Modeling with SketchUp for Interior Design

Conceptualize, Create, Communicate: A Textbook

SketchUp 2014 / Make or Pro versions / Mac or PC

Bonnie Roskes
Annie Elliott
SketchUp Specialties Series

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By Bonnie Roskes and Annie Elliott
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1 Introduction

When opening a new textbook, it’s often tempting to skip the introduction and get straight to the “meat” of the book. But this chapter tells you a few things you need to know before getting started – skipping it may cause frustration later!

Why SketchUp?

For interior decorators and designers, SketchUp is a near-perfect software application. Intuitive and easy to learn, SketchUp has a relatively small set of tools compared to other CAD programs. But don’t let SketchUp’s simple appearance fool you. It’s an incredibly powerful application, and this book will show you things you might not have expected were possible in a free application.

Created in 2000 as a conceptual 3D modeling program with a low learning curve, SketchUp has traditionally been a program used by architects and engineers. Google acquired SketchUp in 2006 and released a free version, expanding SketchUp’s user base to include landscape architects, mechanical designers, film and stage producers, woodworkers, product designers, artists, mathematicians, and, of course, interior designers. Then in 2012, SketchUp was sold by Google to Trimble Navigation, who kept the free version (called SketchUp Make) available for personal and educational use. (Though if and when you use SketchUp to make money as a design professional, it’s only fair to pay for the Pro version.) At the time of this writing, the Pro version of SketchUp is priced at $590, but SketchUp Make is all you need to work through this book.

Once you become proficient in SketchUp, you’ll be able to design every element in a room to scale, find furniture and accessories in the 3D Warehouse, model furniture from scratch, accurately represent colors, textures, and materials, and present your ideas to clients (or professors). Because SketchUp installs easily on even the most basic laptops, you can show off your ideas, collaborate, and make instant changes while meeting with colleagues and clients. And you can send your models to clients who can view your designs without needing to know anything about the software itself.

People always ask when SketchUp will be available on the iPad and other mobile devices. Well for now, the software is still Mac or PC-enabled only, though there are iPad viewers that you can use to show your models and even record notes, but not make changes.

Getting SketchUp

Everything in this book can be done in SketchUp Make - the free version of SketchUp. There are a few differences between the Make and Pro versions, but none that have to do with interior design. The current version at the time of this writing is SketchUp 2014, and no major changes are anticipated in future versions that would affect the book’s contents.

If you don’t have SketchUp yet, go to [http://www.sketchup.com](http://www.sketchup.com) and click the “Download SketchUp” button.
This will take you to another web page where you’ll have to tell SketchUp about yourself and how you’re planning to use the software. (Again, for learning and personal purposes it’s fine to use SketchUp Make. When you start making your fortune as a designer, you’ll want to pony up for the real thing.) After clicking the download link and verifying your platform (PC or Mac), the rest of the installation should be automatic.

**NOTE:** If you’re curious about SketchUp Pro and its accompanying LayOut application, you can get an eight-hour, fully functioning trial version. When your eight hours are up, if you don’t purchase the full version, Pro will simply revert to the Make version.

LayOut is a presentation tool in which you can show SketchUp models in standard views, and add notes, callouts, and dimensions. Changes to the SketchUp model can be automatically incorporated into LayOut.

LayOut is a great tool, and could be a worthwhile investment for you down the road. But you can do a fine job presenting models with the free version of SketchUp, as you’ll see throughout this book.

### Three-Button Mouse

It’s possible to use SketchUp with a laptop’s track pad instead of using a “real” mouse. But using a three-button, scroll wheel mouse like those shown below will make the program exponentially easier to use. A three-button mouse enables you to navigate around your model quickly and effortlessly, and you’ll never have to click toolbar buttons for the Zoom and Orbit tools. (Take it from co-author Annie Elliott, who spent two years using SketchUp with a track pad, until Bonnie Roskes convinced her to try a three-button mouse. The mouse changed Annie’s whole attitude towards modeling: she couldn’t believe how much easier it was.)

The scroll wheel has two functions: you can roll it up and down, and you can click it like a button. Rolling the wheel zooms in and out, making objects appear larger or smaller. Clicking and holding the wheel while moving the mouse orbits around view; think of holding an object in your hand and turning your hand to see all sides of the object.

Keep in mind that while using the mouse to zoom and orbit, the location of your cursor on the screen affects what happens to the view. For example, if the cursor is at the bottom of the screen and you scroll down, the view will zoom out while moving down toward the cursor. Don’t worry, this takes almost no time to get used to.

If you’re a Mac user, the single-button Apple Mouse (formerly known as Mighty Mouse) works well, but the newer Magic Mouse sometimes gets less-than-glowing reviews. Keep in mind that any three-button mouse can be used with a Mac; it doesn’t need to be an Apple product.
If you’re a Mac user stuck with a mouse that’s not ideal, you can use keyboard shortcuts instead. Pressing and holding the Control and Command keys simultaneously while clicking and holding the left mouse button will activate the Orbit tool.

For PC and Mac users: if any of your mouse buttons don’t produce the expected function in SketchUp, check your mouse settings. On the PC, you can find these settings in the Control Panel, and on the Mac they are found in System Preferences / Keyboard and Mouse. The left mouse button should be set to “click” the right button to “right-click”, and the wheel button should be “middle click.” Your options might appear differently, depending on your mouse drivers, so you may have to experiment with different settings.

