LEARNING MADE EASY

2nd Edition

SketchUp®

for dummies®

A Wiley Brand

Build your modeling mindset

Use 3D models to plan real-world creations

Print and share your SketchUp models

Bill Fane
Mark Harrison
Josh Reilly

SketchUp®

2nd Edition

by Bill Fane
Mark Harrison
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SketchUp® For Dummies®, 2nd Edition

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Introduction

Here's a shot in the dark: You've heard about SketchUp before and maybe even already tried it once or twice. In your first model, you got tripped up trying to move some object around, and ultimately, you just didn't have time to figure things out. Sound familiar?

SketchUp is one of the most popular 3D modeling applications in the world, but most people who try it don't quite figure things out. For a while, the tagline on SketchUp's website was "The easiest way to draw in 3D." We think this is accurate, but it's also true that at a baseline, drawing in 3D may not be so easy!

The good news is that what you've heard is true: SketchUp *is* a fantastic way to get acquainted with 3D modeling. But it takes some oomph on your part to pick up something new.

The oomph is worth it. When SketchUp clicks, you can feel like you've uncovered a new superpower. Visualizing ideas is a gateway to playing with different concepts, refining those concepts into useful plans, and then building models as projects. With 3D models and 2D drawings, you up-level your power to make ideas real.

About This Book

This is a book for people who are new to 3D modeling in SketchUp. We start by getting you set up and ready to go. We zero in on things that may trip you up, and we help you build a foundation for getting what you want out of SketchUp. Along the way, you may pick up a few technical things about polygon counts and Z-fighting, but we keep the jargon optional and focus on helping you think spatially and draw in 3D.

Foolish Assumptions

We don't presume that you know anything about 3D modeling, much less 3D modeling with SketchUp. That said, we do make a few bold assumptions:

- You're familiar with your operating system and web browser.

  For example, we assume you know how to do basic things like locating files and opening web pages. If you're trying to model with SketchUp and figure out how to use a computer at the same time, Wiley has some excellent books that can help you out. Visit `https://www.dummies.com` to browse for options.

- You have a mouse with a scroll wheel.

  SketchUp all but requires you to have a scroll wheel mouse — especially when you're just starting. We're going to teach you how to wield this mouse as a SketchUp light saber, so you should be pretty excited. First tip: The cheaper the mouse, the better it works in SketchUp.

- You are interested in architecture, home improvement, or remodeling.

  Sure, we could teach you SketchUp in the context of designing levels for virtual-reality video games, but we think most of you reading this book will get the most out of it if the context centers on building or house projects that need design, planning, and coordination. We hit some more out-there 3D modeling zones along the way; the book has excellent chapters on advanced 3D drawing and modeling for 3D printing. But we often show you basic concepts as though we were all working on a residential architecture or interior design project.

Icons Used in This Book

TIP

This icon indicates a piece of information that will probably save you time.

REMEMBER

This icon highlights or reinforces important concepts or features you'll want to remember.

TECHNICAL STUFF

Everyone's a little bit of a nerd sometimes, and paragraphs that bear this icon indulge that nerdiness. You can skip them without fear of missing anything important.

WARNING

When you see this icon, pay special attention. It occurs rarely, but when it does, something you do could harm your work. Don't worry; we cover Undo early in this book.

When a specific tool name is mentioned in the text, its toolbar icon often is displayed, like the one shown here.

Tool names are displayed with an uppercase first letter. In many cases, that same letter can be used as a single tap on the keyboard to launch the tool, such as Erase, Rectangle, and Orbit. Some tool names do not have a shortcut key that matches their first letters. For these tools, we display the keyboard shortcut immediately following the tool name in parentheses, such as Rotate (Q), Offset (F), and Select (spacebar, also known as the Final Frontier Cocktail Lounge).

SketchUp is available in versions for Windows, Macintosh, and the web. When something works differently among the versions, we describe the Windows flavor first, followed by parentheses indicating the difference — for example, Ctrl key (Mac: Option).

