6 mm.

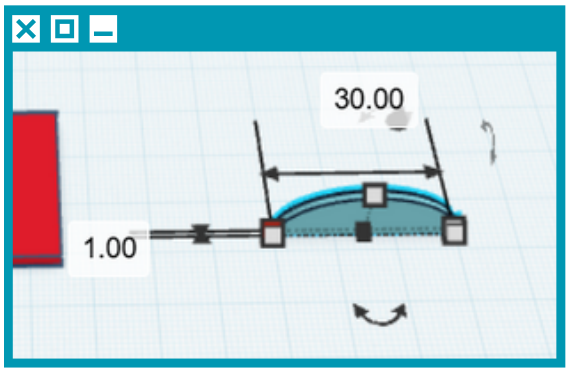


Then change height to 2 mm.

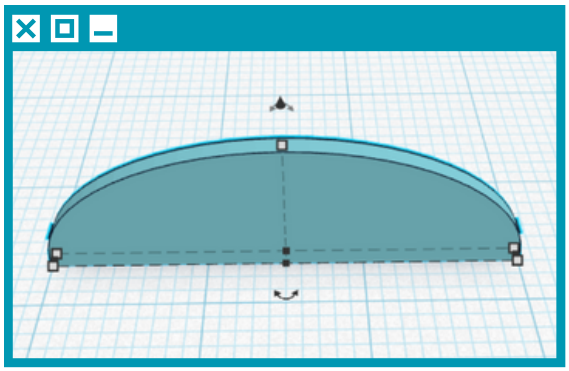


Insert a **round roof** from basic shapes.

LET'S CREATE A GREENHOUSE

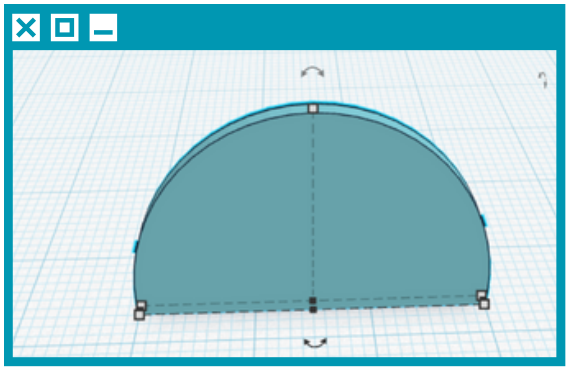


Change its width to 30 mm, and length to 1 mm.

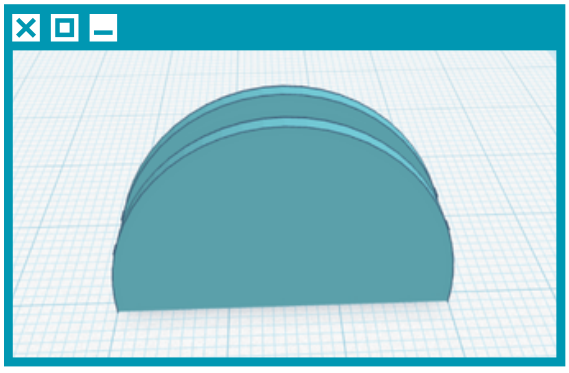


And then height to 20 mm.

Click to duplicate and repeat or click Ctrl+D.

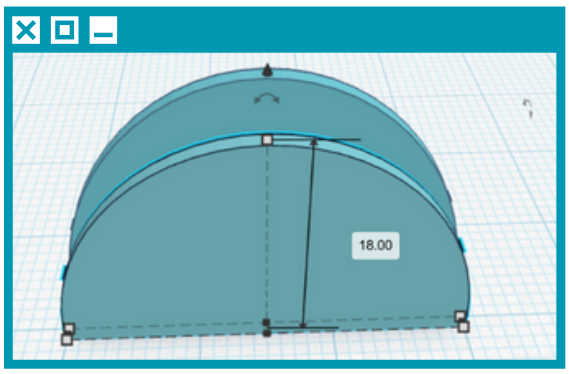


Now you have two similar shapes one on top of the other.

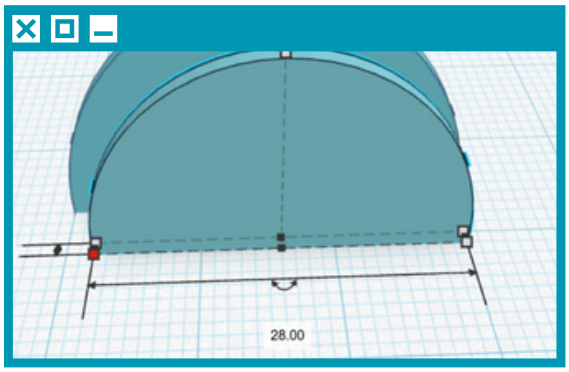


Bring one on front by clicking the down arrow of your keyboard a couple of times.

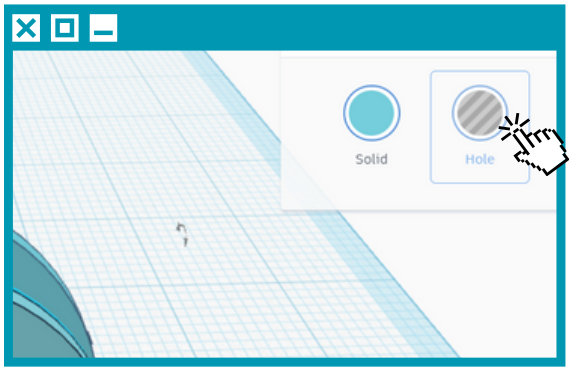
LET'S CREATE A GREENHOUSE



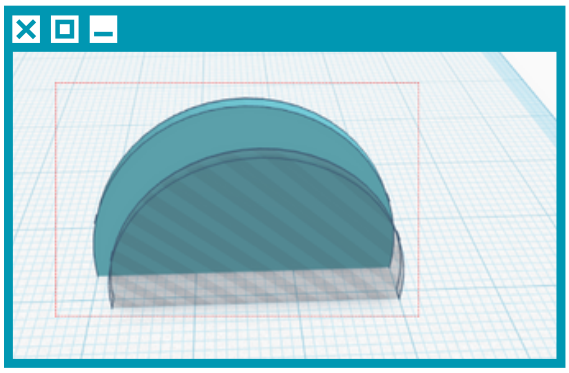
Change the height to 18 mm.



Change width to 28 mm.



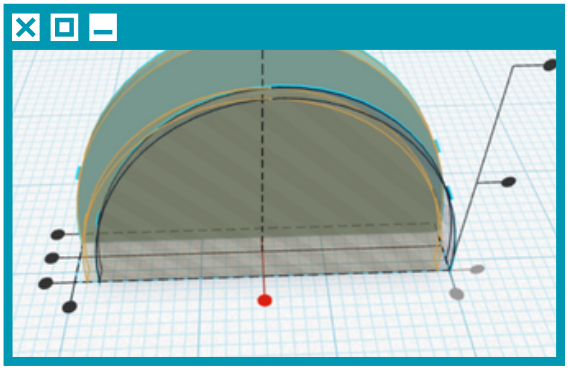
Make the one with the reduced size a hole.



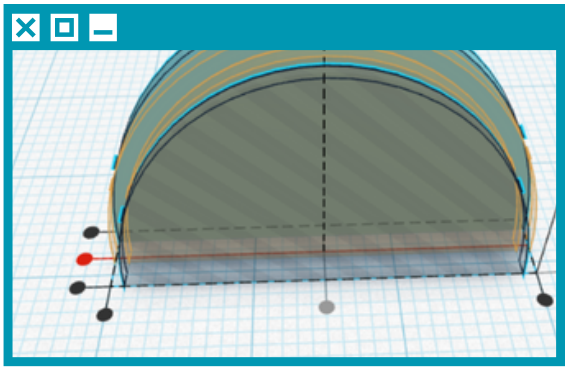
And select the two shapes by making a rectangle selection by left clicking your mouse button.

Now that both shapes are selected, you will align them.

LET'S CREATE A GREENHOUSE

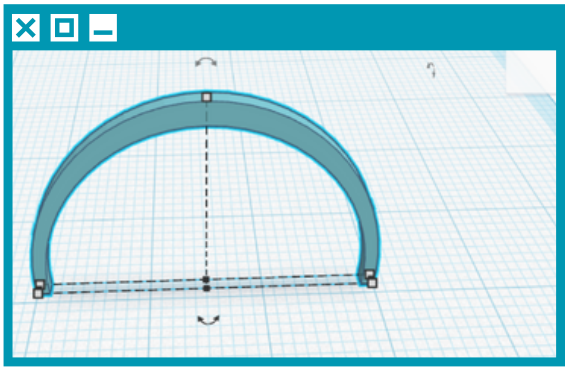


On the middle of the width.

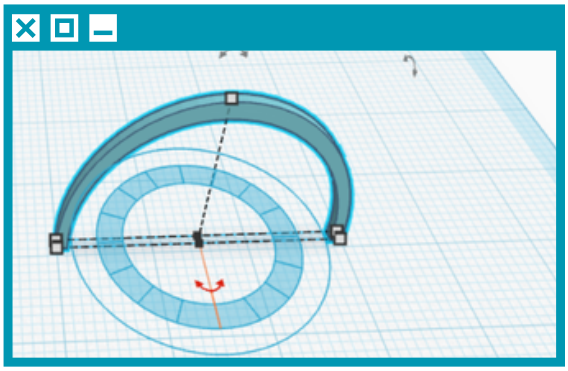


And the middle of the length.

Then group them.

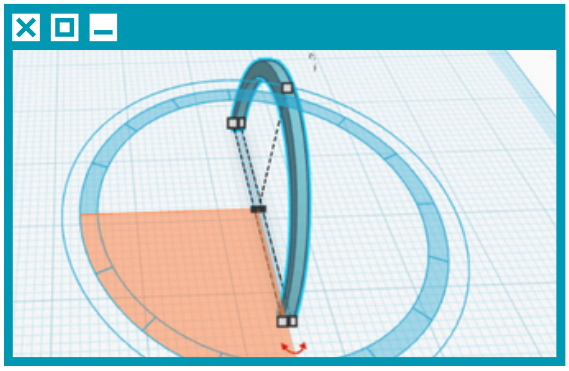


And you get a semicircular support beam for your greenhouse.

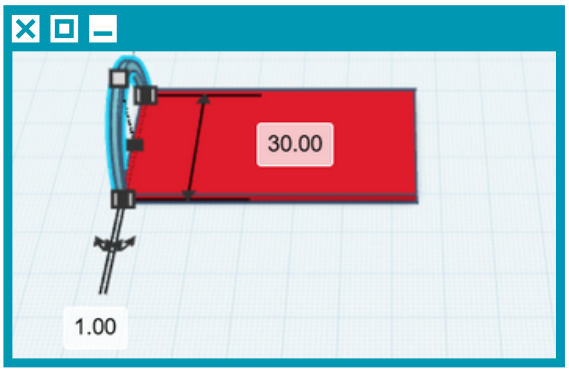


Rotate it in the correct direction.

LET'S CREATE A GREENHOUSE

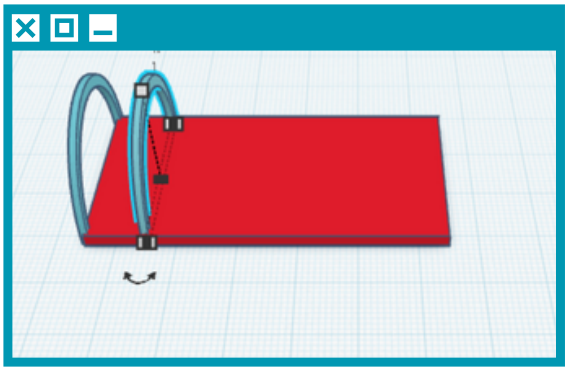


Rotate it by 90°.



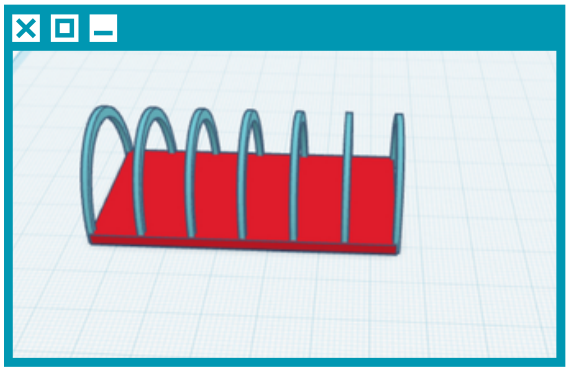
Place it at the left side of your red shape.

Click to duplicate and repeat.



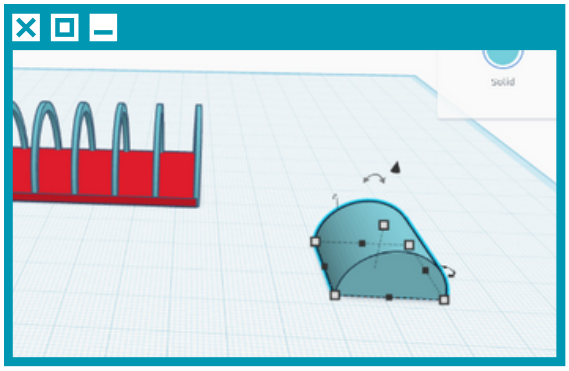
Using the arrow keys, place the second beam in a distance from the first.

Click to duplicate and repeat again.

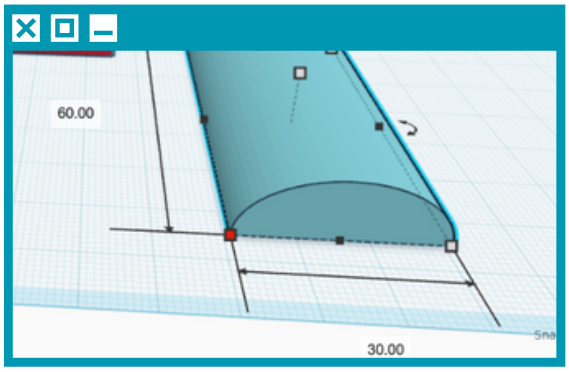


This command remembers the actions you have done after the first time you clicked on it. The second time you click on it, it duplicates and repeats these actions.

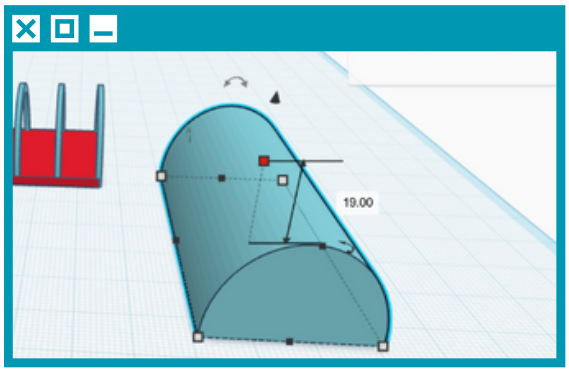
LET'S CREATE A GREENHOUSE



Bring a new round roof in your workplane.

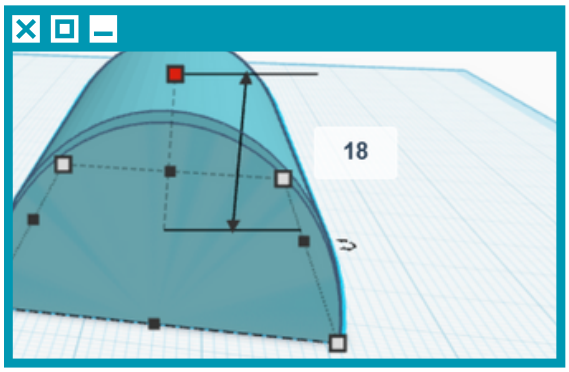


Change the dimensions as shown, to 60 mm and 30 mm.



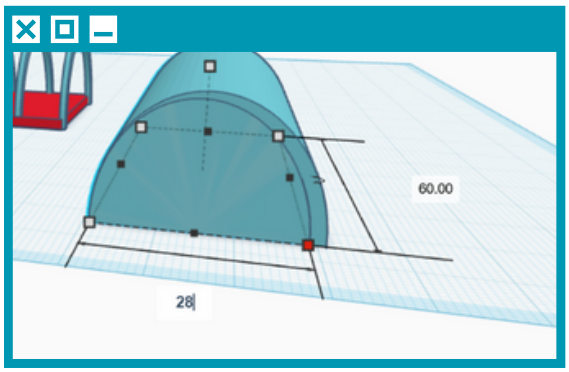
Change the height as well, to 19 mm.

Click duplicate and repeat to get a second round roof on top of the first.

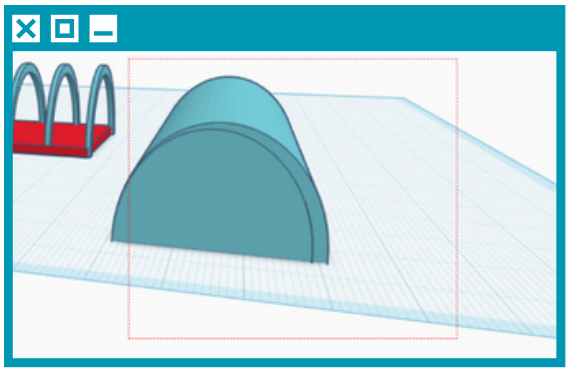


Change the height of the second round roof to 18 mm.

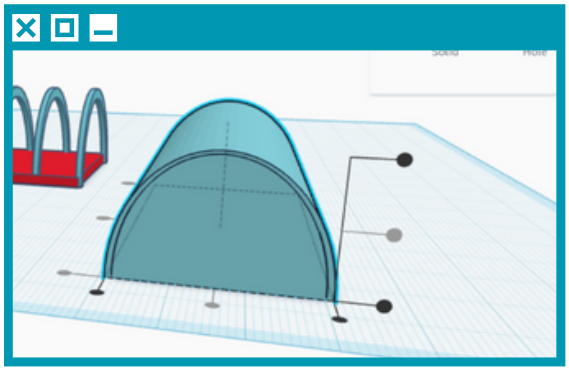
LET'S CREATE A GREENHOUSE



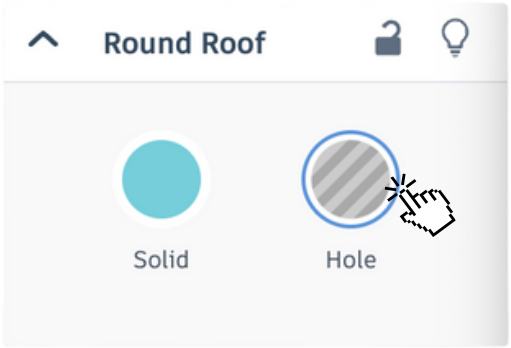
Change width to 28 mm, and leave length as it is.



Select both shapes.

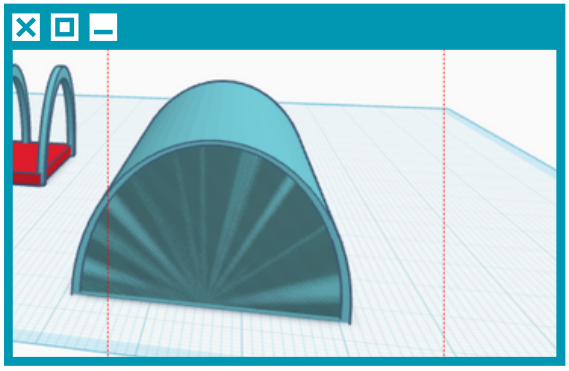


Align them.



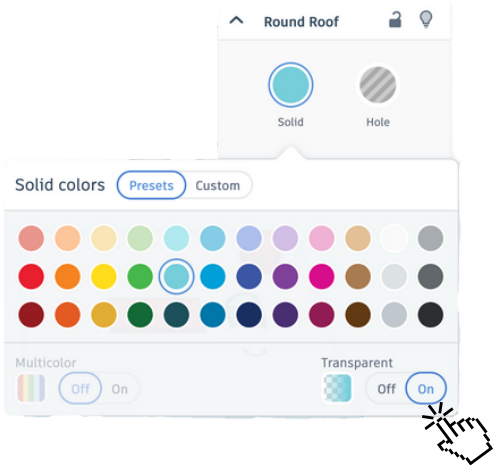
Select the inner round roof, and select hole for the shape.

LET'S CREATE A GREENHOUSE

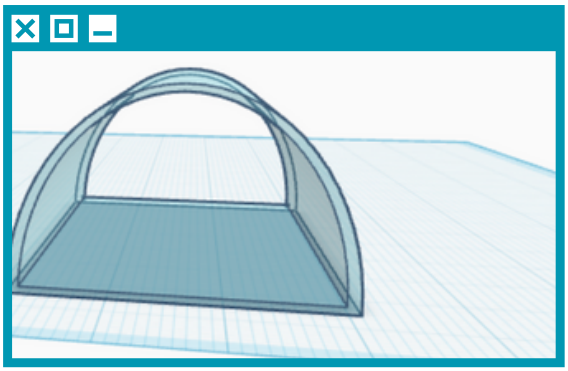


Now select both shapes.