User Interface

Before starting to play with the SketchUp tools, take a few minutes to explore a few features of the user interface.

Templates

When you first open SketchUp, you’ll see the Welcome to SketchUp window. (If you don’t see this window, and SketchUp opens straightaway, choose Help / Welcome to SketchUp from the main menu.) The window shown below is what you’ll see if you’re using the Pro version; it’s slightly different for the Make version. You can explore the various links for tutorials and help, and when you’re ready to start, click the Choose Template button.
The available templates are established for different types of models: architectural, engineering, product design, etc. Different templates also use different units, such as centimeters or feet and inches. Choose any one of the templates (the “Construction Documentation” templates are the simplest, with a white background and no people) then click the **Start using SketchUp** button at the bottom of the window.

The empty file that opens looks like the template swatch you selected. Depending on your template, you may have a sky and ground, you may see a person standing in the middle of the model, or you may just have a white background and nothing else.

**Toolbars and Shortcuts**

The **Getting Started** toolbar is the horizontal toolbar along the top of the SketchUp window. Most of the tools you’ll use in SketchUp can be found here.

If this looks like a sparse assortment of tools, don’t worry - there are many more toolbars available. If you’re using a PC, look at the **View / Toolbars** menu to see the toolbars listed, and toggle them on and off if you’re curious about what they contain. On the Mac, choose **View / Customize Toolbar**. From the large window that appears, you can drag any toolbar onto the main toolbar. You can also drag them off the main toolbar the same way.
Using the keyboard shortcuts can be a great time-saver. For example, if you need to draw a line, it’s a lot quicker to press the L key than to move your mouse over to the Line icon. You can look at the SketchUp menus to see what shortcut keys are already defined, such as L for Line, R for Rectangle, etc.

![SketchUp Menu](image)

Changing or adding shortcuts can be done on the Shortcuts page of the Preferences – a user interface window that will be described further on.

**Model Info**

The settings on the pages of the Model Info window affect the current model only (as opposed to settings that affect all SketchUp models, which are set in the System Preferences). To open this window, choose Window / Model Info from the main menu.

![Model Info Window](image)

Take a few minutes to look at the options on the various pages. Most of these you won’t ever need to change, and almost everything on this window is self-explanatory. For interior designers, the most important Model Info page is Units, where you can set whether you’re working in Architectural (feet and inches) or Decimal (choose from inches, mm, cm, etc.). The other pages that will be used in this book are Dimensions, File, and Text.
System Preferences

As with most computer applications, System Preferences contains options that affect the application in general. The options you set here will be used every time you open a SketchUp file, at least until you change the options. PC users open this window by choosing Window / Preferences from the main menu; Mac users choose SketchUp / Preferences. The options for PC users vary a bit from what Mac users will see.

It’s worthwhile to take a look at each page on this window, although you won’t change much. The Shortcuts page enables you to add, remove, or change keyboard shortcuts, and the Template page enables you to change the default SketchUp template, just as you could in the Welcome to SketchUp window.

Another page to quickly scan is OpenGL, which controls how SketchUp interacts with your computer’s graphic card. If at any point while working in SketchUp you’re not getting SketchUp to select or display objects the way it should, changing the OpenGL options can help. What each option does depends on your computer’s hardware, and since there are only a few options, you can use trial-and-error to find your perfect settings.
Windows and Docking

There are many SketchUp windows you'll be using, such as the Materials, Scenes, Components, and Layers windows shown below. Any window can be opened by choosing it in the Window menu. When several windows are open at once, the screen can get so cluttered you'll have no room for the model itself.

To save space, you can click on a window's title bar (the bar across the very top of the window, where the name of the window appears). This minimizes each window so that you can still see nothing but its title. To open a minimized window, just click its title bar again.

To save even more space, you can dock windows – move them to a specific part of the SketchUp window or “glue” them to each other. You can drag a title bar to the left or right edge of the window, or drag a title bar directly above or below another title bar. This way you can make a stack of minimized windows.
Opening a minimized window while it’s stacked will simply move the other windows up or down accordingly.

To take a window out of the stack, simply drag its title bar out of the stack. And of course, you can close any window by clicking the X icon in the title bar.

**Using the SketchUp Tools**

All of SketchUp’s tools are easy to use, especially after you’ve had a bit of practice. But even if you’re just starting out, you won’t be in the dark about what to do. The **Status Bar** will tell you what steps to take, and the **Measurement Field** is where numbers will appear (if needed), such as length, angle, or radius.

As an example, let’s draw a line with a specific length.

1. Click the **Line** tool.

2. Look at the lower left corner of the SketchUp window, where the **Status Bar** tells you “Select start point.”

```plaintext
Line tool icon
Status Bar reads: Select start point
```
To the left of the Status Bar are three icons that won’t be used in this book. The light bulb tells you whether the model has a specific location on earth (known in SketchUp as “geo-located”). This is for models that are integrated with Google Earth. The person icon indicates whether you’ve taken credit for the model, which is relevant if you’re placing a model in the 3D Warehouse. The “G” icon indicates whether you’re logged into your Google account. You need a Google account to upload models into the 3D Warehouse (but not download).

3. Click anywhere to start the line, and move the cursor in the red (horizontal) direction. Don’t click again yet.

4. Look at the Status Bar for instructions on the next step. You have a choice: either click a point to end the line, or enter a value. To enter a value in this case means to set the line’s exact length.

