

Google SketchUp

THE MISSING MANUAL.



The book
that should
have been
in the box.

"The Missing Manual
series is simply the
most intelligent and
usable series of
guidebooks..."

—Kevin Kelly,
co-founder of Wired

POGUE PRESS™
O'REILLY®

Chris Grover

Google SketchUp

THE MISSING MANUAL

*The book that
should have been
in the box[®]*

Google SketchUp



Chris Grover

POGUE PRESS™
O'REILLY®

Beijing • Cambridge • Farnham • Köln • Sebastopol • Taipei • Tokyo

Google SketchUp: The Missing Manual

by Chris Grover

Copyright © 2009 O'Reilly Media, Inc. All rights reserved.
Printed in the United States of America.

Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472.

O'Reilly books may be purchased for educational, business, or sales promotional use. Online editions are also available for most titles (*safari.oreilly.com*). For more information, contact our corporate/institutional sales department: (800) 998-9938 or *corporate@oreilly.com*.

Printing History:

May 2009: First Edition.

Nutshell Handbook, the Nutshell Handbook logo, the O'Reilly logo, and “The book that should have been in the box” are registered trademarks of O'Reilly Media, Inc. *Google SketchUp: The Missing Manual*, The Missing Manual logo, Pogue Press, and the Pogue Press logo are trademarks of O'Reilly Media, Inc.

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this book, and O'Reilly Media, Inc. was aware of a trademark claim, the designations have been printed in caps or initial caps.

While every precaution has been taken in the preparation of this book, the publisher and author assume no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein.



This book uses RepKover™, a durable and flexible lay-flat binding.

ISBN: 978-0-596-52146-2

[M]

Table of Contents

The Missing Credits xiii

Introduction..... 1

Part One: Basic SketchUp Skills

Chapter 1: Building a Bench: Your First SketchUp Model 13

Firing Up SketchUp for the First Time 14

A Tour of SketchUp's Main Window 16

Looking Around with the Camera 18

Customizing Your Workspace 18

Creating Your First SketchUp Document 22

Choosing a Drawing Template 23

Creating Your Own Templates 24

Changing Your Camera View 27

Bench: Starting Your First Model 32

Building a Board 32

Selecting Objects 35

Turning Your Bench Seat into a Component 36

Building a Bench Leg 38

Building the Bench Support 41

Rotating an Object 42

Moving, Copying, and Deleting Components 44

Component Hide and Seek with the Outliner 47

Assembling the Bench Components 48

Placing Components with Precision	51
Painting Your Bench with Materials	54
Using the Outliner to Select Nested Components	56
Adding to Your Scene	57
Chapter 2: Starting Off in Two Dimensions.....	59
Drawing Lines with the Line Tool	59
Drawing a Triangle with the Line Tool	61
Turning a Triangle into a Rectangle	66
Erasing Lines and Surfaces	67
Adding a Face to Create a New Shape	69
Drawing Polygons and Circles	69
Changing the Radius of a Polygon	72
Changing a Polygon Using the Entity Info Window	72
Drawing Circles	73
Creating Complex Shapes	74
Drawing Rectangles and Arcs	77
Using the Freehand Tool	80
Moving Objects	81
Moving a Face	82
Moving a Point	84
The Effects of Moving	84
Editing Geometry	88
Tools Tour	88
Chapter 3: Drawing in Three Dimensions	93
Navigating 3-D Drawings	93
Introducing the Blue Axis	95
Finding 3-D Inferences	97
Using the Push/Pull Tool	103
Aligning Surfaces and Finding References	105
Pop Quiz: Put the Circle Back	108
Bonus Question: Bore a Round Hole Through the Box	109
Click and Rotate to Find a Reference	109
Surface Orientation and Surface Colors	109
Changing Surface Orientation: Reversing Faces	111
Intersections in 3-D Objects	112
Working with Complex Intersections	114
Double-Clicking with Push/Pull	115
Using the Move Tool in 3-D	116
Understanding Auto-Fold	118
Using Auto-Fold with Circles and Cylinders	120
Using Info Entity to Edit 3-D Objects	122

Part Two: Building a House

Chapter 4: Drawing a Basic House.....	127
Locking an Inference	127
Working with Sloped Surfaces	132
Referencing a Sloped Surface	132
Yet Another Way to Reference a Slope	136
Inference Locking with the Move Tool	138
Using Inference Locking with Shape Tools	141
Making Doors and Windows	142
Using the Offset Tool	144
Building a Roof with an Overhang	150
Initial Landscaping: Front Walk and Driveway	155
Chapter 5: Working Smarter with Groups and Components	157
Creating a Group	158
Editing and Modifying a Group	161
Creating Components	166
Speeding Up Construction with Arrays	169
Creating an Array Between Two Points	175
Editing Components	176
Using the Make Unique Command	178
Exploring the Components Window	181
Components Window: Select Tab	181
Components Window: Edit Tab	182
Components Window: Statistics Tab	183
Using the Flip Along Command	183
Exploding Components and Groups	185
Deleting Components	186
Purging Components	187
Using Dynamic Components	188
Chapter 6: Changing Styles and Applying Materials.....	193
Changing Face Styles	193
Applying Colors and Materials (Windows)	196
Finding and Applying Materials (Windows)	200
Mixing Your Own Colors and Materials (Windows)	202
Finding New Materials (Windows)	204
Loading with the Eyedropper (Windows)	205
Editing Materials (Windows)	205
Applying Colors and Materials (Mac)	207
Mixing Your Own Colors (Mac)	210
Finding and Applying Materials (Mac)	215
Adding New Materials (Mac)	217
Loading with the Eyedropper (Mac)	219