Beyond the Book

As you begin this book, consider that expanding your knowledge will always be part of your experience with 3D modeling. Even with years of experience, we find that we learn something new — or have to figure something out — almost every time we work on a SketchUp project.

You can use this book as a guide to getting to know SketchUp and also as a reference to revisit when you need to figure something out. You can find the Cheat Sheet and other information related to this book (such as errata) by visiting `https://www.dummies.com` and typing *SketchUp For Dummies* in the search box. But there are even more great references at your fingertips:

- **SketchUp Quick Reference Card:** SketchUp offers a one-page quick reference card that's handy for jogging your memory about tool functions and shortcuts. Find it at `www.sketchup.com/quick-reference-cards/sketchup-2020/en`.
- **SketchUp Campus (`https://learn.sketchup.com`):** Alongside this book, you'll need a way to practice 3D modeling. SketchUp Campus offers effective video tutorials that complement the learning methods in this book. Using this book and SketchUp Campus together would be an ace maneuver.

- **SketchUp Forums (`https://forums.sketchup.com`):** Inevitably, you're going to have a question about SketchUp, and this this book is not equipped with a smart speaker. The best place to ask a SketchUp question is the SketchUp Forums.
- **SketchUp on YouTube (`https://www.youtube.com/sketchupvideo`):** It turns out that the Internet is brimming with SketchUp knowledge. If you prefer a steady drip instead of a fire hose, we suggest subscribing to SketchUp's YouTube channel. You'll find short, helpful videos about common workflows, and you'll also get wind of nuggets of wisdom contributed from the SketchUp community.

Where to Go from Here

This book is intended to be a reference. If you keep reading from this page on, right to the end of the index, you'll have a pretty good idea of how to use SketchUp to make 3D models — but you don't have to use this book that way.

We recommend that you start with Chapters 1 and 2, just to get your bearings. But you could skip right to Chapter 2 if you want to jump right in. If you have a little bit of SketchUp experience, we recommend hitting Chapters 10 through 12 to make fantastic images and documents from SketchUp models. Or jump all the way to Chapter 15 to discover our top ten quick wins — techniques that accelerate your modeling — after you have the basics down.

1

Getting Started with SketchUp

IN THIS PART . . .

Set yourself up for success in SketchUp by discovering the simple key habits that make it easier to think in 3D.

Create a simple model, apply color to the faces, turn on your model's shadow, and find out ways to share your work.

Draw edges and faces; create accurate models; and discover the best ways to select, move, copy, rotate, and measure a model's geometry.

IN THIS CHAPTER

- Choosing a SketchUp version
- Getting to know the SketchUp interface
- Touring SketchUp
- Getting ready to work in SketchUp

Chapter 1
The SketchUp Setup

SketchUp is known for its simplicity, and it's common for people to jump right in and start modeling. Even if you already have a running (with scissors) start, we think you'll find it useful to go all the way back to the beginning so we can explain how to get set up for success in SketchUp.

To us, a good setup means building habits that decrease the overall mental effort required to operate SketchUp. That's right: The way to get better and faster in SketchUp is to think *less* about SketchUp.

In the first part of this chapter, we run through the basic setup routine. Stick with us, because after we show you how to launch SketchUp, we jump right into the most important skills that most people never pick up. Finally, we get you oriented in SketchUp, both practically and on a meta level.

Picking a Version of SketchUp

2020 is SketchUp's 20th birthday, so there have been quite a few versions of it in the past. Today, multiple versions of SketchUp 3D modeling are available. Table 1-1 shows three basic flavors of SketchUp.