5. While the line is still unfinished and you’re moving the cursor in the red direction, look at the Length field in the lower right corner. Here you can see the current length of the line. (The units in this field are the ones set in the Units page of the Model Info window.)

![Select endpoint or enter value.]

This is the Measurement Field, and its contents and title depend on what tool you’re using. For example, if you’re creating a rectangle, you can enter two values: width and height. Or if you’re creating a circle, you can enter a radius.

6. You could end the line by clicking a second point, but to set the length of this line, type 12’ (the apostrophe is the symbol for feet), and this number appears in the Length field. This is an important point: you never have to click in a measurement field, and if you do click there, your current action will end! It may feel counterintuitive, but don’t click; just type whatever characters you need and they will appear. You’ll get used to it in no time.

![Length 12']

7. Press Enter, and the line is created with the correct length.

You’ll see similar Status Bar instructions and measurements for other tools. For example, the Rectangle tool will tell you first to click the first corner, then either click the second corner or enter width and height values. Eraser instructions will tell you to click edges to erase, or that you can drag the cursor to erase multiple edges at once. The instructions also tell you what the modifier keys Shift and Ctrl / Option will do while erasing.

Each time you click an unfamiliar tool, be sure to check the Status Bar – you’ll see just what to do and you may learn features of the tool you didn’t know about. And always look to see what’s listed in the Measurement Field.
Here are some other important things to keep in mind while creating or editing objects in SketchUp:

- **Don’t click and drag your mouse.** It may be instinctive to draw a line or pull out a face by clicking the first point, dragging to the second point, and releasing the mouse button to finish. But SketchUp provides much more flexibility when you get out of the dragging habit. For every tool in which multiple clicks are required, click and release the mouse button, move the mouse to the next point, and click / release again.

- **Undo is your friend.** If you click somewhere you shouldn’t, or make any sort of error, you can undo your steps, one by one, all the way back to the very start of your model if needed. On the PC, **Undo** is Ctrl + Z, and it’s **Cmd + Z** on the Mac. If you undo too far, and want to redo a step or two, use Ctrl / Cmd + Y.

- **Ball out with the Esc key.** If in the process of using a tool you’ve made a mistake but haven’t completed the operation yet, press Esc to start over. For example, if you click to start a line in the wrong place, just press Esc and click the correct spot.

- **Click actual points.** Far too often, SketchUp users click somewhere that’s “close enough” when there’s an actual point that can be clicked. For example, if you want to move a sofa to the edge of a floor, click somewhere along the back edge of the sofa, don’t just click somewhere near the back of the sofa. As you’ll see throughout this book, SketchUp helpfully tells you when your cursor is on an endpoint, center point, midpoint, on a face, or on an edge. Take advantage of these indicators – it’s a lot better than estimating points by sight.

- **Right-click in blank space to unselect everything.** Many SketchUp operations start by selecting the object on which the tool will perform an action. After the action, the objects usually remain selected. If you leave objects selected and then try to work on other objects, you might end up with strange results. A quick right-click in empty space will unselect everything in the entire model.

- **Don’t click in the Measurement Field!** This was stated earlier, but it bears repeating because people do it far too often. You might want to click in the spot where the line’s length appears, but keep your mouse away! All you have to do is type, and whatever you type will appear.

### 3D Warehouse

The 3D Warehouse is part of what makes SketchUp such an incredible tool for interior designers; it is a repository for any kind of model you could possibly imagine. So after you model a room, you can find objects in the 3D Warehouse to furnish the room.

Because anyone can upload SketchUp models into this repository, amateurs and professional designers have added thousands of models to the 3D Warehouse since it was established in 2006. Additionally, dozens of furniture and appliance manufacturers have uploaded models of their products, free for all to use.

Sometimes you’ll find a 3D Warehouse model that’s almost what you’re looking for, but it’s not perfect. This book will teach you how to modify those 3D Warehouse models to meet your exact needs. (Two chapters in this book also show how to model furniture from scratch.)

To get a quick idea of how the 3D Warehouse works, open this URL in your Internet browser:  
[https://3dwarehouse.sketchup.com](https://3dwarehouse.sketchup.com).

In the search field at the top right corner, enter a search term for the model you’re interested in: lounge chair, base cabinet, window blinds, Porsche, chainsaw, etc., and you’ll find several – sometimes hundreds – of models that match your term. As with a regular web search, models are listed in order of popularity. Some models are beautifully created by design professionals, while others are created by SketchUp enthusiasts, with varying degrees of quality.
Later in this book we’ll see how to access the 3D Warehouse from within SketchUp as well, which enables you to import a model directly into the SketchUp file you’re working on.

Because of the ever-increasing number of uploaded 3D Warehouse models, a general search for a term such as “base cabinet” or “sofa” will result in a huge number of models for you to comb through. There is an “Advanced Search” link you can use to narrow down your search by criteria such as author. For most of the models used in this book, you’ll be told who the author is (the person who uploaded the model), and you can add the author name to your search. For example, looking for a striped couch by Bonnie Roskes can be found by entering “striped couch roskes” as the search term.

Upload your own models to the 3D Warehouse is quite simple; just choose File / 3D Warehouse / Share Model from SketchUp’s main menu, and the uploading steps are self-explanatory. Uploading models requires a Google account; downloading models does not.