Changing Face Styles: Take 2 (Mac and Windows)	219
Working in the Styles Window	219
Applying a New Style to Your Model	221
Organizing Styles	222
Purge Unused Styles from the In Model View	224
Editing and Modifying Styles	224
Changing Edge Styles	224
Choosing Face Settings for a Style	228
Adjusting Background Settings	229
Using a Watermark with a Style	230
Changing the Modeling Settings for a Style	232
Modifying Styles Using the Mix Tab	234

Chapter 7: Organizing with Outliner and Layers..... 237

Organizing with Outliner	238
Creating a Group in Outliner	243
Locking a Group	244
Hiding and Unhiding in Outliner	245
Using the Make Unique Command in Outliner	248
Reorganizing Groups with Outliner	250
Building a Small Angled Roof	252
Creating an Array of Rafters	253
Drawing Guides with the Tape Measure	255
Erasing and Hiding Guides	259
Creating a Nested Group in Outliner	259
Building Stairs: The Divide and Conquer Method	259
Using Divide to Build Stair Stringers	262
Making and Placing Stair Treads	268
Using Outliner's Filter	271
Working with Layers	273
Adding, Naming, and Deleting Layers	273
Moving Entities to a New Layer	274
Setting the Active Layer and Hiding Layers	276
Viewing Layers by Color	276
Purging Layers	278
Tips for Working with Layers	278

Part Three: Advanced Construction Techniques

Chapter 8: Drawing a Hipped Roof and Using Follow Me 281

Making Construction Lines	281
Using the Protractor Tool	283
Protractor Modifier Keys	285
Using the Follow Me Tool	288
Preselecting the Path for the Follow Me Tool	291

Making Spheres with Follow Me	292
Using a Reference Object to Draw a Sphere	296
Using Follow Me As a Lathe	298
Making Complex Profiles Follow a Path	298
Following Complex or Irregular Paths	302
Making Stairs and Railing	306

Chapter 9: Advanced Techniques for Groups and Components.....311

Making Groups and Components	311
Understanding SketchUp's Sticky Behavior	313
Unsticking Sticky Entities	316
Editing a Group	319
Hiding the Rest of the Model while Editing Groups and Components	319
Creating Components with "Glue to" Options	321
Using a Component's Origin and Axes	324
Copying and Placing Components	324
Using Guides to Place Components with Precision	325
The Effects of the "Glue to" Options	328
Ungluing a Component	329
Component's Cut Opening Option	330
Placing Components in Your Model	331
Exploring the Components Window	332
Editing Components	336
Making Components Unique	338
Renaming Your Component	341
Saving Components for Reuse	342
Purging Unused Components from Your Model	343
Creating a Collection	343
Sharing SketchUp Components	345
Swapping Components in Your Model	346
Swapping Components Using the Reload Command	347

Chapter 10: Matching Your Photos in SketchUp 349

How Photo Match Works	349
Shooting Photos for Photo Match	351
Importing a Photo for Photo Match	353
An Alternative Method for Importing Images	354
Calibrating the Photo Match Image	355
Adjusting the Grid	359
Building a Model from a Picture	360
Adding 3-D Details to Your Model	365
Applying an Image to a Model	369
Creating 3-D Details from a Texture Image	371
Creating 3-D Details for the Bottom of Villa Savoye	374
Finding Models with Photo Textures	377

Part Four: Adding Realism and Movement

Chapter 11: Adding Shadows and Placing Your Model in Google Earth	381
Flicking the Light Switch	381
Changing Shadow Angles	384
Changing Shadows Using Time Controls	384
Changing Shadows by Changing Location	385
Using Google Earth to Set Geographic Locations	389
Controlling the Strength of the Shadows	391
Choosing Whether Faces and Edges Cast Shadows	392
Using Sun for Shading	394
Creating Windows That Transmit Light	394
Turning Shadows On and Off for Individual Entities	395
Chapter 12: Saving Views and Animating with Scenes	397
Creating a Scene	397
Playing the Scenes Animation	400
Changing the Animation Timing	401
Changing the Order of Scenes	403
Renaming Scenes	404
Deleting (Removing) Scenes	405
Turning Scenes into Video	405
Studying Shadow Movement with Scenes	406
Including or Excluding Scenes in an Animation	407
What's Saved in a Scene	407
What's Not Saved in a Scene	410
Updating Scene Details	410
More Ways to Move the Camera	411
Using the Position Camera Tool	412
Setting the Field of View	412
Looking Around	413
Walking the Camera	413
Walk On	416
View Cross-Sections with Section Planes	417
Rotating a Section Plane	419
Saving Section Planes and Section Cuts in Scenes	421
Copying a Section Plane	421
Setting the Active Section Plane	423

