Create

Scenery & Props

with **SketchUp**® plus V-Ray 2.0 ®
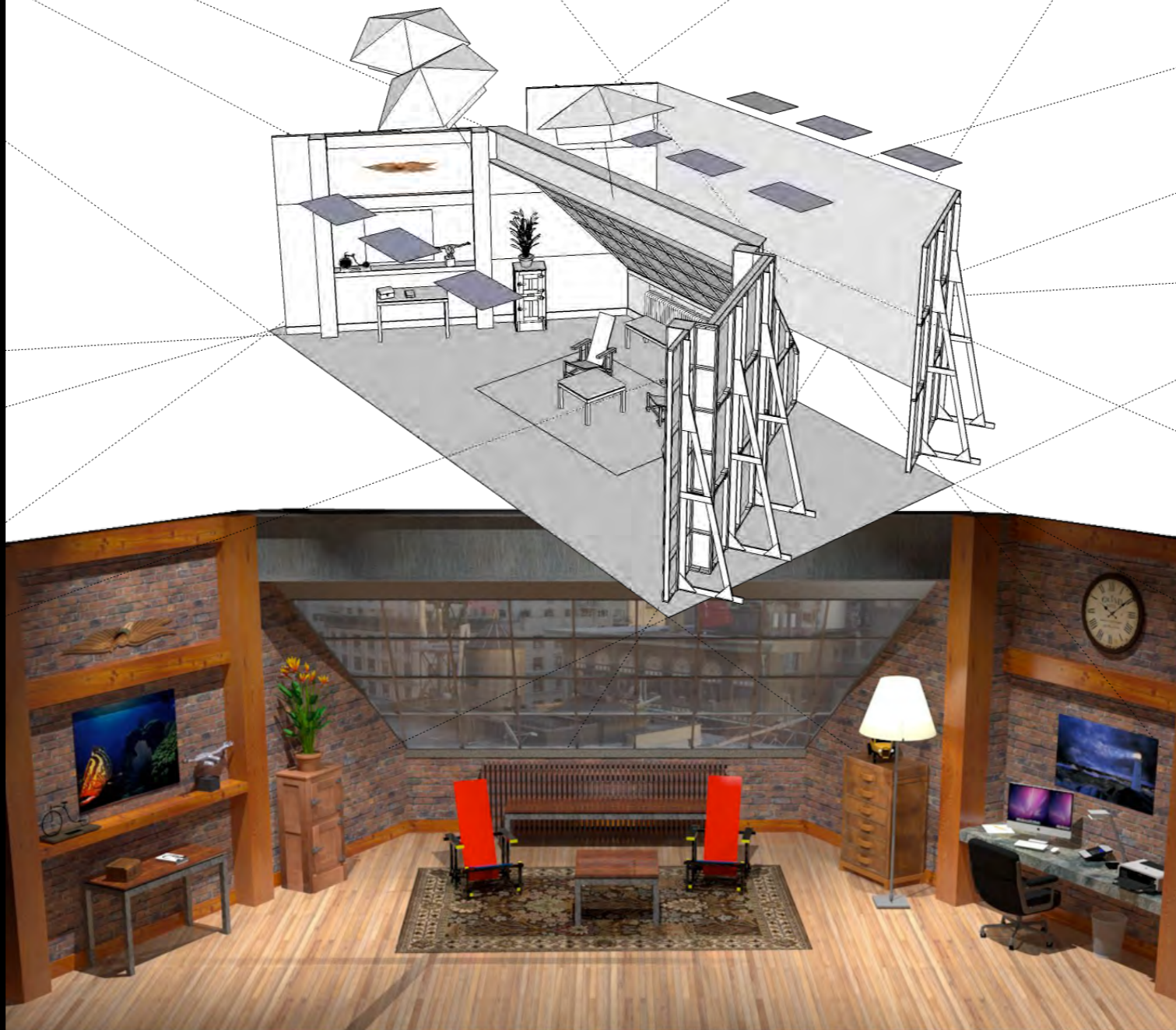

By John Romeo

Interactive Book

SketchUp Pro®

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Introduction

Scenery Design and Construction is an exciting collaboration of artists, materials, and technology. Rapid advances in digital imaging enables the wildest creations possible. Designers were often limited to what could be drawn effectively, but SketchUp® and V-Ray® make anything imaginable possible. The interactive digital format of this book brings making scenery into a new dimension: in fact this book is digital scenery.

Create Scenery & Props with SketchUp®

Create

Scenery & Props

with **SketchUp®**   plus V-Ray® 2.0

Interactive eBook
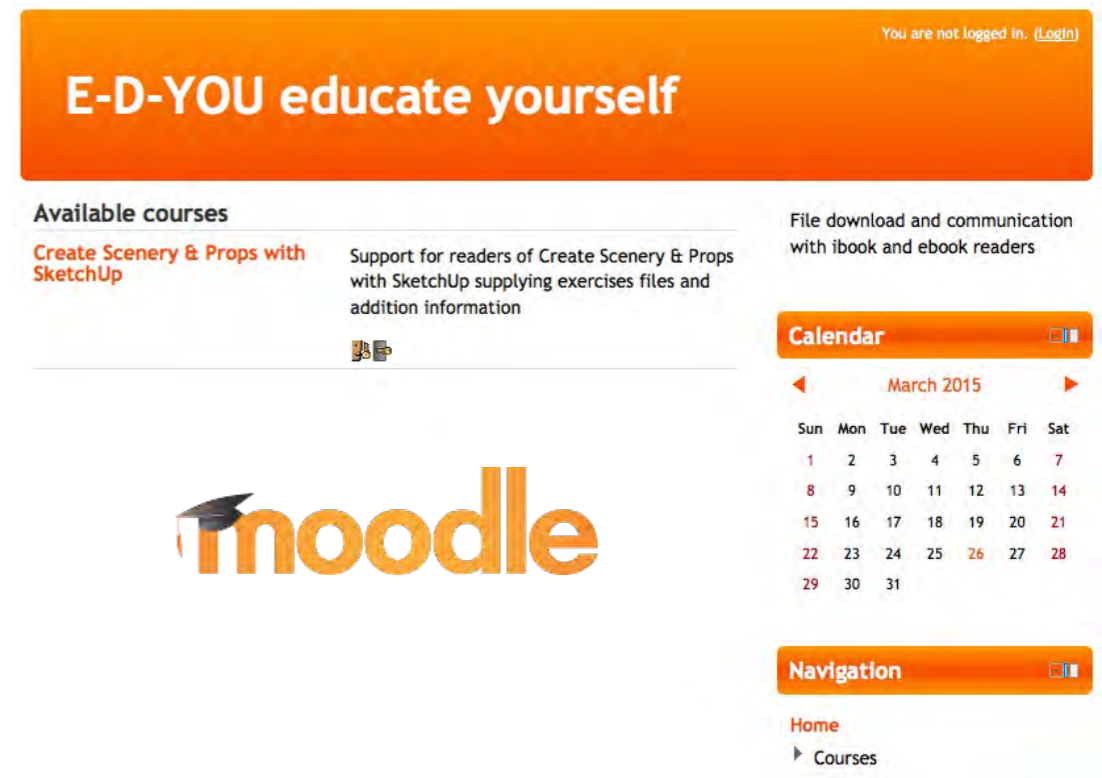
This Book is an Interactive Digital Portal to access video tutorials, images, text, and supporting information controlled by the reader/viewer. The text and images provide an overview of each video lesson. The video streamed to the book is a comprehensive collection of step-by-step tutorials going through the process of designing a set in SketchUp® and rendering it with V-Ray®. The traditional method of set design started with a perspective sketch, and the orthographic projection, which includes plan, section and elevation views, that are followed by followed by a hand crafted white paper model and finished color model. Creating Scenery & Props with SketchUp by means of its interactive digital format moves forward from tradition: not only in how we read a book, but also how we draw. An Internet connection is required to access the video clips and experience the interactive content.

How to use this eBook

To experience this ebook effectively you will need access to the support materials such as exercise files, images and video tutorials. I have setup this book to work with Moodle Learning Management System. The Moodle LMS is used by many schools and universities for teachers to extend learning beyond the classroom. All the files you will need to work along with the video are available for download from the ED-You Moodle.

SketchUp.skp files will automatically download into your browsers' download folder. Image files and PDFs will open if you have pop-ups enabled: they can also be saved to your computer. You can contact me with questions through Moodle or email:john@ed-you.com.

Link Book with Moodle

Click Here: http://ed-you.com/moodle

Login as: Guest

Password: sets

Moodle will open in your Browser, therefore, you cannot return directly to the Book, you have to press the enter button on the iPad®, and select the book to return.

Exercise Files

If you do not want to use Moodle, you can click on the link for the exercise file on the video play pages (for Chapter 1 and Chapter 2 only). Links to the first 2 Chapters are provided so that you can get started without having to download the large Zip File.

 For all other chapters down the zip file below:

Download SketchUp Exercise Files

The Zip File is Approximately 250MB

If you are using the Book on a computer your browser will download the file, usually into the download folder.

If you are using an iPad you will need an app like dropbox to find the download.

The video lessons are real time training streamed to the Book. The text and illustrations contains a description parallel to the pop-up index in each movie segment. The text provides context support for the video; it is not a transcript of the video.

In the first few lessons I emphasize Using Components, The Outliner, The Tape Measure Tool, The Move/Copy Tool, The Protractor Tool and The Rotate Tool because they are very important for smooth workflow and navigation. I use images rather than SketchUp components to illustrate the object that already exist (on a layer) so that duplication and conflicts don't occur between what already exists and what is being created. For example, I use the png image of the Loft Rendering in many lessons, which can be turned on and off in the Layers Window.

What Version of SketchUp Pro® and V-Ray®is this book based on?

The book starts with SketchUp Pro® 2013 and finishes with SketchUp Pro® 2015 and V-Ray® for SketchUp 2.0. Since SketchUp is now releasing an annual update it is very difficult to make the ebook, version specific. The good news is that the interface is almost identical across the 3 versions.

Some exercise files are SU 2013, SU 2014 & SU 2015. I will save all the exercise files backward to SU 2013 and make them available on Moodle.

The SketchUp (.skp) file names shown in the top of the SketchUp file in the video are not necessarily the same name.

Example: c1s1 = Chapter 1, Section 1

Exercise File Name is: c1s1.skp

Complete video tutorials are linked to my website and streamed to the ebook. Because the Book format has a 2 gig file limit, you will have to be online to experience the total functionality.

This Book is not geared to teach the fundamentals of SketchUp®. However, many basic functions are covered in the context building parts of the model.
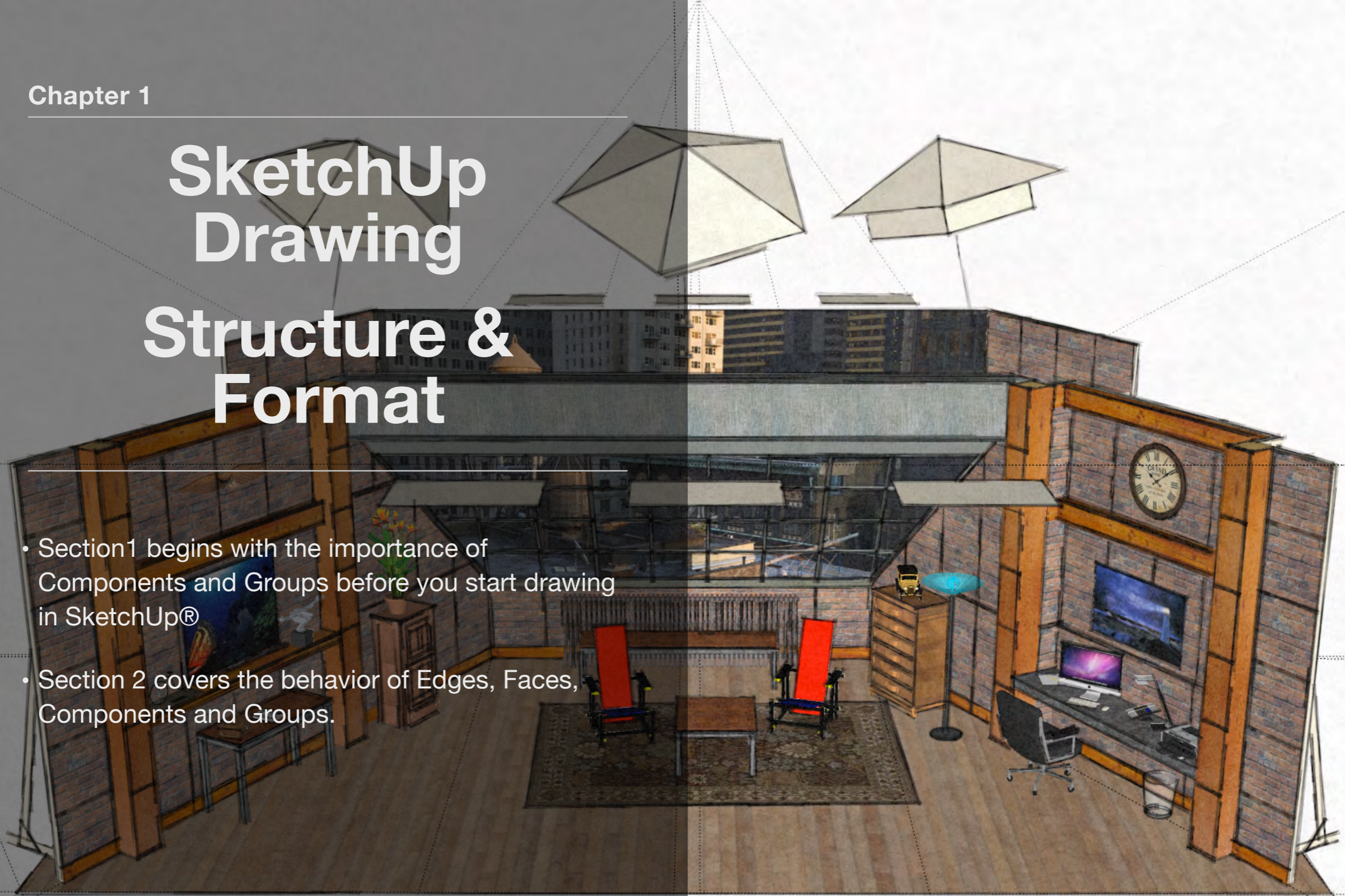
SketchUp® provides basic trainings at:
http://help.sketchup.com/en/article/116174

http://www.sketchup.com/learn/videos?playlist=60

SketchUp Drawing

Structure & Format

- Section1 begins with the importance of Components and Groups before you start drawing in SketchUp®

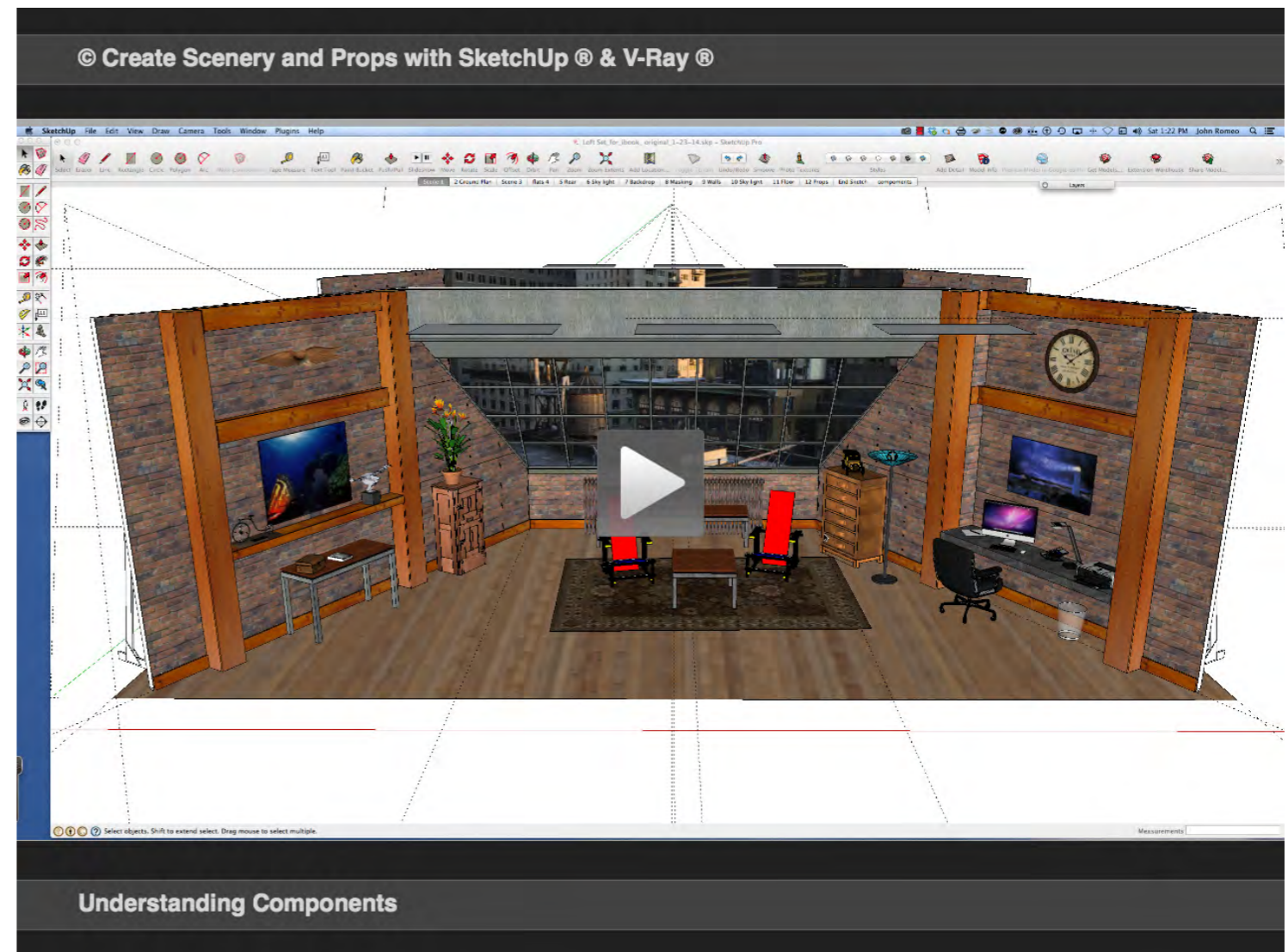- Section 2 covers the behavior of Edges, Faces, Components and Groups.

Understanding Components

Movie 1.1 UNDERSTANDING COMPONENTS

VIDEO MARKERS

1. Component Overview

2. Nested Components

3. Adding Components
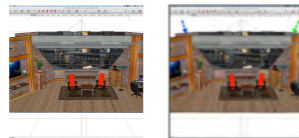
4. Complex Components

Watch Video for an Overview – no need to follow this video step-by-step

Exercise FILE c1s1.skp

01_Component Overview 0:00:00:01
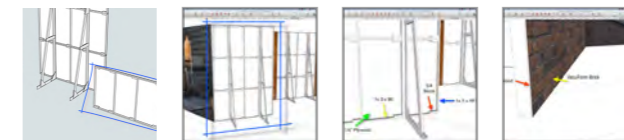

01_Image 1

Understanding Components is an important building block of a SketchUp drawing. Essentiality, a Component is a group of objects that can behave as one object. A component in SketchUp, is similar to a Symbol in VectorWorks® or a Block in AutoCad®. Setting up the drawing structure in the beginning will save much time in the end. The best way to understand components is to look at how they are used in the set.

## 02_Nested Components 0:00:46:18
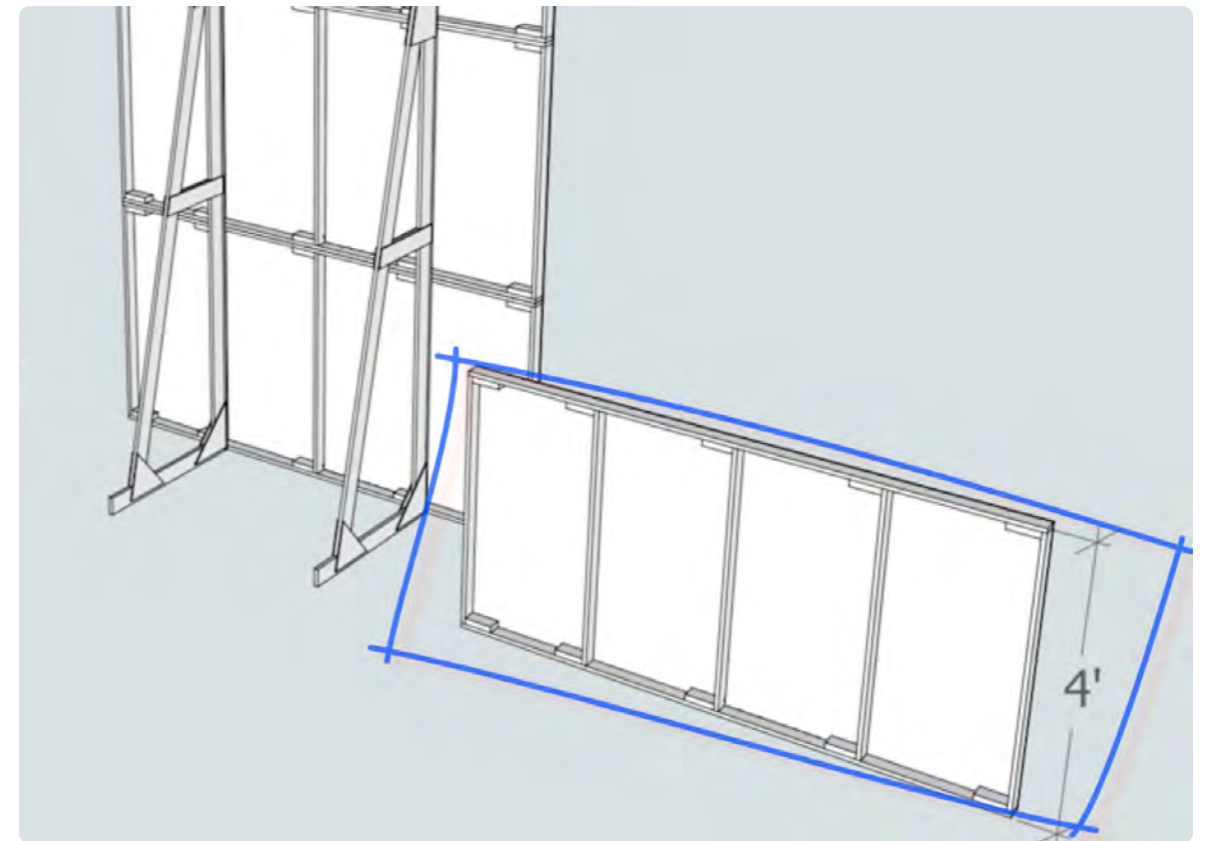
02_Image 1

The Flat in image 1, is component made of 5 pieces: **1 Block 5/4 x 3 x 5**; **1 pc 1 x 3 x 46.5"**; **1 pc 1 x 3 x 96"**; **1 pc of 1/4" x 4 x 8 Plywood and 1pc of Vacuform Brick.** The 8 ft wide x 12 ft high brick wall is a Component made up of three 4 x 8 flats (components/instances) stacked one on top of the other (railroaded). Since there are four 8 x 12 Brick Walls in the set, there 11 instances of the 4 x 8 flat, plus the original.

03_Adding Components 0:03:22:13
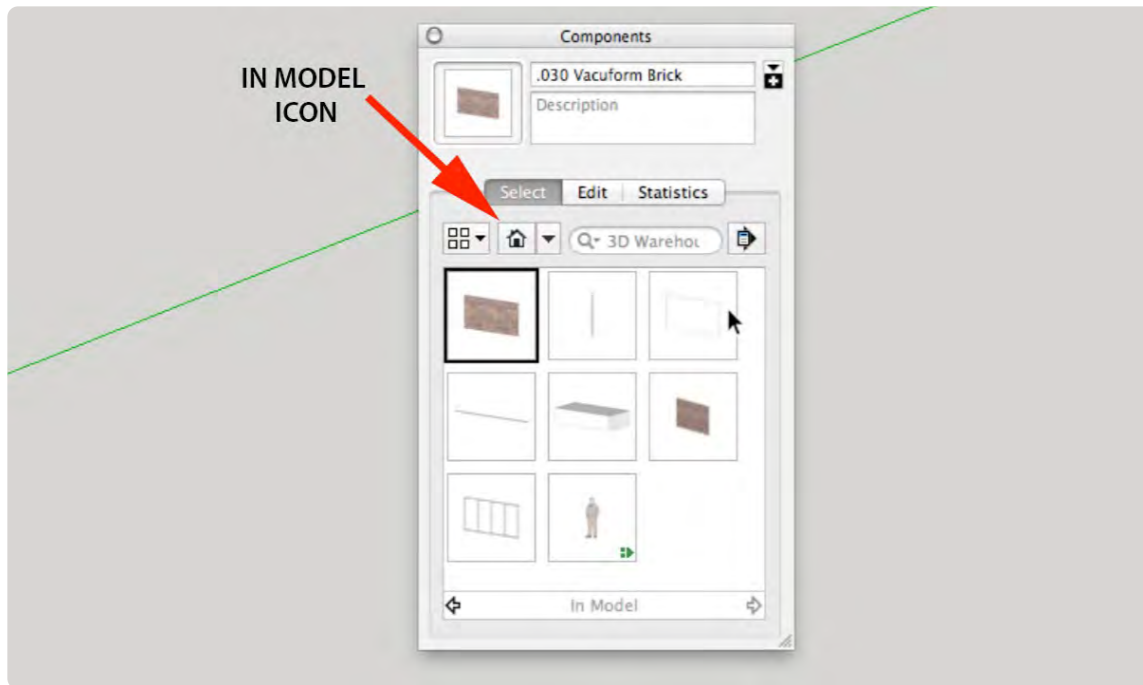
03_Image 1

The Component Window displays the Components in the Model when "In Model HOUSE ICON" is selected. Highlight the component and drag it onto the stage and move it into position with the Move Tool. This section is not about drawing the flat, it is to get an understanding of how components work before diving into SketchUp®:

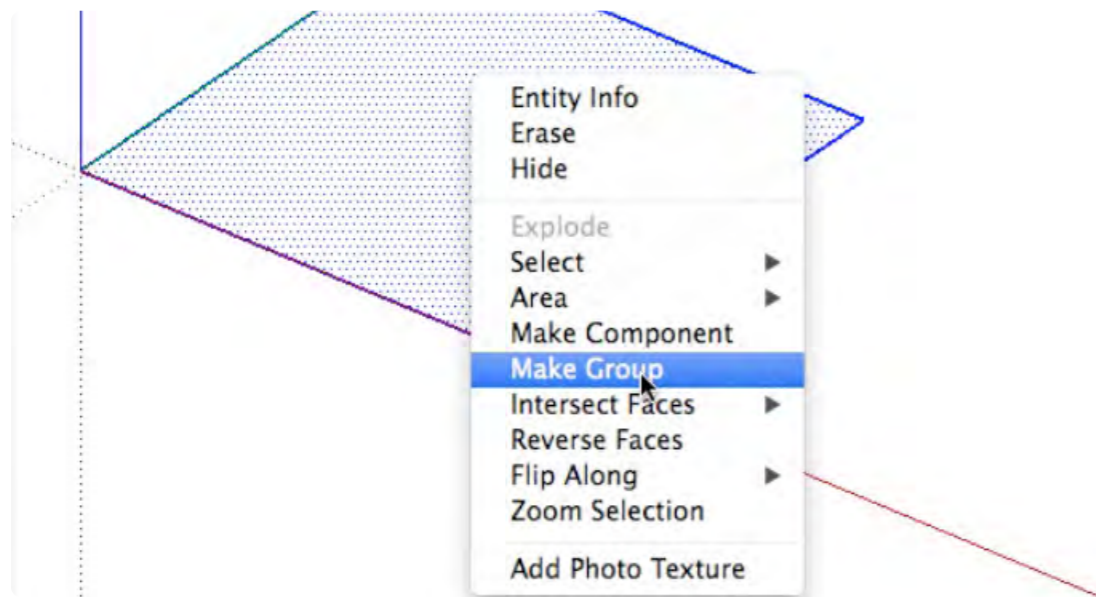## 04_Complex Components 0:03:22:13
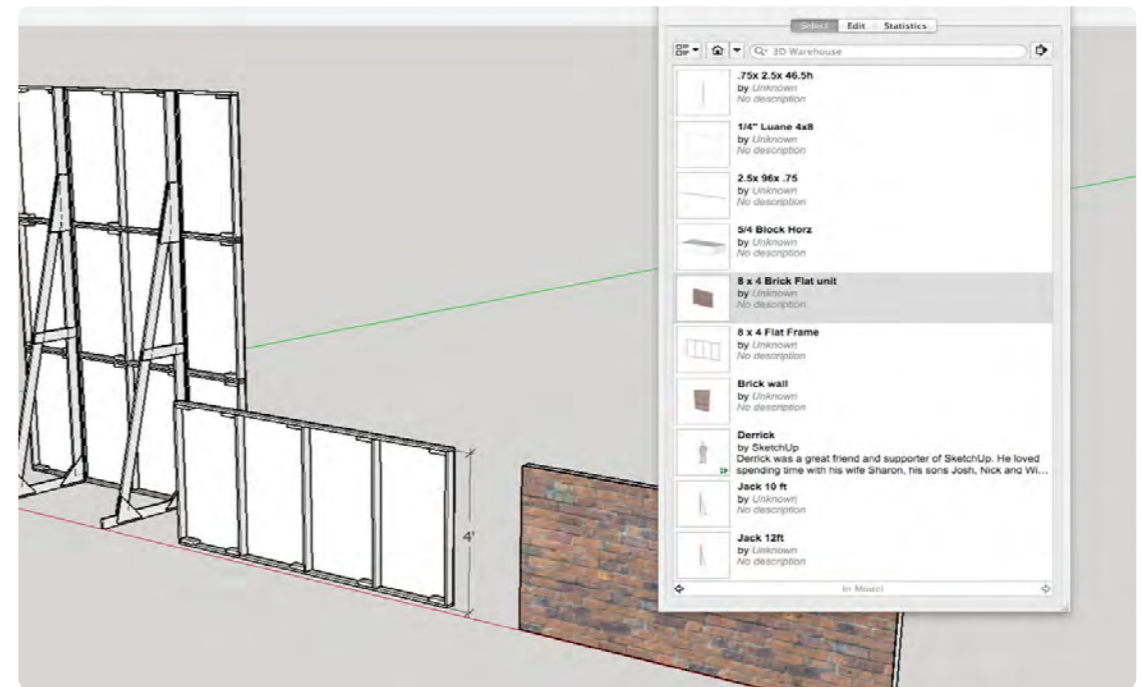
04_Image 1

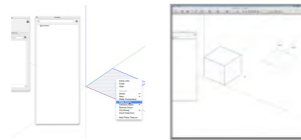Good labeling makes it easy to find Components after many Components populate the window. Three railroaded flats stacked one on top of the other makes up the 12 ft high wall. The Outliner Window displays the Complex Components and Sub-components for easy navigation. We will be using the 3 windows shown in image 4, which are: The Component Window, The Outliner and The Component Attributes Window.

Groups vs. Compoments

Movie 1.2   UNDERSTANDING GROUPS & COMPONENTS

VIDEO MARKERS

1. Edges and Faces

2. Groups

3. Components

4. The Difference

Exercise FILE c1s2.skp

01_Edges and Faces 0:00:00:03

02 image 1

02_Groups 0:00:28:11

In SketchUp, a Rectangle is made up of a series of edges and a face that behave independently until they are made into a group or a Component. Groups are entities that can hold other entities and are commonly used to combine several entities as a single entity for the purposes of performing a quick operation with the combination (such as a copy). A group turns the edges and faces into an object or a collection of objects.
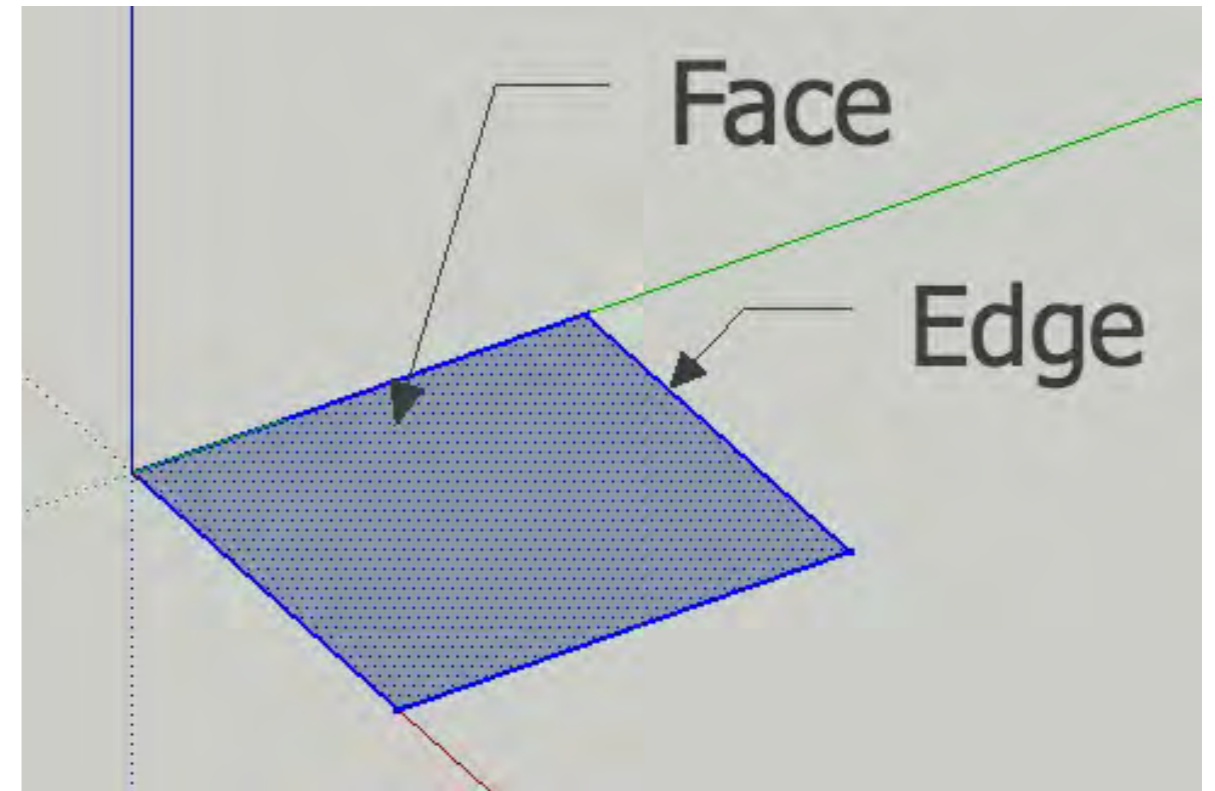
A **Group** may contain attributes, but if you change the attributes of a Copy of the Group, for example, the color: the color of the copy will not change.

Also, multiple copies increase the file size and memory used. I use groups for temporary objects that I will probably delete, so I will not be using groups to often. Groups are useful if you don't need much control of the object.
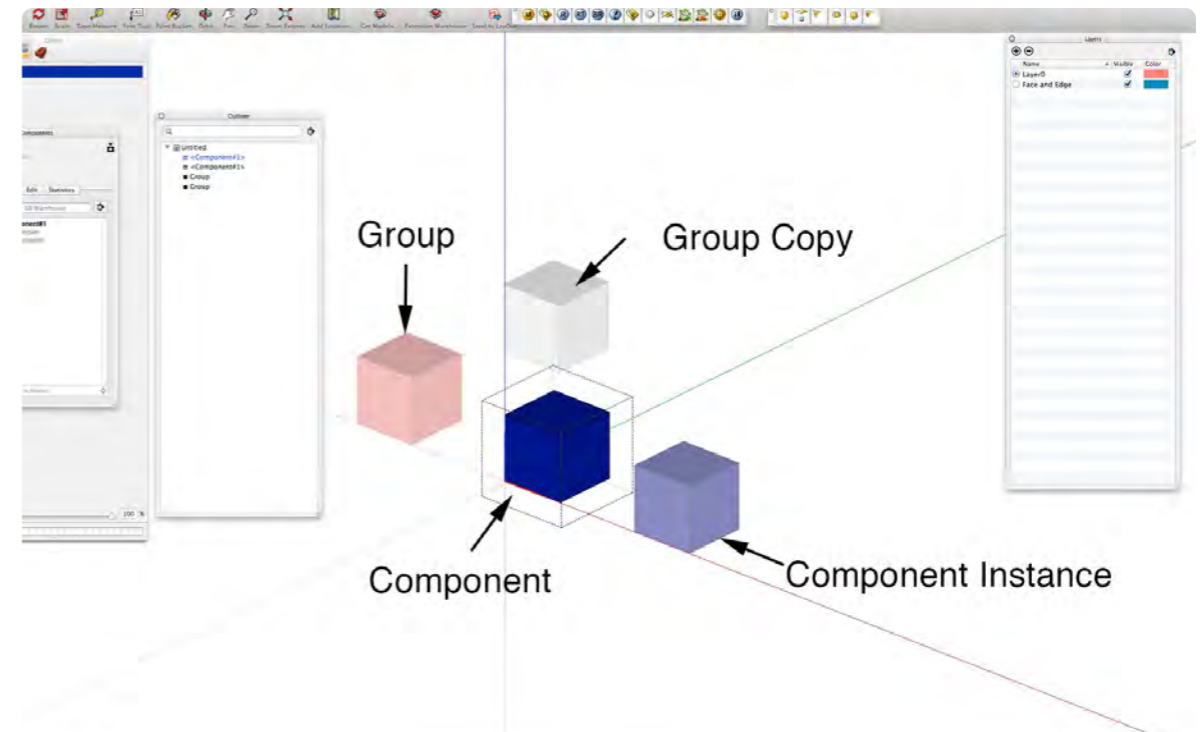
03_Components 0:02:36:26

03 image 1

04_The Difference 0:03:22:16
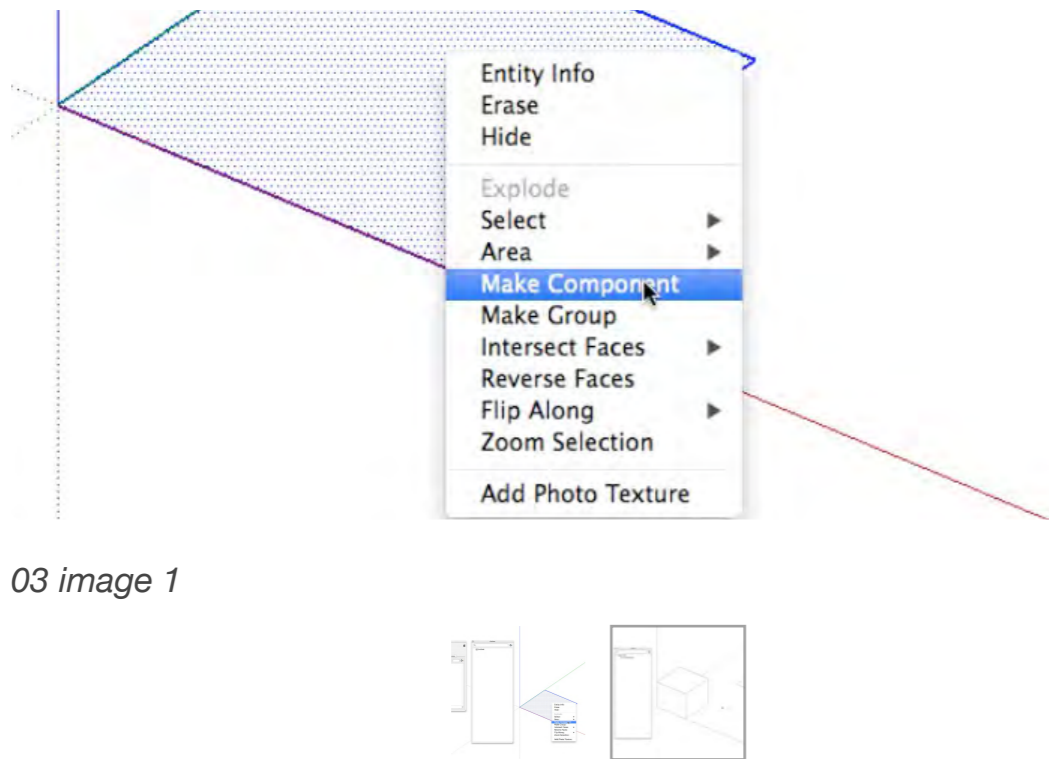
04 image 1

A **Component** is similar to a **Group**, however if you change an attribute of a Components, the attributes of all instances (copies) of the Components will be changed. Component Attributes can be assigned directly to the object or through the Components Attributes Window. Understanding how groups and Components work before starting the drawing will eliminate much duplication of work, steps and time. An edge or a face are called entities when they stand alone: Edge Entity/Face Entity.

The Image shows the difference between a Group and a Component color attribute. The Pink Cube is a Group with the color attribute red (pink because of selection); The White Cube is a copy of the group unchanged by changing the original Group Red. When the Component Cube is highlighted and the color attribute blue is added, the Component instance (copy) turns blue as well. An attribute change to a group only effects the select group. An attribute change to one Component effects all instances (copies) of the Component.

Creating Basic Set Objects 101

- Chapter 2 is the Foundation chapter beginning with how to layout the Ground Plan of the Set with the Tape Measure

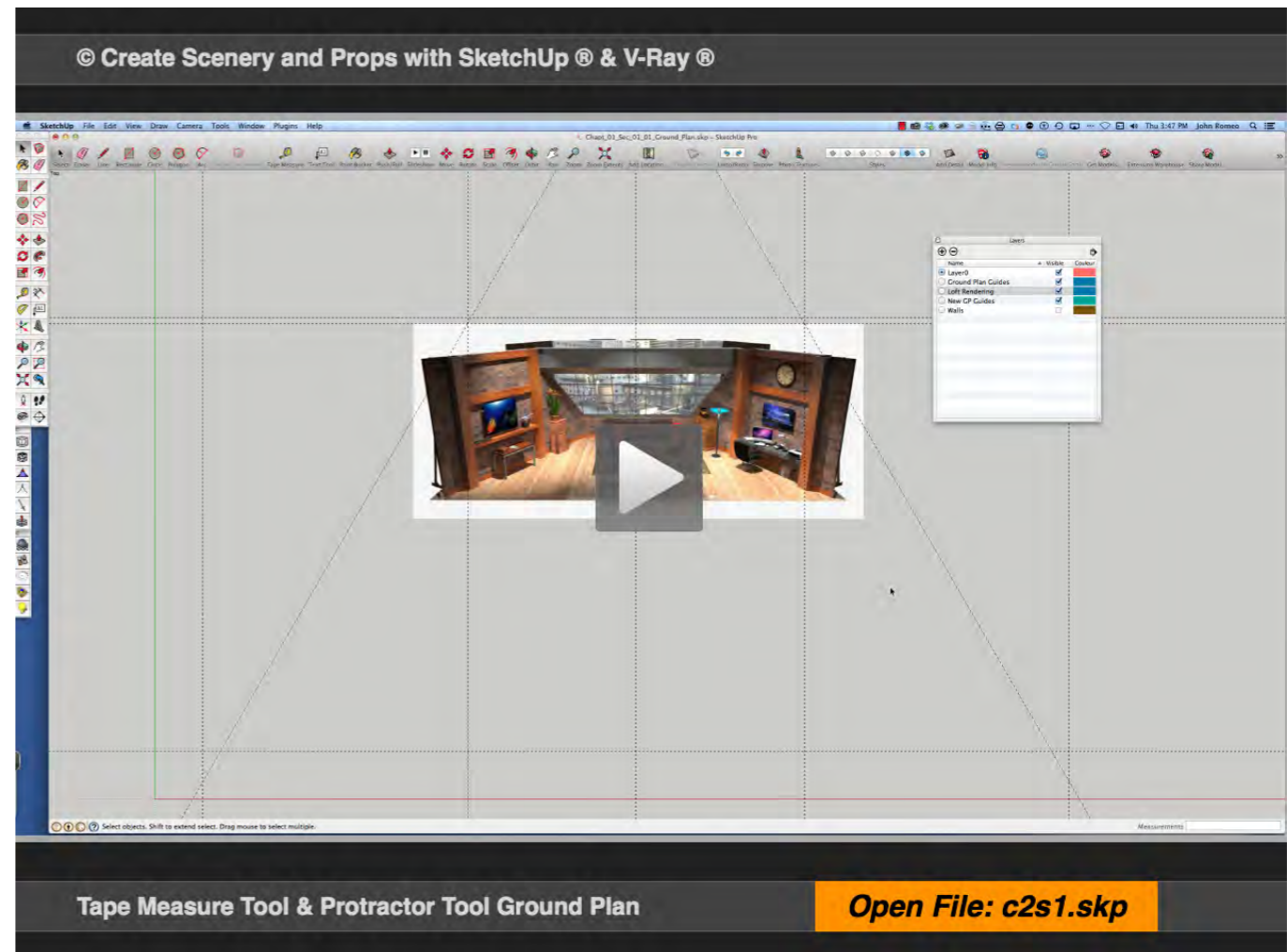- Creating shapes to represent scenic elements

Tape Measure & Protractor Tool

VIDEO MARKERS

1. Tape Measure Tool

2. The Floor Plan

3. Knee Wall Guides

4. Protractor Tool

Movie 2.1 Tape Measure Tool

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Tape Measure Tool & Protractor Tool Ground Plan   **Open File: c2s1.skp**

Exercise FILE c2s1.skp
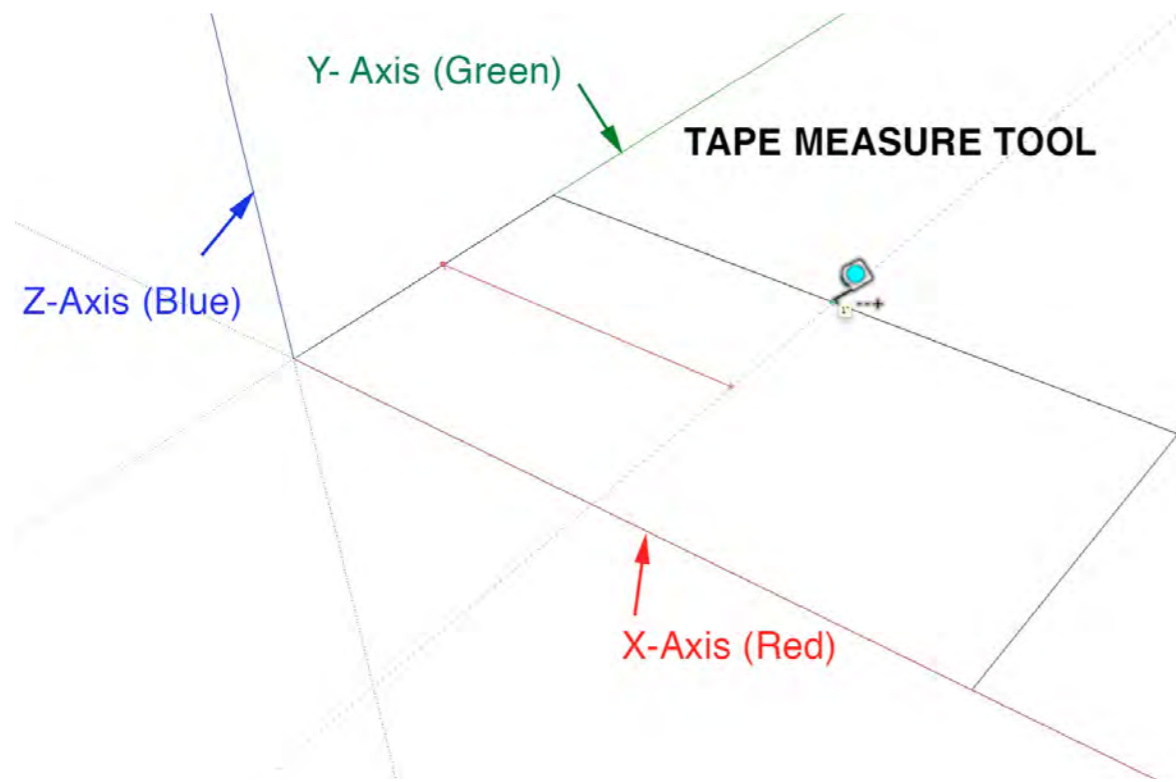
016

01_Tape Measure Tool 0:00:00:02

Image 1

The Tape Measure Tool is my favorite tools in SketchUp. It can create a guideline to infinity in any direction, either in perspective or in parallel views. The intersection of the guides creates snap points in the **X (red), Y (green)** and **Z (blue)** axis. This makes it easy to draw with speed and precision. Other programs like VectorWork and AutoCad have tape measure tools, but they just measure, they don't produce guides.
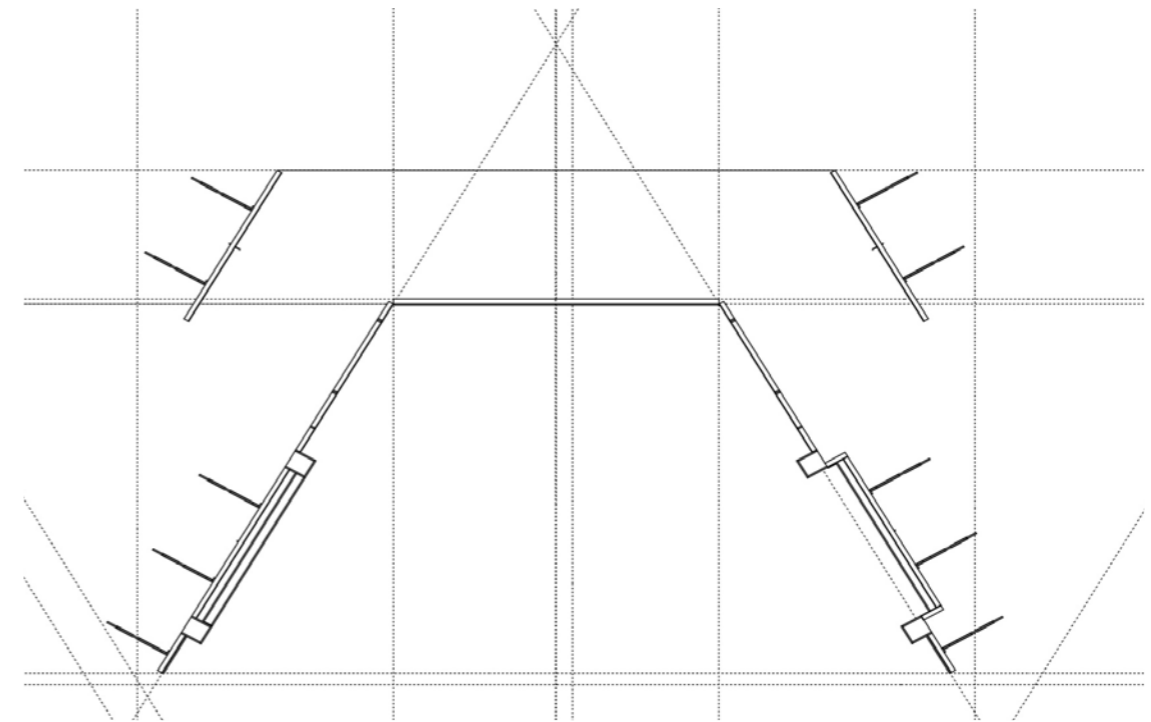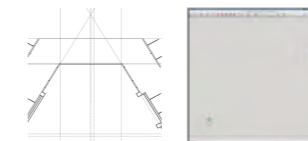
02_The Floor Plan 0:00:39:25

Image 1

The Exercise File opens in the Top Plan Parallel View. Select the Tape Measure Tool and click on the **Y-axis (Green to the left)** holding down the left Mouse Button and start dragging to the right and type 24, press enter. This will place a guide 24" away from and parallel to the **X-axis (Red)**; notice the dialogue box in the lower right hand corner (see Image 2); just type in 24, do not try click in the dialogue box. The number can be changed in the dialogue box before pressing enter.
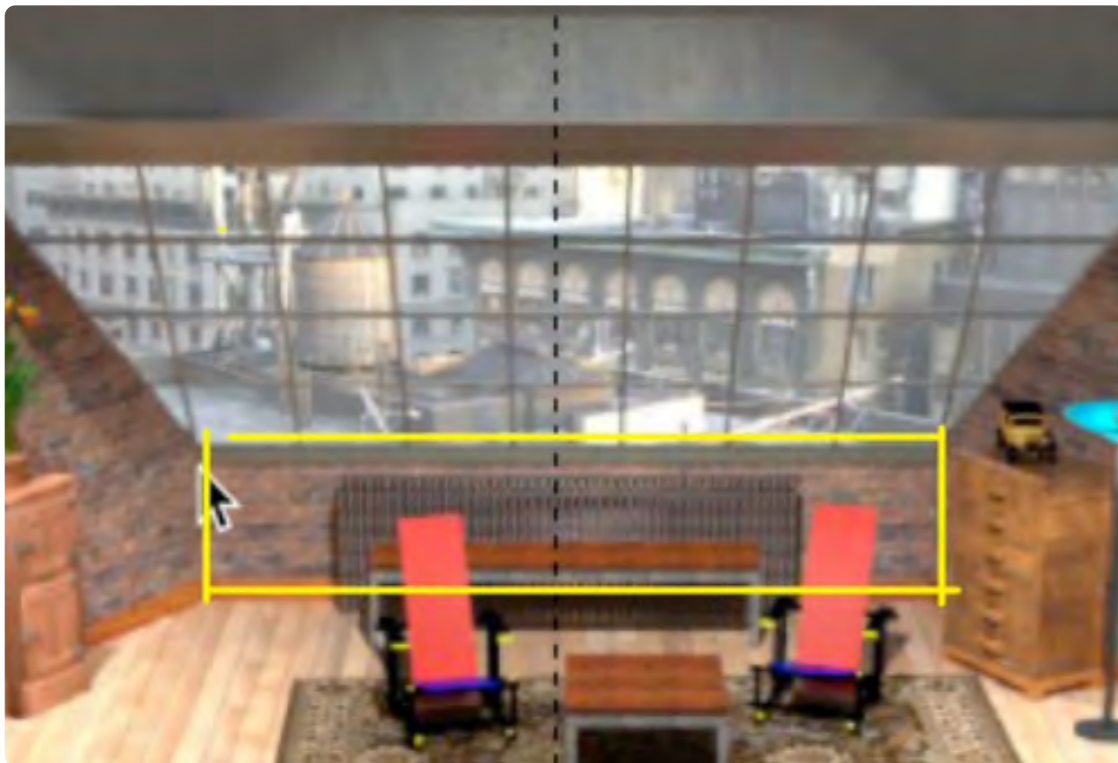
03_ Knee Wall Guides 0:01:40:00

Image 1

The Knee Wall is the first flat to draw on the ground plan. It is 3'-0" high x 14'-0" wide x 2.75" deep. Drag a guide 7'-0" left of center and a guide 7'-0" right of center. Then drag a from the upstage line, downstage 2.75.
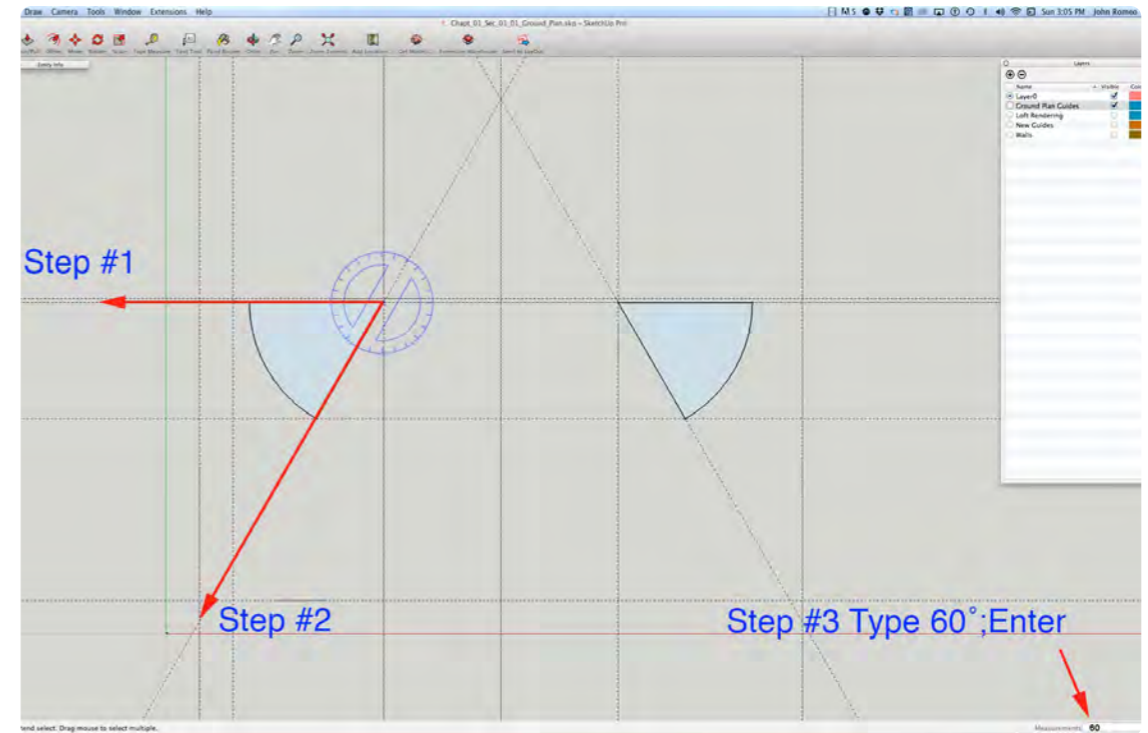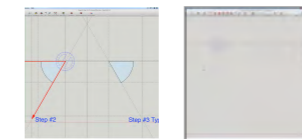
## 04_Protractor Tool 0:02:56:13

Image 1

The Protractor Tool has a behavior similar to the Tape Measure Tool and the Rotate Tool. Select the Protractor Tool and click on a point or intersection; rotate to a second point; rotate to the angle desired or type in of degrees # and press enter. It can also be used on the **Z-axis,** which makes it an extremely useful tool.