TABLE 1-1 SketchUp Versions

Version	Description	Best For
SketchUp Pro	The paid desktop version is software you download and install from SketchUp.com. It comes with LayOut (which we talk about in Chapter 12) and includes SketchUp extensions (which we touch on in Chapter 15). It requires a paid subscription, a paid license, or a discounted college-student subscription.	3D modeling for architectural drawings, illustrations, and professional document sets; faster performance for larger 3D models; extensions for more efficiency and more complex design.
SketchUp For Web	The free web version runs at app.sketchup.com. About 70 percent of this book pertains to the free version of SketchUp.	3D modeling for do-it-yourself projects, space planning, simple woodworking and carpentry.
Older desktop versions (Google SketchUp, SketchUp Make, and SketchUp Pro 2018)	You might already be using an older desktop version of SketchUp that was (or is now) free. You have the benefit of sticking with this version to use with this book, but you may run into a few bugs along the way or find that you don't have access to some things we cover in the book. If you use SketchUp extensions a lot already, we recommend sticking with the version you have.	If you already have it installed and it's working smoothly for you, you've got a running start on the book. You can update to a newer version later, and the book should still make sense to you.

TIP

If you don't already own SketchUp, you may consider purchasing it down the line. To use it for now, you don't have to buy it. Instead, you can take advantage of several subscription options:

- **SketchUp Free:** Free access to 3D modeling in SketchUp for Web is available with this free subscription. Go to SketchUp.com to set up a Trimble account to get started with the free subscription or any of the paid ones below.
- **SketchUp Pro:** This is the version we reference a lot during the book; it's the name of the desktop version and also the subscription you buy to use it.
- **SketchUp Shop:** This subscription offers some nice intermediary upgrades to the free web version, such as solid modeling, CAD file compatibility, and custom model styling.

WHAT IS TRIMBLE?

Trimble is the company that purchased SketchUp from Google in 2012. Aside from developing SketchUp, Trimble makes other really interesting technology to help people work better, such as laser scanning, drones, self-driving tractors, and route optimization.

» **SketchUp Studio:** This is a higher-end subscription, but college students can get a huge discount. In addition to the desktop software, this subscription includes access to other software for architectural analysis and visualization.

TIP

Whichever version of SketchUp you use, you need to create a Trimble account to access it. This is one of the first steps to take when you access the SketchUp.com website.

SketchUp for Schools

If you're getting familiar with SketchUp so that you can help younger people discover their own 3D superpowers, we applaud you. For most K–12 educators in North America, SketchUp offers SketchUp for Schools (a web application) and a statewide grant of SketchUp Pro, which means all public schools in these regions can access the desktop version.

Both of these options are free, so the best choice for you depends on where you're located and how you plan to use SketchUp. Find out more at `https://www.sketchup.com/products/sketchup-for-schools`. If you already use SketchUp for Schools, as you follow along with this book, focus on the instructions for the web version.

SketchUp Pro

SketchUp Pro is the desktop version that has been around since the early days of SketchUp. You can download and install the current version at `https://www.sketchup.com/download/all`.

Whether you're using the current version of SketchUp Pro, an older version of SketchUp Pro, or an older free desktop version, Figure 1-1 should still be useful to you as an overview of the interface. We walk you through each element of the SketchUp interface in "Taking the 10-Minute SketchUp Tour" later in this chapter.

When you first open SketchUp, you'll notice a little person on your screen. This illustration is called a *scale figure*, and his or her purpose is to help orient you in 3D space. With a scale figure, you have an immediate sense of up and down, as well as the proportion (or scale) of your model. The scale figure is also a little bit special in that it is a 2D drawing that will always orient itself to face your view head-on. Of course, you can delete the scale figure from your model; there's no harm in doing so.