Part Five: Saving, Printing, and Sharing Projects

Chapter 13: Importing, Exporting, and Printing 427

Importing 3-D Models	427
Importing SketchUp SKP and SKB Files	428
Importing AutoCAD 3D DWG or DXF Files	429
Importing 3DS Files	430
Importing 2-D Images	432
Importing 2-D AutoCAD DWG and DXF Files	434
Importing Photoshop PSD Files	437
Exporting from SketchUp	438
Exporting 3-D Images	438
Exporting Models to Google Earth	438
Exporting 2-D Images	439
Exporting from SketchUp Pro	441
Exporting 2-D Images	442
Exporting Animations	443
Printing SketchUp Views	445
Printing from Windows	446
Printing from a Mac	448

Chapter 14: Finding, Creating, and Sharing Components 451

Finding Components in the 3D Warehouse	451
Exploring the Model Browser Window	455
Advanced Searching in the 3D Warehouse	456
Creating a Dynamic Component (SketchUp Pro Only)	458
Preparing Your Component with Color Swatches	459
Creating Material Attributes for a Dynamic Component	460
Making a Resizable Dynamic Component	466
Constraining the Dimensions of Dynamic Components	469
Preventing Dynamic Components from Scaling	472
Sharing Components	474
Purge Before Saving	475
Uploading a Model to the 3D Warehouse	475
Editing Your Model Details in the 3D Warehouse	479
Removing Your Model from the 3D Warehouse	479
Changing the Share Options for Your Model in the 3D Warehouse	479
Uploading a Dynamic Component	480

Chapter 15: Designing Edge Styles in Style Builder (SketchUp Pro) 485

Style Builder Overview	486
Creating Images for New Sketchy Edge Styles	487
Generating a Template for Strokes	488
Drawing New Strokes	490
Editing Strokes	490

Editing Strokes in Style Builder	492
Changing the Stroke Settings	493
Adding More Strokes	494
Saving a New Style	495
Opening a New Style in SketchUp	495
Chapter 16: Presenting Your Model with LayOut (SketchUp Pro)	499
Workflow for a LayOut Project	499
Starting Up LayOut	500
Choosing a Template	502
Saving a Custom Template	503
LayOut Program: The Quick Tour	503
Menus	504
Toolbars	505
Trays	506
Status Bar, Measurements, and Zoom View	507
Manipulating Your Model in LayOut	508
Managing LayOut Pages	510
Organizing Elements with Layers	511
Creating Content that Appears on Multiple Pages	512
Inserting a Model into LayOut	513
Changing the View of a 3-D Model in LayOut	514
Updating Links to SketchUp Models	517
Drawing in LayOut	517
Adding Text to Your LayOut	520
Storing Favorites in Scrapbooks	522
Printing from LayOut	523
Exporting PDF Files	524
Presenting from LayOut	525
<i>Part Six: Appendixes</i>	
Appendix A: Installing SketchUp and Getting Help	529
Appendix B: SketchUp Menu by Menu	539
Index	569

The Missing Credits

About the Author



Chris Grover is a veteran of the San Francisco Bay Area advertising and design community, having worked for over 25 years in print, video, and electronic media. During that stint, he's had freelance articles published in a variety of magazines from *Fine Homebuilding* to *CD-ROM World*. Throughout his career, he's worked with clients involved in construction, building materials, and architectural design. Chris is owner of Bolinas Road Creative (<http://BolinasRoad.com>), an agency that helps small businesses promote their products and services. He's also the author of *Word 2007: The Missing Manual* and *Flash CS4: The Missing Manual*.

About the Creative Team

Nan Barber (editor) is associate editor for the Missing Manual series. She lives in Massachusetts with her husband and G4 Macintosh. Email: nanbarber@oreilly.com.

Nellie McKesson (production editor) lives in Brighton, Mass., where she makes t-shirts for her friends (<http://mattsaunderbynellie.etsy.com>) and plays music with her band Dr. & Mrs. Van Der Trampp (<http://myspace.com/drmrsvandertrampp>). Email: nellie@oreilly.com.

Jan Jue (copyeditor) enjoys freelance copyediting, a good mystery, and the search for the perfect pot sticker.

Ron Strauss (indexer) is a full-time freelance indexer specializing in IT. When not working, he moonlights as a concert violist and alternative medicine health consultant. Email: rstrauss@mchsi.com.

Jason Arnold (technical reviewer) lives in Santa Rosa, CA with his wife and two daughters. He spends his free time practicing Japanese, martial arts, and photography.

Lewis Wadsworth (technical reviewer) is an artist, illustrator, and designer with degrees from Dartmouth College and Yale School of Architecture. He teaches at the Boston Architectural College, and his own architectural designs (illustrated using SketchUp) have been published in *AIArchitect* and elsewhere. He currently lives in Boston, Massachusetts with his wife Karen, a cellular biologist, and his two young daughters Sofia and Athena.

