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How to Use Basic SketchUp Tools

Figure 1 shows the Large Tool Set, which includes all the drawing, moving, measuring, labeling, and viewing tools. When you hover the mouse over an icon in the tool set, SketchUp identifies the tool with a small label, like the one for Line Tool in the illustration.

I’ll cover the following eight tools in this chapter:

**Line Tool.** Used to make straight lines or create a plane-like face for a piece of wood. Another tool pushes or pulls the face to the desired thickness.

**Eraser Tool.** This tool does just what its name says. But it also allows you to hide or smooth parts of the model by removing odd facets and lines.

**Push/Pull Tool.** Probably the most frequently used SketchUp tool. It transforms a plane or face into a 3D object. The Push/Pull Tool allows you to make mortises and tenons and to make or change the thickness, width, or length of a piece of wood.

**Select Tool.** This is used to pick individual parts or the complete model. Once you select a part it can be deleted, moved, copied, or scaled, using other tools in the set.

**Rectangle Tool.** It draws a four-sided shape. I don’t use this tool, but I’ve included it because I know many woodworkers who do use it effectively to begin drawing pieces of wood.

**Circle Tool.** Used to make round components like dowels or holes for tenon pins, screws, bolts, and such.

**Arc Tool.** Used for the shapes in moldings, lathe turnings, knobs, carvings, and the like.

**Tape Measure Tool.** You use this tool to check dimensions. The Tape Measure Tool also lets you place temporary construction lines to show the location of holes, dovetails, joints, cuts, grooves, and so on.

You need to become familiar with these tools before moving on to the others in the Large Tool Set. I’ll explain how to use the other tools in later chapters.

### The Line Tool

Click on the Line Tool. The cursor will take the shape of the Pencil icon. Begin drawing a line by clicking the left mouse button in the modeling window, close to the origin of the three axes. Where you click sets the starting point for the line. Click the mouse button to start the line and release the button immediately—do not hold it. Drag the mouse from left to right to extend the line to the right. As you can see in Figure 2, the line will be red. That means the line is being drawn on the red axis. If you don’t see a red line, move the mouse slightly until the line snaps onto the red axis. So far, the line is “rubber banding,” and its direction and length depend on how you move the mouse.

Make the line any length you wish, checking to be sure it remains red, then click the mouse button to set its endpoint. When you click to end the line, its color will change to black.

SketchUp assumes that you will continue to draw a line from the end of the previous line, so you don’t need to click the mouse button to continue drawing. The Line Tool continues rubber banding until you click the mouse again, select another tool, or press the Esc key.

Continue drawing the line, but shift its direction to the blue axis. Move the mouse as needed to ensure that the line color is blue. Click the left mouse button to set the end of this line (Figure 3).
Continue drawing the line, keeping it on the red axis again and moving the mouse from right to left to draw the line toward the left. When the cursor reaches a spot just above end of the first line you drew, a dotted line will appear. This is an inference—SketchUp’s anticipation of your next step. In this instance, SketchUp believes you intend to make a rectangle, so it automatically indicates the point at which you should end the line. Click the mouse to end the line at the inference point, as shown in Figure 4. There are occasions when SketchUp balks at showing the inference and needs some help to find it. You can help by touching the first line’s endpoint, then dragging the mouse to line up with the axis.

Continue the line along the blue axis back to the starting point of the first line. Click the mouse to end the line. The endpoint immediately fills with a white “face,” as shown in Figure 5. Everything drawn in SketchUp is composed of edges and faces. The lines you create make up the edges, and since the edges exist in one geometrical plane (coplanar), SketchUp automatically fills in a face.

Faces indicate drawing quality. If a face does not appear when you expect it to, chances are the lines you drew are not coplanar, meaning that one or more lines weren’t on axis.

Next, you’ll give this one face some thickness. If you were designing a piece of furniture, this would become its first piece of wood.

Be sure you still have the Line Tool selected. Click the mouse on the lower end of the rectangle, then release the mouse button immediately. Be sure the line is on the green axis (the line will turn green), and maneuver the mouse so that the line moves toward the background. Click to end the line, as shown in Figure 6.

Continue the line upward on the blue axis. When the inference appears, click the mouse button to end the line.