About the Authors

Putting this book together required the combination of two distinct skills: a creative and practiced eye for room design, and technical expertise in 3D modeling in SketchUp.

Bonnie Roskes is a SketchUp expert and owner of 3DVinci (http://3dvinci.net), providing manuals, self-guided projects, and tutorials on SketchUp and related applications. Her SketchUp Hands-On series has been lauded by her loyal reader base as comprehensive, easy-to-follow book on all things SketchUp. She has also written books for younger audiences: ModelMetricks for teaching 3D design for ages 8-12, and GeomeTricks for teaching 2D/3D geometry to K-12 math students. Her current project is adding titles, including this one, to the SketchUp Specialties Series, in which she collaborates with specialists in specific fields (such as interior design) on industry-targeted training books. Other topics will include Film and Stage, Kitchens and Baths, Advanced LayOut, 3D Printing, and more. She also wrote The Google SketchUp Cookbook in 2007, published by O’Reilly Press.

Bonnie often presents at education conferences, leads software training sessions, and blogs at http://3dvinci.blogspot.com. Trained as a structural engineer, all her years of SketchUp expertise haven’t made her much of an interior decorator, as co-author Annie Elliott can attest. In fact, for this book Bonnie put together a few colorful SketchUp models that made Annie wince, before she was made to change them.

Bonnie met Annie in 2004, when a mutual friend recommended Annie (whose firm is called “bossy color” http://bossycolor.com) to help design Bonnie’s new kitchen. Annie is an interior decorator and design blogger who worked in some of the nation’s top museums before turning to interior design. Quoted frequently in publications from The Washington Post to Real Simple magazine, Annie is considered an expert on color, residential space planning, and telling people what to do in the nicest way possible.

Annie is definitely not an expert on software. When Bonnie introduced her to SketchUp, Annie was shocked to discover how intuitive it was. Annie now uses SketchUp for kitchen designs, tile layouts, and, of course, furniture plans. It’s the only modeling program she needs.

Both Bonnie and Annie live with their wonderful families in Washington, DC.
About the Cover

The front cover image is a rendered view of a SketchUp model created by designer Surya Murali, whose models also feature prominently in several chapters of this book. A rare case of someone who’s both technical and creative, Surya is a Kuwait-based electrical engineer who does 3D visualization work as a hobby. Her beautiful room models are well known and admired by those who frequent the 3D Warehouse. Her interest in room layouts started in childhood, and her first whole-house project came about while designing a bungalow for her parents in India, which was built almost exactly to her design. Exploring Surya’s models is a great way to get an idea of just how powerful SketchUp can be, when it’s combined with a great sense of style and design.
2 Model a Room

The main focus of this book is using SketchUp to create a 3D model of a room (or series of rooms), and furnish the room according to your personal designs. And your first task of any design project is to start with the room itself.

In this chapter, you’ll learn how to:

- Take field measurements and decide what needs to be measured
- Model the room according to the measured dimensions
- Add a door
- Add windows as components
- Edit the window components
- Add finishing touches such as baseboards

At the end of the chapter (and throughout the rest of the book) you’ll find a “Model It Yourself” project that will test your knowledge of the concepts presented in the chapter.

Taking Field Measurements

A typical job for an interior designer is to start with an empty room and figure out what to put in it. And accurate placement of furnishings requires that you start with a geometrically accurate room model. (Of course, if you’re working off a set of plans, instead of a physical room, you’ll be able to get your measurements much more easily.) So you enter the room, armed with your tape measure; what exactly do you need to measure?

Even if you mostly work in Imperial units (feet and inches), it’s a heck of a lot easier to take measurement in centimeters or millimeters. Because there are no pesky fractions of an inch to deal with, metric units are easy to enter in SketchUp. Once you get your measurements into SketchUp, you can always switch your model units to whatever you want.

Here are some “rules to live by” when taking field measurements of a room:
• Measure each wall in horizontal sections, as shown below. If a wall contains a window, measure from the left corner of the wall to the left edge of the window moulding, then measure the entire width of the window (including moulding), then measure from the right edge of the moulding to the right corner of the wall. It’s also a good idea to measure the overall length of the wall or the floor, just to verify your math.

If your floor has baseboards, the floor measurement will be about 2 inches shorter than the wall measurement - a baseboard typically projects about one inch from the wall.

• Measure each wall in vertical sections, as shown below. When windows are present, start at the ceiling, and measure from the ceiling to the top of the window moulding. Then measure from the top of the window moulding to the bottom of the moulding (not to the window sill). Then measure from the bottom of the moulding to the floor. Again, make sure these dimensions add up the overall floor-to-ceiling measurement.

• Measure the thickness and depth (how far they protrude from the wall) of all window mouldings.
• Do the same for doors: Measure the total width and height of the door, the distance from the ceiling to the top of the moulding, and measure the moulding thickness and depth.
• Before putting away your tape measure, measure the height and depth of any baseboards, chair rails, and crown mouldings.
Once you’re an old hand with SketchUp, you’ll be able to take these measurements and plug them right into a preliminary SketchUp model on the laptop you’ve brought to the job site. But until then, you can always jot down measurements on a rough drawing, and bring them into SketchUp later.

**Model a Basic Room in SketchUp**

We’ll now model a simple, rectangular room whose floor measurements are 15’ x 12’ (wall-to-wall, not taking into account the baseboards), and whose ceiling is 8’-6” high. Because we’re using Architectural units, we’ll make sure to start with the correct design template.