Acknowledgments

It takes a team to move a Missing Manual from concept to publication, and I want to thank all the pros who helped with *Google SketchUp: The Missing Manual*. Thanks go out again to my editor Nan Barber for her skillful editing and long hours spent keeping us all on track. Thanks also to Jan Jue for the copyediting and Ron Straus for the index, and to Dawn Frausto for coordinating their work. A special thanks to Lewis Wadsworth for letting us reproduce his spectacular SketchUp models and for the sharp-eyed technical review. His experience as an architect and SketchUp master was much appreciated. My sincere appreciation to Jason Arnold, also a technical reviewer, who brought great enthusiasm to the SketchUp exercises and asked the all the right questions. Thanks to the Go-2-School guys, Mike Tadros and Alex Oliver, for letting us base many of the exercises on their excellent video series (www.go-2-school.com), and to Bryce Stout of Google's SketchUp team for generously contributing his time and assistance. And once again, thanks to Peter Meyers for first signing me up to the Missing Manuals team. Thanks, as always, to my beautiful wife Joyce, and my wonderful daughters Mary and Amy.

—Chris Grover

The Missing Manual Series

Missing Manuals are witty, superbly written guides to computer products that don't come with printed manuals (which is just about all of them). Each book features a handcrafted index; cross-references to specific pages (not just chapters); and RepKover, a detached-spine binding that lets the book lie perfectly flat without the assistance of weights or cinder blocks.

Recent and upcoming titles include:

Access 2007: The Missing Manual by Matthew MacDonald

AppleScript: The Missing Manual by Adam Goldstein

AppleWorks 6: The Missing Manual by Jim Elferdink and David Reynolds

CSS: The Missing Manual, Second Edition by David Sawyer McFarland

Creating a Web Site: The Missing Manual by Matthew MacDonald

David Pogue's Digital Photography: The Missing Manual by David Pogue

Dreamweaver 8: The Missing Manual by David Sawyer McFarland

Dreamweaver CS3: The Missing Manual by David Sawyer McFarland

Dreamweaver CS4: The Missing Manual by David Sawyer McFarland

eBay: The Missing Manual by Nancy Conner

Excel 2003: The Missing Manual by Matthew MacDonald

Excel 2007: The Missing Manual by Matthew MacDonald

Facebook: The Missing Manual by E.A. Vander Veer

FileMaker Pro 9: The Missing Manual by Geoff Coffey and Susan Prosser

FileMaker Pro 10: The Missing Manual by Susan Prosser and Geoff Coffey

Flash 8: The Missing Manual by E.A. Vander Veer

Flash CS3: The Missing Manual by E.A. Vander Veer and Chris Grover

Flash CS4: The Missing Manual by Chris Grover with E.A. Vander Veer

FrontPage 2003: The Missing Manual by Jessica Mantaro

Google Apps: The Missing Manual by Nancy Conner

The Internet: The Missing Manual by David Pogue and J.D. Biersdorfer

iMovie 6 & iDVD: The Missing Manual by David Pogue

iMovie '08 & iDVD: The Missing Manual by David Pogue

iMovie '09 & iDVD: The Missing Manual by David Pogue and Aaron Miller

iPhone: The Missing Manual, Second Edition by David Pogue

iPhoto '08: The Missing Manual by David Pogue

iPhoto '09: The Missing Manual by David Pogue and J.D. Biersdorfer

iPod: The Missing Manual, Seventh Edition by J.D. Biersdorfer and David Pogue

JavaScript: The Missing Manual by David Sawyer McFarland

Mac OS X: The Missing Manual, Tiger Edition by David Pogue

Mac OS X: The Missing Manual, Leopard Edition by David Pogue

Microsoft Project 2007: The Missing Manual by Bonnie Biafore

Netbooks: The Missing Manual by J.D. Biersdorfer

Office 2004 for Macintosh: The Missing Manual by Mark H. Walker and Franklin Tessler

Office 2007: The Missing Manual by Chris Grover, Matthew MacDonald, and E.A. Vander Veer

Office 2008 for Macintosh: The Missing Manual by Jim Elferdink

PCs: The Missing Manual by Andy Rathbone

Photoshop Elements 7: The Missing Manual by Barbara Brundage

Photoshop Elements 6 for Mac: The Missing Manual by Barbara Brundage

PowerPoint 2007: The Missing Manual by E.A. Vander Veer

QuickBase: The Missing Manual by Nancy Conner

QuickBooks 2009: The Missing Manual by Bonnie Biafore
QuickBooks 2010: The Missing Manual by Bonnie Biafore
Quicken 2008: The Missing Manual by Bonnie Biafore
Quicken 2009: The Missing Manual by Bonnie Biafore
Switching to the Mac: The Missing Manual, Tiger Edition by David Pogue and Adam Goldstein
Switching to the Mac: The Missing Manual, Leopard Edition by David Pogue
Wikipedia: The Missing Manual by John Broughton
Windows XP Home Edition: The Missing Manual, Second Edition by David Pogue
Windows XP Pro: The Missing Manual, Second Edition by David Pogue, Craig Zacker, and Linda Zacker
Windows Vista: The Missing Manual by David Pogue
Windows Vista for Starters: The Missing Manual by David Pogue
Word 2007: The Missing Manual by Chris Grover
Your Body: The Missing Manual by Matthew MacDonald
Your Brain: The Missing Manual by Matthew MacDonald