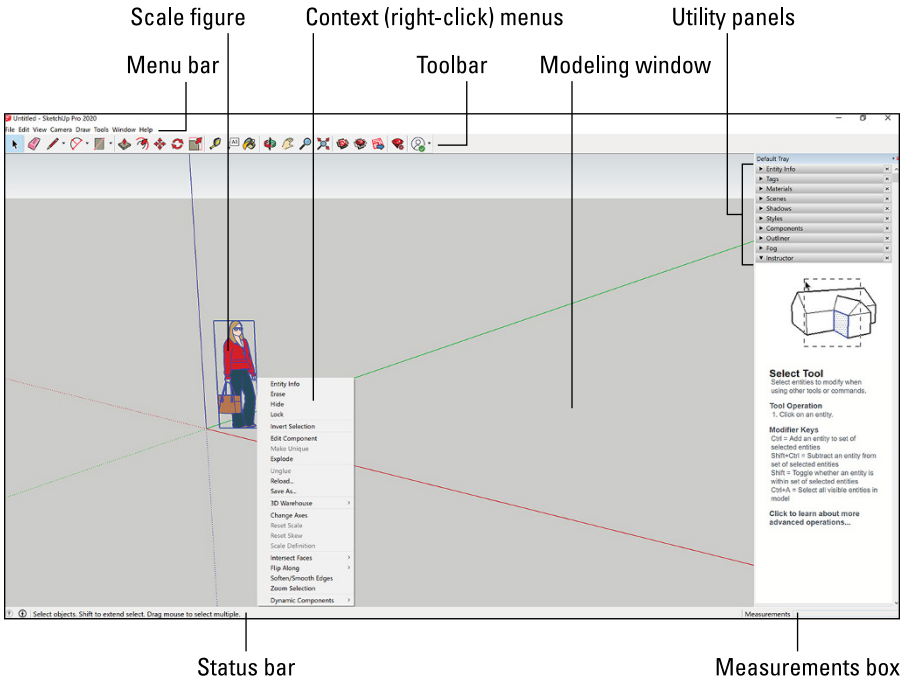

FIGURE 1-1: Important features in SketchUp Pro.

SketchUp for Web

Since 2018, the free version of SketchUp has been available primarily as an application that runs in your Internet web browser. It's called SketchUp for Web, and you launch it from `https://app.sketchup.com`. If you haven't already created a Trimble account, you need to sign up for one the first time you visit the app.

This web version looks different from the desktop version. But when you get to know where things are, we think you'll find it just as easy to navigate. If you are using SketchUp for Web, bookmark the next page to reference Figure 1-2 throughout this book.

SCALE FIGURES

Fun fact: Every major update to SketchUp has a different scale figure, and each figure is based on a real person who's a member of the SketchUp team. In SketchUp Pro 2020, Laura greets you. Yes, if you like, you may talk to Laura (or yourself) while modeling. No one will look at you strangely. We promise.

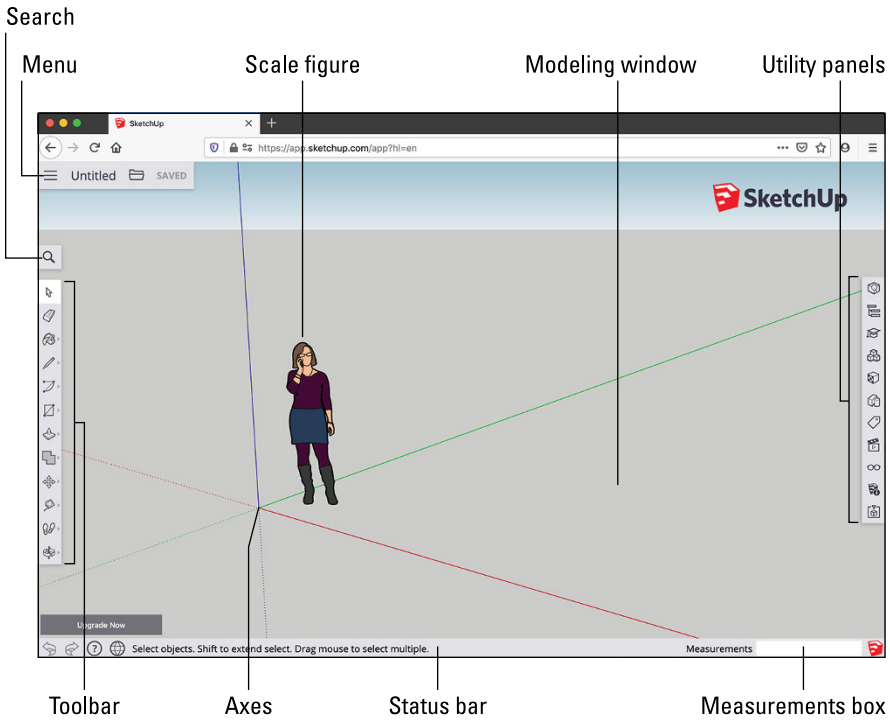

FIGURE 1-2: Important features in SketchUp for Web.

