Google SketchUp® 7
Hands-On

Advanced Exercises
By Bonnie Roskes

Exercises, tips, and tricks that will help take your designs, models, and presentations to a whole new level.

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# Table of Contents

## Chapter 1: Chapter 1: Introduction
- How this Book Came About ................................................................. 1
- How this Book is Set Up ................................................................. 1
  - Google SketchUp 7 Hands-On: Basic Exercises .............................. 1
  - Google SketchUp 7 Hands-On: Advanced Exercises ...................... 2
- About the Author .............................................................................. 2
- About the Cover ............................................................................... 2

## Chapter 2: Advanced Intersect and Follow Me
- Creating a Table Leg ......................................................................... 3
- Placing Skylights in a Roof ............................................................... 7
- Creating a Faucet ............................................................................. 9
- Rounding Sharp Corners .................................................................. 13
- Engraving: 3D Text with Intersect With Model ............................... 20
- Creating Portholes .......................................................................... 24
- Creating a Log Cabin ...................................................................... 28
- Creating Flat-Sided Logs .................................................................. 28
- Creating Notches ........................................................................... 28
- Building the Cabin .......................................................................... 31
- Door and Window Cutouts ............................................................... 34

## Chapter 3: Advanced Groups and Components
- The Outliner: Organizing Groups and Components ......................... 35
- Setting Up the Model ..................................................................... 35
- Making Changes to the Model ......................................................... 41
- Window Components: Cutting Thick Walls ...................................... 46
- Cutting Walls with a Single Component ......................................... 46
  - Opening in a “Hollow” Wall ......................................................... 46
  - Opening in a Thick Wall ............................................................ 48
  - Window with Glass in a Thick Wall ............................................. 50
- Cutting Walls with a Nested Component ....................................... 51
  - Wall of Unknown Thickness ....................................................... 51
  - Wall of Known Thickness ........................................................... 56
- Cutting Faces in a Curved Wall ....................................................... 61
- Using Components for Symmetry .................................................. 63
- Making Symmetric Buildings ......................................................... 63
- Symmetry without Seams ............................................................... 66
- Replacing and Reloading Components ......................................... 68
# Chapter 4: Advanced Materials and Textures

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texture Positioning</td>
<td>73</td>
</tr>
<tr>
<td>Fixed Pins</td>
<td>73</td>
</tr>
<tr>
<td>Positioning a Texture around Curved Faces</td>
<td>78</td>
</tr>
<tr>
<td>Example 1 - Positioning a Tiled Image</td>
<td>78</td>
</tr>
<tr>
<td>Example 2 - Positioning a Single Image</td>
<td>80</td>
</tr>
<tr>
<td>Editing Textures and Unique Textures</td>
<td>84</td>
</tr>
<tr>
<td>Tips for Efficiency with Materials</td>
<td>87</td>
</tr>
</tbody>
</table>

# Chapter 5: Working with Digital Images

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texture Positioning with Free Pins</td>
<td>89</td>
</tr>
<tr>
<td>Using Images for Face-Camera Components</td>
<td>93</td>
</tr>
<tr>
<td>Editing Images</td>
<td>100</td>
</tr>
<tr>
<td>Using Photos to Create 3D Models</td>
<td>101</td>
</tr>
<tr>
<td>Creating 3D Models with Free Pins</td>
<td>101</td>
</tr>
<tr>
<td>Creating a Painted 3D Bus</td>
<td>105</td>
</tr>
<tr>
<td>Creating a Painted Playhouse</td>
<td>105</td>
</tr>
<tr>
<td>Photo Match</td>
<td>109</td>
</tr>
<tr>
<td>Photo Match with an Unpainted Model and One Photo</td>
<td>109</td>
</tr>
<tr>
<td>Photo Match with an Unpainted Model and Two Photos</td>
<td>113</td>
</tr>
<tr>
<td>Building a Model from a Photo: Example 1 - Playhouse</td>
<td>115</td>
</tr>
<tr>
<td>Building a Model from a Photo: Example 2 - Table</td>
<td>118</td>
</tr>
<tr>
<td>Building a Model from Two Photos</td>
<td>123</td>
</tr>
<tr>
<td>Projecting an Image onto a Topographical Face</td>
<td>127</td>
</tr>
</tbody>
</table>