Introduction

When it first came out, SketchUp caused quite a stir in the three-dimensional (3-D) art world for a couple of reasons. First, it's the easiest program you can use to create three-dimensional models of buildings, furniture, and everyday objects. And second, you can get your hands on a fully useful copy for free.

People haven't always found it easy to draw three-dimensional images on two-dimensional surfaces. Just ask the Lascaux cave artists or anyone who sat in art class studying 2-point and 3-point perspective. Even with computers helping out, you can still run into problems. Most 3-D graphics programs have learning curves like the Eiffel Tower and they cost a fortune. In 2000, SketchUp came along and changed the rules by making 3-D drawing almost as easy as drawing on the back of a napkin. Three years later, Google acquired the company that developed SketchUp (@Last Software), since the program works so well with their online program Google Earth.

With SketchUp, you start off with simple tools that are familiar if you've ever used a computer to draw rectangles or circles. Then, to create 3-D objects, you use specially designed tools to push and pull your objects into the desired Ferraris or hot-air balloons (Figure I-1). Pushing and pulling may sound like a haphazard way to build models, but that's far from the case. SketchUp lets you create models that are accurate down to a fraction of an inch. Also, using SketchUp's component tools, you can minimize repetitive tasks and build complex models quickly. When you're done, go ahead and place your model on a map of the world using Google Earth.

So, what's the catch? There isn't one. All you have to do is download the program from <http://sketchup.google.com>. Then follow along in this book, and you'll become a SketchUp master artist in no time.

Note: SketchUp Pro, the pay-to-play version, costs \$495. It's meant primarily for architects and builders who need to share their 3-D work with programs like AutoCAD. If you're not one of them, relax. You can use the free version of SketchUp forever, and the program won't even nag you to upgrade to Pro.

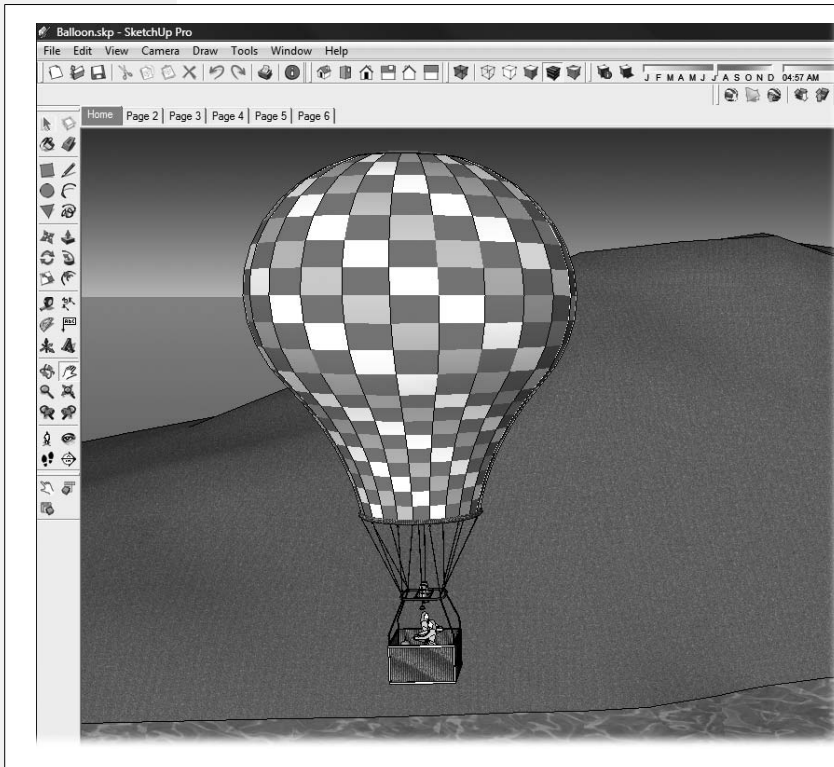


Figure I-1: SketchUp may be a favorite of architects and builders, but all sorts of people use it to design models of just about anything you can imagine. This hot-air balloon is one of the thousands of models found at the Google 3D Warehouse, a website where SketchUp artists share their models.

What You Can Do with SketchUp

As the name implies, SketchUp lets you create 3-D artwork quickly. SketchUp does a few things, and it does them very well. Here's a short list of the jobs SketchUp does well:

- Create models of buildings, furniture, and other everyday objects.
- Design models with interior and exterior details, like houses with individual rooms.
- Quickly design special architectural elements, like pitched or complex roofs.
- Create reusable parts that you can use in other models.
- Easily add colors and textures.
- Create landscaping around buildings.

