

Learning Guide

Create 3D Models with Tinkercad

Introduction

Tinkercad is a freely-available, easy-to-use 3D design software that runs in a web browser. It is a versatile program that can also be used in electronics and coding fields. The skills you will learn using Tinkercad provide the foundations for using other 3D design tools and can be applied to many disciplines, including engineering, industrial design, architecture, and more. By the end of this lesson, you will be able to create a 3D model using Tinkercad, and export your model for use in other applications.

Video Learning Guide for this Lesson:

https://www.youtube.com/watch?v=yog_pwkztHU

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Step 1: Get started with Tinkercad

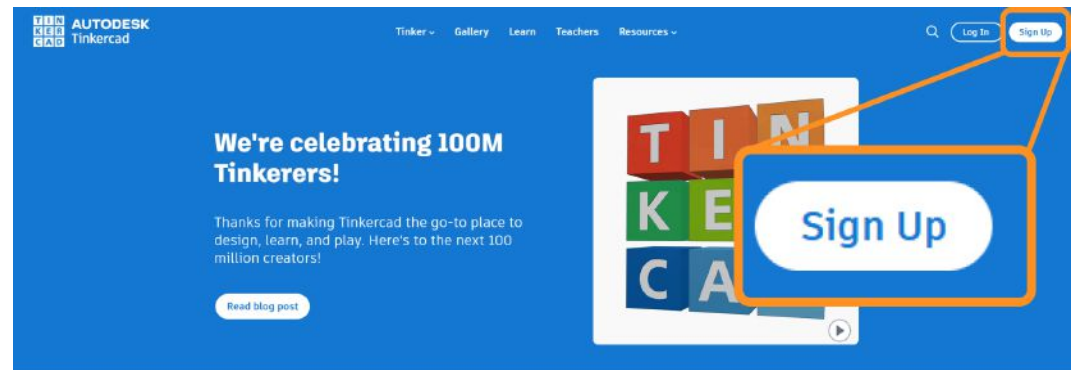
Preview

It is quick and easy to get started with Tinkercad, so you can jump right in to creating your own 3D models. In this section, you will learn how to set up your free account and start a new project.

Experiment

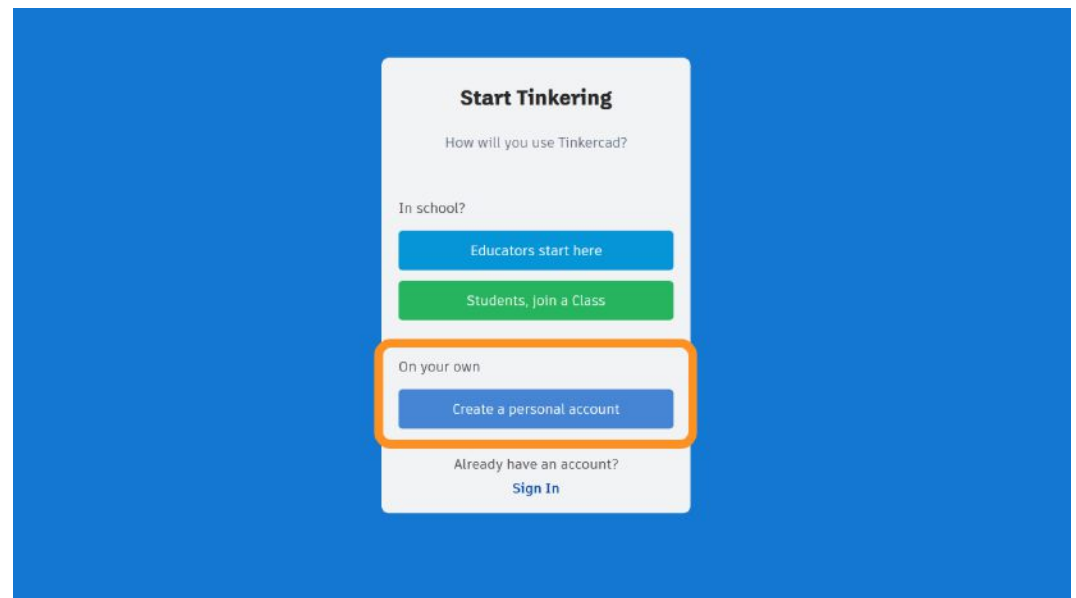
LOG INTO TINKERCAD

Open Tinkercad (<https://www.tinkercad.com>) on your web browser and click **Sign Up** in the upper-right corner to create a free account.



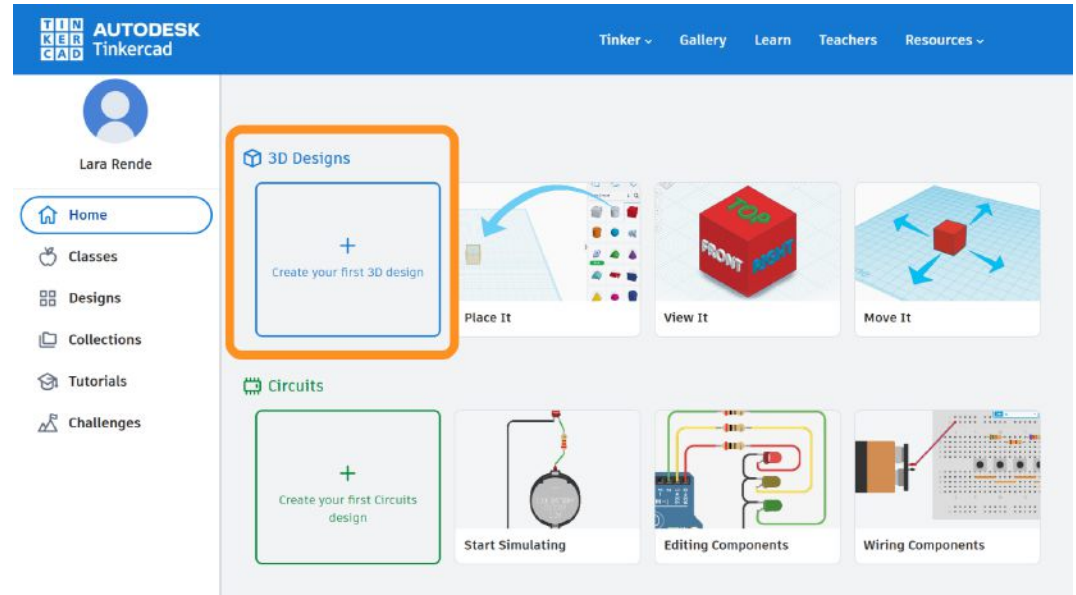
Pick the **Create a personal account** option and sign up with your email address.

After your account is created, you can keep all of your Tinkercad projects under the same account and access them from any computer with an internet connection.

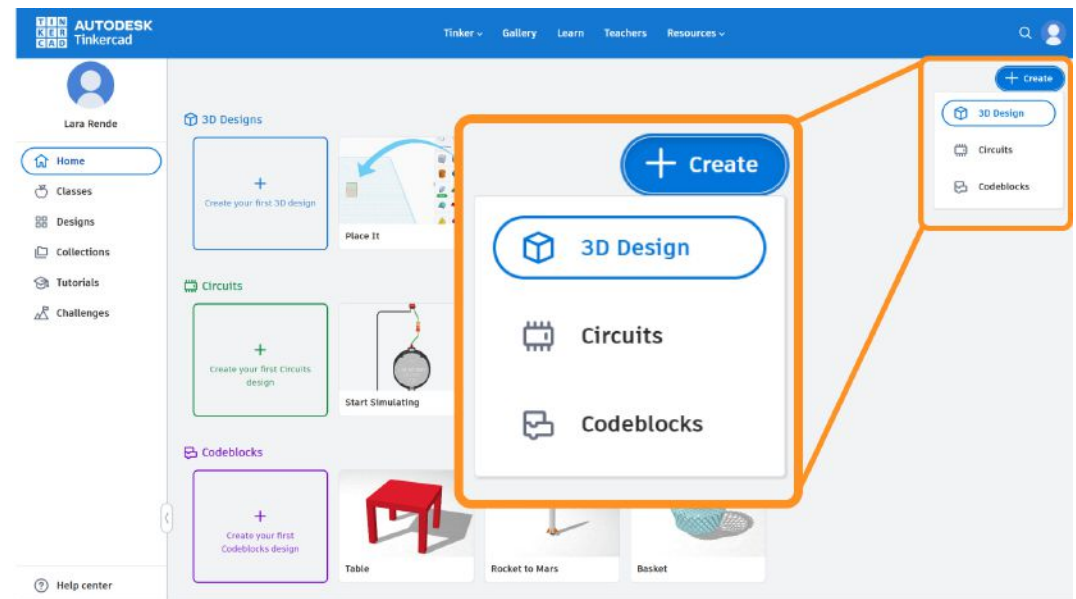


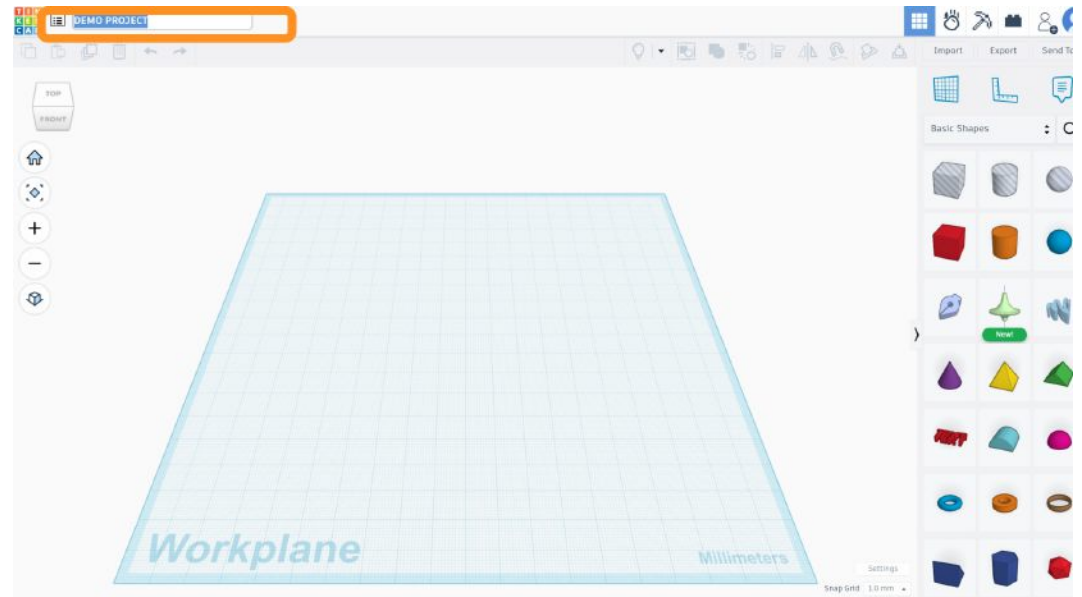
CREATE A NEW PROJECT

Click on “**Create your first 3D design**” on your dashboard.



You can also click the **+Create** button on the right side of the screen, and select the **3D Design** option.





You can rename your project any time by clicking on the title in the top-left corner.

Self Check

Could you create a Tinkercad account and set up a new 3D project? Do you have an idea of what kind of 3D model you are planning to create?