# Chapter 6: Sectioning

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sectioning Overview</td>
<td>131</td>
</tr>
<tr>
<td>Using Sections for Interior Design</td>
<td>136</td>
</tr>
<tr>
<td>Using Section Planes to Create Floor Plans</td>
<td>140</td>
</tr>
<tr>
<td>Using Section Planes for Repeating Patterns</td>
<td>143</td>
</tr>
<tr>
<td>Creating a Striped Vase</td>
<td>143</td>
</tr>
<tr>
<td>Creating a Striated Pyramid</td>
<td>146</td>
</tr>
<tr>
<td>Simultaneous Section Cuts</td>
<td>151</td>
</tr>
<tr>
<td>Using Inferences to Create Sections</td>
<td>153</td>
</tr>
</tbody>
</table>

# Chapter 7: Styles and Sketchy Edges

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styles</td>
<td>155</td>
</tr>
<tr>
<td>Pre-Defined Styles</td>
<td>155</td>
</tr>
<tr>
<td>Editing and Creating Styles</td>
<td>157</td>
</tr>
<tr>
<td>Mixing Styles</td>
<td>164</td>
</tr>
<tr>
<td>Watermarks and Backgrounds</td>
<td>168</td>
</tr>
<tr>
<td>Exploring an Existing Watermark Style</td>
<td>168</td>
</tr>
<tr>
<td>Creating a Watermark Style</td>
<td>171</td>
</tr>
<tr>
<td>Logos and Markings</td>
<td>175</td>
</tr>
</tbody>
</table>
## Table of Contents

### Sketchy Edges
- Exploring Sketchy Edges .................................................. 179
- Creating Sketchy Edges .................................................. 182
  - Sketchy Edge with One Graphic (Manual) ......................... 182
  - Sketchy Edge with One Graphic (Style Builder) .............. 186
  - Sketchy Edge with One Graphic for Each Length (Manual) ... 188
  - Sketchy Edge with One Graphic for Each Length (Style Builder) 190
  - Sketchy Edge with Two Graphics for Each Length (Manual) ... 192
  - Sketchy Edge with Two Graphics for Each Length (Style Builder) 193
- Tips for Creating Your Own Sketchy Edges .......................... 195

### Chapter 8: Presentation and Animation
- Scenes .................................................................................. 197
- Layers .................................................................................. 202
  - Using Layers to Hide Objects .......................................... 202
  - Using Layers for Labelled Presentations .......................... 205
  - Using Layers to Explore Design Options ......................... 208
  - Using Layers to Simulate Animation ............................... 211
  - Layers of Groups and Components ................................. 214
- Walk-Throughs ..................................................................... 216
  - Creating Walk-Through Scenes ....................................... 217
  - Adding and Updating Scenes .......................................... 224
- Shadows .............................................................................. 226
- Fog ....................................................................................... 229
- Using Sections and Styles in an Animation ......................... 232
- Animation in Stages ........................................................... 240
  - Dividing the Model into Parts (Groups and Components) ... 240
  - Sectioning Each Model Part ............................................. 243

### Chapter 9: Sandbox Tools
- Creating a Sandbox (TIN) .................................................... 249
- Sandbox from Scratch ....................................................... 249
- Smoove ............................................................................... 250
- Sandbox from Contours .................................................... 253
- Drape and Stamp .................................................................. 254
  - Drape .............................................................................. 256
  - Stamp .............................................................................. 257
  - Stamp in 3D .................................................................. 259
- Adding Detail to a Sandbox .................................................. 260
- Organic Shapes ................................................................. 263
Chapter 10: Miscellaneous Advanced Exercises

Creating a Steel Frame ................................................................. 265
  Downloading the Structural Sections ........................................ 265
  Creating the Column - Beam Connection ................................... 267
  Adding Floor Joists and Connectors ...................................... 269
  Completing the Frame ............................................................. 272
Creating a Spiral Staircase ...................................................... 274
Aligning Any Two Faces .......................................................... 279
3D Geometric Objects ............................................................. 281
  Starting from a Cube ............................................................. 281
  Starting from a Golden Section ............................................. 282
  Starting from a Polygon ....................................................... 284
Creating a Model from 2D Plans ............................................. 288
  Creating the Walls ............................................................... 289
  Adding Components ............................................................. 292

Chapter 11: Dynamic Components

Where to Find Dynamic Components .................................... 297
Using Dynamic Components .................................................. 299
  Furnishing a Dynamic Room ................................................. 299
  Dynamically Decorating a House ......................................... 306
    Dynamic Door ................................................................. 306
    Dynamic Windows .......................................................... 308
    Dynamic Trees ............................................................... 315
    Dynamic Fencing ............................................................ 316
Creating a Dynamic Component ........................................... 319
  Preparing the Model ............................................................ 319
  Creating Material Attributes ............................................. 320
  Creating Ball Position and Animation .................................. 322
  Creating Material Behavior ............................................... 325
  Adding User Options .......................................................... 326
  Finishing the Dynamic Component ...................................... 328
  Sharing a Dynamic Component ............................................ 328
21. The last step is to cut holes in the base to accommodate the handles. Hide all of the handles, then remove the faces covering the holes.