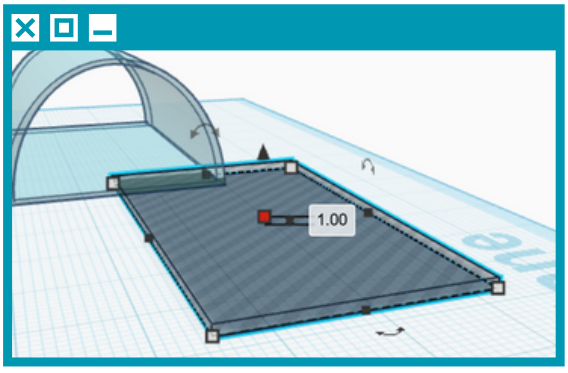
And group the two shapes together.



Click on the solid color and select transparent on the bottom right of the pop up window.

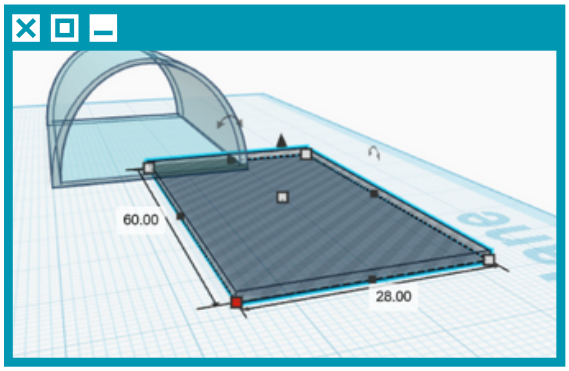


This is how it would look like.

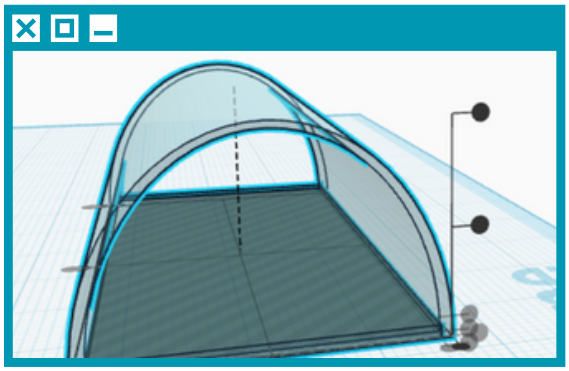


Bring a hole box in your workplane, then change its height to 1 mm.

LET'S CREATE A GREENHOUSE

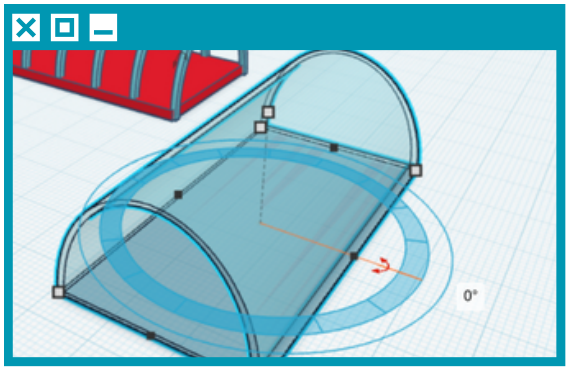


Change its width to 28 mm and its length to 60 mm.

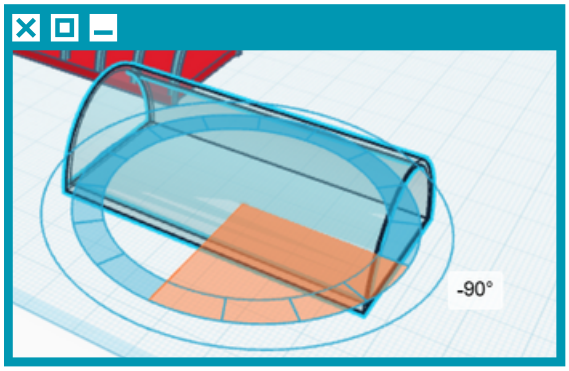


Align it with the transparent round roof.

Group them together.

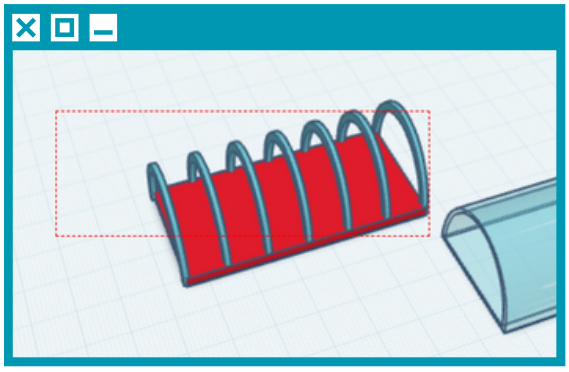


Rotate the transparent shape.

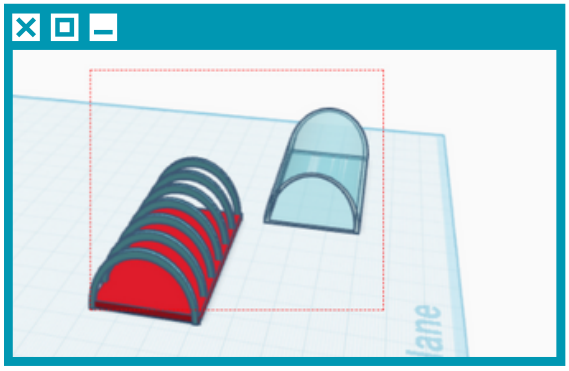


By 90° on the width axe.

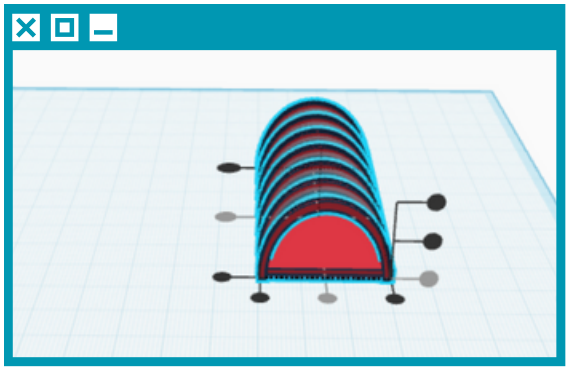
LET'S CREATE A GREENHOUSE



Select the first construction of base and supporting beams, and group them together.



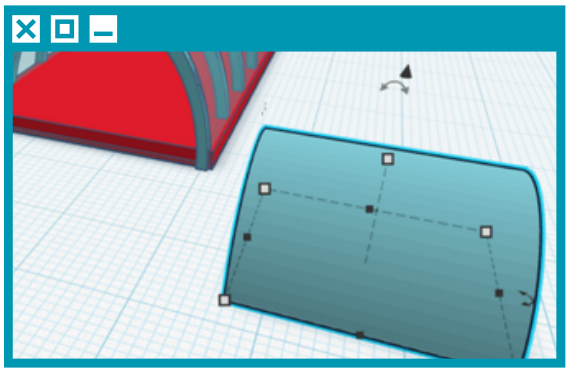
Now select both shapes.



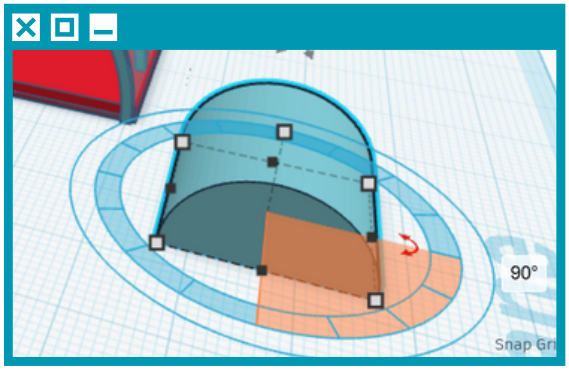
Then align them to look like this.

And you get the greenhouse shape. Now you need to add two walls.

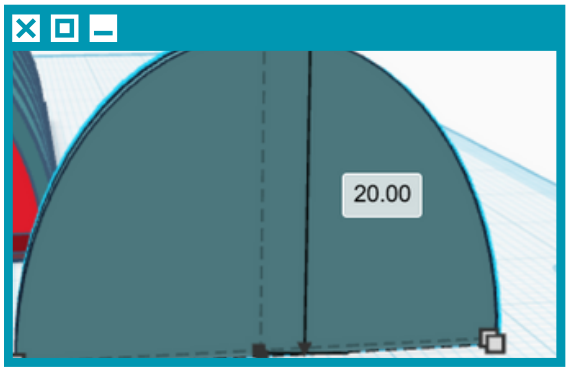
LET'S CREATE A GREENHOUSE



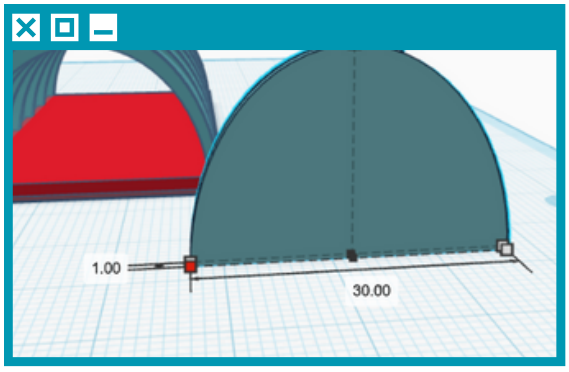
Bring a round roof in your workplane.



Rotate it by 90°.

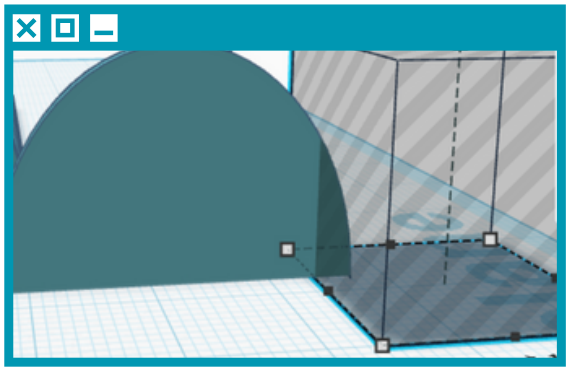


Change its dimensions as shown, heigh to 20 mm.

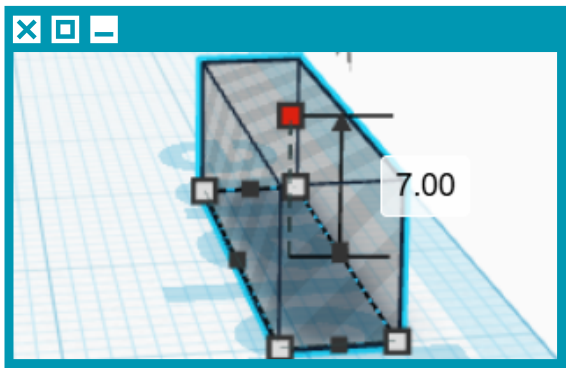


Width to 30mm and lenght to 1mm.

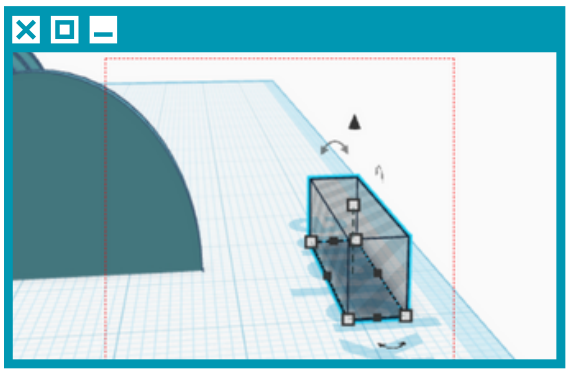
LET'S CREATE A GREENHOUSE



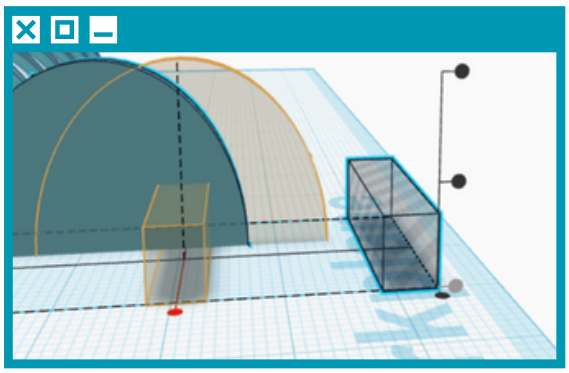
Bring a hole box in your workplane.



Change its width to 5mm and height to 7mm.

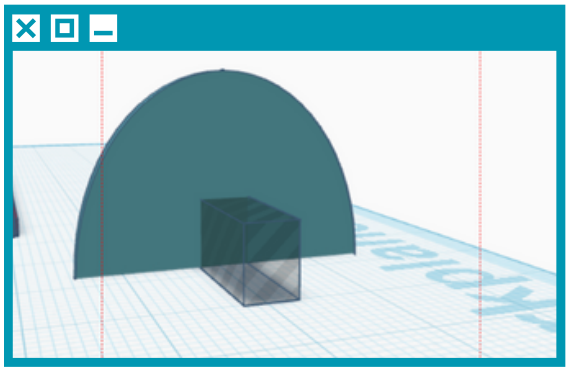


Select the two shapes.

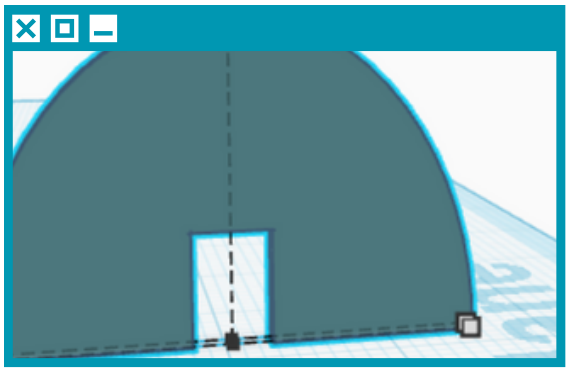


And align them.

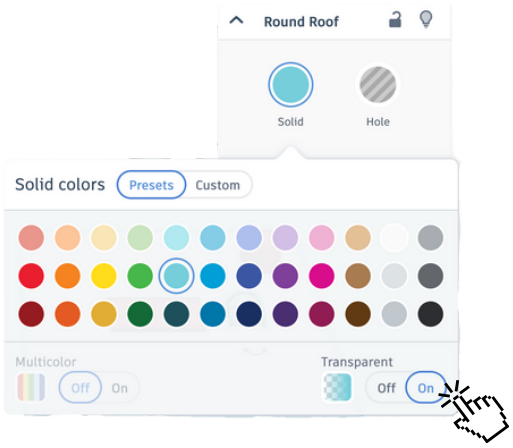
LET'S CREATE A GREENHOUSE



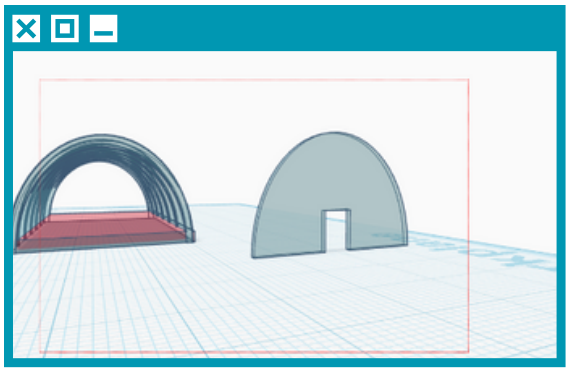
Select again.



And group.



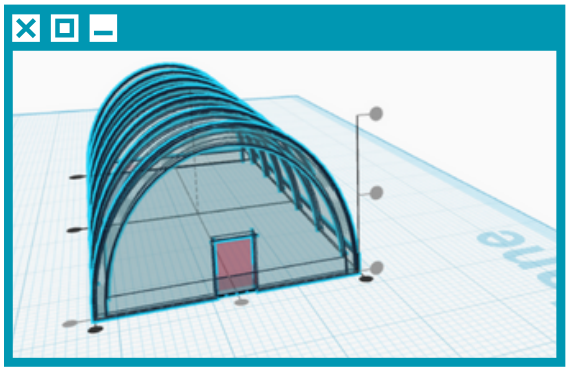
Click on solid color and then turn transparent option on.



Select your wall and greenhouse.

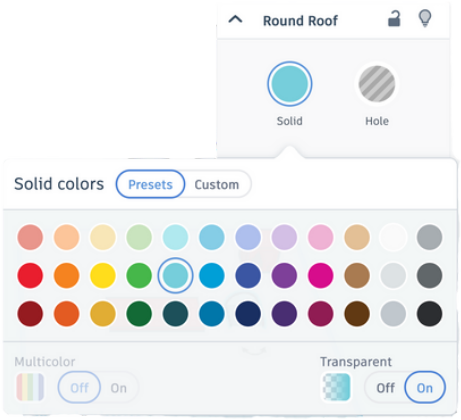
Align them.

LET'S CREATE A GREENHOUSE



Now that it looks like this.

Duplicate it.



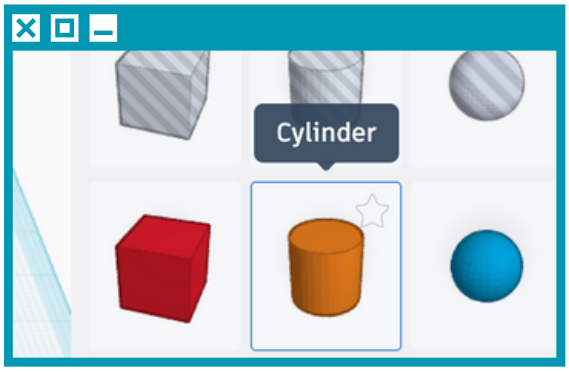
Change the color as you wish.

Using the arrow keys, bring the second wall on the other side of the greenhouse.

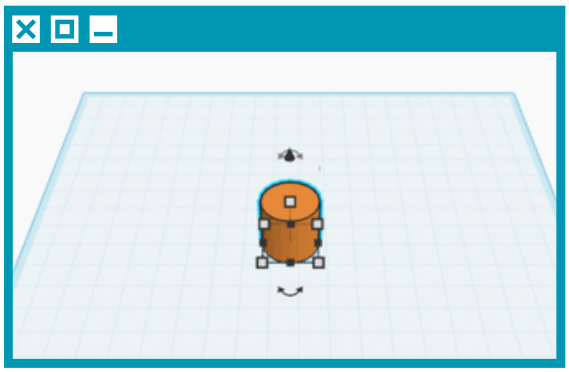
And thats it!

LET'S CREATE A WINDMILL

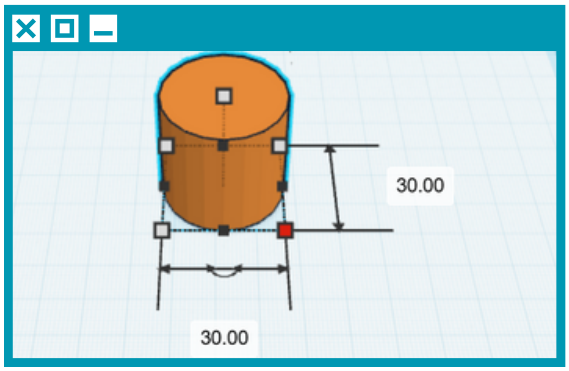
In this example you are going to practice a different way to change the shapes of objects.



Drag a **cylinder** shape on your workplane.

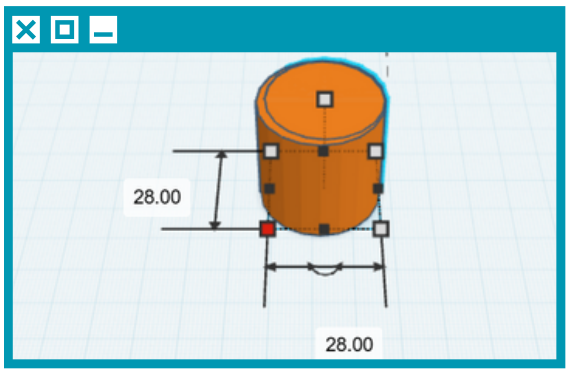


By clicking Shift key and simultaneously dragging one of the white dots of your shape, it gets bigger or smaller retaining its original shape.



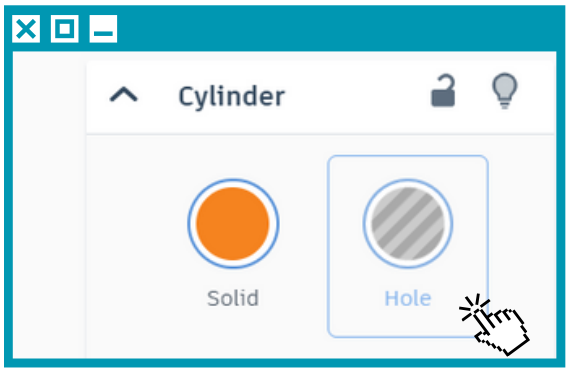
Change its width and length to 30 mm.

Click to duplicate and repeat.

