



Welcome!

Hey guys! For today's tutorial we'll be looking at the basics of sketchup. Sketchup is a 3D model making tool that operates in 3D space. There are other 3D model making programs out there like rhino and autocad but they are often used to make models in 2D space from the plan up. With Rhino, it's a bit different where you're operating in 4 separate planes at once. So Sketchup is probably the most appropriate of the 3 to make exploratory models, massing models and the such. You can also create model with a great amount of detail in Sketchup, but a lot more foresight and planning is needed to execute those sorts of models if you don't want to be super frustrated while doing so (of course after you've used sketchup for a while it gets easier and easier).

Choosing your template

So to start off, when you open up sketchup you get to choose a measurement template (if you just start it'll give you the default which I think is mm). What this does is set all the default measurements in your model to read in a particular measurement, ie. Inches, mm, etc. This doesn't mean that you are restricted to a single measurement while model making in that template, you can still create lines using inch measurements in metric but it's just that if you want to check back on dimensions it will always show in metric. So if you think about space in meters use meters.

Navigating model space

First thing we'll be looking at in sketchup is how to navigate the 3D model space. There are a few key tools when it comes to orienting your view in sketchup, the orbit tool (which is the two blue arrows wrapped around each other), the pan tool (the hand), the zoom tool (the magnifying glass), and the zoom extents tool (the magnifying glass with the arrows coming out of it).

Before we get into the tools, a short explanation as to the layout of sketchup, you will typically have all your tools at the top of the screen (these can be dragged around to stay anywhere on the screen). The grey/white space that should occupy the majority of the screen is your model space. There, you should see 6 line, 3 dotted and 3 solid. These come in 3 colours, blue is for you up down or y axis, and the red and green are the corresponding z and x axis. From this you can see that sketchup operates using the Cartesian grid. This concept will come into play a lot more clearly when we get to making shapes but for now we'll get back to navigation tools.

Most of these have shortcuts on your mouse, like the orbit tool which is the scroll wheel on your mouse. If you push down on your scroll wheel while dragging across the screen the orbit tool will send you around in the opposite direction of your mouse. What the orbit tool does basically is send you around a point so that you can see 360 degrees around your model.

The pan tool unfortunately does not seem to have a shortcut, but it works in a similar way in that it also send you in the opposite direction when you click and drag across the screen. Where the pan tool differs, is instead of revolving you around a point, it allows you to move across a plane.

The zoom tool does exactly what it says, it allows you to zoom up to any point in you 3D space. The shortcut for that is the scroll wheel on your mouse, scrolling towards the tip of your mouse (or up) zooms in, and towards the end (down) zooms out. If you don't have a mouse, click-dragging vertically up zooms in, and vertically down zooms out. Quick thing about the zoom tool is that it registers objects in your model space. What that means is that it knows when you're zooming into an object as opposed to infinite space. What this does is that it reacts a lot better if you're zooming in or out of an object as opposed to empty space, so while it will take a lot of scrolls to zoom into or out of empty space, only a few will do the trick when done on an object.

* quick tip – because the pan tool doesn't have a shortcut key, people often use the zoom tool to choose views across a plane by zooming out away in the opposite direction you want to get to then zooming back in on the object you want to see.

Lastly, the zoom extents tool allows you to zoom to the extent at which you can view every active object in your model space. This tool is operated by simply clicking on its tool icon in the tool bar. This come in handy when you "get lost" in your model, which may occur if you accidentally zoom into a "solid" space in your model or just really confused as to what you're looking out and all the revolves and zooms just don't seem to be getting you anywhere. Now that we know how to navigate around the space, we can move on to actually making shapes and stuff.

Shape creation and manipulation 2D

The most useful and versatile tool to making shapes is probably the line tool. Skethcup, unlike illustrator doesn't actually generate smooth arcs, so when you make an arc, or a circle or any "smooth" surface for that matter, what sketchup actually makes is a many sided polygon, so lines are pretty much the basis of all shape creation in sketchup. The line tool is the pencil shaped tool on your toolbar, and has "L" as its shortcut key. The line tool is pretty similar to the sort you may be familiar with in illustrator or photoshop where it basically creates a line between the two points you click. So to create a line you can either click once to make a start point then click again to make an endpoint, or you can click and hold then release when you want the line to terminate.