22. Here’s another way to get the same results. Use **Undo** to return to this: the base and untrimmed handles, with intersection edges.

23. Select all intersection edges at one handle (you may end up selecting other edges as well, which is OK. **Copy** the edges (**Edit** / **Copy**). This method will create a more realistic faucet, with separate solid pieces rather than hollow shells.

24. Edit the handle where you selected the edges, and paste in the copied edges using **Edit** / **Paste in Place**.

25. Now you can trim the handles as you did before, and remove the intersection circles from the base.

26. **Undo** again to the untrimmed handles and base, with *no* intersection edges.

27. We will now shorten the handle so that it just barely protrudes into the base. Edit a handle, and use the guide point to draw a vertical circle. (Remember, you can Shift-lock a circle’s orientation before you click its center point.)

28. Move this circle slightly toward the end of the handle.

29. This time use **Intersect** / **Intersect Selected** (not **Intersect with Model**), so that you get intersection edges with the circle, but not with the faucet base. Then trim extra edges.
10. Choose **Edit / Paste in Place** to place the text edges on the box.

11. Paint each letter face new color. Then, to select them all, right-click on any letter and choose **Select / All with same material**.

12. Cut these faces (**Edit / Cut**).

13. Unhide the text, and open it for editing again. Then choose **Edit / Paste in Place** to place these faces on the backs of each letter.

14. Close the text component again. Switch to **X-Ray** view again and move the text straight back so that it protrudes very slightly into the box.

15. **Explode** the component and trim away the fronts of the letters. You’re left with an engraving of the text within the box face. The sides of the letters have the color you used for the 3D text component, and the letter faces have the color you used for the faces along the front of the box.

16. Now that you’ve engraved this box the hard way, let’s see an easier way to do it. Use **Undo** to return to the original 3D text component, protruding into the box, with no intersection edges.
18. Make a component for the window front, again gluing it to Any face and checking Cut opening. The component’s cutting plane should be along the back of the frame.

19. Use the guide lines as a reference to move the front component atop the back component.

20. Erase the guides. Then move the front component up, using the same distance as the thickness of the back frame (6 inches, in my case).

21. Make a component of these two components, gluing it to Any face. Do not check Cut opening, and set the component axes and cutting plane along the back of the front frame.

22. Erase the window.

23. To make the walls that will house this window, make a rectangle in Top view and offset it by the thickness of the back frame (6 inches again, in my case).

24. Pull up the walls.
25. Insert a few windows. No faces of the walls are cut.

![Image of a building with windows]

26. Select and explode all of the windows. This releases the front and back components, which are each set to cut their respective faces, and you can see through the windows.

![Image of exploded windows]

27. From the back of the windows, you can see that the frame fits perfectly within the wall.

![Image of window frame]

28. This step is totally unnecessary, but it’s neat. To make the windows look like stained glass, bring one of the front components into some blank space, or edit one that’s already there. Paint each pane a solid color, and edit each color to be translucent.

![Image of stained glass window]

This is how the windows look with the new colors.
6. Pull the back face of the box so that it intersects the curved face. Then run **Intersect with Model** to create the intersection edges.

7. Erase the sides faces of the box, so that you are left with this:

8. Sample the material on the flat face.

9. And click the inner curved face to project the material onto it. The image size is correct, but the positioning is a bit of a mess. The flat sign face is no longer needed, so erase it.

10. To fix the positioning, let’s try to project the texture. Display the hidden edges, and right-click on one of the middle segments. Choose **Texture**, and **Projected** is not checked. Choose **Projected** to make the material here, well, projected.

11. Turn off the hidden edges, sample the projected texture, and click anywhere on the curved face. The sign now fills the face with projected image.

12. There’s a problem, however. Look closely at the first or last letter of the sign. The “G” below is stretched because it is on a diagonal face that has a projected image from a flat face. So to get a true wrapping of this sign, we can’t use projected textures.
18. You can select each edge, or double-click the face and Shift-click the face again to unselect it. With the edges selected, right-click on one of them and choose **Hide**. Now we have a natural-looking tree.

19. Make a component from this tree, and this time check **Always face camera**. Also check **Set Component Axes**.

20. As before, place the origin at the bottom of the trunk, and set the red direction to the right. This is important: for the green direction, maintain the existing relationship between the current red and green axes. In my example, look at the existing axes indicated by the blue arrow below: the green axis is 90 degrees counter-clockwise from the red. So for the new axes (see the red arrow below), the green axis also has to be 90-degrees counter-clockwise from the red.