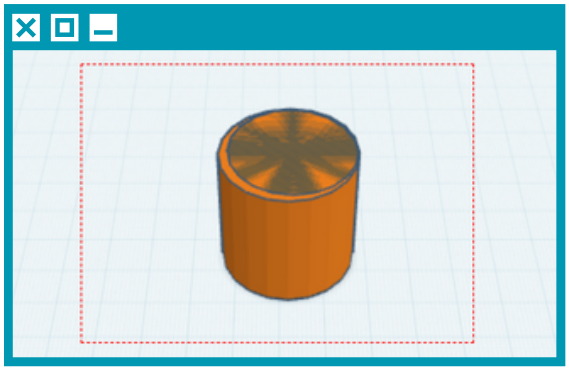


Change the width and length of the second cylinder shape to 28 mm.

LET'S CREATE A WINDMILL

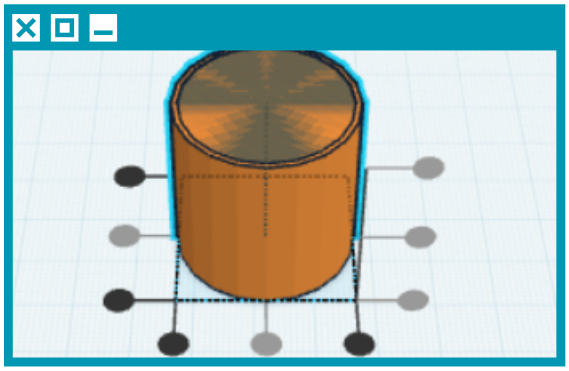


Click on the hole.

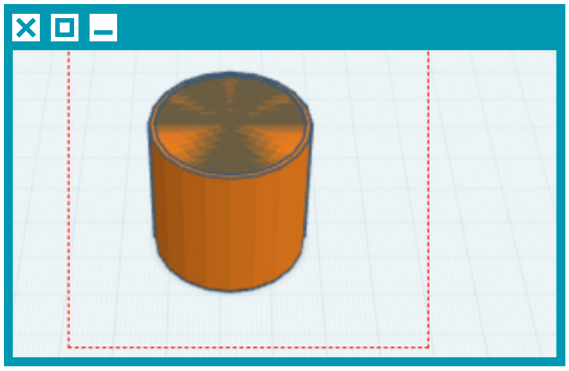


Make a rectangular selection by left clicking your mouse button.

Align them.



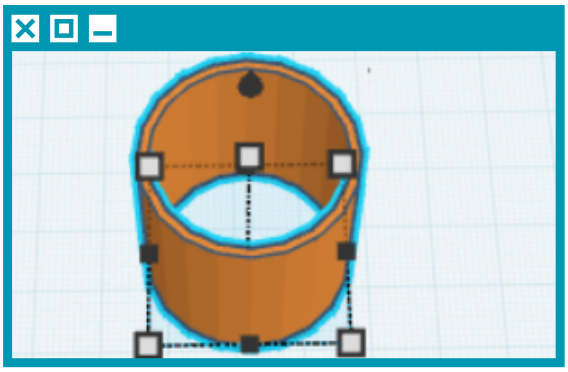
Align in the middle of the width and length.



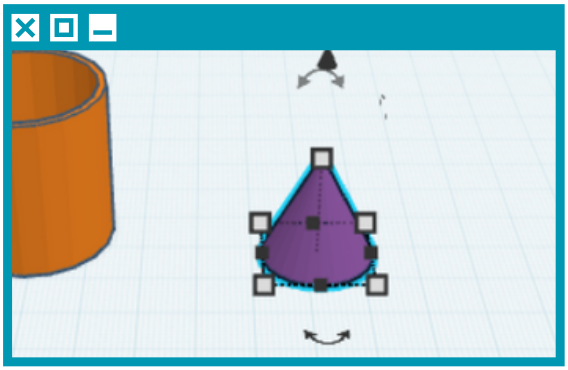
Select both shapes.

And group.

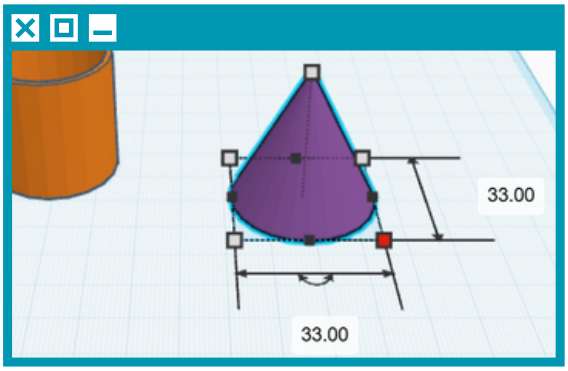
LET'S CREATE A WINDMILL



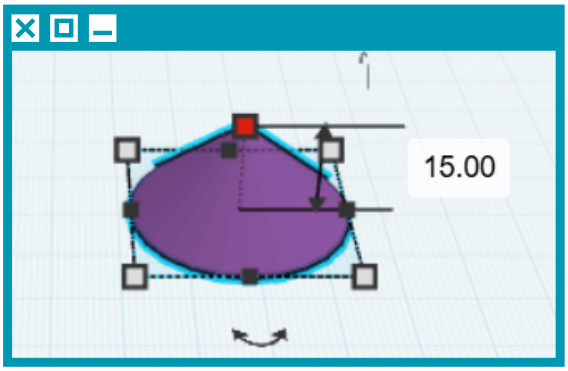
It should look like this.



Drag a **cone** shape on your workplane.

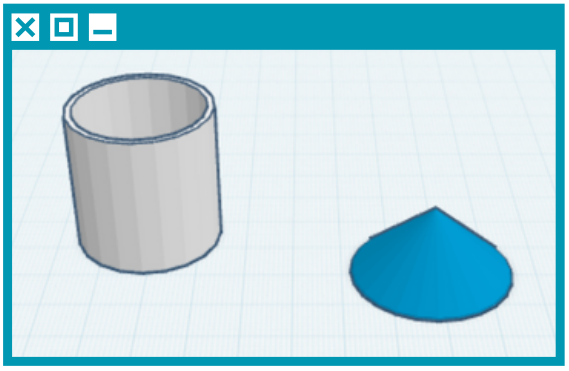


Change the base dimensions to 33 mm.

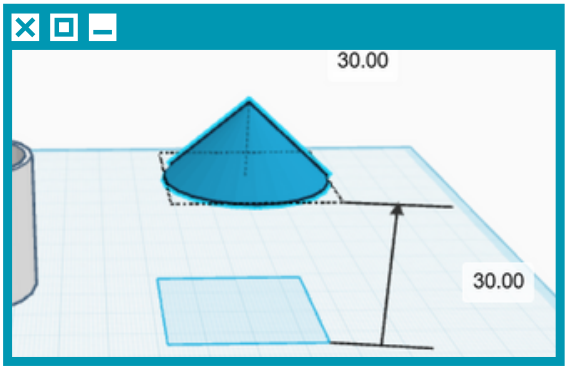


Then its height to 15 mm.

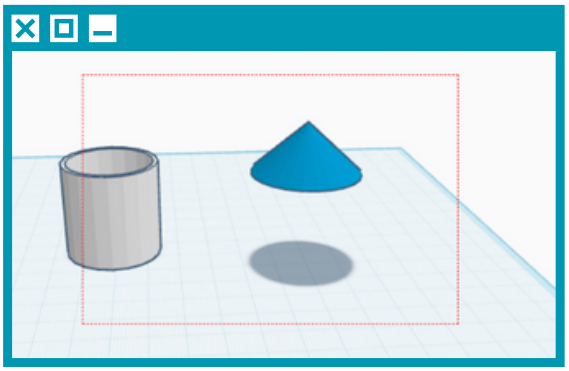
LET'S CREATE A WINDMILL



Change colors.

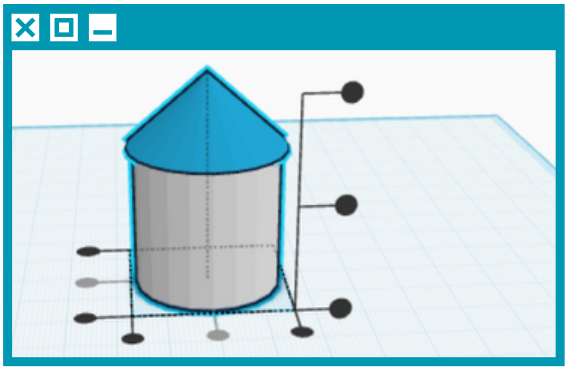


Lift the cone by 30mm from the workplane, by lifting the black triangle above the cone.



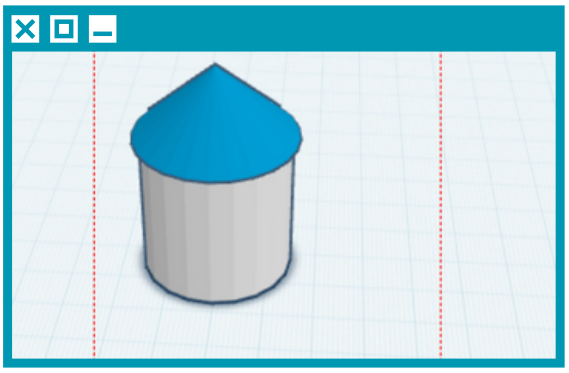
Select both shapes.

Then, align them.



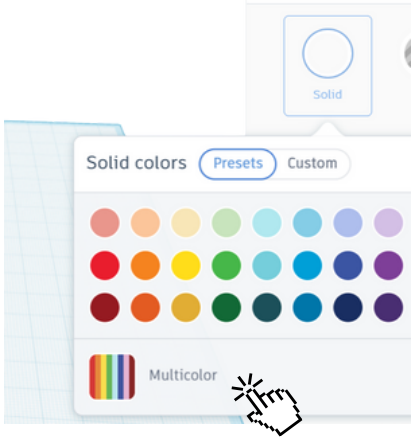
Align in the middle of width and length.

LET'S CREATE A WINDMILL

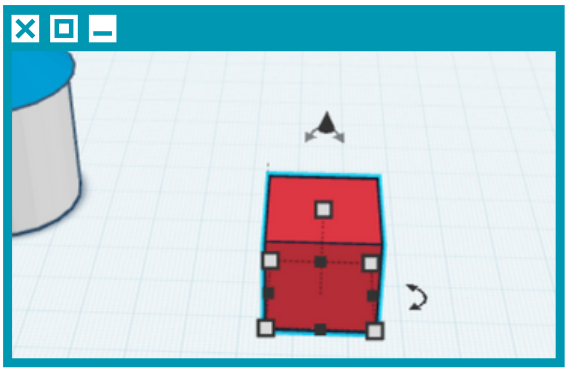


Select both shapes.

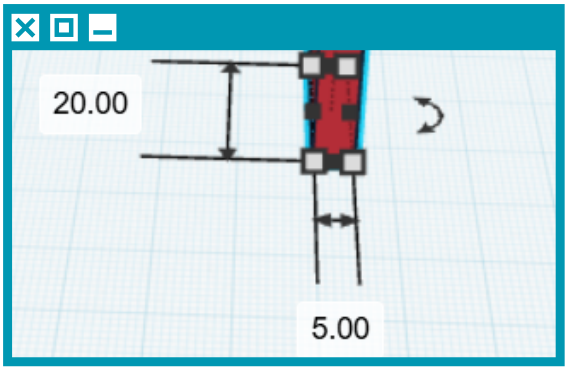
Group them.



Select Multicolor.

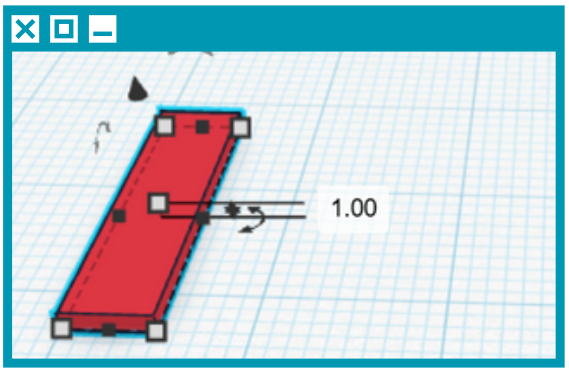


Drag a cube shape on your workplane.



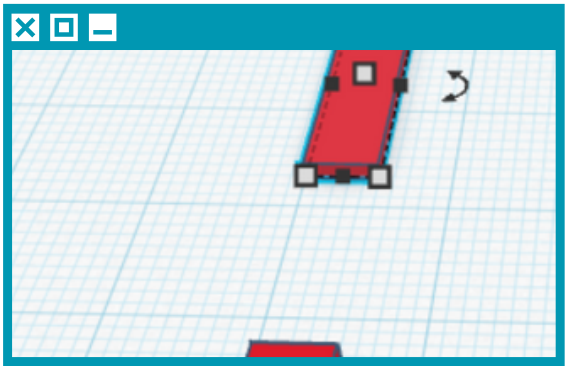
Change its width to 5mm, and lenght to 20mm

LET'S CREATE A WINDMILL

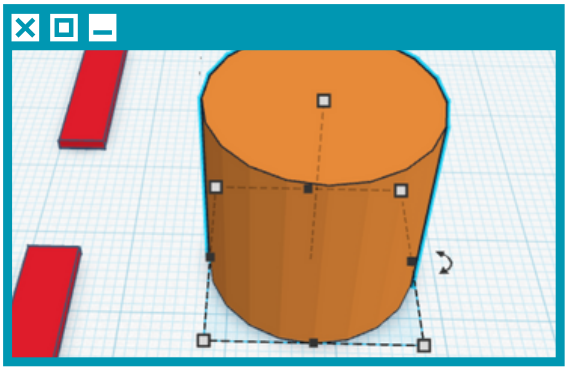


And height to 1mm.

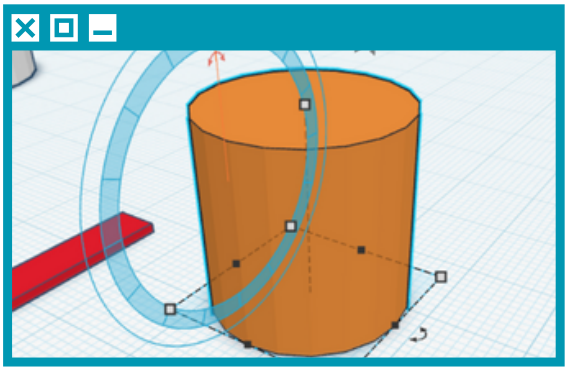
Click to duplicate and repeat.



Move the second shape using the up arrow on your keyboard.

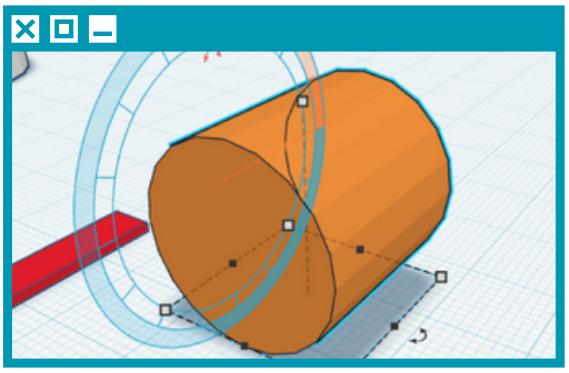


Drag a cylinder shape on your workplane.

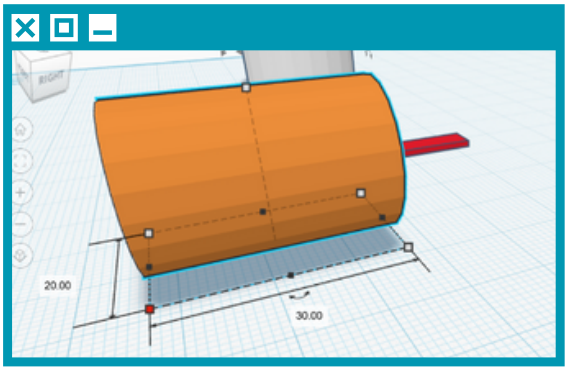


Rotate it by 90°.

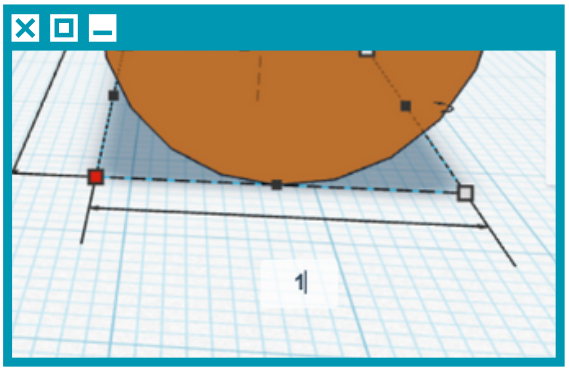
LET'S CREATE A WINDMILL

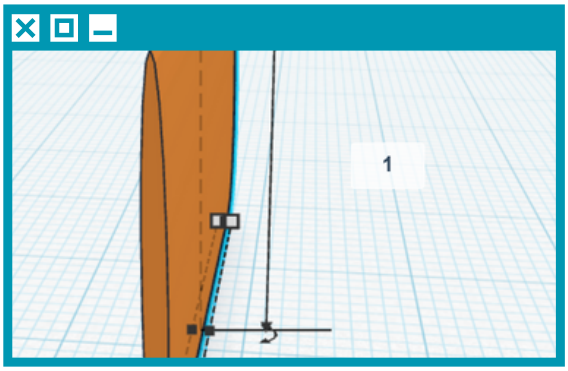


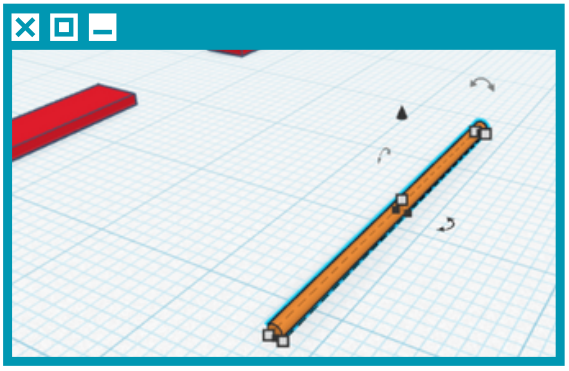
In order to be in this position.



Change its dimensions to 1mm.

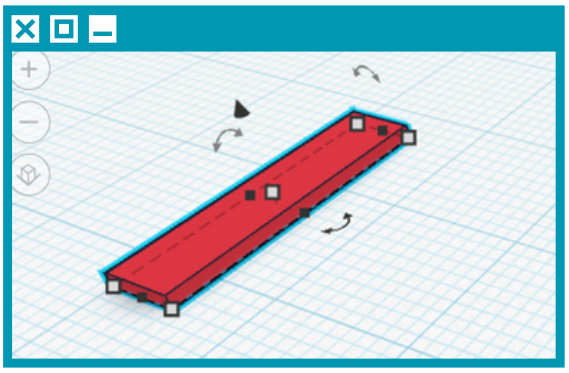




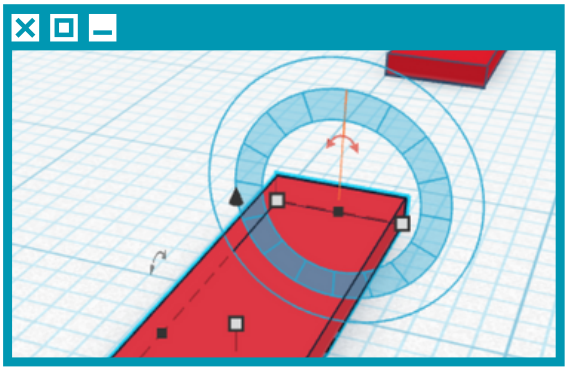


It should look like this.

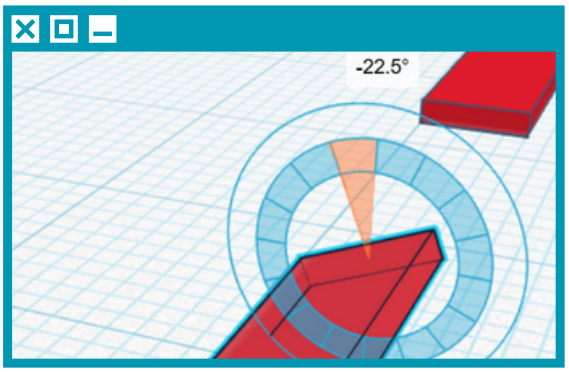
LET'S CREATE A WINDMILL



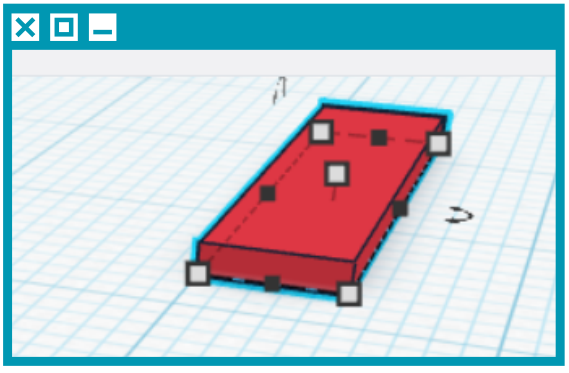
Select the first box.



Rotate it.