Step 2: Create a 3D model with basic shapes and functions

Preview

This section will show you how to navigate in the viewport, and begin creating 3D models in Tinkercad by adding, editing, and grouping shapes. It is strongly suggested that you use an *external mouse* while navigating and using Tinkercad, instead of a trackpad, for an easier experience working in 3D space. The navigation controls in this Guide will be based on keyboard and external mouse buttons.

Experiment

VIEWPORT AND CONTROLS

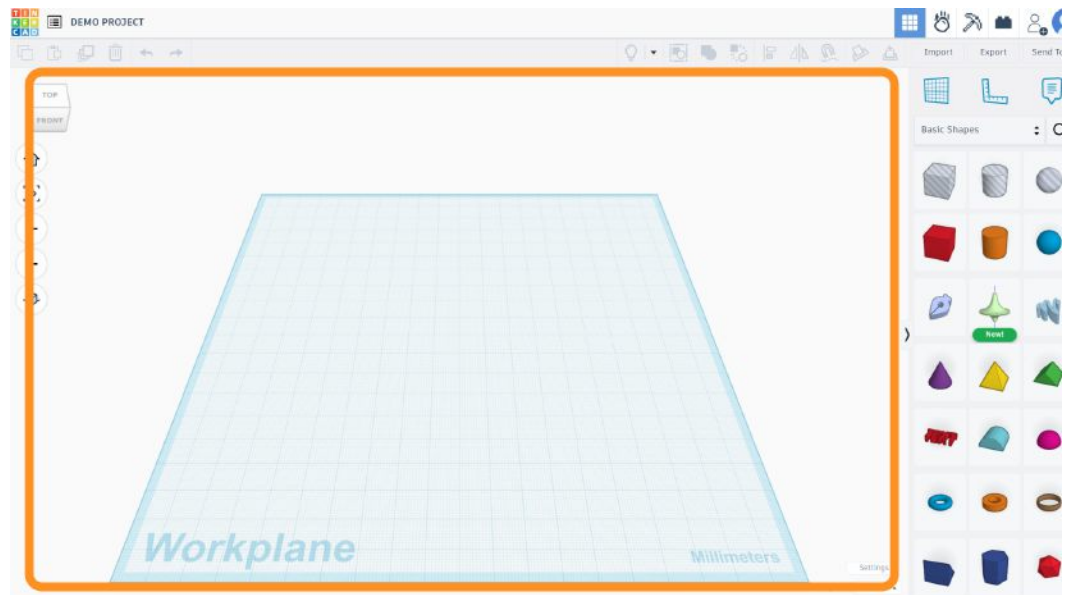
The **viewport** is the main work area on screen that you can navigate in 3D. You can work and navigate in the viewport with the following commands:

Zoom: Use the scroll wheel on your mouse.

Pan: Hold down the scroll wheel and move the mouse.

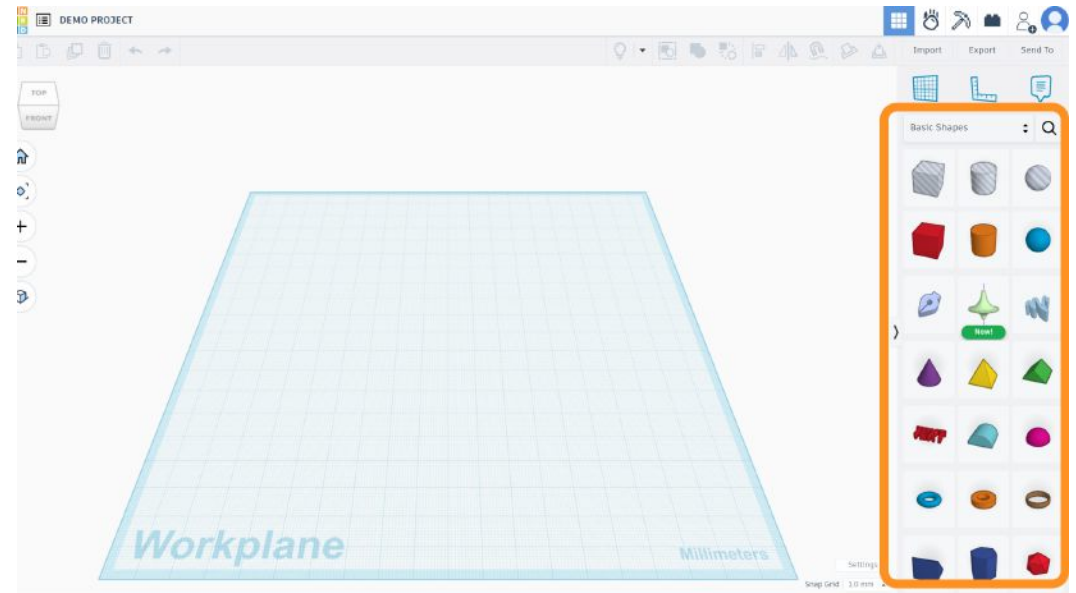
Rotate: Hold the right mouse button and move the mouse.

The **workplane** is the 2-dimensional blue grid that acts as the “floor” of the 3D space. The workplane can help with orienting yourself in the space.



ADD SHAPES

From the **Basic Shapes** library on the right, click on the shape you want to use to start building your 3D model and drag it onto the workplane.

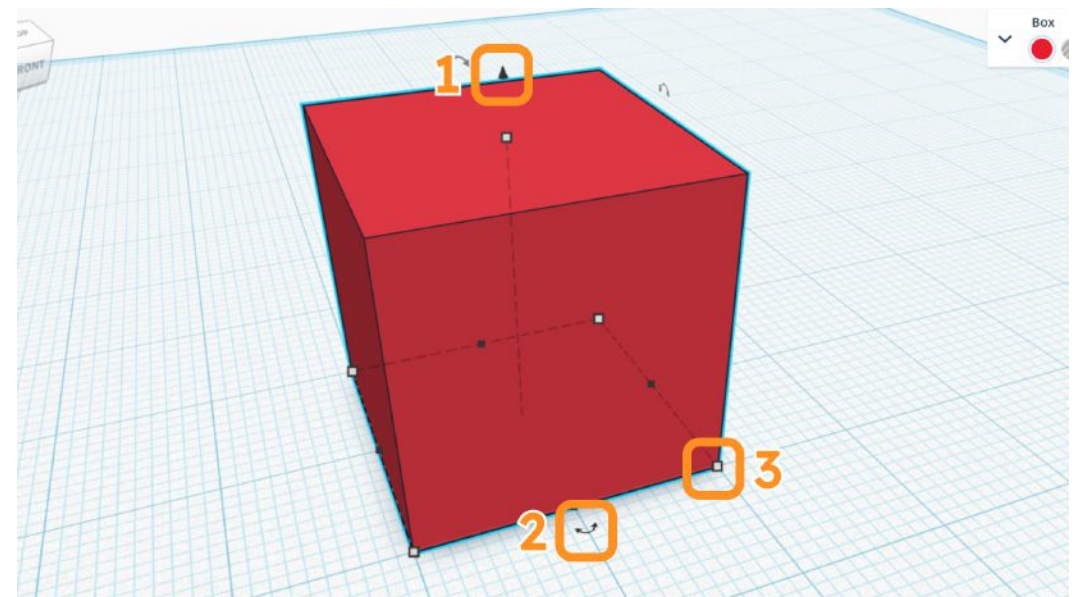


MOVE SHAPES

To move your shape on the workplane, click on the shape and drag it to the location you want. To move your shape vertically, click and drag the **cone icon (1)** on top of your shape.

To rotate your shape, click on the **half-circle arrow (2)** icons on different sides of your shape and drag.

You can scale your shape on different axes by click-dragging on the **white square icons (3)** around your shape.

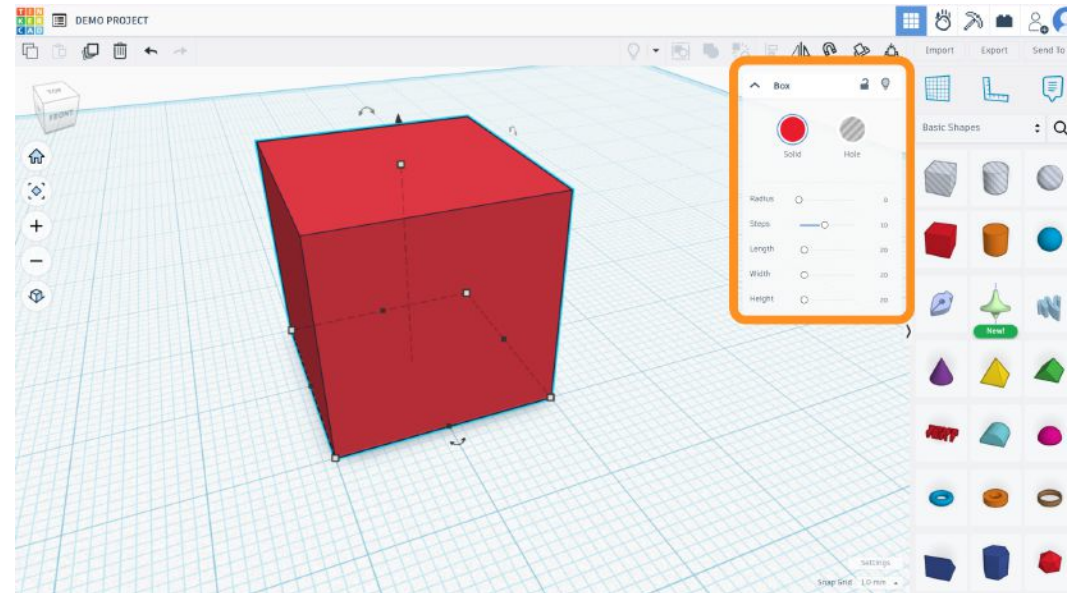


EDIT SHAPES

Click on a shape to select it. It will be highlighted in blue.

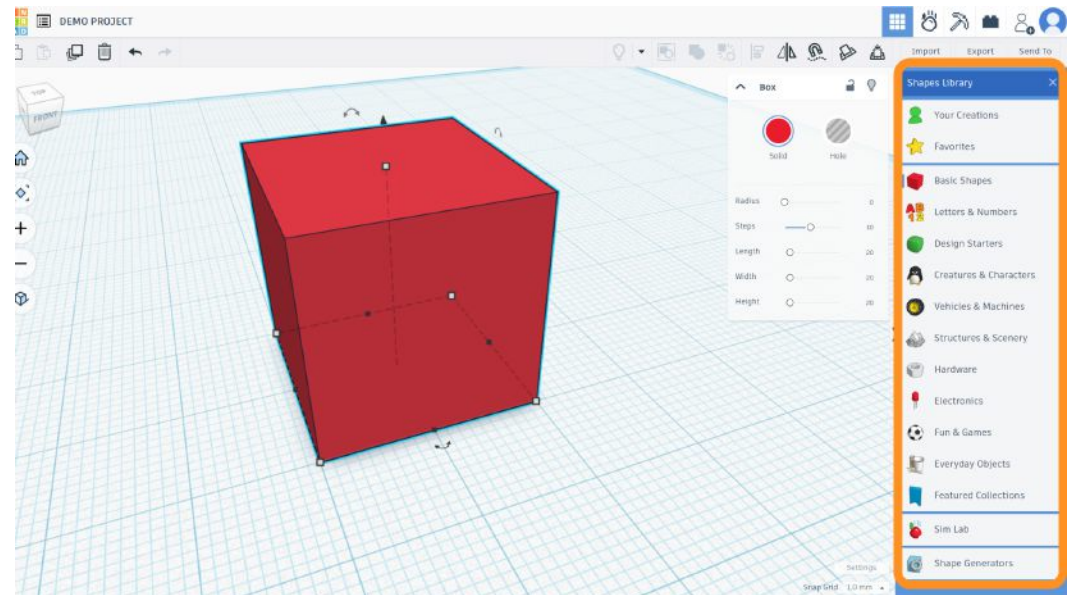
Use the dropdown menu on the right side to change the shape's dimensions, color, and more.