If you don’t maintain the red-green relationship, future components won’t be inserted the way you want (they’ll either be facing the wrong way or upside-down).

21. Create the component, move it down to the ground if necessary, and insert a few more.
17. Now for the front of the bus. Click the bus thumbnail in the **Materials** window and apply it to the front face. The position of the texture on this face is random, though you know how to fix it. But there is a better way.

18. Use **Paint + Alt/Cmd** to sample the correctly positioned texture on the side.

19. Now click the front face. The photo still needs to be adjusted, but its placement is correct along the edge shared with the side face.

20. Position the texture on this face. The pins along the common edge are already located correctly. But the two pins indicated below need to be moved to the correct corners.

21. Drag these pins into place.

22. The top face can be done the same way. Sample either the side or front face material, and apply the material to the top. The image is already aligned along the two edges common to the side and front faces, but needs adjustment in this corner:

(If your photo isn’t facing the right way, or is upside down, start positioning it, right-click, and try **Flip / Left/Right** or **Up/Down**.)
8. To complete the main part of the table, we need to remove what’s not included. To make tracing easier, change the edge color (Styles window, Edit tab, Edge settings), and trace the rectangle below the table top and between the vertical supports.

9. Pull this rectangle through.

10. The faces that were not painted, or are painted incorrectly, will be painted a solid color. This color should be red, but I’m using white so that other objects will be easier to see. To paint the outer faces on the other side and back, sample the correctly painted faces first.

11. Make this part of the table into a group. This will prevent other objects from sticking to it, and will make it easier to select later.

12. Now we will create one table leg. Draw a rectangle to create this vertical face.

13. Go back to the photo’s scene tab, right-click on the new face, and choose Project Photo. This applies the photo only to the new face.

14. Trace around the front face of this leg:
17. Close the group and toggle off section cuts.

18. The last two section planes will be used for getting the necessary views for placing furniture. Activate **Section Plane** again, and orient it to the ground plane. Hold Shift, and place the plane just below the roof.

Now you can see into the room on the second floor, and all of the other planes have returned to the display.

**Tip:** If you want to keep certain section planes from being displayed, you can hide them like any other SketchUp object. Hidden section planes will not return to the display when you toggle section plane display; you will need to manually unhide them.

19. Toggle off the section plane display, and add some furniture. (The easiest way to find furniture is to do a quick search in the **Components** window for the piece you want, such as “queen bed author:google.”)

20. Toggle section planes back on. Then make a copy of the horizontal plane you just made, placing it just below the second floor.

21. This section plane is not automatically active, so right-click on it and choose **Active Cut**. (You can also activate a section plane by activating **Select** and double-clicking the plane.)
5. To see what these styles look like, activate them one by one. “Company Watermark” has a logo overlay in the lower right corner, and a grainy overlay throughout.

NOTE: Watermark styles are covered in “Watermarks and Backgrounds” on page 168.

6. “Marker with Depth Cue” has marker-like sketchy edges that become less thick the farther they are from the camera. No axes are displayed, there is no sky or ground, and the view is Hidden Line.

7. “Reddish Brown” has an orange background, and its face colors are orange for the front, pale yellow for the back.

8. Activate “Base Style” again, and click Create new style to create a new style based on “Base Style.”

9. Assign this new style a name.

10. With the new style active, click the Mix tab. This opens the lower pane of the Styles window, which should be set to In Model.
6. Save and close the file. Then make similar changes in the “documentProperties.xml” file.

The edges are now evenly split between circle and triangle chains.

7. Save and close the file, and make a new .zip of the contents inside “temp.” Rename this .zip file “Circle Triangle Chain.style.” and move it into the “Sketchy Edges” folder. Delete the “temp” items.

8. Return to SketchUp and activate this new style.

Sketchy Edge with Two Graphics for Each Length (Style Builder)

For this style, we’ll fill in a template generated by the Style Builder.

1. Open Style Builder, and choose File / Generate Template.

2. Make sure all five lengths are used, and set 2 Strokes per set. The Stroke width, as we’ve seen, is 16.

3. Click Save As, and save the template as a graphic file.
15. Because the scene was not saved with a specific view, you can orbit to any view and click the scene tabs to try out the two floors.

### Using Layers to Simulate Animation

SketchUp does not have the capability to actually move objects in an animation (well, not without a plug-in or dynamic component), but you can use layers and scenes to simulate objects moving.

1. In the **Components** window, search for “ceiling fan roskes.” For the model shown below, click the thumbnail to insert it directly into the current file.