### Edges and Faces

The SketchUp computer geometry is rather simple—all components and pieces are composed of edges and faces. Here you see the Connecticut stool leg with all of its edges and faces selected, which highlights them in blue. Although in SketchUp we see the leg as a solid, it is actually hollow. It’s an object with a thin (zero thickness) skin of faces surrounded by edges.

All edges in SketchUp consist of straight lines only. Even curved edges, such as the turned portions of the stool leg, are made up of many straight lines—so many that the curves look smooth. But if you zoom in close, you can see the straight line segments in the curves.

Faces are also always flat. The turned surfaces in the leg are made up of very small flat faces. You need connecting edges on a common plane to achieve a face. You can’t make a face in SketchUp without creating edges that make up a plane. There isn’t a Face Tool in SketchUp. Rather, to create a face you create edges. If they are coplanar, SketchUp automatically fills in the face.
Figure 9. Finishing the block.

There are easier ways to draw rectangular blocks—pieces of wood, if you will. You'll learn those techniques later. But drawing the block one line at a time helps you understand how to use the Line Tool, how to stay on axis, and how to make use of SketchUp’s inferences.

Whenever you want to stop SketchUp from continuing to draw a line, hit the Esc key. That cancels the action altogether, so you can begin anew.

Figure 9 shows the finished block, completely enclosed with six faces. Use the mouse and scroll wheel to zoom in and orbit around. Check out the bottom face by orbiting downward. Then orbit around the block to look at the back face.

Put your cursor over the block and practice zooming in and out with the mouse scroll wheel. Note that when you zoom, the position of the block on screen depends on where you positioned the mouse cursor. When the cursor is over the block, it will remain in the center of the screen. Try moving the mouse to the upper-right hand corner. Now when you zoom in, the block will move off the screen toward the lower left corner.

Creating this block is an important initial exercise. It introduces you to the basic drawing features in 3D space. It also lets you practice six points to remember for successful modeling:

- Use the mouse correctly. Click the left button; don’t hold it down.
- Release the mouse button before dragging the mouse.
- Stay on the red, green, or blue axis.
- Watch for the inferences that SketchUp automatically displays.
- Zoom in as close as you can to the model, so you can easily see what you’re doing.
- Use Pan, Orbit, and Zoom as often as needed to get a convenient view of the model.

The Eraser Tool
One of the most frequently used tools is the Eraser.

Select the Eraser Tool and move it so that the small square on the end of the tool is over one of the block’s edges. Click the mouse to delete the edge. The faces that were dependent on that edge are also deleted.

Position the small square at the end of the Eraser Tool on a corner of the block. This time, when you click the mouse, multiple edges and faces disappear (Figure 10). You can also hold the mouse button and drag the Eraser Tool to delete lines and faces. When you hold down the mouse button, the lines you want to erase turn blue.

Use the Eraser Tool to delete edges, but leave the front face intact. You’ll do more with that face in a later step.

The Eraser Tool performs a couple of other handy functions, which I will cover in more detail later. In combination with the Shift key, the Eraser Tool will temporarily hide selected graphics, a component, a line, or a face from view. To “unhide,” or bring the graphics back into view, click on Edit in the Menu Bar and select Unhide from the menu. When combined with the Ctrl key (Option on a Mac), the Eraser Tool becomes a smoothing and softening tool to remove hard lines that should not show.

The Push/Pull Tool
In an earlier step, you made the block a 3D object by adding lines with the Line Tool. There is a much easier way to accomplish that: Use the Push/Pull Tool.

Click on the tool and move the cursor over the front face of the block. A pattern of small blue dots appears on the face, as shown in Figure 11. Click and release the left mouse button. Now move the mouse in the green direction, toward the background. As you move the mouse, the face—now a 3D block—grows longer, as shown in Figure 12. To end the extrusion,

Use the Arrow Keys to Stay on Axis

SketchUp has two ways to help you stay on axis.

1. Use the four arrow keys on the computer keyboard. Tapping the appropriate key when you begin to draw a line constrains the line to a particular axis. For example, if you need to draw a line on the red axis, click the mouse to start the line, then tap the Right Arrow key. No matter what direction you move the mouse, the line will follow the red axis. To constrain the line to the green axis, tap the Left Arrow key. To constrain the line to the blue axis, tap either the Up Arrow or Down Arrow key.

The arrow keys also work with the Move/Copy Tool. To constrain movement of a component on the red axis, for example, tap the Right Arrow key. Use the other arrow keys to constrain movement on the other axes.