- Add accurate shadow effects based on geographic location, time, and date.
- Place models in a specific location on the Google Earth map.
- Develop 3-D models from 2-D photographs or drawings.
- Produce walk-through animations.

By contrast, here's a short list of jobs other—that is, more expensive—3-D programs perform better than SketchUp:

- Character animation with moveable joints.
- Organic elements such as realistic hair or fur.
- Complex lighting using multiple light sources.
- Kinetic effects in animation such as bouncing balls or flying bullets.
- Elemental effects such as flames, smoke, and explosions.
- Animations where characters move about a scene.
- Complex architectural designs detailing every electrical wire and pipe in a building.

So, you won't use SketchUp to create a 3-D feature film that competes with *Shrek* or to design a computer game. But once you get the hang of it, you can create great-looking 3-D drawings very quickly. Most people use SketchUp to model buildings, but you can just as easily create other 3-D objects like furniture and appliances. Because SketchUp can export artwork in Google Earth's .kmz format, you can place your SketchUp models on the map as shown in Figure I-2.

SketchUp vs. SketchUp Pro

SketchUp is available in two flavors: the free version and the \$495 SketchUp Pro version. Let your wallet and your 3-D needs be your guide.

SketchUp (free)

With the free version, you can design complex 3-D models and print pictures and export 2-D art to use in websites or other programs. You can save your model as a JPEG or PNG file and edit it in Photoshop. You can also save your models in the .kmz file format that lets you place models in Google Earth. Here's the lowdown on the file formats you can create with SketchUp:

- **Standard 3-D file format:** .skp. You can also save to formats used by earlier versions of SketchUp.
- **Google Earth:** .kmz. Place your models anywhere on the planet!
- **2-D image files:** JPEG (.jpg), Portable Network Graphics (.png), Tagged Image File (.tif), Windows Bitmap (.bmp). You can both import and export images in all of these formats, and also import Targa files (.tga).

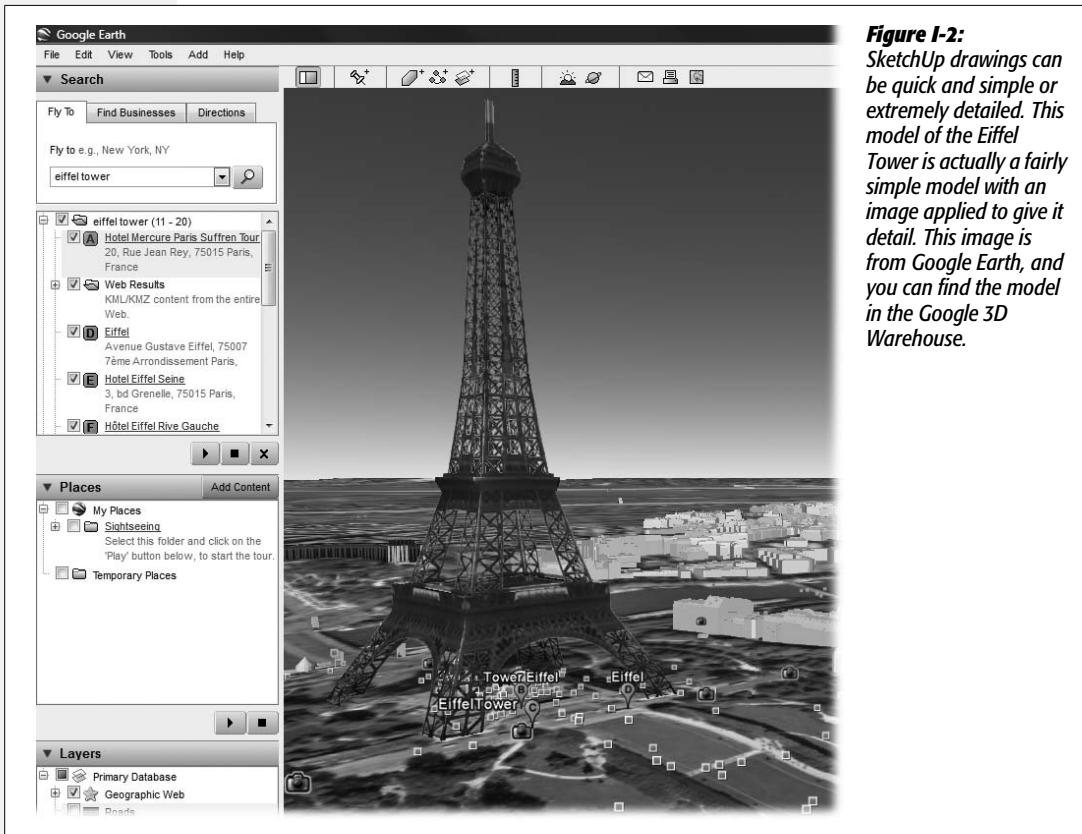


Figure I-2: SketchUp drawings can be quick and simple or extremely detailed. This model of the Eiffel Tower is actually a fairly simple model with an image applied to give it detail. This image is from Google Earth, and you can find the model in the Google 3D Warehouse.