Create Scenic Objects Part 1

VIDEO MARKERS

1. Walls

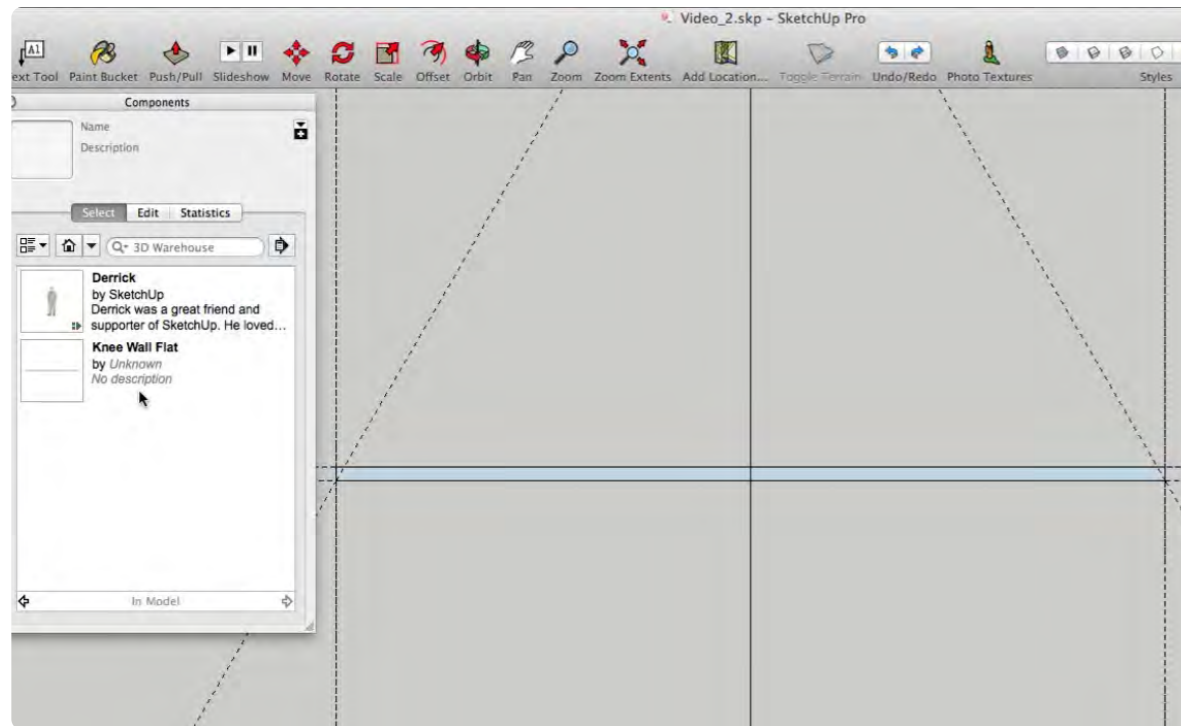2. Walls Continued

3. Instance

4. Scenes for Navigation

5. Extrude Walls

Exercise FILE c2s2.skp

Movie 2.2 Wall Objects Video Part One

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Create Scenic Objects Part 1
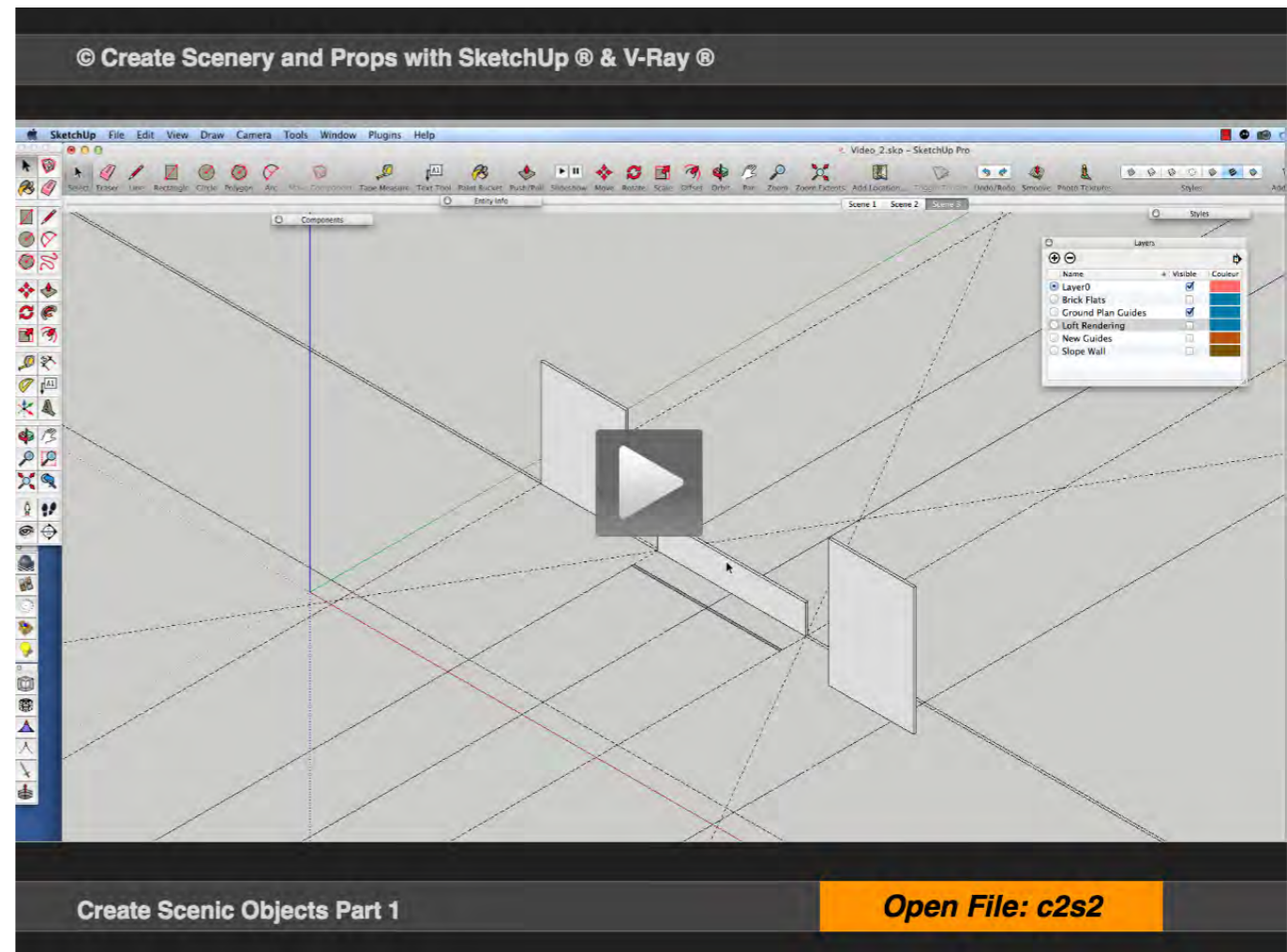
Open File: c2s2

01_Walls 00:00:00:07


Press or Click to Enlarge Image

In the last video, we setup the guidelines and determined that the width of the flat is 14 feet. The Layers Window should be open; click on the checkbox for Loft Rendering and a JPEG image of the set will be displayed. The Knee Wall begins with a rectangle, 14 ft **(X-axis)**, 2 3/4" **(Y-axis)**. At this is point an object needs be made a Component to track and control its attributes in the drawing, both separately and collectively. The Knee Wall Flat Component is now listed in the Component Window.

02_Walls Continued 00:01:10;02
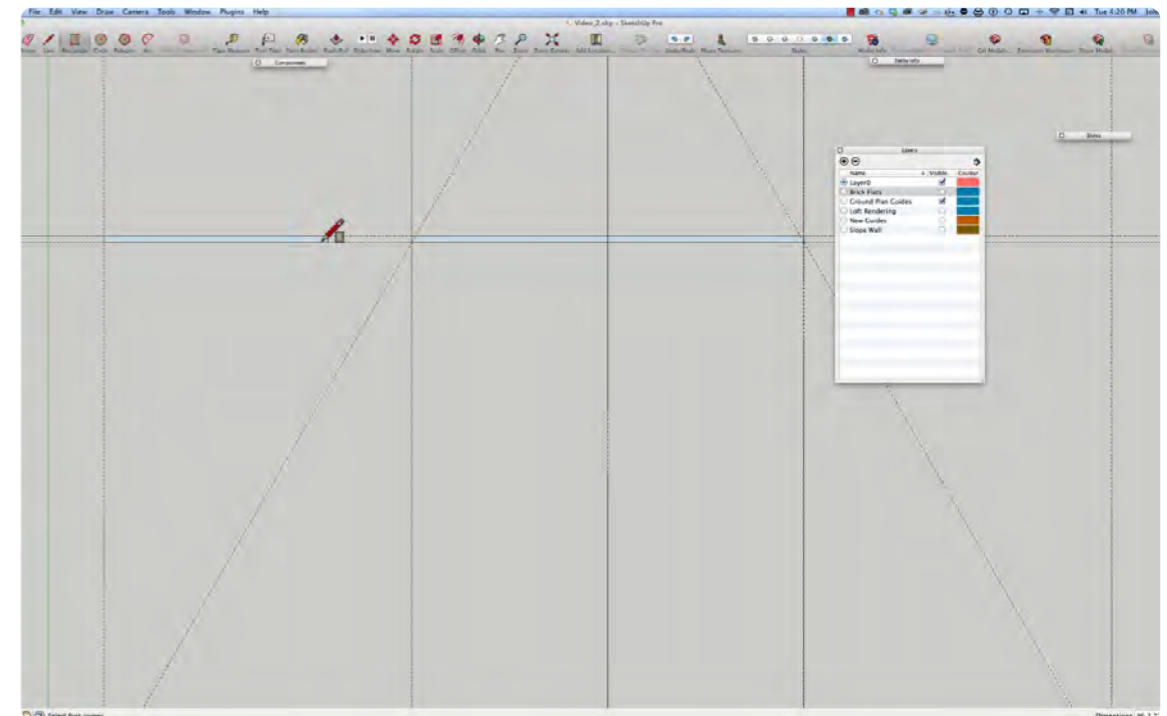
In the Layer Window, select the Brick Flat checkbox to display a JPEG image. The image cab be toggled on and off and not have its actual geometry be part of the SketchUp drawing. In this segment we draw the plan views of the walls that will be extruded and moved into place. These walls make up a big part of the set and will be created as wall shapes not actual Hollywood Flats. There are four 8 ft wide x 12 ft high walls, two 8 ft w x 10 ft h sloped walls, one 3 ft h x 14 ft h knee wall, two 2 ft w x 12 ft h walls and two 1'6" w x 12 ft return walls in the set.

03_Instance 00:02:38;00
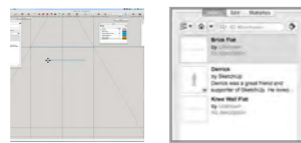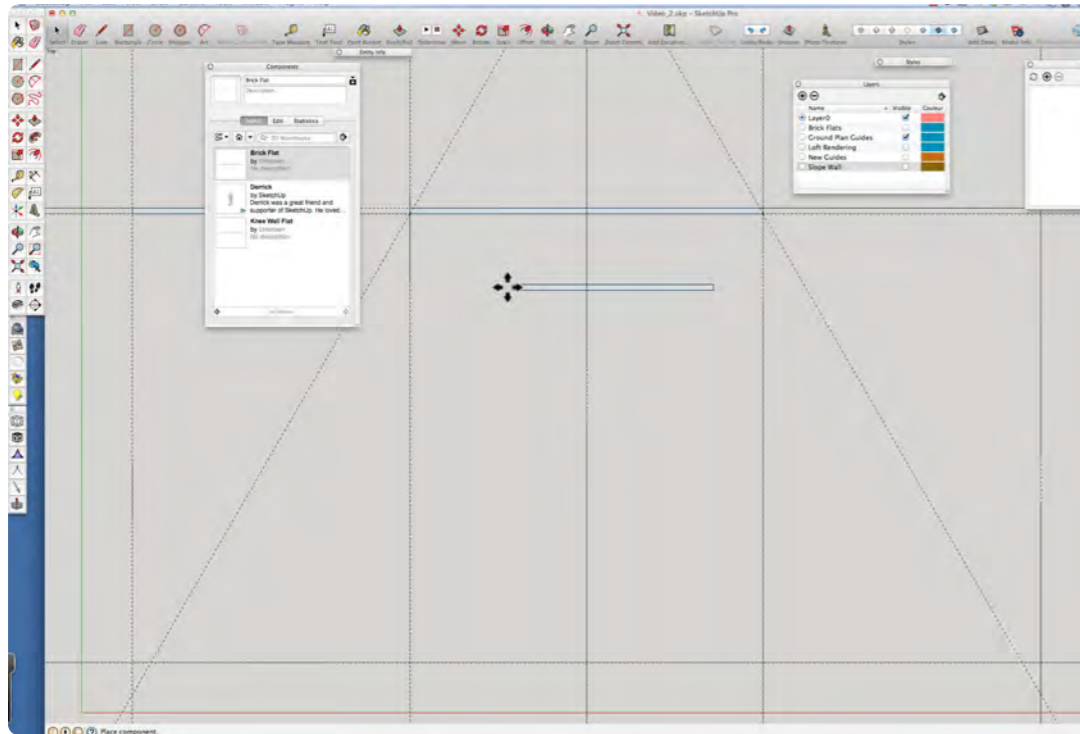
When you drag out a Component from the Component Window or make a copy of a component you are creating an Instance of that Component. An instance requires hardly any memory, whereas, duplicated group double the memory required. **The Make Unique** command, creates a new Component, and will add the suffix #1 or #2. The new Component it should be renamed immediately, to avoid confusion as the drawing gets populated with many Components.

04_Scenes for Easy Navigation 00:03:28;29
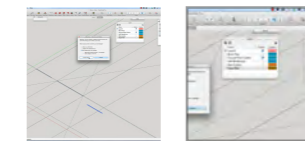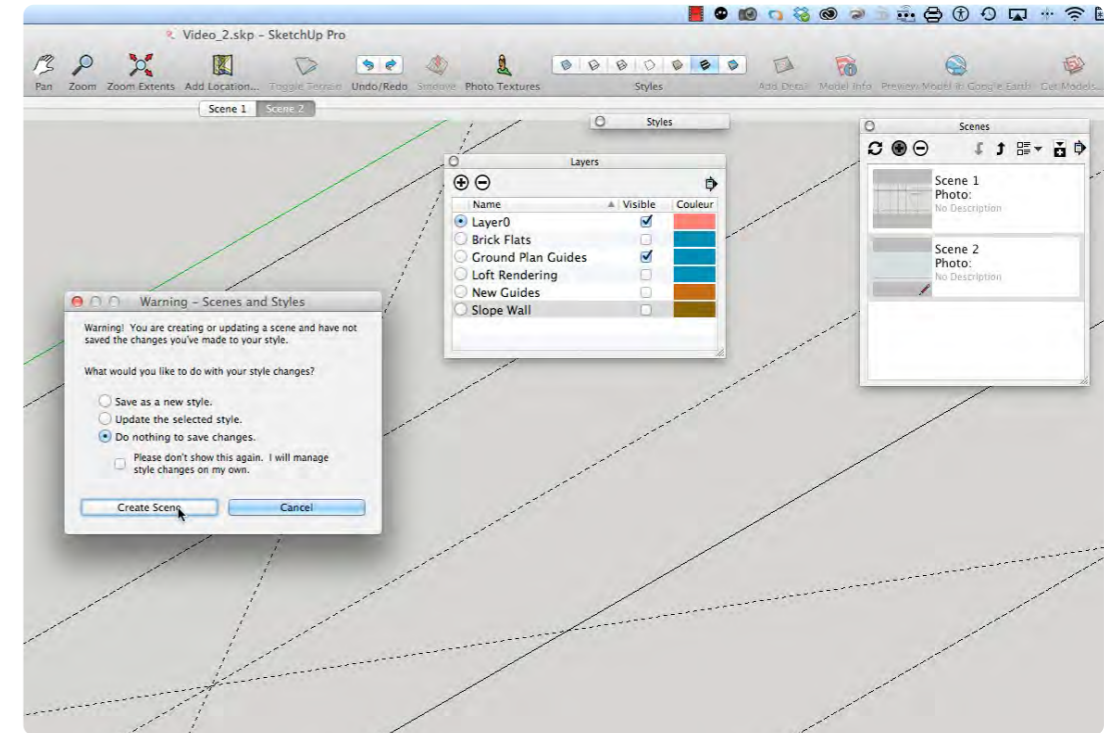
Open the Scenes Window,(if it is not already open) located in the Window Tab. The Scenes Command enables the creation of a button at the top of the screen that saves the screen the way it was last when a new scene is created. If you make a change to a scene you can save the changes. In this segment a new scene will be created for the Plan View, Front View, and Isometric View. This will make it easier to navigate through the drawing without having to hunt for view commands.

05_ Extrudes Walls 00:04:41;08
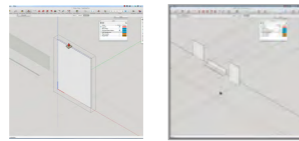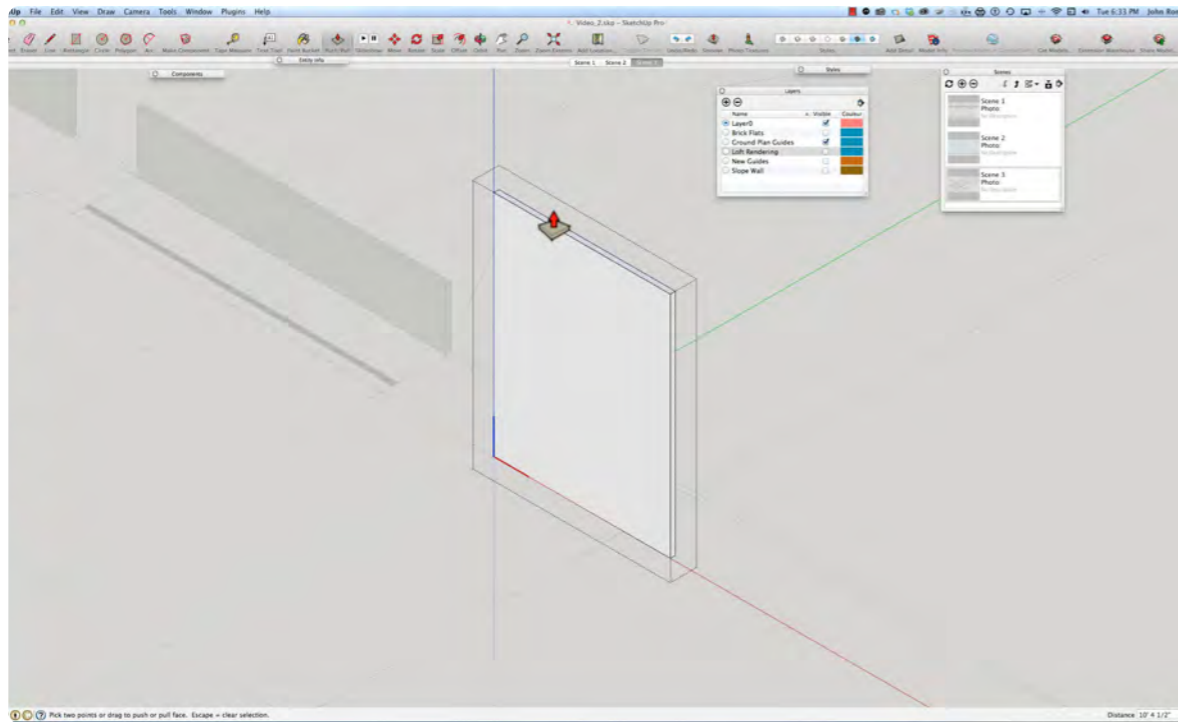
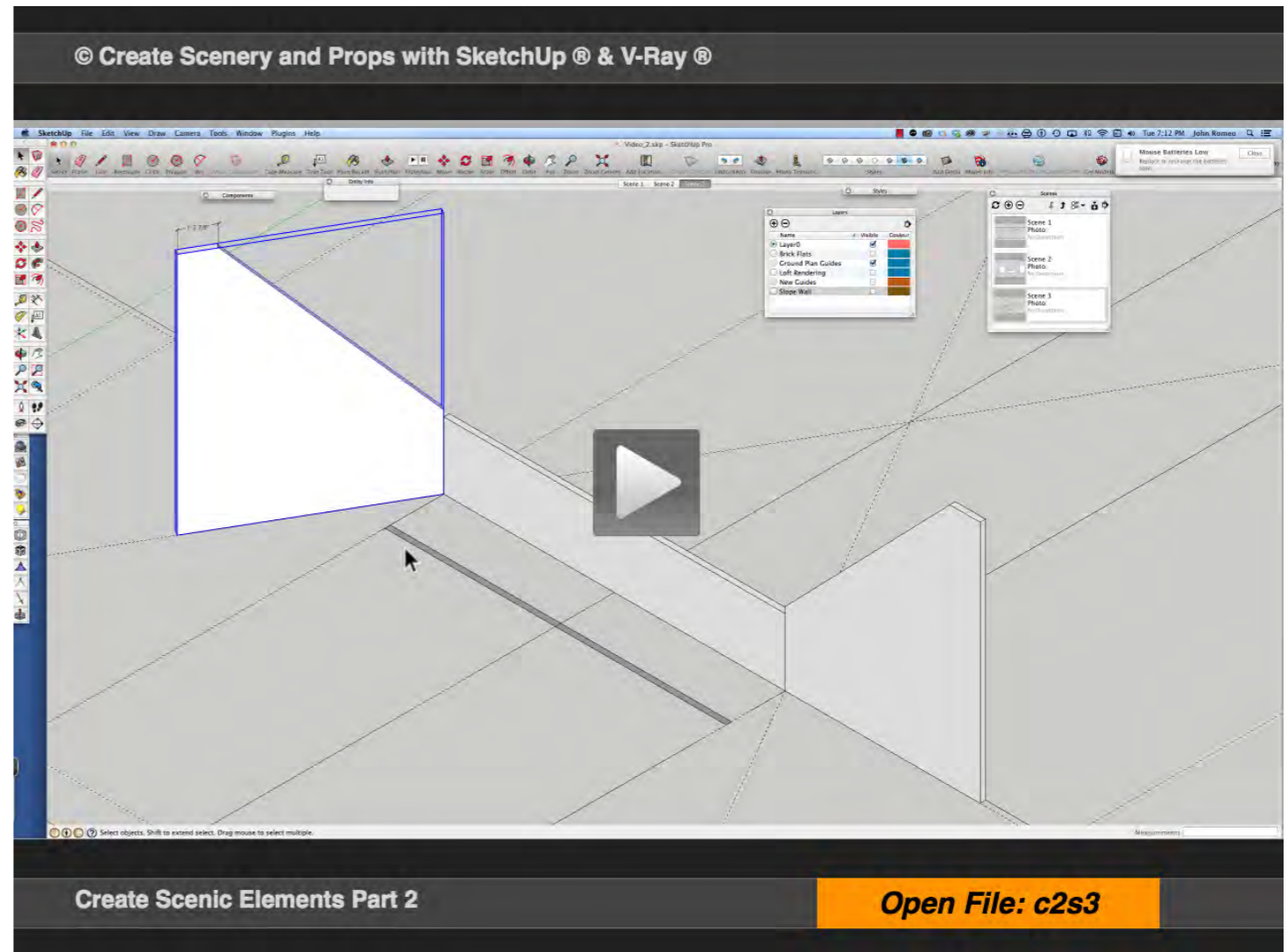First, double click on the component, then click again on the face that you want to extrude. Select the PUSH PULL TOOL, (or keystroke "p") and pull in the direction of the extrusion and type in a value in the lower right hand corner. Note, once you initiate a command, like the Push Pull Tool, the box in the lower right hand corner becomes active, just start typing and the value will be automatically entered into the box.
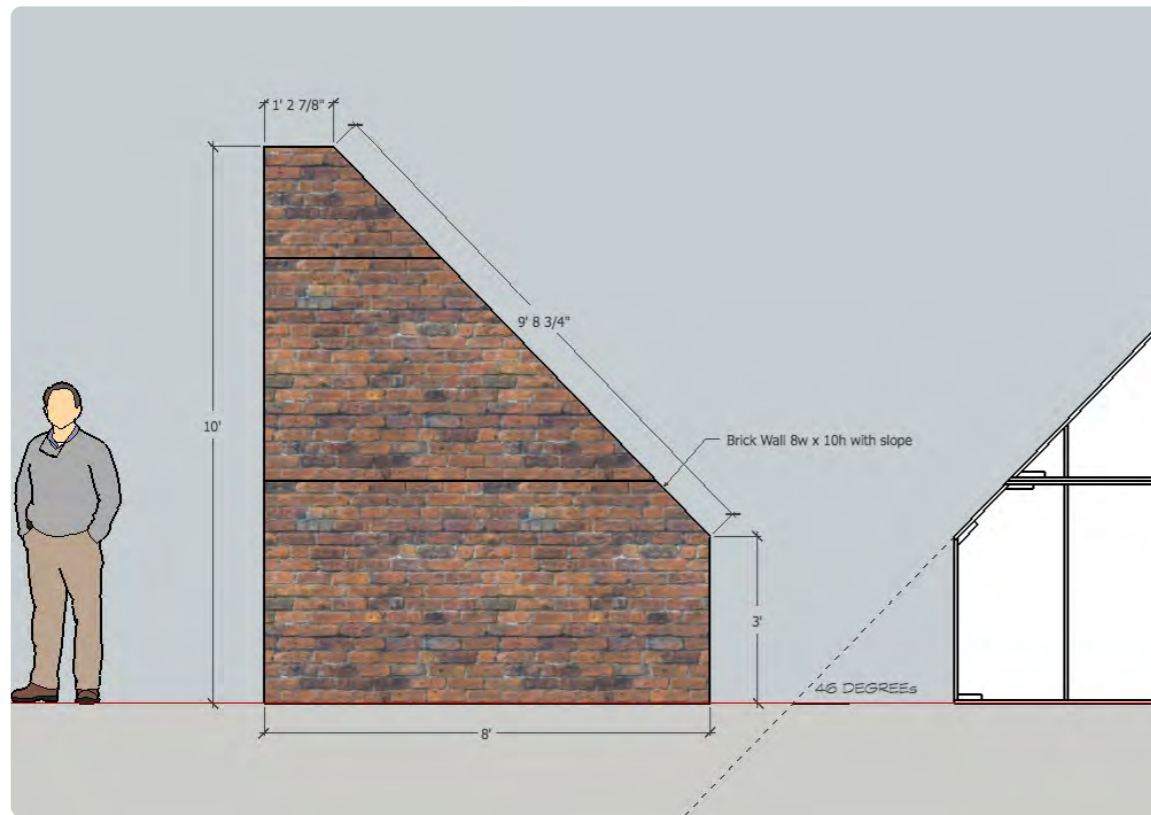
Create Scenic Objects Part 2

VIDEO MARKERS

1. Cut Slope

2. Protractor Tool

3. Push/Pull Tool

4. Clarification

5. Scale Tool

6. Moving and Rotating

7. Recap

Exercise FILE c2s3.skp

Movie 2.3 Wall Objects Video Part Two

01_ Cut Slope 0:00:00:01

1' 2 7/8"

9' 8 3/4"

10'

Brick Wall 8w x 10h with slope

3'

46 DEGREEs

8'

The skylight in the Loft sits on the sloped wall and the angle of the wall is 46 degrees. It is deliberately not 45 degrees to make you have to use the Protractor Tool. I would normally create the angle measuring up 36" and over 14-7/8" and draw a line connecting the 2 points, but I reversed that process to demonstrate the protractor tool.

02_ Protractor Tool 0:00:42:07

The protractor tool is an extremely powerful layout tool, because you can click on any surface, in any axis and place an infinity guide along the angle. It works just like the tape measure tool. The combination of the Protractor Tool and the Tape Measure Tool literally make layout a snap. The Protractor Tool changes color when it snaps to an axis, in this case it is on the **green X-axis**; red is (Y) and blue is (Z): RGB.

**Illustration 2.1** Protractor Tool

Protractor Tool

Angle 46

Start typing to enter a value in the box in the lower right corner: do not try to select the box. When using guides, it is a good practice to place the guide inside the Component instead having it lay on the surface outside the component. The video demonstrates how to move the guides inside the Component and move them to the guide layer.
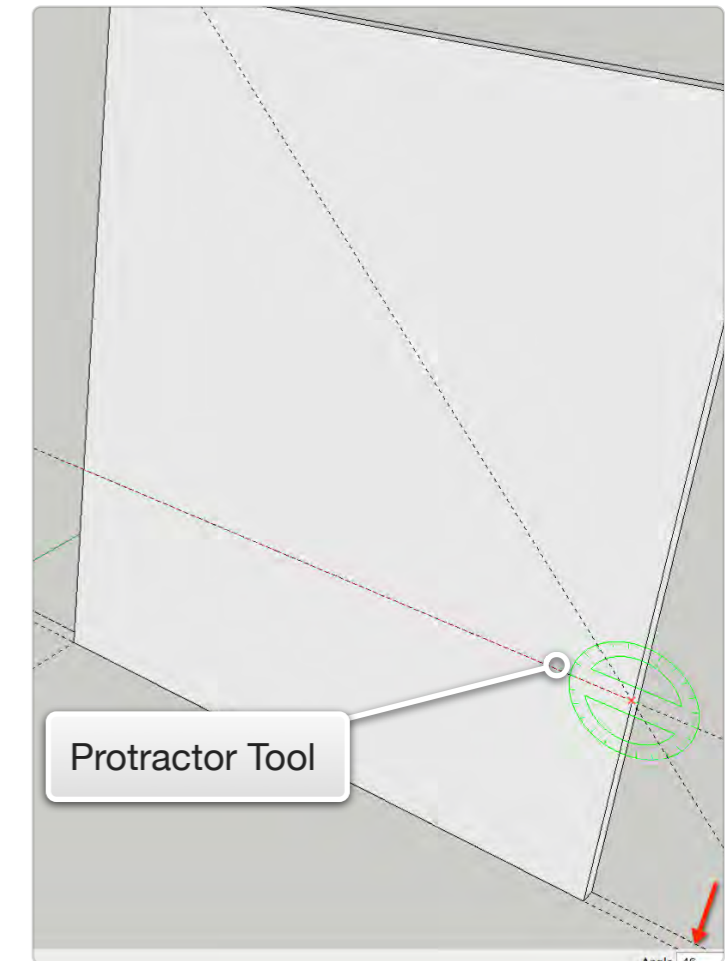
03_Push/Pull Tool 0:02:58:21

The Push Pull Tool can be used for other functions other than extruding. I use it as a clipping tool for the sloped wall. Click and highlight the segment to be clipped and push in that direction until it turns grey and white and unwanted segment will disappear.
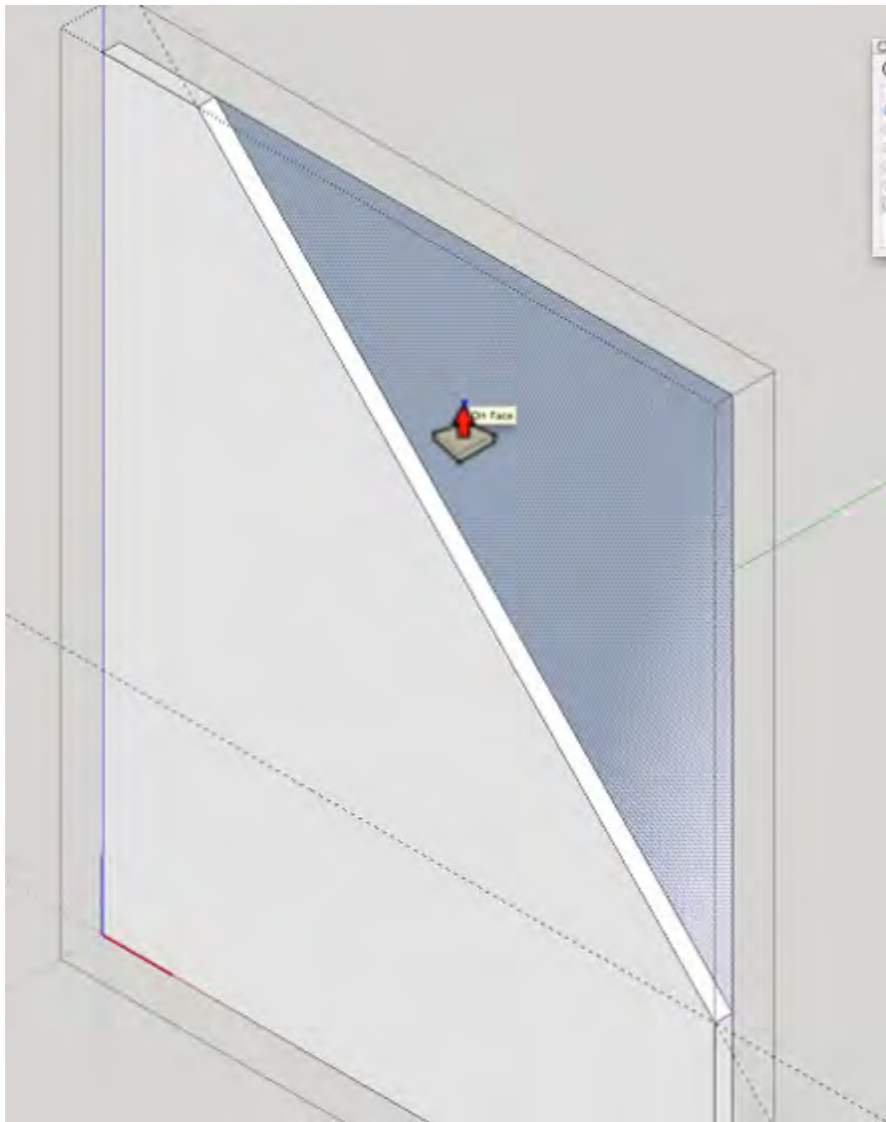
04_Clarification 0:03:58:01

This section begins with basic shapes to represent flats without the construction details that will be added later on in the book. This way if you are not interested in the construction detail you can skip that part.
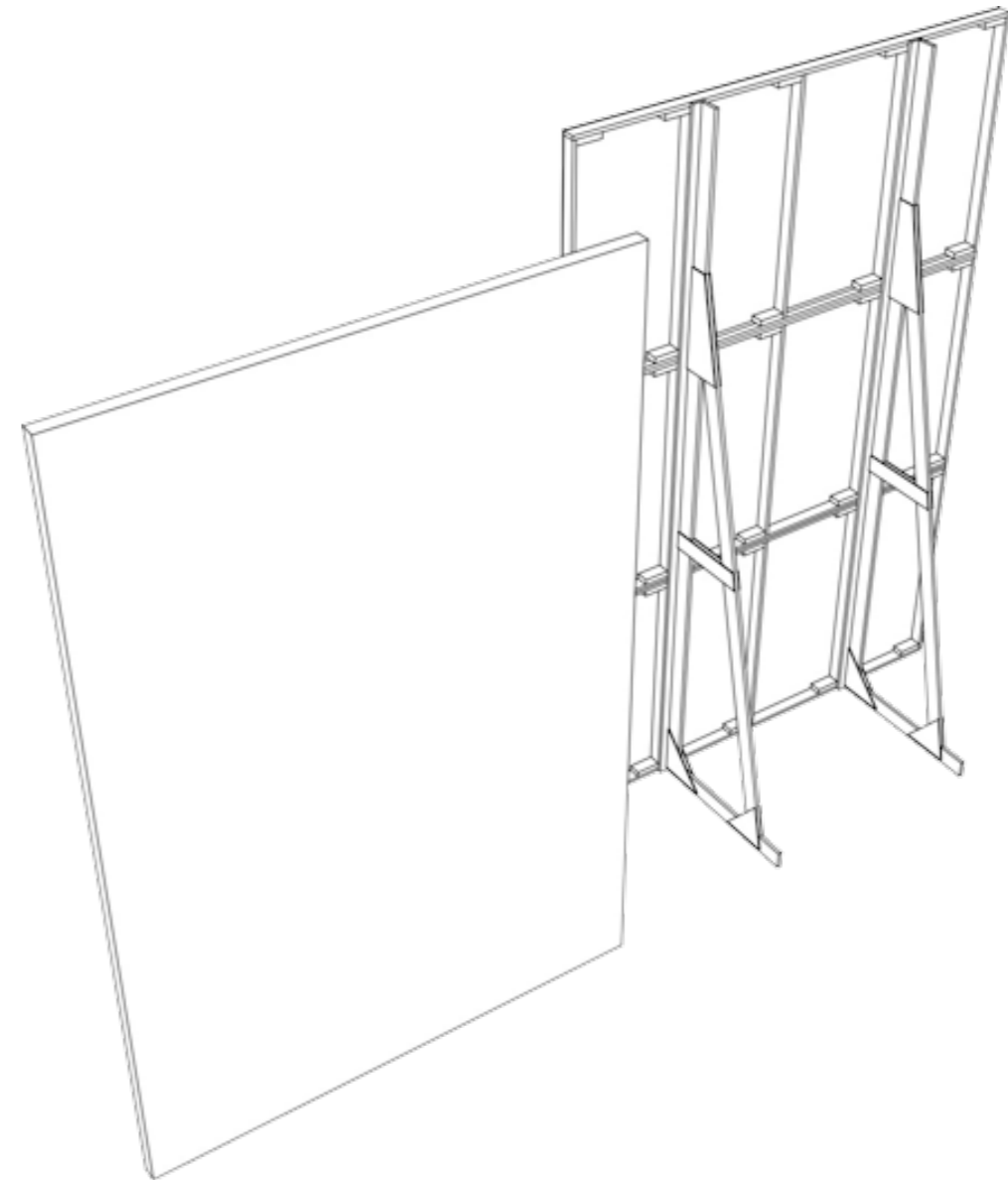
05_ Scale Tool

SketchUp does not have a Mirror Tool, however the Scale Tool can function as a Mirror Tool. Highlight the object to mirror, then select the Scale Tool, then hold and drag the red square across the object in the opposite direction until -1.0 appears in the lower right hand corner.
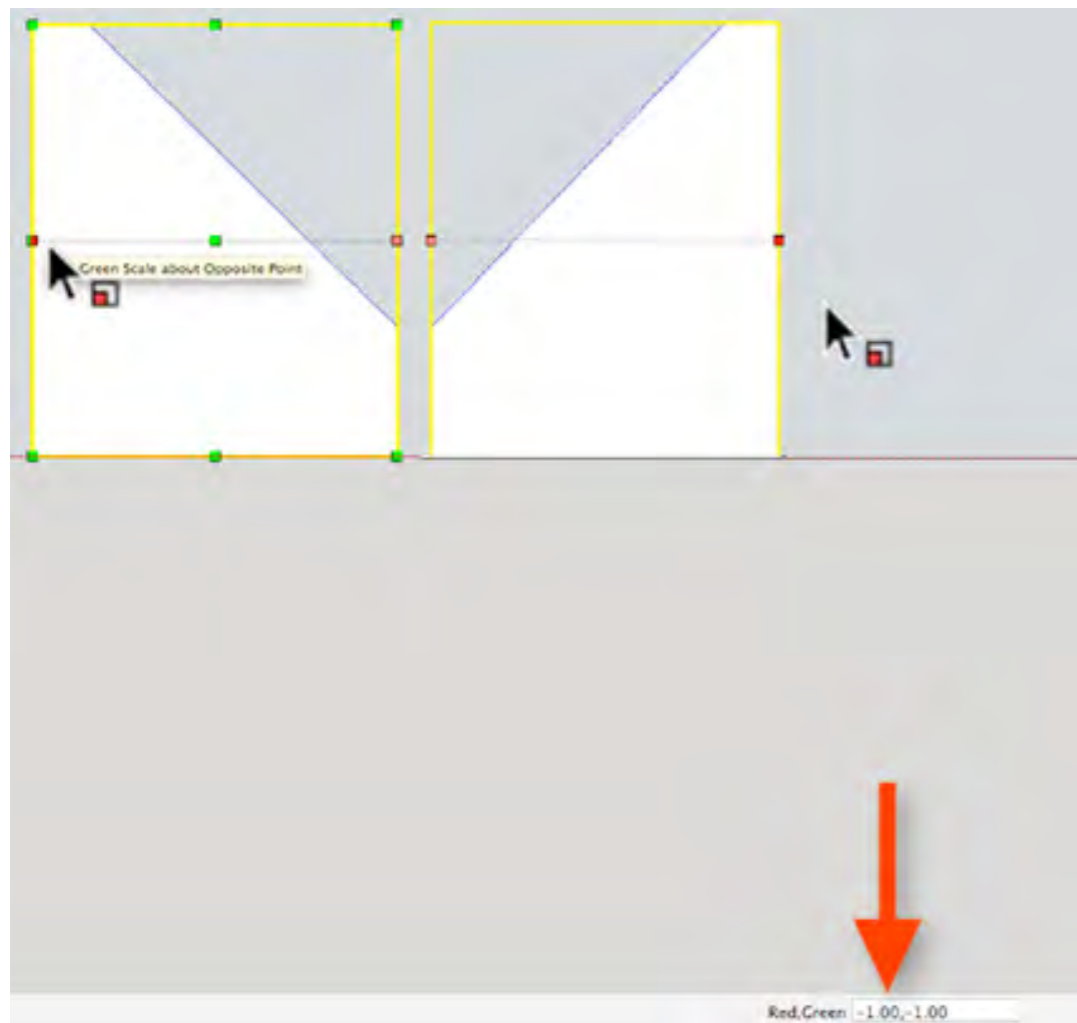
## 06_ Move and Duplicate 0:08:19:28

The Move Tool moves objects and if you hold the option "alt" key it creates a duplicate and the duplicate becomes an instance of the original component. When moving an object constraint the axis that you want to place it on; as you move the curser the red, green or blue axis will appear. Hold the arrow key to force constrain: Red (right), green (left) and blue (up)
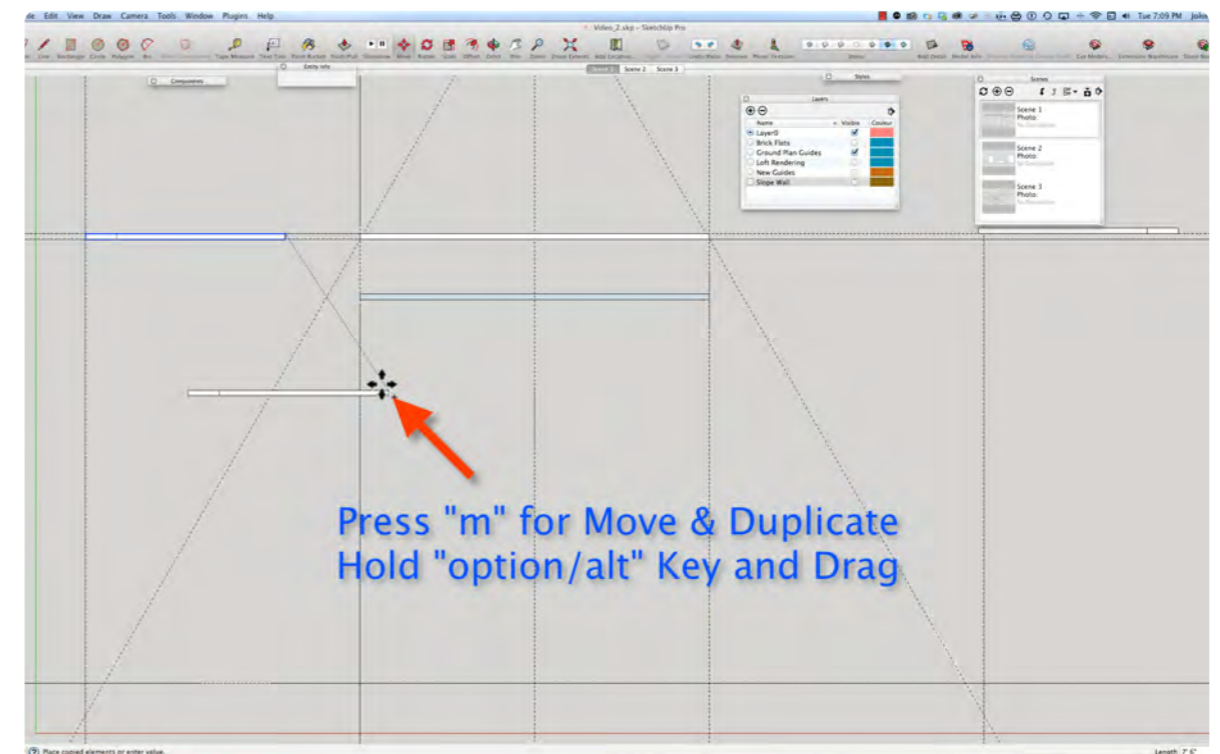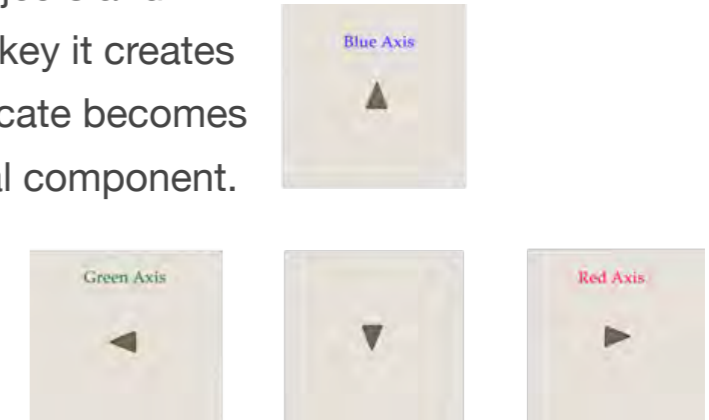
07_Rotate Tool

At this point we have created the sloped walls and Rotated them into position, and connected it to the knee wall.

The Rotate Tool is similar to the Protractor Tool, it rotates an object, whereas, the Protractor Tool places a rotated guideline. The Rotate Tool makes it easy to create an object straight on and then rotate it into position later.