1. Start SketchUp, and you should see the **Welcome to SketchUp** window (this window looks slightly different in the Make version). If SketchUp opens straightaway and you don’t see this window, go to the SketchUp main menu and choose **Help / Welcome to SketchUp**. Click the **Choose Template** button, and choose the “Construction Documentation - Feet and Inches” template. Then click **Start using SketchUp** at the bottom of the window.

The file opens in **Top** view, and you should see two axes: red (horizontal) and green (vertical). The point at which these axes meet is called the origin. Unlike with some of the other design templates, this one has no extra objects, such as a person, to clutter the display. (In some of the templates, a person is included for scaling purposes, but we don’t need any help with that here, since we already know our dimensions.)
2. To draw the floor, click the icon for the **Rectangle** tool. (You can also press the R key.)

![Rectangle tool in SketchUp](image)

It's a good idea to familiarize yourself with the keyboard shortcuts for the tool you use often (R for **Rectangle**, L for **Line**, etc.). Pressing a key takes less time than clicking an icon or going to the main menu, and less mouse movement is easier on your hands.

3. A rectangle is defined by two corner points. It’s good practice to start at the origin, so click at the point where the axes meet, release the mouse button (no dragging the mouse), then move your cursor so that your rectangle looks approximately as shown below (don’t click). While you’ve moving your mouse around, take a look at the **Dimensions** field at the lower corner of the SketchUp window. This tells you the width (the larger number) and height (the smaller number) of your rectangle. These dimensions update as you move your mouse.

![Dimensions field in SketchUp](image)

As mentioned in Chapter 1, many SketchUp users tend to use drawing and editing tools with a “click - drag - release” mouse movement. While this does work for some of the tools, dragging the mouse is not recommended: all SketchUp tools work much better with a “click, release, move mouse, click again” action. So break the mouse-dragging habit, and get used to moving your mouse without the button pressed.

4. At this point, you can click to complete the rectangle, or leave it unfinished. Now we’ll enter the dimensions to size the rectangle to represent the floor. You don’t have to click inside the **Dimensions** field, just start typing and the numbers will appear there automatically. Type 15’,12’ (include the apostrophe symbol for feet, and separate the two dimensions by a comma).

![Dimensions field with typed dimensions](image)

A quick word about units. The base unit for this template is inches, so if you enter any value other than inches, the unit symbol must be included. If you want to avoid using unit symbols, you could enter these dimensions in inches: 180,144. No matter what the base unit is, you can always enter dimensions in any unit, adding unit symbols when needed, such as 100mm, 10cm, or 12”.
5. Press Enter, and the rectangle resizes to the dimensions of the floor. You’ll have to zoom in to see the whole rectangle. If you have a scroll wheel mouse just scroll up to zoom in; zooming will be relative to where your cursor is.

If you don’t have a scroll wheel mouse then run out and get one, but in the meantime you can use the **Zoom** tool. Zooming this way is done by dragging the mouse up and down. The **Zoom Extents** icon is to the right of the **Zoom** icon; you can always click this to place your entire model in the SketchUp window.

**Having the right mouse can make the difference between effortless SketchUp navigation and carpal tunnel syndrome.** As mentioned in Chapter 1, a three-button, scroll wheel mouse means you’ll never have to click the **Orbit**, **Pan**, and **Zoom** icons. You can zoom with the scroll wheel, orbit by keeping the middle mouse button (usually the scroll wheel itself) pressed, and pan by holding both Shift and the middle button.

**Another plus: when you navigate using your mouse buttons, you don’t have to leave the drawing tool you’re using.** For example, you can click one point of a line, orbit around, then click the other point.

6. Once the floor is drawn, you can break free of thinking in 2D. Orbit the view up, either by holding down the middle mouse button while dragging the mouse up, or use the **Orbit** tool shown below (which uses a regular mouse drag). Your view should show a near-flat rectangle, with the blue axis representing the vertical direction.
7. Click the **Push/Pull** icon or press P.

8. Click the rectangle, release the mouse button, and move the mouse up so that the box has some height. You can either click again to complete the box, or leave the box unfinished. (Most SketchUp drawing tools work this way: you can enter an exact dimension before an operation is finished, or you can complete the operation and enter the dimensions afterward.)

9. The room has an 8'-6” ceiling, so type 8’6” (no quotation marks are needed for inches) and press Enter.

You could also enter this dimension as 8.5’ or 102 (the equivalent value in inches). What if your measurements contain fractions, such as 8'-5 ¾"? That can be entered like this: 8’5 3/4 (or as 101.75). See why metric units are so much easier?

10. We need to see inside the room, so to remove the ceiling, right-click on the top of the box and choose **Erase** from the popup menu. You should now have an open box.
11. As you can see, SketchUp assigns different default colors to the two sides of any face. In this particular template, front faces are white and back faces are blue. If you already know what color the walls will be, you might as well include that color as part of the room model. To find collections of colors and materials, click the Paint Bucket icon or press the B key.

If you’re using a PC, you’ll see the Materials window. The large color square at the top left corner shows the current color, and the drop-down menu contains collections, such as “Colors,” “Translucent,” “Metal,” etc. If you’re on a Mac, you’ll see the Colors window. The top of this window provides several color picking options (sliders, crayons, etc.), and you can click the brick icon to see the drop-down menu of color and material collections.