- 3-D models: SketchUp (.skp); Google Earth terrain, 3DS (.3ds); AutoCAD (.dwg, .dxf); DEM (.dem, .ddf). You can import models created in all of these formats, and export your own models as SketchUp (.skp) or Google Earth (.kmz).
- Animations and walk-throughs. Video for Windows (.avi); QuickTime (.mov) files on Mac.

Tip: You'll learn all about importing and exporting with SketchUp in Chapter 13.

SketchUp Pro (\$495)

The SketchUp Pro version gives you many more ways to share your 3-D models with other programs, like AutoCAD, or 3d Studio Max. It lets you use all of the same file formats as the free version, plus more:

- 2-D image files. You can import and export all of the same file formats as the free version, plus *export* in the following additional formats: Portable Document Format (.pdf), Encapsulated PostScript Format (.eps), Epix (.epx), and AutoCAD (.dwg, .dxf).

- **3-D models.** You can import and export all of the same file formats as the free version, plus *export* in the following additional formats: 3DS (.3ds), AutoCAD DWG (.dwg), AutoCAD DFX (.dfx), FBX (.fbx), OBJ (.obj), XSI (.xsi), and VRML (.vrm).l).

The Pro version includes two additional programs:

- **LayOut** gives you a set of tools that let you place, arrange, title, and annotate SketchUp models for computer and print presentations.
- **Style Builder** helps you customize the look of your SketchUp drawings. Want to produce a 3-D drawing of a client's new home that looks as if it were laboriously hand-drawn? It's a snap with Style Builder.

In short, the Pro version gives you better ways to work with other pros and the ability to communicate more complex 3-D details to clients and colleagues.

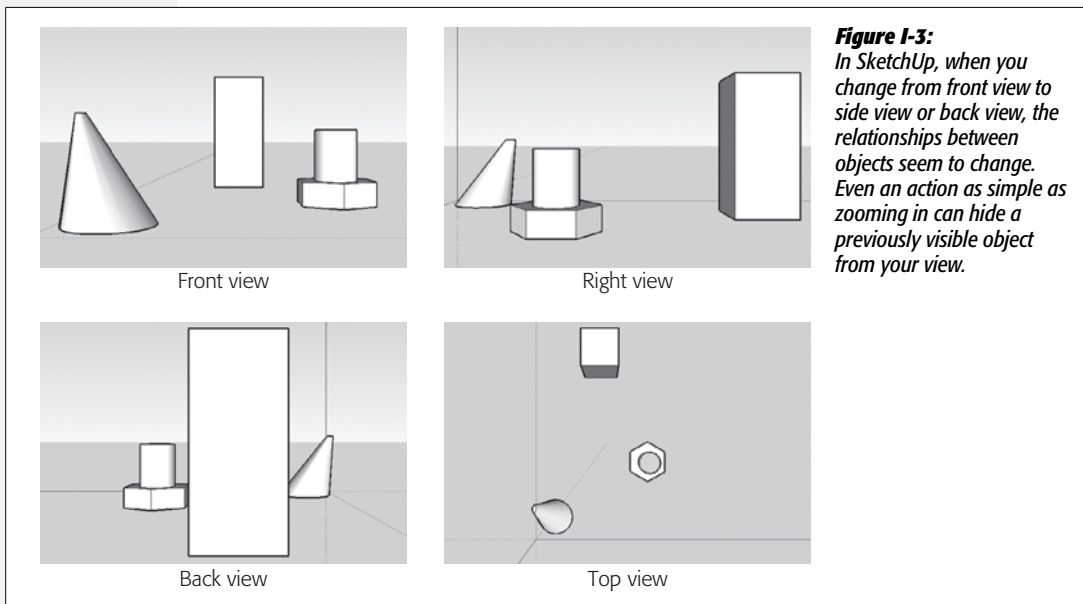
Entering the Third Dimension

In most graphics programs like Adobe Illustrator or Photoshop you move only in two dimensions: up/down and left/right. It's like looking at a flat sheet of paper through a window. You move the window up/down or left/right to see other parts of the paper. Even if you zoom in or zoom out, the details on the paper merely get larger or smaller, while the relative positions of drawings on the paper remain the same. In 3-D programs like SketchUp, you have another dimension, which you can think of as *depth*. Imagine you're walking forward into the scene, or backing away, expanding your field of vision. SketchUp refers to your view as the *Camera*, and that's a great way to understand the difference between 2-D and 3-D. Instead of looking through a window at a flat piece of paper, you're looking through a camera at a three-dimensional world. You can look at any of the objects in this world from any angle including front, back, top, or bottom. As you move the camera in the 3-D world, the positions and relationships of the other objects appear to change. They aren't really moving, but because you've changed position everything looks different, as shown in Figure I-3.