Keep in mind that the dropdown menu will be customized based on the shape selected, and not all shapes will have the same settings.

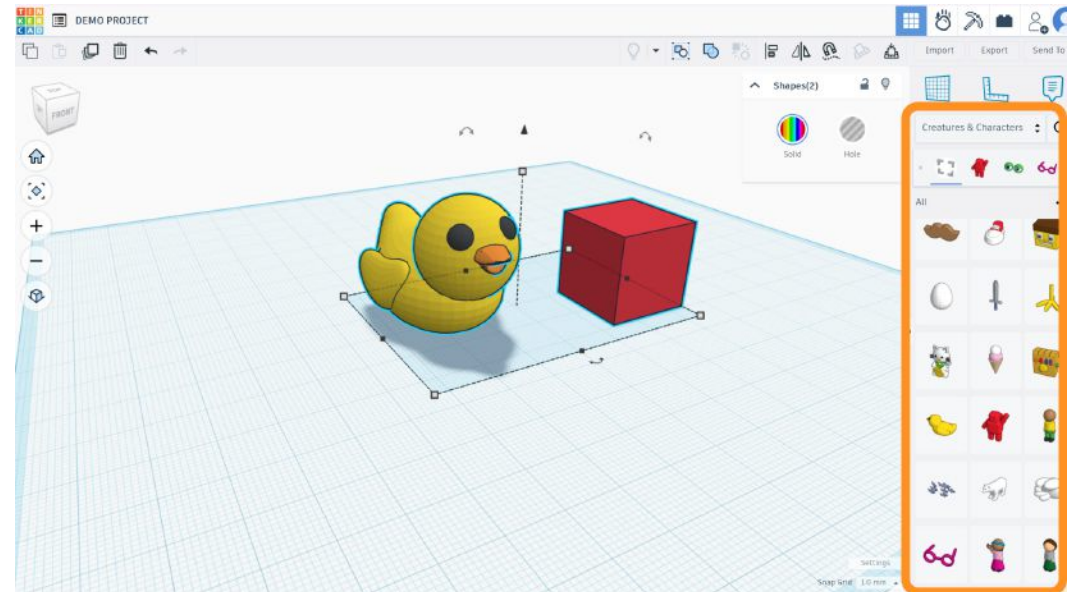


ADDITIONAL SHAPE LIBRARIES

Click on the **Basic Shapes** library dropdown on the right panel to find additional shape libraries within Tinkercad. These libraries include letters & numbers, characters, vehicles, and many more!



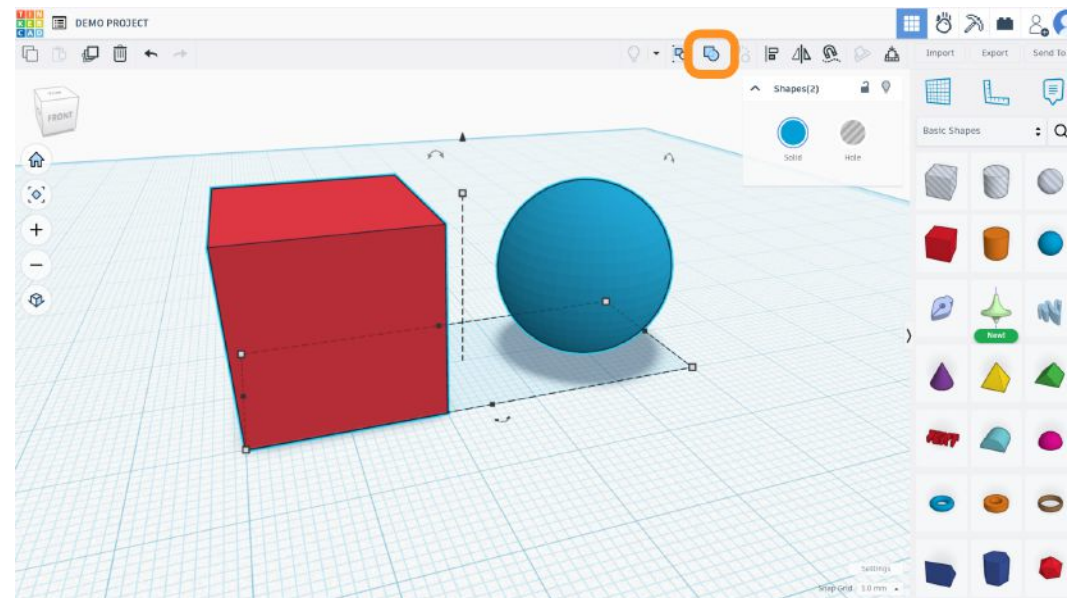
You can use and edit the additional shapes from the library just like the basic shapes. Have fun exploring different options and putting shapes together to create a new 3D model.



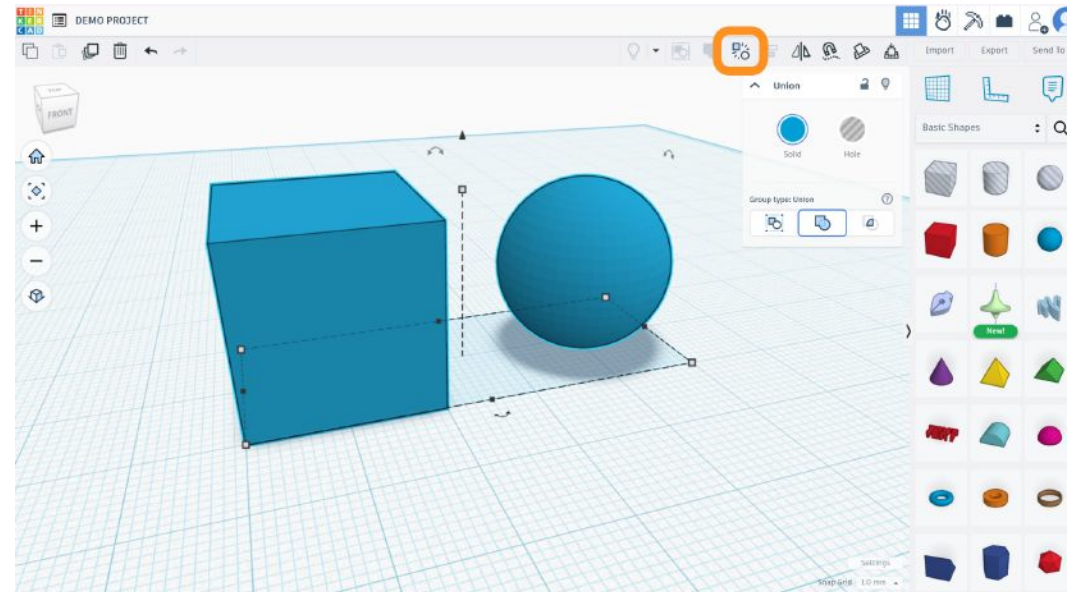
GROUP SHAPES

Grouping shapes will combine them into a *single shape* with the *same* material. If individual material/color/texture is important for each individual shape, leave them separated.

Select multiple shapes by holding the **Shift** key and clicking on each shape, then click the "**Group**" icon on the top menu bar or press **CTRL+G**.

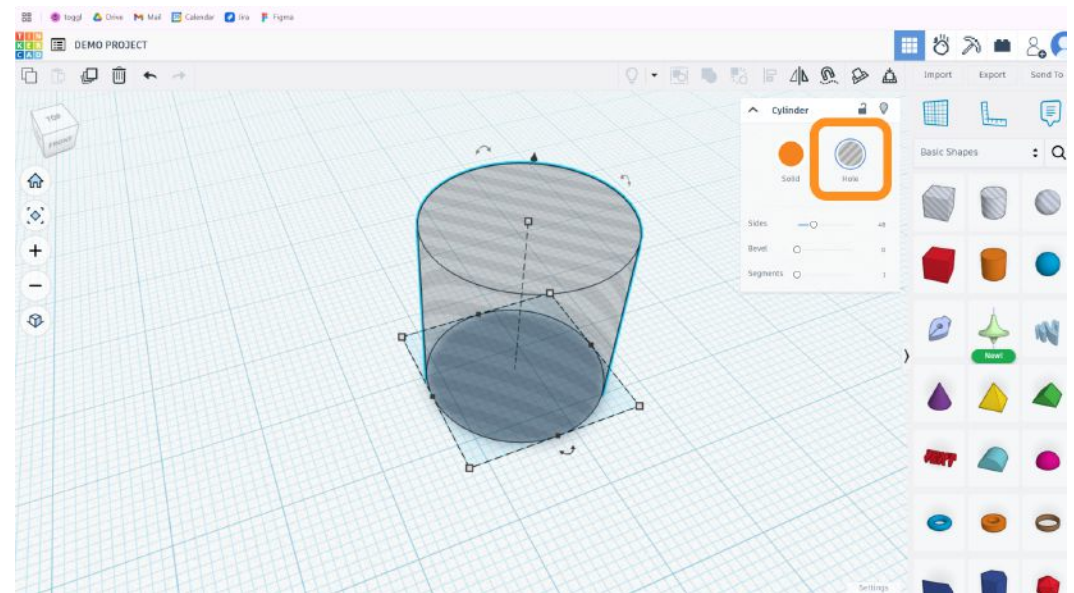


You can ungroup shapes with the “**Ungroup**” icon on the top bar or by pressing **CTRL+SHIFT+G**.