12. Pick a color and click each of the four walls (the inside faces).
Add the Door

The door to this room is cut from the 15’ wall, as shown below. It is 7’ high and 4’ wide, including its mouldings. The door is centered in the wall, which means the left outer edge of the door is 5’-6” from the left edge of the wall. The door moulding is 4” thick and 2” deep.

1. Orbit around so that you’re facing the inside face of one of the 15’ walls.

2. If you find the display of the colored axes distracting, you can turn them off by choosing View / Axes from the main menu. Some people prefer to always keep the axes displayed; it’s a matter of personal preferences. View / Axes is a toggle function, so you can switch them on and off as needed. The rest of the pictures in this chapter will not show the axes.

3. To mark the position the left edge of the door, click the Tape Measure icon or press T. Tape Measure will be used often in this book for various purposes (including measuring, of course), but this time we’ll use it to make a guide line.
A guide line, sometimes also called a construction line, is used to mark locations or measurements. Guides lines are unlike “normal” SketchUp lines in that they are infinite and they don’t interact or interfere with other objects. But they can be selected, moved, and erased like other SketchUp objects.

4. Make sure there is a “plus” sign attached to your cursor, otherwise a guide line won’t be created. If there is no “plus” sign, press (don’t hold) the Ctrl key (PC) or Option key (Mac).

5. A guide line is created by offsetting an existing edge. Click anywhere along the left edge of the 15’ wall (don’t click on an endpoint).

6. Move the cursor to the right, and either click to place the guide line anywhere, or don’t click. Type 5’6” (or type 66, which is the equivalent distance in inches), and press Enter. This places a dashed guide line at the correct offset distance from the left edge of the wall.

7. We could create the door with the Rectangle tool, but let’s use a tool we haven’t tried yet. To create the door outline one edge at a time, click the Line icon or press L.
8. Click to start the edge at the intersection of the guide line and the floor, and move the cursor in the direction you want the line to go: straight up, along the guide line.

9. Type 7’ and press Enter, and the vertical line becomes 7’ long.

10. SketchUp is now ready to start the next edge of the door outline. Move the cursor to the right; the preview color of the line should be red, because the line is parallel to the red axis.

11. Enter 4’ to complete this edge.
12. Then to complete the door outline, add a third edge straight down to the floor. Make sure this edge follows the blue direction, otherwise it will not be vertical! Once the three edges are complete, they turn from bold to thin, because they now completely enclose a face within a face.

13. The guide line is no longer needed, so click the Eraser icon or press E.

14. Click the guide line to erase it.

15. To make the moulding, we’ll offset the doorway edges inward. But the edges need to be selected in advance, so click the Select icon or press the Spacebar.

16. Press and hold the Shift key, which enables you to select multiple objects at a time. Then click each of the three edges of the doorway, which should all become bold and highlighted in blue. (If you inadvertently click the wrong object, such as a face, Shift-Select is a toggle function so you can click the face again to unselect it.)

17. With the three edges (and nothing else) selected, click the Offset icon or press F.
18. Click anywhere near one of the selected door edges, then move the cursor inward. Click to complete the offset (or don’t click), and enter 4. This offsets the three edges 4” inward.

19. To unselect the edges that are still selected, right-click anywhere in blank space.

20. Choose a color such as dark gray and paint the moulding face.

21. Erase the doorway face. (In addition to using Erase from the popup menu, you can also erase a face by first selecting it, then pressing the Delete key.)
22. To give the moulding its 2” depth, activate **Push/Pull**. But before clicking anywhere, press the Ctrl key (PC) or Option key (Mac). Don’t keep this key pressed, just tap it once, and you should see a “plus” sign attached to your cursor. This is a little-used but important modification to **Push/Pull**, which keeps the original faces intact, rather than causing them to be erased. Pull the moulding face into the room 2”.

![Diagram of a room with moulding added](image)

23. To see what that Ctrl or Option modifier key just did, orbit around to see the outside of the doorway. There is a moulding face on the outside of the room; without the modifier that face would not be there. To see this for yourself, you can undo the **Push/Pull** (press Ctrl+Z or Cmd+Z), and try it again without using any modifier keys. Then redo it with the modifier.

![Diagram showing the result of Push/Pull with modifier](image)

**Add the Windows**

Creating windows provides the perfect opportunity to get familiar with one of SketchUp’s handiest features: components. Whenever you have an object that will repeat and/or have specific alignment properties, it’s best to make that object into a component. Among other benefits, using components results in a smaller file size and faster model speed, since SketchUp only needs to know what’s in the original component – everything else is just a copy. And a component acts as a single object, making it easy to select, copy, move, etc.
This room has three identical windows, one in the 12’ wall and two in the 15’ wall. The bottom of each window is 3’ above the floor, and each window is 3’-1” wide and 4’-2” high. The window in the 12’ wall is centered horizontally. The windows in the 15’ wall are each located 2’ from the edge of the wall.

The mouldings around the windows are 3” thick and 2” deep, and each window has 1” muntins dividing the pane of glass into six sections.