Rotate 60 degrees
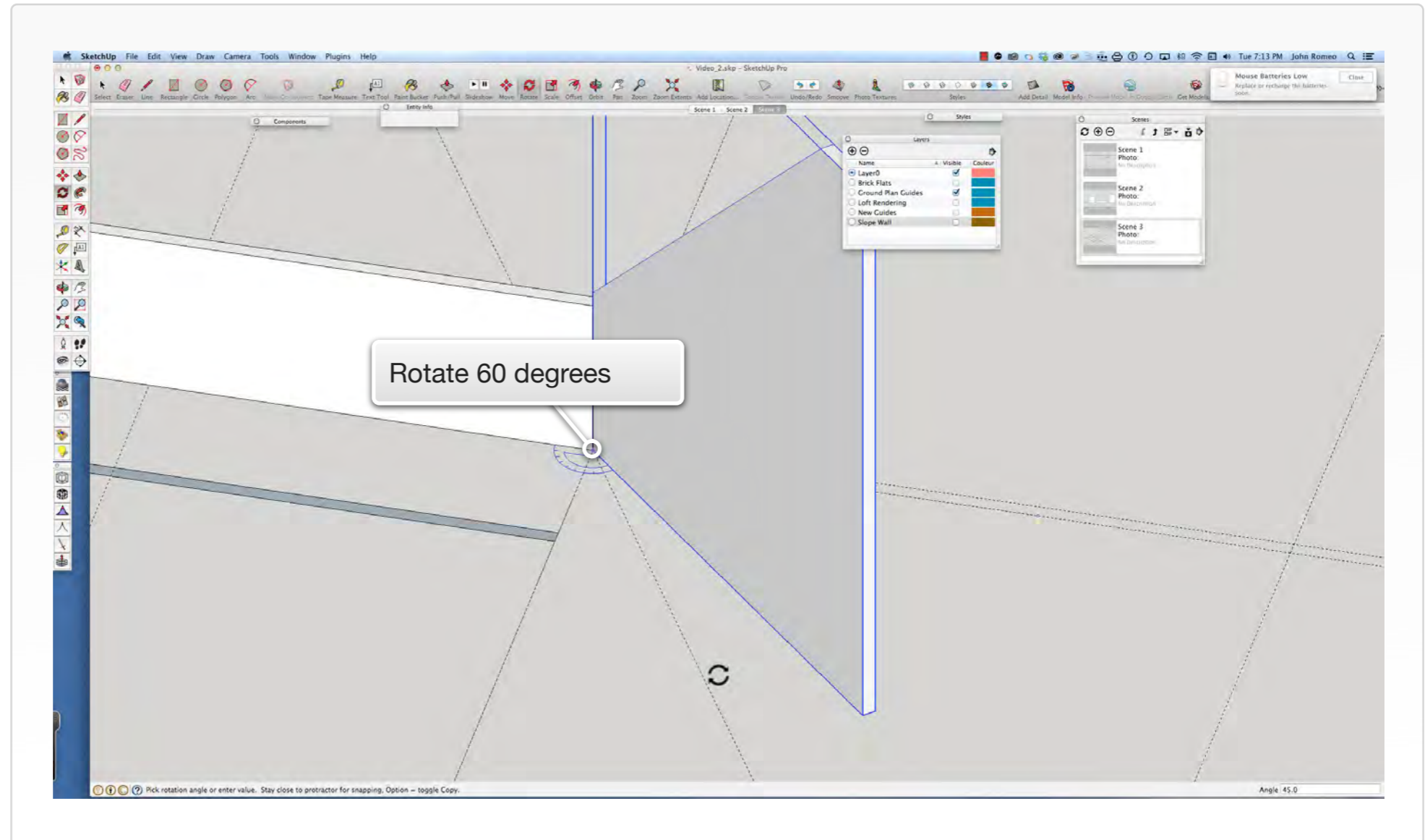
Create Scenic Objects Part 3

VIDEO MARKERS

1. Coping

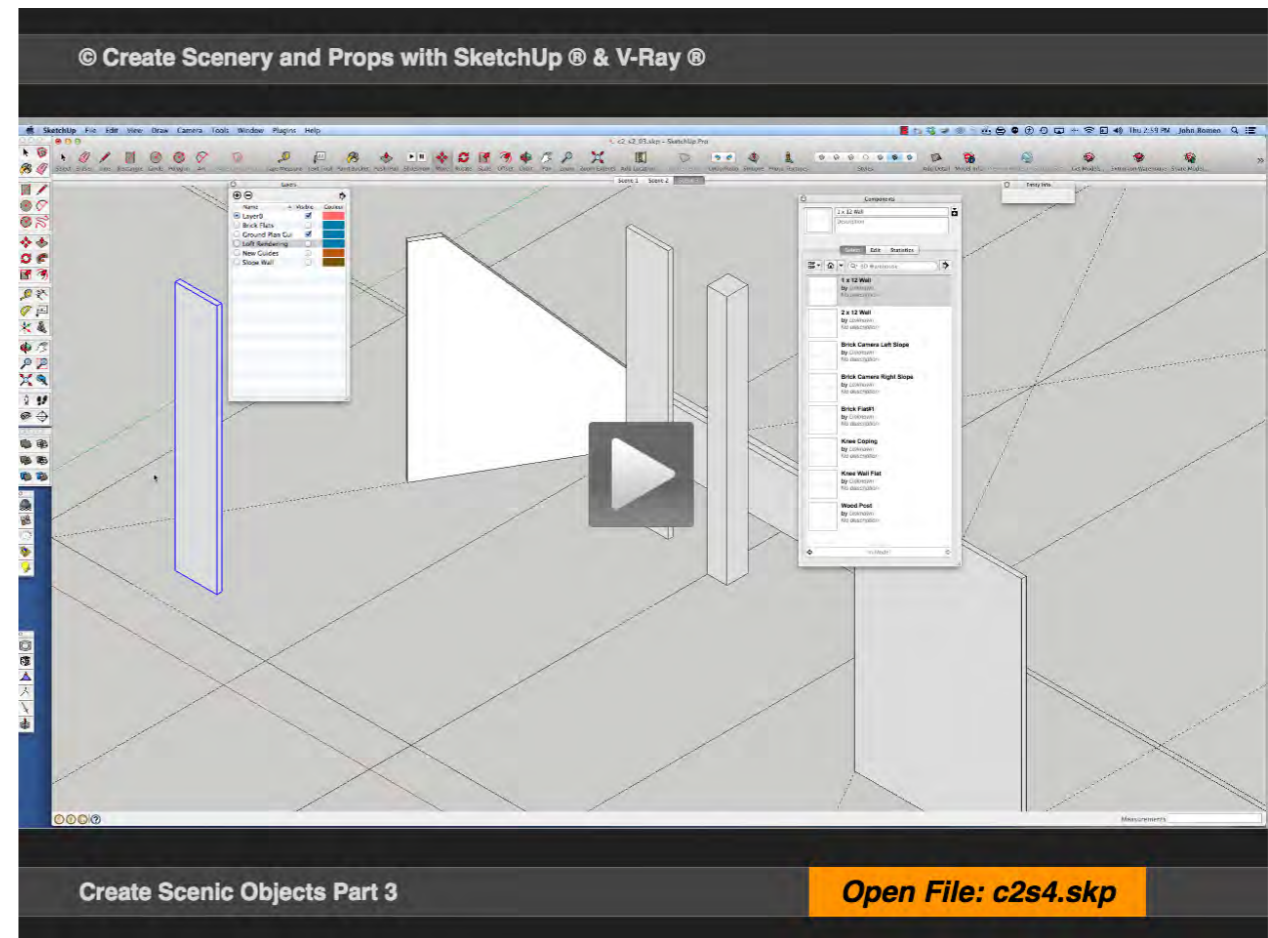### 2. Wood Posts

3. 2 X 12 Wall

4. 1 X 12 Wall

Movie 2.4 Wall Object Video Part 3

Exercise FILE c2s4.skp

01_ Coping 0:00:00:03

02_Wood Post 0:01:18:17
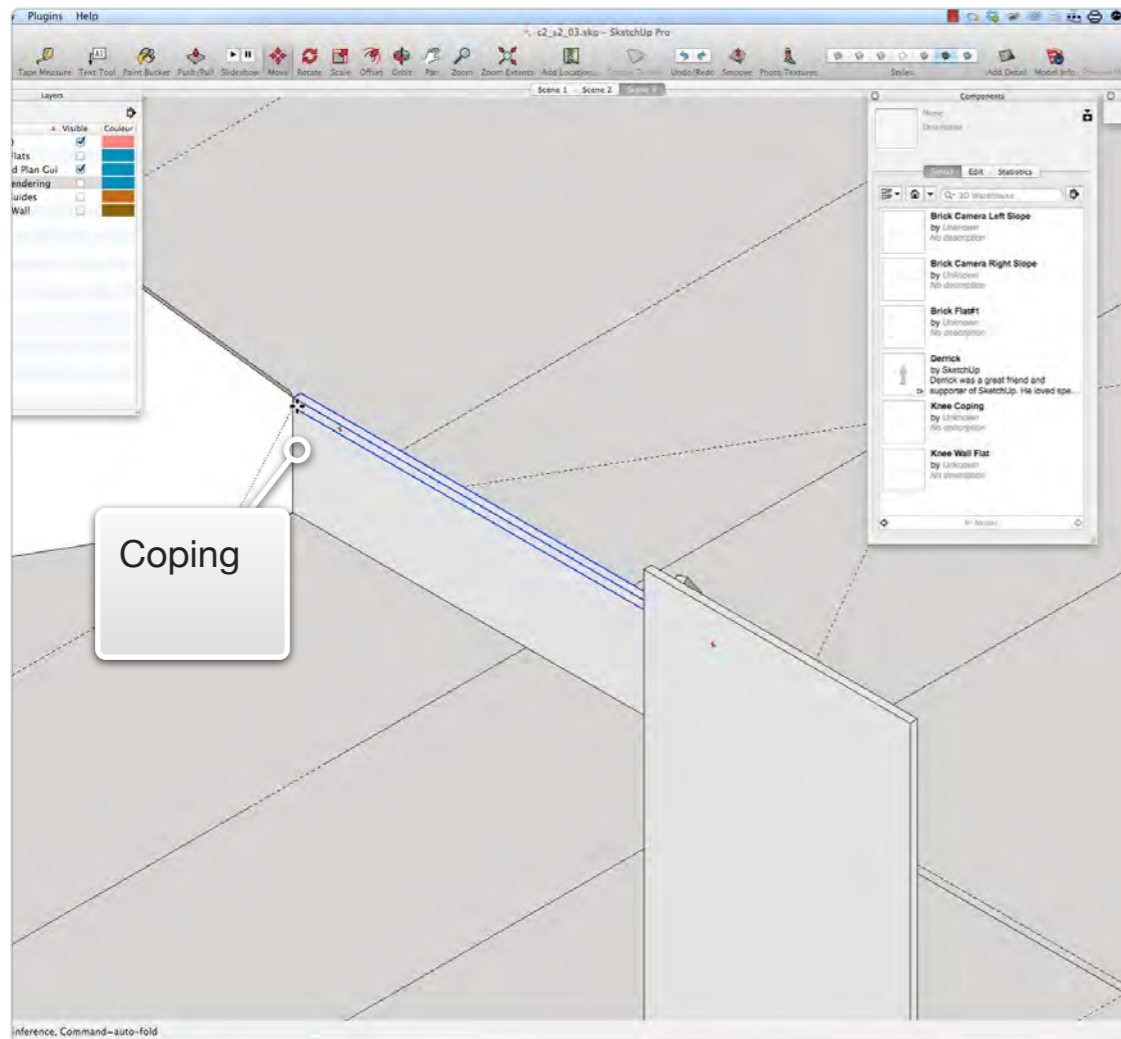
The Coping is the cap that sits on top of the Knee Wall: It is 14 ft long x 3.75 inches deep x 3" high and forms a ledge for Skylight to sit on.
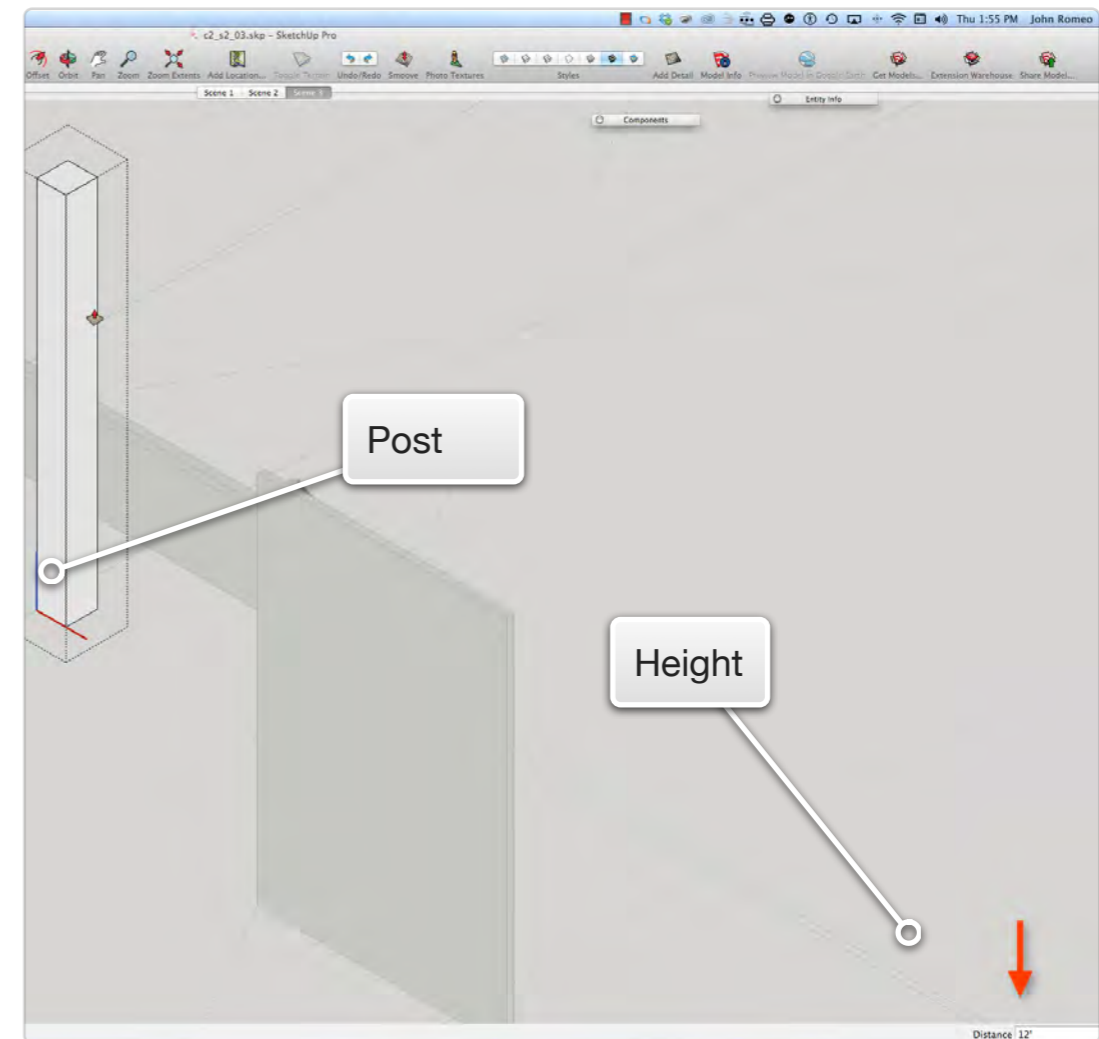
The Wood Post is constructed from 1 X 12 #2 Pine, which is .75" X 11.25" x 144". Without ripping the lumber, the post size would be 11.25" wide X 12" deep X 144" high. I include the wood post with wall objects because it will be an integral part of the Wall Unit Component.

03_2 x 12 Wall 0:03:56:23

The 2 ft X 12 ft walls down Camera Left and Right act as a Cutter Wall to frame the shot passed the post. In this video it shown as a 2' x 2.75" x 144" object, and in a later video it will be a 2 x 12 Hollywood Flat.
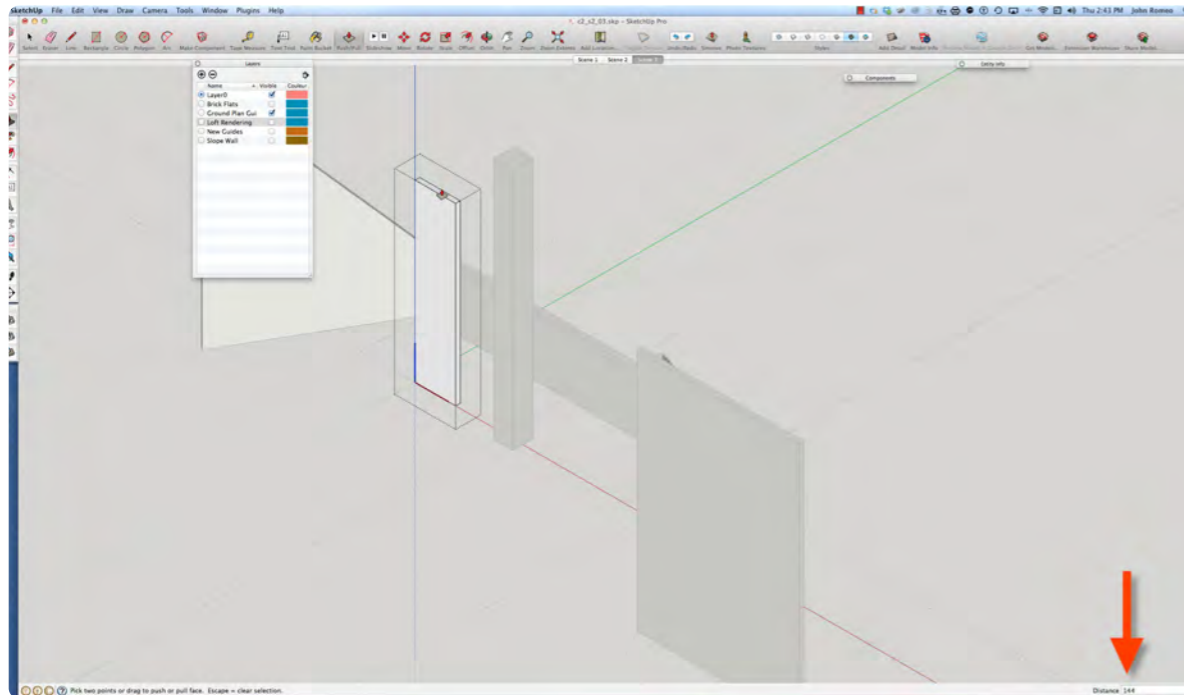
04_ 1 x 12 Wall 0:04:47:18

The 1 x 12 wall is used as return to create the counter alcove.

05_ Recap 0:06:16:04

Notice the Component window populated with the objects made thus far.
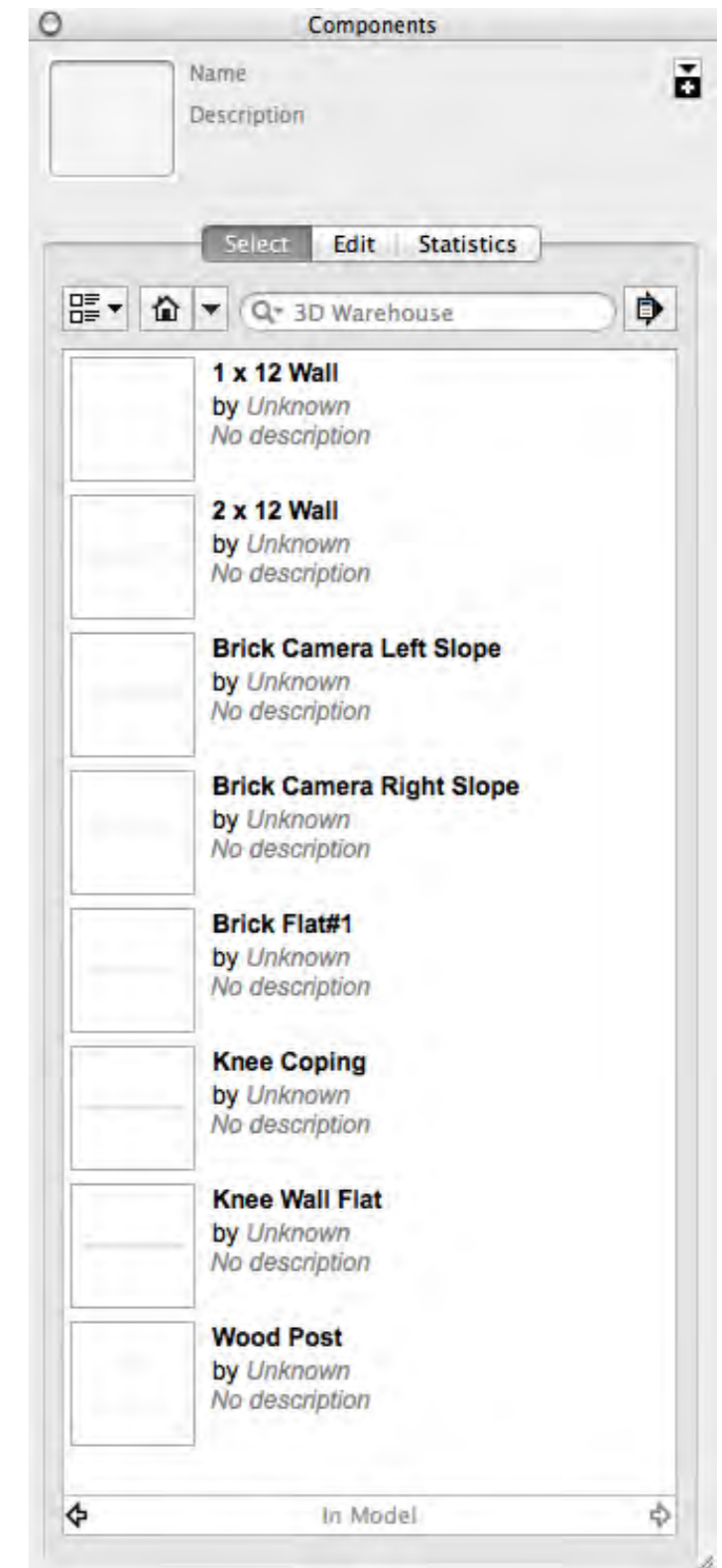
Putting the Pieces Together Part 1

VIDEO MARKERS

1. Duplicate and Move the
   Posts

2. Camera Left Wall Unit

3. Camera Right Wall

4. Moving and Attribute
   Control

Movie 2.5 Putting the Pieces Together Video Part 1

Exercise FILE c2s5.skp

01_Dupilicate and Move the Posts_0:00:00:03

dragged on ground plane

dragged to intersection of guides

Right Isometric View,

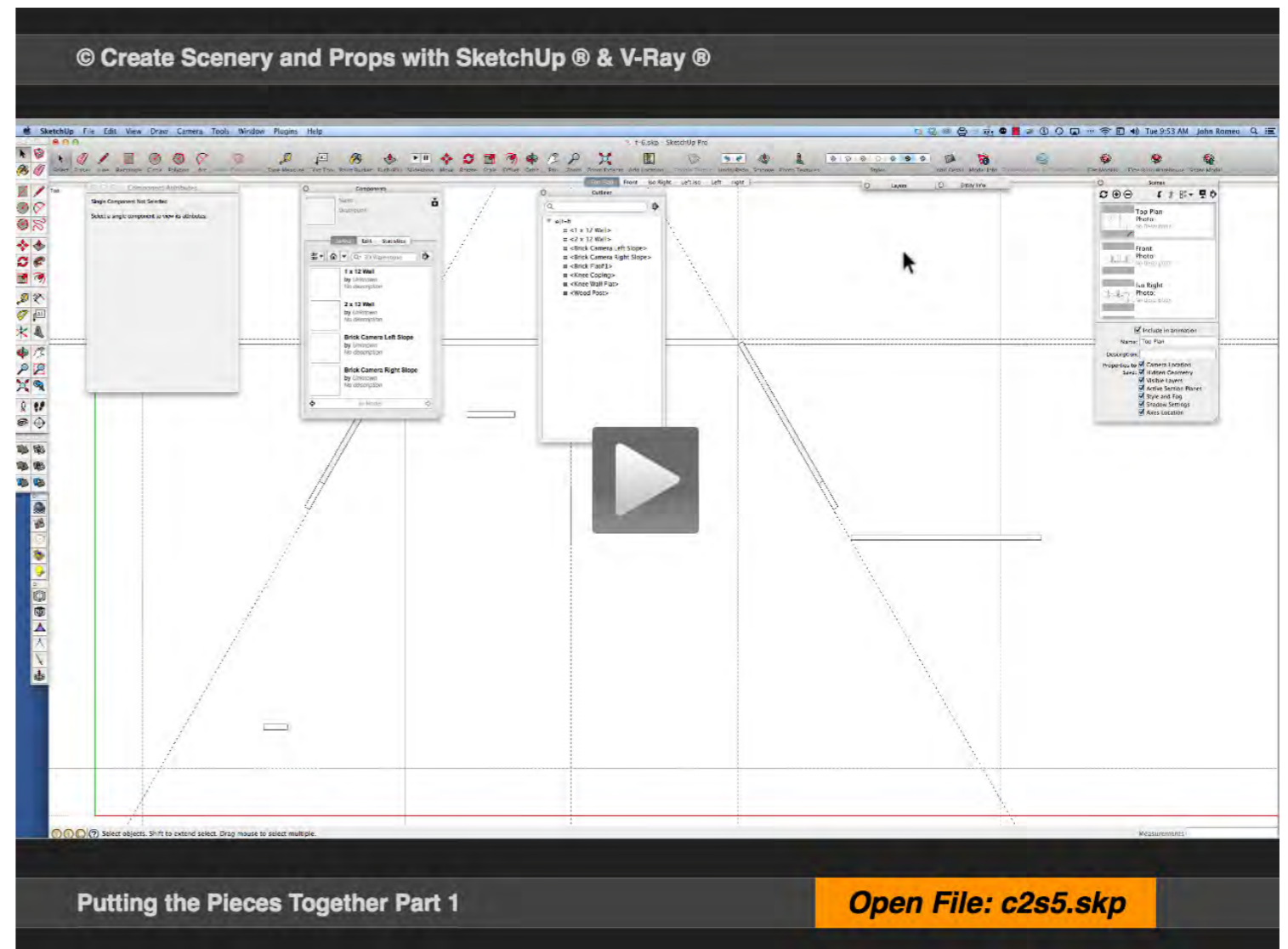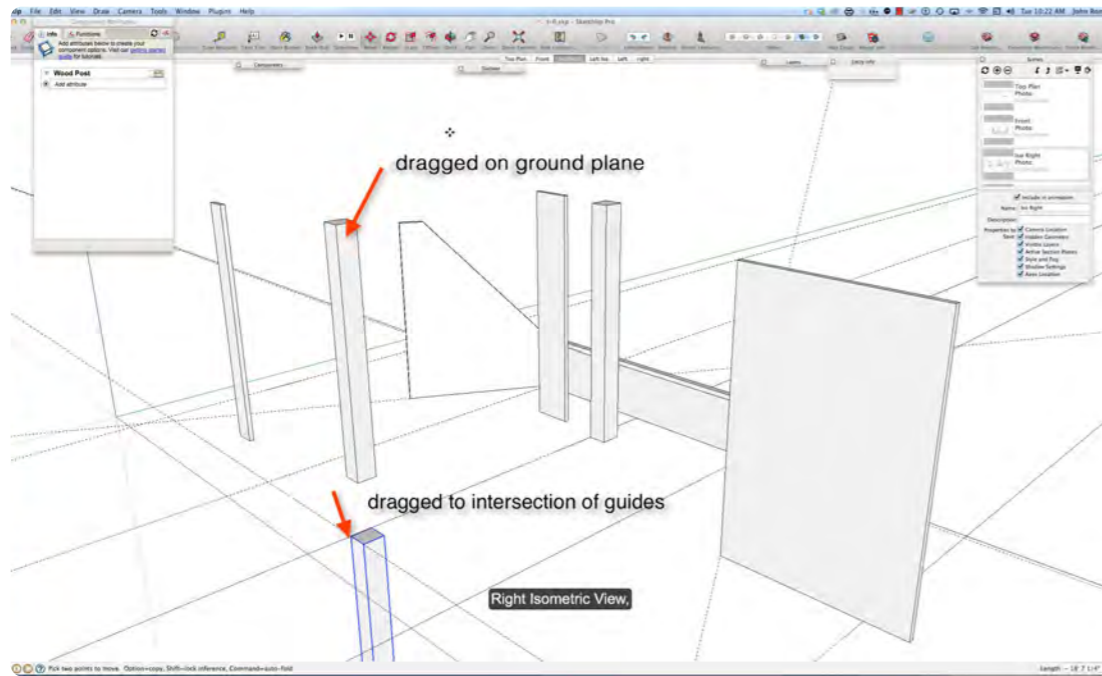There are two ways that the Posts can be duplicated, the first is to drag an Instance of the post from the Component Window and place it on the drawing and the second way is to use the Move Tool to create a copy. It is usually faster to take the instance already on the stage. If you drag a copy across the ground plane, it will sit on the ground plane, but if you snap to the guides, which sit on the ground plane it will end up below the Ground Plane. Even though this seems peculiar it is a good way to move the object to a specific point, because you can simply change its Z height in the Components Attributes Window.

02_Camera Left Wall Unit_0:01:39:06

dragged from top
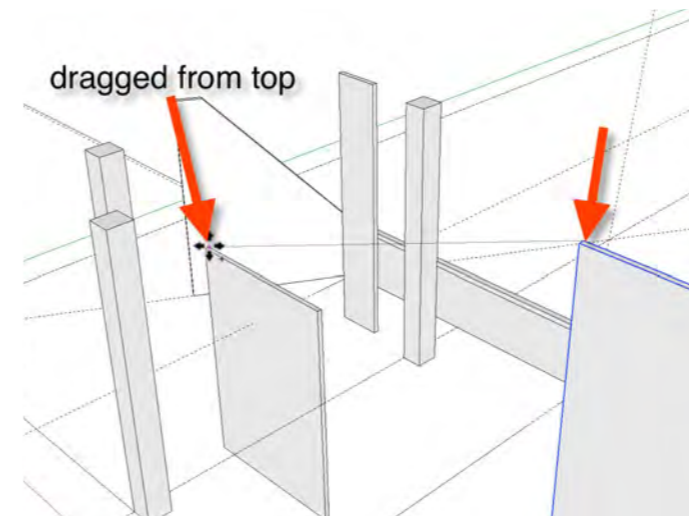
It is easier to move the object from the top than it is from the bottom. In this case, the bottom corner is blocked and the drawing would need to be rotated to get access to the back.
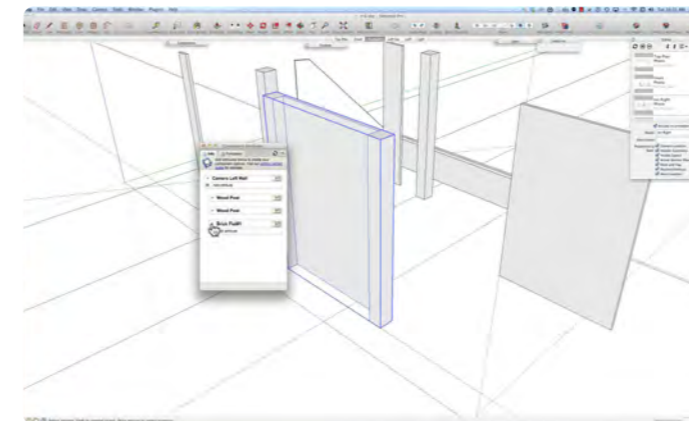
The 8 x 12 wall is moved into position adjacent to the post and it is easy to hold the shift key and drag another instance of the post to the opposite side of the wall creating the wall unit. The two posts in the wall need to be made into a Component called Camera Left Wall Unit and rotated 60° and located in its proper position on the ground plane: see thumbnail images 1,2, and 3.

03_Camera Right Wall_0:05:14:23

A copy of the Camera Left Wall was made earlier to use for the camera right wall, but before it is moved into place, it needs to be made unique and the return walls need to be added to create the Counter Alcove. Open the Loft Rendering in the layers window to see the 1 x 12 walls camera right. The 1 x 12 wall is already in the drawing so it needs to be dragged inside the Component and the Component rearranged properly.

The Return Walls need to be rotated 90° before you place them inside the component. Then double-click on the component to place the return calls inside the component and then move the 8 x 12 wall back to the corner of the return wall and the alcove is created. The Return Walls ended up 12 feet above the ground plane because when they were moved into position they snapped to the top of posts. To correct this, open the Component Window and add Position Attribute and set the Z height to zero.

8 x 12 Wall moved
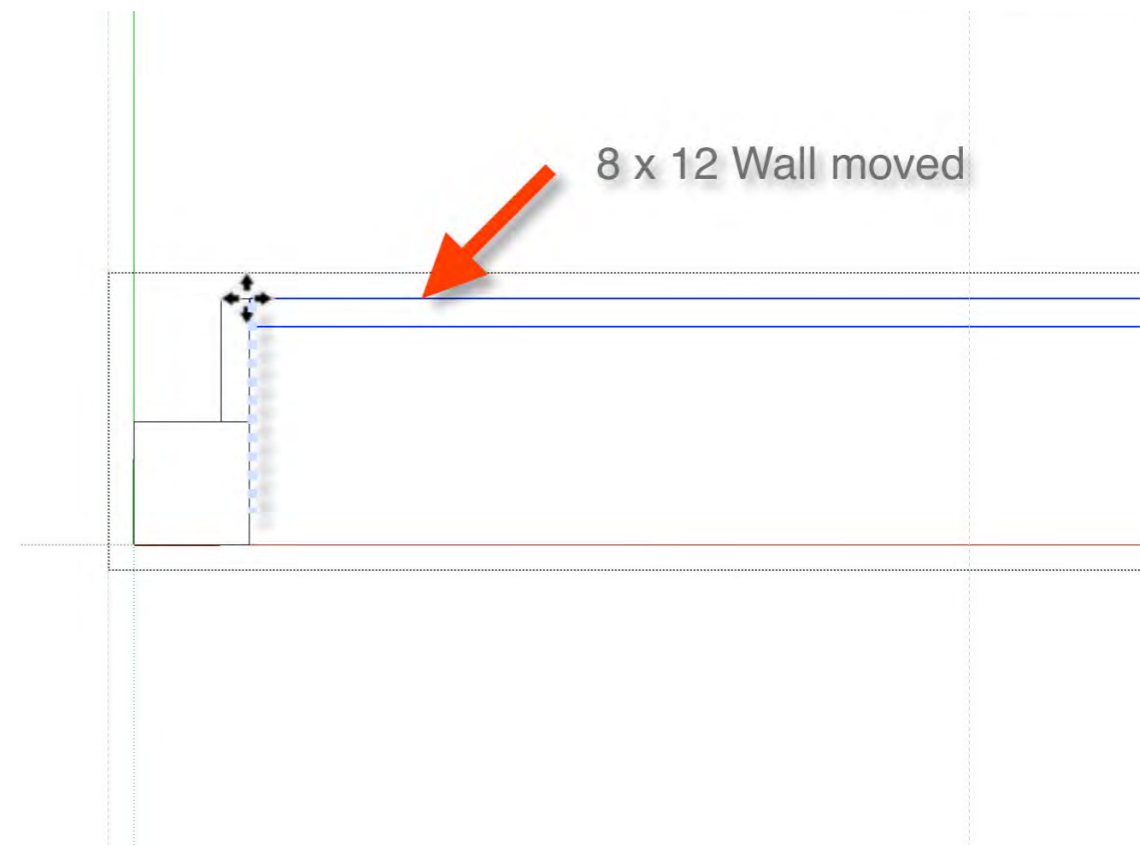
04_Moving and Attribute Control_0:08:12:26

add position attribute
type 0 in the Z box
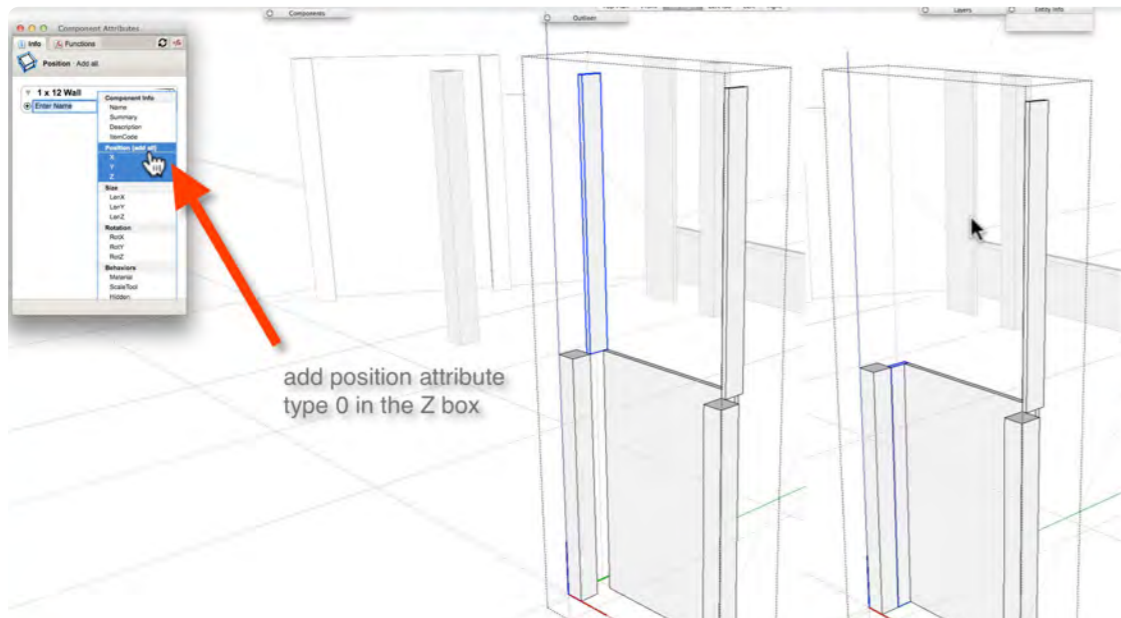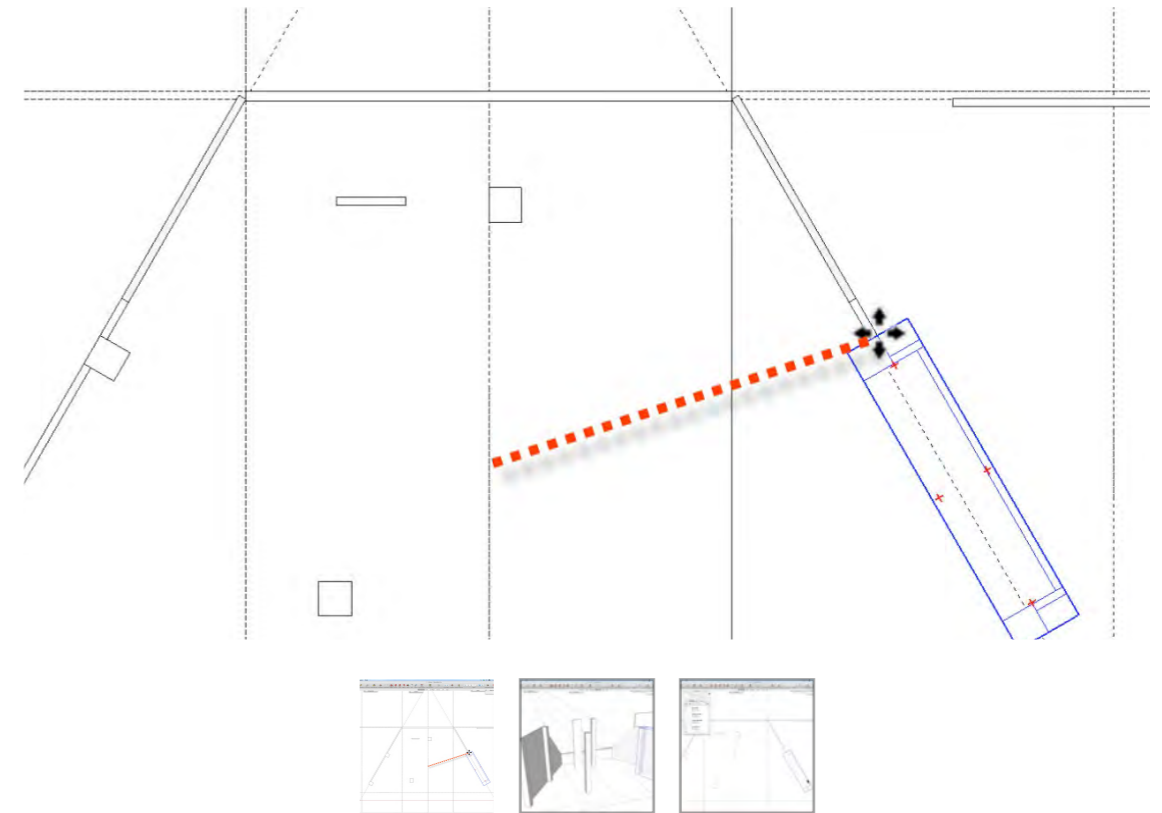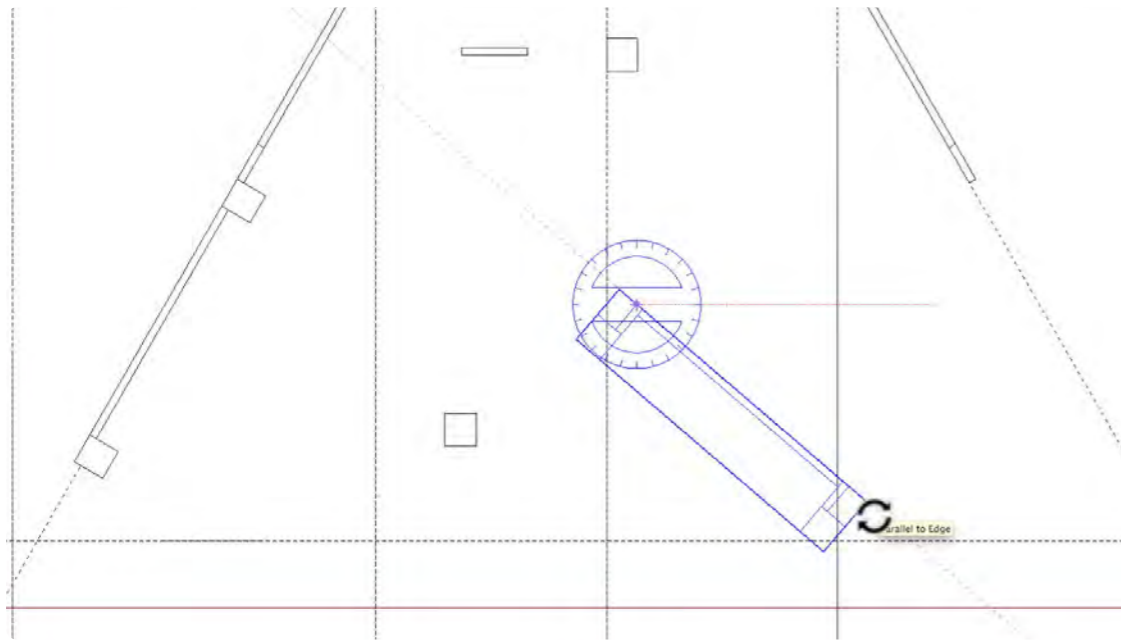
This section focuses on moving, rotating and nesting Components, which is a very important concept to understand about SketchUp. We explored what happens when objects go where you do not expect them to go, and how to resolve those problems using the Components Attributes. The Camera Right Wall contains the same instances contained in the Camera Left Wall. The unit component is unique but the instances will update globally. This will make it easier to add the brick texture to the walls and the wood texture to the posts.

Putting the Pieces Together Part 2

Movie 2.6 Putting the Pieces Together Video Part 2

VIDEO MARKERS

1. Cutter Walls

2. Rough Skylight

3. Floor

4. Masking Walls

5. Backdrop

6. Move with Attributes
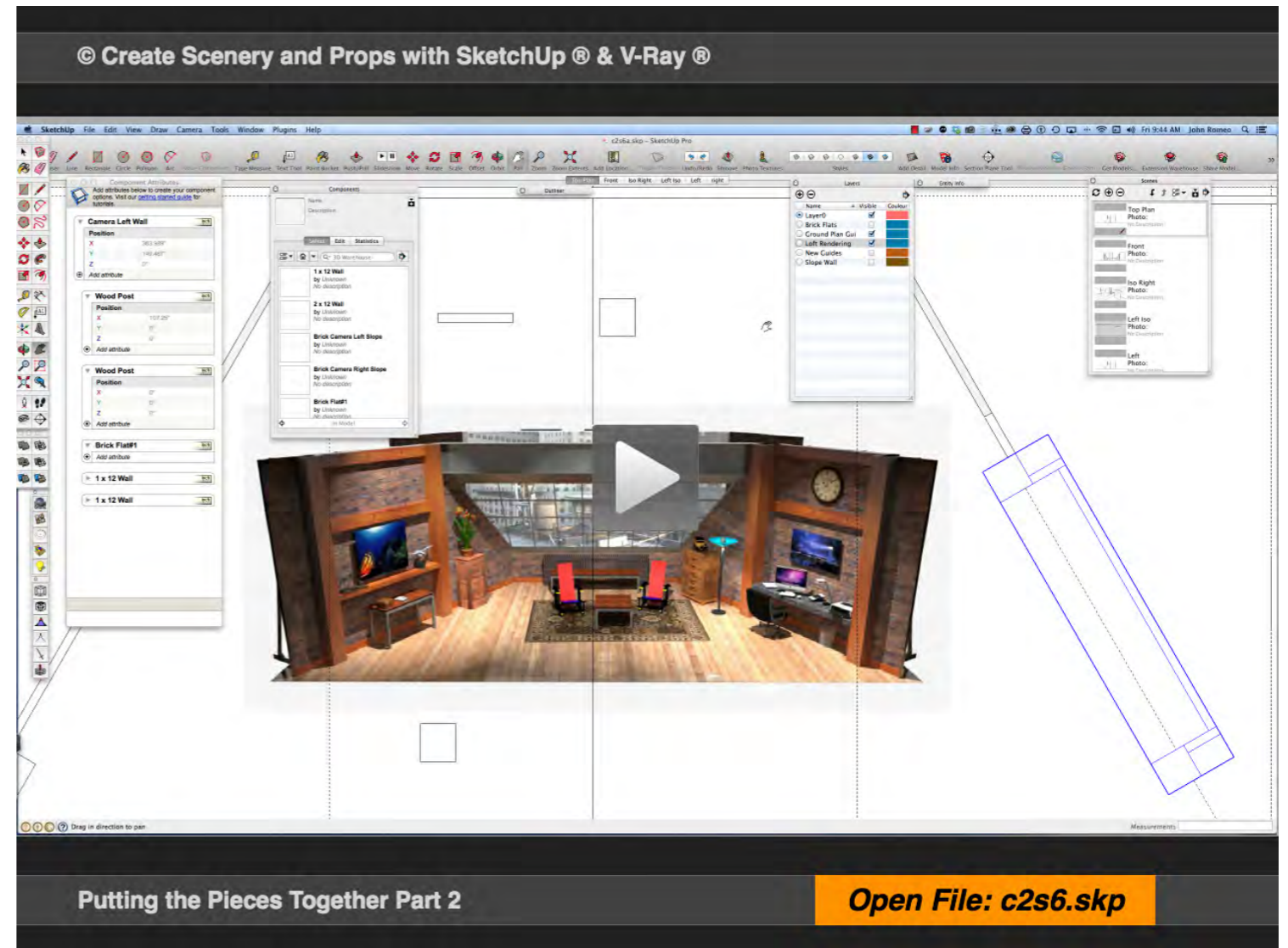
Exercise FILE c2s6.skp

01_Cutter Walls_0:00:00:01

The purpose of a Cutter Wall is to frame the shot in a film or video set: it is similar to the concept of bleed in a printed document. Two instances of this wall will be needed, one for Camera Right, and one for Camera Left and both objects should remain as instances not unique Components. If you want different textures on each object, then you would make each object unique.

02_Rough Skylight_0:01:40:00
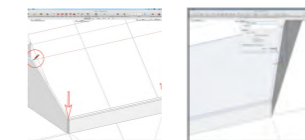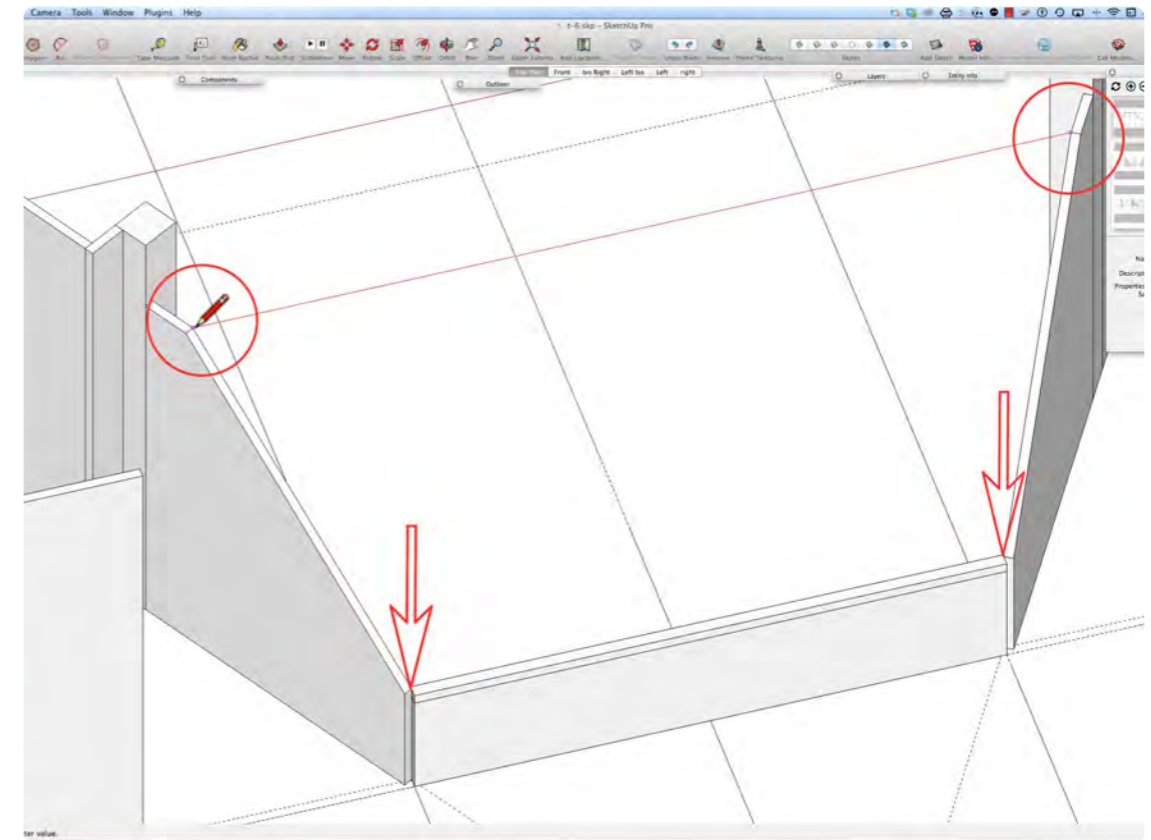
This is a good time to do a rough drawing of Skylight so that in the next chapter we can create a detailed drawing of the frame. Use the line tool to connect the four points shown in the image above and create the Skylight Component.

03_Floor_0:03:54:29
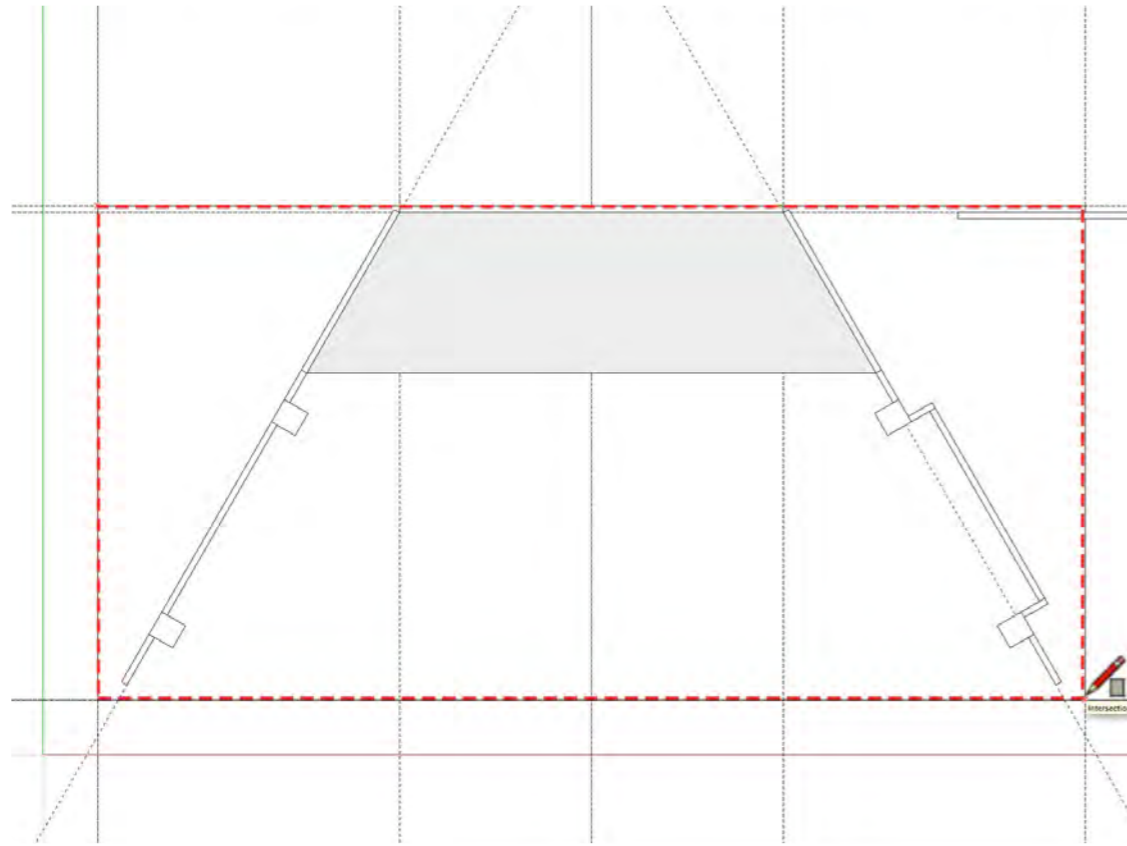
The Floor in set is wood grained linoleum 1/8" thick X 36 feet wide X 18 feet deep. The guides are in place from the ground plan video, so draw a rectangle snapping to those guides. I like to maintain the top surface of the Floor at +0'-0" so, with the push pull tool, pull down and type 1/8" in the box in the lower right-hand corner.

04_Masking Walls_0:05:11:20

The Masking Walls are two more instances of the 8 x 12 wall put in place 24 feet apart and 6 feet from the Knee Wall and rotated 60° respectively. They are necessary because of the small size of the backdrop. If a very wide backdrop is available these walls would not be necessary.

05_Backdrop_0:08:18:15

24 ft

16 ft
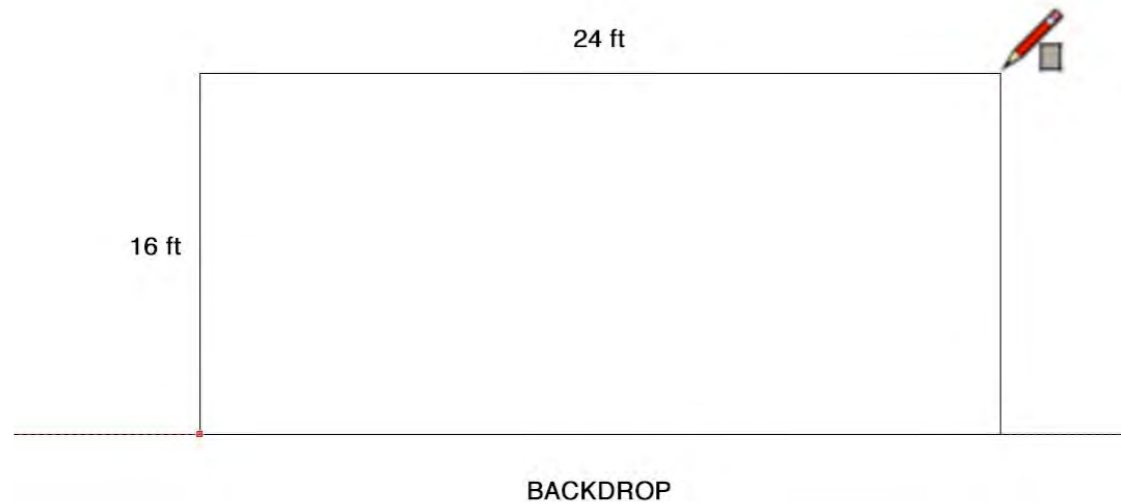
BACKDROP

The Backdrop is 24 feet wide by 16 feet high and would most likely be a Translite and not a Backdrop. The 24 x 16 foot rectangle is created in the front view and immediately made into a component. Then it is moved into position between the two masking walls and it will snap to t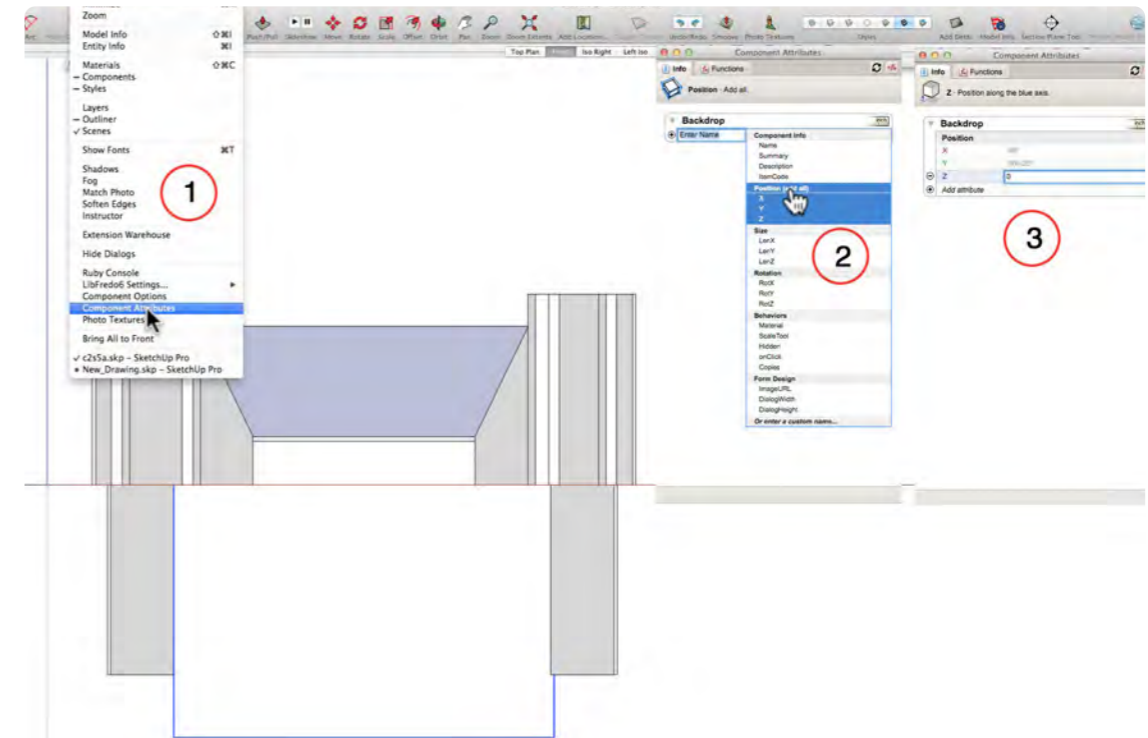he ground plane, because the Masking Flats were moved and snapped to the ground plane without being elevated into their proper position.

06_Move with Attributes_0:09:38:12

Moving the objects to the correct position is easy by changing the component attributes. To do this you have to open the component attributes window and add the position attribute and enter zero for the Z value. It is easier to move objects this way then trying to orbit around and drag them two points in 3-D space.