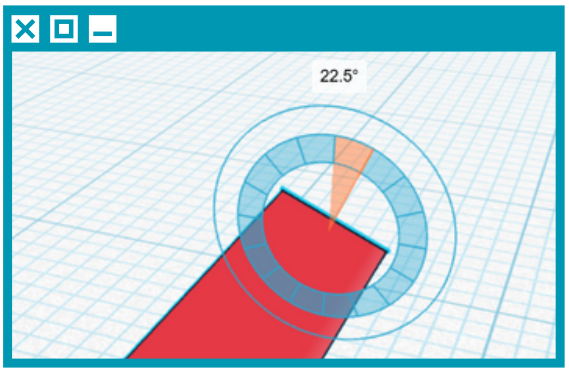


by -22.5°.

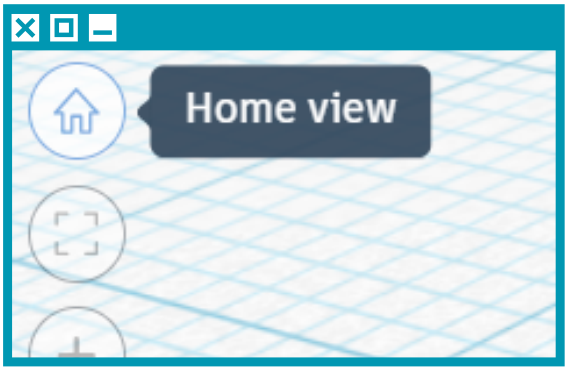


Select the second box.

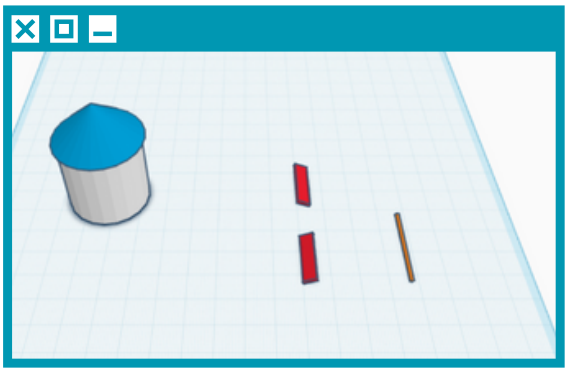
LET'S CREATE A WINDMILL



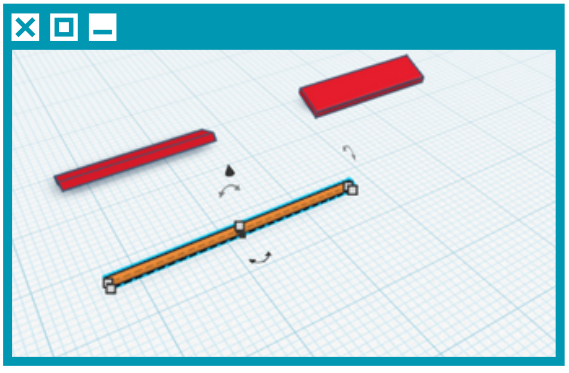
Rotate it by 22,5°.



Click on Home view.

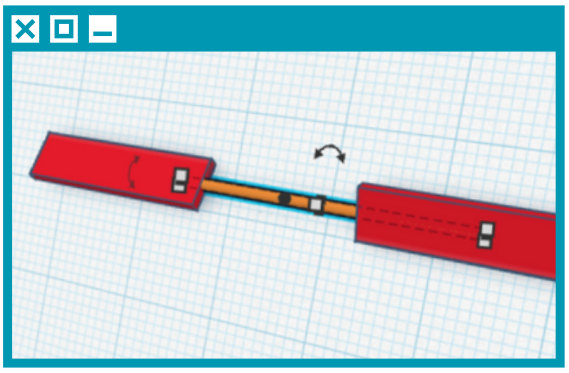


This is now the home view.



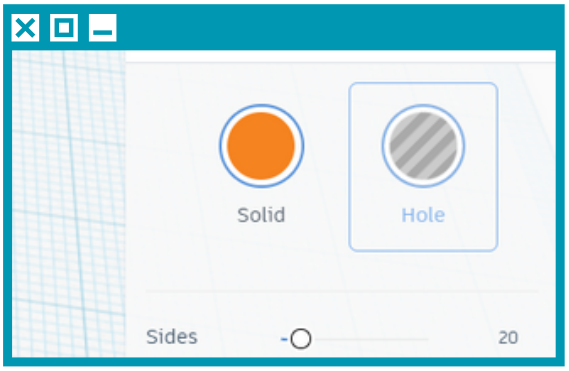
Select the cylinder and move it towards the boxes by using the arrow keys of your keyboard.

LET'S CREATE A WINDMILL

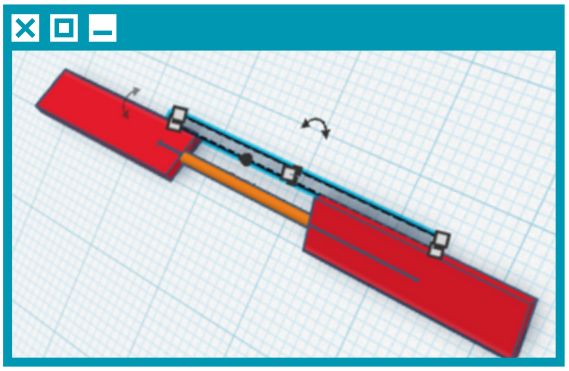


It should look like this.

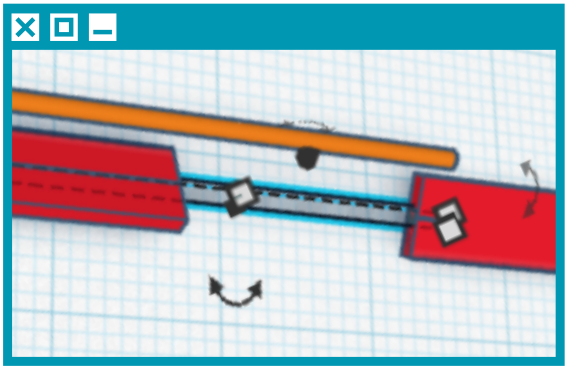
Click to duplicate and repeat.



Click on the hole.

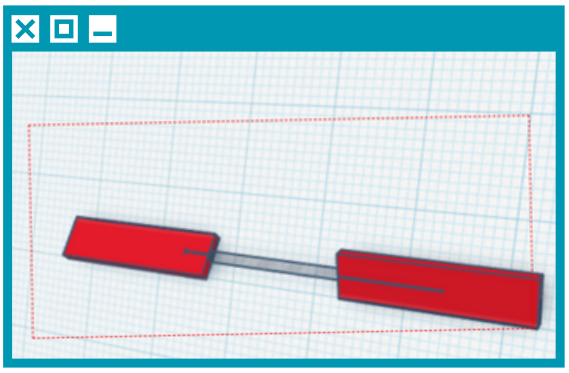


Move the orange cylinder.



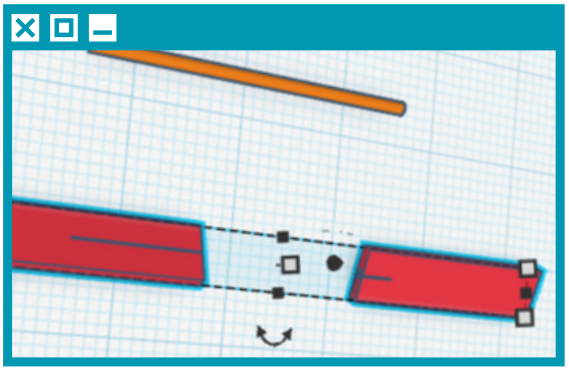
Place the hole shape at its original place.

LET'S CREATE A WINDMILL

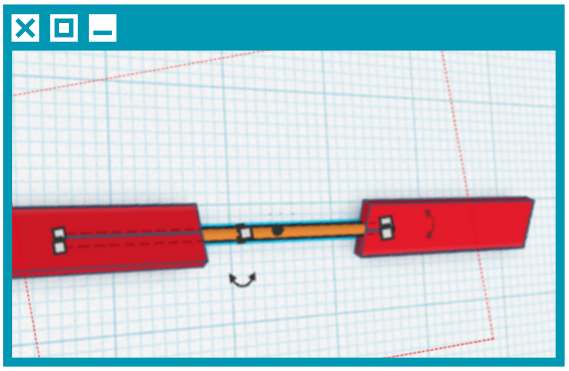


Select the 3 objects.

Group them.

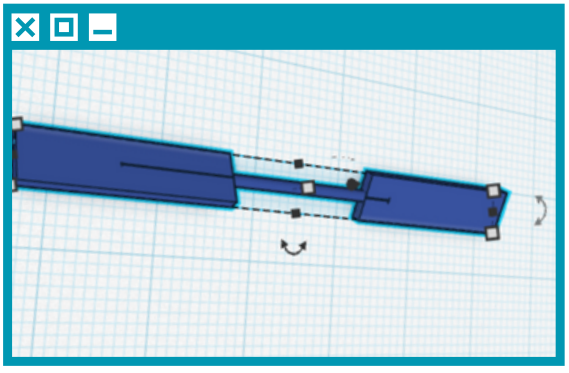


Then move the orange cylinder back to its original position.



The reason for doing this is so that the red and orange materials do not collide with each other.
Select both shapes.

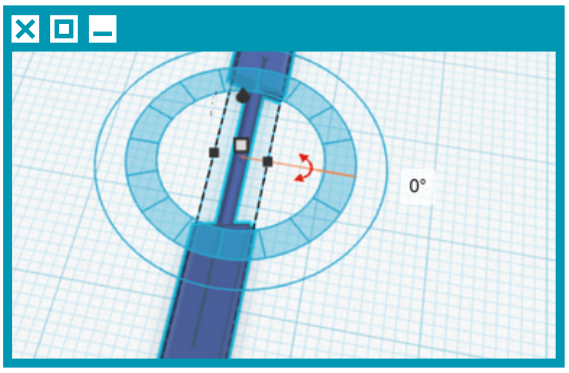
Group them



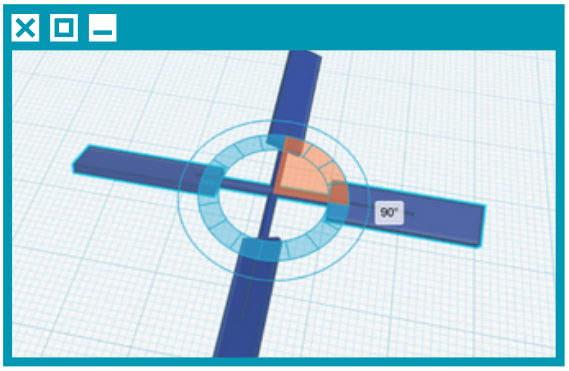
Change the color.

Click to uplicate and repeat.

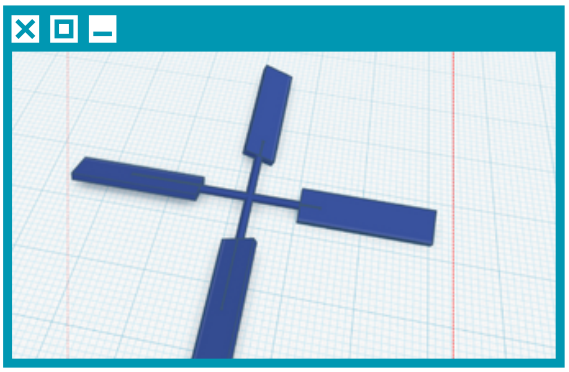
LET'S CREATE A WINDMILL



Next you will need to rotate the second shape.

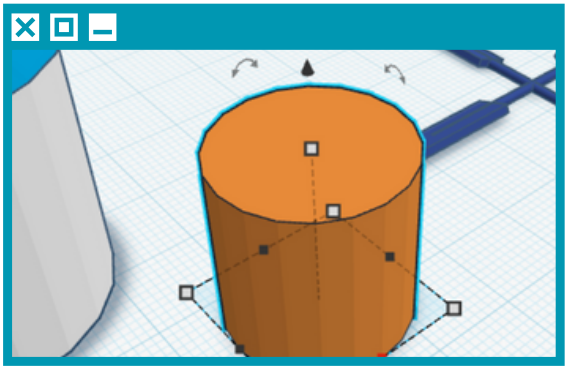


Rotate it by 90°.



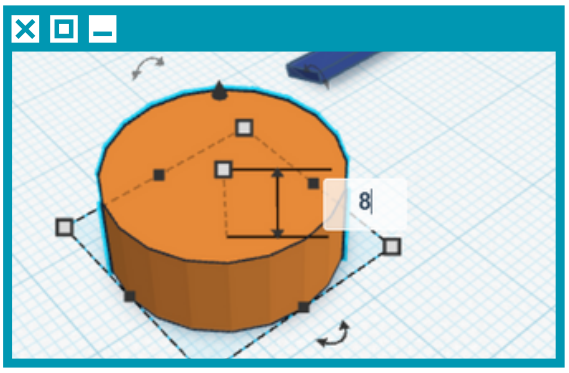
Select both shapes.

Group them.

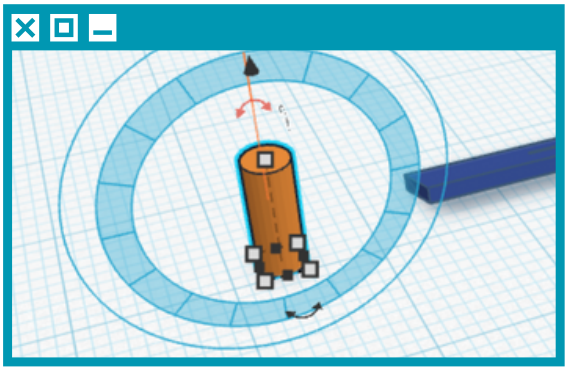


Drag a cylinder shape on the workplane.

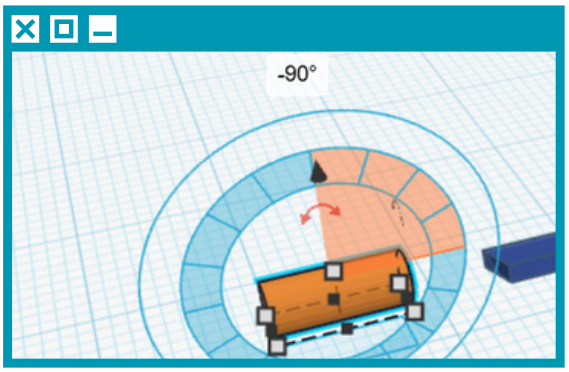
LET'S CREATE A WINDMILL



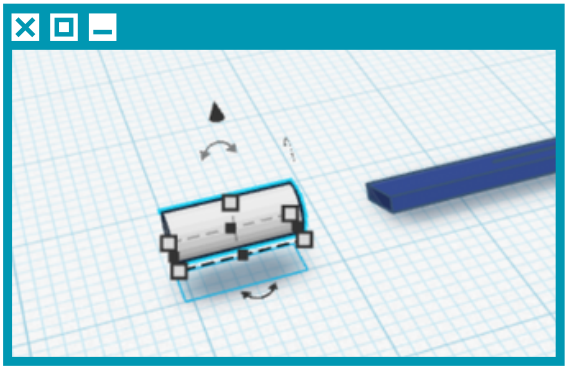
Change its height to 8 mm.



Next you will clcik to rotate it.

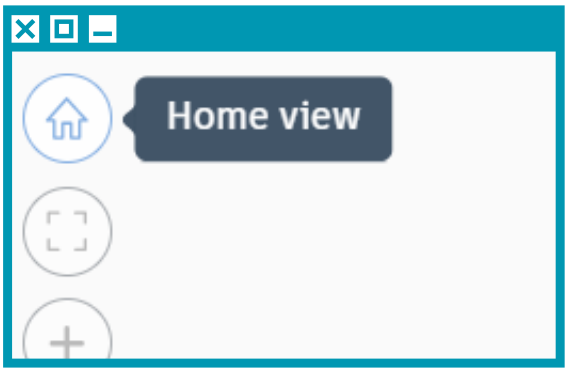


Rorate it by 90°.

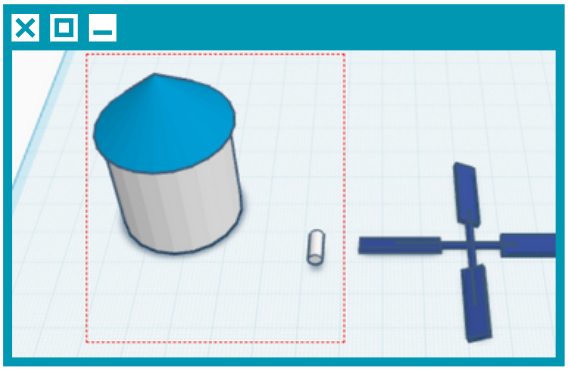


Change its color to white.

LET'S CREATE A WINDMILL

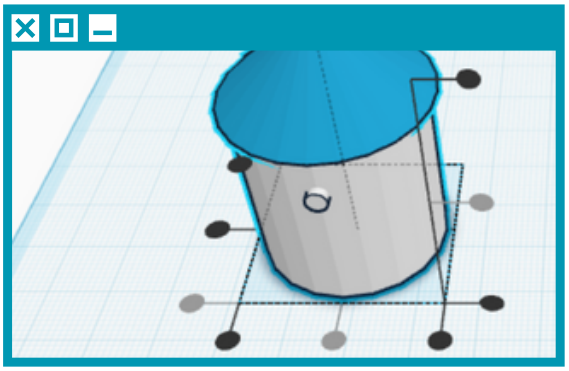


Click on home view, for better preview.

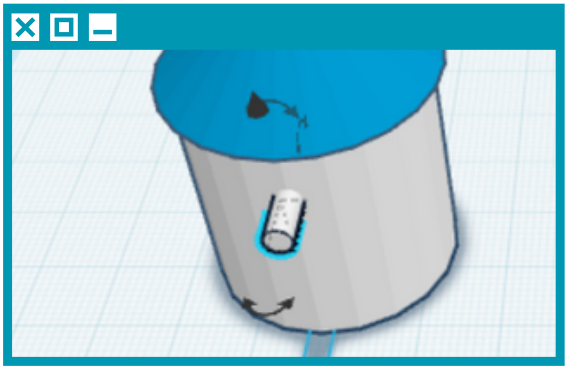


Select the building and white cylinder.

Click to align.

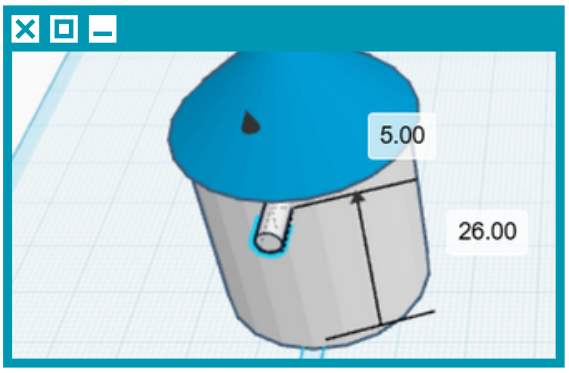


Align in the middle of the width, the front of the length and the middle of the height.

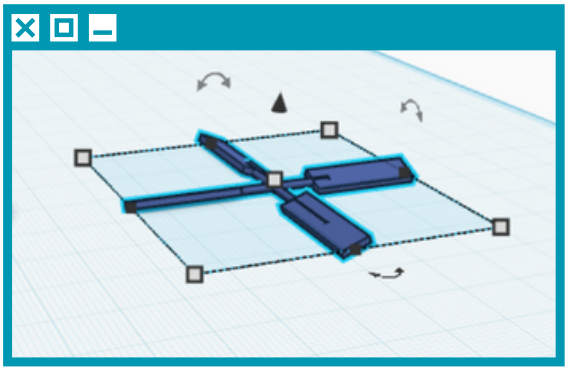


Drag the white cylinder a little more outside the building by using the arrow keys.

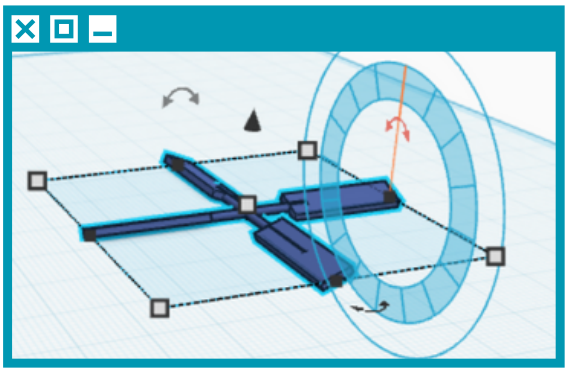
LET'S CREATE A WINDMILL



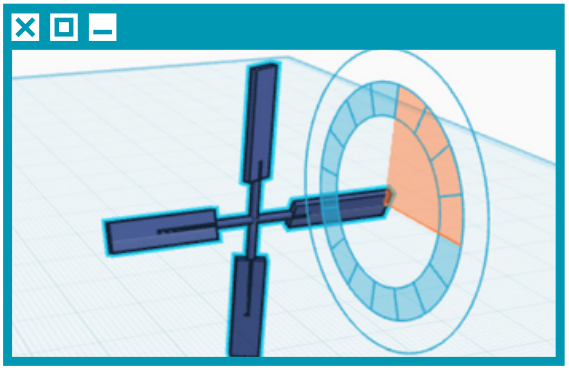
Lift it up so that it is placed underneath the roof.