2. Use the Shift key. In this case, you need to start the line or the movement on the desired axis, then hold down the Shift key. This will constrain the line or movement on that selected axis. You will find these aids invaluable. I use them very frequently.
You can stop the rabbet at any point along the edge by clicking the mouse. Or, to run the rabbet all the way along that side of the block, click the mouse on the back edge of the block (Figure 16).

**Figure 11.** Hovering the Push/Pull Tool over a face selects it, as shown by the pattern of blue dots.

**Figure 12.** Using the Push/Pull Tool to give thickness to a rectangle.

**Figure 13.** Adding lines breaks faces and their edges into separate elements. Here, the line divides one face, so that only part is selected.

**Figure 14.** Once you have divided a face, you can use the Push/Pull Tool to extend specific parts. It’s a technique used to create tenons, for example.

**Figure 15.** Adding lines to a face to begin shaping a rabbet along one edge of the block.

**Figure 16.** Using the Push/Pull Tool to create a rabbet.

**Figure 17.** Using the Select Tool to highlight an edge.

**The Select Tool**

When you choose the Select Tool, the cursor becomes a short arrow. The tool’s name describes its function: Use it to select things in the model. It can select one thing or many, depending on how you use the tool.

Figure 17 shows one edge selected. Put the cursor over the line and click the left mouse button. The line changes from black to blue. If you then hold down the Shift key and click in an adjacent face, you will have both the line and the face selected. The pattern of blue dots on the face tells you it has been selected. Note, too, that when you hold down the Shift key, a plus (+) sign appears next to the arrow; this indicates that you can select more than one item.
There are several reasons to select things in a model: to move, scale, delete, copy, or group things, or to make a component. So, with the top and edge selected as in Figure 17, if I pressed the Delete key on the keyboard, I would remove only those two items. You can use this tool several ways to quickly select all or part of a model.

**Left-to-right drag** Use the Select Tool to click and drag a box around the modeled block, moving the mouse from the upper left to the lower right of the screen. This creates a solid selection box, as shown in Figure 18. All things entirely within the box are selected and highlighted. If you drag the box only part-way across the modeled block, as shown in Figure 19, only fully enclosed items are selected. In this case the box fully encloses only two edges and one side face, so they are selected and highlighted.

**Right-to-left drag** Clicking and dragging the Select Tool from right to left produces a different result. The box is shown with a dashed line, and anything the box touches will be selected. So, as shown in Figure 20, the front and top face are highlighted but not the left vertical and horizontal top edge.

**Double and triple clicking** You can also use multiple mouse clicks to quickly select all or part of an object. Move the Select Tool cursor over the front face of the block. Double-click the left mouse button. This selects and highlights the face and its four bounding edges, as shown in Figure 21. Triple-click to select the entire block. And if, after you have selected everything, you click a fourth time, that will deselect everything but the face the cursor is over.

**The Rectangle Tool**

After picking the Rectangle Tool, click and release the left mouse button to set the location of the rectangle’s starting corner. Move the mouse to size the rectangle; click the mouse again to finish the shape.

When the angle of view is looking down on the model, as shown in Figure 22, the rectangle will draw on the red–green plane. To draw a rectangle standing vertically, use the Orbit Tool to make the angle of view more straight on.

A plane or face has two sides. SketchUp uses blue to represent the back side of a face; white, to represent the front. These faces are created automatically, and SketchUp guesses as to front and back. Sometimes it’s wrong, and you will see a blue face that should be white. Figure 23 shows a rectangle with the wrong face forward. To reverse the faces, right-click on the face and select Reverse Faces from the pop-up menu. The face will turn white.

**The Circle Tool**

Click on the Circle Tool and hover the mouse over the top surface of the block. A small blue circle will appear. The blue color signals that the circle will be created on the blue axis; its face will be in the red–green plane (the same plane as the top surface of the block). A small
label (On Face) near the circle tells you that you are drawing the circle on the face of the block.

Click the left mouse button to fix the location of the circle’s center point. Release the button and drag the mouse to expand the circle’s radius. Click again to fix the circle’s size on the face, as shown in Figure 24.

Hover the mouse over a vertical face on the block, as shown in Figure 25. This time, the circle appears in green, meaning it will be created on the green axis because its face is on the red-blue plane. As you did before, click the mouse to position the center point of the circle, move the mouse to the desired radius, and click again.