Creating Complex Scenic Elements

The Skylight and The I-beam are complex pieces that have challenging locations to work on in the set. This chapter focuses on making odd shaped pieces in 3D Space
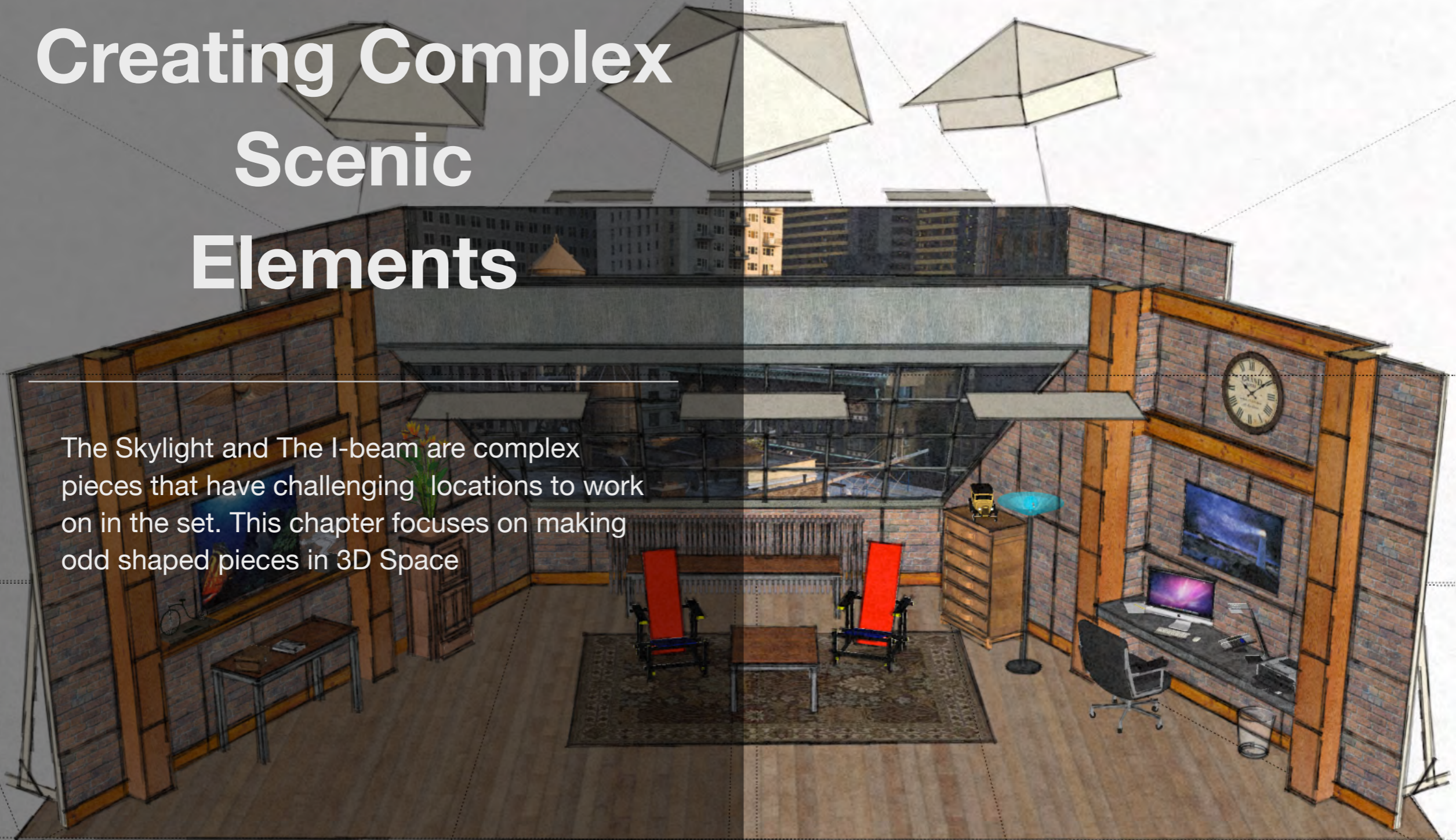
Skylight Part 1

VIDEO MARKERS

1. Skylight Angle

2. Move to Floor

3. New Component

4. Program Quirks

5. Fit in Truck

6. Frame Perimeter

Exercise FILE c3s1.skp

Movie 3.1 Skylight Part 1

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Skylight Part 1

Open File: c3s1.skp

01_Skylight Angle_0:00:00:12
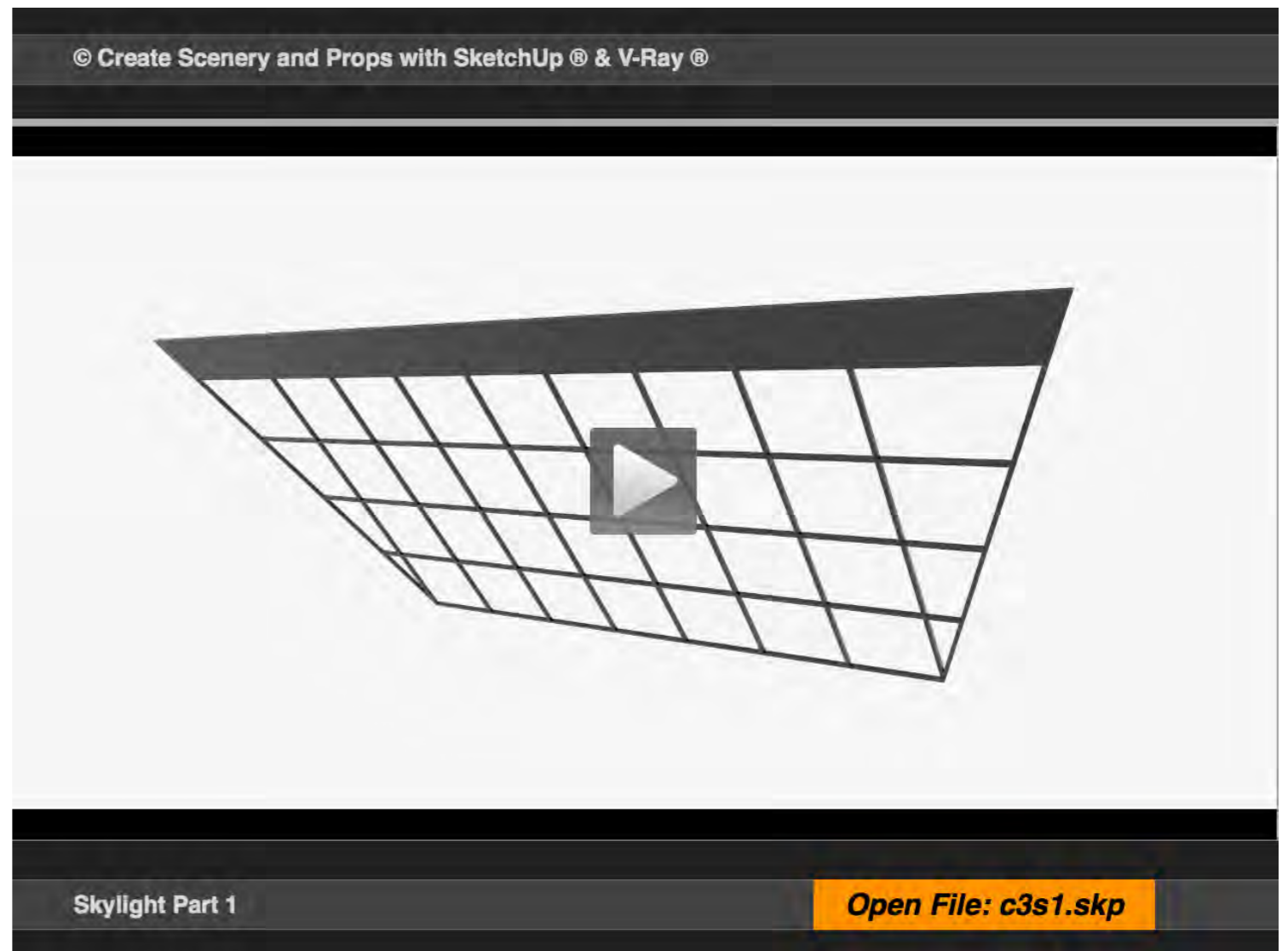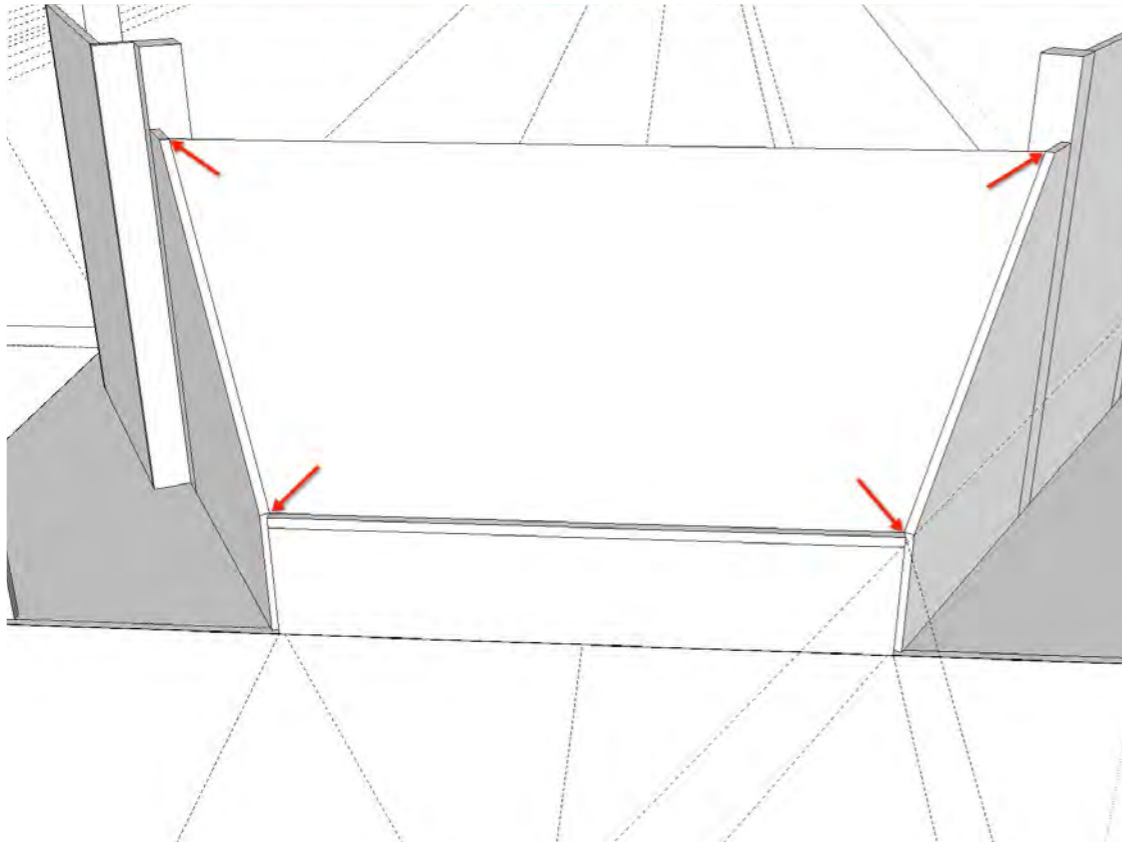

The Skylight is a difficult piece to draw because it rests on a wall that is rotated 60°; the slope of the wall is 46°, and the angle of highlight is 50.1°. Many points in space need to be connected to correctly to make this drawing a coplanar object. However, in SketchUp, all that is needed is to connect the 4 corners or 4 points of the Skylight in 3-D space.

The video demonstrates how the angles are generated and how to create an instance of the Skylight Component and flatten it on the ground plane to layout the pieces of the frame.

The Protractor Tool is used to determine the angle; the Rotate Tool is using to rotate and flatten the geometry on the Ground Plane.
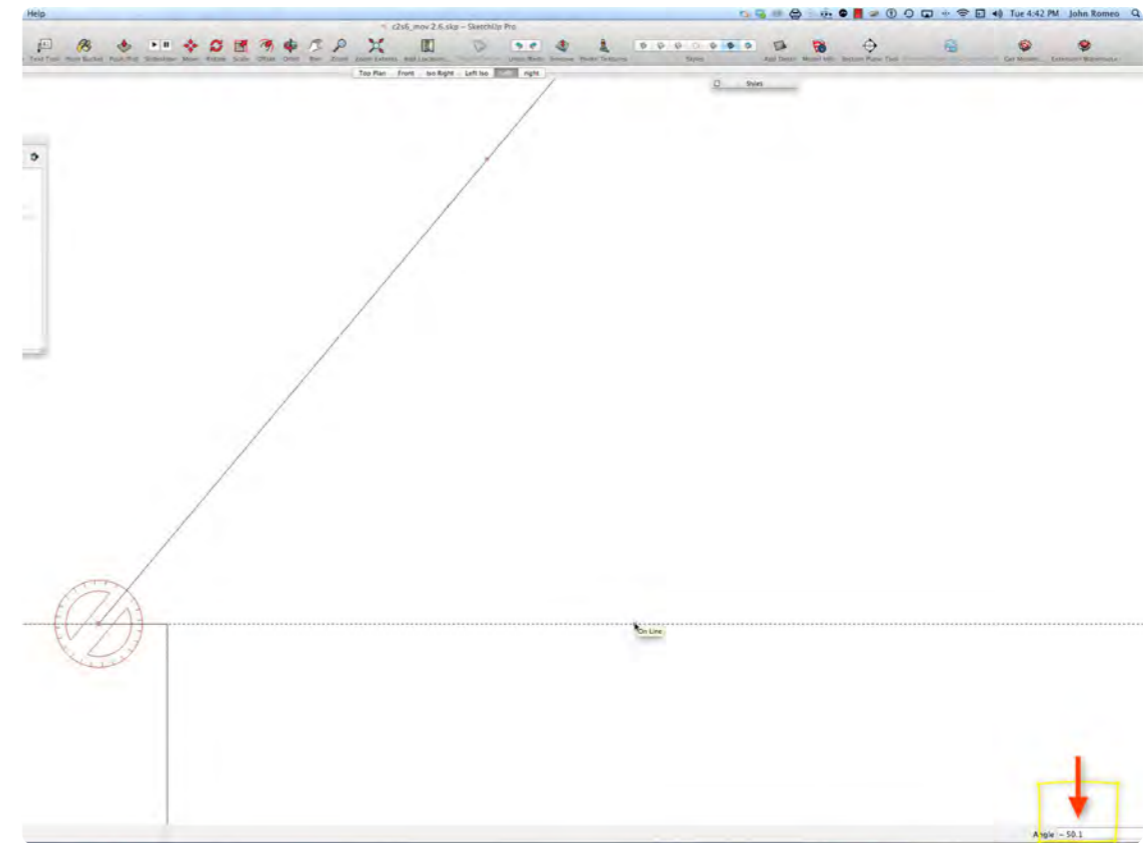
02_Move to Floor_0:02:29:09

03_New Component_0:05:23:28
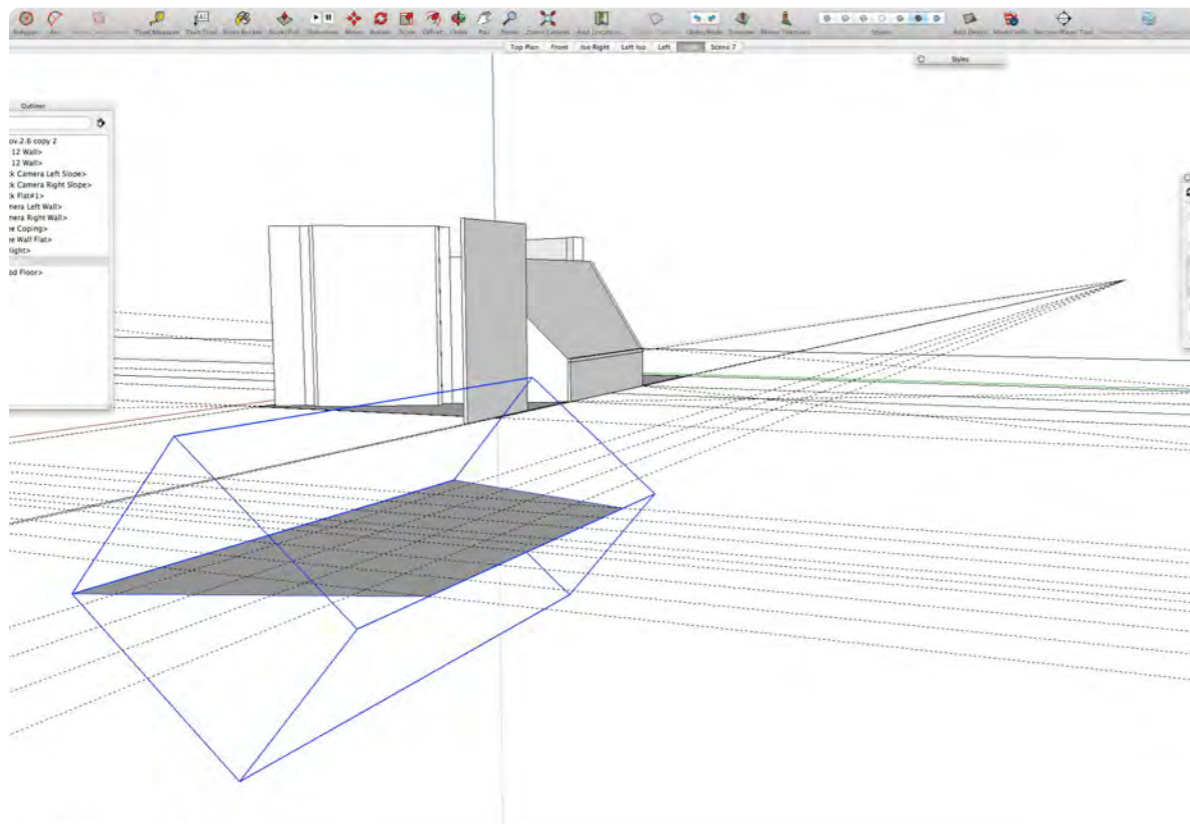
Select the Move Tool, holding down the option key, drag an instance of the Skylight horizontally, and with the rotate tool, rotate it 50.1° parallel to the ground plane and move it down to the floor.
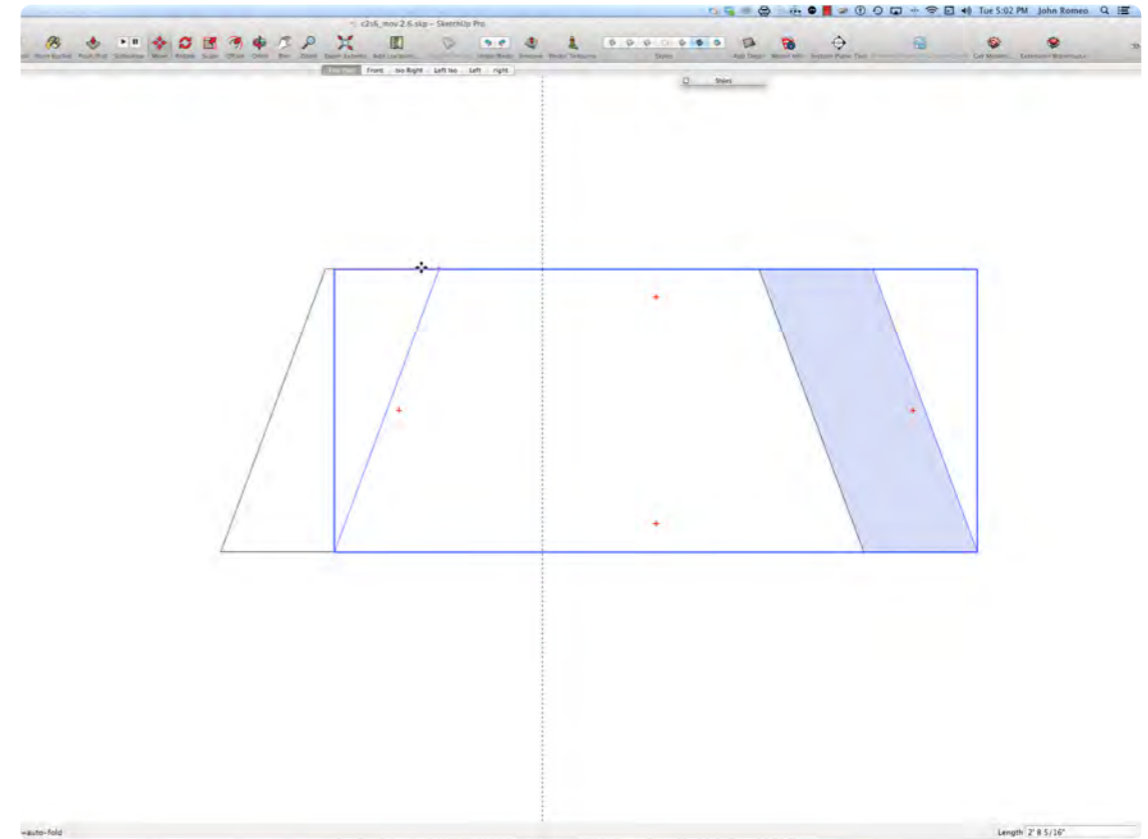
The Skylight was created in 3-D space and made into a Component with it rotated 50.1°, so the Component blue box was created parallel to the ground plane so it ends up with a very funky shape. This could end up being a little confusing so the best thing to do is redraw it with it flattened on the ground plane and turn it into a new component.

04_Program Quirks_0:07:29:03
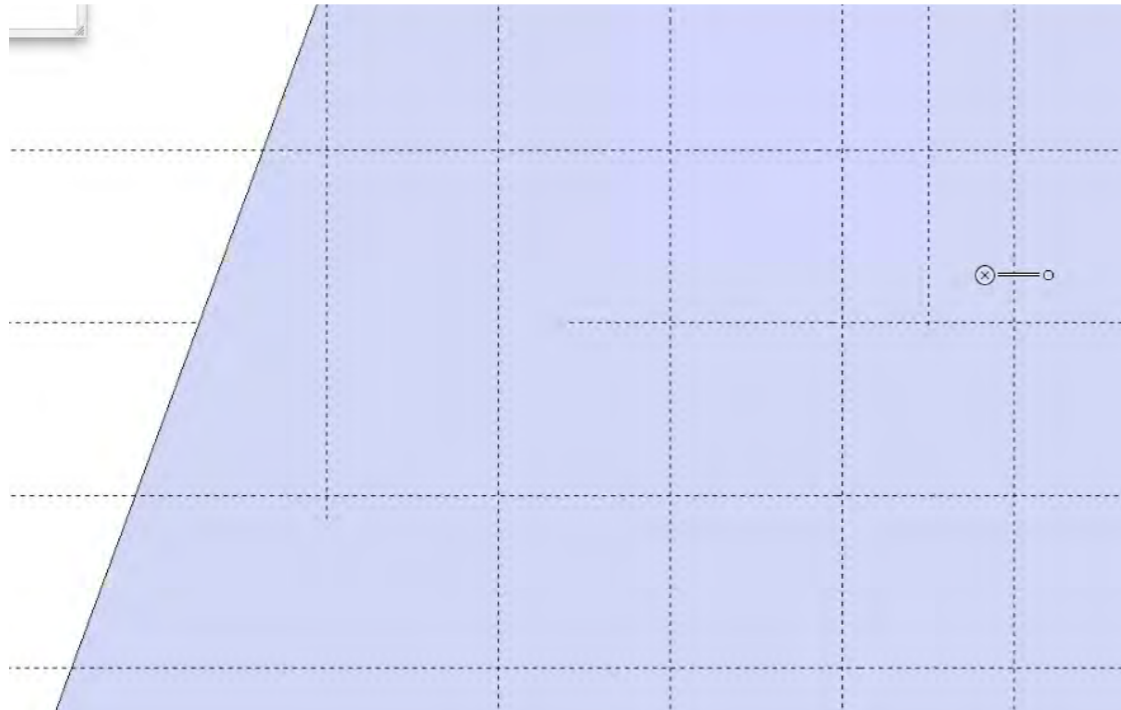
Some of the guidelines forming the skylight grid seem to disappear in top plan view parallel view. If you change to top plan perspective view you can see that the lines are there that sort of disappeared. Usually the lines reappear when you zoom in or out.

05_Fit in Truck_0:07:54:03
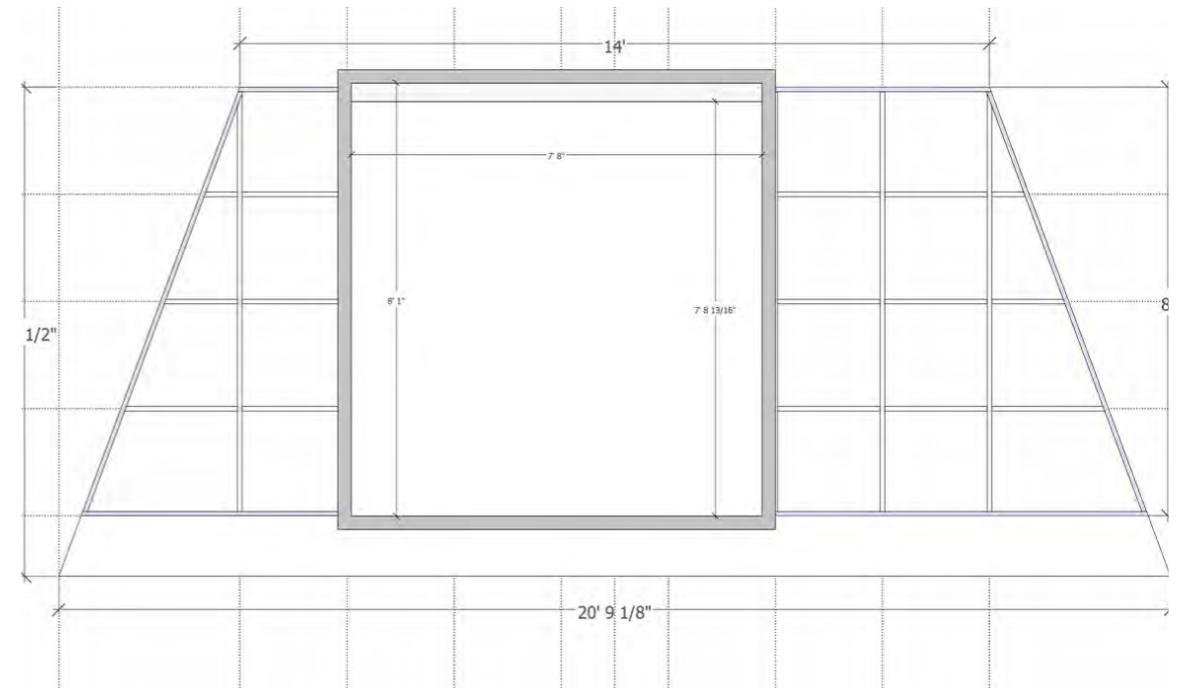
It always make sense to consider if a large piece of scenery will fit in a standard 24 foot truck. Generally, the interior height of a 24 foot truck is 97 inches, but that can vary and there is usually a bar going across the back of the truck making that height about 92 inches. A 96 inch high frame can still fit in the truck by leaning it. When possible limit the height of pieces to 90 inches high to be safe.

06_Perimeter Frame_0:09:34:13
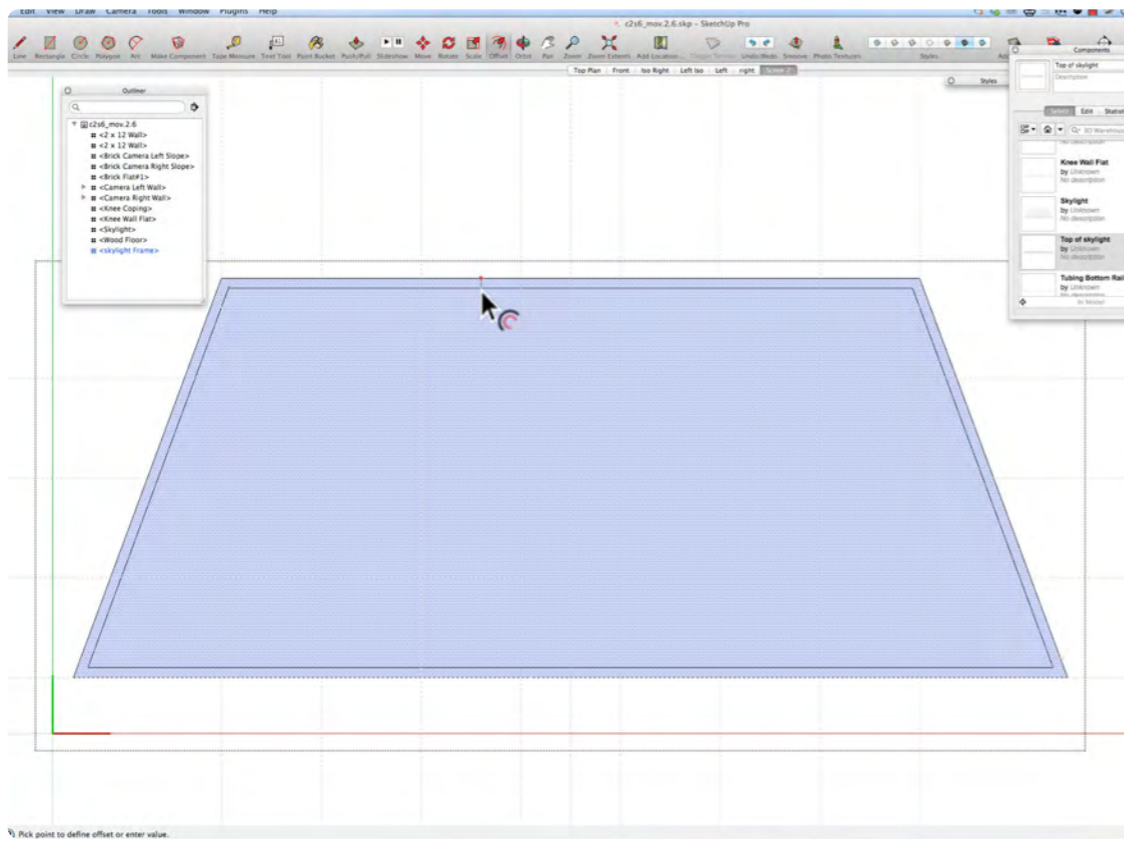
The Skylight Frame is already a component so double-click and select the Offset Tool and offset the perimeter 1 inch to the inside click and hit the spacebar. Create all the pieces of The Skylight in 2-D before extruding any pieces because it is easier to snap to the guides.

.

Skylight Part 2

VIDEO MARKERS

1. 1 x 1 x 94" Tubing

2. Snap to Guides

3. Trim Angle

4. 1 x 1 X 23" Tubing

5. End Pieces
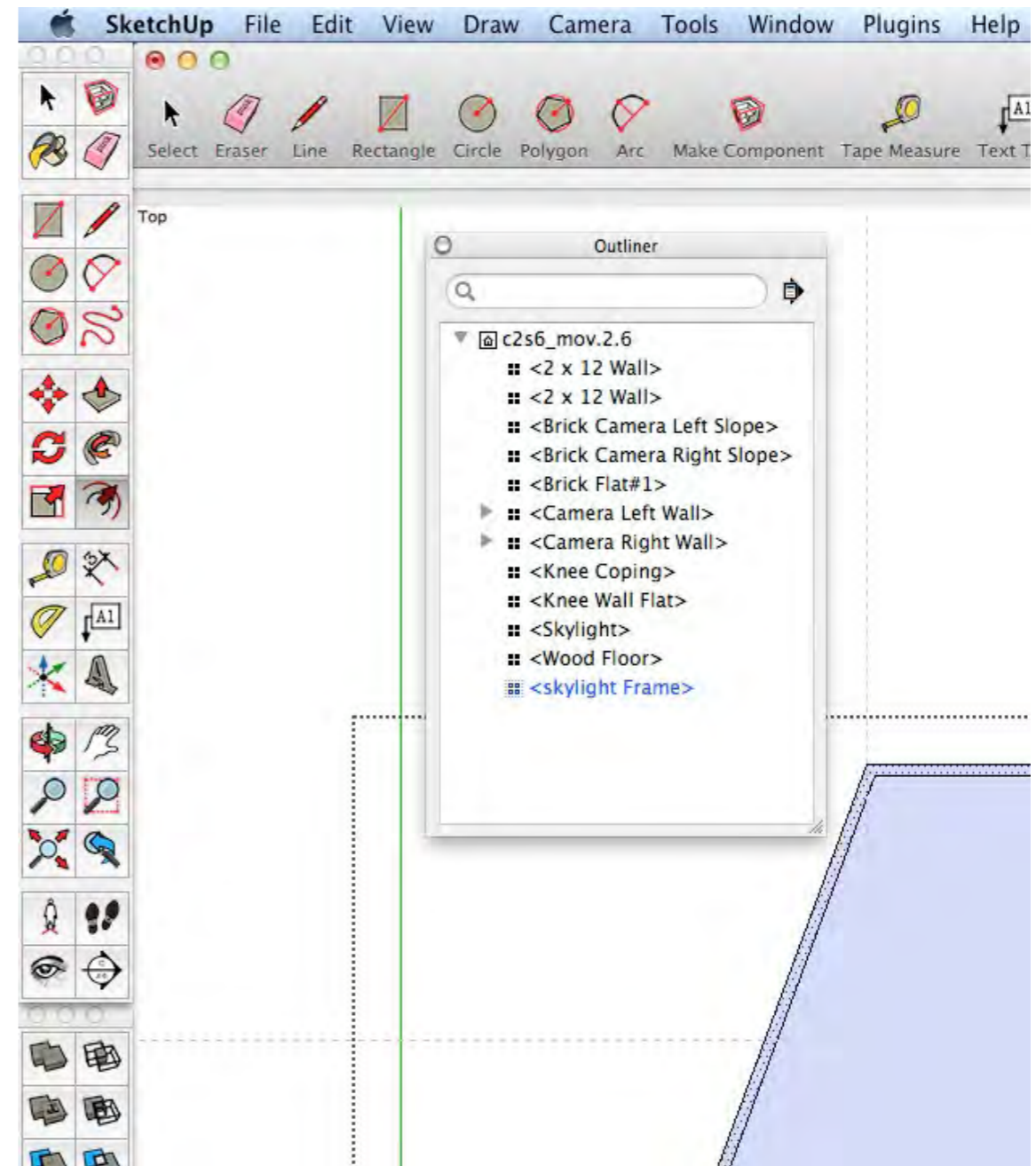
6. Mirror with Scale Tool

Movie 3.2 Skylight Part 2

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Skylight Part 2

Open File: c3s2.skp

01_1 X 1 X 94 Tubing_ 0:00:01:01

and type in (1, 94)

The Skylight is constructed out of 1" X 1" 16 gauge Metal Tubing, that comes in 20 ft. Lengths. In the last video we made the peri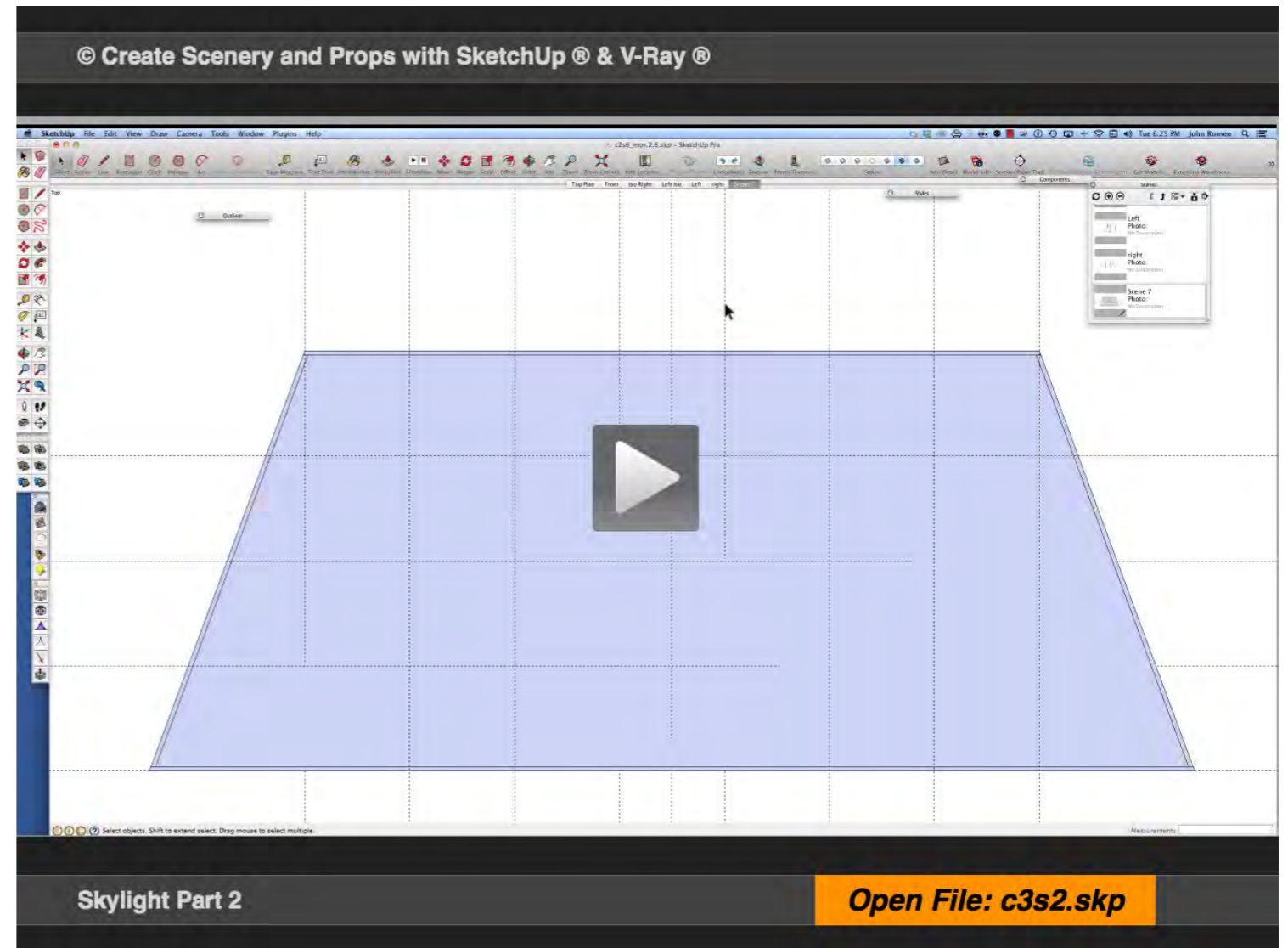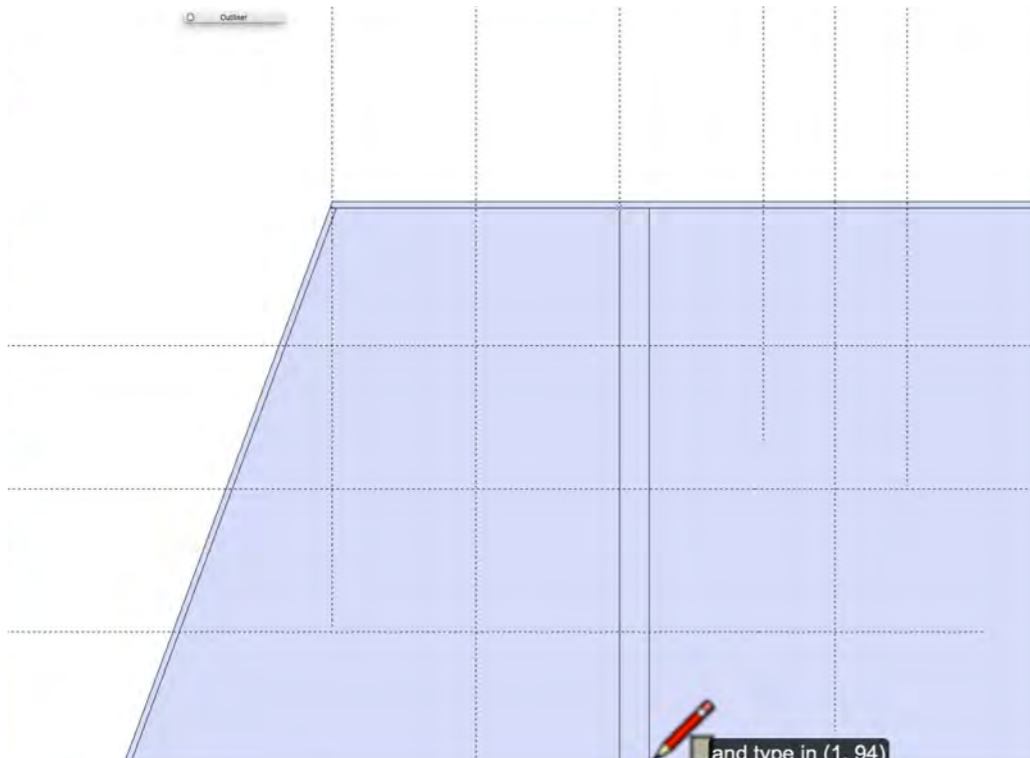meter frames, which are the longest lengths required. The next pieces to make is the 90" long vertical pieces. Select the Rectangle Tool, or press "r" and click on the intersection of the Perimeter Frame and the guideline, and type in (1, 94). SketchUp does not have a center point navigation for the rectangle tool, so create a Rectangle and then move it on center. (added in SU 2015)

02_Snap to Guides_0:01:03:02

In this drawing, the guides sit on the ground plane, so it makes sense to create a 2-D objects; make it a Component; place multiple instances of the Component as 2-D objects and then select any one of the instances and extrude it with the Push Pull Tool, and all the instances that have not been made unique, will be extruded as well. This workflow saves much time. If you made the initial component and extruded it to 1", it could still work if you extruded it down and then moved all instances later.

03_Trim Angle_0:02:54:24

Triangle = 180 degrees

20°

70°   90°

04_1 x1 x 23 Tubing_0:06:16:06

Line up mid-points
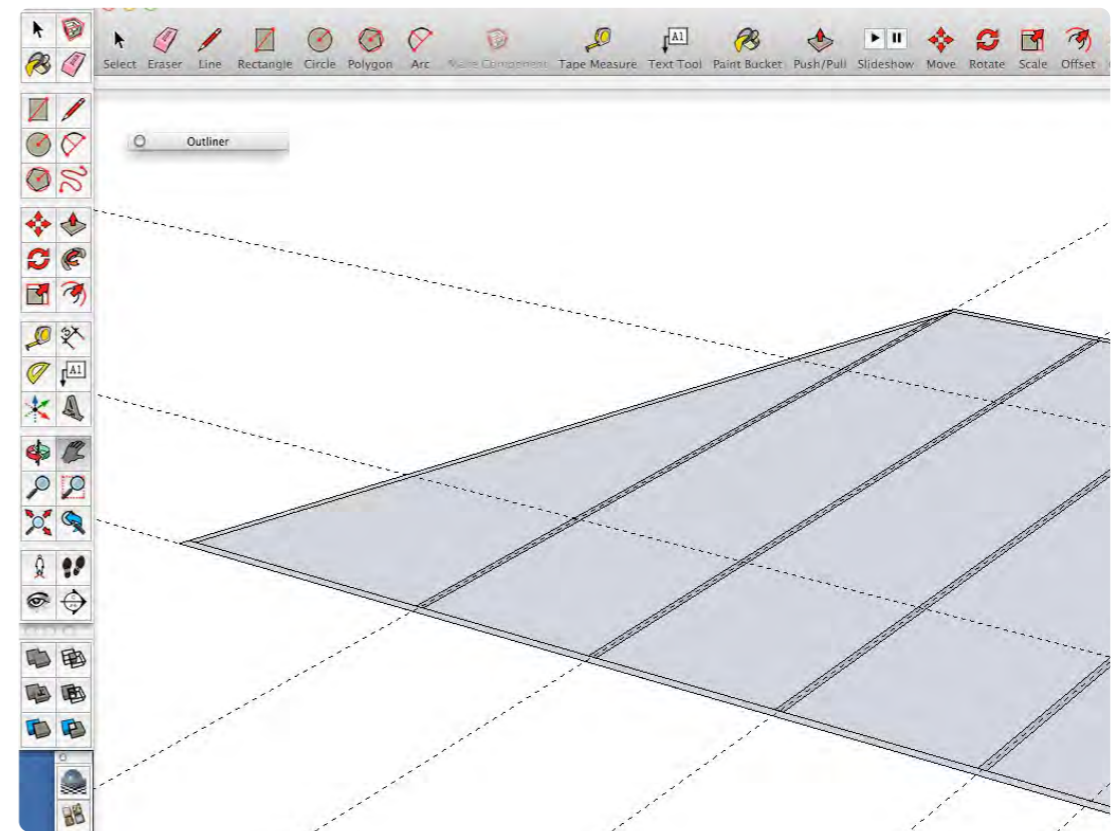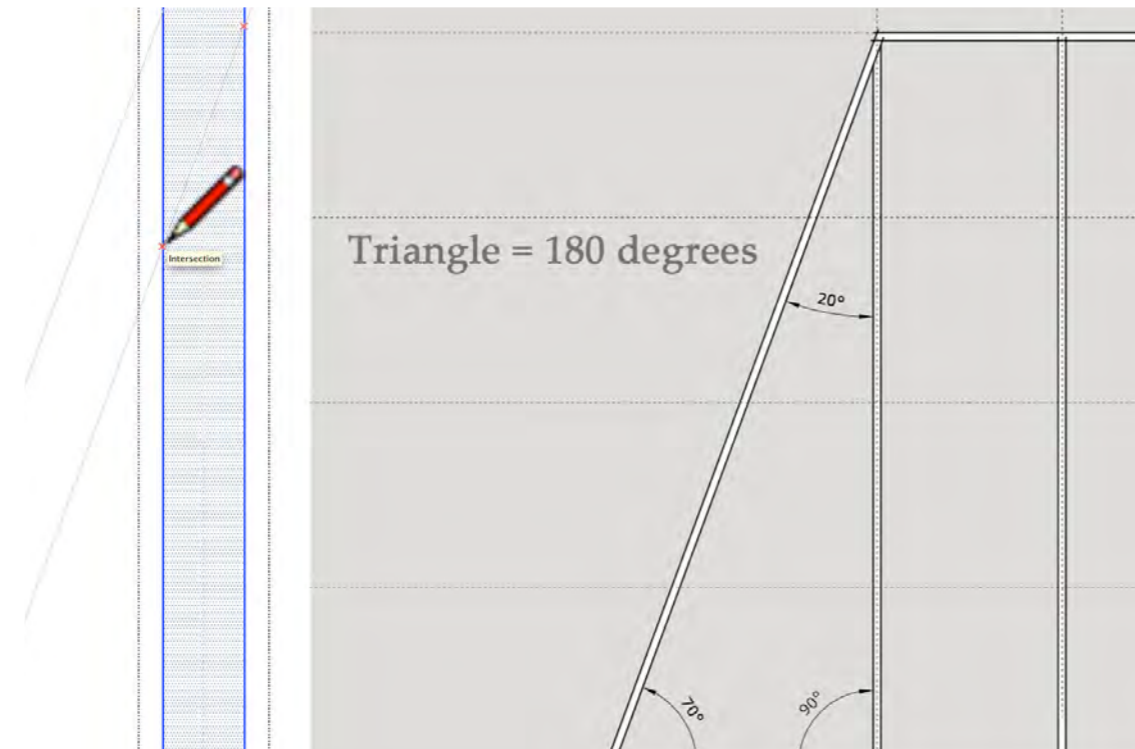
The 20° angle will be trimmed from an instance of the 1 x 1 X 96" tubing. Be sure to select the instance and right-click 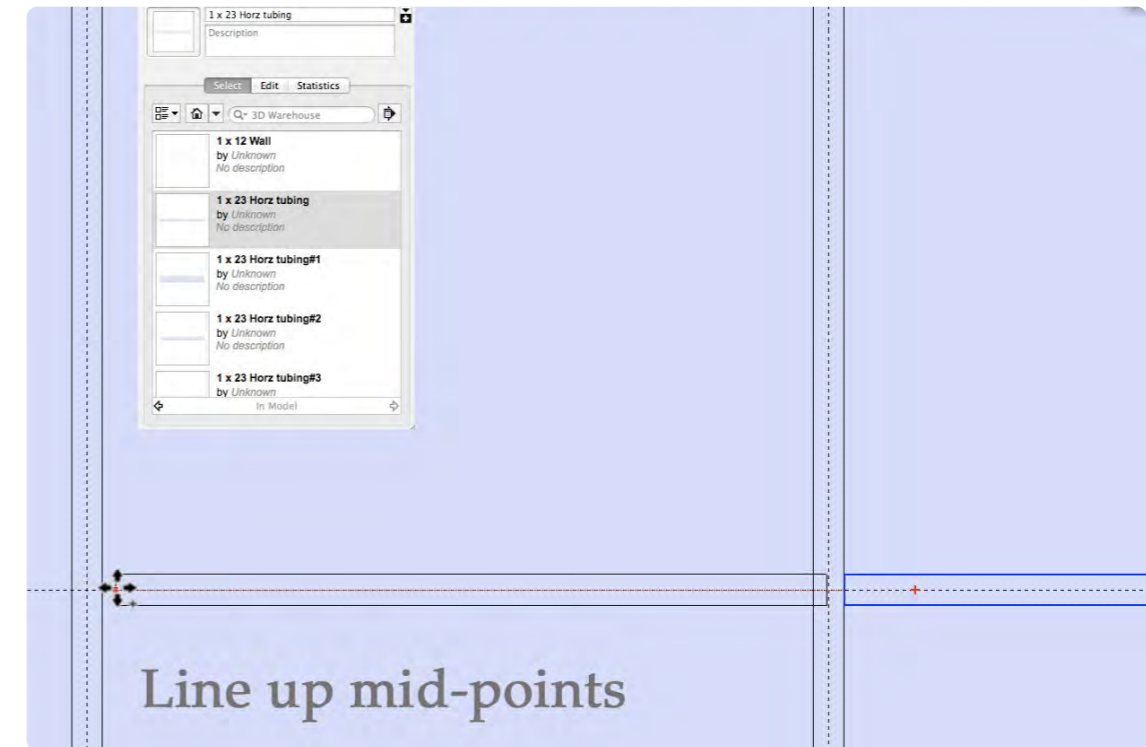to make unique before trying to trim the angle. The figure above illustrates the composition of the triangle that is formed: notice the three angles check out because they add up to 180°. Make sure that you click on the new unique component until you see the blue highlight. When using the line tool, make sure that you hover over the point, when the **red X** appears, drag to the next point and the second **red X**, click and spacebar to exit the command.

The 1 x 1 x 23" tubing pieces start with a rectangle (23,1); make it a Component and name it 1 x 23 Horz Tubing. Duplicate it and move into place all 18 instance of the 1 x 23 Components: do not make the instances unique. They need to remain instances so they can all be extruded to 1" in one step. It may be difficult to find the midpoint of an object when zoom out, zoom in a little closer and it will be easier to snap to midpoints.

05_End Pieces_0:07:28:23

1, 2, and 3 horizontal tubings

06_Mirror with Scale Tool_0:10:22:06

direction I want to scale it, type -1,
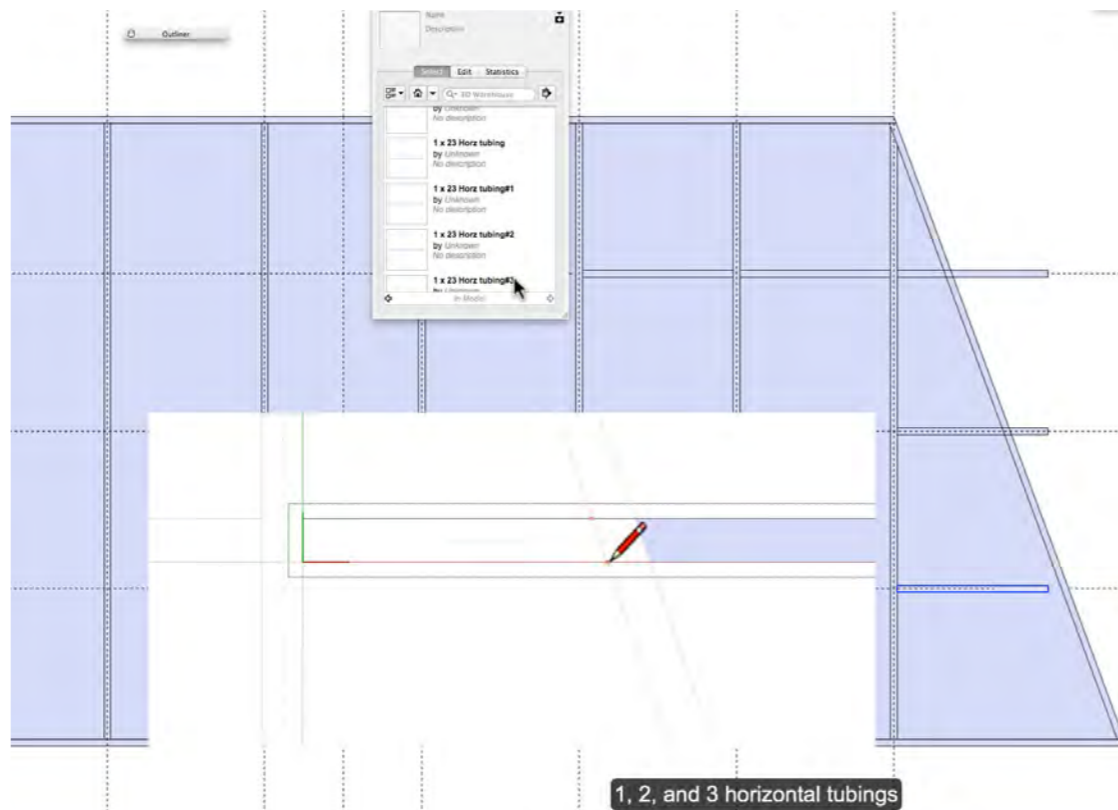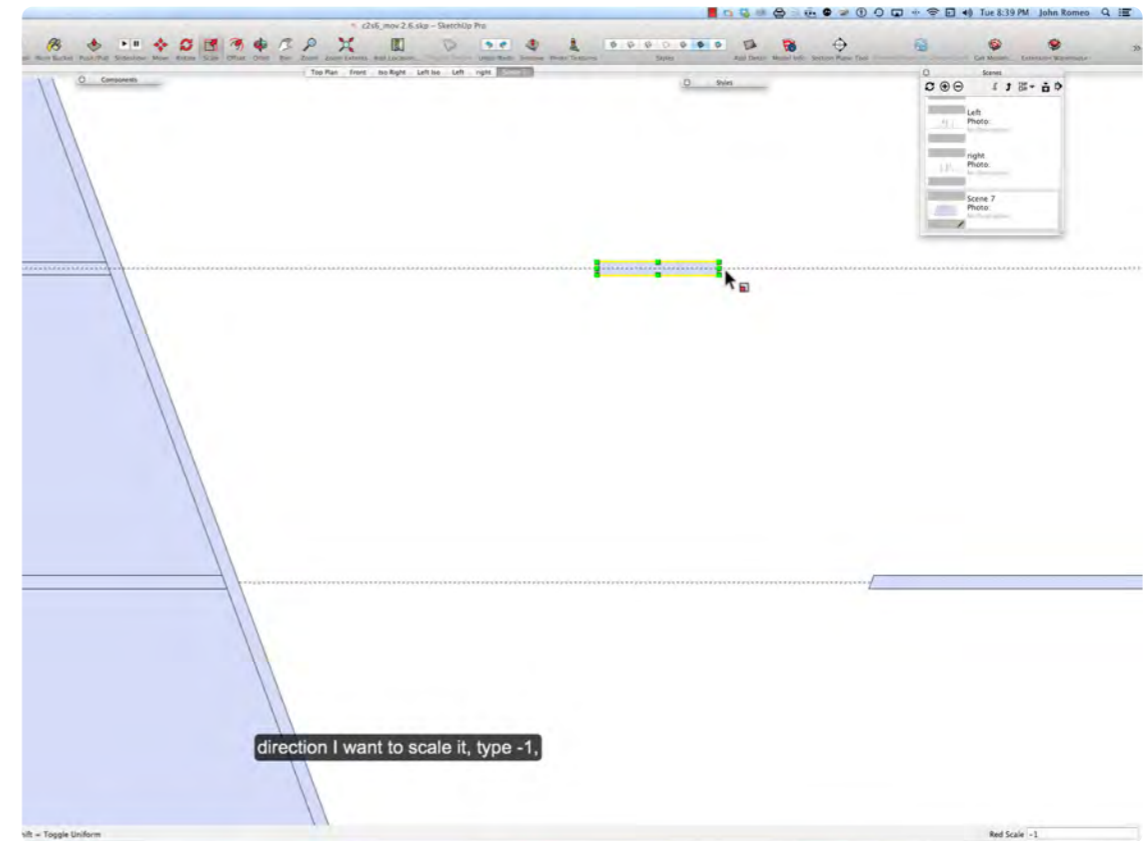
Create the angle pieces on the left side of The Skylight. Drag out 3 instance of the 1 x 23 Horz Tubing and make each one unique. Check to see that there are 3 new components in the component window. Move the pieces into place and trim to the angle respectively. Do not repeat this step for the right side, because they will be mirrored in the next step.