TIP

One benefit of SketchUp for Web is that you don't have to remember where things are. For most of the tools we reference throughout this book, you can simply use the Search tool to find and activate them. For example, let's say you can't remember which tool you'd use to measure the height of a wall. As you can see in Figure 1-3, if you search for *Measure,* Search returns all relevant results — in this case, the Tape Measure and Dimensions tools. So you don't need to remember where a tool is, and you barely have to remember what it's called.

If you're not sure you want to buy SketchUp, know that you will still pick up a ton of knowledge using just the free web version. In fact, we recommend using SketchUp for free before deciding to purchase. If you start with the free version, know that as you poke around SketchUp for Web, you may run into a few tools that are available only if you purchase a subscription. You need to upgrade to a different version if you want to use one of these features.

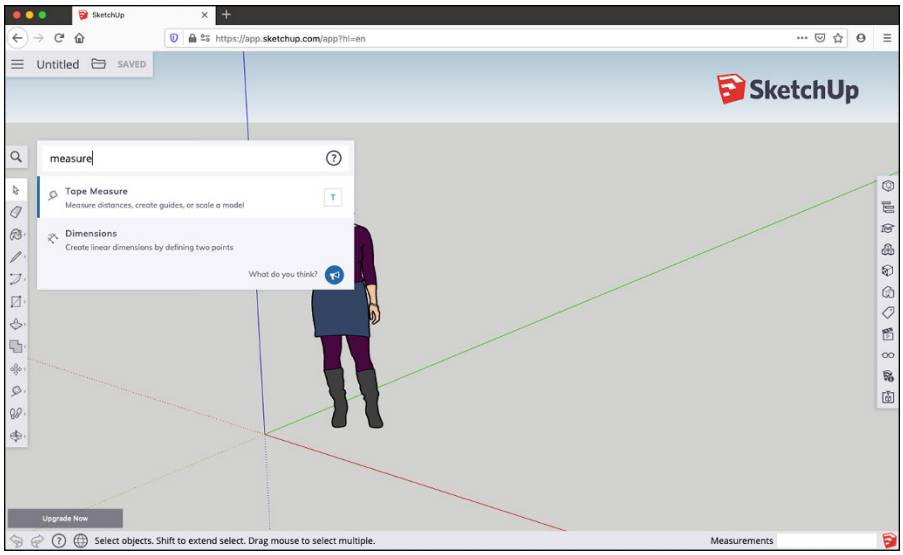

FIGURE 1-3: Search for tools or search for what you want to do with tools in SketchUp for Web.

Trimble Connect

By default, the models you create in SketchUp for Web are saved to and stored on a web service called Trimble Connect. This has a couple of advantages:

- You can access your 3D models from any device.
- Trimble Connect keeps a revision history of your models, so you always have a backup file and a retrievable history of your modeling progress.

You can always download your models from Trimble Connect if you prefer to keep backup files on your desktop.

Navigating SketchUp

It's time to release the air lock and float in 3D space. Before you start zooming around Technicolor polygon nebulas, let's get you oriented with the basics of seeing and operating your new spaceship. Believe it or not: This section is full of techniques that people who use SketchUp for a living never learn. So take your time here, and get set up right.

Customizing settings to see better

Using any version of SketchUp, you'll rely a lot on your eyes. If you find yourself struggling to see the scale figure or the axis lines, it's a good idea to set yourself up right away to see better by customizing certain settings. Start by jumping to Chapter 10 to read the sidebar "Improving accessibility with Styles.