Select those shapes.

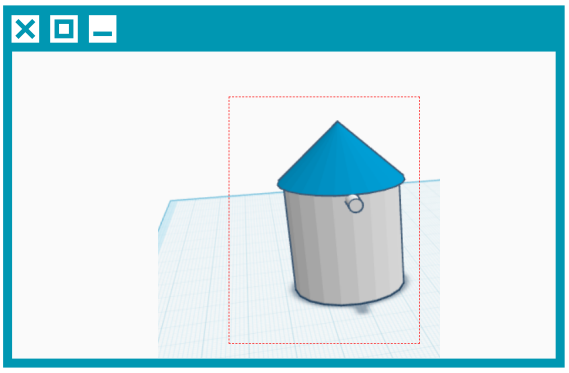


Now you need to rotate it.



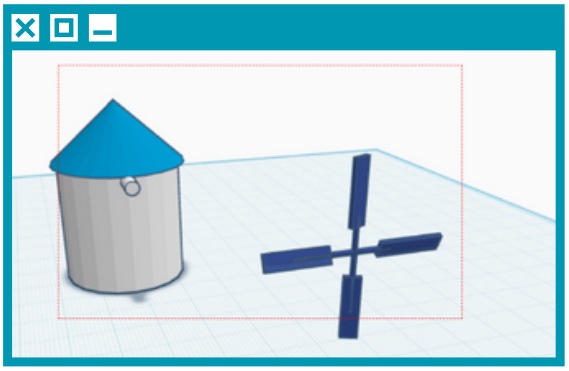
Rotate it by 90°.

LET'S CREATE A WINDMILL

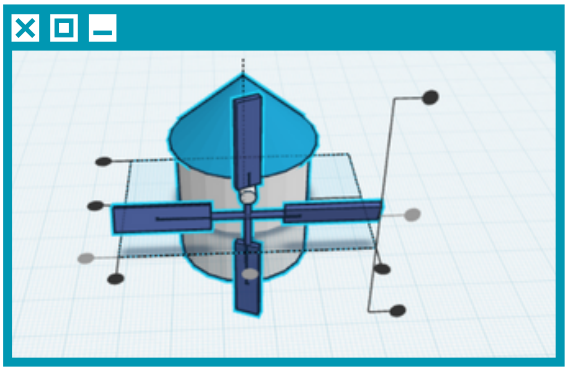


Select the white cylinder shape with cone.

Group them.

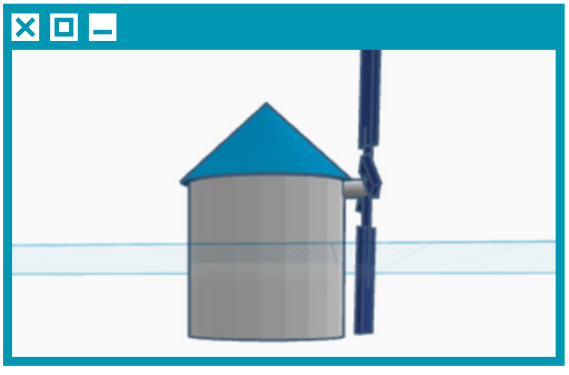


Select the two objects.



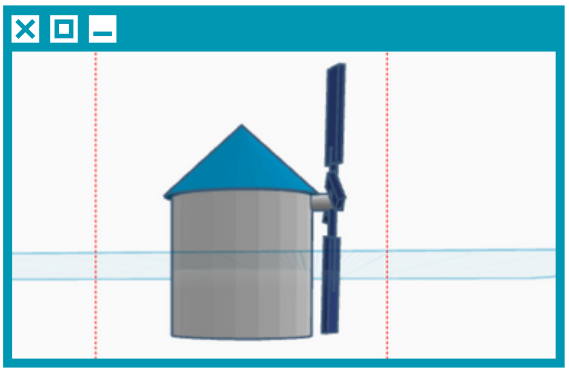
And align them.

Click the left side of your view cube.



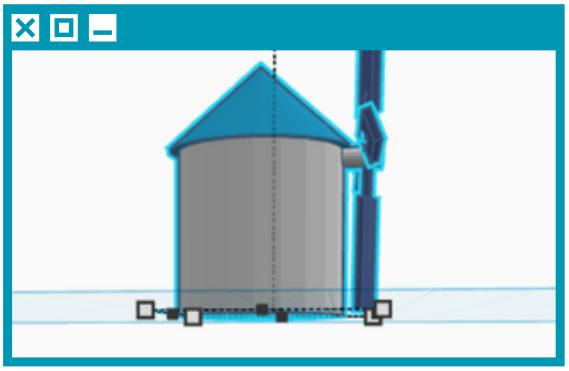
To have a look like this.

LET'S CREATE A WINDMILL



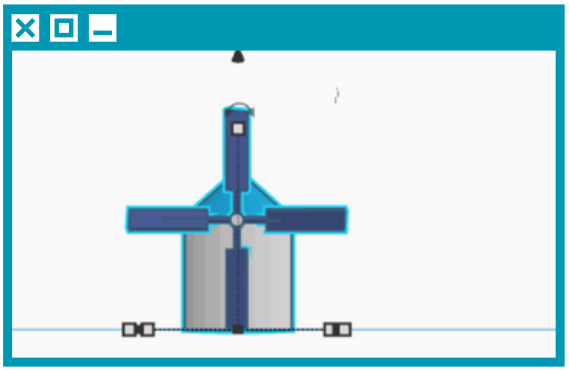
Select both shapes.

Group them.

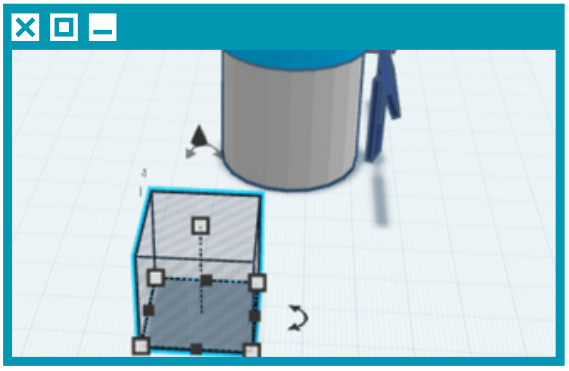


Click D on your keyboard to drag the building on the surface of the workplane.

Click the left side of your view cube.

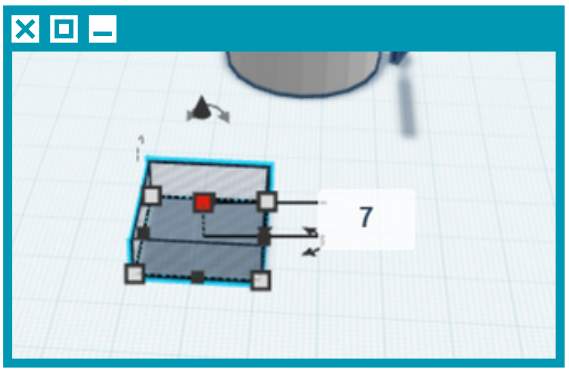


To have a look like this.

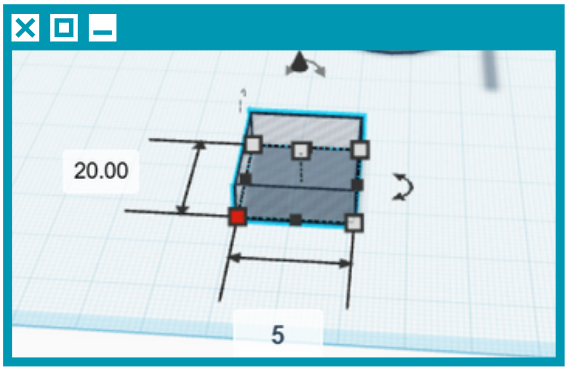


Bring a hole box on your workplane.

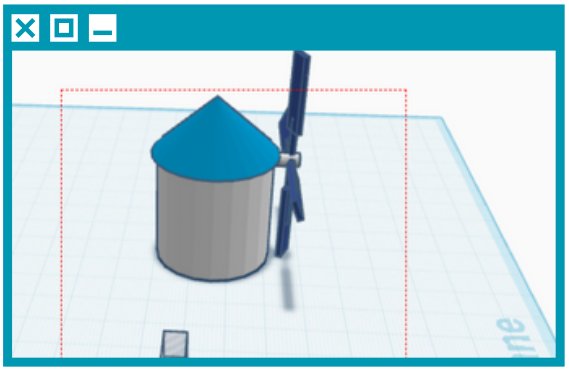
LET'S CREATE A WINDMILL



Change its height.

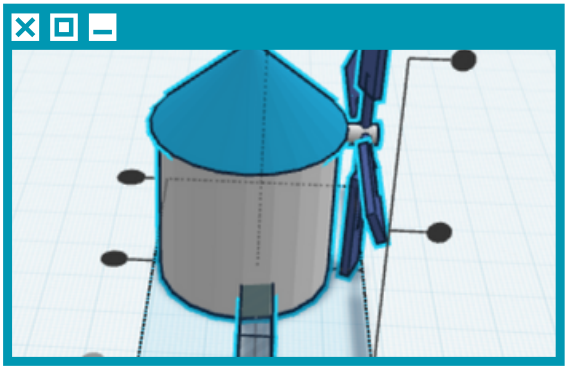


And width.



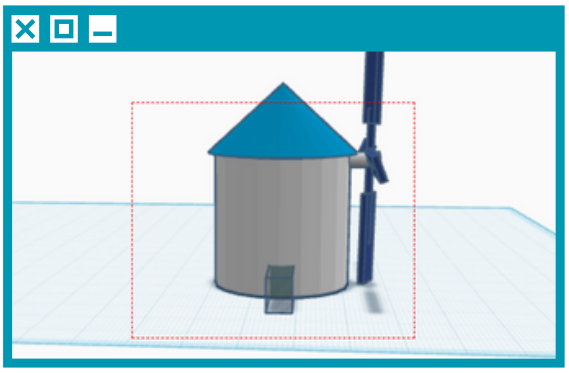
Select both shapes.

clcik to align.



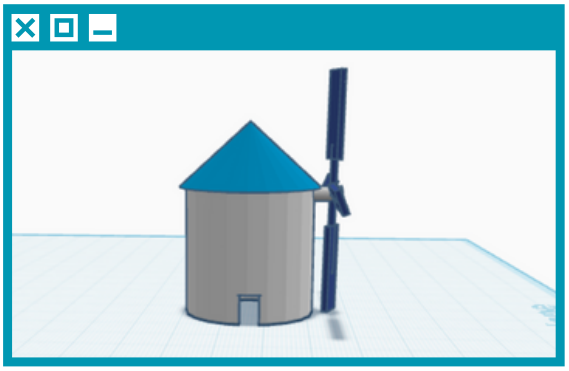
Move the hole box with your arrow keys in order to be placed in the middle of the building

LET'S CREATE A WINDMILL

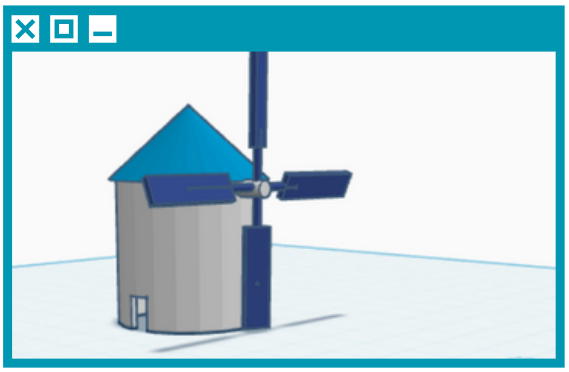


Select both shapes.

Group them.



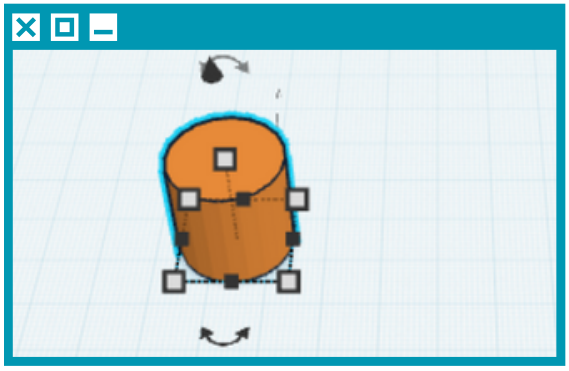
Now, it should look like this.



Here's your windmill!

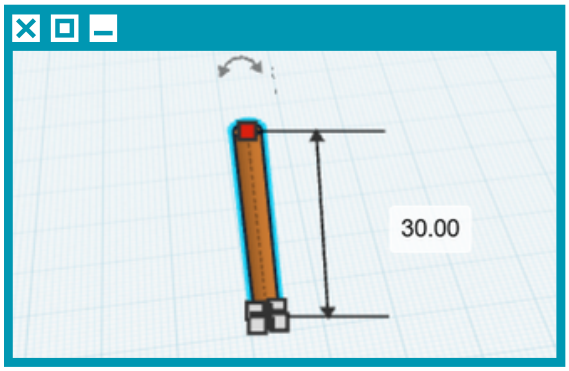
LET'S CREATE A SOLAR WATER HEATER

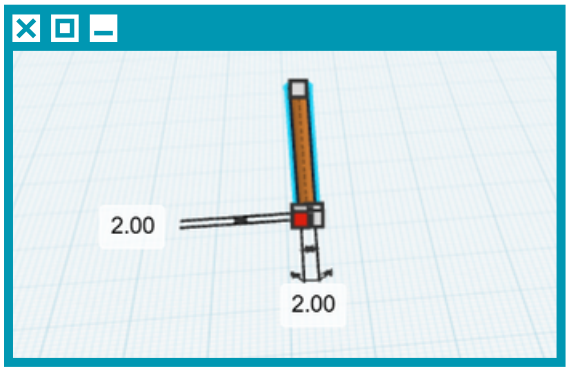
In this example you will use a new tool, the Mirror Tool. You will also change the grading of the grid to adjust your design

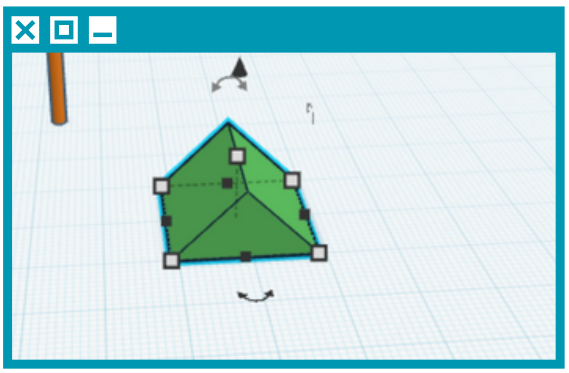


Drag a cylinder on your workplane.

Change its height to 30 mm and base dimensions to 2 mm.



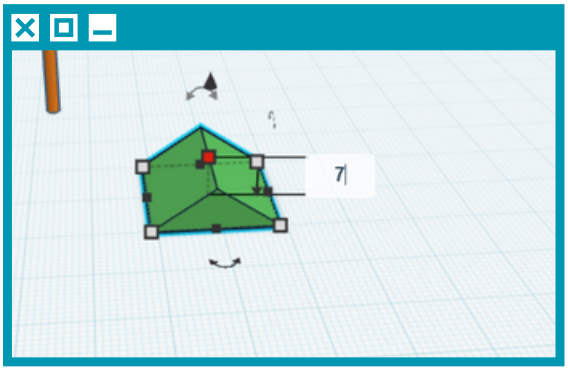


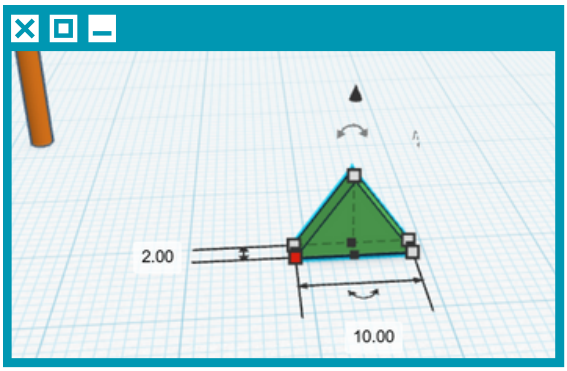


Drag a roof shape on your workplane.

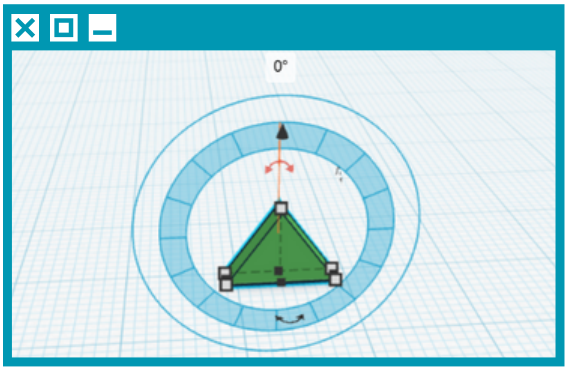
LET'S CREATE A SOLAR WATER HEATER

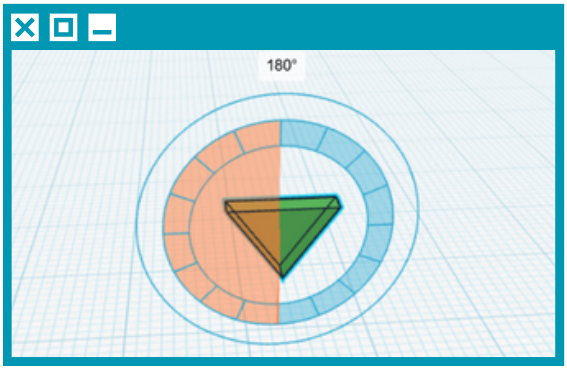
Change its dimensions.



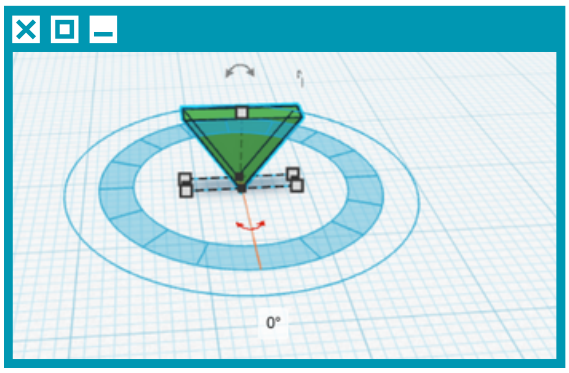


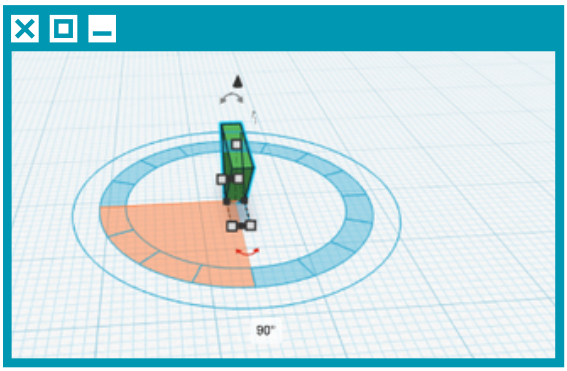
Rotate it by 180°.



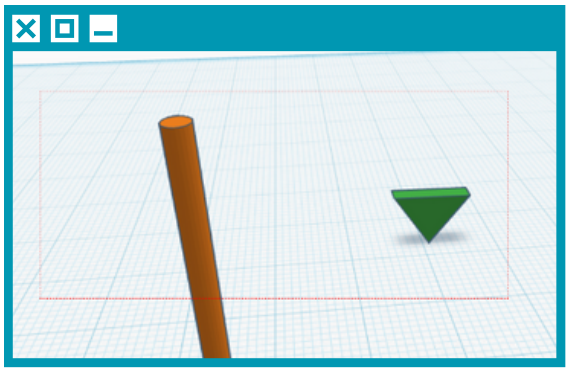


And then by 90°.



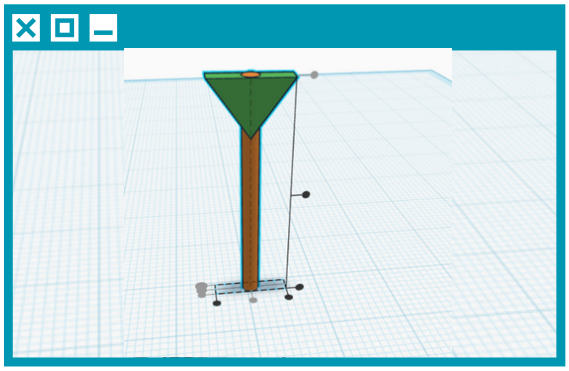


LET'S CREATE A SOLAR WATER HEATER

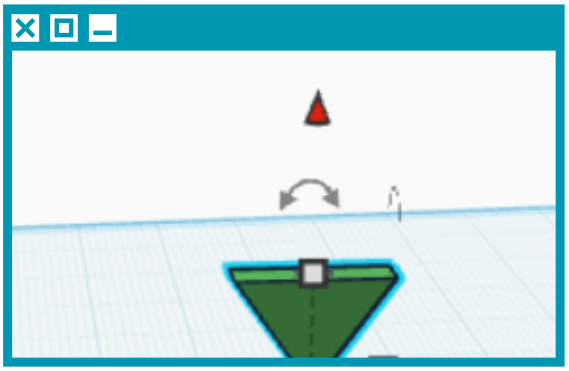


Select the roof and cylinder.