The line tool has several characteristics that help (sometimes annoy) when creating shapes. If you're familiar with snap-to function for lines, shapes etc, sketchup works on similar principles where objects or lines in this case will snap to either one of the axis, an endpoint of an existing line/object, or the midpoint of said line/object. These functions follow a hierarchy or "snapping strength" where priority will be given to endpoints, then axis, then midpoints; so, if you're making a line or moving an object, and

you get close to another endpoint, but you were moving along an axis, it will automatically move your line/object onto that endpoint. This can be overcome, in the case of moving an object along an axis/parallel by pressing the shift key down after you've started moving in the desired axis/parallel direction. This also sort of work for other non-axis directions but if your mouse sways off and moves almost in an axis direction, holding shift will not save you.

Another thing about the line tool is that it functions sort of like the pen tool in illustrator or the polyline tool in autocad where it will keep adding lines to your endpoints unless you tell it otherwise (by choosing another tool, or just pressing the line shortcut/tool again) or until you've finished a shape in which Skethcup sees as making a self enclosed plane. Just making an enclosed outline does not a shape make.

Also, you can directly determine the distance of your line by checking the dialogue box on the lower left hand corner of the screen where it will display the distance. Or you can directly type in the measurement of your line after you've clicked to make the start point and hovered it in an approximate direction to make a line with an exact measurement.

The other 3 major shape making tools are the rectangle tool, the circle tool, and the arc tool (there is also the free hand tool which allows you to make freehand drawing lines but that stuff gets really messy if you haven't planned it out before hand).

The rectangle tool (the square on the tool bar or "r" on keyboard) make rectangles. To make rectangles click once to create one corner then click again to create the opposite corner to finish your rectangle. You can also directly type in the measurements of your rectangle by typing "aa x bb" which will give you a rectangle with width "a" and length "b" in your chosen template measurement. You can also specify a different measurement while doing this.

The circle tool (circle on toolbar or "c") makes circles. Click once to choose the center of the circle then click again to determine the length of your radius

The arc tool (semi circle on toolbar or "a") creates arcs.... Sort of (draw it too far and what it really makes is a bulge that is almost a circle). To make an arc, click once to determine a start point, click again to determine an endpoint, then click again (after having placed your mouse into the desired position) to determine the "height" of your arc (while you're placing your mouse you can also enter the exact height of the arc by just typing it in).

Now that you've got your standard shapes you might want to manipulate them or move them. To do this you will need the select (mouse point on the toolbar or space on the keyboard) and move tool (cross with arrows sticking out of its ends or "m" on keyboard).

The select tool allows you to select surfaces or lines. This comes in handy when you want to select stuff for moving it, or for when you want to change its shape with the move tool or other tools.

The move tool allows you to move objects or individual lines/corners around in 3D. This means you can move shapes around to place them in different spots, or you can completely change a shape like a rectangle into a parallelogram or a spiky 4 pointed shape.

Shape creation and manipulation in 3D

To make shapes “3D” you can either create a series of lines extruded in 3D or you can use the push/pull tool (block with arrow coming out of it, or “p”) to extrude planes out to make 3D. This method doesn’t give you very customized shapes as it only pushes an existing plane outwards while keeping the existing and extruded one connected. To use the push/pull tool hover the mouse over a surface (this doesn’t work for lines) and when that surface displays a blue dotted hatch you can then click on that surface and move your mouse (or type the desired distance) to a length/height

Once you have these planes that exist in 3D correlation to one another you can use all the stuff you’ve learn in 2D shape creation and manipulation to make more complex shapes.

Organization/work flow

Like photoshop, and illustrator, sketchup has the ability to group objects and put objects in different layers.

To group something, select the object (single click selects only what you’ve selected, double click for a plane selects plane and adjoining edges for a line selects adjoining planes, triple click selects everything connected) then right click to get a selection menu or “ctrl+g”. Double clicking a group allows you to enter into the group and edit that object.

To make layers open up the layers tab from windows and click the add button to add layers and the minus button to delete layers. To put objects in your model space into layers right click on them and select identity info, in a tab will appear and you will have a dropdown menu to choose layers from.

Like photoshop, layers can also be hidden when you aren’t working on them which is really helpful when working in 3D space because objects will definitely get in the way.