TIP

In your modeling window, try this: With your mouse or trackpad, place your cursor over the scale figure, and use your scroll wheel or trackpad to zoom in a bit. Did you zoom in like you expected, or did you zoom out? And did you zoom to the extent that you intended? Scroll wheels and trackpads can be finicky. In SketchUp Pro, you can invert the direction of your scroll zooming. To control the size of the cursor icon, you have to leave SketchUp and fiddle with your operating system mouse settings.

We heartily recommend customizing those computer preferences that help you see better in SketchUp and any other software you use.

Getting to know your mouse

This is where things get interesting. At this point, you should have SketchUp up and running, with a scale figure on your screen and a three-button mouse at your side. Now, here is the most important SketchUp technique that most people never figure out: Without selecting any tool, press and hold your mouse's scroll wheel button while dragging the mouse. This is *orbiting* in SketchUp.

This mouse sequence is the primary way you set and reset your view in 3D space. It's how you see in 3D. But many people switch manually from whatever tool they're using to the dedicated Orbit tool. Tool switching costs brainpower and speed, but it doesn't have to if you orbit with the scroll wheel orbit instead. This kind of orbiting is available whenever you want in SketchUp, even between the click-release and the click-to-finish operations that we talk about in the next section.

There's more: While holding down that scroll wheel button on your mouse, use your other hand to press and hold the Shift key on your keyboard. Now you've toggled on the Pan tool, which lets you drag the view of your modeling window. Drag your mouse left and right, both holding the Shift key and releasing it to see the effect of switching between these two camera moves. Figure 1-4 shows how to pan and orbit.

We cover zooming with the scroll wheel in Chapter 2. For now, pat yourself on the back: You just turned on your light saber.

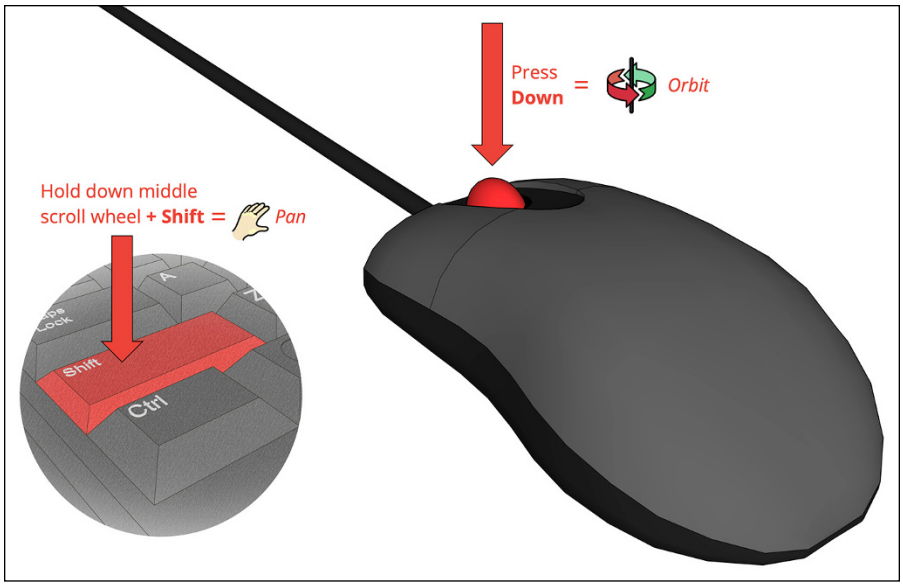

FIGURE 1-4: Using the scroll wheel to pan (left) and orbit (right).

Finding your Zen with click-release, click-to-finish

Most people expect SketchUp to work with click-and-drag behavior. SketchUp tools work with click-and-drag, but you'll quickly find that it's harder to model accurately using this technique. We've actually observed people develop more physical stress by clicking and holding the left mouse button.