Use the Scale Tool to make a mirror image for the right side of The Skylight. Make a duplicate of the three angle pieces and do not make them unique, because you can mirror an instance without it changing the original component. Highlight each instance individually and then select the mirror tool, click on the object with the scale tool, select the red handle and drag it to the right; type in-1 in the box; press enter and then the spacebar: Move each piece into position.

Skylight Part 3

VIDEO MARKERS

1. Extrude Perimeter

2. Extrude Internal Pieces

3. Clean up Extra Lines

4. Top Piece

5. Plexiglas

Movie 3.3 Skylight Part 3
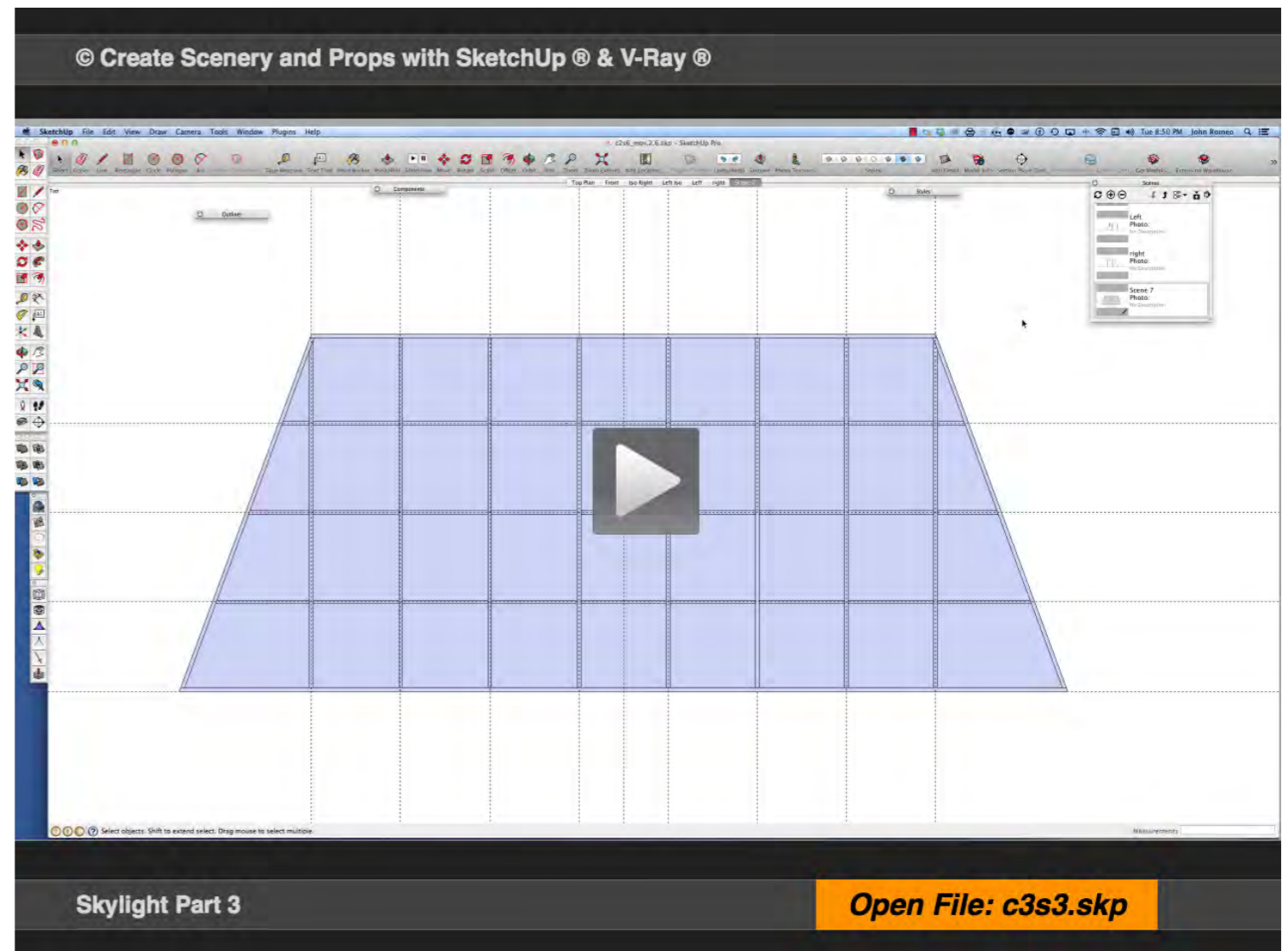
01_Extrude Perimeter_0:00:01:26

02_Extrude Internal Pieces_0:02:27:01

All the pieces of The Skylight Frame are in place and it is time to extrude them into 3-D objects with the push pull tool. Start with the perimeter frame, which is 4 pieces to extrude. Since each of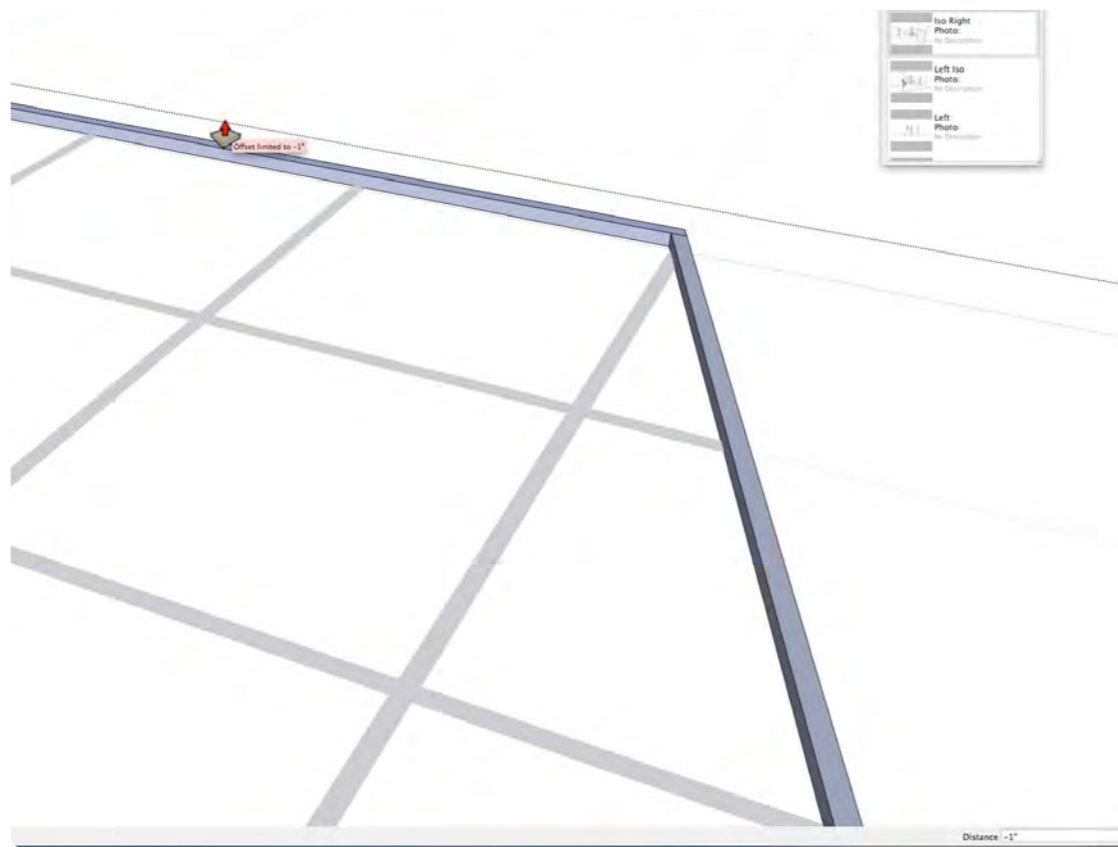 the four pieces is an individual Component, each piece will need to be extruded separately. For the first piece, you will need to type in a value of 1" and for the other three pieces you can pull up to the adjacent piece and snap to lock in to the height.

Extruding the internal pieces starts with the 23 inch wide rectangles, which can all be extruded to 1 inch high together since they are all instances of the same Component. The left and right trimmed pieces will extrude in pairs, because the mirror image of each piece is an instance of that piece.

03_Cleanup Extra Lines_0:03:26:22

04_ Top Piece_0:04:57:15
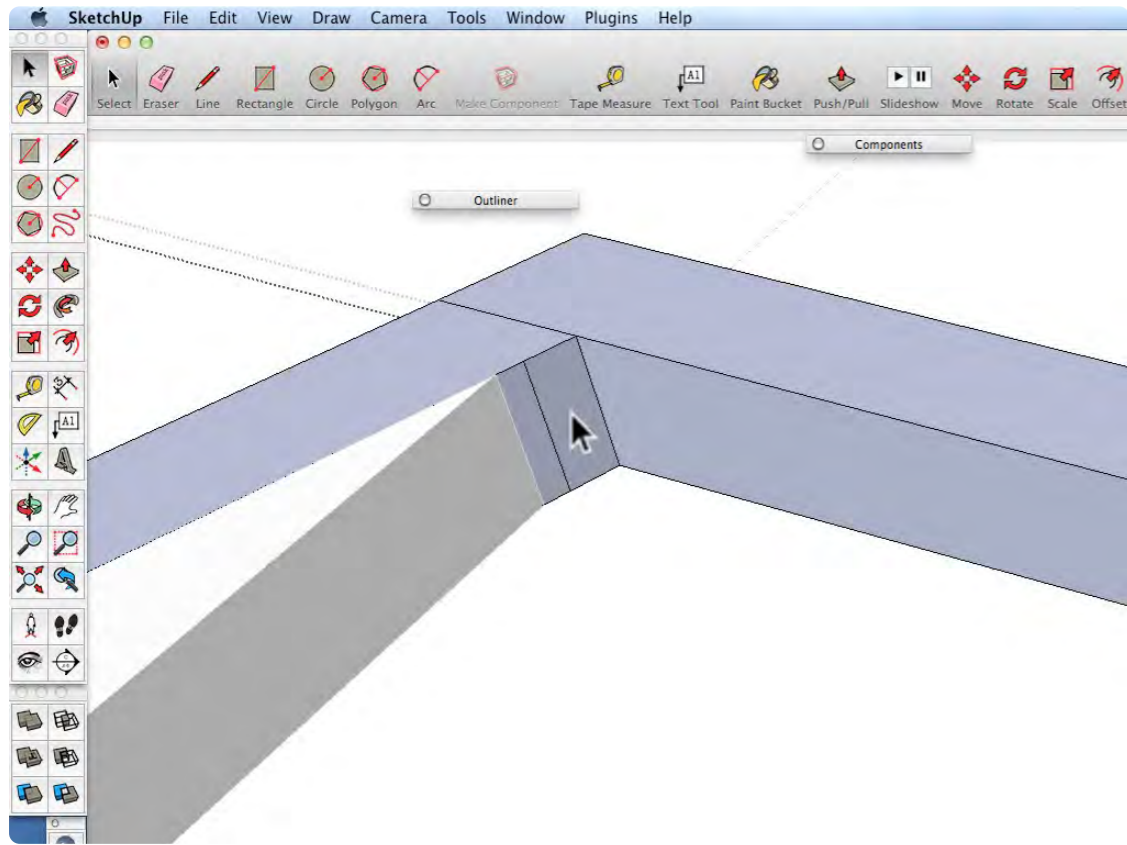
Sometimes extra lines appear in your drawing after extruding 2-D objects into 3-D objects. It is a good practice to clean up these lines by deleting them when possible. If a line is deleted and it creates a hole in the object select the undo or command/control z.
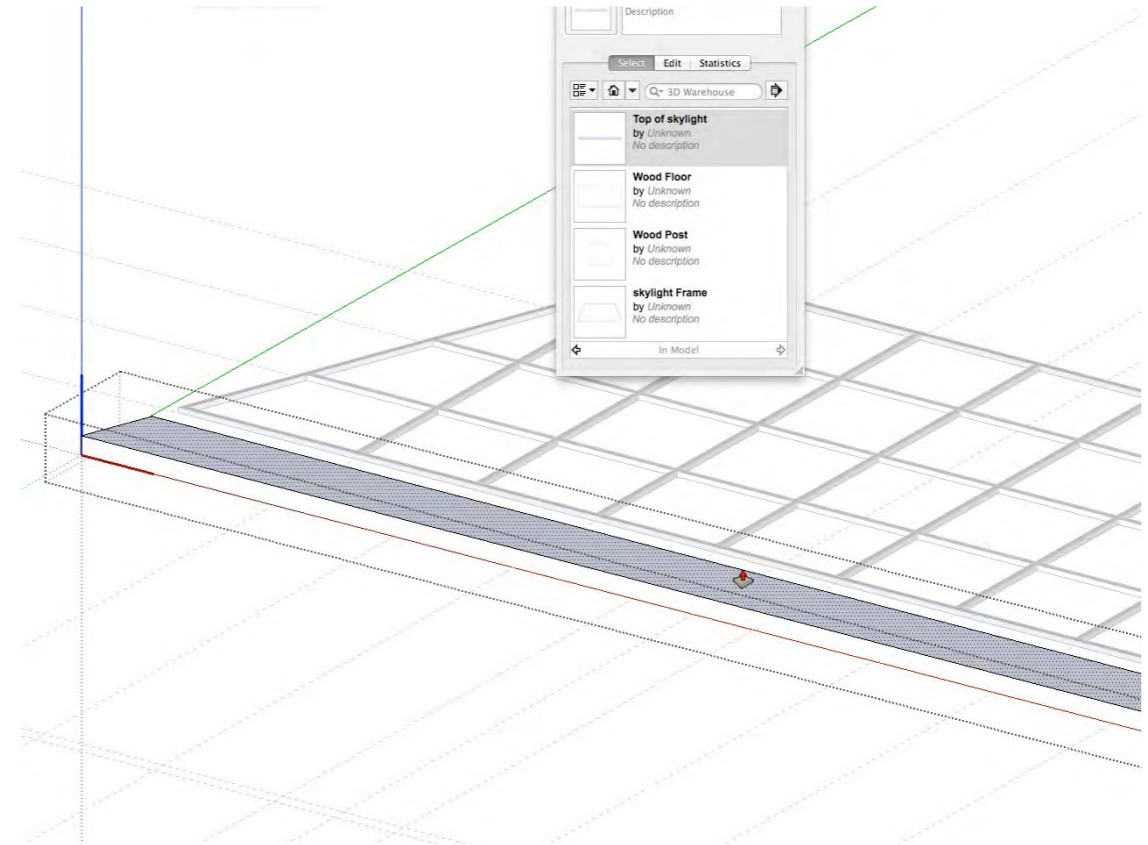
The top piece of The Skylight is made removable so that it could fit in a truck. It was saved as a Component, so all we have to do is drag out an instance and extruded to 1 inch thick and place it in position on The Skylight Frame.
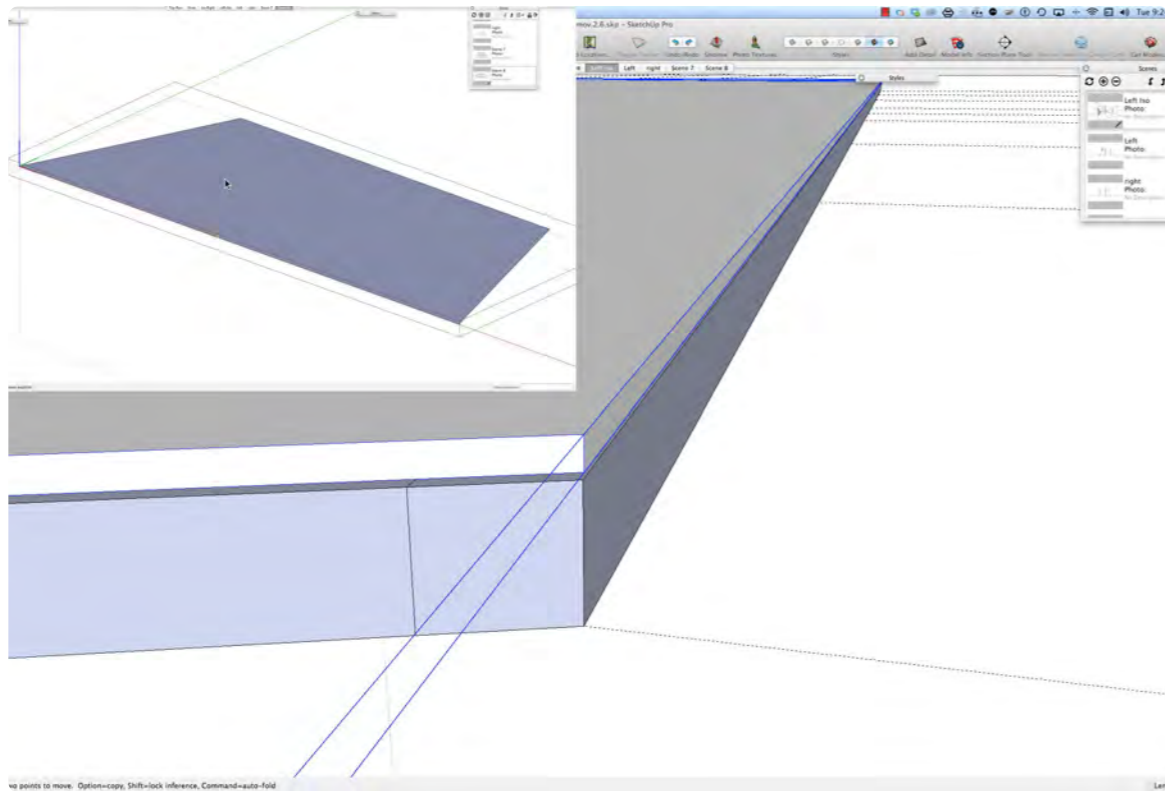
05_PlexiGlas_0:06:12:00

Adding Plexiglas to the Skylight can add realism to the rendering: adding reflections and refractions and helping establish the depth of field for the backdrop. To add the Plexiglas to The Skylight Frame, drag out an instance of the frame and redraw it with the line tool, and extruded to 1/4" and line it up with the edge of the frame.
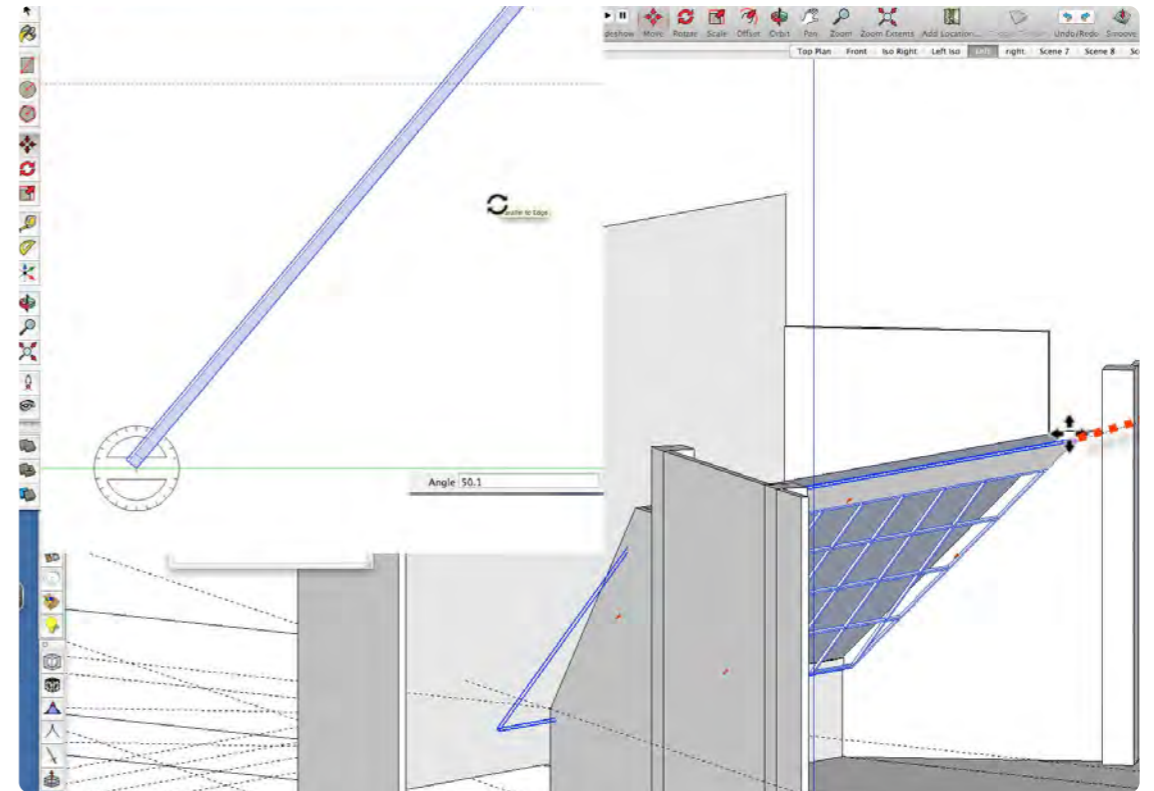
06_Place Skylight_0:09:47:14

The skylight is sitting on the floor and it needs to be rotated 50.1 degrees and moved into position in the set. Select the scene tab labeled left and pan over and with the rotate tool rotate the frame 50.1°. Then orbit into position and drag skylight and snap to the rough drawing of the skylight. Once The Skylight Frame is in position, cut it, delete the 2-D Skylight Drawing, and paste the frame in place.

I-Beam

VIDEO MARKERS

1. I-Beam Guides

2. Bottom Flange

3. Web

4. Top Flange

5. Place I-Beam

Movie 3.4 I-Beam

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I-Beam

Open File: c3s4.skp
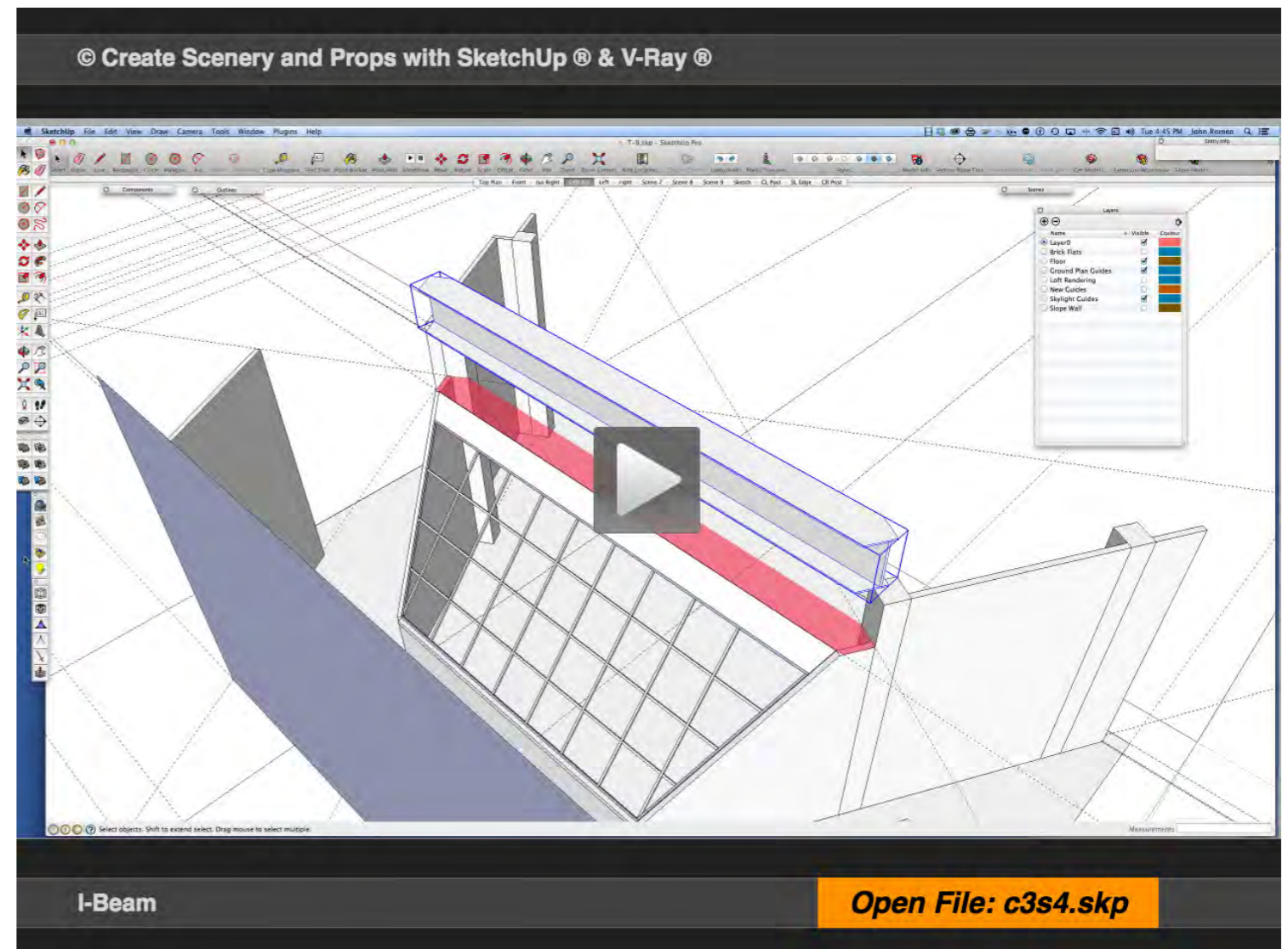
01_I-Beam Guides_0:00:00:01

Pink Lines I-Beam Guides

- The I-beam is located 10 feet above the floor and sits on the Camera Left and Camera Right Sloped Wall. Select The Tape Measure Tool and place guides on the downstage edge of The Skylight and the upstage faces of the Posts adjacent to the Sloped Walls. Use the Scenes Tabs for easy navigation to the sides of the Posts to place guides. It is extremely important that the guides are in the correct position and are **coplanar**, because the flange would be distorted and not extrude correctly.
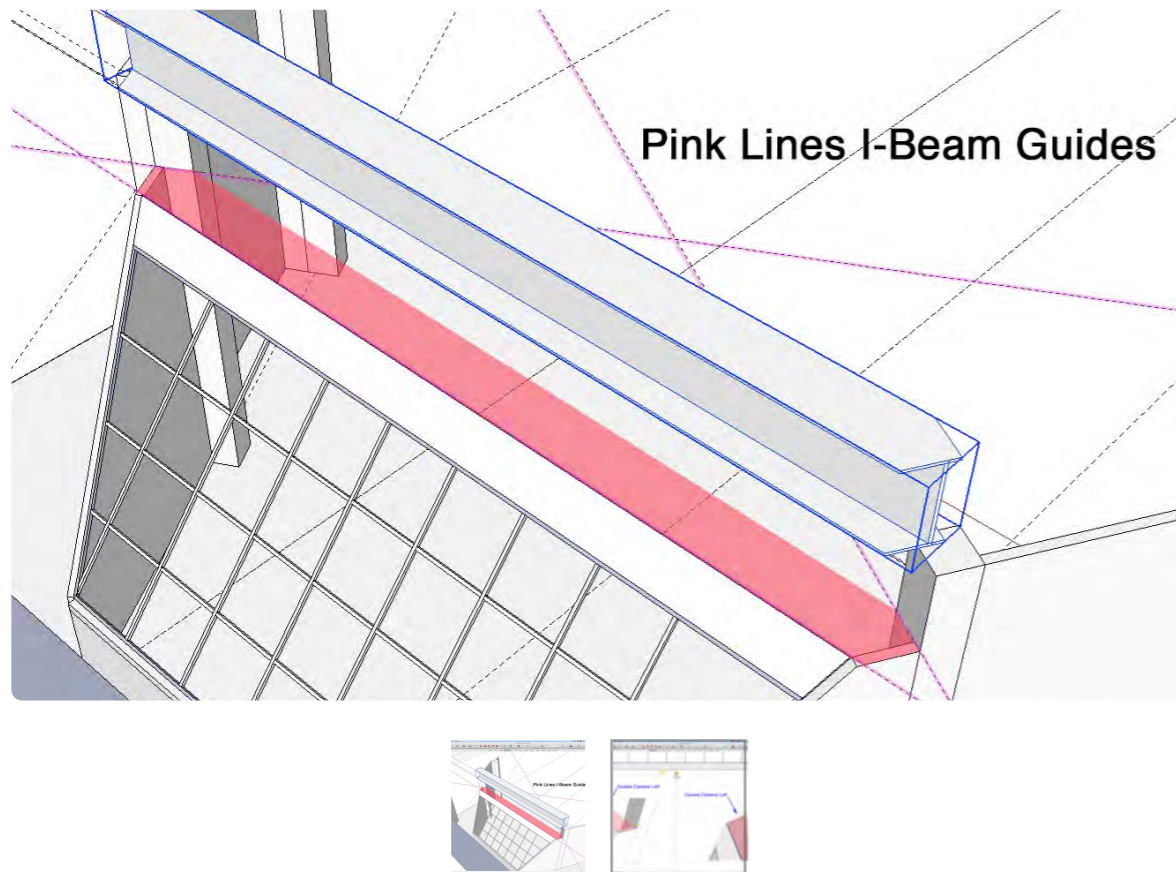
02_Bottom Flange_0:01:20:02
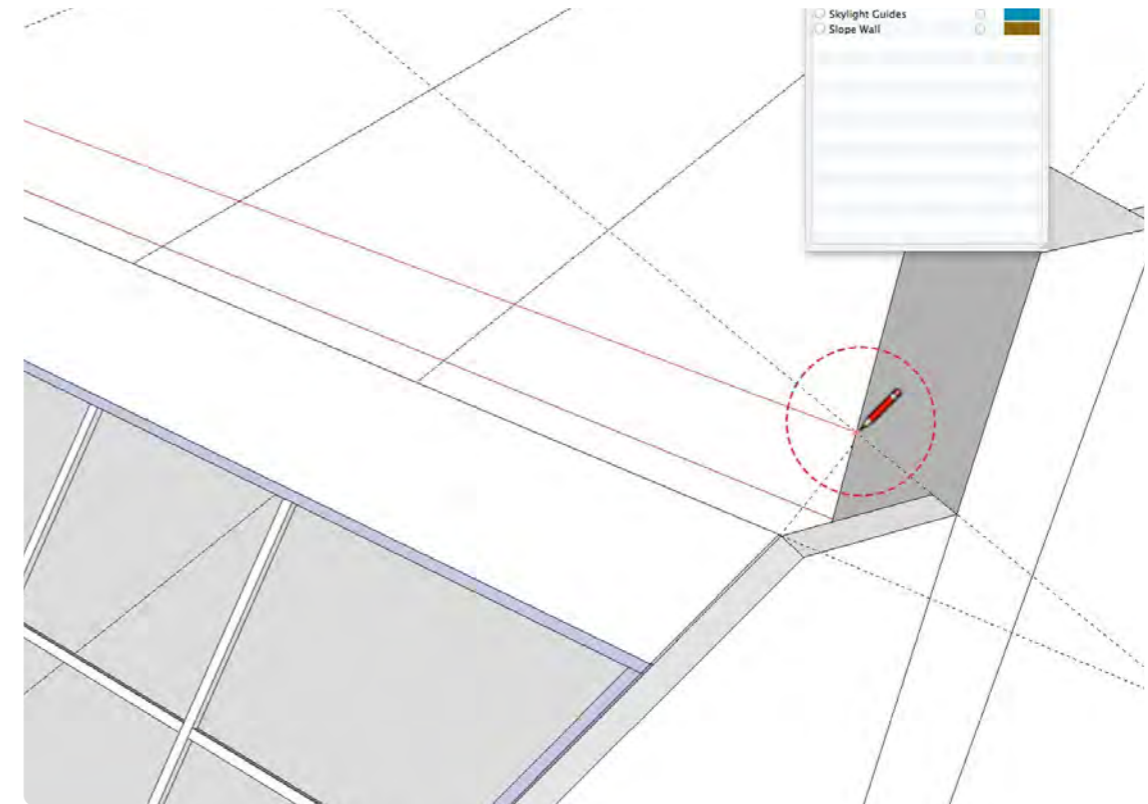
Select the line tool and simply connect the points generated with the guides to create the bottom flange, as you see in red. Make sure you see the **red X** when clicking on each point. Create the I-beam Component and drag it to the floor. Change to an isometric view to check that the flange is located on the floor. Extrude it to 3/4" (.75) with the Push Pull Tool.

03_Web_0:02:37:07

04_Top Flange_0:03:51:19

Aline
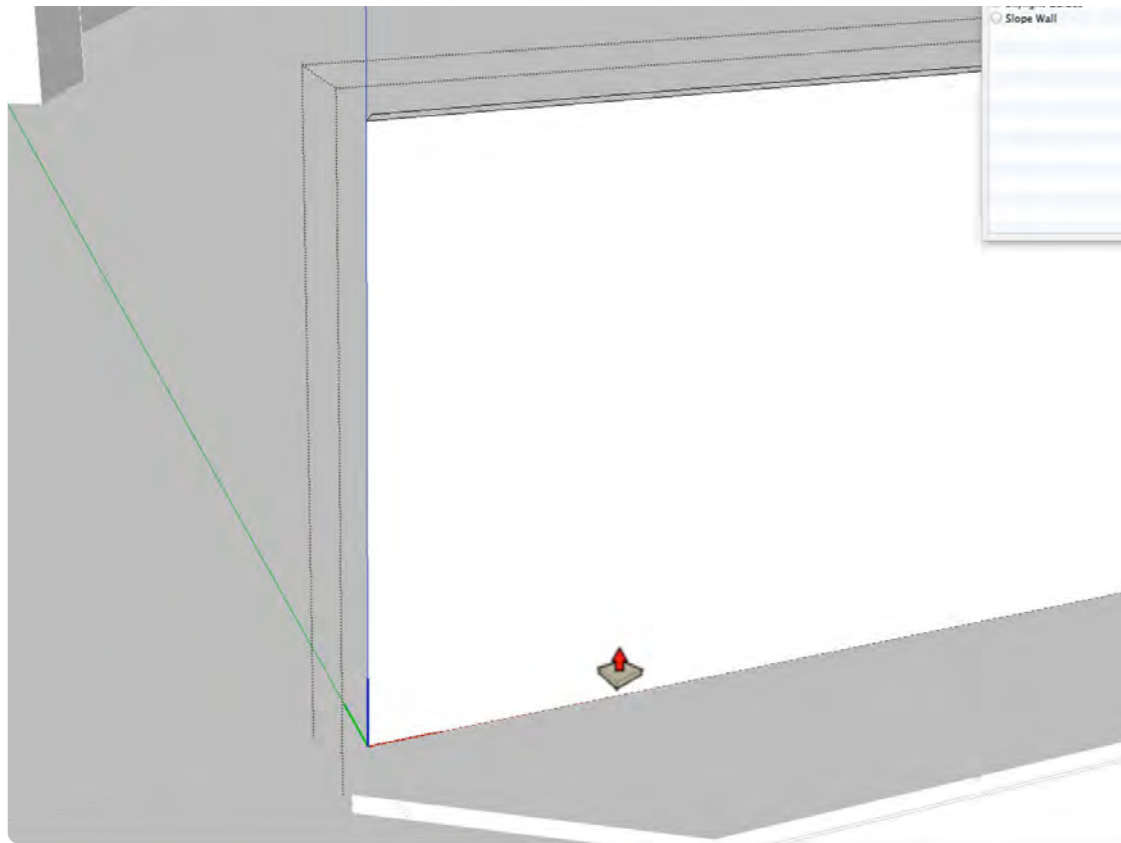
To locate the web on top of the flange, place a centerline with the tape measure tool. The flange is 1'-5 1/2" wide, so drag from the edge along the green axis and type in 8.75. Create two more guides, 3/8" on either 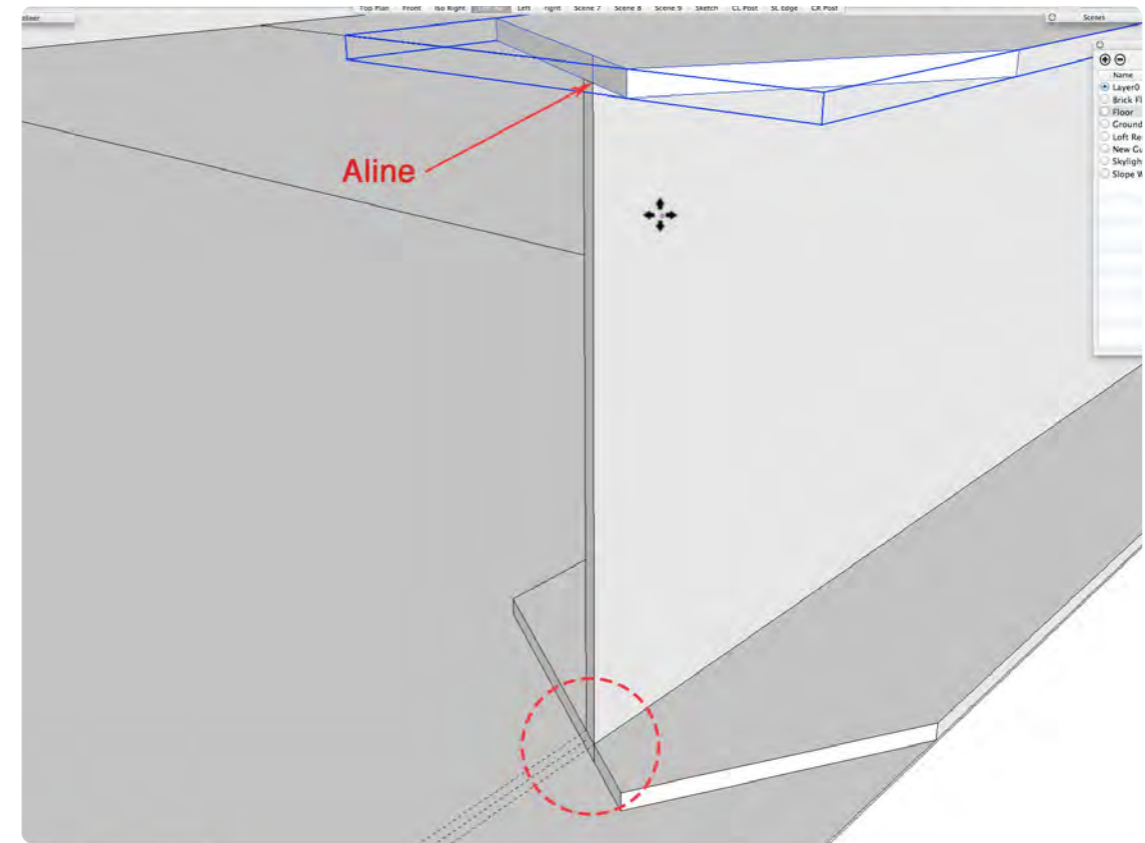side of the center. Connect the 4 point with the line tool and extrude to 22.5" and make it a component; name it I-beam Web. Note: in the video, make "I-beam Web" component was skipped.

The top flange is created from an instance of the bottom flange. The first step is to insert an index line inside the bottom flange Component, so that it can be precisely lined up with the top edge of the web. Next, holding down the option key, drag a copy of the bottom flange to the top. Do not make the top flange unique, unless you want it to have different attributes than the bottom.

05_Place I-Beam_0:05:15:00

To move the I-beam into position grab the move tool and select the top right-hand corner of the I-beam and drag it into position to the top quarter of the camera right post as shown in the illustration below.
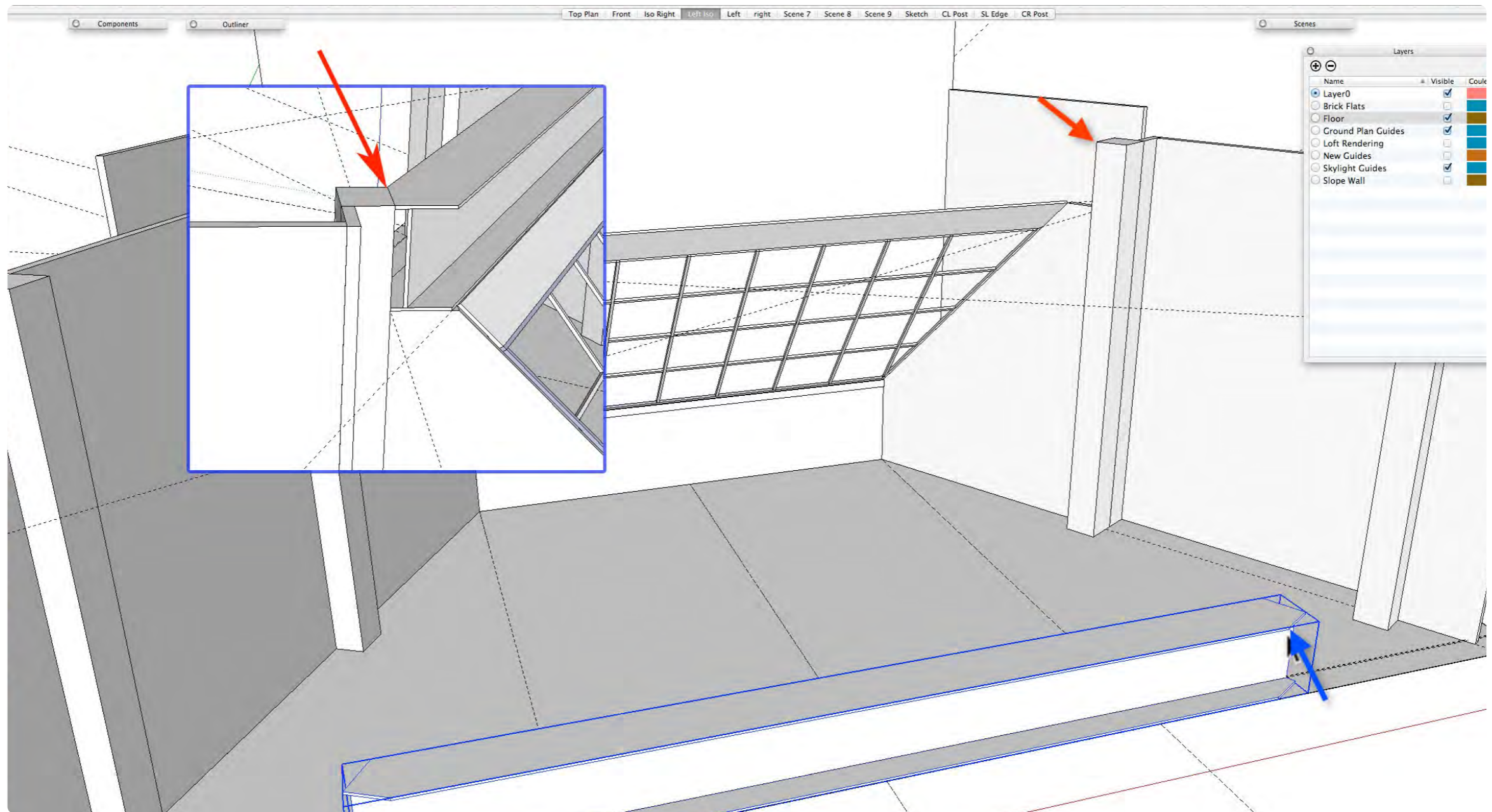
Horizontal Beams and Counter

VIDEO MARKERS

1. Horizontal Beams

2. Counter

3. Baseboard

4. Move Into Parent
   Component

Movie 3.5 Horizontal Beams and Counter

01_Beams and Counter_0:00:00:19

The Horizontal Beams and the Counters add depth and interest to the Brick Walls. The Beams are 96 inches wide by 8 1/2 inches high by 4 1/4 inches deep. Draw a recta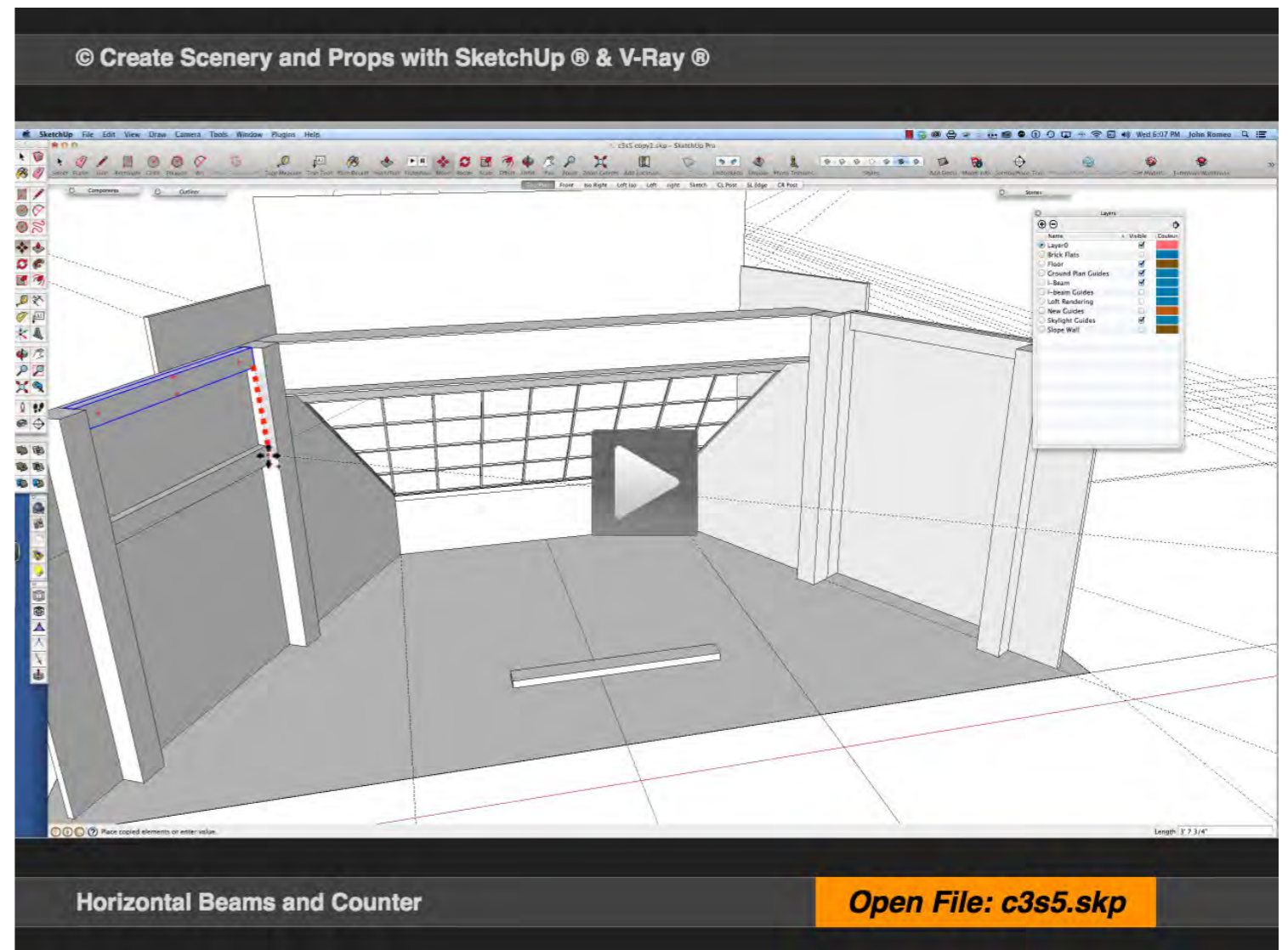ngle 96 inches wide by 4 1/4 inches and extrude it to 8 1/2 inches with a push pull tool. The shelf is 96 inches wide by 3 1/2 inches high by 9 inches deep, and on the ground plane draw rectangle 96" x 9" and extrude it to 3 1/2 inches high. Then rotate the pieces 60° and place them on the wall.

02_Counter_0:06:14:11
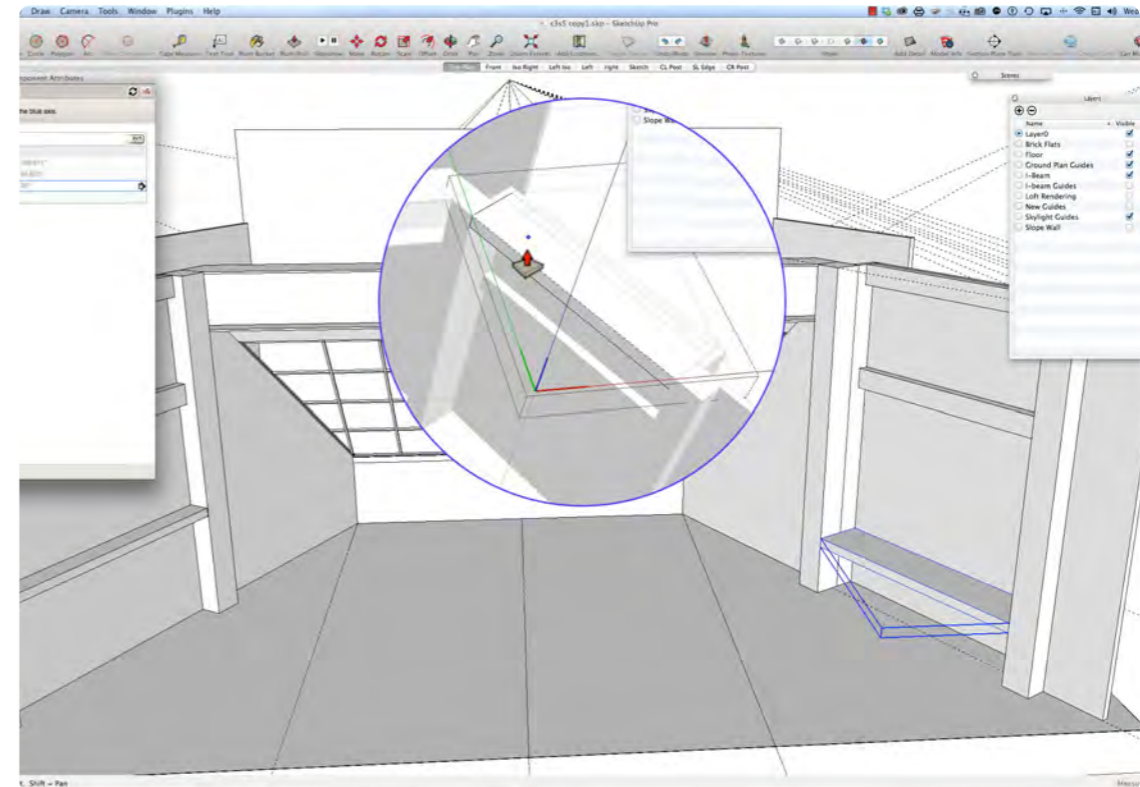
In the video, the counter was drawn at the top of the column because that is where the guides snapped. So rather than redo it, it was easier to finish the counter at the top and then simply change the **Z height** of the Counter in the Component Attribute Window. I like to use examples of unexpected results to demonstrate the logic and workflow of SketchUp and how to fix the unexpected.

03_Baseboard_0:07:42:14

04_Move Into Parent Component_0:12:09:11
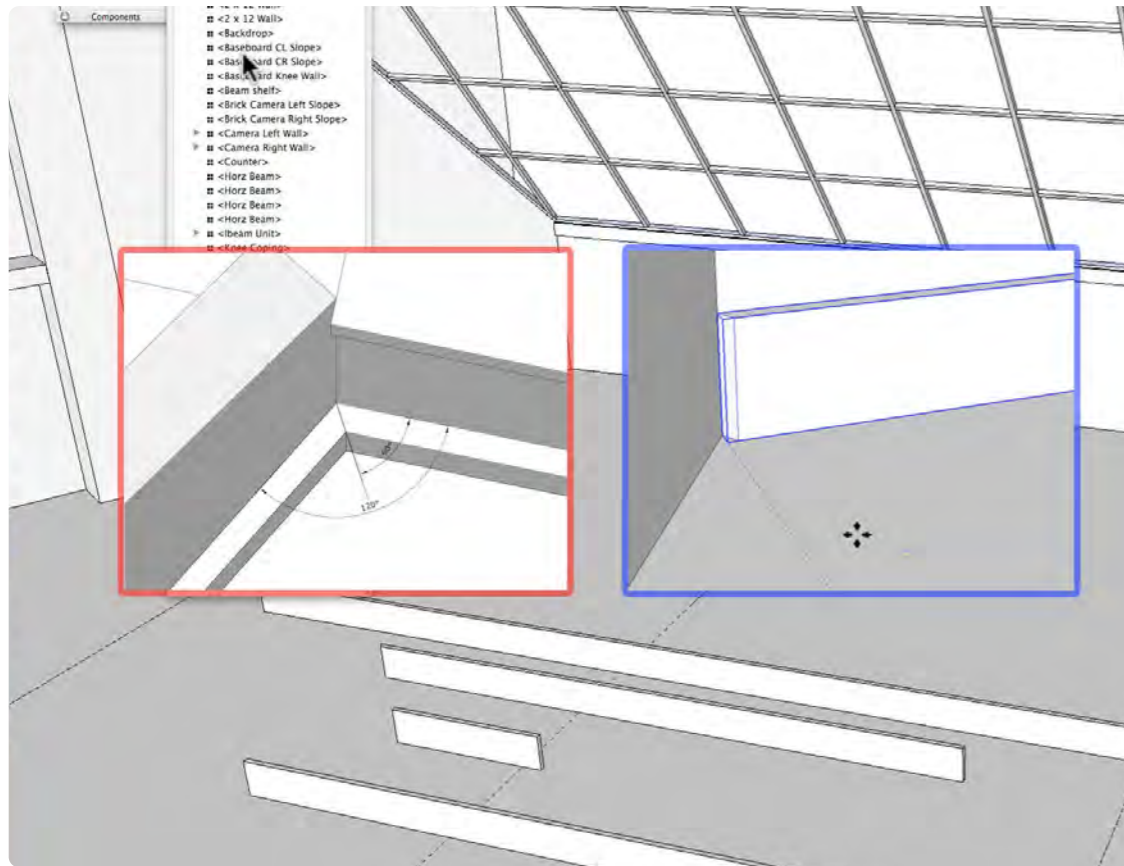
The Baseboard is nominally 1 x 6, which is actually 3/4" X 5 1/2". There under four different pieces of Baseboard in the set. The Baseboard under the Knee Wall is 14ft. Long, with a 60° angles 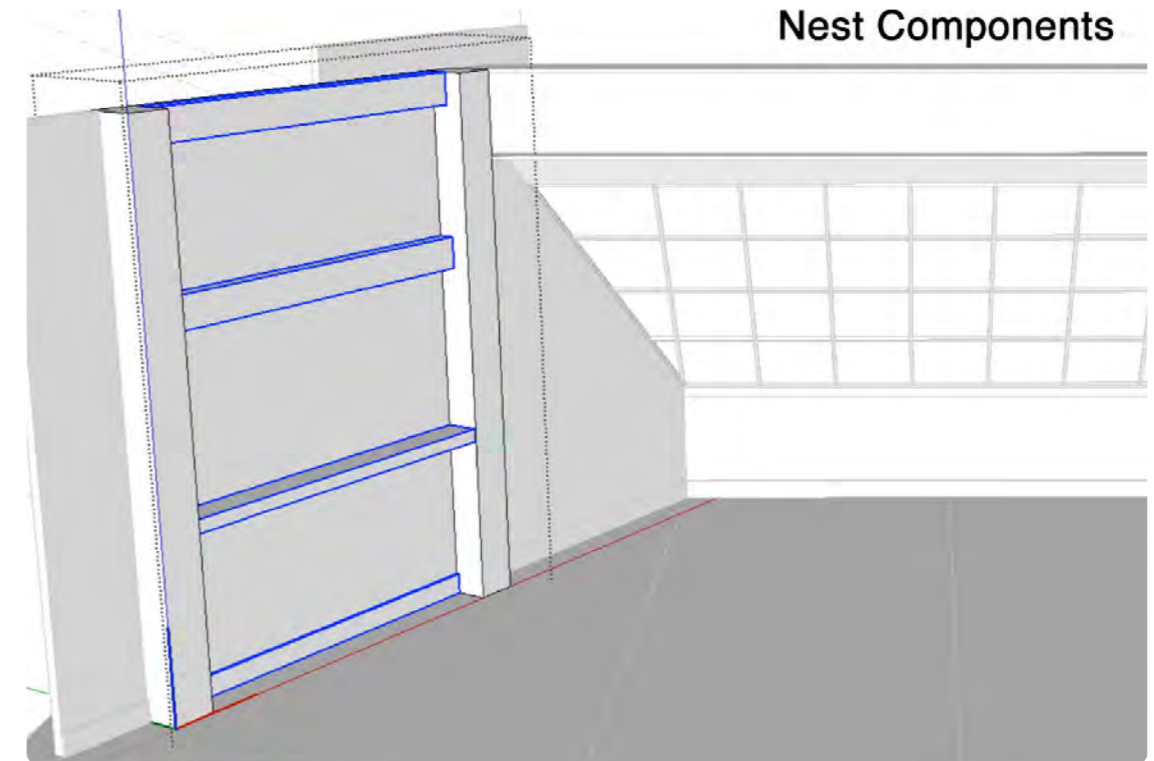on either end. It is 8 feet long on the Sloped Wall, with a 60° angle on one end. At the Camera Left and Camera Right Walls, it is 8 ft. long, with squared off ends and for the cutter walls, 2 ft. Long (square ends). Note the angle formed with the Knee Wall and the Left or Right Wall is 120°.