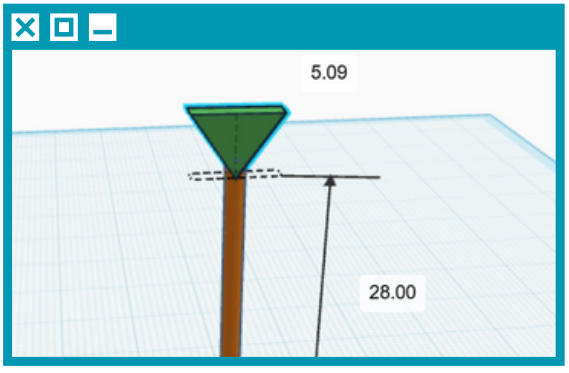
Click to align them.



It should look like this.

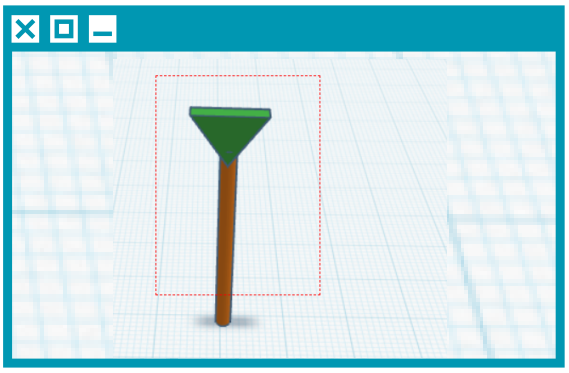


Lift the roof up by dragging the black triangle.



Like this.

LET'S CREATE A SOLAR WATER HEATER

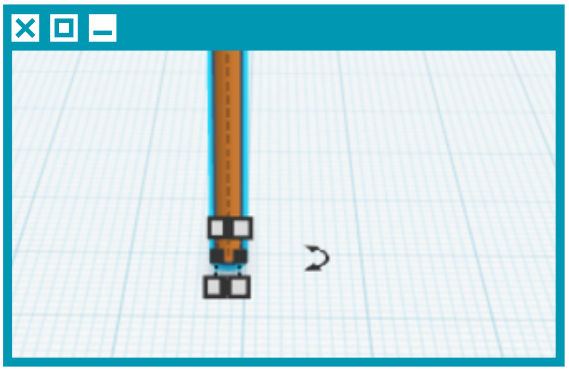


Select both shapes

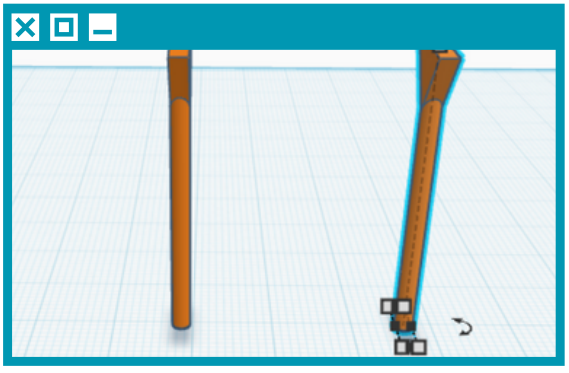
Group them

Click to duplicate and repeat.

Click on the front side of the view cube.

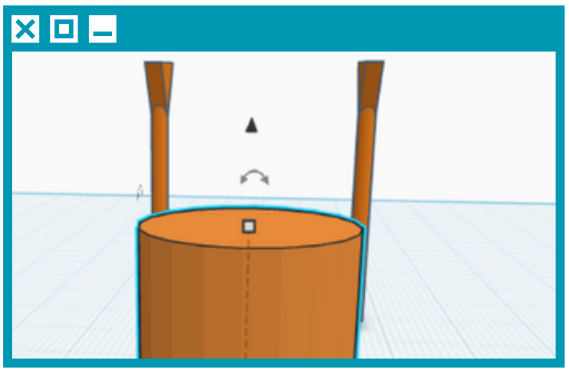


Use the arrow keys on your keyboard.

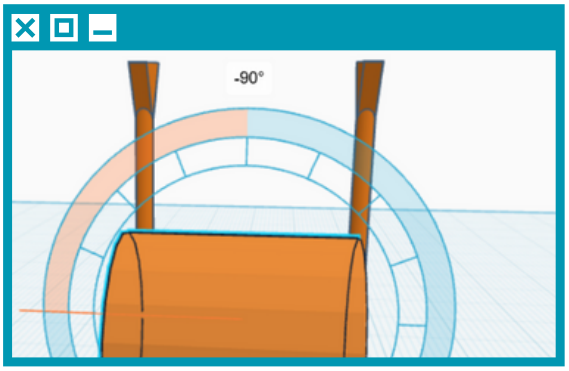


In order to move the second shape next to the first, like shown.

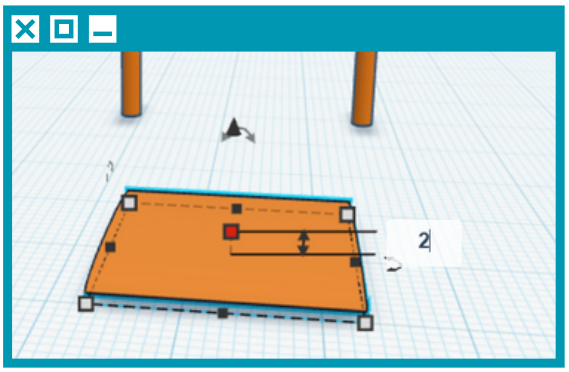
LET'S CREATE A SOLAR WATER HEATER



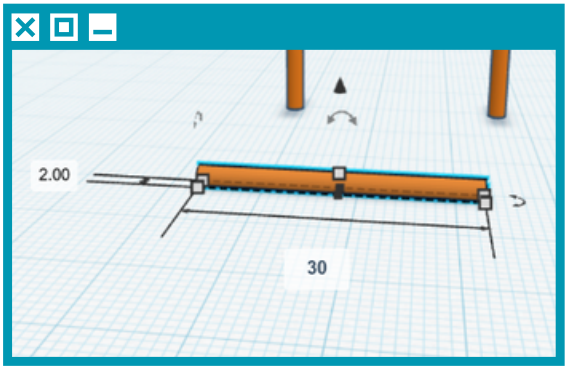
Drag a cylinder shape on your workplane.



Rotate it by 90°.

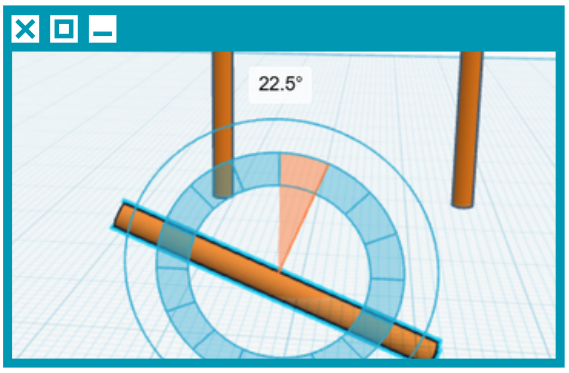


Change its dimensions to 2 mm and 30 mm.

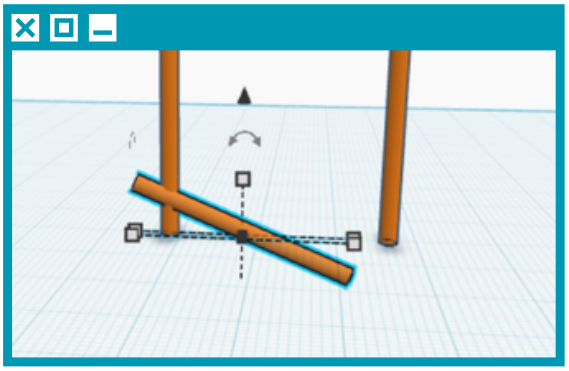


It should look like this.

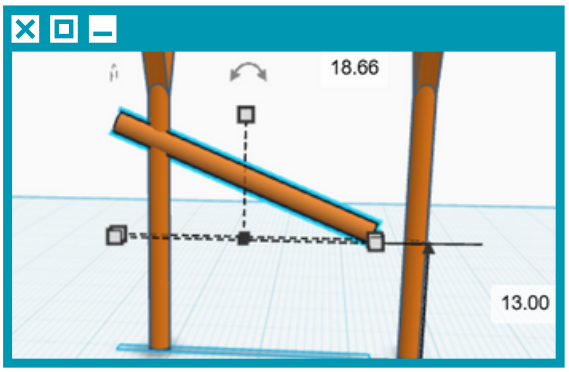
LET'S CREATE A SOLAR WATER HEATER



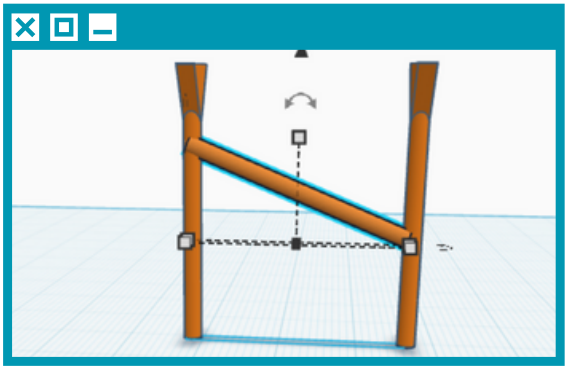
Rotate it by 22,5°.



Like this.

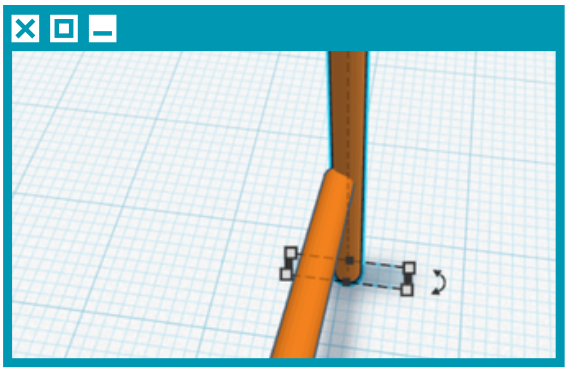


Lift it up.

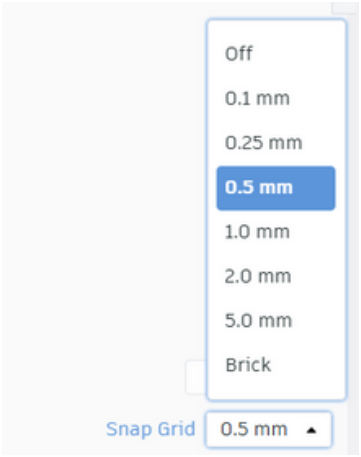


And move it so that it touches both shapes.

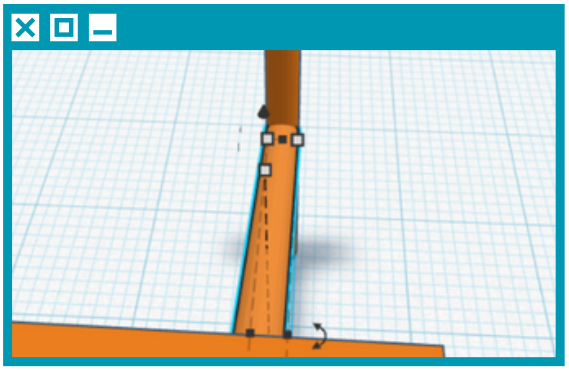
LET'S CREATE A SOLAR WATER HEATER



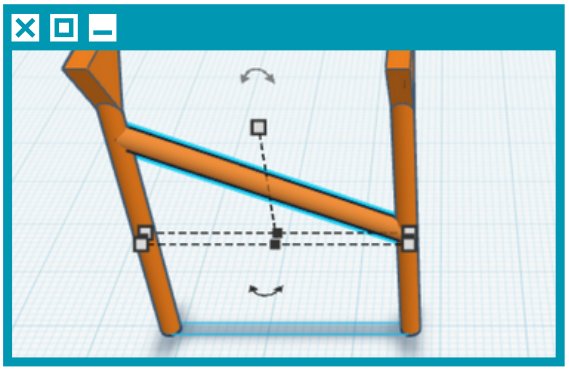
The beam is not properly centered and it cannot be by clicking the arrow key.



Go to the snap grid and select a 0.5 mm instead of 1mm.

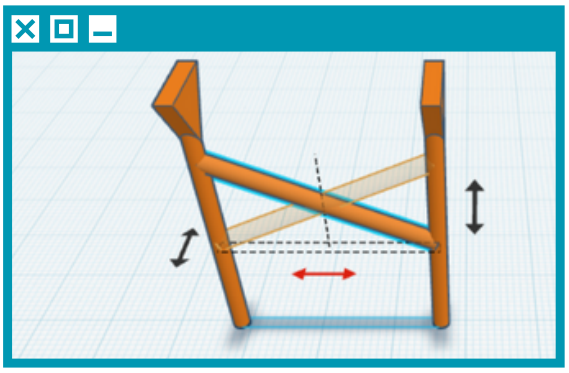


Now, if you move the beam with your arrow key it will be perfectly centered.



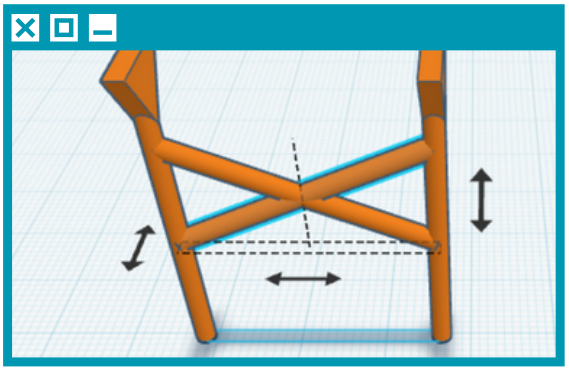
Select the beam, and then duplicate and repeat.

LET'S CREATE A SOLAR WATER HEATER

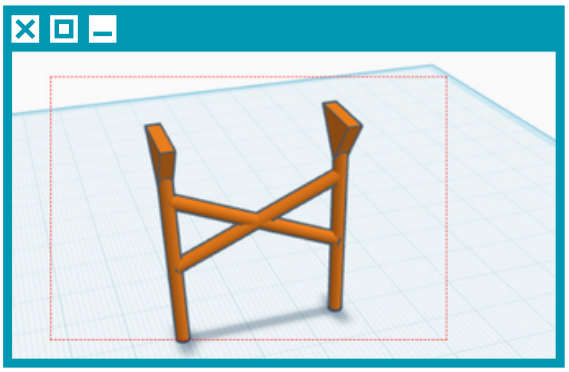


Select the mirror tool.

You have to state in which dimension you want to mirror your object.

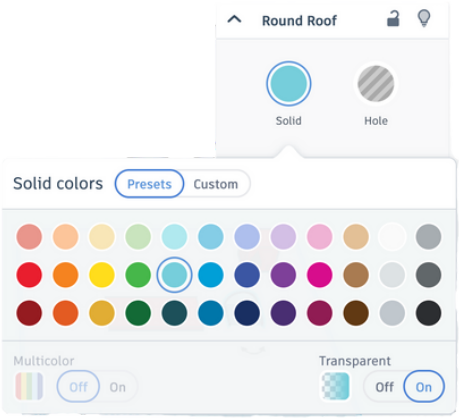


Click D to drag the building on the surface of the workplane.



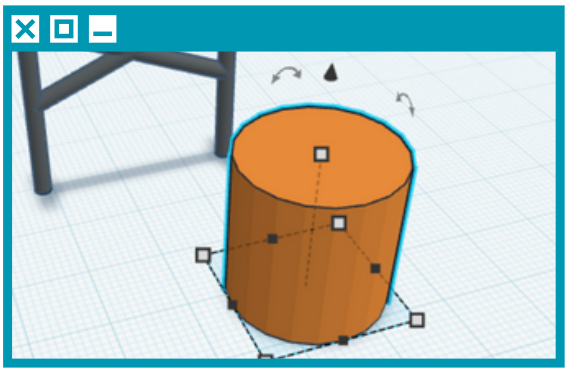
Select the all tree objects.

Group them.

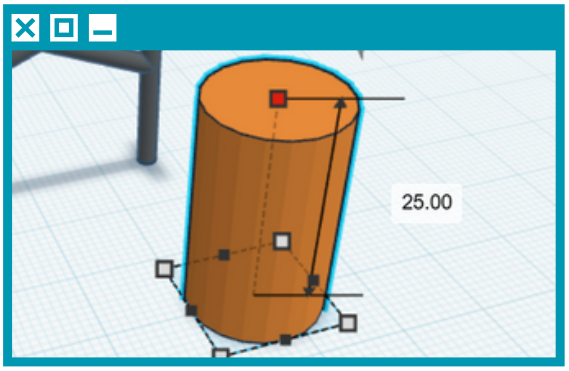


Change their color.

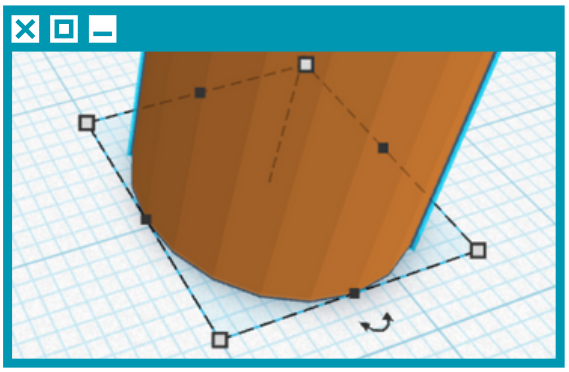
LET'S CREATE A SOLAR WATER HEATER



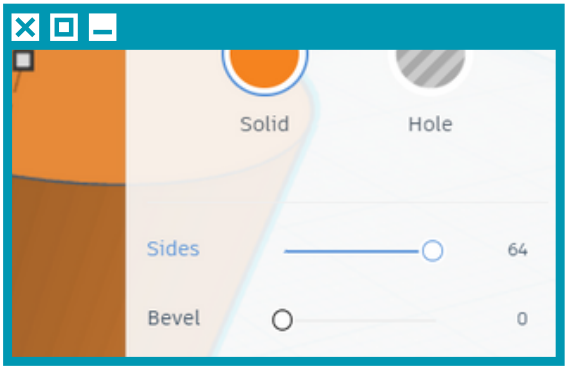
Drag a cylinder shape on your workplane.



Make height 25 mm, width and length should be 15mm.

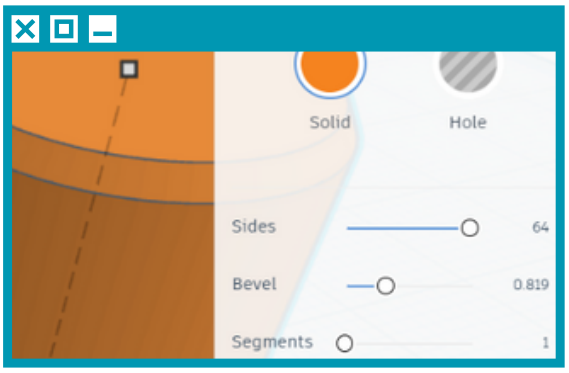


If you notice the surface of your cylinder, the sides are very visible.

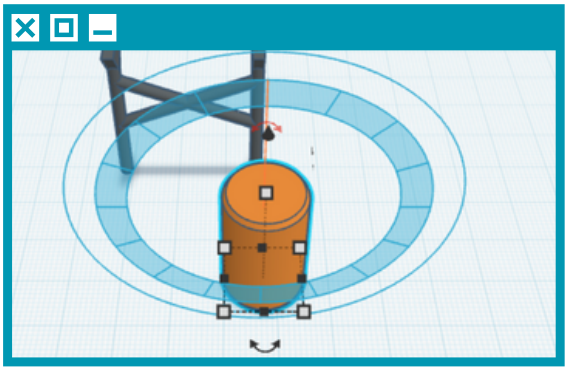


If you change the number of sides to the maximum (64), the surface of the cylinder will look smoother.

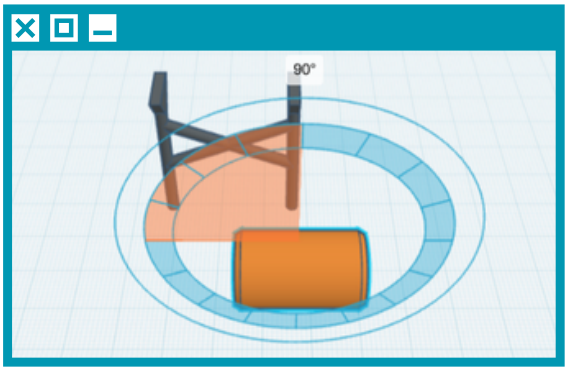
LET'S CREATE A SOLAR WATER HEATER



If you increase the bevel, the edges of the cylinder will be smoother.