With a few exceptions that we cover where appropriate in the book, SketchUp tools work with click-release, click-to-finish. Just like orbiting (see "Getting to know your mouse" earlier in this chapter), the best thing you can do is bake in this behavior while you are getting familiar with SketchUp. If click-release, click-to finish trips you up at first, start by repeating the following exercise until it's second nature:

1. **Tap the L key on your keyboard to activate the Line tool.**
2. **With the tool visible in the modeling window, press your left mouse button.**

   We call this a *click-release*.
3. ***Without* clicking again, move your mouse around the screen, and watch how SketchUp previews the line you are drawing.**

   Many of you will be so excited by this point that you will have already clicked again. (That's okay; just press the Esc key and start over.) But if you do this

right, you could go make a cup of coffee and come back ten minutes later to find SketchUp is still in the middle of drawing this line.

4. **Before you click again, move the tip of the pencil icon to the place on your screen where the red, green, and blue lines meet.**

   This is called the *model origin*.

5. **When you see your cursor display small crosshairs, click again to finish the line.**

   This is the *click-to-finish*.

This is a simple exercise, but in our experience, it will take great intention for you to extend it to the way you use SketchUp tools. Practice makes perfect!

Working faster with keyboard shortcuts

Although it's good for you to be familiar with tool icons, a more efficient use of your RAM is to remember a tool's default keyboard shortcut: the simple keyboard input for activating a tool.

We introduce and practice the following shortcuts throughout the book, so there's no need to bust out index cards and remember them now. But for posterity, this baker's dozen of shortcuts are those that we think are worth remembering:

- Select (spacebar)
- Line (L)
- Eraser (E)
- Arc (A)
- Rectangle (R)
- Circle (C)
- Push/Pull (P)
- Paint Bucket (B)
- Move (M)
- Rotate (Q)
- Scale (S)
- Tape measure (T)
- Undo (Ctrl+Z) (Mac: ⌘+Z)

Why are these shortcuts worth remembering? As with shortcuts in other software, activating tools with keystrokes is quicker than moving your mouse to a tool icon or menu location. Also, it takes more of your mental energy to remember where a tool icon or listing is. It costs you less time and less energy to remember the tool as a simple shortcut. And because you'll be jumping between these tools almost constantly in SketchUp, knowing the keyboard shortcuts adds up to a lot of saved time and energy!

TIP

In SketchUp for Web, if you need to look up a tool's shortcut while modeling, just use Search to find the tool by its name. There's even a shortcut for Search: Shift + /.

Introducing Undo

We have another suggestion for bringing Zen into your SketchUp practice: Accept that messing up is part of 3D modeling. Also, we assume that you'll be figuring out how to think spatially in SketchUp while you're figuring out how to use the program. Stumbling a bit is part of the experience for both beginners and advanced modelers. Here are a few ways that you can gracefully reverse and try again:

- **Use the Escape key.** In between click-release and click-to-finish, Escape is essentially a way to interrupt anything you are currently doing in SketchUp and try again. It's simple and predictable.
- **Undo.** There's a reason that Undo makes our baker's dozen of shortcuts worth remembering. Often, you won't know until click-to-finish that the outcome isn't what you wanted. Just remember the Undo shortcut Ctrl+Z (Mac: ⌘+Z), and you can back out of the last 99 things you did in SketchUp.
- **Use the spacebar:** The spacebar is the keyboard shortcut for the Select tool, so switching to it between click-release and click-to-finish interrupts your modeling just like Escape, except that it switches tools. Spacebar is an easier key to feel out on your keyboard, though, so you may find it easier to reach and remember while modeling.
- **Zoom Extents (Shift+Z):** Especially while you're figuring out how to use your mouse for orbiting, panning, and zooming, you will occasionally get lost in SketchUp. If you find yourself stuck in a wall or stuck in limbo far away from the origin, use Zoom Extents (Shift+Z), and your camera will zoom your view out to reveal everything in your model.

Taking the 10-Minute SketchUp Tour

Now we think you're ready to take the 10-minute SketchUp tour: a rundown of the layout, tools, and utilities you'll interact with in this book. Throughout this section, please refer to Figure 1-1 if you use a desktop version or Figure 1-2 if you use SketchUp for Web.