The Beams, Shelf, Counter, and Baseboard need to be moved inside their parent Component respectively. This can be done by simply cutting the object and click on the parent component and make sure the dotted line bounding box is showing and then paste to place the object. Essentially, you will be nesting Components inside of Components, inside Components. There is no limit to the number of sub-Components.

Scenic Elements Construction Details

This Chapter focuses on drawing scenery exactly how it is built whereas, the previous chapter focused on shapes representing the actual objects.
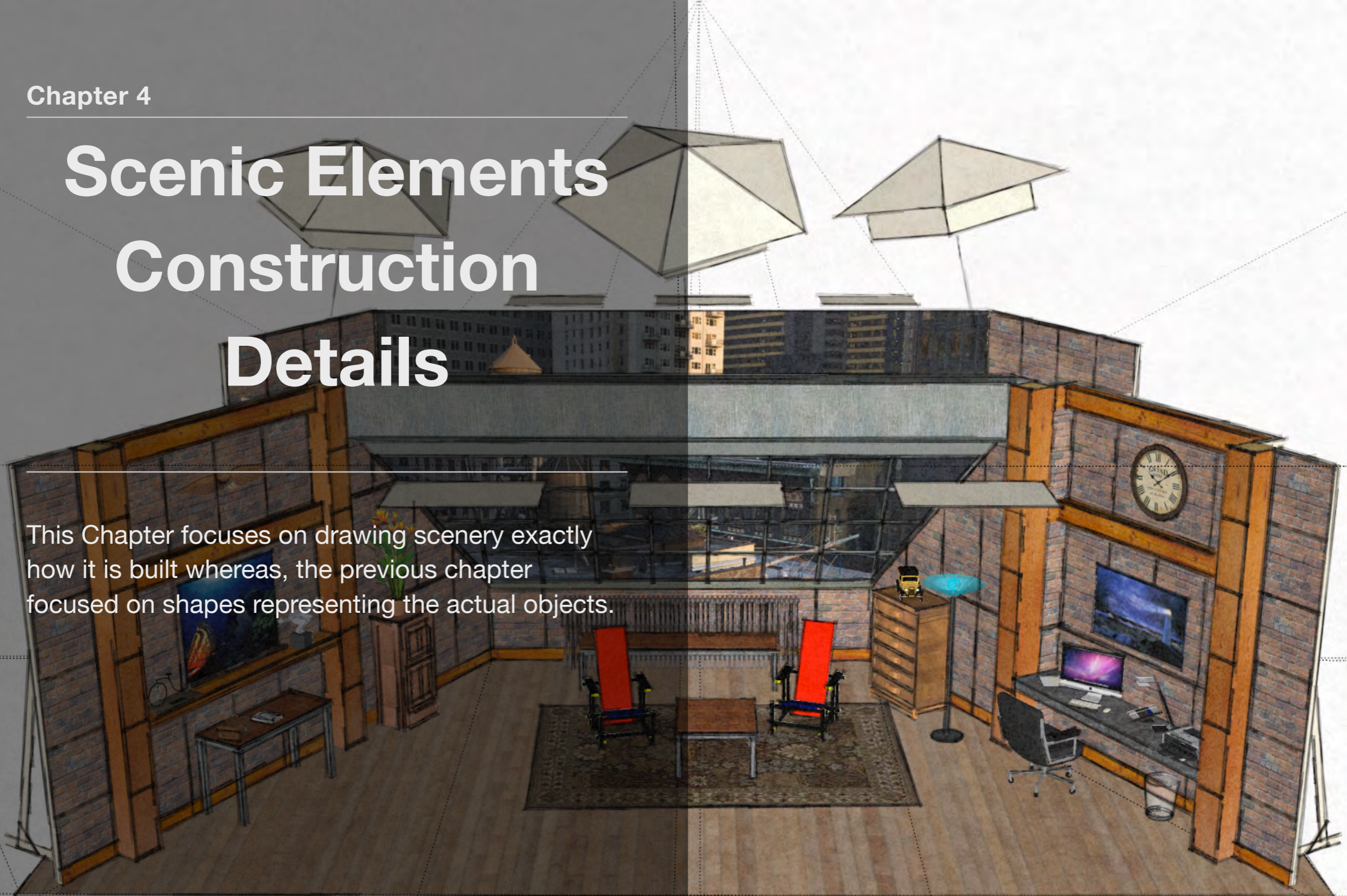
8 x 4 Hollywood Flat

Movie 4.1 Hollywood 8 X 4 Flat

VIDEO MARKERS

1. Flat Overview

2. Flat Frame

3. Ply and Brick

4. Review Outliner

01_Flat Overview_0:00:00:01

02_Flat Frame_0:02:19:03

Five Components Contained in the Flat

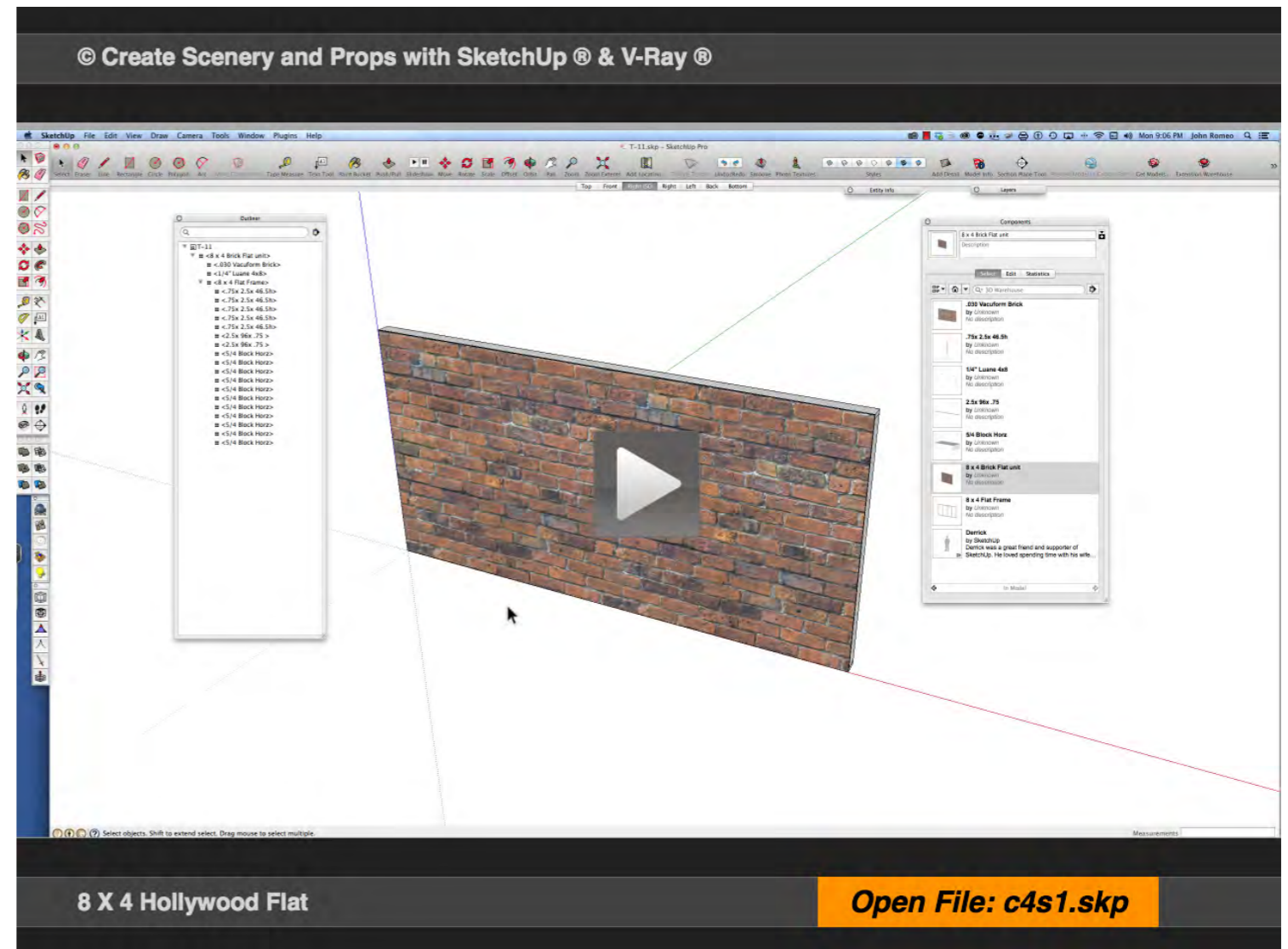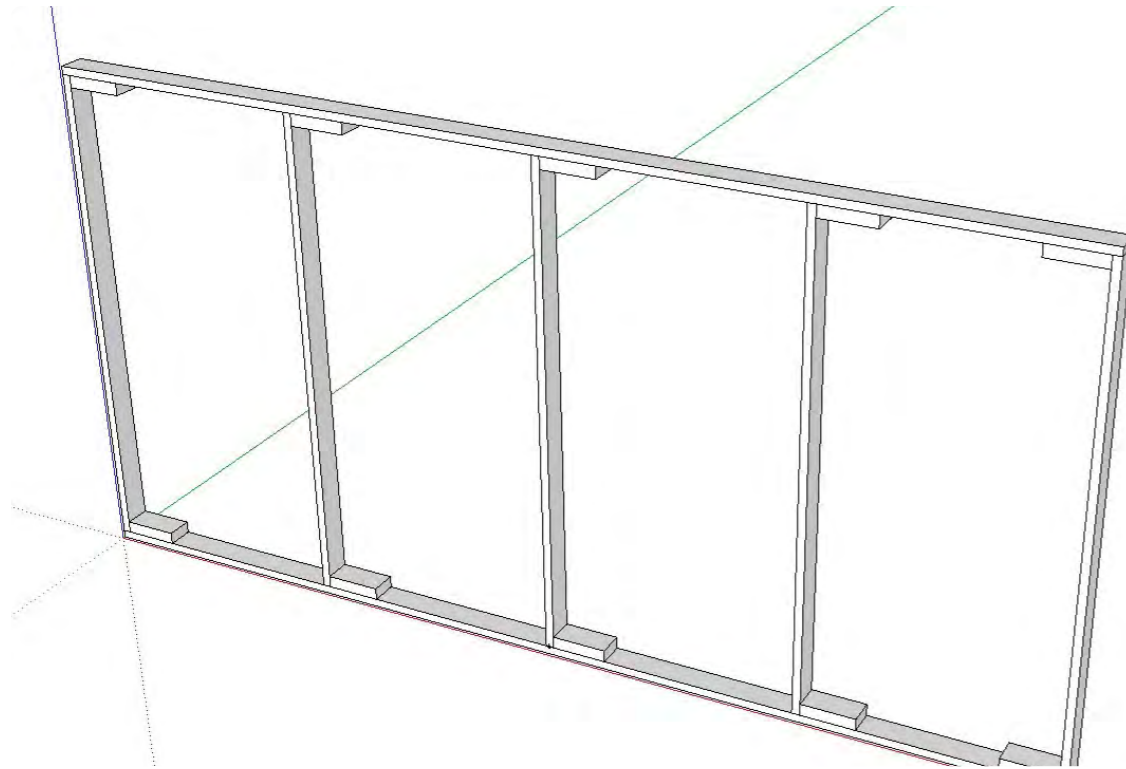Chapter 2 section 1 was about creating shapes that represented walls and posts and the counter. In chapter 4, we will re-create these same items with full construction details as they would be built for real. This lesson starts with an overview of how the Hollywood Flat Component is viewed in the outliner and the Component Window with a fully detailed example. In order to start with a fresh drawing, it will be necessary to purge all the details in the drawing. This step is very useful because it demonstrates how to remove unwanted components from the library.
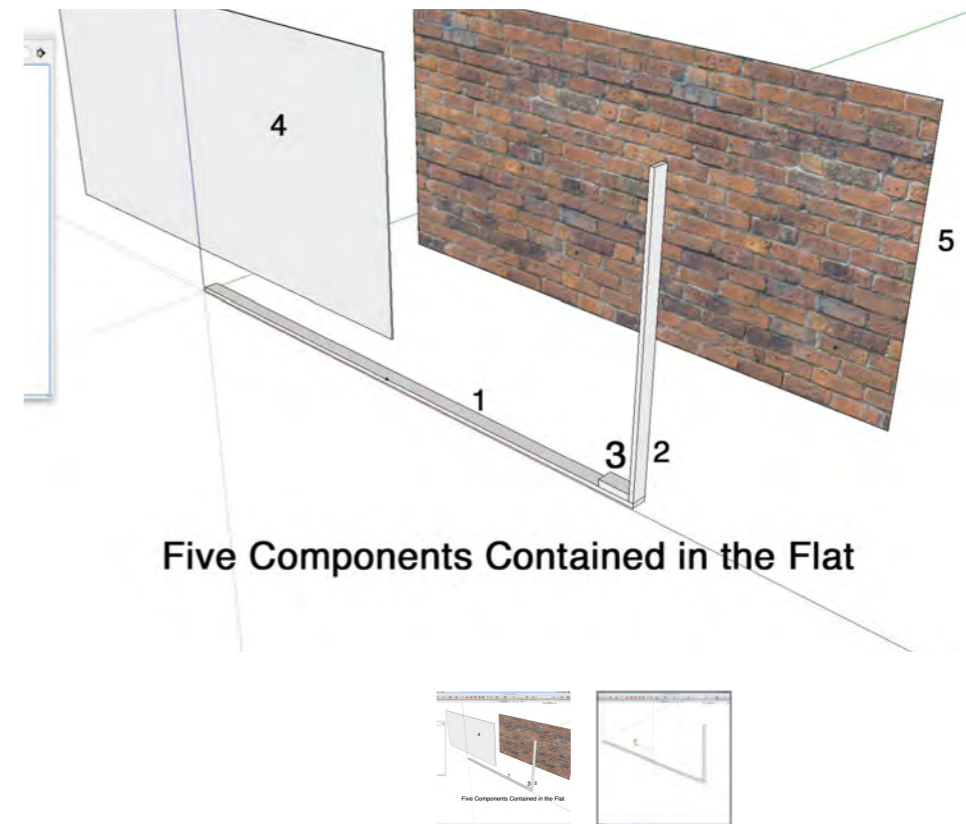
This Hollywood Flat is created with only five Components, even though there is a total of 17 objects in the drawing. This is a key concept in creating complex drawings that are made up of mostly instances that repeat. The frame is made of nominal 1 x 3 clear pine, which the actual dimensions are 3/4 X 2 1/2. The frame is constructed laterally because the flats will be stacked (railroaded): that is why I keep referring to them as 8 x 4 flats instead of 4 x 8 flats.

03_Ply and Brick_0:08:33:23
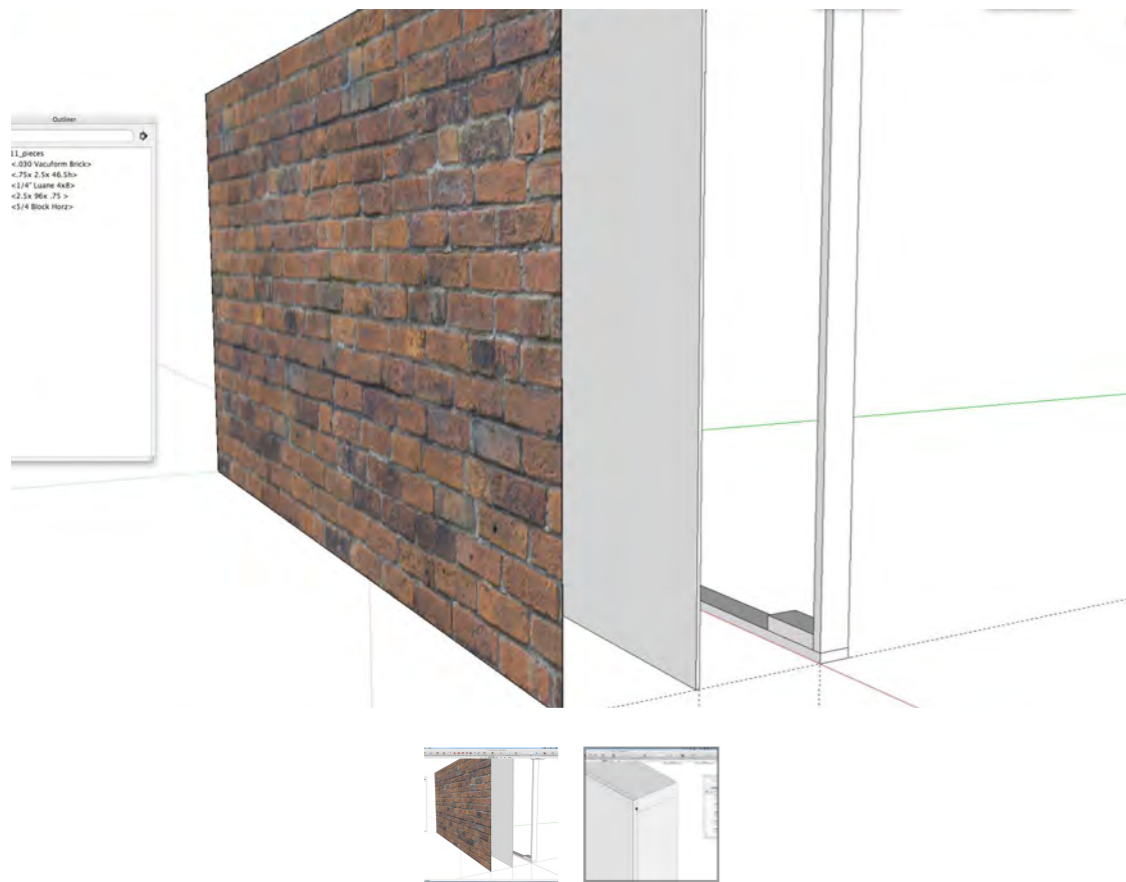
Draw a rectangle 8 ft. x 4 ft. directly on top of the flat frame and double click to make sure the face and the edges are selected and right click. Select Make Component and label it 1/4" Luan Plywood, then click on it and extrude it to 1/4" with the Push Pull Tool and move it into position with the move tool; repeat the same steps for the Brick Vacuform Panel.

04_Review Outliner_0:11:00:02
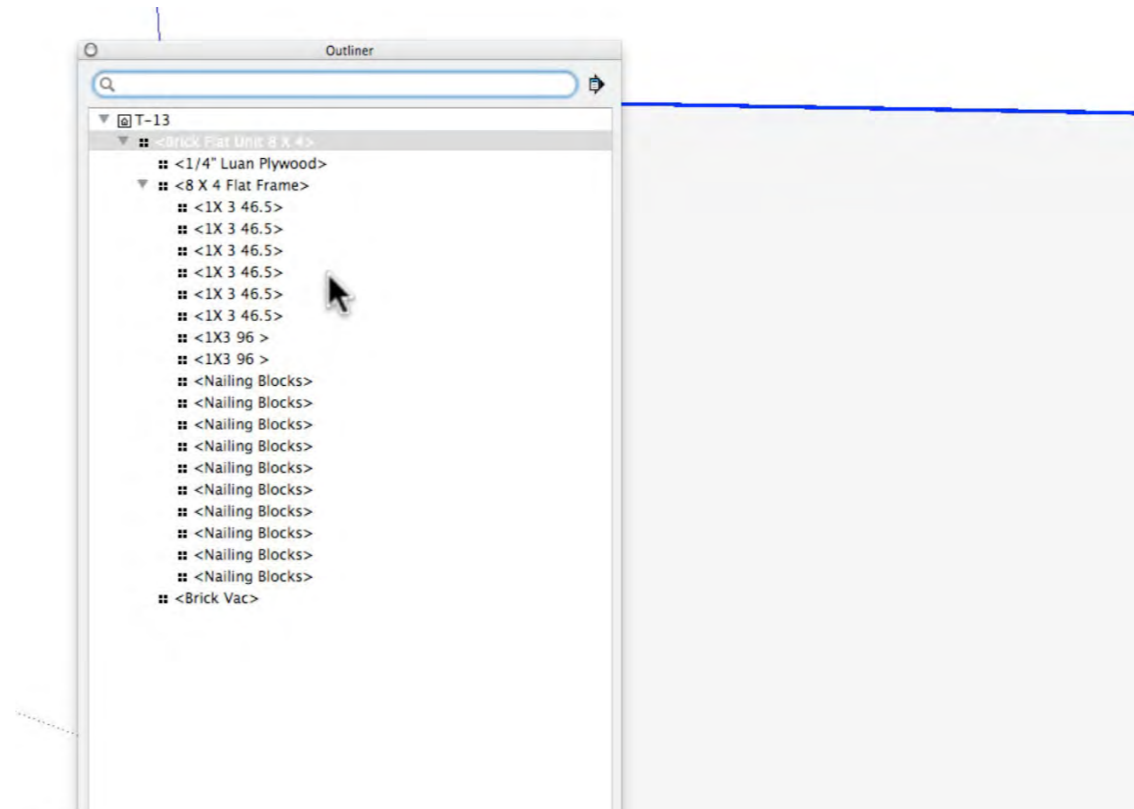
The Outliner is populated with all the Components and Instances that make up the Hollywood Flat. The triangle on the left is used to open and close the contents of a component, if the component has only one object in it it will not have a triangle. The outliner can be very useful when one object obscures another when you are trying to locate a point, you can hide the object that is blocking the other object. You can also use the outliner to select a single Component or Multiple Components.

Sloped Wall Flats Part One

Movie 4.2 Sloped Wall Part 1

VIDEO MARKERS

1. Layout with Guides

2. Instances of Frames

3. Edit Bottom Frame

4. Edit Middle Frame

5. Edit Top Frame
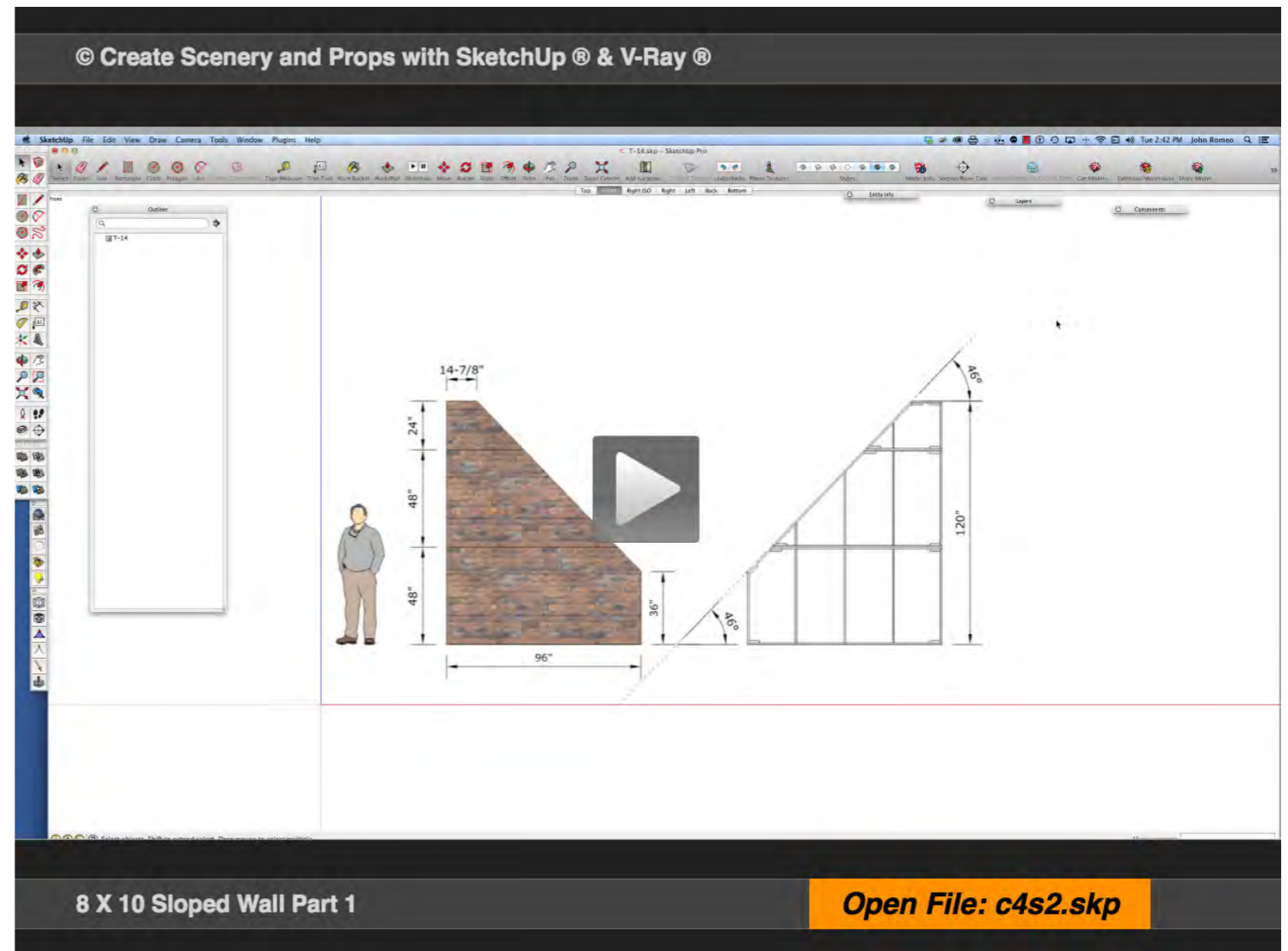
01_Layout with Guides_0:00:00:01

02_Instances of Frames_0:02:06:29

Make sure you are in the front view. Use the tape measure tool to create guides representing a rectangle 8 feet wide by 10 feet high. Then place a guide 3 feet up along the blue axis; select the protractor tool and place it on that point and rotate 46° to crea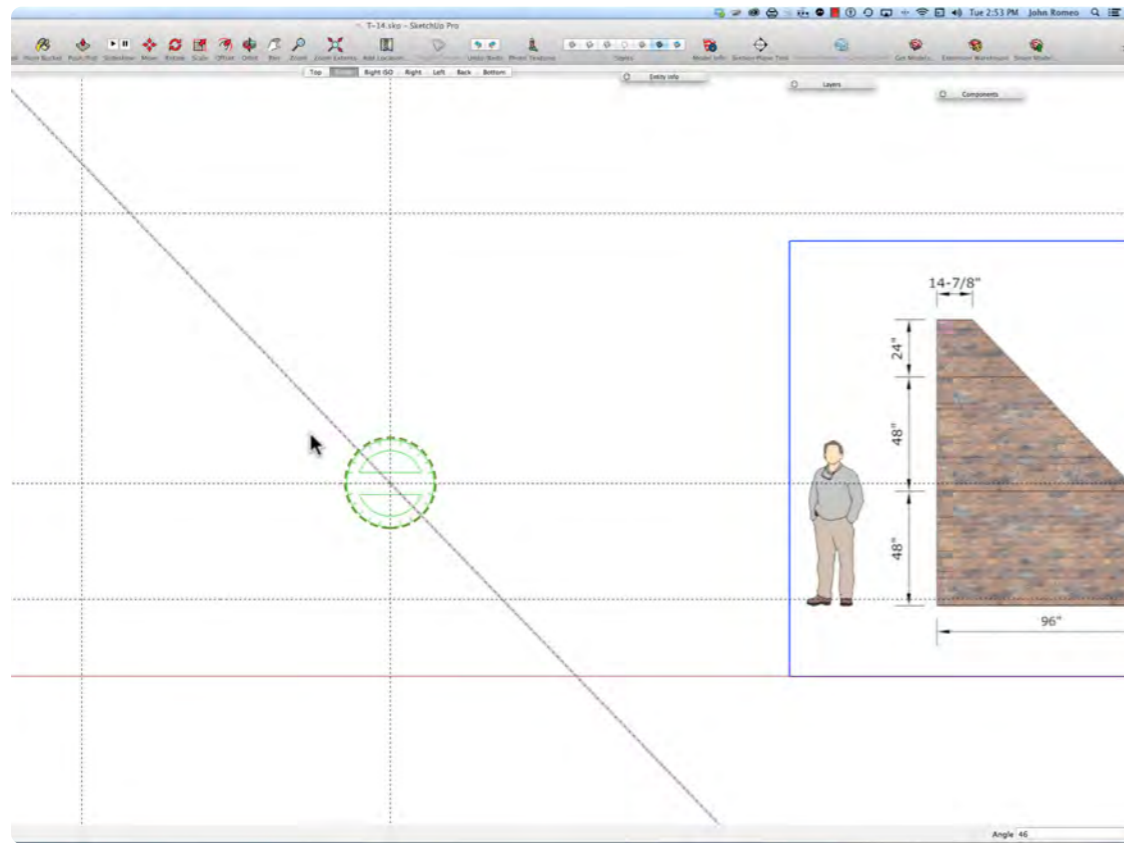te the angle of the slope. Next drag a guide at 4 ft. and at 8 ft. on the blue axis. Remember to hold the up arrow key to lock on the blue axis.

Build the sloped wall with instances of the 8 x 4 Hollywood Flat created in Section 1. Drag an instance of the flat from the component window and stack 2 copies at 4 ft and 8ft. Make sure that the instances snap to the guides and are in the correct plane by orbiting to check their position. Make each instance unique: if you do not make the instances unique the changes will be made to the original flat, which we do not want to happen.

03_Edit Bottom Frame_0:04:02:00
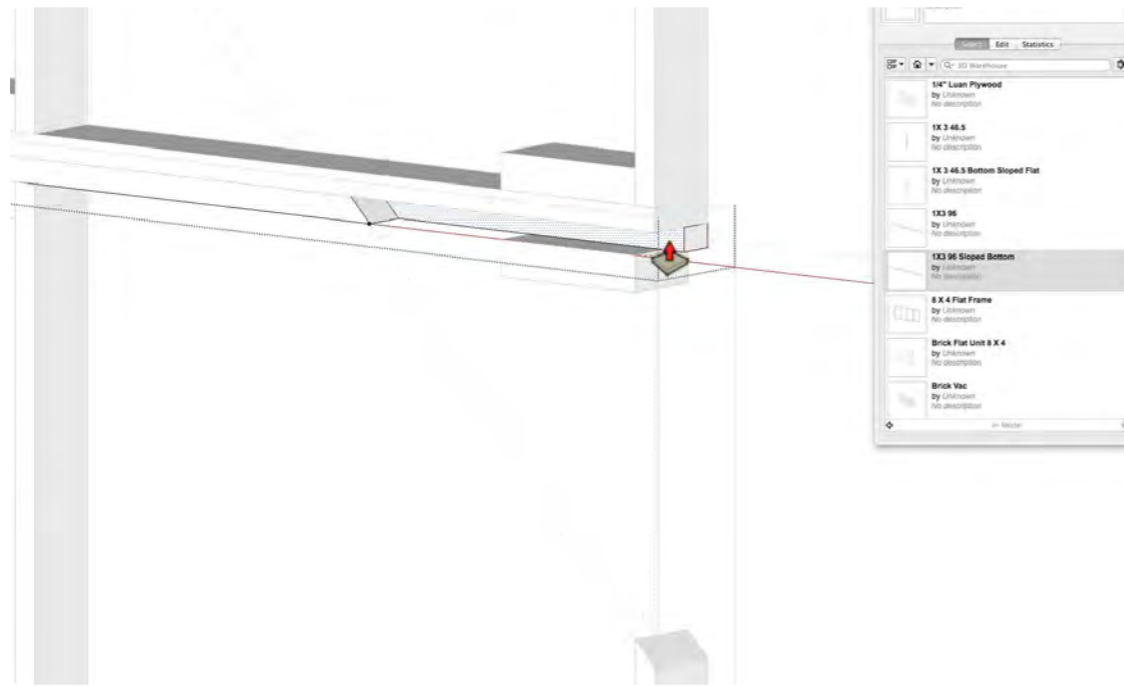
04_Edit Middle Frame_0:06:19:09
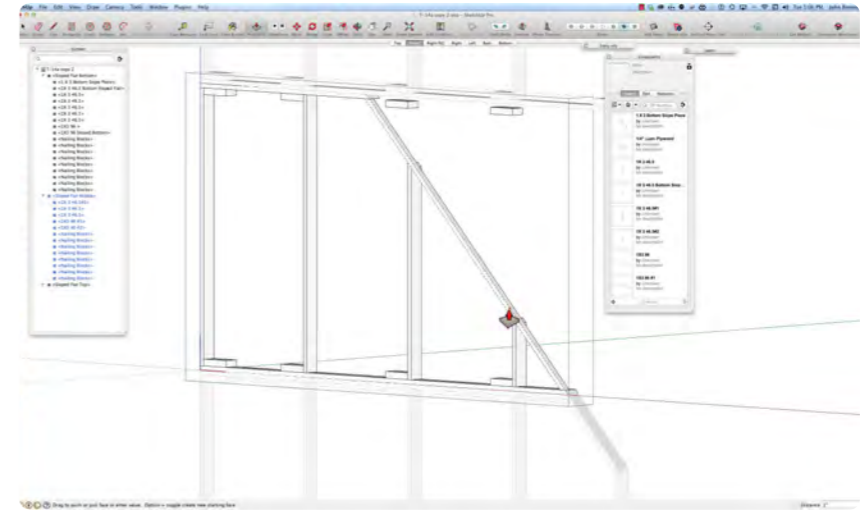
05_Edit Top Frame_0:09:13:17
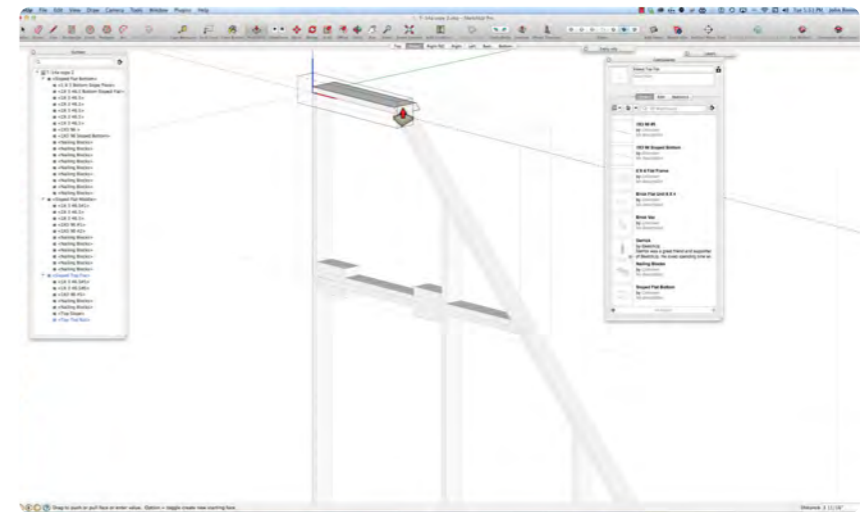
Start the bottom frame by making unique each piece that will be edited. If you do not make the pieces unique other instances in the flat will change. Grab the Tape Measure Tool and drag a guide parallel to the previous slope guide making sure to constrain the axis. Double-click to place the edit lines with the Line Tool, and then with the Push Pull Tool, push away until it snaps to the adjacent rail, or you can type in 2.5. Next, remove the nailing block that is hanging out in space. Repeat the steps used in the bottom frame for the middle and top frame.

Sloped Wall Flats Part Two

Movie 4.3 Sloped Wall Part 2

VIDEO MARKERS

1. Insert Nailing Blocks

2. Add Plywood Skin

3. Add Vacuform Panel

4. Move to Floor

5. Mirror with Scale Tool

6. Explode
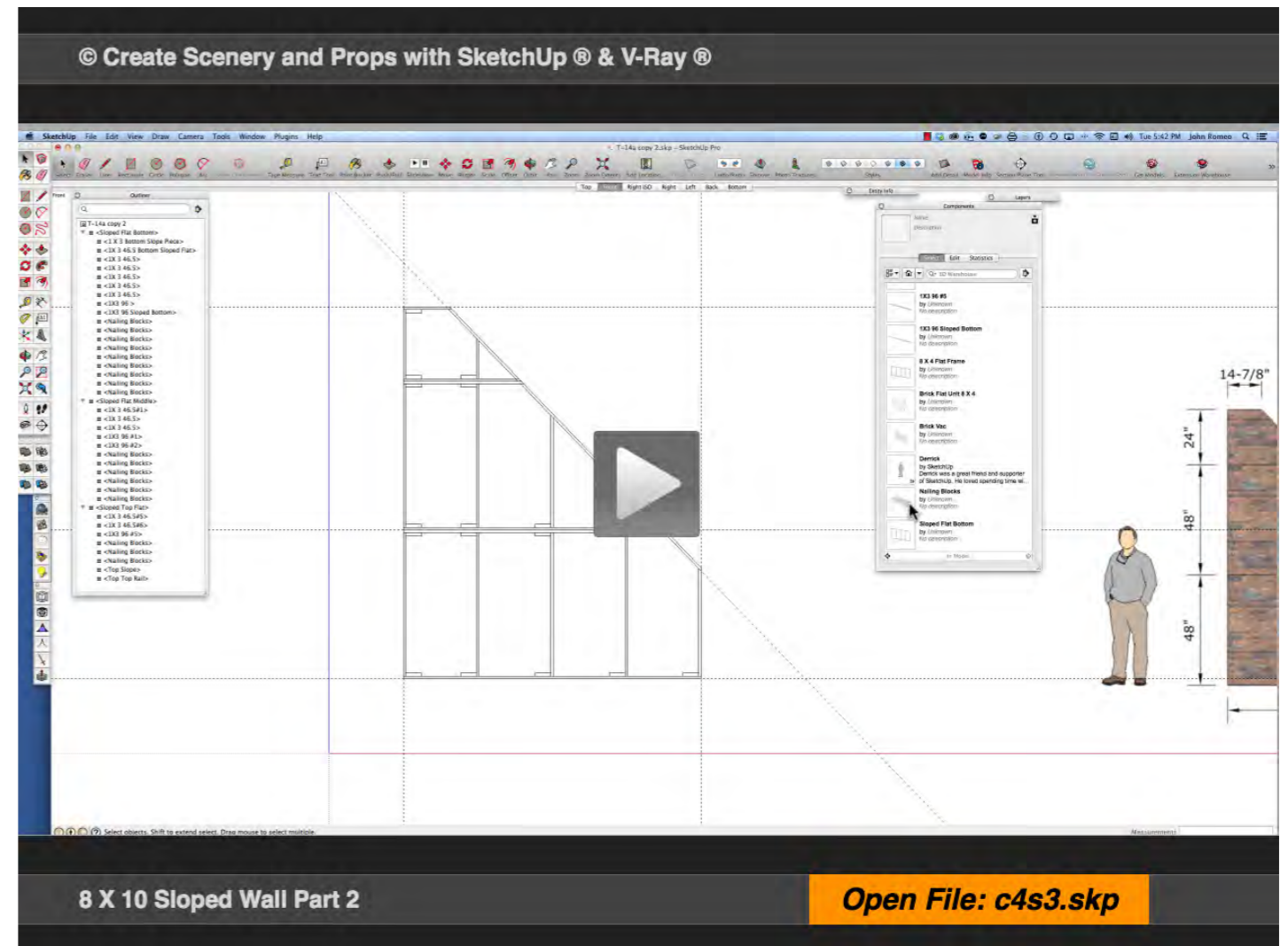
01_Insert Nailing Blocks_0:00:00:01

02_Add Plywood Skin_0:01:42:00
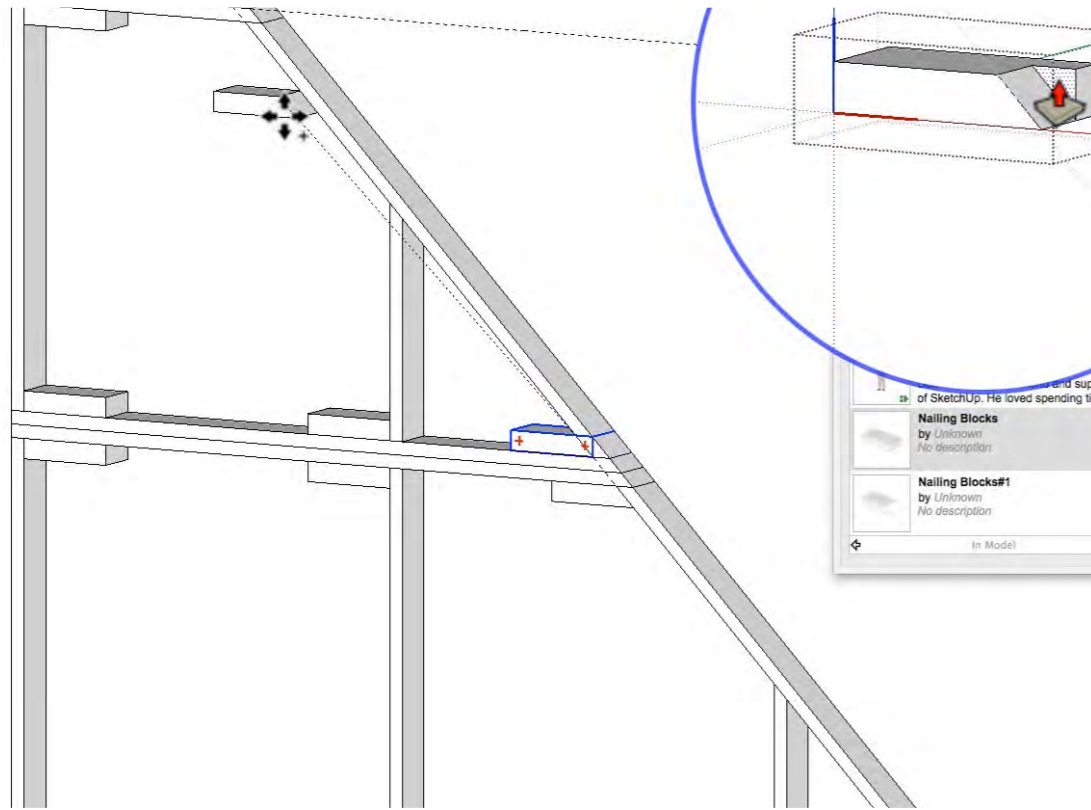
Drag out an instance of the Nailing Block in the Component Library and make it unique. Next, with the Protractor Tool, draw the 46° angle and use the Push Pull Tool to clip the angle and place the blocks in the respective corners. Keep in mind that the intent of the blocks is to form an interlocking joint. The last block was drawn in place as an alternative to using the protractor tool.

The Hollywood Flat is skinned with 1/4" Luan Plywood. The skin is created with the line tool clicking on each of the points on the perimeter of the frame. This is done outside the frame component because it wants to be independent of the frame. Make it a component and extrude the plywood to 1/4". It will also be independent of the Vacuform Brick so that they can each have different textures.

03_Add Vacuform Panel_0:03:23:06

04_Move to Floor_0:05:11:09
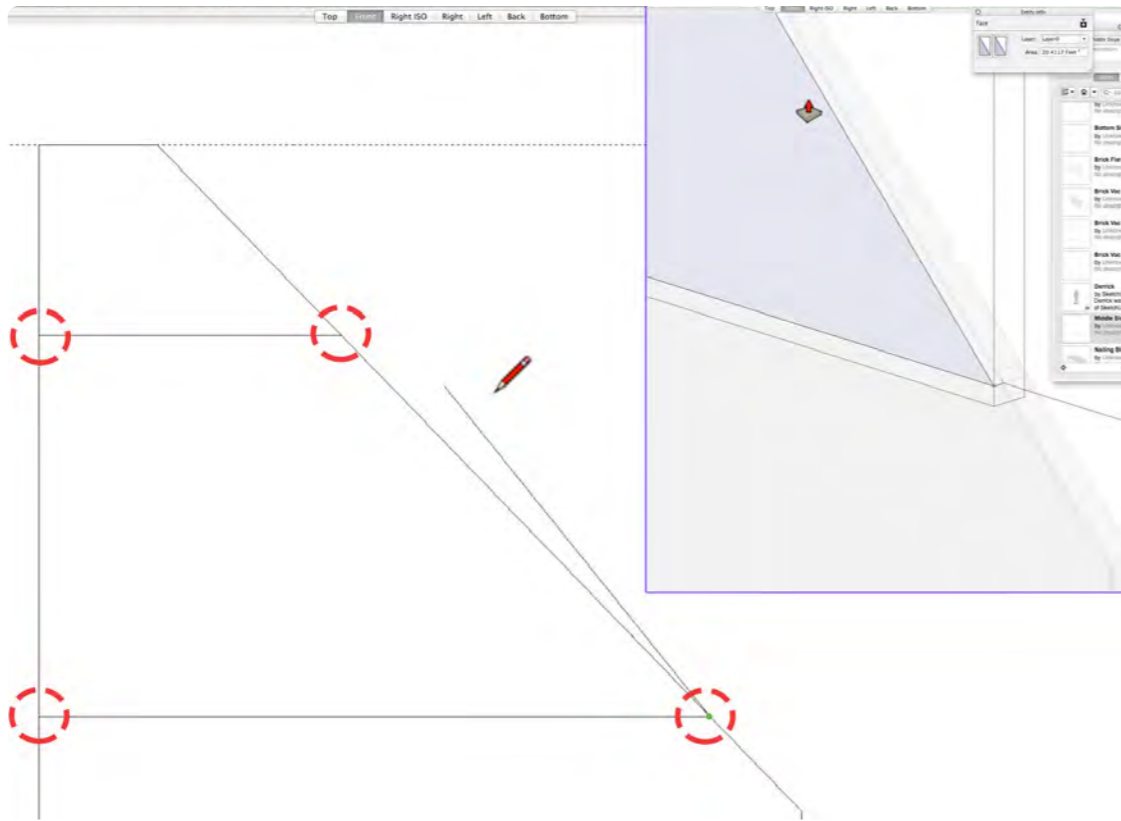
Repeat the same steps for the Vacuform Panel used for the making the Plywood. In a later segment, I will demonstrate how to create a brick texture from a photograph or a SketchUp or V-Ray texture. The Brick texture can be put on the front face of the plywood if you do not want to bother with creating a separate panel. Multiple Components of the Brick Panel can be turned on and off in the outliner to display different options in the same set.

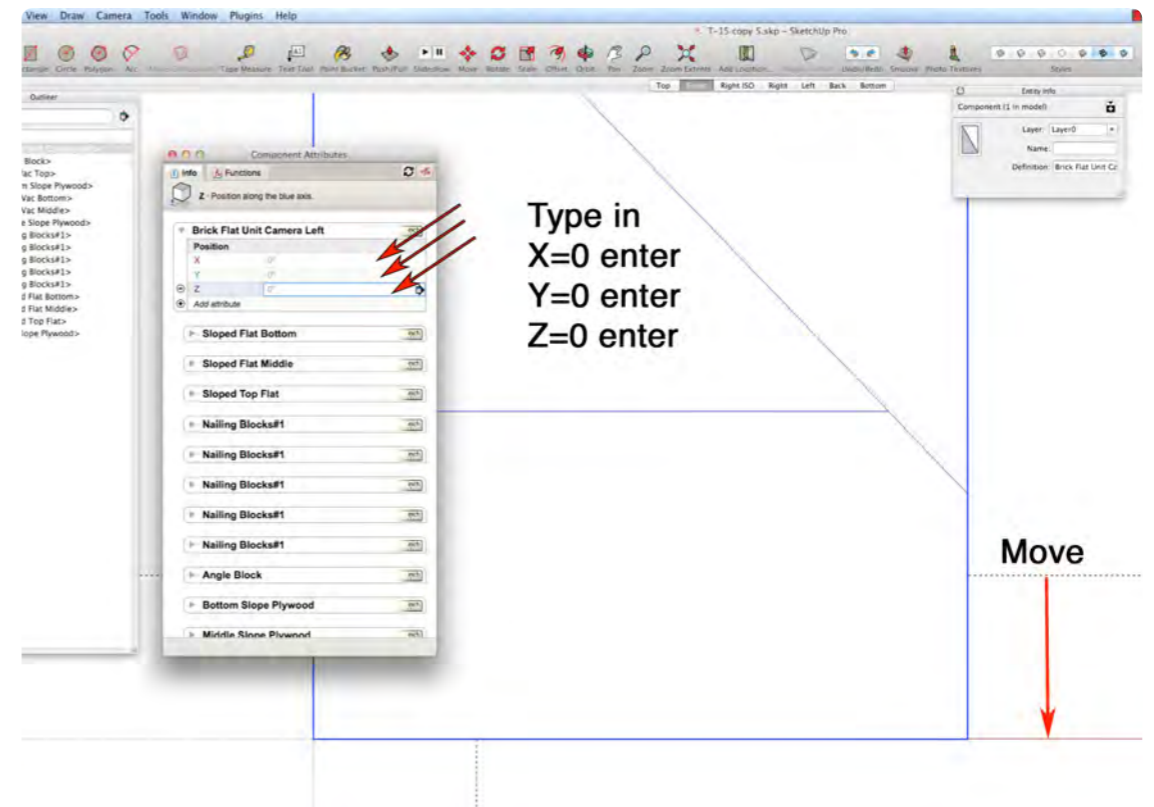The Component Attributes Window is similar to the Properties Manager in AutoCad or the Object Info Palette in VectorWorks. When the Attribute Window is opened you see a plus sign (+) Add attribute for the parent, in this case, Brick Flat Unit Camera Left, and add the Position (all) Attribute for x,y,z. Enter the Zero (0) for x, y, z and hit enter. The entire Component with all the Sub-Components will move to the origin at coordinates 0,0,0. Use this method to move objects with the highest level of precision.

05_Mirror with Scale Tool_0:05:58:03

Step1   Step 2   Step 3
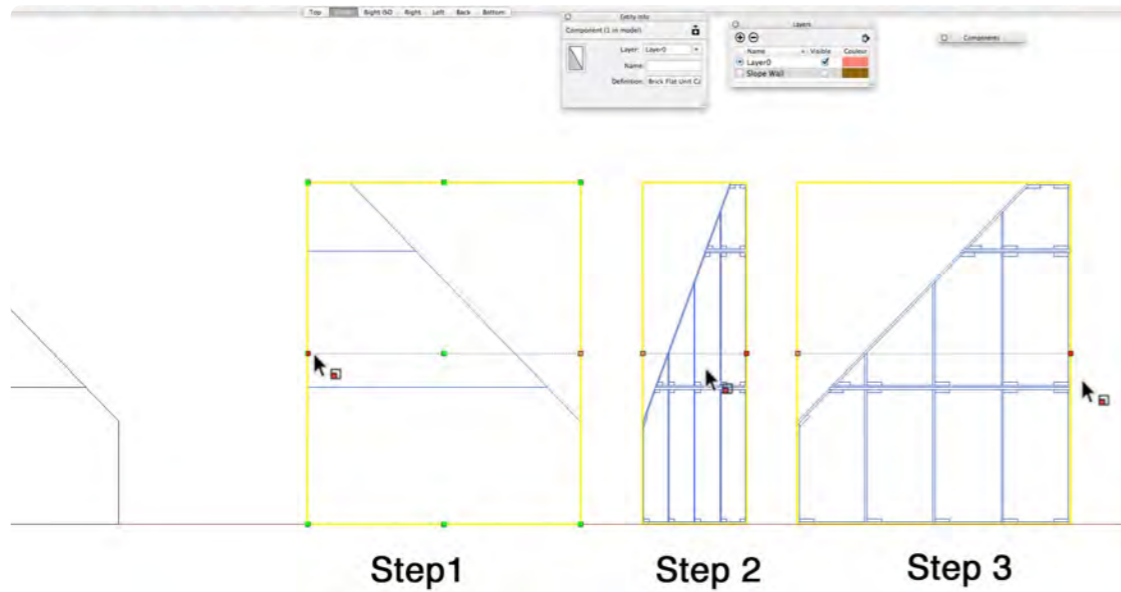
The Scale Tool can be used as a substitute for a Mirror Tool, as previously demonstrated in Chapter 2, Section 3. In this case, it is more complicated because the object that will be mirrored is a more complex Component with nested Components that need to be moved. The Sloped Walls have Plywood Objects and Vacuform Objects that can be brought to the front of the frame with the Move Tool. The Plywood and the Vacuform can be moved in the Component Attributes Window by adding a position attribute: for the plywood Y enter 3; for the vacuform Y enter 3.030.

06_Explode Command_0:08:10:15

The Explode Command drops the hierarchy of a component down one level. If the Brick Wall Camera Right Unit Component is exploded once, it will become three stacked flats. In this case, we do not want to explode it further, in fact we want to make the three flats back into the Brick Wall Camera Right Unit again with attributes moved.