Drawing in 3-D Without Getting Lost

If you're new to the world of 3-D design, sooner or later you're bound to get lost. It happens to everyone, and it's just part of the learning process. For example, you may have zoomed in so closely to a part of your model that nothing looks familiar. Or maybe you've maneuvered the view so you don't see your model at all; you think you're looking off into blank space.

Don't panic. This book provides tips throughout for finding your bearings and moving around your SketchUp world. Here's your first tip for returning to a familiar view of your project: Choose Camera → Zoom Extents to get a view of every object in your SketchUp world. Then choose Camera → Standard Views → Front to see those objects in a familiar orientation. This camera two-step returns your view to a recognizable perspective.



About This Book

Not surprisingly, Google doesn't provide a printed manual for a program it offers for free over the Internet. Instead, Google provides an online help system. It's at <http://sketchup.google.com/support>, and you can read all about it in Appendix A. But with this book, you'll get a full course in creating models in SketchUp, and you won't need to jump back and forth between Google's online help and your project.

This book serves as the kind of manual that should come with every program. You'll find step-by-step instructions for using every feature in SketchUp, including those you may not even have understood, let alone mastered, such as the intricacies of, say, components or the Photo Match tools.

About the Outline

Google SketchUp: The Missing Manual is divided into six parts, each containing several chapters.

Part One: Basic SketchUp Skills introduces the SketchUp workspace and then lets you jump in and create your first model: a simple bench. With these new skills under your belt, you're ready to explore in detail some of the differences between working in two dimensions and working in three dimensions. Step-by-step tutorials show you how to draw 2-D lines and shapes in SketchUp. By the end of Part 1, you're drawing in three dimensions and using a wide variety of SketchUp tools to build increasingly detailed models.

Part Two: Building a House is where you become a journeyman builder. You start by building simple 3-D shapes and learn how to save them as reusable components. Along the way, you become an expert at adjusting the SketchUp view, so you can easily see and work with your model. At the end of this part, you use SketchUp's Outliner to keep track of your components and to show and hide parts of your model as you work.

Part Three: Advanced Construction Techniques tackles more complicated construction projects like buildings with hipped roofs. You learn even more about the power of components and how to save tons of time by using them. You're introduced to another timesaving tool, the Follow Me tool, which can build a complicated edge as fast as you can click.

Part Four: Adding Realism and Movement explores the ways you can place your models into the virtual world provided by scenes and Google Earth. What better way to show the beauty of your finely constructed 3-D building than with a walk-through? You'll also learn how to dress up your models with realistic material shading and shadows. Most likely, your building has a place in the real world. You can find that spot in Google Earth and plop your model down where it belongs.

Part Five: Saving, Printing, and Sharing Projects is where you learn how to show off all your hard work and, if you wish, use the advanced tools in SketchUp Pro. You'll find out about importing and exporting to a variety of file formats. You'll learn about the Style Builder program that lets you customize the line styles used by SketchUp. This section also introduces SketchUp Pro's LayOut tool, used to place your SketchUp models into documents for presentation to clients.

Part Six: Appendixes. Appendix A, *Installing SketchUp and Getting Help*, explains how to download and install SketchUp. You also learn where to look for additional help from sources such as Google and SketchUp user groups and forums. Appendix B, *SketchUp Menu by Menu*, provides a menu-by-menu description of the commands you find in SketchUp.

The Very Basics

You'll find very little jargon or nerd terminology in this book. You will, however, see a few terms and concepts that you'll encounter frequently in your computing life:

- **Clicking.** This book gives you several kinds of instructions that require you to use your computer's mouse or trackpad. To *click* means to point the arrow cursor at something on the screen and then—without moving the cursor at all—to press and release the clicker button on the mouse (or laptop trackpad). To *double-click*, of course, means to click twice in rapid succession, again without moving the cursor at all. To *drag* means to move the cursor while pressing the button continuously. To *right-click* or *right-drag*, do the same as above, but press the mouse button on the right.

When you see an instruction like *Shift-click* or *Ctrl-click*, simply press the key as you click.

- [Excel VBA Programming for Dummies pdf, azw \(kindle\), epub, doc, mobi](#)
- [read online John Carter of Mars, Volume 1 pdf, azw \(kindle\), epub, doc, mobi](#)
- [Algorithms: Design Techniques and Analysis \(Lecture Notes Series on Computing\) for free](#)
- [download Not for Sale: Feminists Resisting Prostitution and Pornography pdf, azw \(kindle\)](#)
- [Glazed, Filled, Sugared & Dipped: Easy Doughnut Recipes to Fry or Bake at Home for free](#)

- <http://pittiger.com/lib/Excel-VBA-Programming-for-Dummies.pdf>
- <http://nexson.arzamaszev.com/library/Friends-Like-These.pdf>
- <http://fortune-touko.com/library/The-Mammoth-Encyclopedia-of-the-Unsolved.pdf>
- <http://pittiger.com/lib/Murder-at-Mallowan-Manor--a-Libby-Sarjeant-Christmas-short-story--Libby-Sarjeant--Book-4-5-.pdf>
- <http://www.netc-bd.com/ebooks/The-Quarry.pdf>