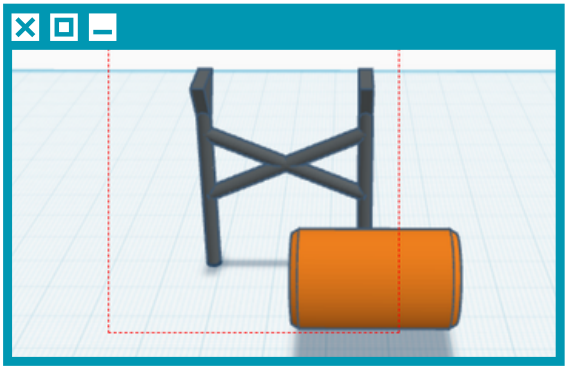


Rotate the cylinder.



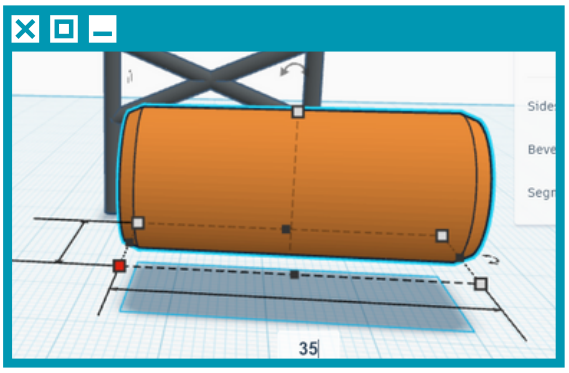
Like this by 90°.

Click to align.

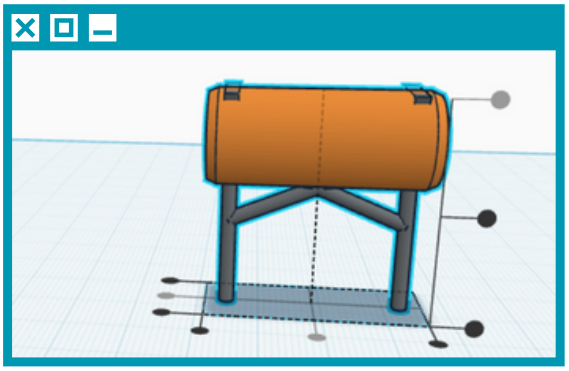


Like this.

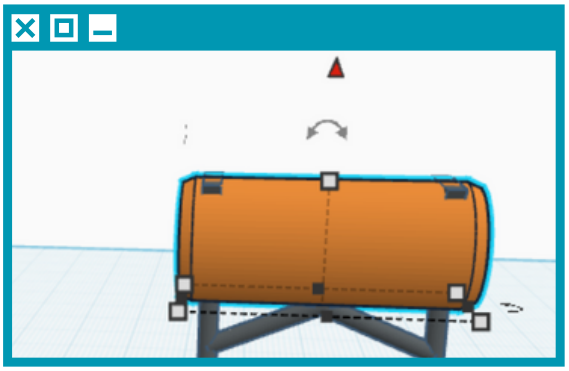
LET'S CREATE A SOLAR WATER HEATER



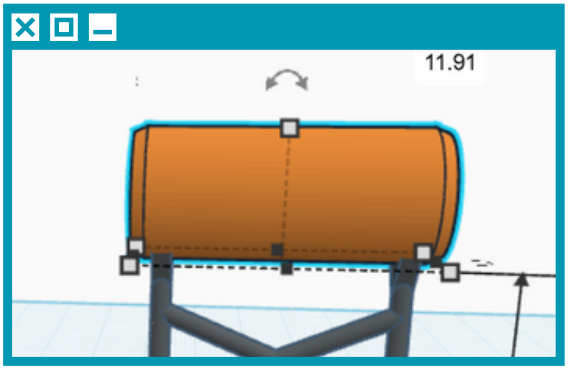
Change the side of the cylinder to 35 mm instead of 25 mm.



Click D to drag the building on the surface of the workplane.

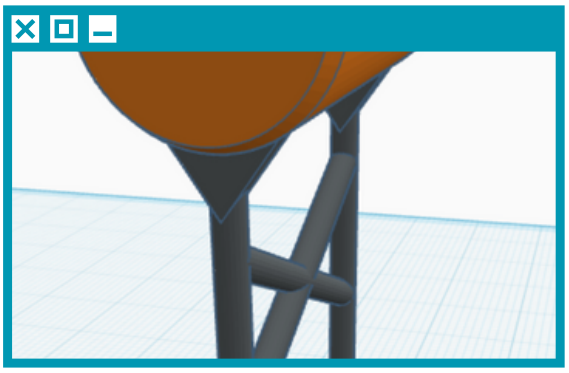


Lift the cylinder up.

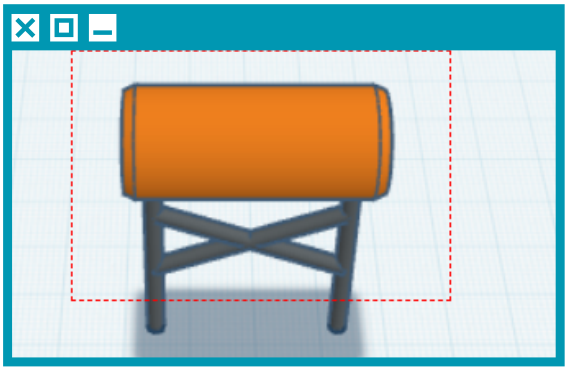


Click on the left side of your view cube.

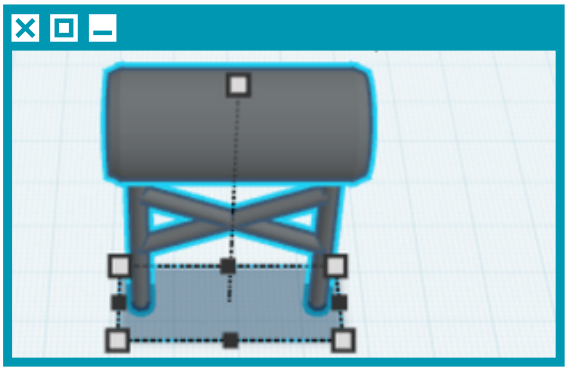
LET'S CREATE A SOLAR WATER HEATER



Check that the cylinder sits smoothly on the base. If not, adjust its height.

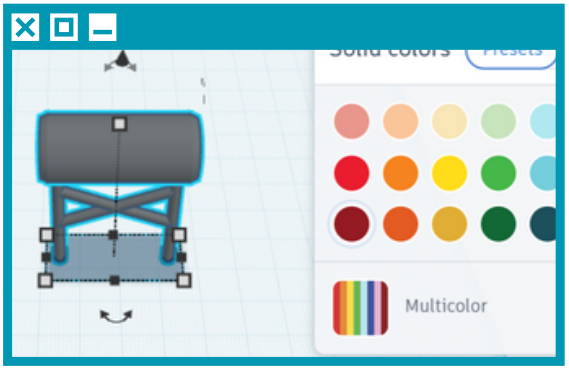


Select both shapes.



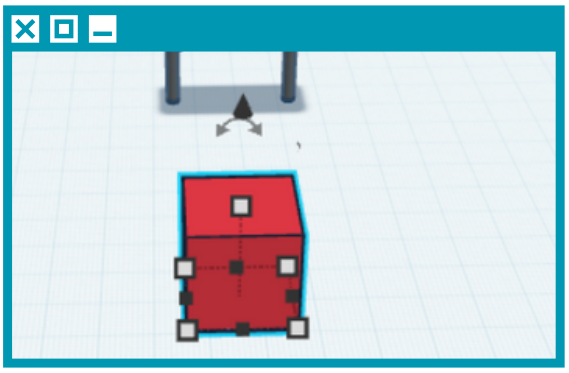
After you selected both shapes.

Group them.

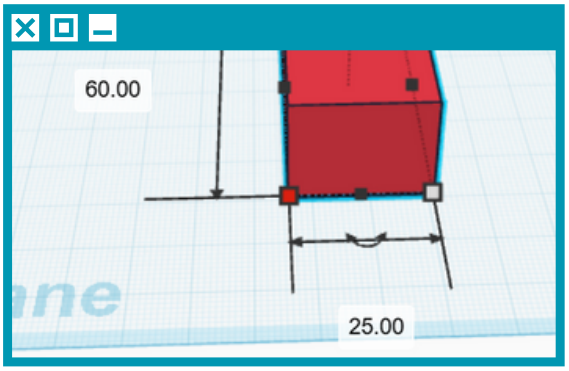


Select multicolor.

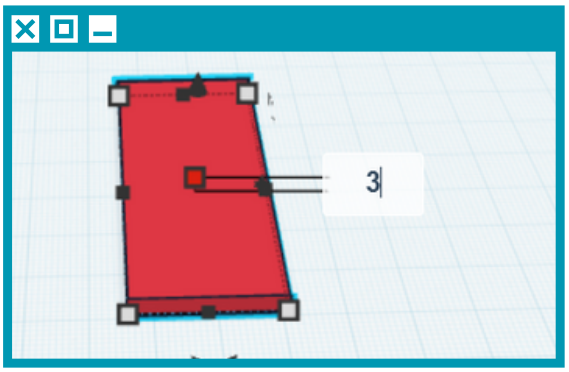
LET'S CREATE A SOLAR WATER HEATER



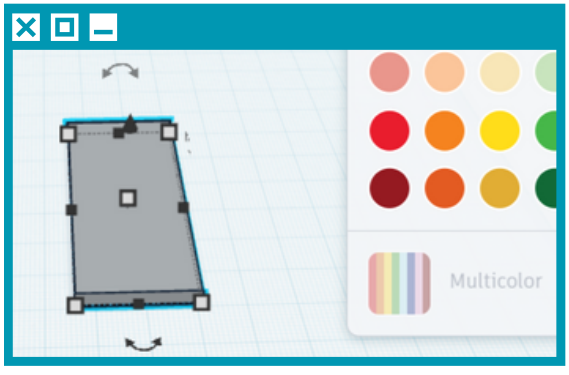
Drag a box shape onto your workplane.



Change its dimensions to 60 mm and 25 mm.



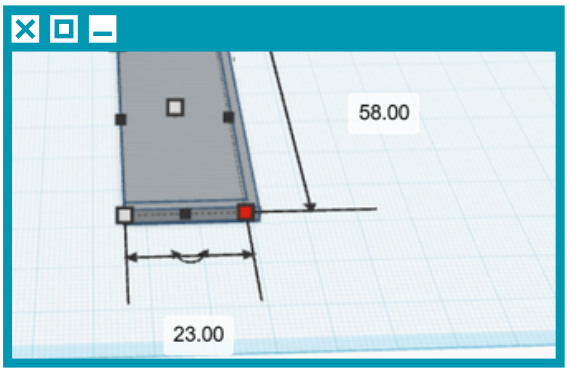
And change hight to 3 mm.



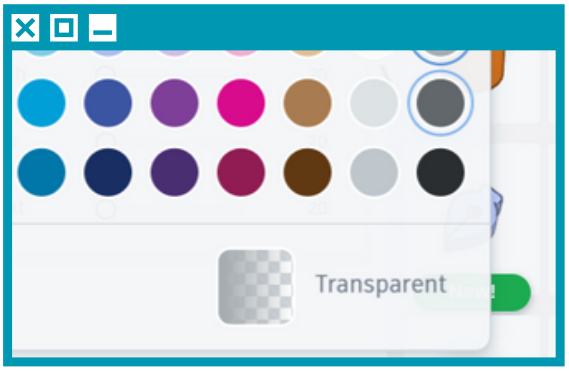
Change shape color.

Click to duplicate and repeat.

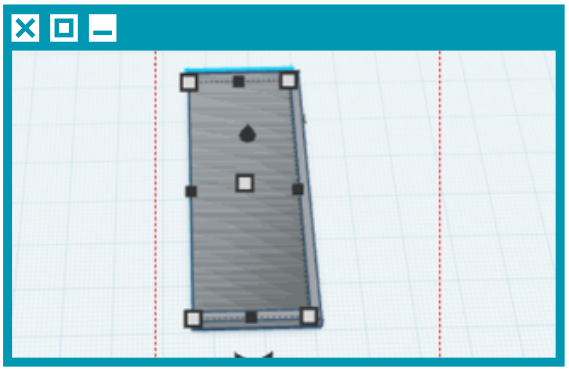
LET'S CREATE A SOLAR WATER HEATER



Change the dimensions of the second shape to 23 mm and 58 mm.

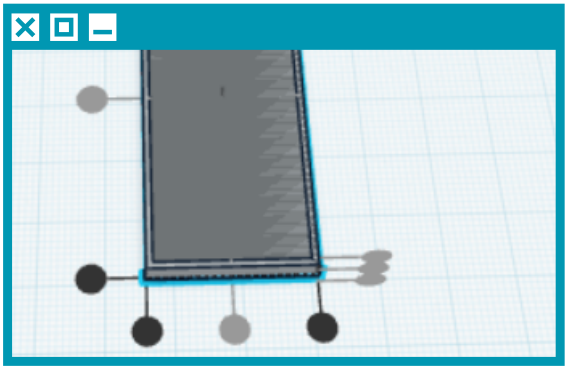


Select transparent.

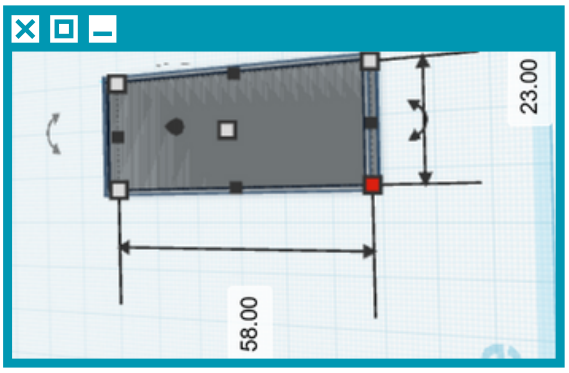


Select both shapes.

Click to align.

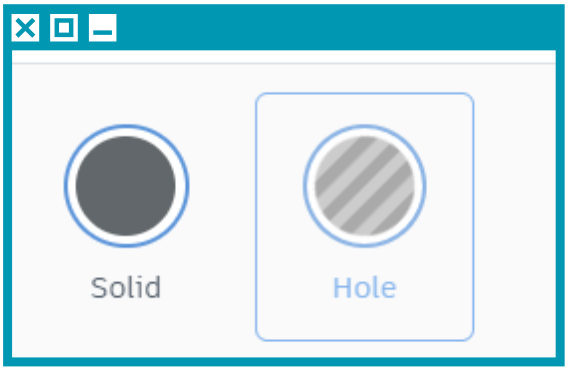


LET'S CREATE A SOLAR WATER HEATER

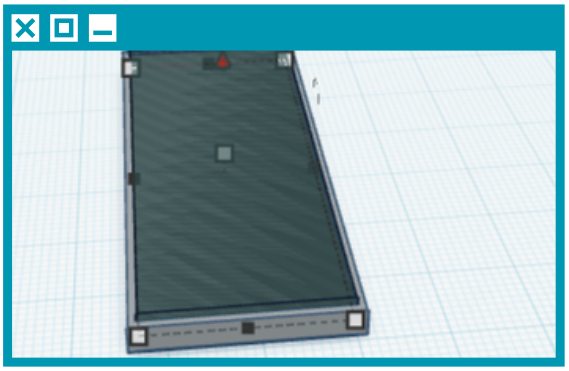


Select the transparent shape.

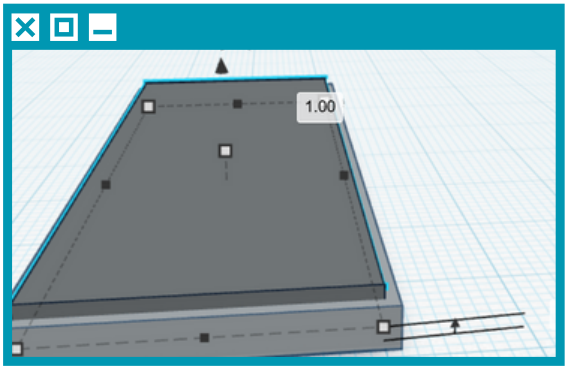
Click to duplicate and repeat.



Make the duplicated object a hole.

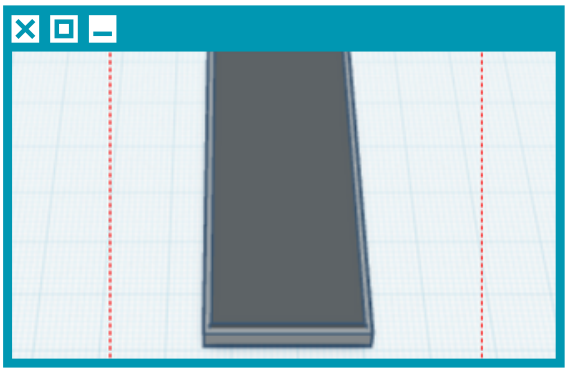


Select the hole and the grey object. To do that you click on the hole shape and then you click Ctrl and the grey shape. You should not select the transparent shape as well because you do not want it to be deleted.



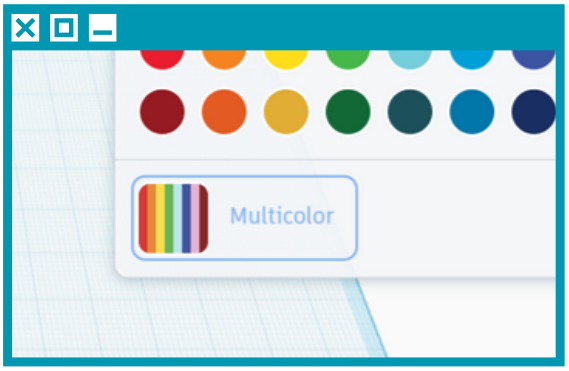
Group them.

LET'S CREATE A SOLAR WATER HEATER



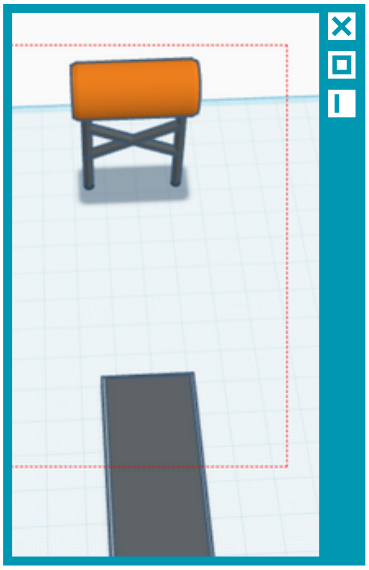
Select both shapes.

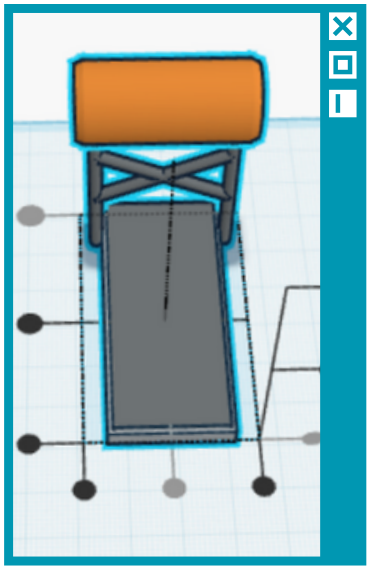
Group them.



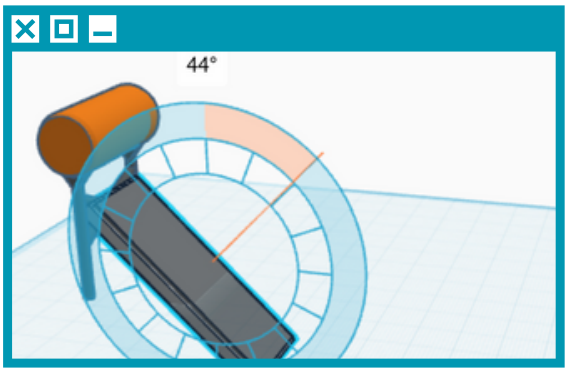
Select multicolor.

Select both shapes and align them.

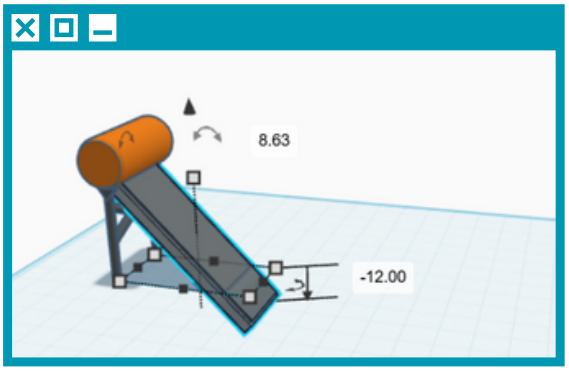




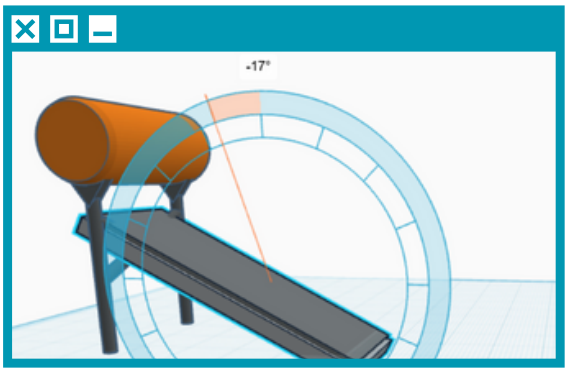
LET'S CREATE A SOLAR WATER HEATER



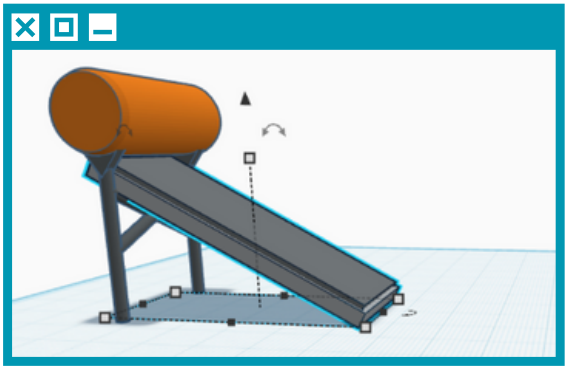
Rotate the grey shape.