1. When we drew the rectangle for the door, we created it in its exact spot. That’s one way to work, but another way is to create an object first and then move it into place later. This is what we’ll do for the first window. Orbit to view the 12’ wall shown below, and draw anywhere within this wall a rectangle 4’-2” (50”) high and 3’-1” (37”) wide.
If you haven’t noticed, SketchUp has a quirky way of sizing a rectangle. If you follow this rule, you’ll never get your rectangle “reversed”: always orient your rectangle the way you want it to end up, either vertical or horizontal (similar to portrait or landscape orientation when printing). The Dimensions field will indicate which length is longer, and you can enter your exact measurements accordingly.

2. Because this window will have all of its edges offset for the moulding, you don’t need to select edges in advanced. Just activate Offset, click inside the window rectangle, then move the cursor inward and create a 3” offset.

3. When painting this moulding face, we want to use the same color we used for the door moulding. Unless you remember the exact color you used, you might have trouble getting an exact match. So go back to the Materials or Colors window and click the house icon. (Mac users, you’ll need to click the brick icon first before the house icon will be available). This shows a list of colors used so far, and you can click the color used for the door moulding (dark gray in this case).
4. Paint the window moulding and use **Push/Pull** with the Ctrl or Option key, to make it 2’’ deep.

5. In the **Materials** or **Colors** window, find the “Translucent” collection and paint the window face to resemble glass.

This is not the complete window (there are no muntins), but let’s assume this is a preliminary design which doesn’t require tons of detail. So this window is good enough, at least for now, and we’ll add the muntins later.
6. Since a couple more of these windows are needed in another wall, we’ll now make the window into a component. Activate Select and drag a selection box from left to right around the entire window, not including any other objects.

![Image of a window being selected](image)

*It’s very important to understand the different between a left-to-right selection box and one that’s drawn from right to left. Left-to-right boxes select only what’s completely inside; any objects partially inside this box will be left unselected. A right-to-left box selects everything completely inside it, as well as anything touching the box. We’ll get a chance to practice both types of boxes in this book.*

7. The entire window and mouldings should now be selected: its edges are highlighted in blue and its faces are covered by blue dots. Right-click on any selected face or edge (it’s always easier to right-click on a face than an edge), and choose Create Component.

8. In the Create Component window, enter a name for the component (“Window” is an obvious choice), and make sure Cut opening is checked, so that the window will cut through the wall. Also be sure that Replace selection with component is checked. Then click Create.
9. Once a component is created, it is a single object highlighted in blue, meaning it is selected. Leave it selected, since it will need to be moved into place. But first, to establish where the window will be placed, use **Tape Measure** to create a guide line 3’ above the floor.

![Diagram of a window with a guide line]

10. With the window component still selected, click the **Move** icon or press M.

![Image of the Move icon]

11. A move is defined by two points. For the first point, click anywhere along the bottom of the window, against the wall.

![Endpoint in Component]
12. For the second move point, click anywhere on the guide line. Now the bottom of the window is 3' above the floor.

13. Remember, this window is supposed to be centered in the wall; the distances from the sides of the window to the wall edges are equal (refer back to page 26). We could use guide lines again, but it’s easier to just center the window. The Move tool should still be active, so click the midpoint along the top back edge of the window.
14. Move the window directly to the right or left, following the green direction. While the move direction is green, press and hold the Shift key to “lock” this direction. Then click the midpoint of the 12’ wall. This centers the window perfectly in the wall.

Another way you can lock a move direction, without using the Shift key, is by using the arrow keys. To lock in the green direction, press (don’t hold) the left arrow; pressing the left arrow again toggles off the lock. The right arrow is used for the red direction (mnemonic device: “right” and “red” both start with R), and up and down arrows are both used for to lock the blue direction. Shift key vs. arrow keys: again, a matter of personal preference.

15. It’s always a good idea to check your measurements, so we’ll use the Tape Measure tool again, this time to measure a distance. Activate Tape Measure, and make sure the “plus” sign is toggled off (use the Ctrl or Option key), because we don’t need a guide line this time. Click a point on the left edge of the wall, then move the cursor to the left edge of the window (don’t click). The measurement appears as a popup next to the cursor, and should be 4’-5 1/2”. This matches the measurement we wanted.
16. A minor diversion: if you’re curious about how translucent materials work, orbit around to a view from outside the room, looking in the window. Usually a face can be painted with different colors on the front and back sides, but when you use a translucent material it automatically gets applied to both sides.

17. The 15’ wall that’s currently empty needs two more of these windows. We’ll start by making one copy, which is done with the Move tool. First select the window, then activate Move. Press (don’t hold) the Ctrl or Option key, which adds a “plus” sign to the cursor. For the first move point, click anywhere along the bottom of the wall, below the window.

18. For the second move point, move the cursor along the bottom of the empty 15’ wall until the window is approximately in the right place.
As soon as you click to place the copy, the “glass” face will cut the wall. And because both move points were along the floor, both windows will be same height from the floor.

19. Leaving the copied window selected, draw two guide lines, each 2’ inward from the left and right edges of the 15’ wall.

20. To move the new window into its correct location, activate **Move** and click any point along the left back vertical edge of the window. Start to move the window in the red direction and hold Shift (or press the right arrow key), and click anywhere on the left guide line. This aligns the left side of the window with the guide line.

21. Keep **Move** active so we can copy this window to the other guide line. Press Ctrl or Option again, and click any point along the right back vertical edge of the window.
22. Move out the copy in the red direction, aligning the right edge of the window with the right guide line.