![Components Window](image)

*NOTE:* The “Ceiling Fan Animated” model contains the completed version with the scenes we’re about to create. Because this model has scenes, it should not be inserted directly into an open file, it should be opened in another instance of SketchUp.

2. **Explode** the model.

![Exploded Model](image)
8. Change the time to an evening hour, and the shadows pass to the other side of the house.

9. Create the “Winter PM” scene.

10. Now switch to a summer month and morning hour, and create a new scene.

11. Switch to an evening hour and create another scene.

12. Because the view was not saved in any scene, you can view any part of the house, such as the patio, and check out the shadows that appear at various times of day and year.

13. Shadows also appear inside the house. Use the walk-through tools to make your way inside, and click the scene tabs to see how the shadows pass through the rooms.

NOTE: You may have already noticed, but shadows can cause your model to move slowly. This is because SketchUp needs to recalculate shadows every time you orbit or zoom or walk. If shadows are slowing you down, turn them off, then turn them back on when you have the view you want.
9. Do the same for a point with the same elevation on the other side of the lake.

10. Now complete the road line with a tangent arc on either side of the line.

11. Select the three roadway curves and use Offset to make roadway boundary curves 3 meters on either side. (If your units are not meters, enter 3m.)

12. Erase the rectangle and roadway center lines, so that only the boundary lines remain.

13. Turn off X-Ray view, and choose Camera / Perspective.

14. To compare Drape and Stamp, make a copy of the entire model. Drape will be used on TIN, Stamp on the other.

### Drape

1. For one of the TIN models, select its roadway boundary curves - there should be six total.
2. Click Drape (Tools / Sandbox / Drape).
3. Click the TIN. Even though it is grouped, you can still select it as a whole (you could select it ungrouped as well).
The **Outliner** should look like this: four tread components and one group of posts (the group was renamed as “Posts” in this example).

16. Select the tread above the posts to see which one it is in the **Outliner**.

17. In the **Outliner**, drag the post group below the tread that was highlighted.

This makes the posts a sub-component of the tread. And because all treads are identical, they each get their own group of posts.

18. To create a railing, start by opening a tread component (not the top one) and adding a vertical line from the outer bottom corner, approximately aligned to the center of the post below. (It might be easier to visualize this in X-Ray view.) The vertical line appears on all treads.

19. Draw another line connecting the vertical line to the end of the line above it.

20. For the railing section, draw another circle, centered at the bottom of the vertical line.
15. Rotate and Move it into the corner, and apply some color if you want.

16. The next cabinet is supposed to be 2’ wide so copy the 1’ cabinet, make it unique, edit it, and move its entire right side one foot to the right. Next to that, insert two copies of the washer, and one range.

17. Next, insert a 2’6” cabinet.

18. Wall cabinets should proceed along the wall above the appliances. So make a copy of the 2’-6” cabinet, and make the copy unique. Edit the copy to remove the wall cabinet and counter.

19. The next wall cabinets should have the counter included, to go over the washer and dryer. So copy the original 2’-6” cabinet once again, and make it unique. Edit it to remove only the wall cabinet, leaving the counter.
7. Fence materials are not available on the Component Options window, so open the changed fence and change its materials.

8. Now open the In Model folder of the Components window, and find both fences - the original and the new one. Right-click on the original fence thumbnail and choose Select Instances.

9. Now right-click the thumbnail for the new fence and choose Replace Selected.

Now all fences have the new spacing and materials. (This picture shows the “Posts” layer hidden.)

10. To extend one fences to the correct length, activate Scale and drag the handle for the unfinished end to meet the post of the neighboring fence.

Once scaled, the posts self-copy to maintain the set spacing.
Creating Material Behavior

When the user uses Interact on the ball it moves, and when the user click on the wall or stand, we want its material to change. So we need a different type of “onClick” behavior for these objects.

1. Start with the wall: add an “onClick” attribute. Then place your cursor inside its definition field.

2. For the definition syntax, find the SET function, listed under “onClick.”

3. Insert this syntax into the definition field.

4. The attribute is the wall material, entered below as “Bouncer!WallMat.” Then each material name comes next, each within quotes and separate by commas. Type this carefully!

5. After pressing Enter, test out the walls by using Interact to click on them. Both walls should scroll through all four materials.

6. We want the same behavior applied to the stand. But we don’t need to type this syntax out again; we can copy the one we already entered for the wall. Select the wall’s material behavior syntax and copy it (Ctrl+C, Cmd+C).

7. Add an “onClick” attribute to the stand, and paste in the syntax (Ctrl+V, Cmd+V).