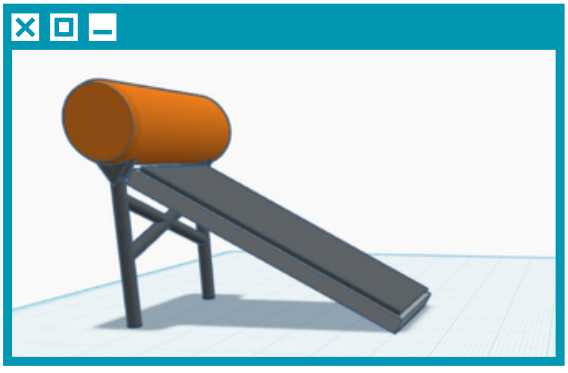


Lift it up so that it touches the workplane. You could also click D.



Rotate again, until it looks like it is shown here.





And here it is!

CREATE YOUR CLASS IN TINKERCAD

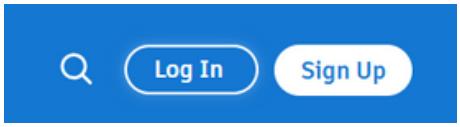
Till now, you have created a personal Tinkercad account where you can create your designs.

Now, you want your students to be able to design in Tinkercad.

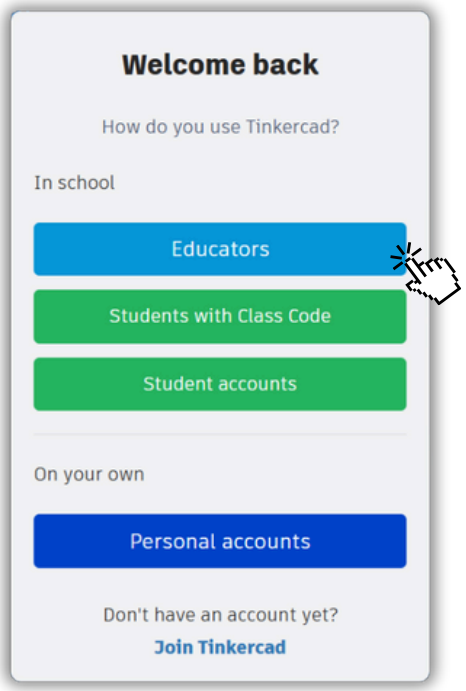
Students could create their own personal accounts, although it requires parental consent, which makes maters a little complex. Also, teachers would like to have an update on what their students are creating.

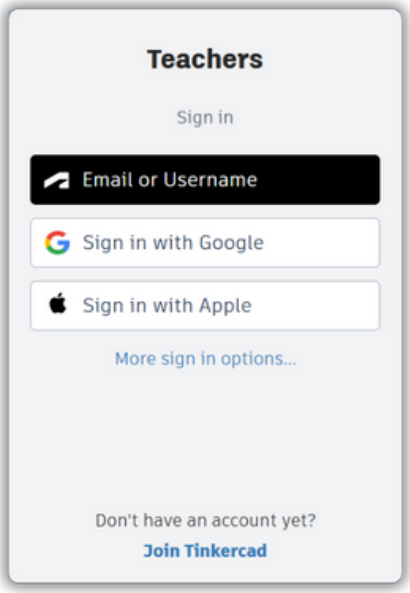
For this reason, what you should do is create a class (or more) in Tinkercad. In order to do that, first you have to declare that you are an educator. To do that you have to complete the following steps:

First, you log out of your Tinkercad account.

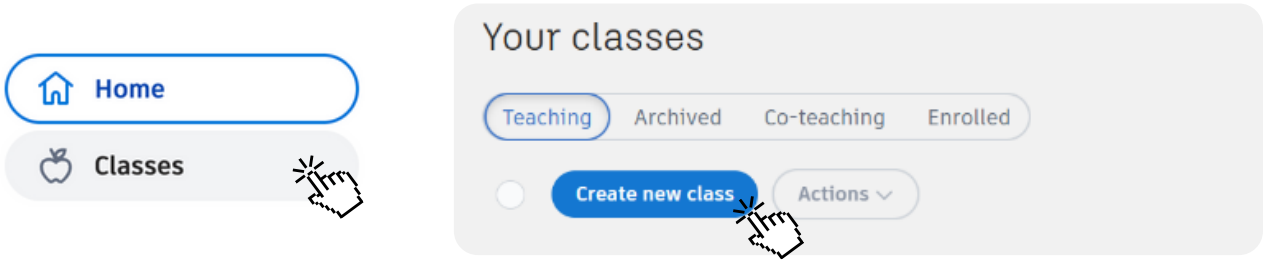


This time you click on Educators; Sign in with your Google account or with any other way you signed in the first time, continue with permissions etc. until you are in Home page.

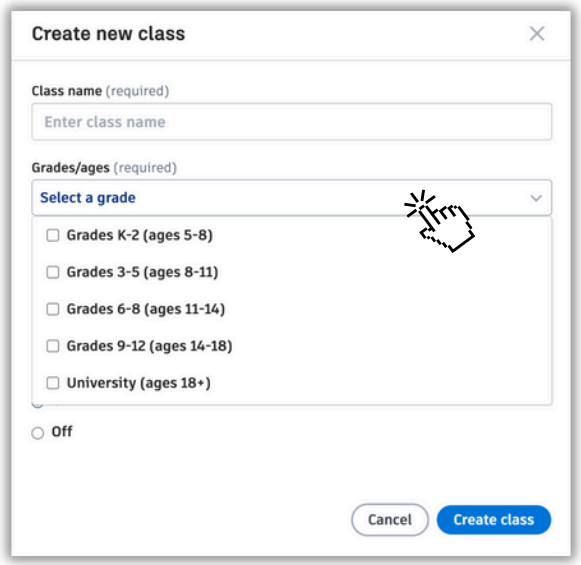


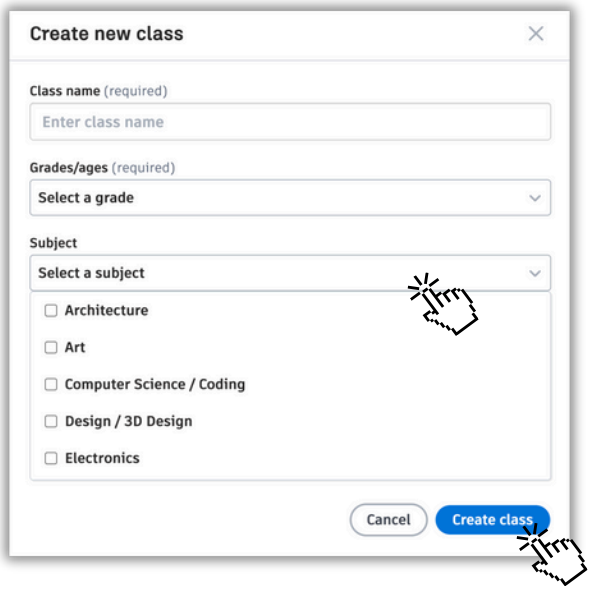


Once you are in home page of Tinkercad, click on classes tab in the left menu. Proceed to create new class.



Give a name to your class and select the relevant grade and a subject. Continue to create class.



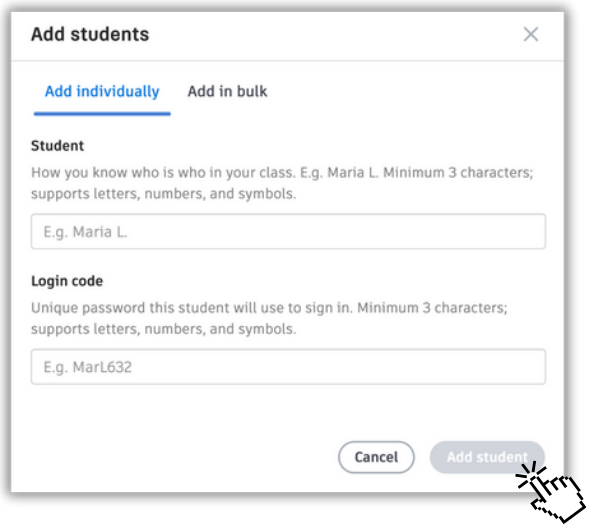


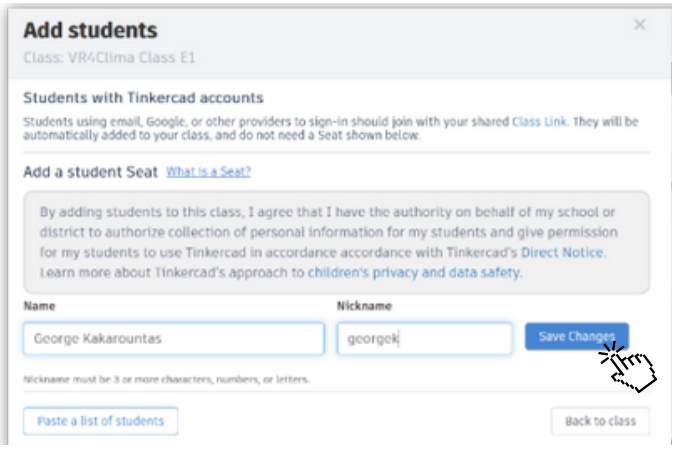
Add students to your class

First, follow the steps and accept the student data and privacy notice.

Students joining via email or Google can use your class link - copy the share link to invite them. If students don't have email or are underage, you can create a Seat for them.

Add the full name of the first student and a nickname associated with it.

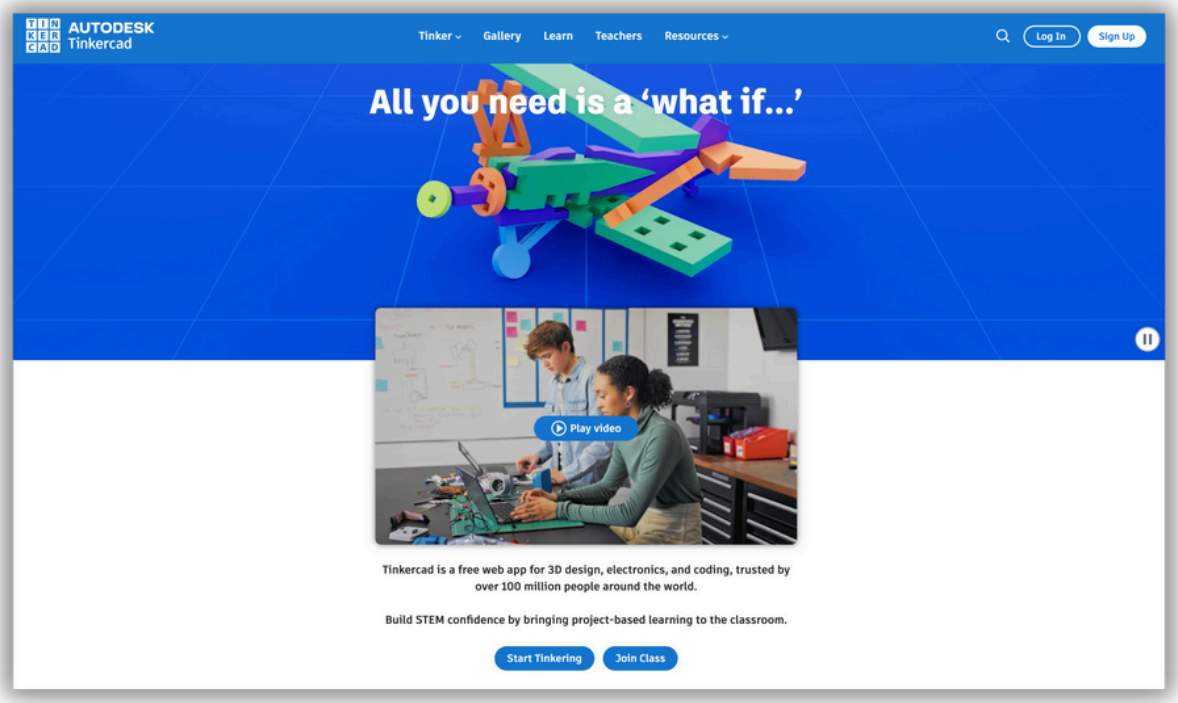




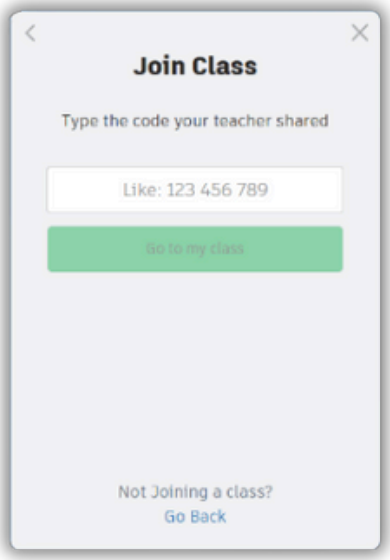
Once you have added all your students, click on class roster.

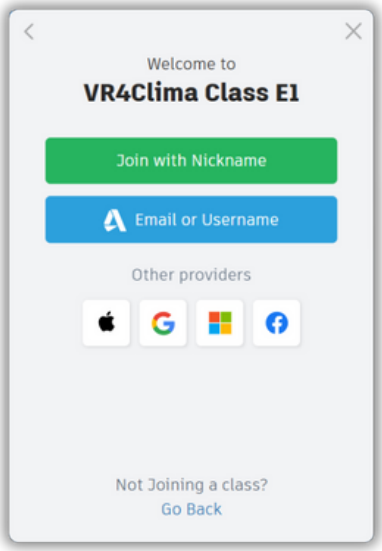
That way, the new page will open where you can print the list and cut out a strip to give each student their credentials in order to enter the class.

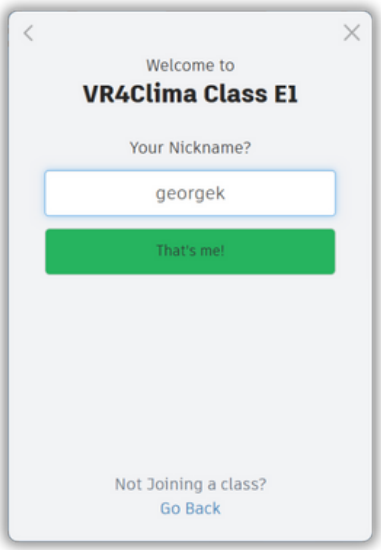
Let's see your students' interface now.



Have your students go to Tinkercad website and click on button to join class. In the pop-up window, they have to type in the class code they got from you and follow the steps.

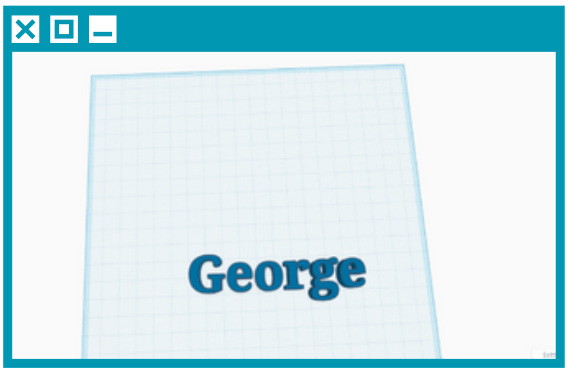






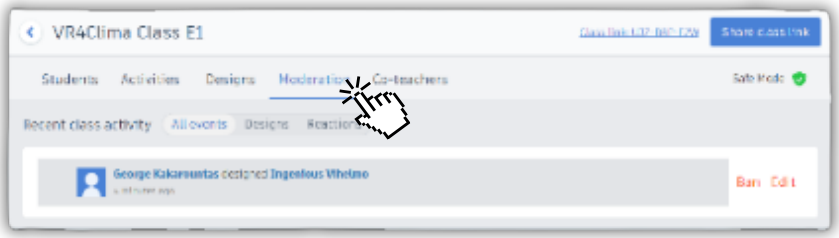
They can create a new design or click on an activity you have added.

Let's suppose that this student created his name in 3D. In the next steps we will see how teacher can access it.



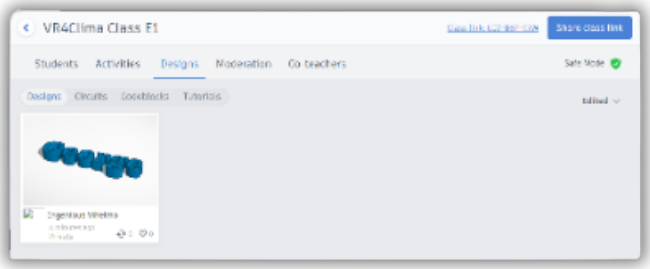
Let's go back to the educator's interface

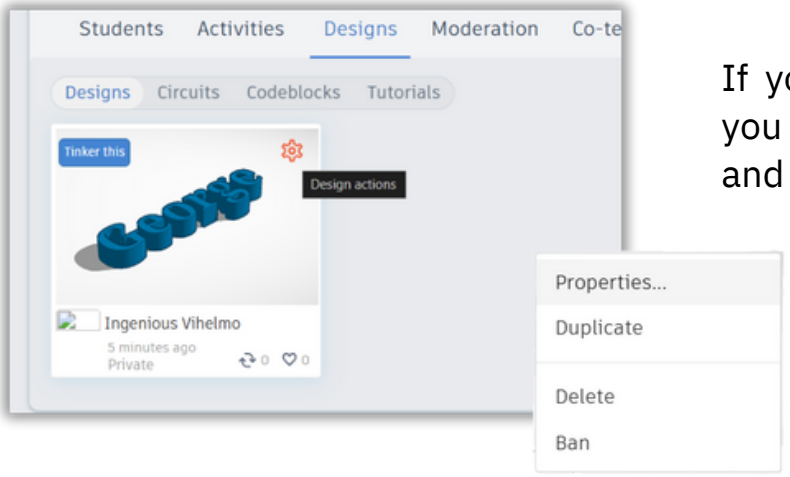
We will see how the teacher can access the students' designs.



When you click on the moderation button, you can see your students' activity.

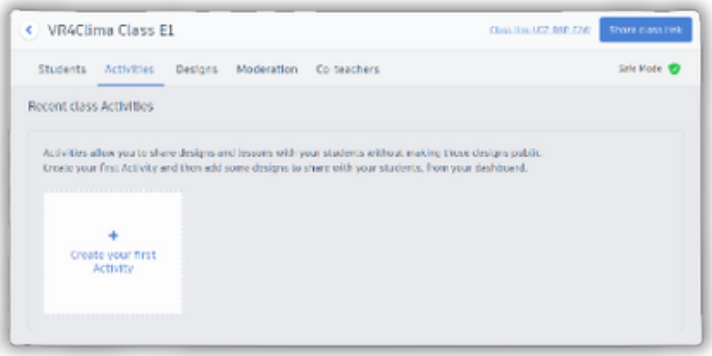
When you click on the designs button, you can access your students' designs.

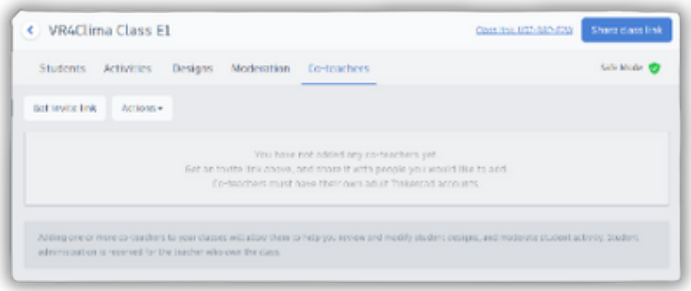




If you click on the design actions, you can duplicate, delete or ban it and also you can add properties.

You can create structured activities for your students. And invite co-teachers by sending them an invite link.





Good luck!

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein. Project Number: 2023-1-EL01-KA220-SCH-000155463

Funded by the European Union

VR4Clima

EPU N·T·U·A

University of Thessaly Founded 1984

VR academi Ai & METAVERSE LAB Empowered Minds Shaping Tomorrow

CENTER FOR THE PROMOTION OF SCIENCE

16 ΠΕΙ. Δ.Σ ΛΑΜΙΑΣ

РУСКИ КРСТУР ПЕТРО КУЗМЈАК ОСНОВНА И СРЕДЊА ШКОЛА СА ДОМОМ УЧЕНИКА