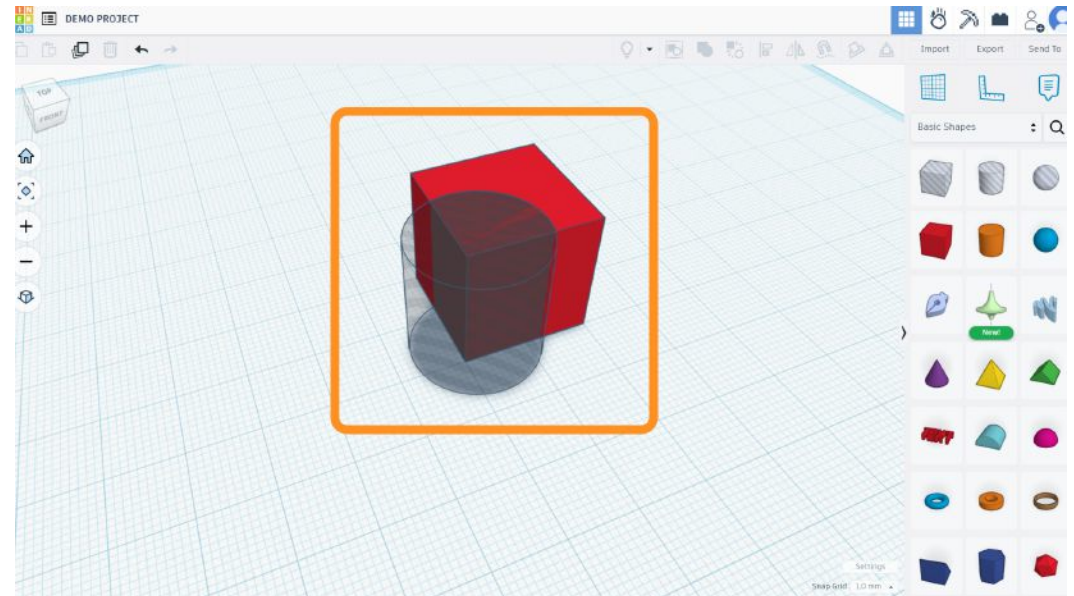


You can use the **group** functionality in Tinkercad to combine objects together, as well as *subtract them from each other*.

Use the “**Hole**” option from shape dropdown for one of your shapes. You will notice that the shape will turn transparent instead of having a color. This shape will be *cut out* from another.

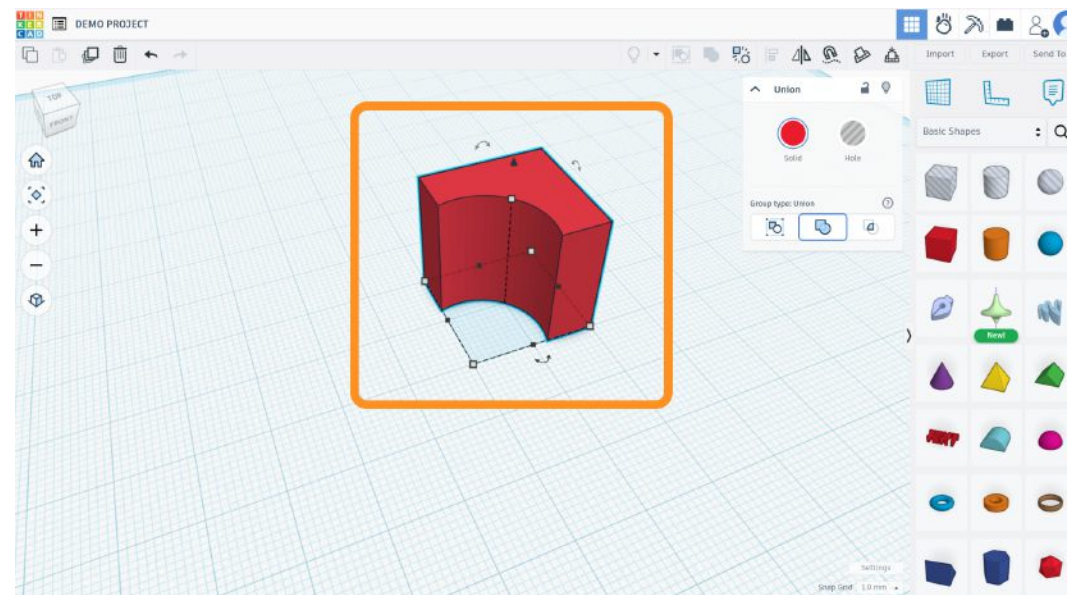


Next pick the shape you want to *cut out from*. Move and align both of the shapes, so the transparent one is **overlapping** with the other over the area you would like to cut out.



Now, if you **group** these shapes together (through the menu bar or with CTRL+G), you will notice that the transparent shape will disappear.

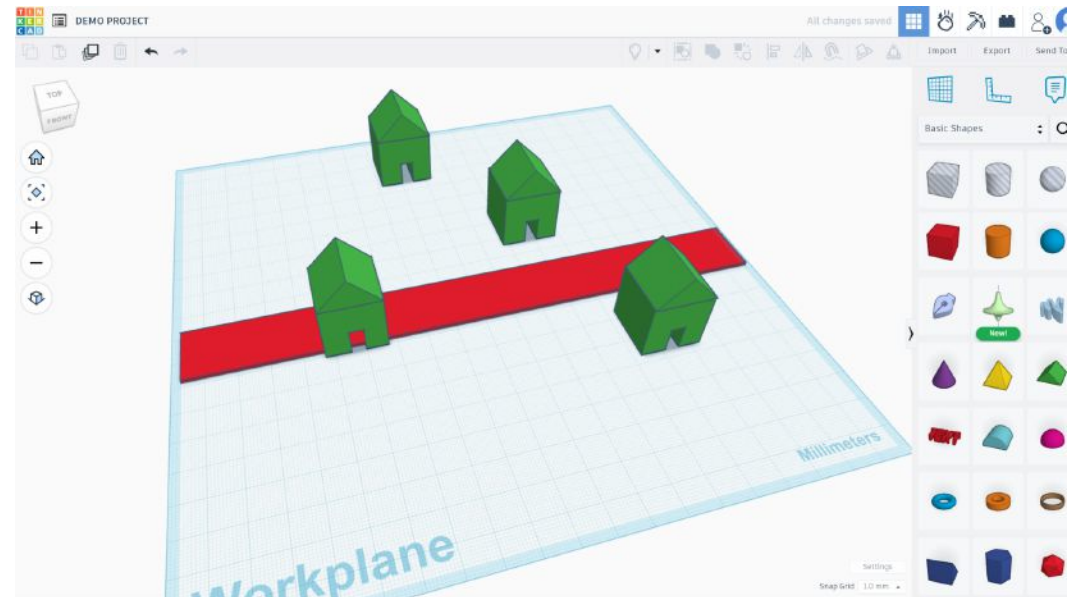
You will be left with a single shape, which should have a hole cut out in the shape of the transparent one on its surface.



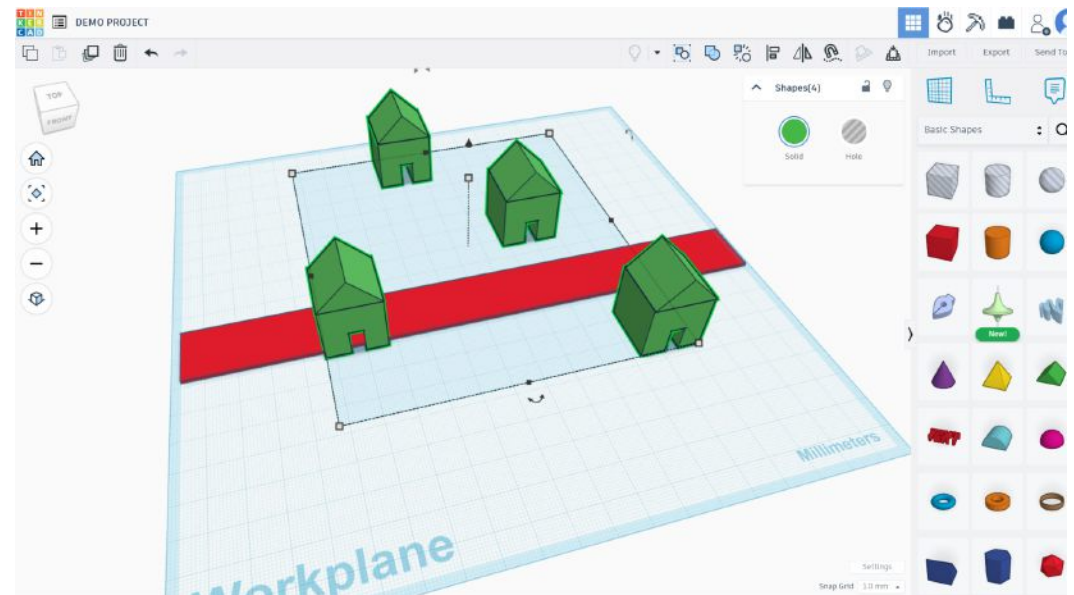
ALIGN SHAPES

Depending on the 3D design you're creating, you might find it useful to position your shapes on the same axis. For example, you may have multiple little houses that need to be positioned in a line by the side of a road.

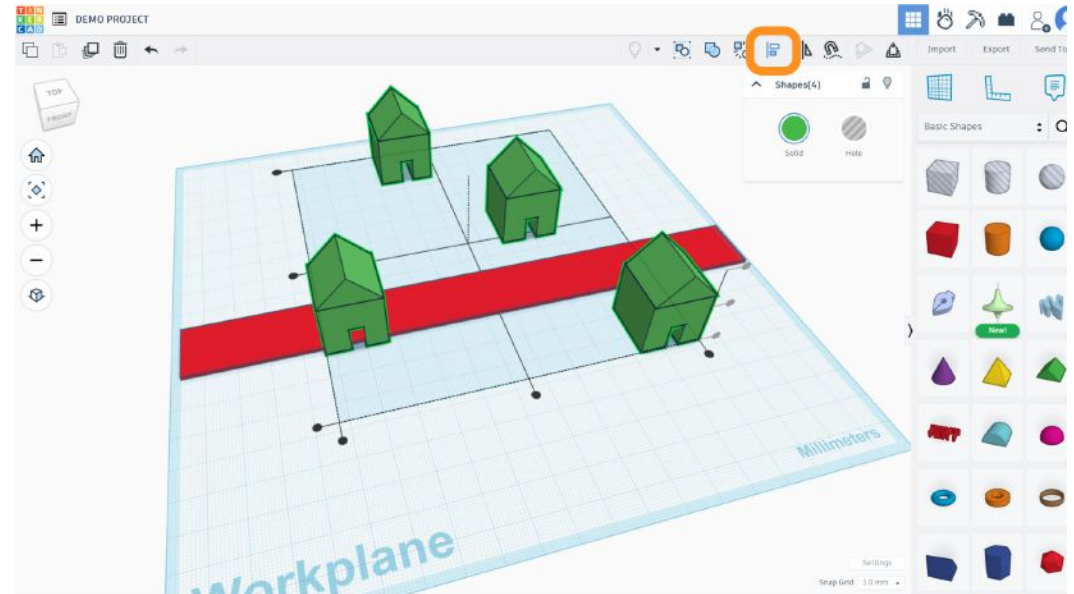
In this case, you can use the **Align** tool to align multiple shapes on the same axis.