You can use the Push/Pull Tool to modify circles, turning them into dowels or holes, as shown in Figure 26. To do that, select the Push/Pull Tool and move it over one of the circles you drew. A pattern of blue dots inside the circle tells you that you have selected it. Click the mouse, release the button, then move the mouse to either push the face to create a hole, or pull it to make a pin or a dowel. Click again to stop the action.

**The Arc Tool**

To see how the Arc Tool works, place an arc on the top edge of the block, as shown in Figure 27. Select the tool, click once on one of the edges, then click the mouse on the other edge. Now move the mouse to see how the arc changes size and shape. As the figure shows, the arc’s color changes to magenta when it is tangent to an edge. Also, there is an inference that tells you when you are at the same distance from the endpoints—that is, at a 45 degree angle. Then you get tangency to both edges. Click again to fix the position and shape of the arc. In this case, the tangency determines the bulge of the arc.

However, there are many instances in which you want to specify the height of an arc. You can do that by using the Measurements Box in the lower right-hand corner of the screen. (The Measurements Box is more fully explained in Chapter 5). As you use the mouse to change the bulge of the arc, the numbers in the Measurements Box also change. You can type a number and hit the Enter key to fix the shape of the arc.

Choose the Push/Pull Tool and click on the small triangle above the arc shape you just drew; the blue dots will signal that you’ve selected that area. Push along the green axis, toward the background, then click on the back edge of the block (Figure 28). This is one way to round over edges and create moldings.

Click the Arc Tool on one end of the edge of the rabbet, then click on the other end. Push the mouse upward, along the blue axis, to create a cove shape. Click again. Now use the Push/Pull Tool to create the cove shape shown in Figure 29.

**The Tape Measure Tool**

SketchUp has a rich set of layout and construction lines (temporary dotted lines) called guides. I find guides essential for furniture design. You use them to lay out and position cuts, holes, grooves, rabbets, tongues, and any other joinery shape. Most of the
time, you use the Tape Measure Tool to create the guides you need (when you need a guide placed at an angle, you use the Protractor Tool, which is covered on page 41). The type of guide the Tape Measure Tool creates depends on where you first click the mouse. Setting guides can be frustrating at first, but with practice, you can increase your efficiency and speed.

I will use our working block to show the various ways to use the Tape Measure Tool.

**Parallel Guide Line** As shown in Figure 30, place the very tip of the Tape Measure Tool icon on an edge in a component, click, and move the mouse to the left, along the red axis. A dotted line, parallel to the edge line, follows the mouse movement. Click again to set the position of the line. When you want a parallel guide a specific distance from an edge, type the desired value. This value will appear in the Measurements Box.

Occasionally, the Tape Measure will create a Guide Point (a small, heavy cross) instead of a Parallel Guide Line. Unless you started the Tape Measure Tool at a corner, this can happen when the Tape Measure Tool senses an inference to some other corner or feature. To correct the problem, shift the location of your starting point to be free from the automatic inference.

**Guide Point** As shown in Figure 31, position the tip of the Tape Measure Tool on a corner, click and release the mouse, move the mouse to the right, and click again to set the guide point.

I use guide points occasionally to find a circle’s center or a point’s distance from a corner. Guide points are difficult to delete, so I don’t use them as often as guide lines. However, you can delete all guide lines and guide points in the model with a couple of mouse clicks. Go to Edit in the Menu Bar and choose Delete Guides from the drop-down menu.

**Linear Guide Line** A Linear Guide aligns with a particular edge, as shown in Figure 32. To set this type of guide, double-click the Tape Measure Tool on the desired edge. I use Linear Guides quite often when I need to line up components or find the intersection of two angled lines.

I often need to locate the centerline of a face, which I can easily do with the Tape Measure Tool. Click on one edge, move the mouse over to a perpendicular edge, and slide it along that line. As shown in Figure 33, you will see a cyan-colored dot when you have moved to the midpoint. Click the mouse again. Now you have a guide running down the center of the face.

You can also use the Tape Measure Tool as a tape measure. When you use the tool to draw guide lines, a plus sign appears. Click the Ctrl key (Option on a Mac) to remove the plus sign. Now you can click to start a measurement, move the mouse to the endpoint, and click the mouse again. You can read the dimension in the Measurements Box.
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