- **Modeling window:** See the big area in the middle of your computer screen? That's your modeling window. You build your model here, and your modeling window *always* shows a 3D view of your model, even if you're looking at it from the top or side. Key features of the modeling window are the model axes: three green, red, and blue lines that help define the directional space of your model.
- **Menu bar (Desktop only):** If you've used a computer in the past 30 years, the menu bar is nothing new. Each menu contains a long list of options, commands, tools, settings, and other goodies that pertain to just about everything you do in SketchUp. We generally refrain from pointing you to the menu bar to find things, because that requires that you remember the name of a tool, the menu it lives on, and where on the menu it is. Nevertheless, we expect you'll be using the menu bar throughout the book.
- **Menu (web only):** In SketchUp for Web, you will be using the menu a lot less to find tools but just as much to open files, save copies using Save As, and change settings.
- **Search (web only):** A recent addition to the SketchUp interface is this quick way to find and activate tools and look up shortcuts. If you're using the web version (it's not available in SketchUp Pro yet), you'll find this really handy when you start learning tools and utility settings that you don't use that often or have a hard time remembering.
- **Toolbar:** Click a toolbar button to activate a tool or command. You'll start to use tool icons naturally while using SketchUp. In desktop versions, you can customize your toolbar setup to show tools you use most often, or to not show those tools whose shortcuts you've remembered. In the web version, similar tools are nested together in the toolbar. So when you click the Rectangle tool icon, you'll switch to the Rectangle tool but also see the other shape-drawing tools available to you. Similarly, the Tape Measure tool contains other tools for measuring and labeling things.
- **Large toolset (desktop only):** The large toolset contains most of the tool icons for the commands we use in the book. The large toolset is not pictured in Figure 1-1 because we think it's better to turn off the Large Toolset and attempt to use core commands by shortcuts. But if you prefer a visual

reference for tool icons, you may prefer leaving the Large Toolset on to have all the tools handy all the time. You can can control its visibility by choosing View➪Toolbars (Mac: View➪Tool Palettes).

- **Status bar:** Consider this your SketchUp dashboard. The status bar provides helpful information about the tool you are currently using. It's important to check the status bar for reminders about *modifier keys:* keystrokes that you use in combination with certain tools to perform additional functions. Soon enough, you'll know how to copy by using the Move tool with a modifier key. You'll definitely forget this key, and when you do, the place to look is the status bar. The status bar also relays step-by-step instructions for the tool's operation, but you may be better off using the Instructor (see the nearby sidebar "Meet the Instructor").
- **Utility panels (desktop only):** Before long you'll start to interact with utilities — things like colors and display settings — that are generally organized on the right side of your SketchUp window. In desktop versions, you control which utility settings are visible via the Window menu. In more recent PC versions of SketchUp Pro, you can manage the default tray of utilities: Choose Window➪Manage Trays, and use the Manage Trays dialog box to reconfigure what you do (or don't) see here. On a Mac, utilities look like dialogs except that they're neatly collapsible, and you can stack them aside in tidy trays when you are not using them.
- **Utility panels (web only):** In the web version, all utility panels — for stuff like saving model views or libraries of model textures — are organized on the right side of the screen, accessible by their icons. Opening a utility panel slides open a larger interface where you can access one or multiple panels. Use the X next to a panel name to close it, or use the arrow icon at the top right of the panel to hide the utilities you are currently using.
- **Measurements box:** You use this box all the time as you model, but you'll never need to touch it. Depending on what you're doing, this box displays information about what you're modeling or enables you to specify a precise length, angle, or other measurement while modeling. Chapters 2 and 3 help you understand all that this little unassuming box can do.
- **Context (shortcut) menus:** Whenever you have something selected in SketchUp, you can right-click your selection to reveal a shortcut menu of commands and options. These are always relevant to whatever you right-clicked, so the contents of each menu are different. If you decided to proceed without a mouse, you can still right-click a trackpad, usually by using two separated fingers.