23. Erase both guide lines.

**Modify the Windows**

Remember, our simplified windows are missing their muntins. It’s rather easy to add them in, so you might as well do it so that your client won’t think you’ve designed the wrong room. Because the windows are all the same component, we can make changes to any one of the windows, and the rest will update accordingly.

1. To make changes to the windows, right-click on any window and choose **Edit Component**. The edited window appears surrounded by a dotted-line box, and everything else in the model appears faded in the background. While a component is “open” for editing like this, you can only access what’s inside the component; everything else in the model is off-limits until you close the component.

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*Another way to edit a component is to activate **Select** and double-click the component. And if you ever want a component to stop being a component, you could right-click on it and choose **Explode**. This breaks the component down into individual edges and faces.*
2. We’ll now use guide lines to divide the single pane of glass into six sections. There are supposed to be two glass sections in the horizontal direction, so create a guide line offset from the inner left edge, ending at the midpoint shown below.

While you’re drawing guide lines, you’ll probably notice similar guide lines appearing on the other window components; they won’t affect what you’re doing to the window you’re working on.

3. There should be three glass sections in the vertical direction, so a guide line at the midpoint won’t help. Instead, right-click on an inner back vertical edge (either side) and choose Divide. Move the cursor until the edge is divided into three segments, then click.
4. Now create a guide line offset from the lower inner edge, stopping at the one-third point of the divided vertical edge. Because the vertical edge is now comprised of three equal edges, you’ll see a green endpoint symbol at each one-third point.

5. Add a guide line at the other one-third point.
6. To draw the 1” thick muntins, use **Tape Measure** to offset all three guide lines ½” in both directions. While you’re offsetting each guide line, be sure the offset direction is parallel to the correct axis.

7. The narrow spaces between the guide lines define the muntins; the large rectangles define the six glass sections. Use either the **Rectangle** or **Line** tool to trace over the guide lines and define the muntins.
8. To erase all of the guide lines at once, choose **Edit / Delete Guides** from the main menu. Then paint the muntin face to match the moulding, and pull it out 1”. Don’t forget to use the Ctrl or Option key while pulling!

9. That’s enough to make the window look pretty accurate. To end the editing of this window, right-click in blank space and choose **Close Component**. (You can also close a component by activating **Select** and clicking once anywhere outside the component.) This is what you should have now: three identical windows.
Finishing Touches
The only steps left are to add a simple baseboard, and “wrap up” the whole room as a group.
As with the moldings we’ve created so far, a baseboard doesn’t need the level of detail an actual baseboard usually has. Our baseboard will be based on a rectangle – 2” high, protruding 1” from the walls.

1. We’ll use the Offset tool again, and this time we’ll need to select the edges in advance. Orbit to a view as shown below, so that you can see the entire floor, and select the five edges that will have baseboards.

2. Offset these edges 1” inward, paint the baseboard face, then pull up the baseboard face 2”. Again, use Ctrl / Option when pulling.
An important step you should always perform when you have a completed room is to make the room into a group. A group is similar to a component, in that it is a single object, and it must be opened to be edited. But since the room itself won’t be copied, there is no need to make it into a component (not that a component wouldn’t also work). Another benefit of both groups and components is that other objects don’t “stick” to them, or otherwise interfere with them. This is important for walls, floors, and windows, which we want to remain stationary and unchanged as we move various furnishings into and around the room.

3. To make the room into a group, first select the entire room: walls, windows, floors. You can use a selection box for this, or just press Ctrl+A or Cmd+A. Then right-click on any selected face and choose **Make Group**.

4. But wait – there’s one change we forgot to make before grouping the room; the floor is supposed to be wood. Don’t panic, editing a group is just like editing a component. Right-click anywhere on the room and choose **Edit Group**. Find a material from the “Wood” collection and paint the floor.

5. Close the room group like you closed the window component.

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*Are you wondering how you might make changes to the windows? They are now “nested” components – nested inside the room group. So to edit the windows, you would first have to edit the room group, then edit one of the window components. When finished, you’d have to first close the window component, then close the room group.*

6. The room is done, and ready to be furnished! To save your work, use **File / Save As** from the main menu. You’ll furnish this room in the next chapter.
Model it Yourself

Using the techniques presented in this chapter, model a similar room with the dimensions shown below.

The longer wall, opposite the large doorway, has three identical windows, each divided into nine panes. The horizontal and vertical window spacings are shown below. (The 2’-6” to the bottom of the window is measured from the floor, not from the top of the baseboard.)
There are two windows along the shorter wall, with horizontal spacing shown below. Vertical spacing is the same for the windows along the longer wall.

The doorway to this room has an 11’ x 7’ opening, with a 2” moulding all around. The 7’ height is measured from the floor, not the top of the baseboard.

And don’t forget the baseboard along the floor, which is 1.5” x 1.5”.
Chapter Review Questions

1. You need to draw a line 4’-6 ¾” long. What are three ways to enter this dimension?

2. What are two functions of the **Tape Measure** tool?

3. When you want to paint something using the same color used elsewhere in the model, where you can find the list of already-used colors?

4. The **Eraser** tool can be used to erase edges. What are two ways to erase a face?

5. How do you use the **Offset** tool when you want to offset all edges around a face? Only some of the edges around a face?

6. Describe two ways you can lock an axis direction.

7. How can you select everything in your model?

8. Why would you make a window into a component, but a room into a group? What are some other interior design objects might you make into components?

9. How do you edit a component, and how do you end the editing when finished?