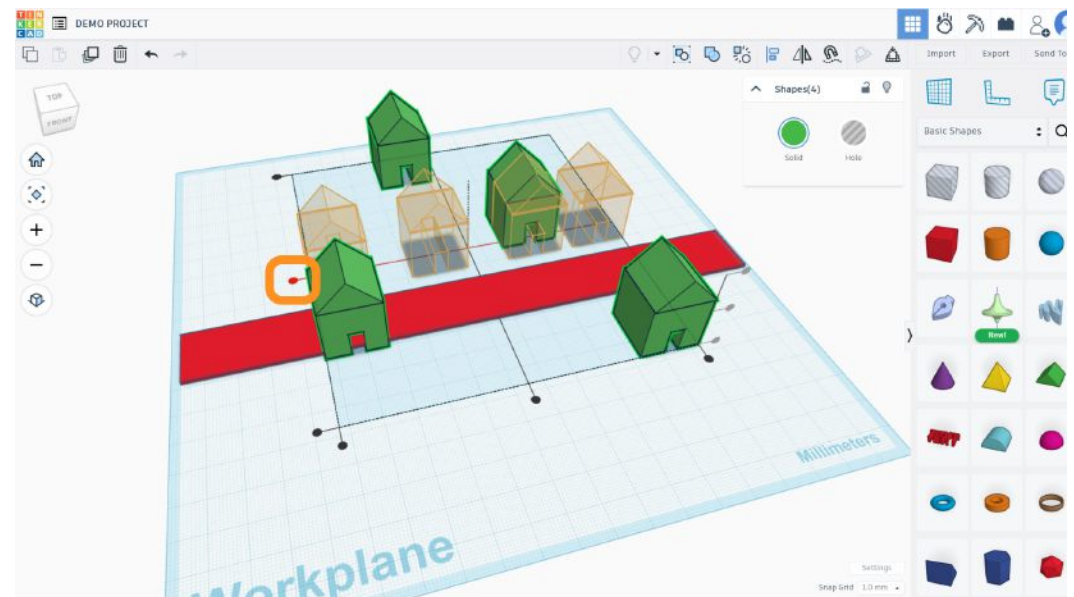
Select all the shapes you want to align by holding down the **SHIFT Key** and clicking on each of the shapes.



Click on the **"Align"** tool on the top menu bar or press the **L Key**. You will see a grid appear on your Workplane that will help you figure out which direction to align your shapes.

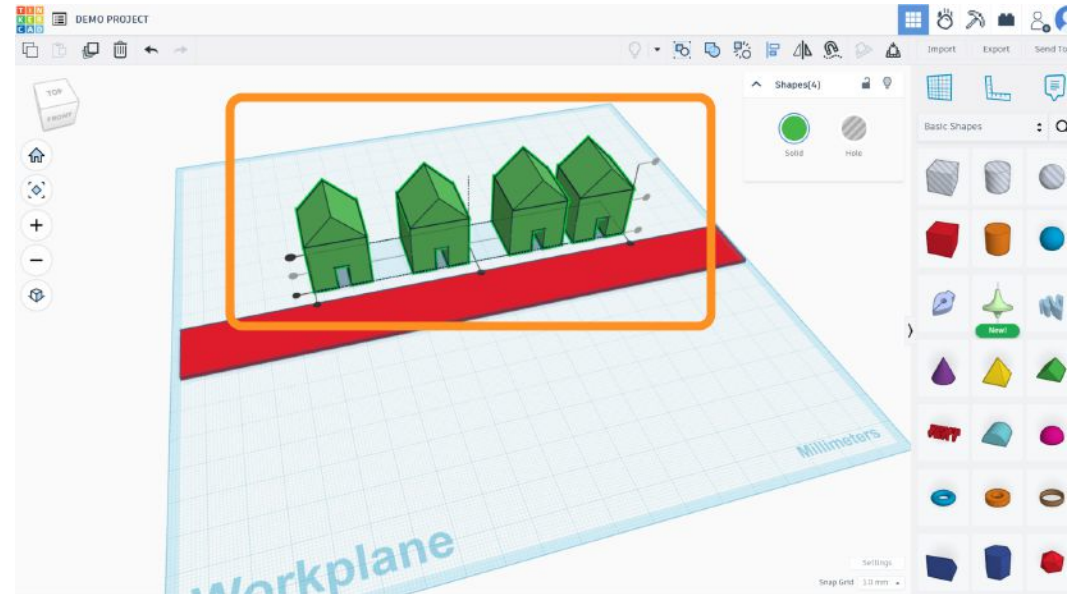


Use the circular handles to select the direction in which you want to align your shape. If you hover over one of the handles, you will see a preview of what the aligned shapes will look like.



Click on the desired circular handle to align your shapes as you wish.

You can always undo (CTRL+Z) if you make a mistake during alignment.



Self Check

Were you able to create and group shapes in Tinkercad to make the 3D model you wanted?

Step 3: Customize a 3D model with additional tools

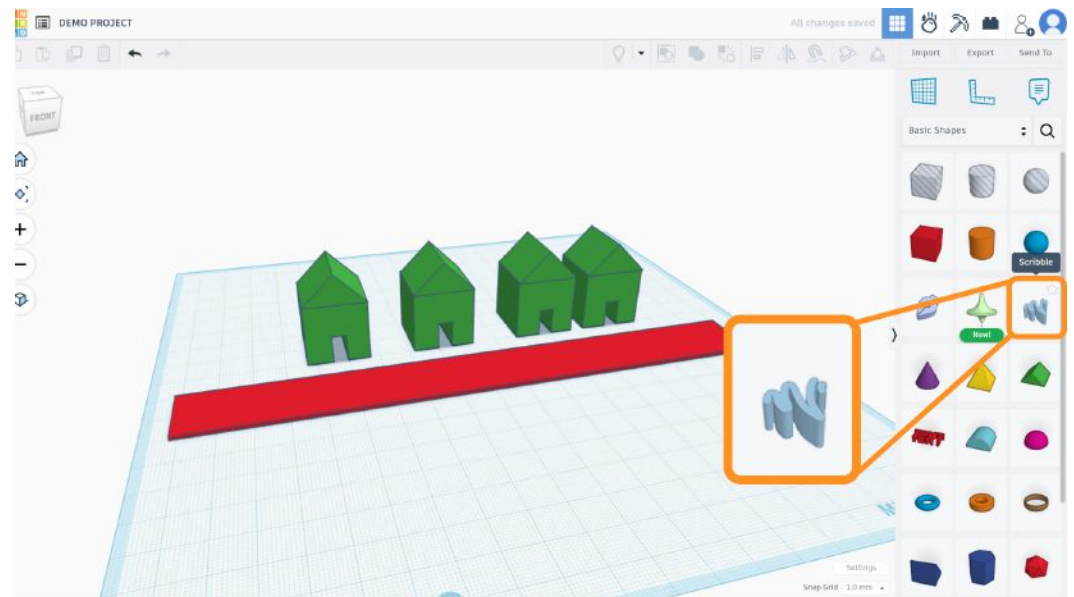
Preview

Once you get familiar with creating basic shapes in Tinkercad, you can use additional tools in the library to customize your 3D models further.

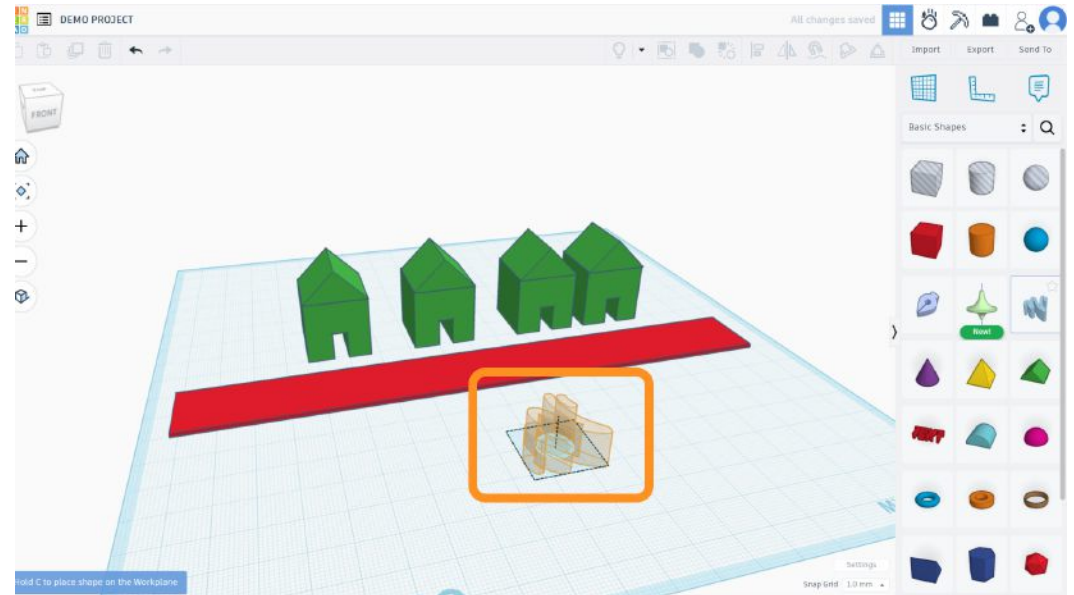
Experiment

SCRIBBLE TOOL

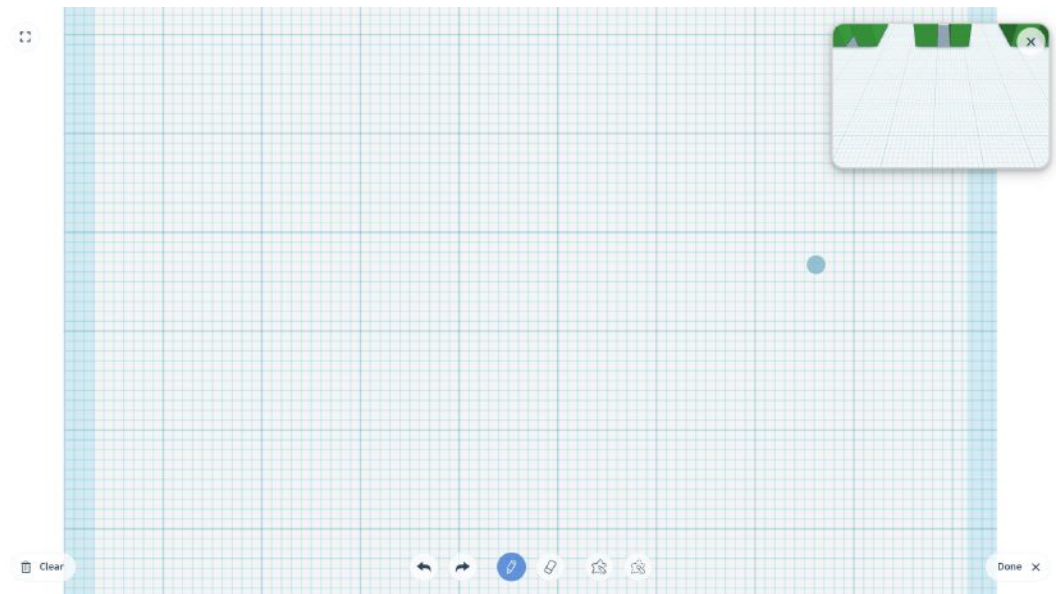
Some tools within Tinkercad allow creators to create more custom shapes instead of relying only on the building blocks in the library. The **Scribble** tool gives the creator the ability to use a free-flowing brush on a 2D plane to draw a desired shape, and then extrude the shape to create a 3D model.