Selected   Exploded

Jacks

Movie 4.4 12 Ft. Jack

VIDEO MARKERS

1. Jack Guide

2. Jack Frame

3. Blocks and Straps

4. Turn Into 10 Ft Jack
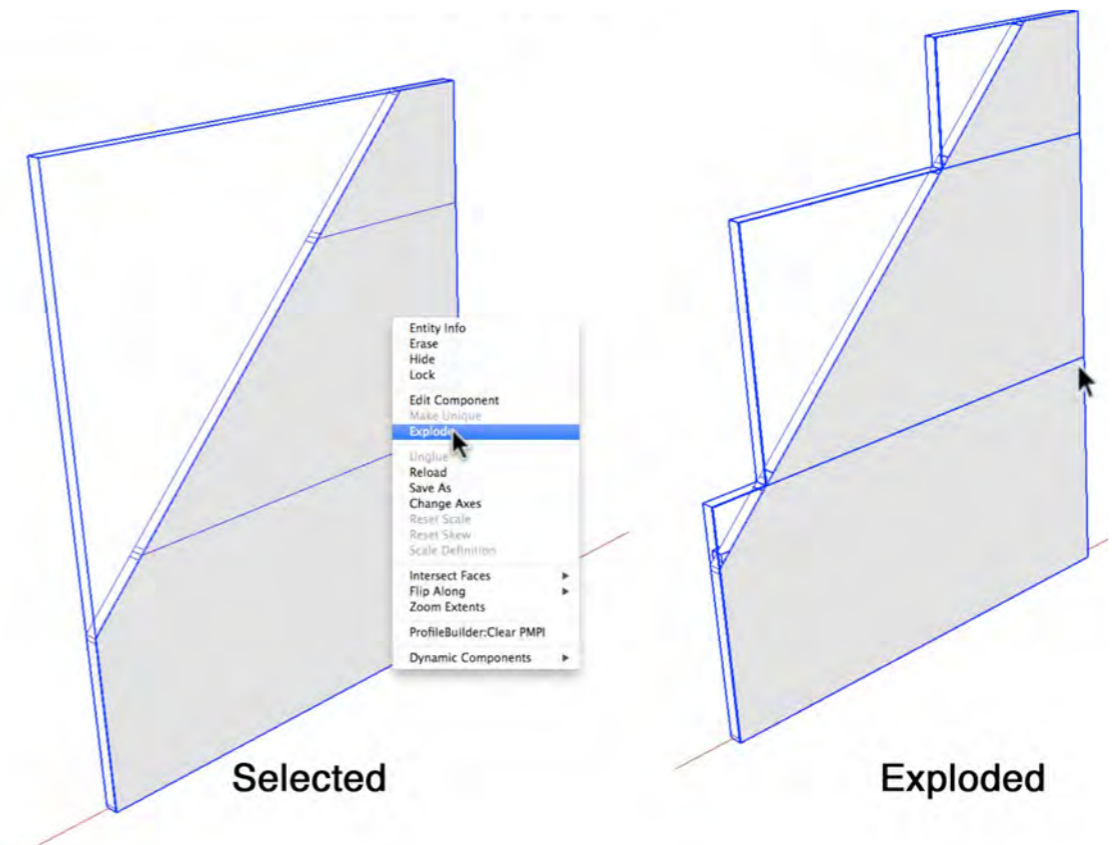
01_Jack Guides_0:00:00:01

02_Jack Frame_0:02:26:25
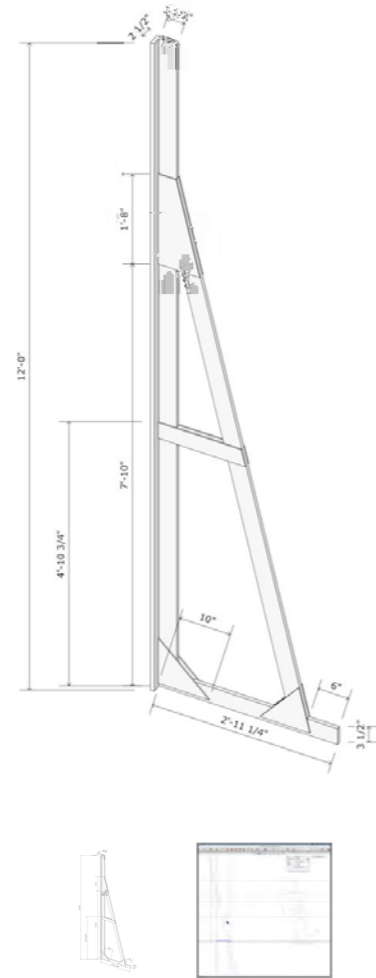
In the Front View, place the guides for the Jack as shown in image 2. Drag the guide from the red or blue axis and make sure that it is constrained to the respective axis. It is easy to create the pieces with the guides in place in the correct spot and coplanar. Use the protractor tool to create the 1st diagonal guide and draw a 2nd line parallel to it, constrained at 3.5".
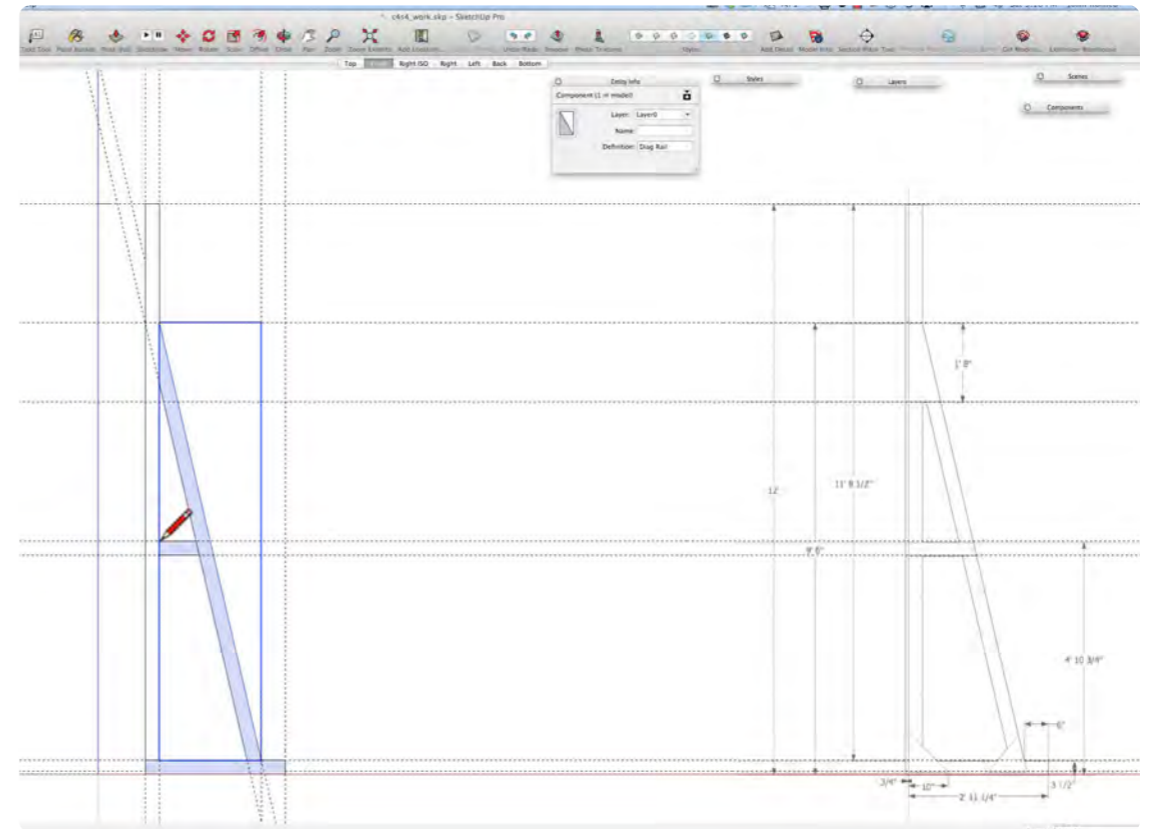
The Jack Frame is built out of 1 X 4 Clear Pine or #2 Pine; the actual dimension is 3/4" x 3 1/2". The reason for using 1 x 4 instead of 1 x 3 is because #2 pine 1 x 3 tends to have larger knots than 1 x 4, which tends to have smaller pin knots. A bottom flange can be added to be able to screw it to the floor.

03_Blocks and Straps_0:04:06:28

04_Turn into 10 ft Jack_0:09:39:28
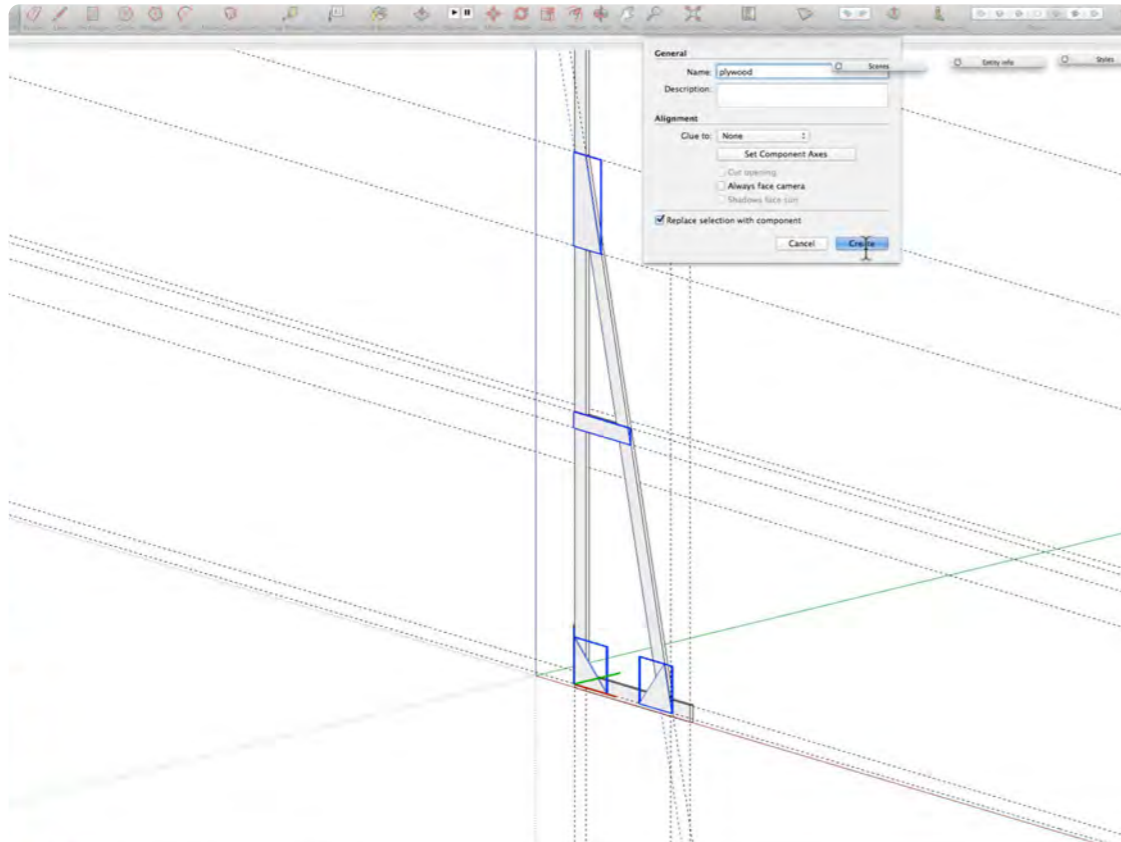
The corner blocks and straps are 1/4 AC Fir or Arauco Plywood. Draw a Rectangle 10" X 10" and with the Line Tool, draw a diagonal line and delete the unwanted lines. Make each piece into an individual Component and then highlight all 4 pieces and make them Components. Next, copy an instance of each piece to the other side of the Jack.
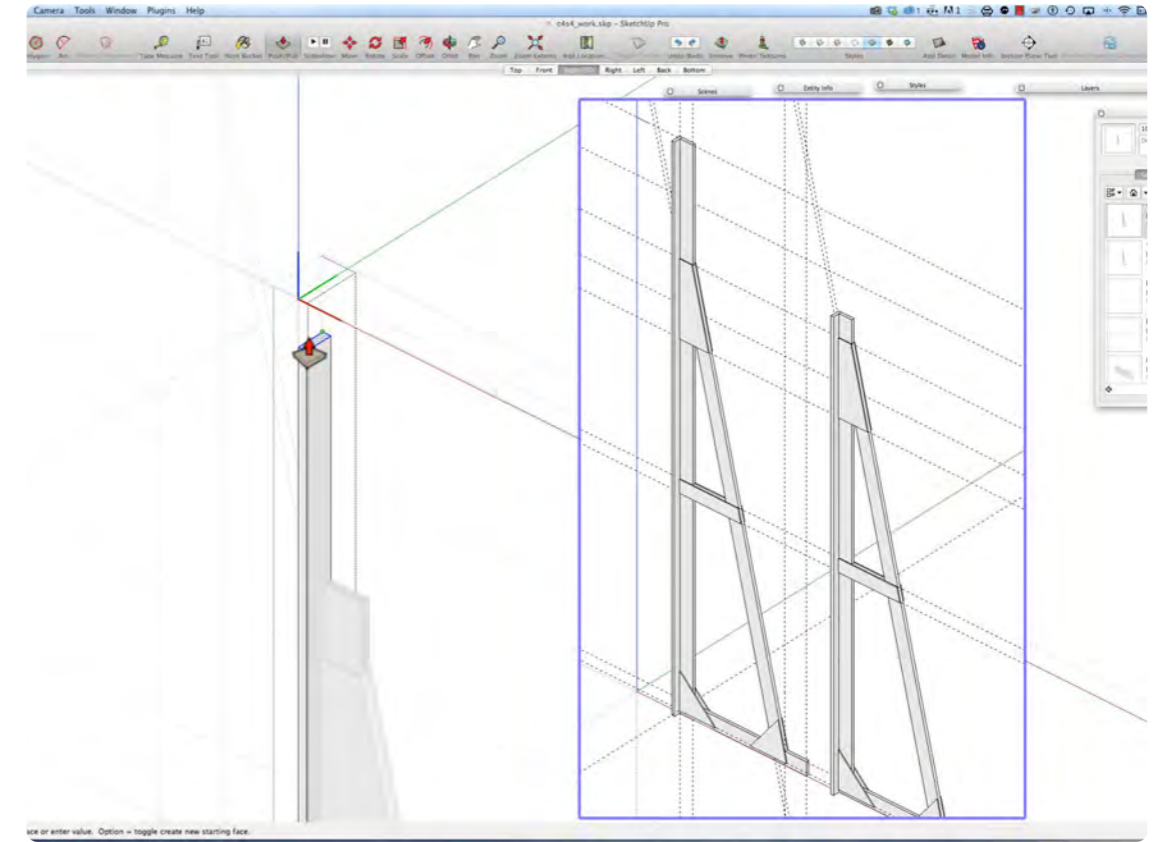
The 12ft Jack can be made into a 10ft Jack with the Push Pull Tool. First made a copy of the Jack and Make it Unique. Next, make the Vertical Rail and the flange Unique. With the Push Pull Tool push down and type in 24"; enter, and deselect. It is just like you used a handsaw to cut down an actual 12ft Jack to 10 ft.

Wood Post, Beam, Shelf and Counter

VIDEO MARKERS

1. Wood Post

2. Wood Beam

3. Wood Shelf

4. Laminate Counter

Movie 4.5 Post, Beam, Shelf, and Counter

01_Post_0:00:00:01

02_Top Beam_0:03:28:46
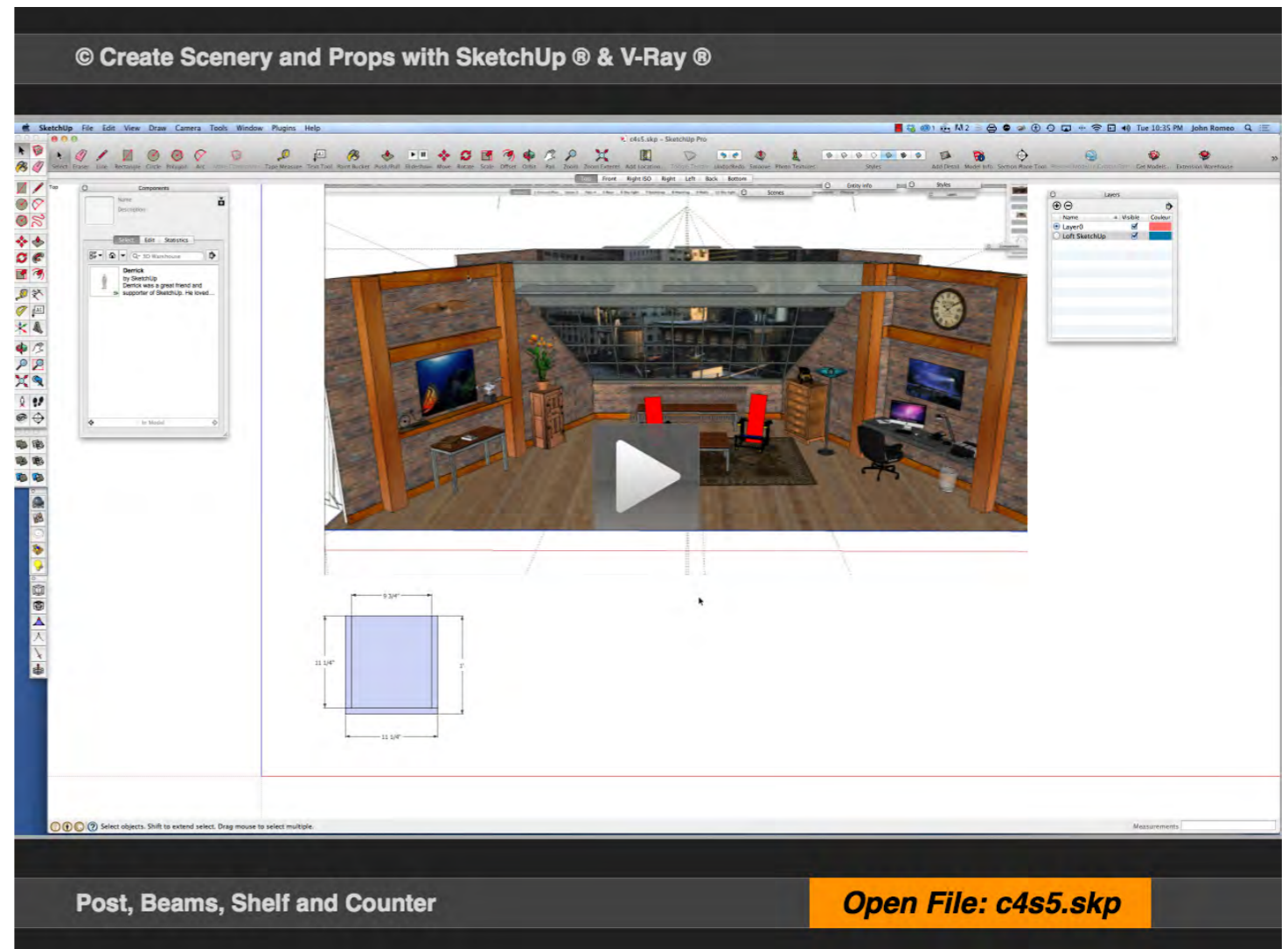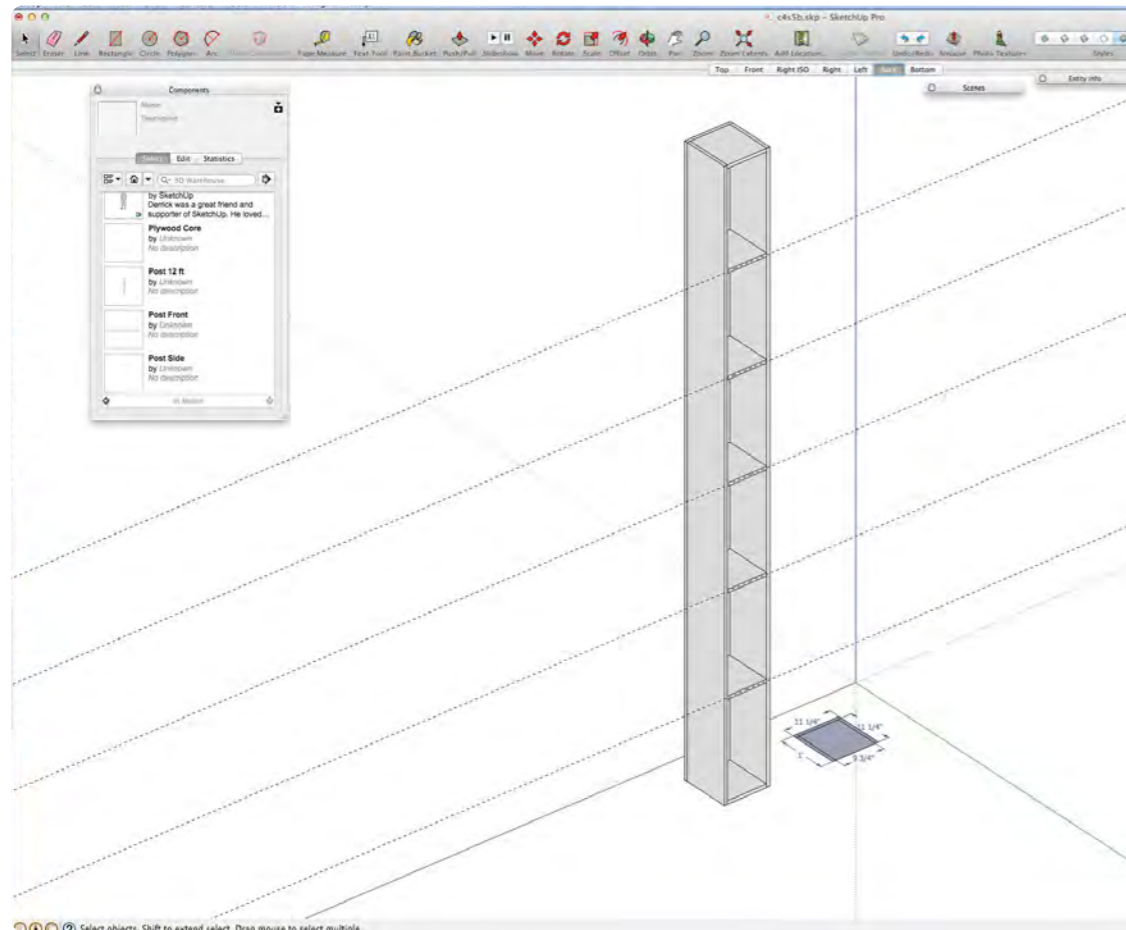
The Wood Post is made out of 1 x 12 #2 Pine, which is actully 11-1/4" X 3/4". There are 3/4" Plywood Cores on 24" centers and it is open at the back. The plan view reference image can be turned on and off in the Layers Window. Use the Tape Measure Tool to place guides on 24" centers to locate the position of the cores. The Post is 12 ft high x 11 1/4" wide x 12" deep.
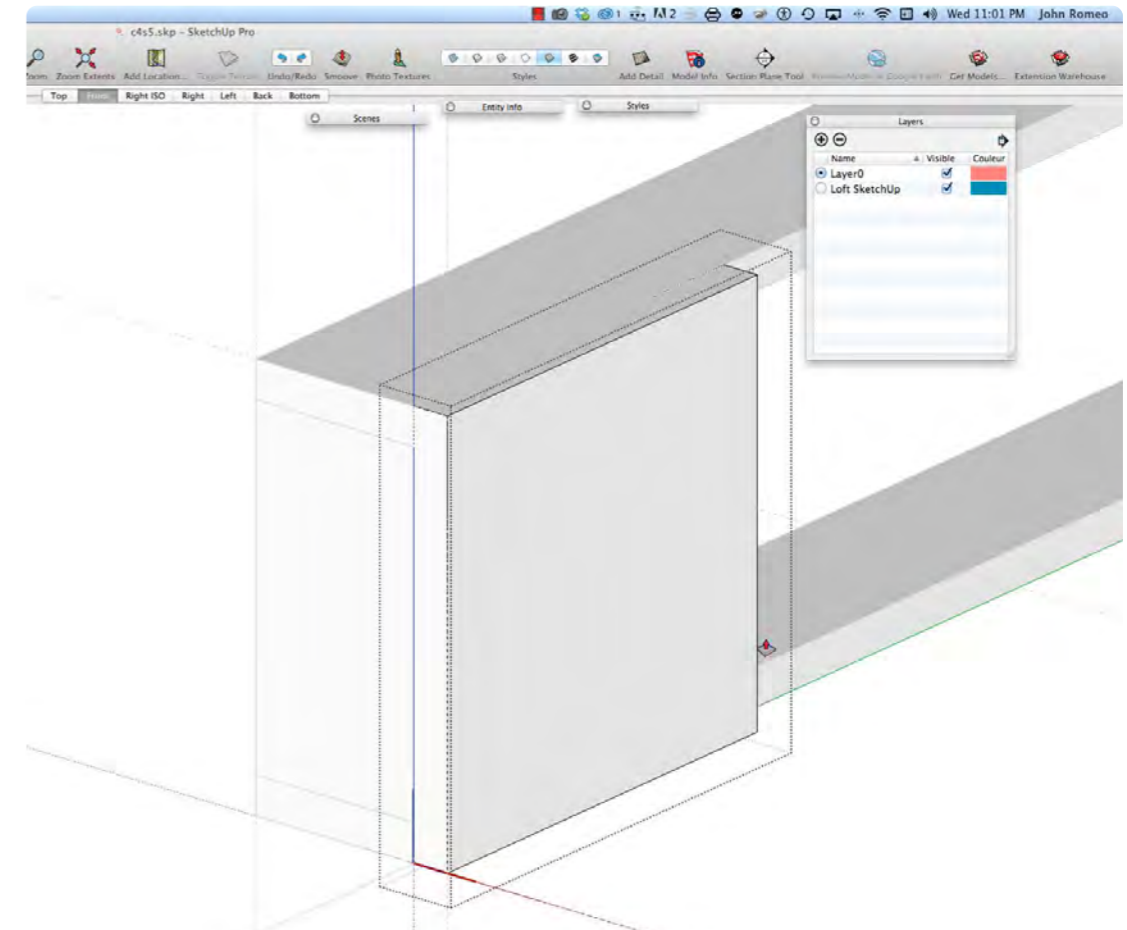
Change to the Front View and place guides as show above; draw the 2D shapes and Rotate to Extrude with the Push Pull Tool. The front face of the lateral beam is made out of 1 x 10 or 1 x 12 ripped down to 8 1/2"; 3/4" Plywood Cores are on each end and in the center; the top and bottom are 1 x 4 (.75 x 3.5). The Beam is 8 ft wide a sits between two posts.

03_The Shelf_0:07:39:28

04_The Counter_0:10:43:21
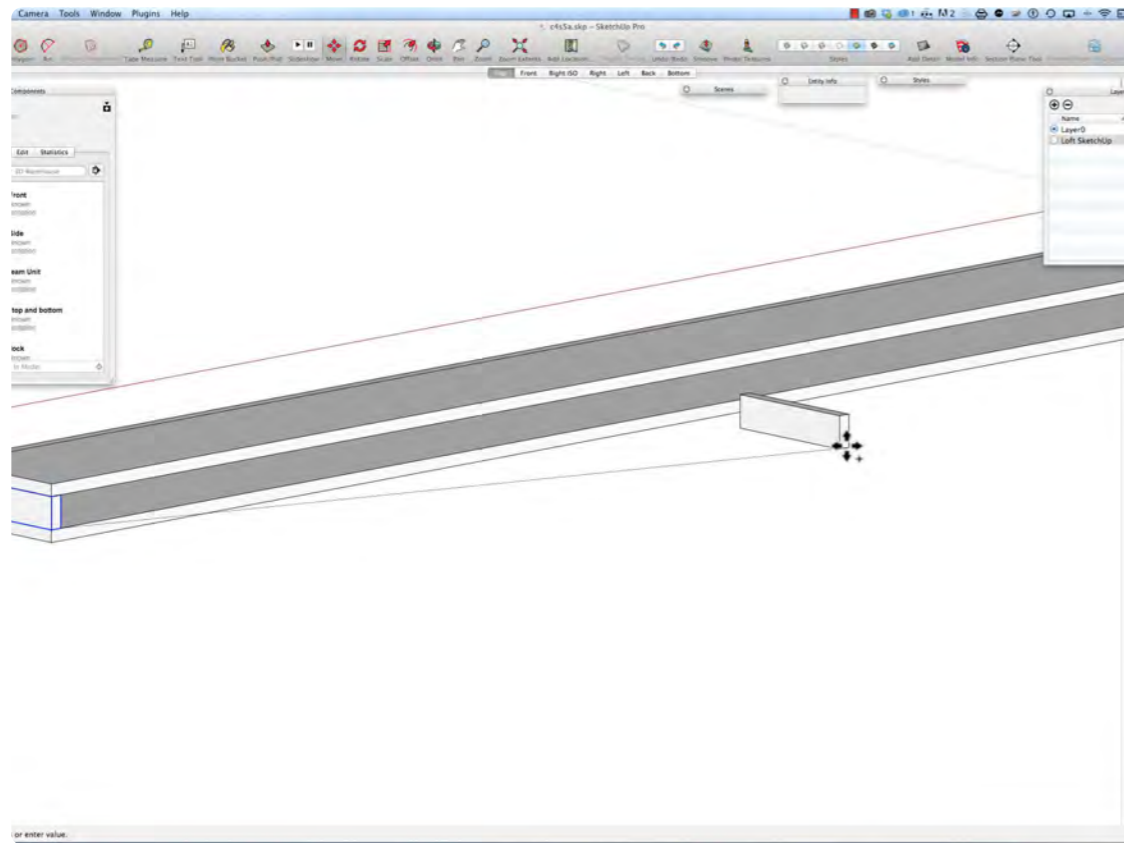
The shelf is drawn in the Plan vVew, on the Ground Plan and begins with a rectangle 96" wide x 8.5" deep; Extrude the Rectangle to 3/4". Draw a rectangle 96" wide x 3/4" and Extrude it to 3 1/2". Drag a copy of the shelf bottom to make the top of the shelf. The Shelf can also be started in the Front View, the way the Beam was drawn: this two methods drawing, both work equally well.
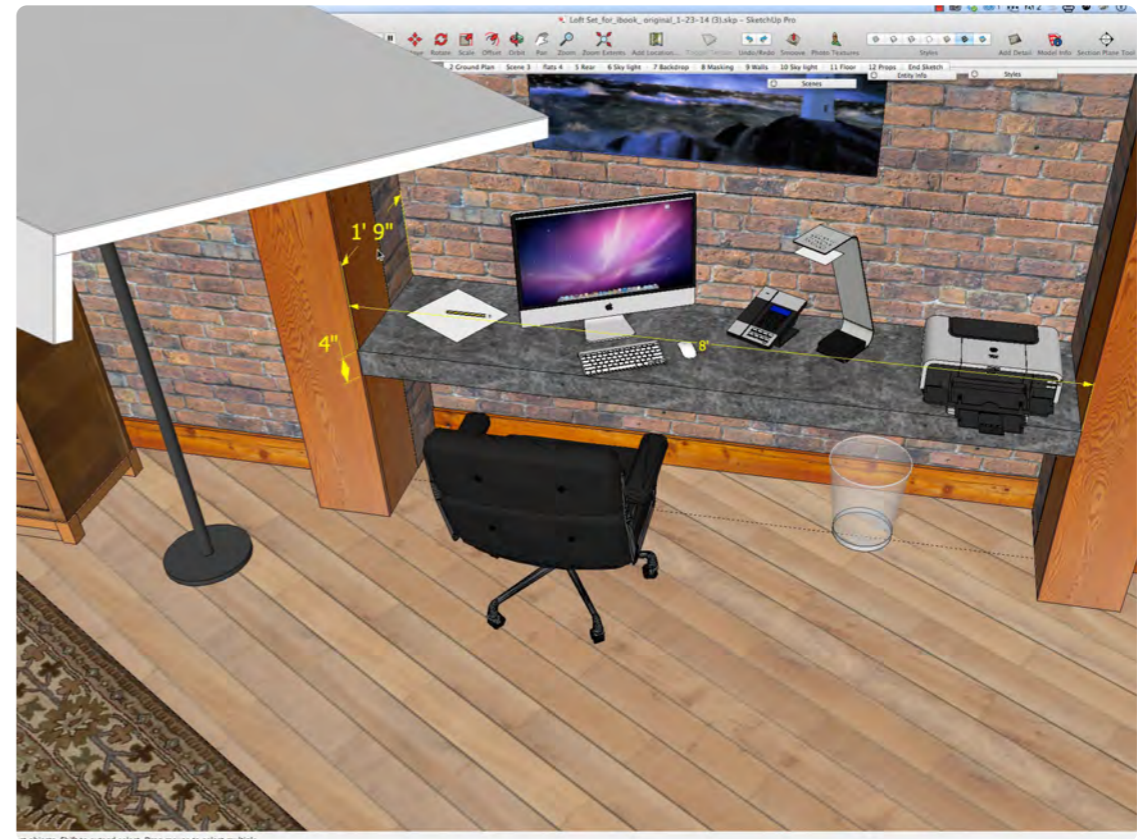
The Counter Top is 3/4" Particle Board or MDF and the Front Edge is 1 x 3 or 5/4 X 3 Clear Pine. The Front Edge of the Particle Board sits on top of the 1 x 3. The face laminate goes on first, then the top laminate. The laminate is add separately for accuracy in the construction details and it makes it easier to separate the textures. The laminate is 1/16" think.

Cutter Wall Flat and Return Wall Flat

Movie 4.6   Cutter Wall and Return Wall

VIDEO MARKERS

1. Frame

2. Plywood Skin

3. Return Wall

© Create Scenery and Props with SketchUp ® & V-Ray ®
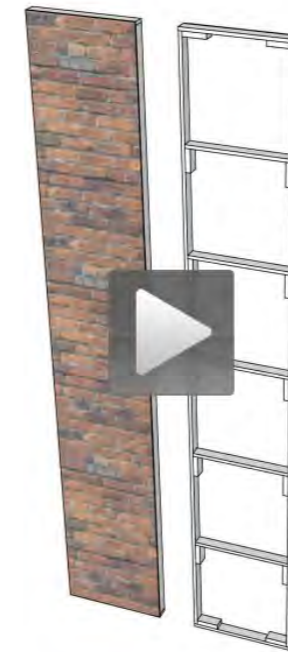
Cutter Wall   Open File: c4s6.skp

01_Frame_0:00:00:01

02_Plywood Skin_0:03:44:15
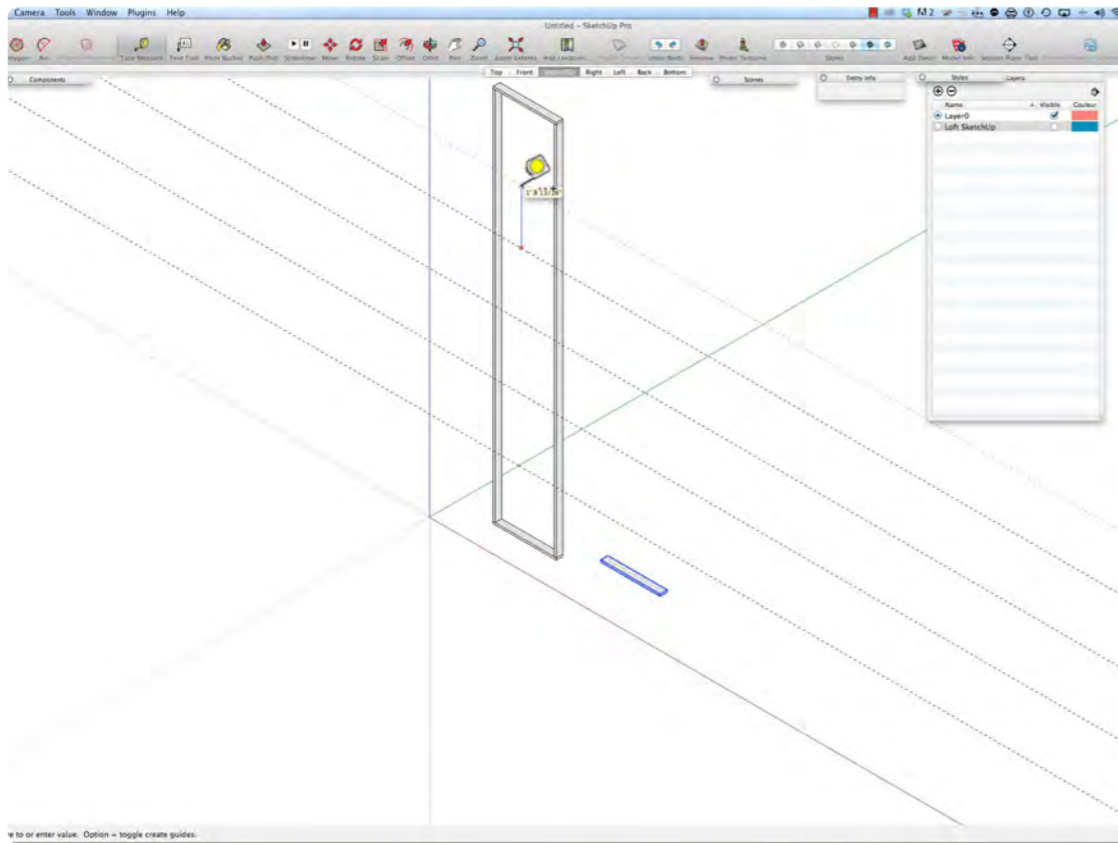
The Cutter Wall is used as a place to cut or frame a shot. In this set it is 2'-0" w x 12'-0" h. This flat is basically the same construction as the 8 x 4 brick flats; the difference is that it stands vertically rather than horizontally. The frame is 1 x 3 and the internal toggle rails are on 24" centers. Use the Tape Measure Tool to layout the centering of the rails.
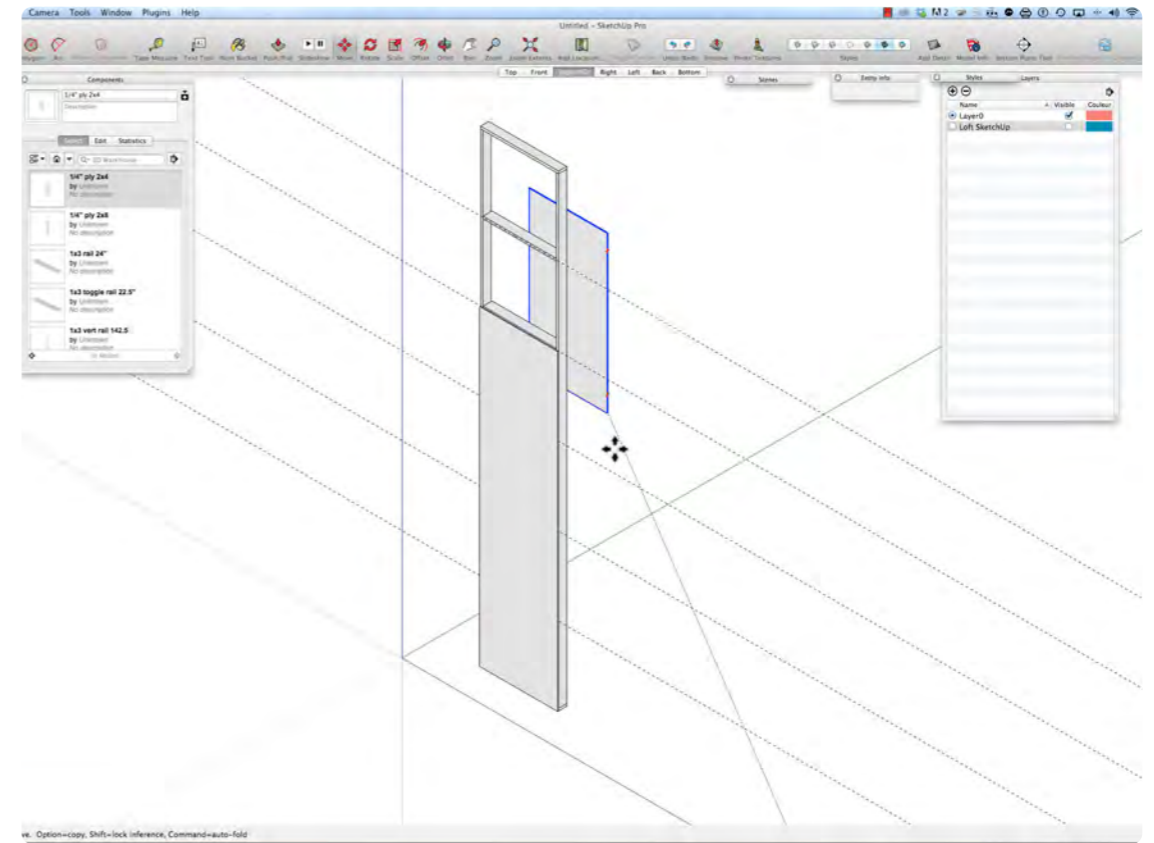
The Flat is skinned with 1/4" Luan Plywood in 2 pieces: 2 x 8 and 2 x 4. In the front view, draw a rectangle 24" w x 96" h. Instead of drawing each piece separately, make a copy of the 2 x 8 plywood and make the copy unique; use the Push Pull Tool to push it down to 24" x 48". In this case, the Push Pull Tool serves as a resize tool. Repeat the same steps for the Brick Vacuform .030

03_Nailing Blocks_0:07:02:19

04_Return Wall Flat_0:08:59:17

Return Wall
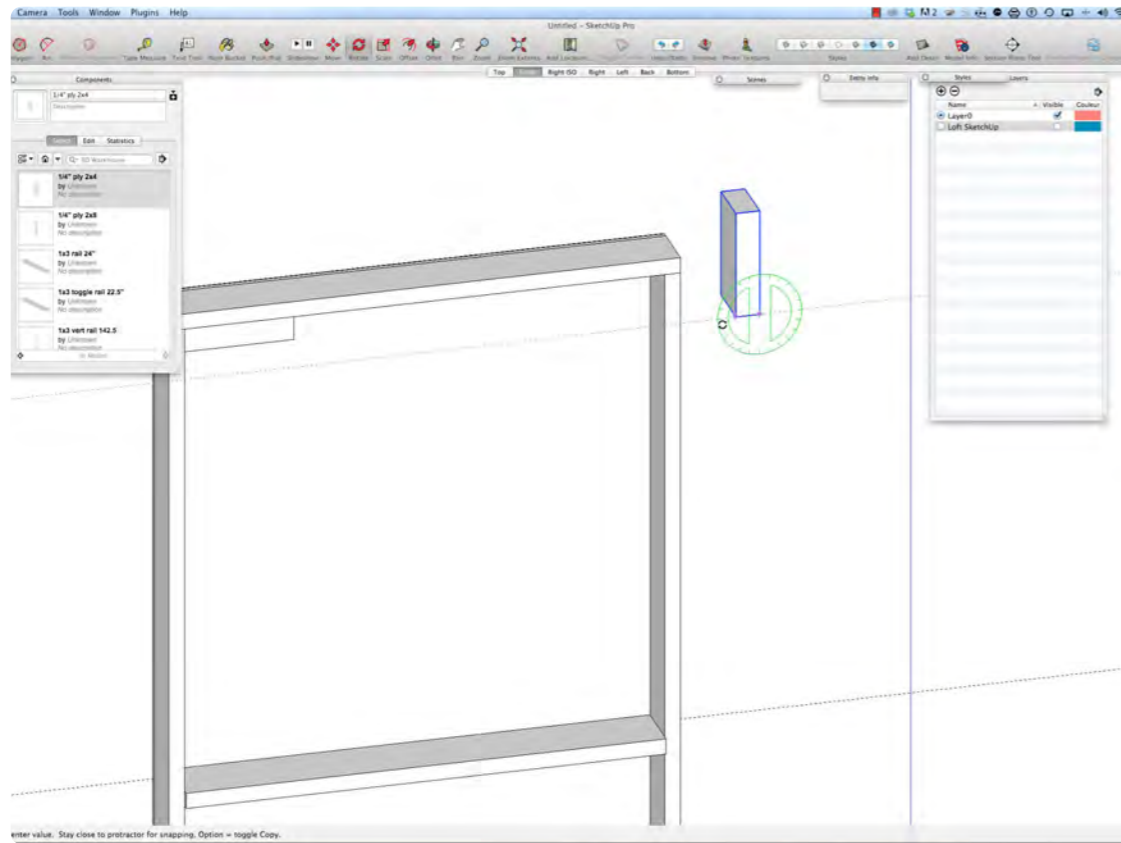
The Nailing Blocks are made from 5/4 x 3, which is 1 1/8" x 2 1/2" x 5 1/8" long. The blocks need to interlock so there is a horizontal and a vertical block. The instance that is rotated does not need to be made unique. Instances of an object can be in a different rotation. Use the Rotate Tool to rotate the block 90 degrees.
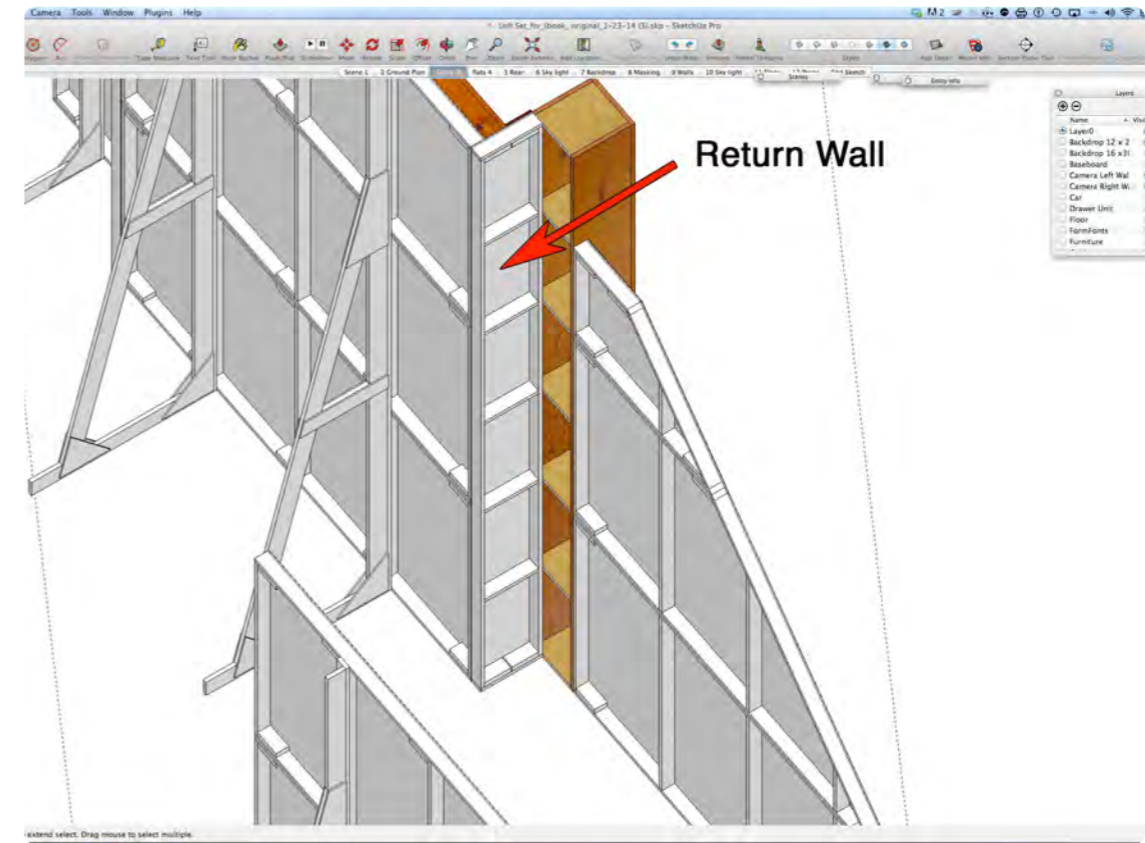
The Return Wall Flat forms the alcove for the Counter Top. Follow the same steps used to make the Cutter Wall. An instance of the Cutter Wall made unique can also be use to make the return flat by editing it.

The Knee Wall Flat

VIDEO MARKERS

1. Knee Wall Flat Frame

2. Plywood Skin

3. Brick Face

4. Cap

Movie 4.7 Knee Wall Flat
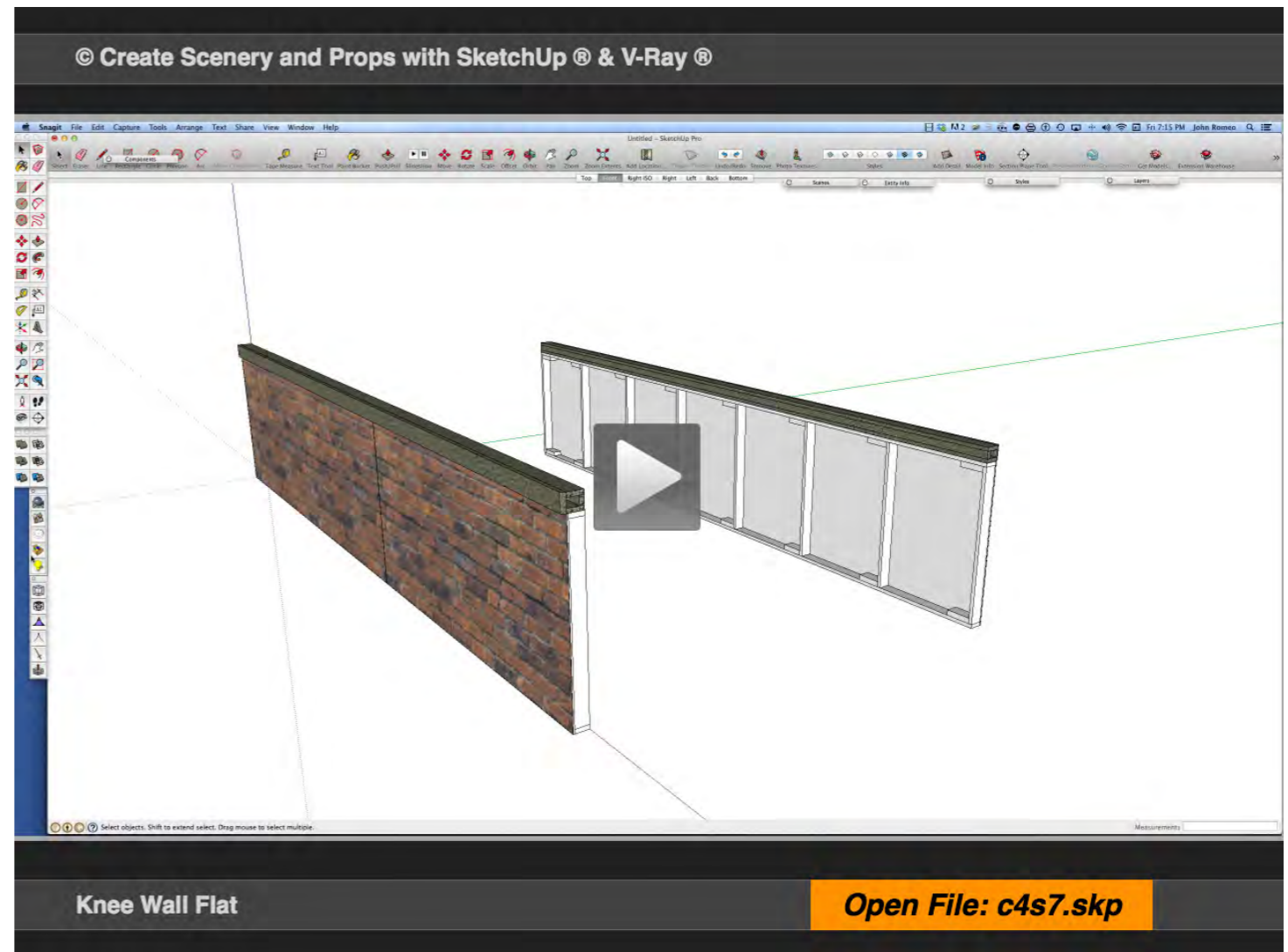
01_Knee Wall Flat Frame_0:00:00:01

02_Plywood Skin_0:03:12:26
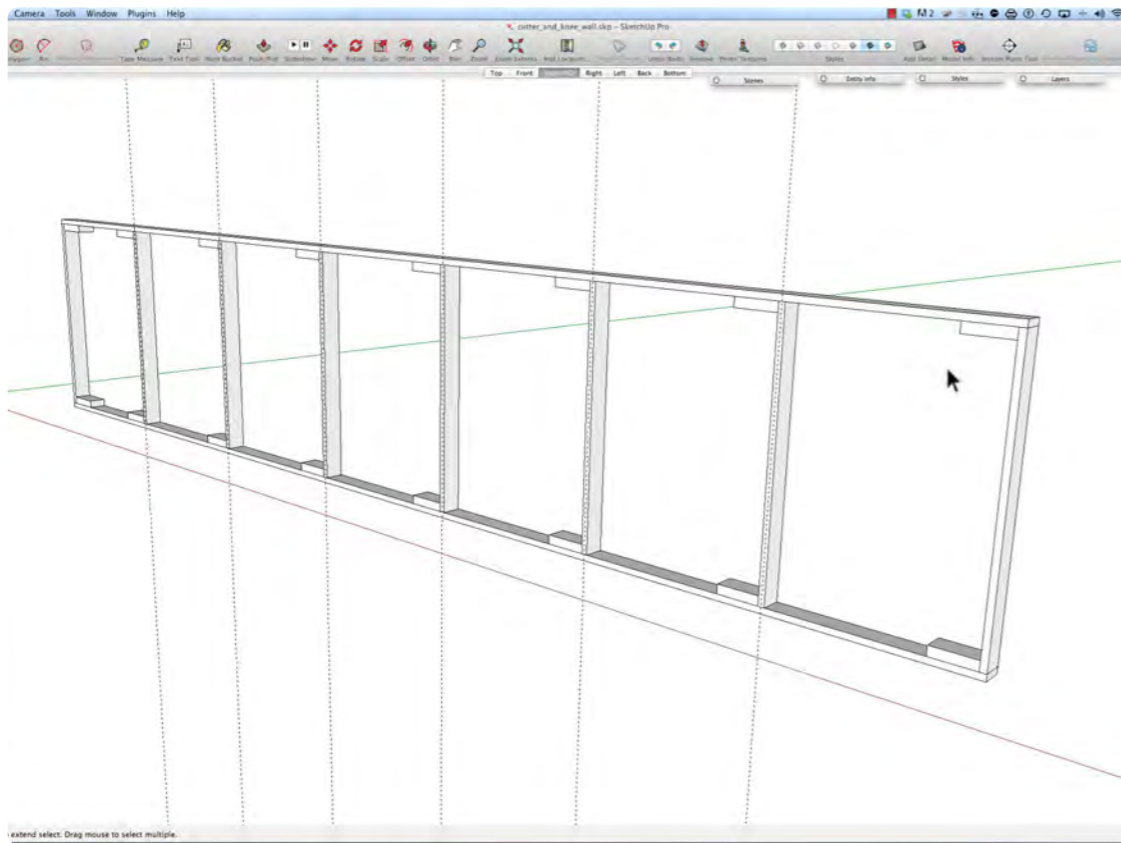
The Knee Wall serves as the base for the Skylight. It is 14 ft wide x 3 ft high including the Coping or Cap. In the Plan View, draw a Rectangle 14 ft x 2 1/2" and Extrude it to 3/4". Then draw a Rectangle 2 1/2" x 3/4" on top of the 1 x 3 rail and extrude it to 31 1/2". Copy an instance of the rail to the top and copy the vertical rails on 24" centers. Add the 2 1/2" X 5 1/8" x 1 1/8" nailing blocks to each corner of each rail.
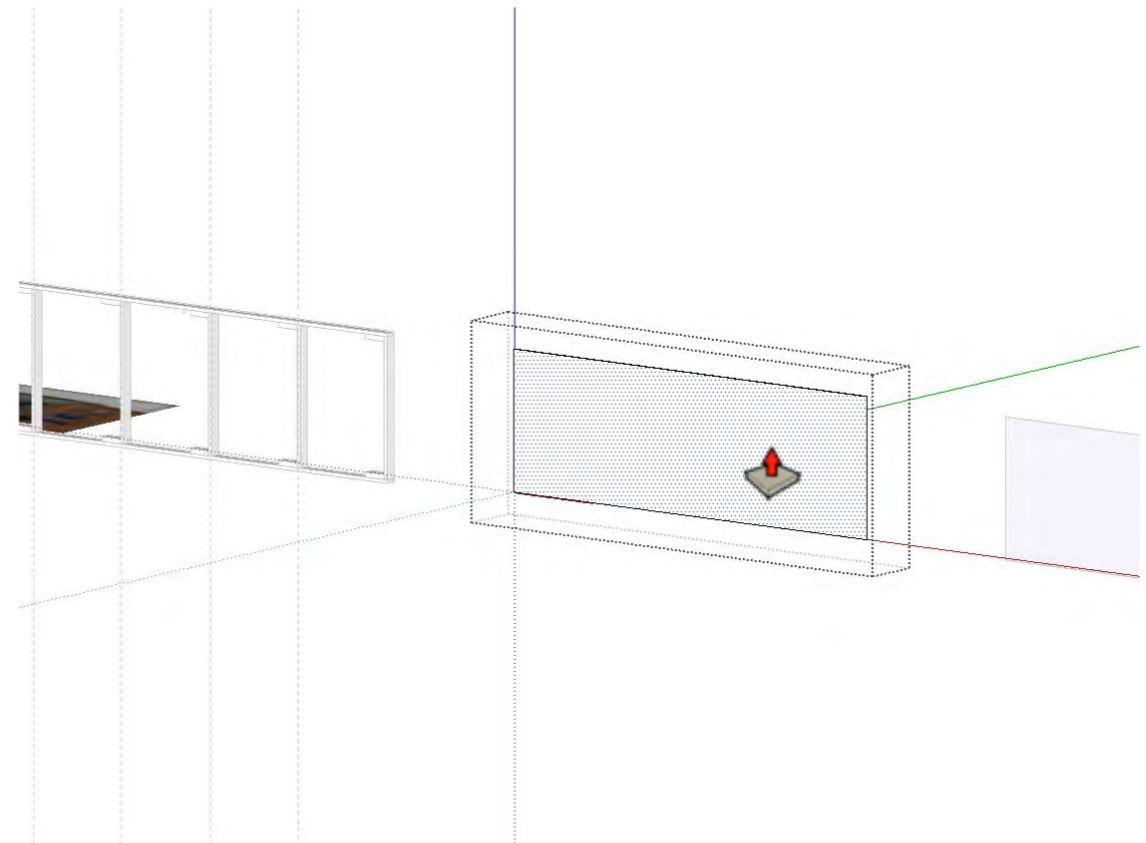
The Plywood Skin is 1/4" Luan and is in two pieces: 96" w x 33" h and 72" w x 33" h. Draw a rectangle in the Front View 96 x 33 and Extrude it to 1/4", make it a Component and move it onto the frame. In the video, the Push Pull Tool is used to extend the height from 31.5" to 33".