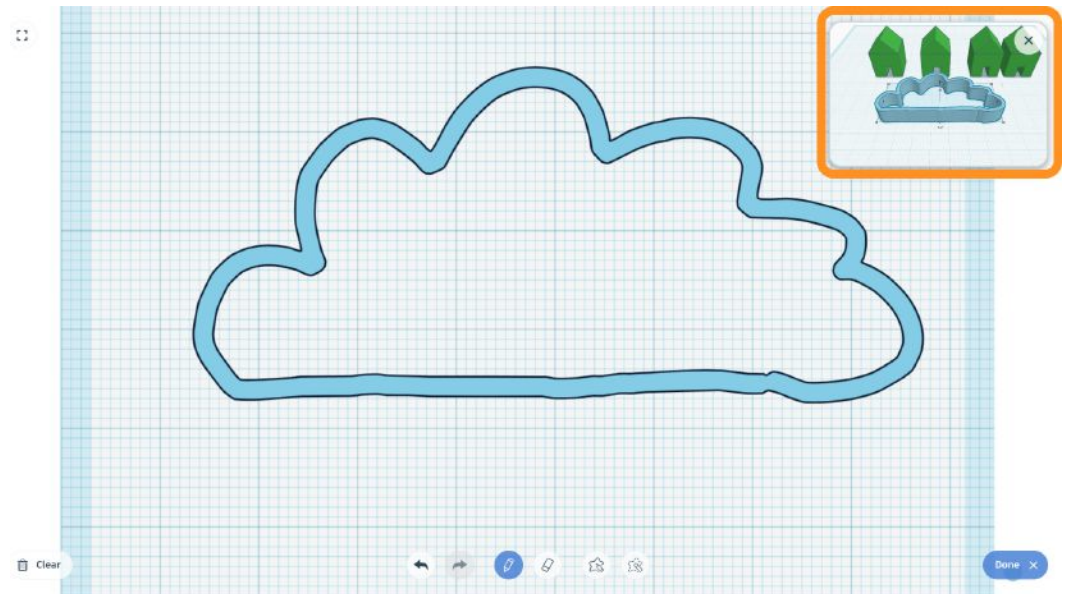
Find the **Scribble** tool and click-drag it onto the Workplane.



A new window will open up where you can use the Scribble tool freely to create a custom 3D shape.



Start by clicking and dragging your cursor on the 2D plane. You will see a 3D representation of your scribble in the top-right preview window.



When you're happy with your shape, click "**Done**" in the bottom right corner to go back to the 3D workplane.

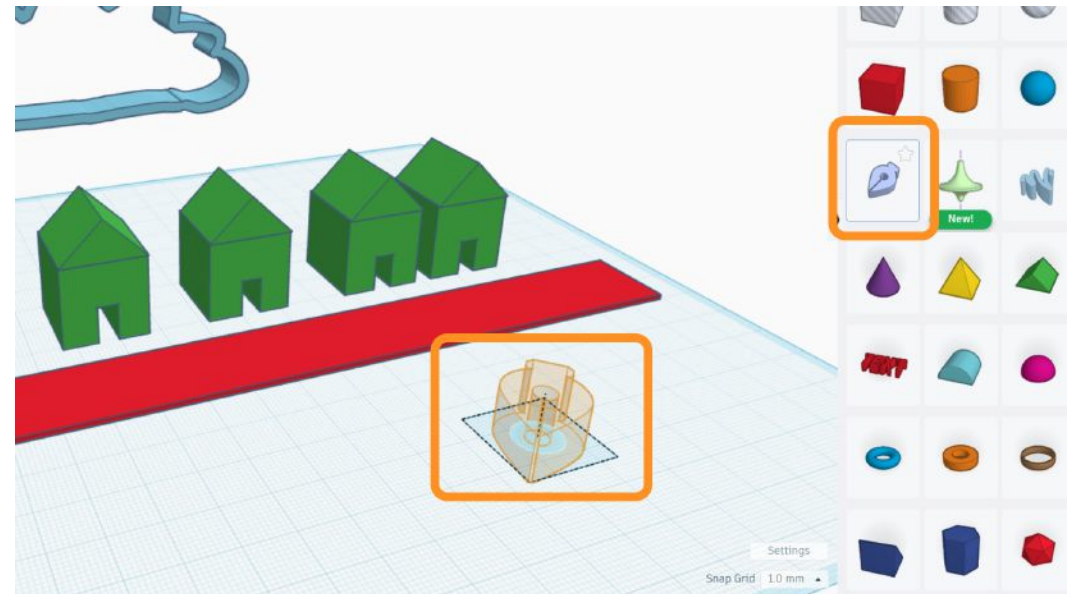
If you ever need to go back to your Scribble to adjust it, double click on the Scribble shape in the viewport and the 2D window will open up again.



EXTRUDE SKETCH TOOL

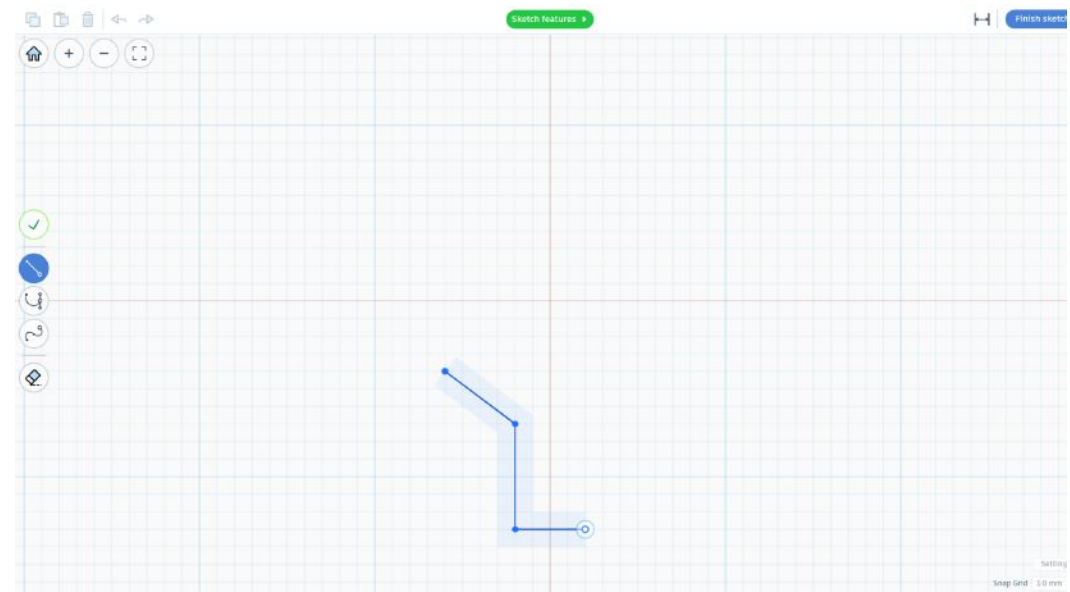
The **Extrude Sketch tool** works similarly to the Scribble tool, except this time, you can “sketch” with rigid or curved lines.

From the Library panel, click and drag the tool onto your Workplane.



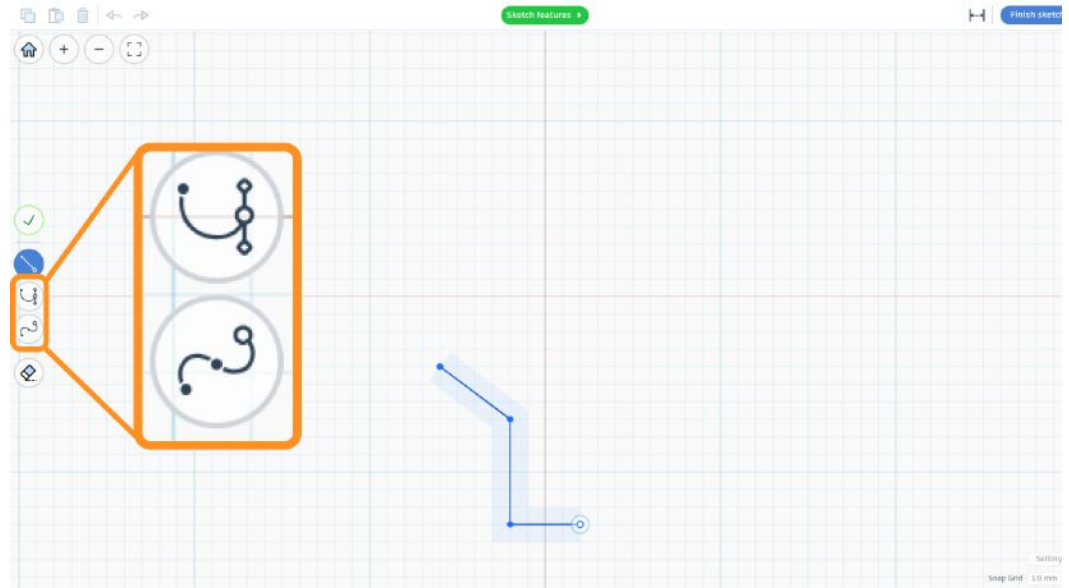
By default, the tool will start with creating **rigid lines** on the 2D plane.

Click anywhere on the grid to place your first point. Then keep clicking to create lines between each point you have placed.

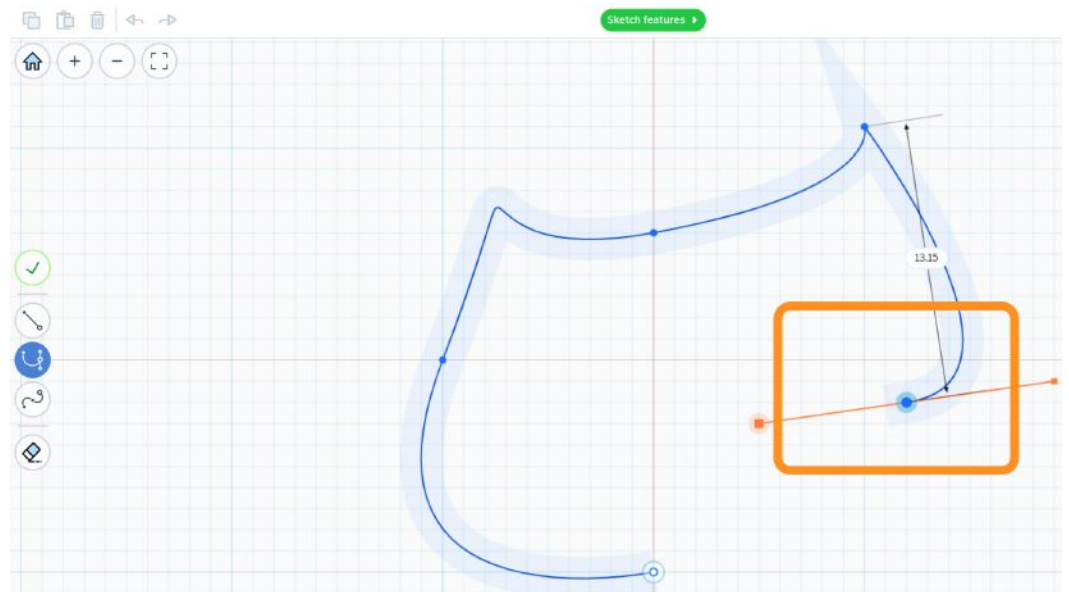


If you'd like to create a shape with smoother edges and curves, you can use the **Curve** options from the left side of the window.

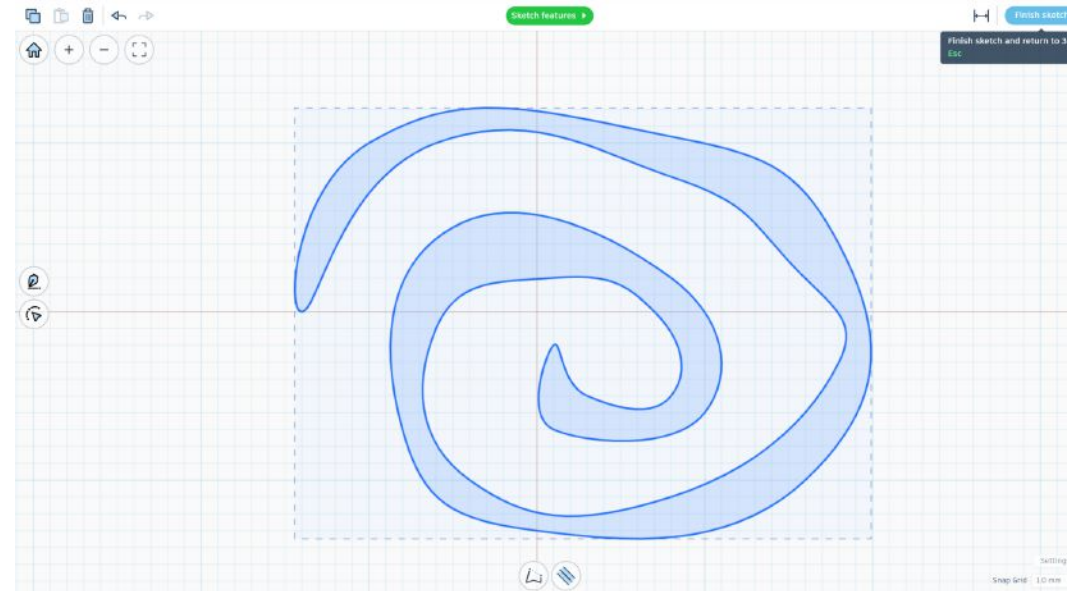
Click on any options to try them on the 2D plane.



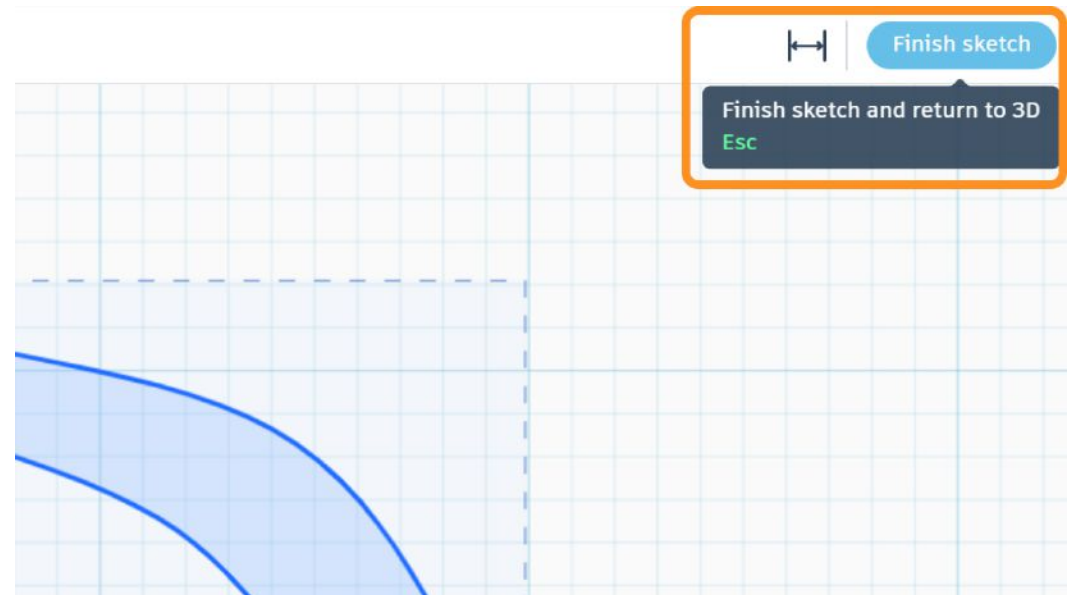
When using the curved lines, you can click on anywhere on the grid like before. However, this time **click and drag** your cursor to determine the direction of the curve as you connect your points.



Once you close the shape you've created by connecting all points, the tool will automatically create a 3D shape.



When done, click on the **Finish sketch** button at the top right corner.



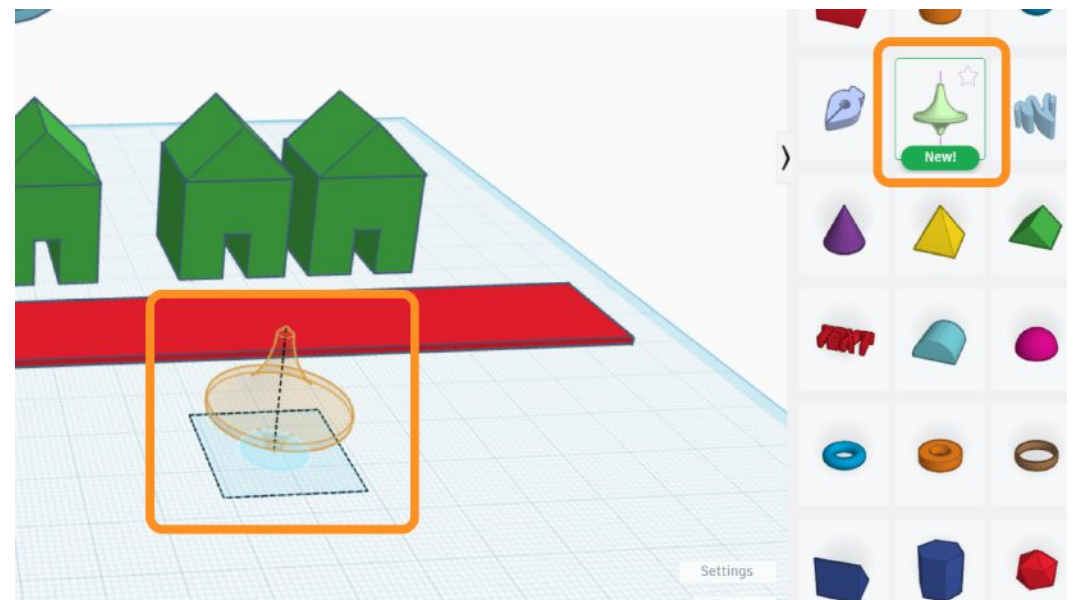
You will see your sketch extruded in 3D on the Workplane. You can move and edit these shapes just like any other default shape from the library.



REVOLVE SKETCH

The **Revolve Sketch** tool works very similarly to the previous Scribble and Extrude Sketch tools.

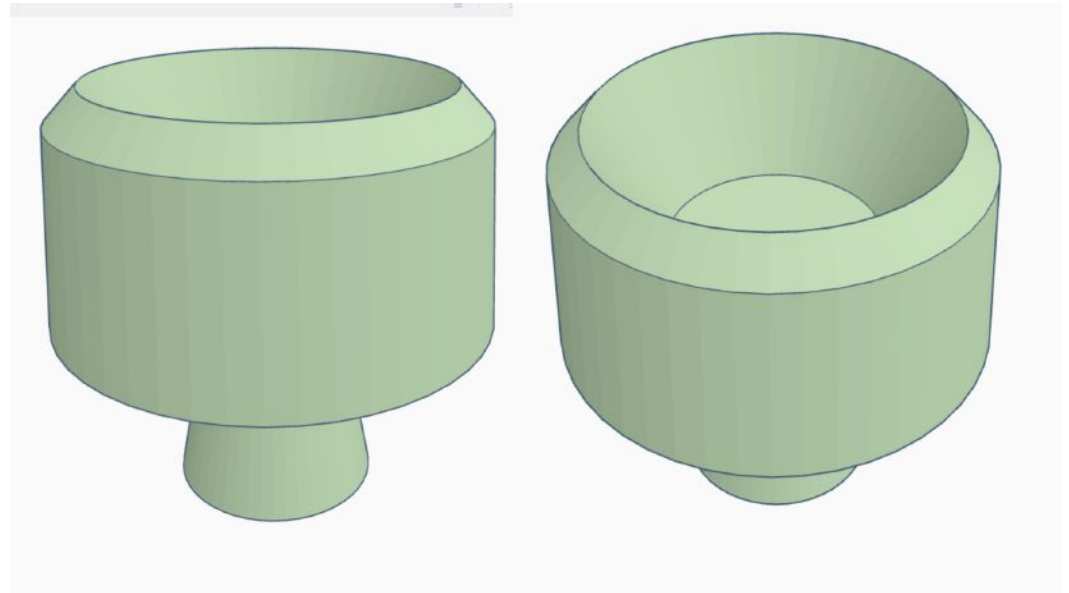
Click and drag the tool onto the Workplane to get started.



Similar to the Extrude Sketch tool, the **Revolve Sketch** tool works with lines and curves to create a shape.

However, instead of extruding a 2D shape into a 3D model, the Revolve Sketch tool **spins your sketch around a vertical axis** to create a 3D model.

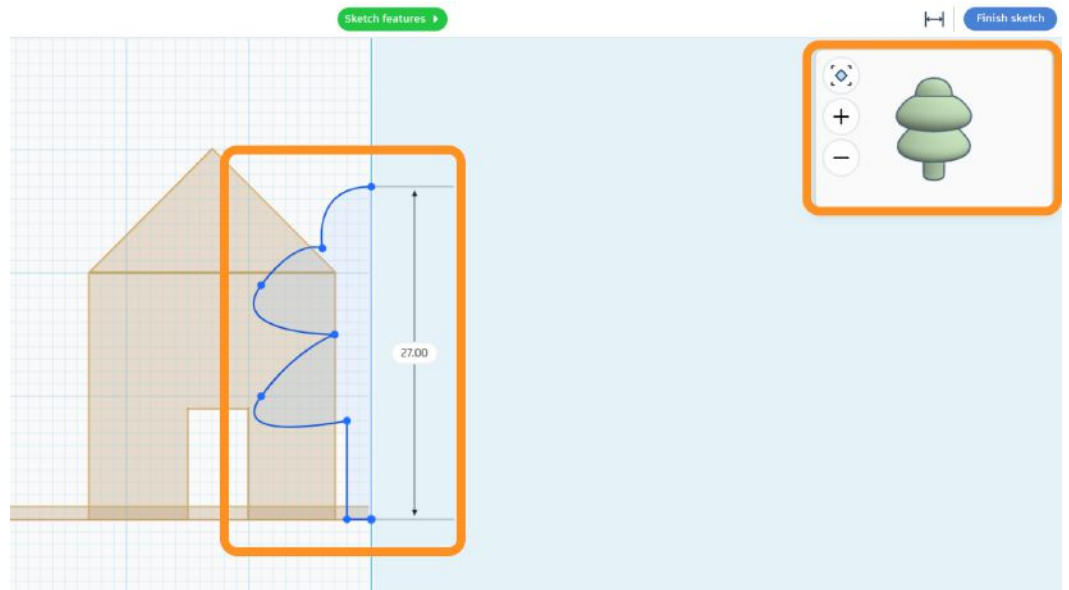
Compared to other tools, the Revolve Sketch tool is helpful to use when you want to create a shape that is *symmetrical all the way around an axis*.



Click and drag points on the grid to create a shape with lines or curves.

The 3D preview window on the top right will show you live updates of the 3D version of the sketch.

You might notice that this tool has a fairly similar feeling to creating a clay vase on a pottery wheel!



When you're happy with your sketch, click the **Finish Sketch** button at the top right corner and you will see your 3D model added to the Workplane along with other shapes.



The tools you learned can help you create different shapes depending on the outcome you want. Check out the image on the right to see 3 different “tree” shapes created with the 3 tools in order: Scribble, Extrude, Revolve.



Self Check

Were the Scribble, Extrude and Revolve tools helpful to you when creating your own shapes? Take your time exploring what each option offers in Tinkercad.

Step 4: Export your model

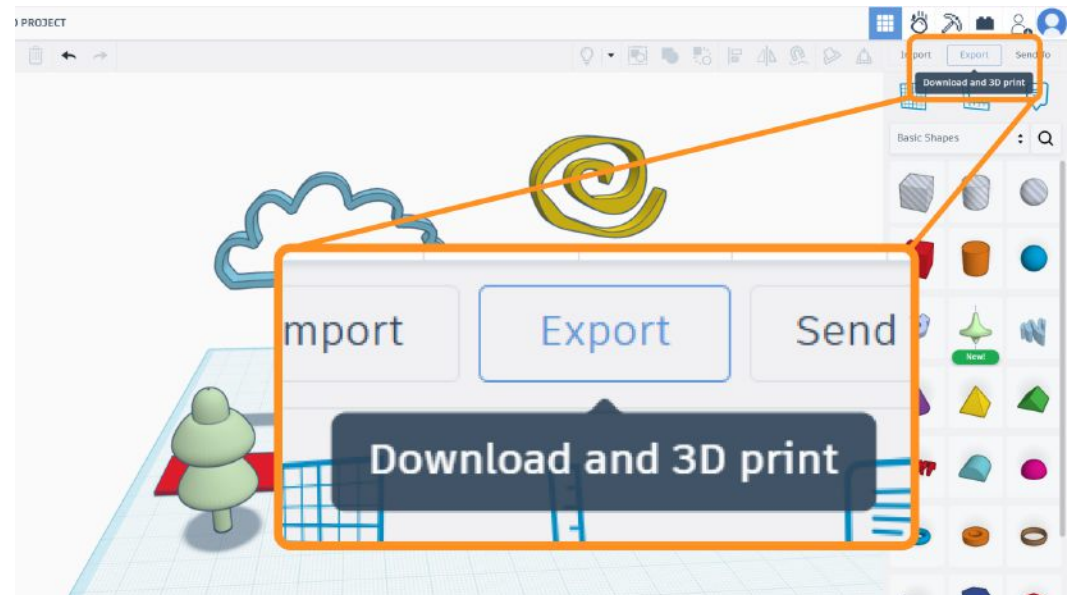
Preview

When you're done with your Tinkercad project, you can export the 3D model you've created and use it in different software programs. Follow this step to learn different export options in Tinkercad.

Experiment

EXPORT

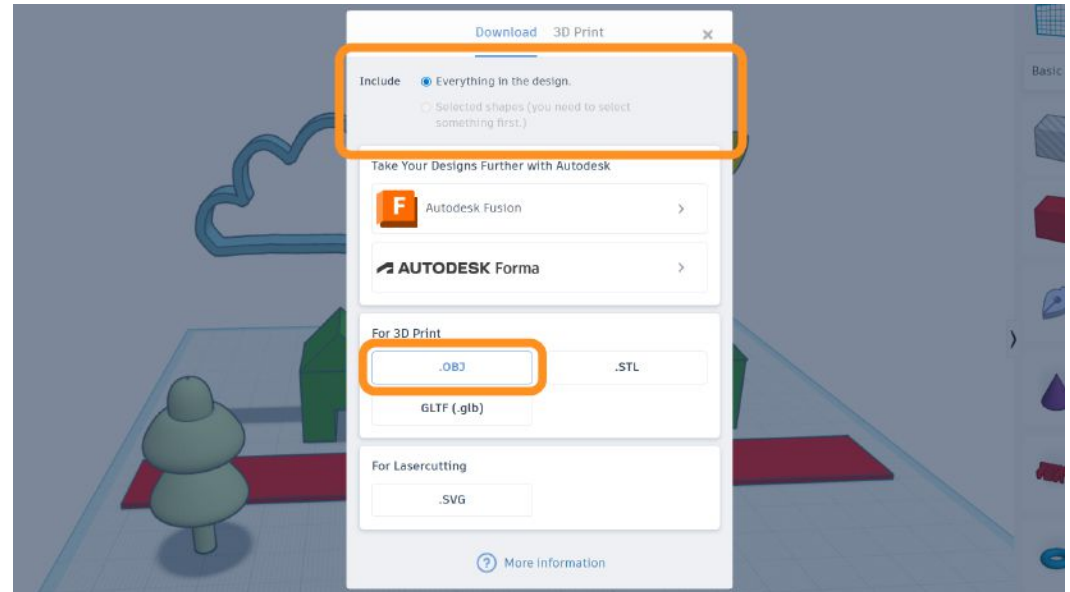
Click on the **Export** button on the top-right.



In the “Include” options, you can download everything in your design or just the selected shapes.

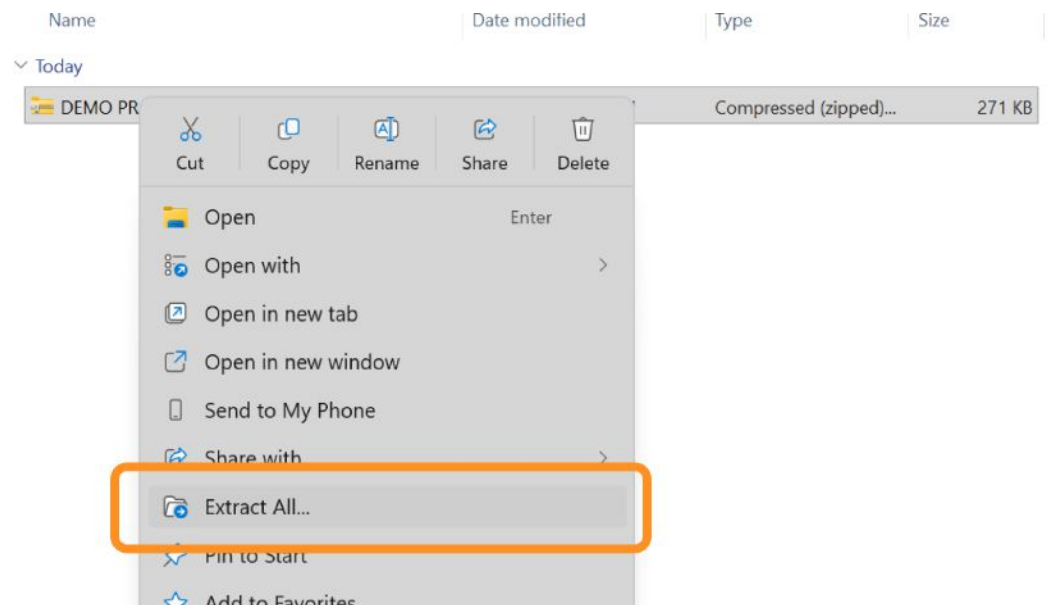
There are multiple file format options to download your model. You can try the different options depending on your needs. For the purposes of this lesson, we will be using the **.OBJ** option.

Tinkercad will automatically download your model to the “Downloads” folder in a compressed zip folder format.



To be able to access your model from another software or tool in the future, you need to extract your file from the zip folder.

To do this, open your “Downloads” folder and find the zip folder you downloaded from Tinkercad. Right click on the folder, and select **Extract All...**



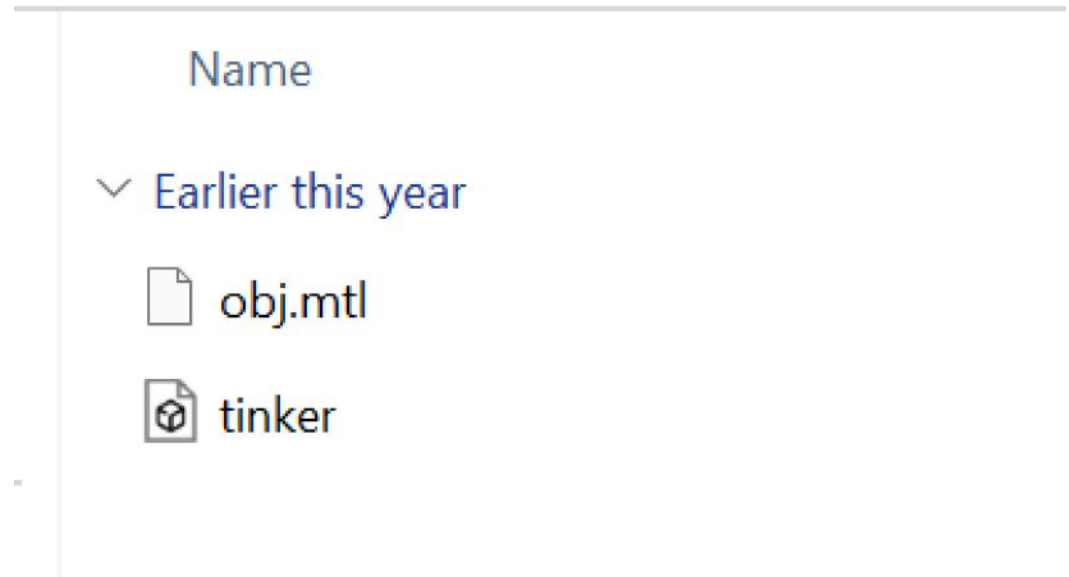
You can now access your 3D model from the unzipped folder.

When downloading from Tinkercad, you will see 2 different files in the downloaded folder.

The .obj file named “**tinker**” is the file that contains your 3D model (the shape).

The .mtl file named “**obj.mtl**” is the material information of your 3D model (the colors).

Just keep in mind that when importing to a different 3D software, you can select and import both files together. This way, you’ll import your model and preserve its color.



Self Check

Are you able to access your model on your computer after exporting?

Lesson Closure

Demonstration of Learning

In this Guide, you've learned how to start a project, navigate in the viewport, and create a 3D model in Tinkercad. As a final step, you've exported your 3D model to your computer to be used with other tools.

Exploration Opportunities

Getting used to modeling and creating in Tinkercad might take some time and practice. There are many helpful tutorials on [Tinkercad's Learning Center](#) under the "Resources" tab that can help you get familiar with Tinkercad's functions and potential.

You can now use the 3D model you've created and exported from Tinkercad in many different types of 3D projects. If you're interested in learning how to create your own webpage with animated 3D features, check out the following lessons:

[Edit and Animate 3D Models with Spline](#)

[Create a Website with 3D Animations in Google Sites](#)

If you're interested in creating 3D models with other methods, such as sculpting or AI generation, explore the following lessons to learn more:

[Create 3D Models With SculptGL](#)

[Generate 3D Models with Meshy](#)