03_Brick Face_0:05:08:11

04_Knee Wall Cap_0:06:16:03
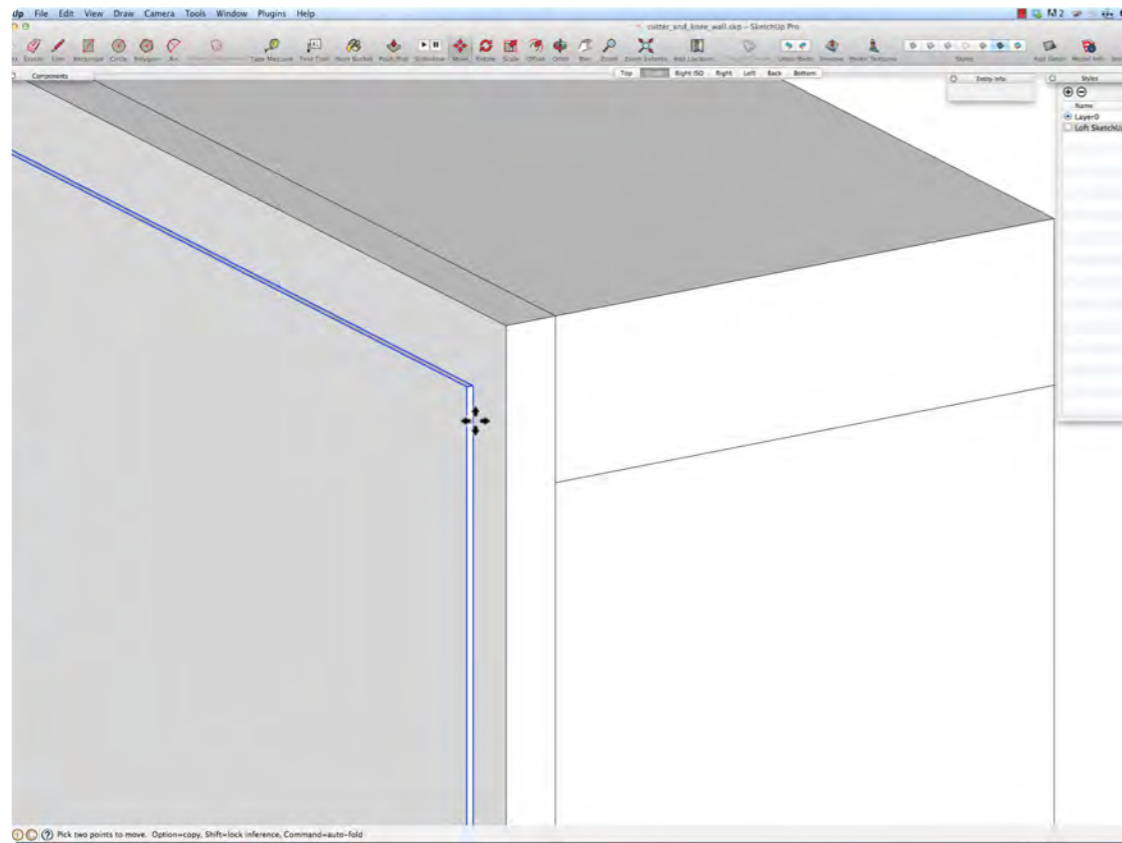
The Brick Face is Vacuformed Plastic .030 gauge. Repeat the same steps used to make the plywood skin except Extrude to **.030.**
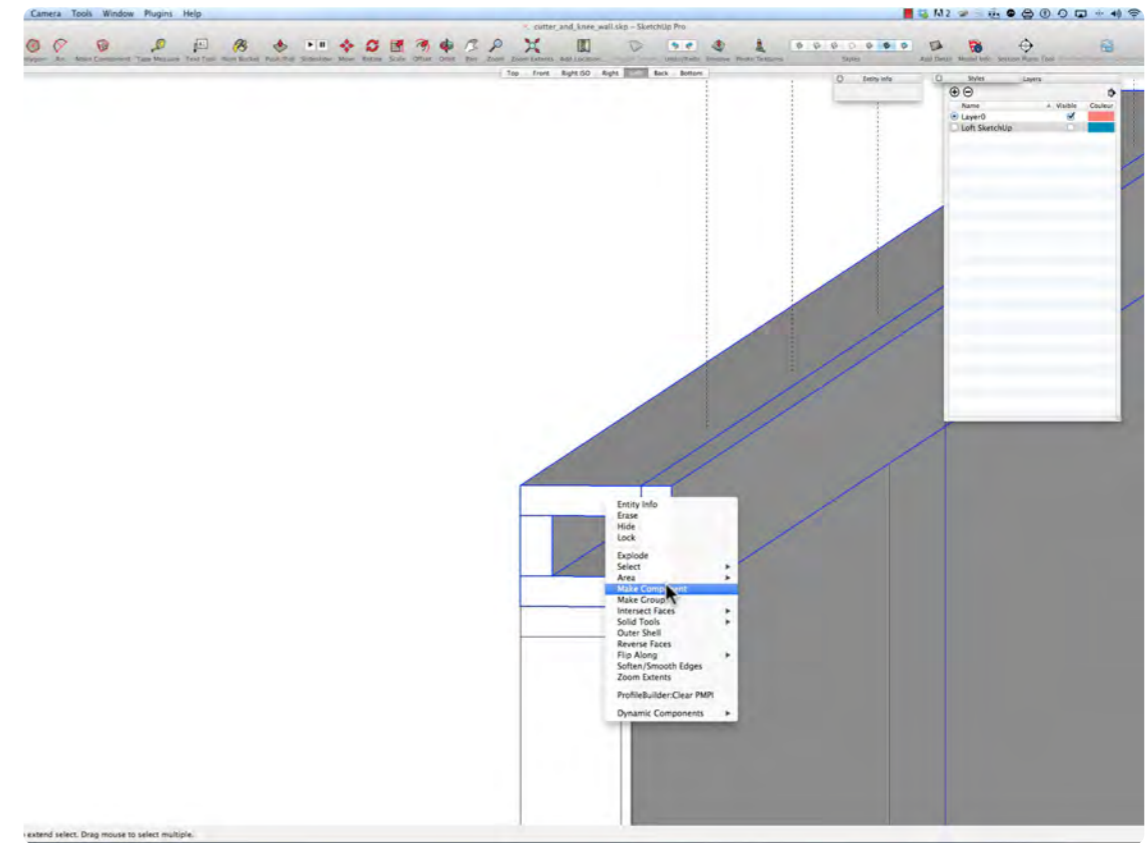
The Cap is 14 ft w x 3 3/4 inches wide. It overhangs the Front Face of the Flat by 3/4". In the Left View, draw a rectangle 3" x .75" and extrude it to 14". Add the face 3/4" w x 3" h and Extrude it to 14'. Drag an instance of the bottom to the top. Make the back 1 1/2" x 3/4" and extrude to 14". Note, always make each piece into a Component. Make the cap a Component, and then marquis select the entire Knee Wall and Cap and make it a Component.

Working with Components and Textures

- Create a Component Collections from a folder

- Make textures from image files and apply them to surfaces.

- Work building complex components with many sub components nested together and move them into place

- Using the Outliner, Layers and Scenes to hide and reveal objects in the model

- Jumping ahead with a peek at V-Ray Rendering
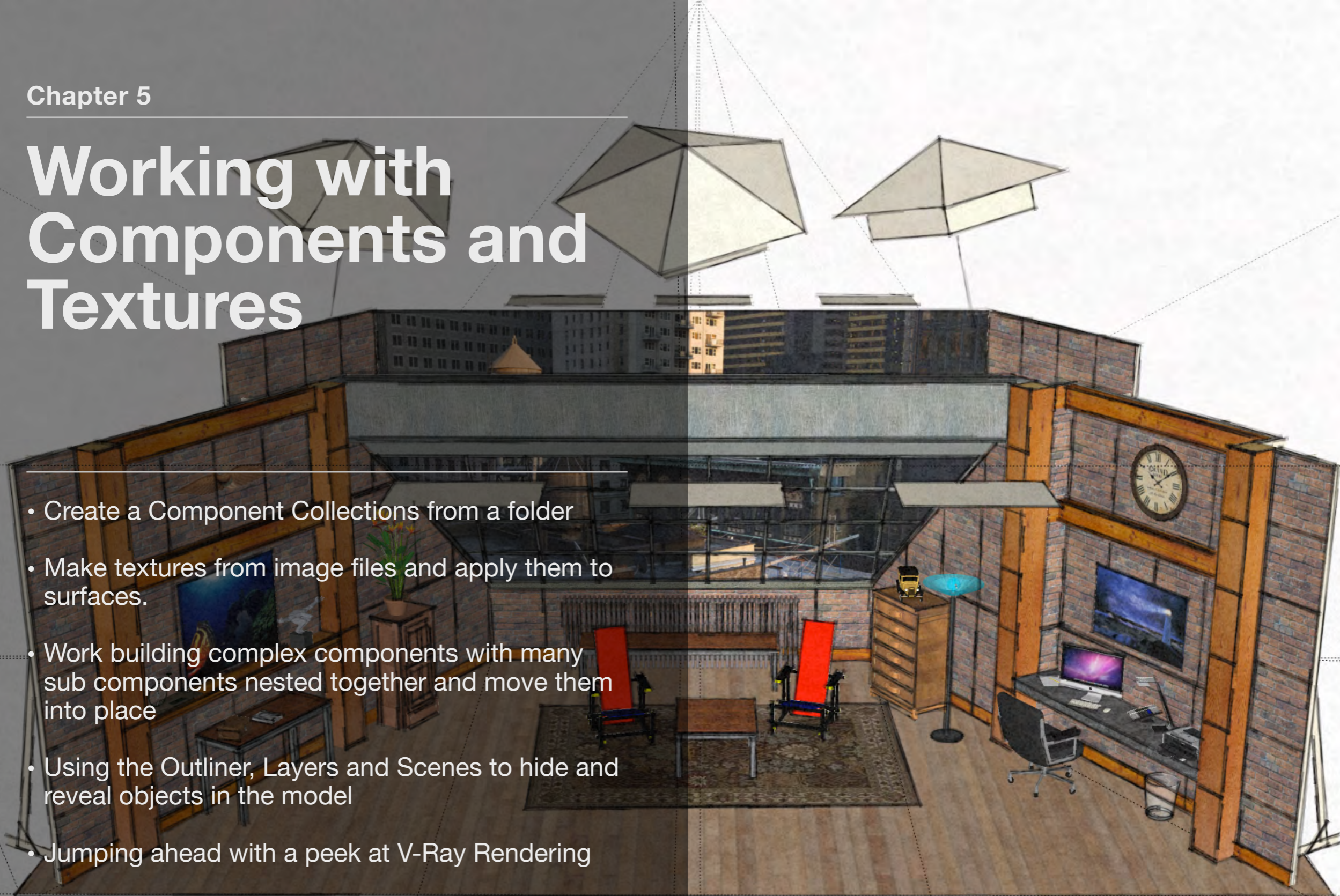
Component Collections and Textures

Movie 5.1 Component Collection and Textures

VIDEO MARKERS

1. New Component
   Collection

2. Assemble Brick Walls

3. Begin Applying Textures

4. Texture Beam and Shelf

5. Counter
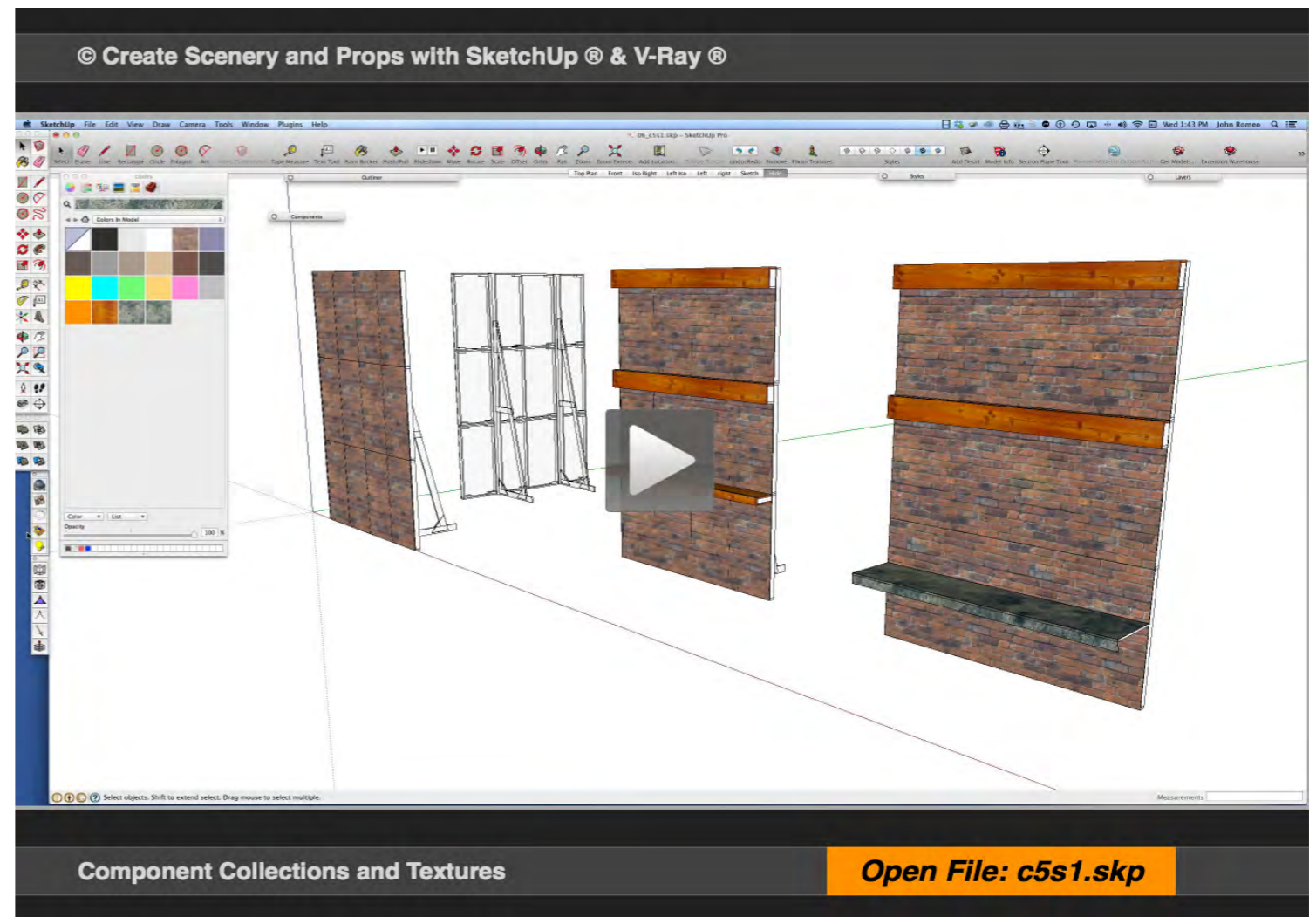
01_New Component Collection_0:00:01:11

02_Assemble Brick Wall_0:01:45:09
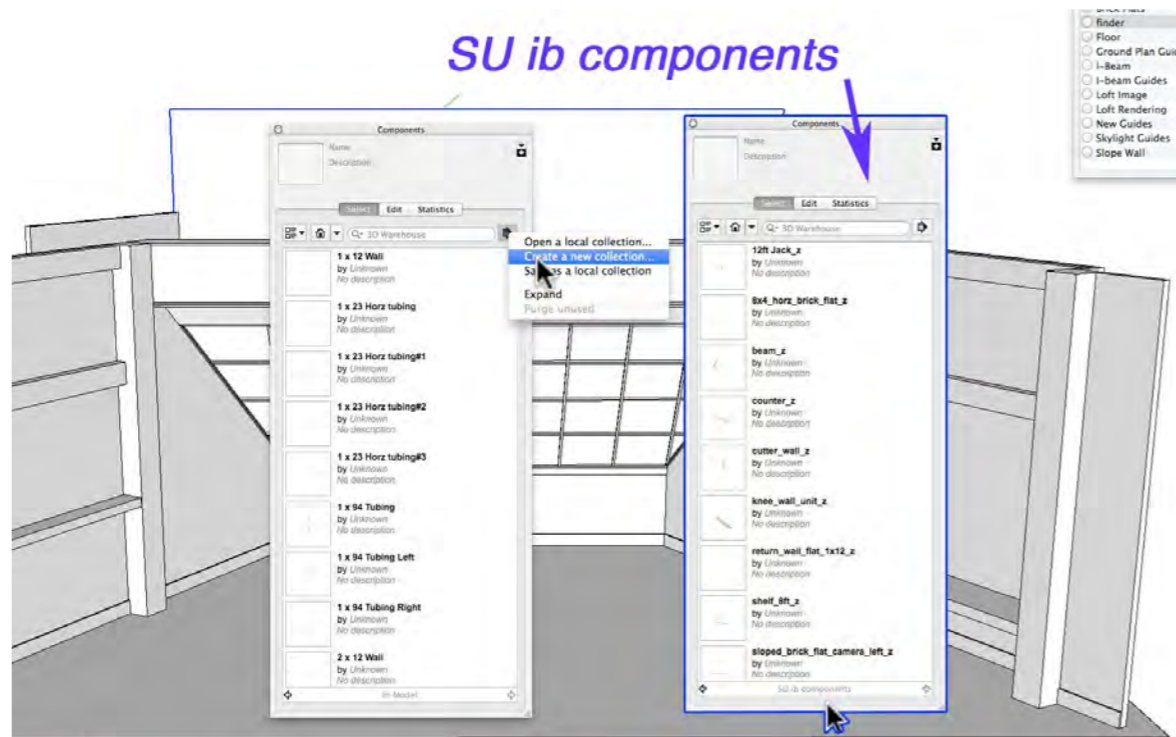
Component Collections are a key part of organizing a SketchUp drawing. Components are saved either individually or in groups of Components. For the loft rendering, I have organized the objects into a folder so that they can be brought into SketchUp as a collection. Each file can have many Components in it if you wish. Since many of the Components originally in the model may have similar names so I added a "z" to the end of the file name for clarification.

The Brick Wall Assembly capitalizes on the diligence of Component Creation throughout the drawing process. Because the process was followed, complex Components are merely instances that use very little memory and enable rendering as efficiently as possible. Stacking the flats horizontally is an excellent way of building the walls. The Jacks make the Walls stand up, but also double as vertical stiffeners. A well managed Component Library can be a valuable asset, especially in a studio or theatre that uses stock scenery.

03_Begin Applying Textures_0:04:30:02

04_Texture Beam and Shelf_0:07:35:17
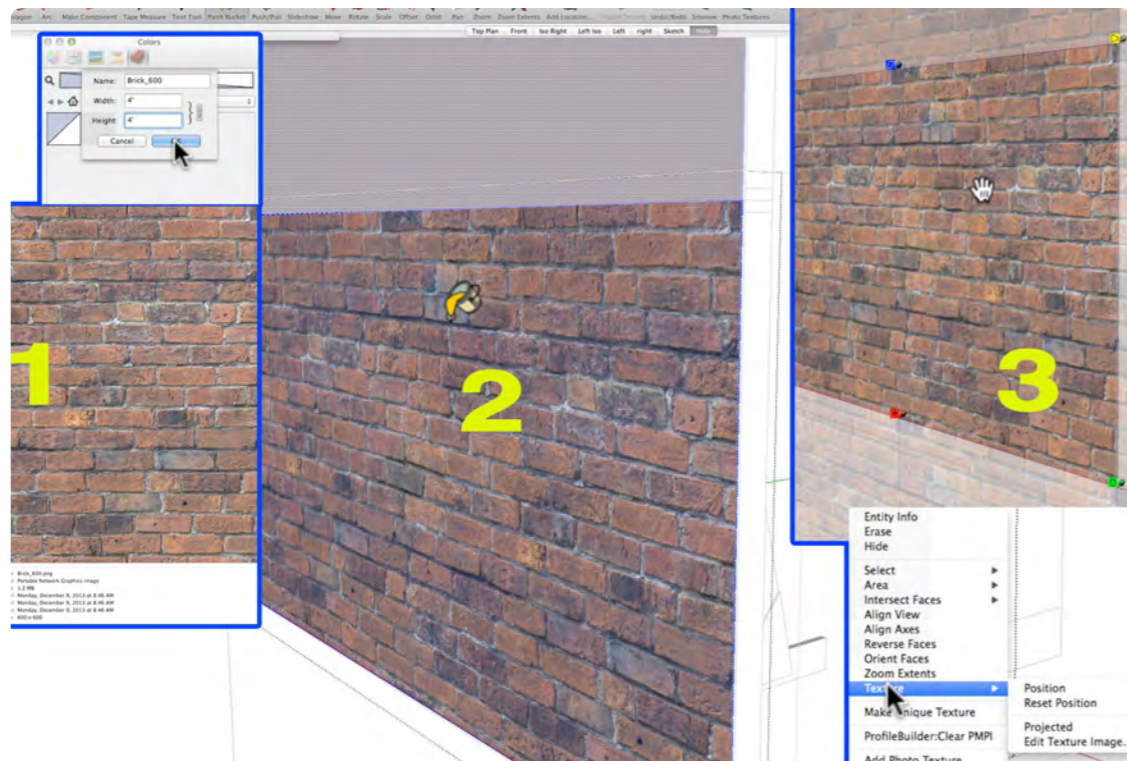
This set does not use any of the SketchUp Stock Textures. Creating a custom texture is not difficult. In the Color/Materials Window, right click in the blank space and select new texture and SketchUp will open up the file directory to choose the image file for the texture. An image size of 600 pixels x 600 pixels is recommended. A dialogue box will open to enter the size of the texture. The Brick Texture, for example, is 4' x 4' . For texture that are rectangular instead of square, click on the link icon to enter a different width and height.

The texture for the wood beam needs to be scaled properly or it will not look good. It is important to choose an image that can work with the size required in the drawing. The face of the beam is 8 1/2" x 96" and the texture should 10" x 96". If the image is rotated horizontally in an image editor (PhotoShop etc), then you will not have to rotate it in SketchUp: this will save time when applying textures. To reposition a texture, right on the textured object and select, Texture, Position.
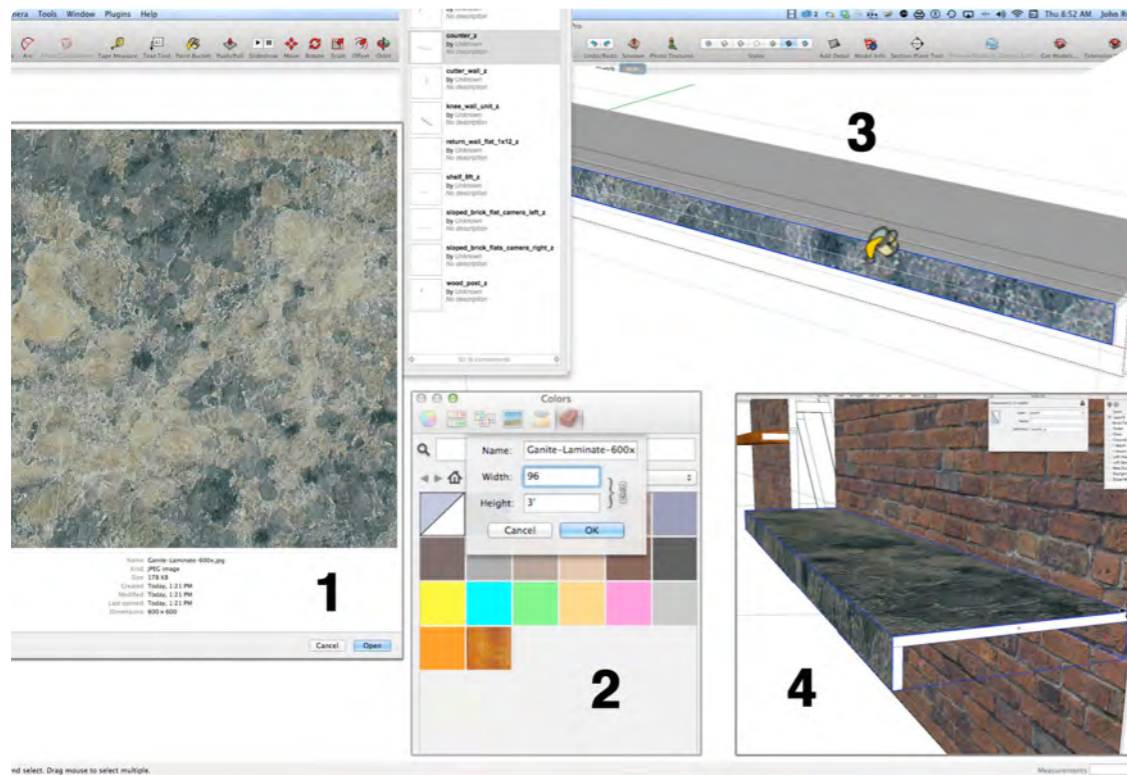
The Counter texture is the granite Formica laminate. The top is made out of 3/4 particle board or MDF and front rail is 1 x 4 or 5/4 x 4 pine. The laminate is 1/16" and it is applied to the front face first. The image file is 600 x 600 pixels, which is not ideal for a 21" x 96" rectangle. The image size is pushed to 36" x 96". This texture will not blend as well as the brick Image: it will look like patchwork. In this case pushing the width to 96" works well, but that is not always the case.

Adding Detailed Objects and Switching Shapes

VIDEO MARKERS

1. Add Wood Post & Return Wall

2. Baseboard

3. Switch CL & CR Walls

4. Switch Masking Walls

5. Switch Sloped Walls

6. Switch Cutter Wall

7. Knee Wall

Movie 5.2   Switching Shapes Objects
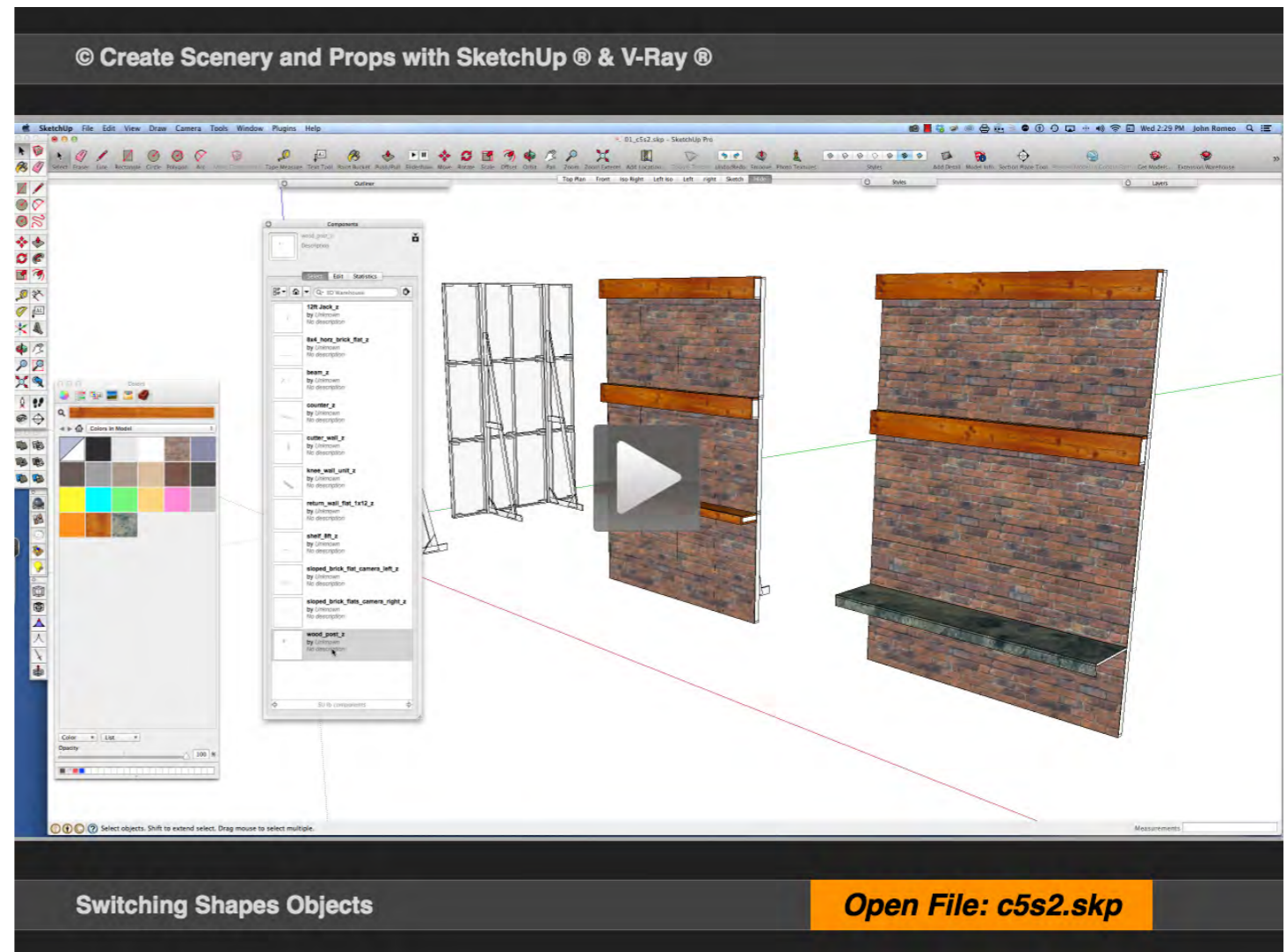
01_Add Wood Post & Return Flats_0:00:00:01
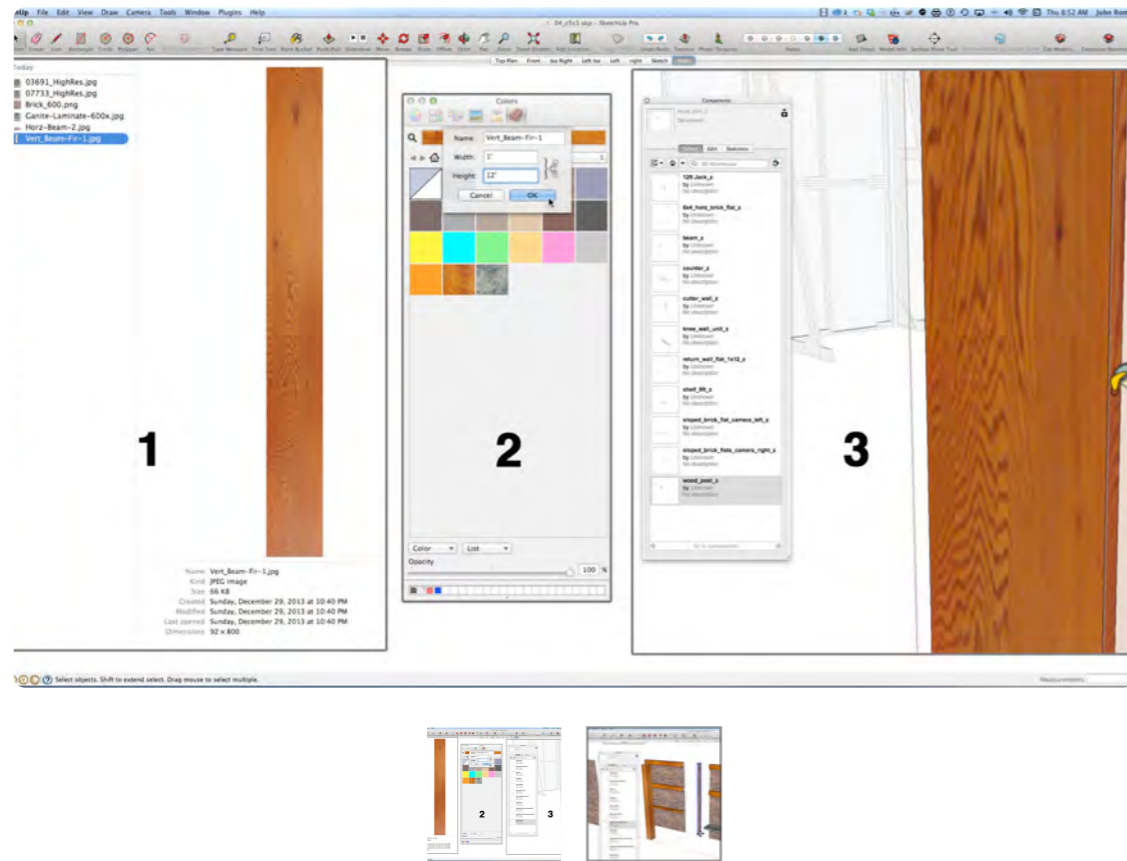
The texture for the Wood Post is from the same image as the beam, the difference is it is rotated vertically and scaled to 1'-0" w x 12'-0" h. The scaling works great in this case; it gives the post a courser grain which reads better as illustrated in detail #3 above. The return wall is combined with the post and the 8 x 12 wall to create the alcove for the Counter. The two Return Walls need to be rotated 90 degrees, one clockwise and one counter clockwise. Move the Return Flats and the Posts roughly into position and orbit around the back of the unit to put them in place.

02_Baseboard_0:04:13:06
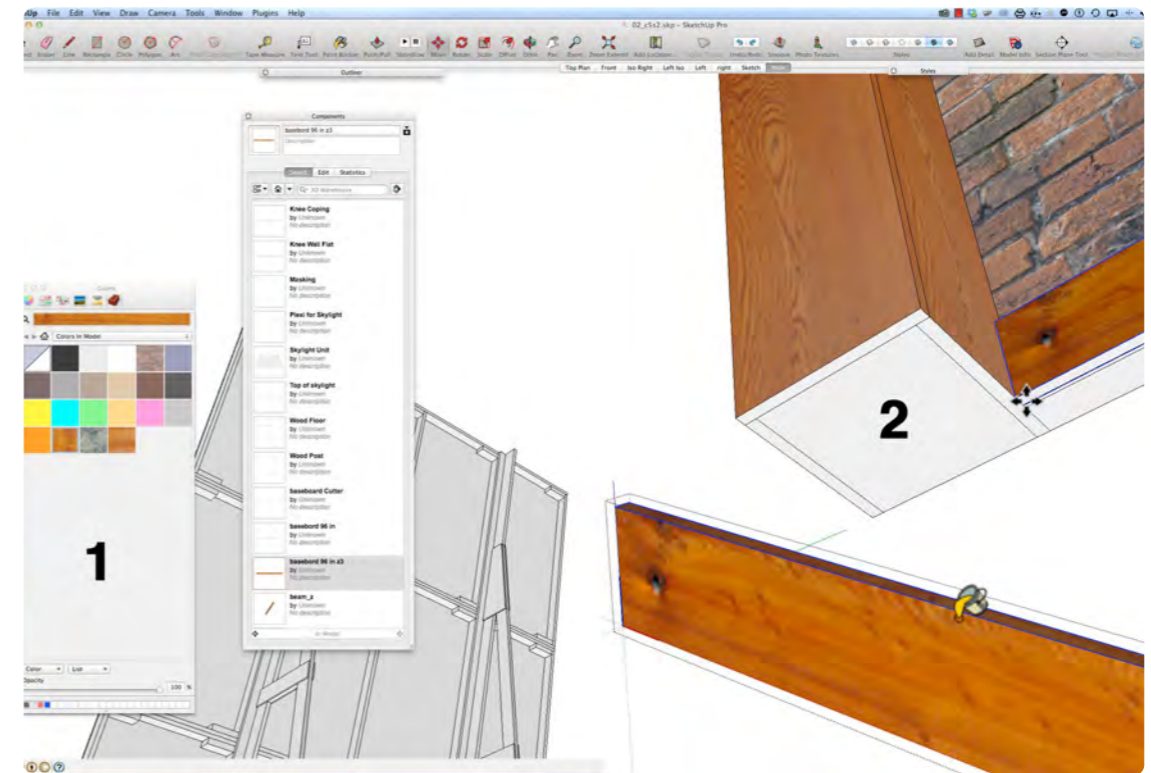
This is a convenient time to add the baseboard to the Camera Left and Camera Right Walls. In the Component Window, making sure that in model is selected, find the "Baseboard 96" Component and drag out an instance and place it on the floor; make it unique and change the name to Baseboard 96 in z3. Use cut-and-paste to place it in the Camera Left and Camera Right wall components. Orbit to the bottom of the wall to locate an easy snap point to help locate the baseboard in its proper spot.

03_Switch CR and CL Walls_0:06:10:00

04_Switch Masking Walls_0:08:42:15
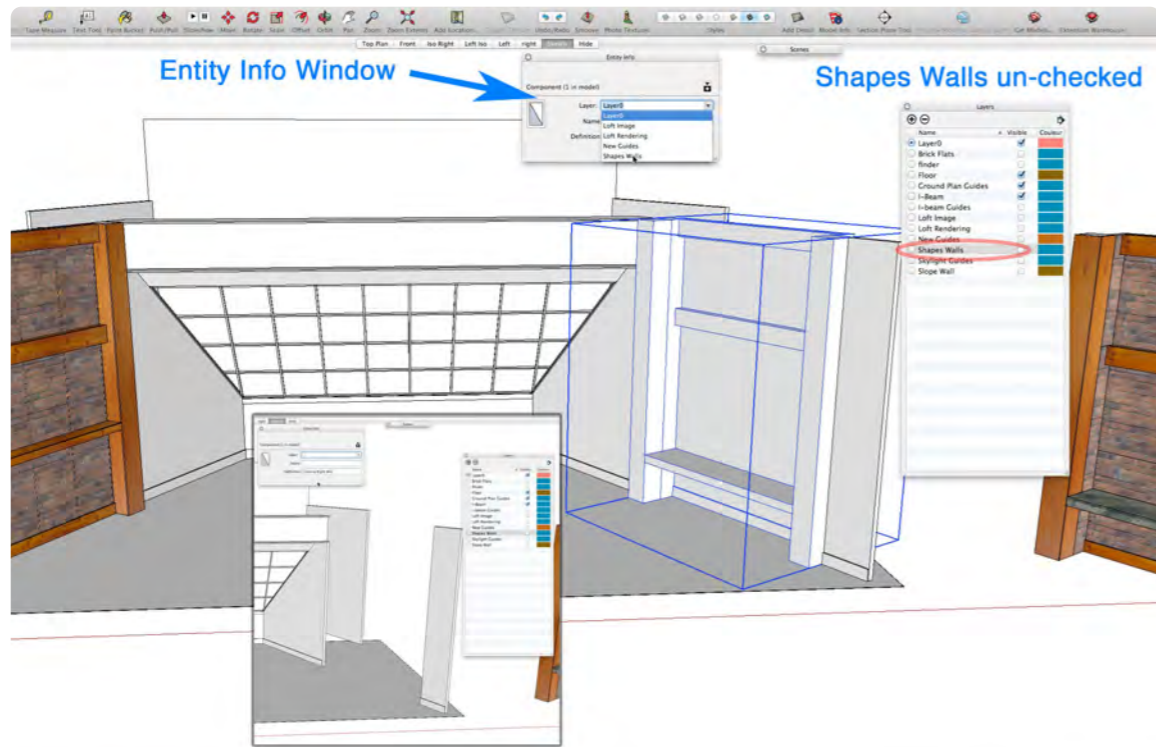
In previous lessons we made shapes as most of the Scenic Elements in the set and then we made the same elements with construction details. This segment focuses on adding the construction details on a separate layer so that they can be turned on or off in the layers window or in the scenes tab. The Entity Info Window is where you change which layer an object is on without having to cut-and-paste. In this case, I prefer to use LAYERS to turn objects on and off rather than HIDE.

The Masking Flats are necessary because the Backdrop is only 24 feet. Ideally, the Backdrop would be around 48 feet wide. The Masking Walls are wild walls that can be set to camera. They are instances of the 8x4 flat and the 12 ft jack, so they really don't add much to the file size. In the video, they are rotated and moved in the plan view, which means they will be 4 ft off the floor. After moving that flat, drag it down 4 ft. to the floor. In the current drawing the backdrop is 24ft w x 16ft.; the hight will be cut down to 12ft in a subsequent video.

05_Add Texture to Sloped Walls 0:10:26:24
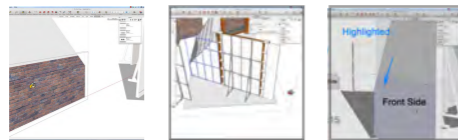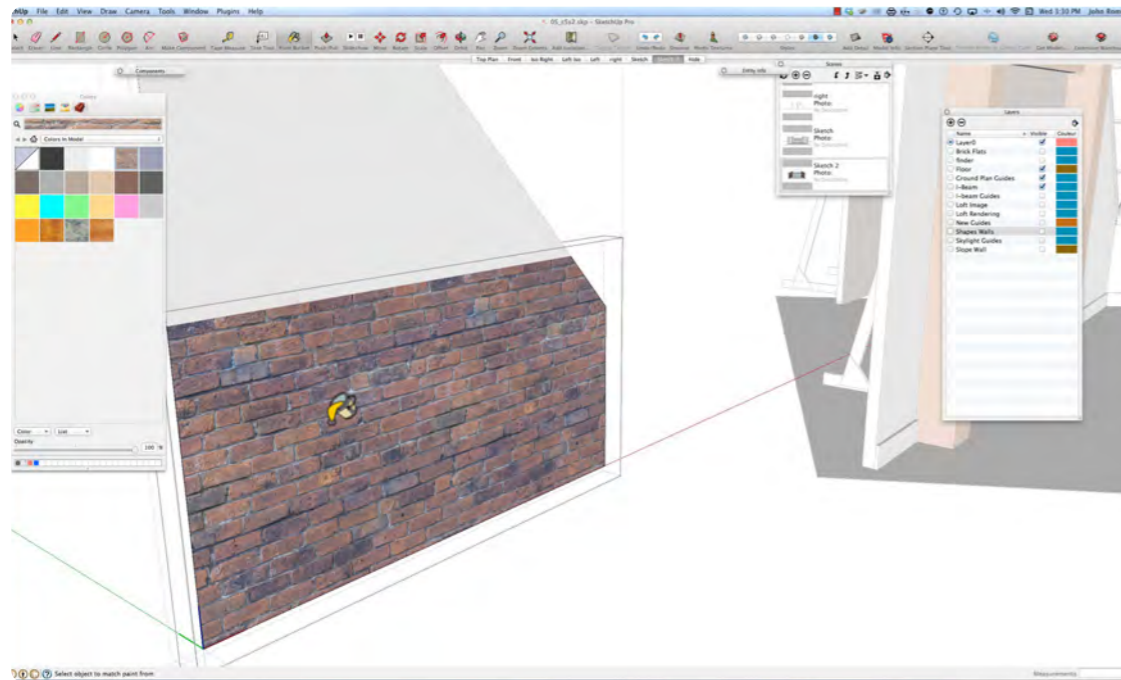
Add the Brick texture to the Sloped Walls. Notice In image 3 (above) that when the Camera Right flat front of the brick face is highlighted, the back of the Camera Left brick face highlights automatically: this is because the Camera Left brick face was create as mirrored copy of the Camera Left. So when the Camera Right brick front highlighted, the front of the Camera left back of the brick highlights. This should not effect anything in the project because the back of the brick is never seen.

06_Switch Cutter Wall_0:14:16:28
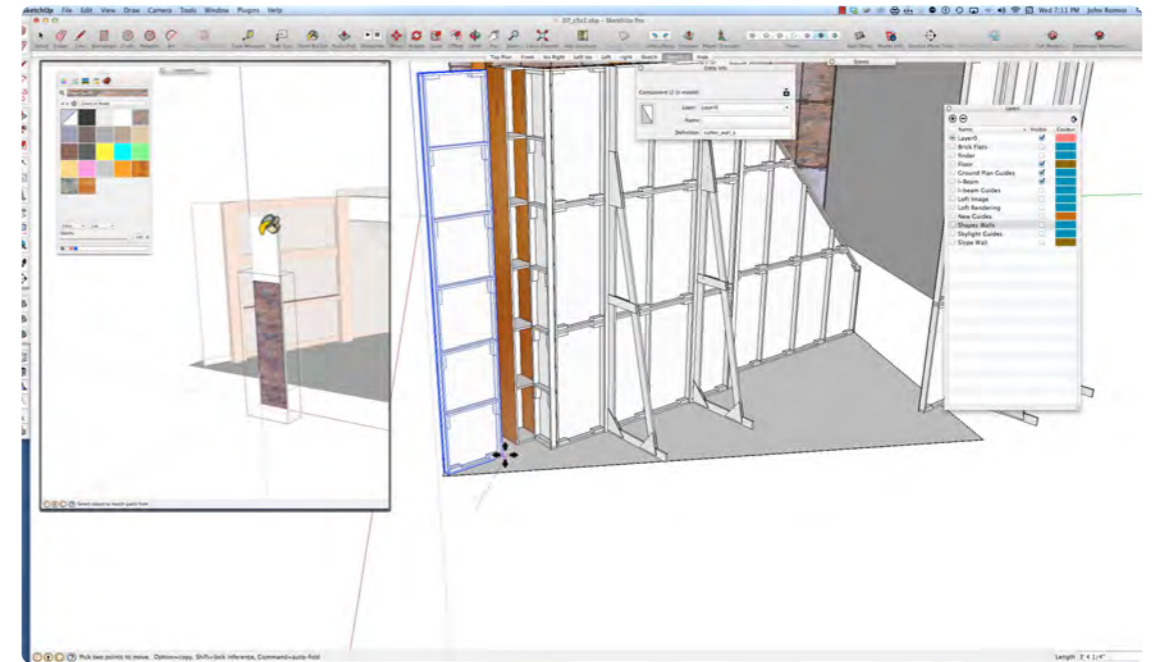
In the Component Window find Cutter Wall_z component and drag it onto the floor. Apply the brick texture to the top and bottom of the Cutter Wall, then add the Baseboard; cut and paste it onto the Cutter Wall_z component. Next, with the Move Tool, create a copy/instance of it. Rotate the two flats 60 degrees. Hide the SHAPE version of the flats and move them into position in the set.
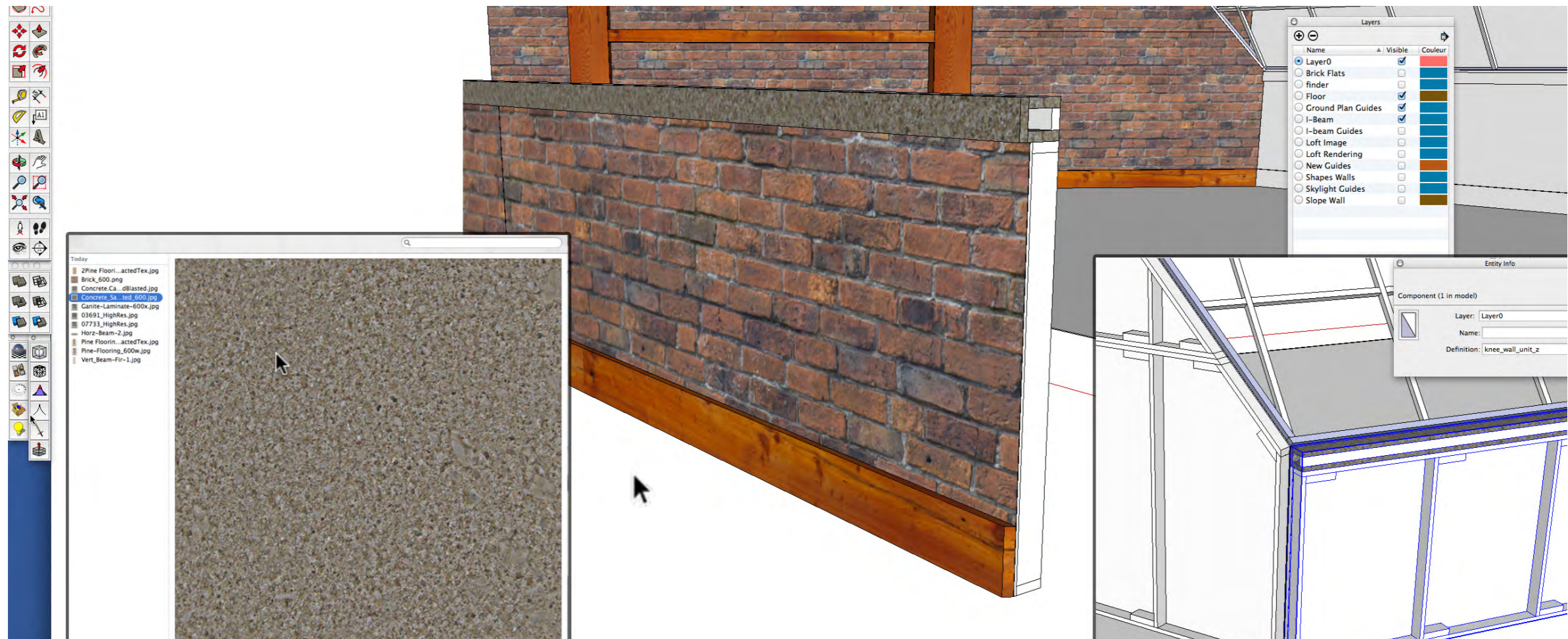
Drag out an instance of the Knee Wall unit_z onto the floor and apply the brick texture. In the Color/Materials Window, right click, make materials and select Concrete_Sanblasted_600.jpg. Make the texture 3' x 3' and apply it to the Knee Wall Cap. Add the baseboard, and zoom way in so it is easy to find the corner and place it inside the Knee Wall unit_z component. Notice the work flow is more efficient. Many of the steps in the lesson repeat and each time a step repeats a step it gets easier to complete.

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Finishing the Set and V-Ray Test Render

VIDEO MARKERS

1. Applying Textures to Shapes

2. Baseboard

3. Floor Texture & I-beam

4. Backdrop

5. Test Render

Movie 5.3   Finish Set & Test Render
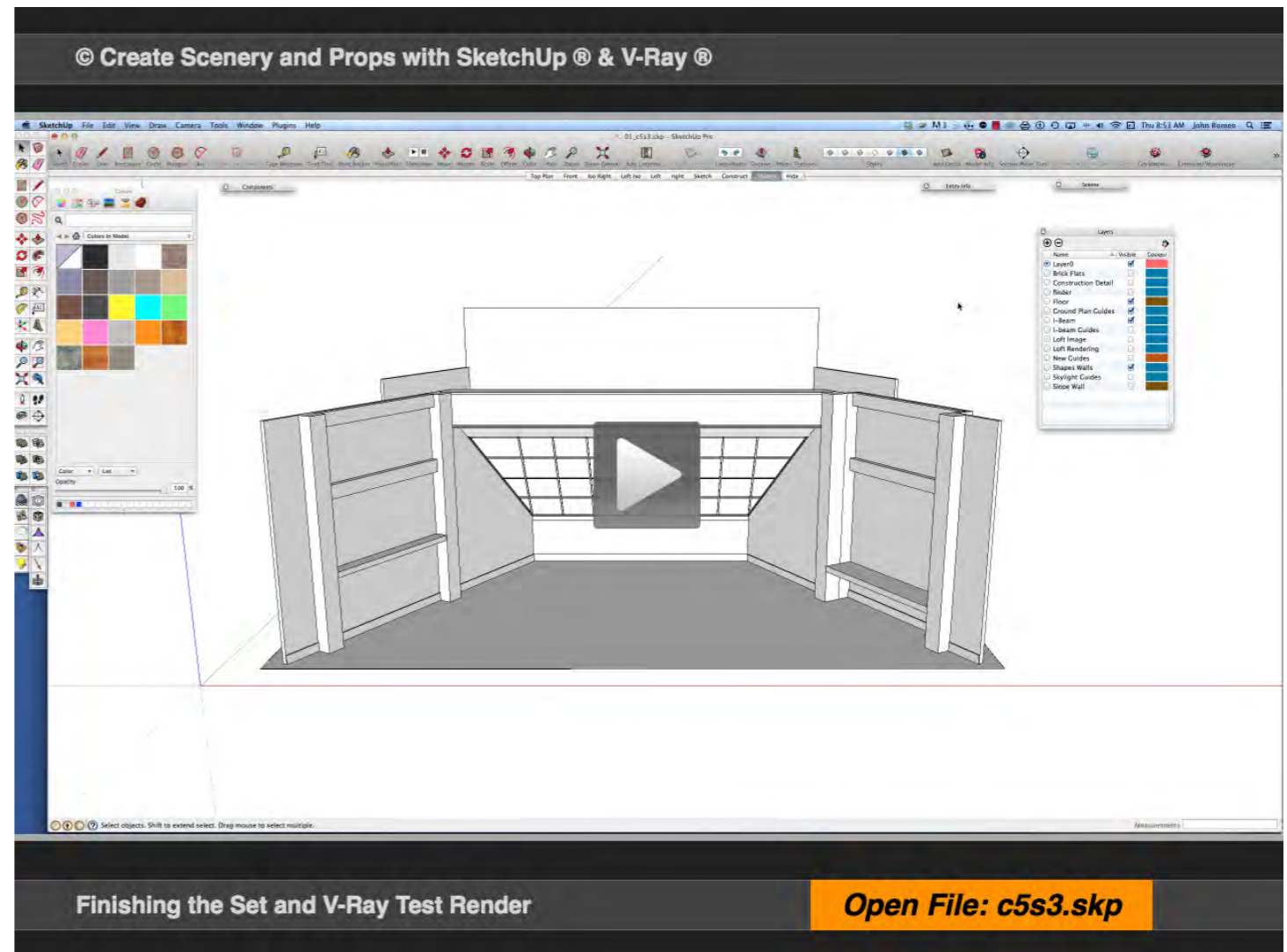
01_Applying Textures to Shapes_0:00:00:01

02_Floor, Skylight & I-Beam_0:03:38:13

Floor Texture
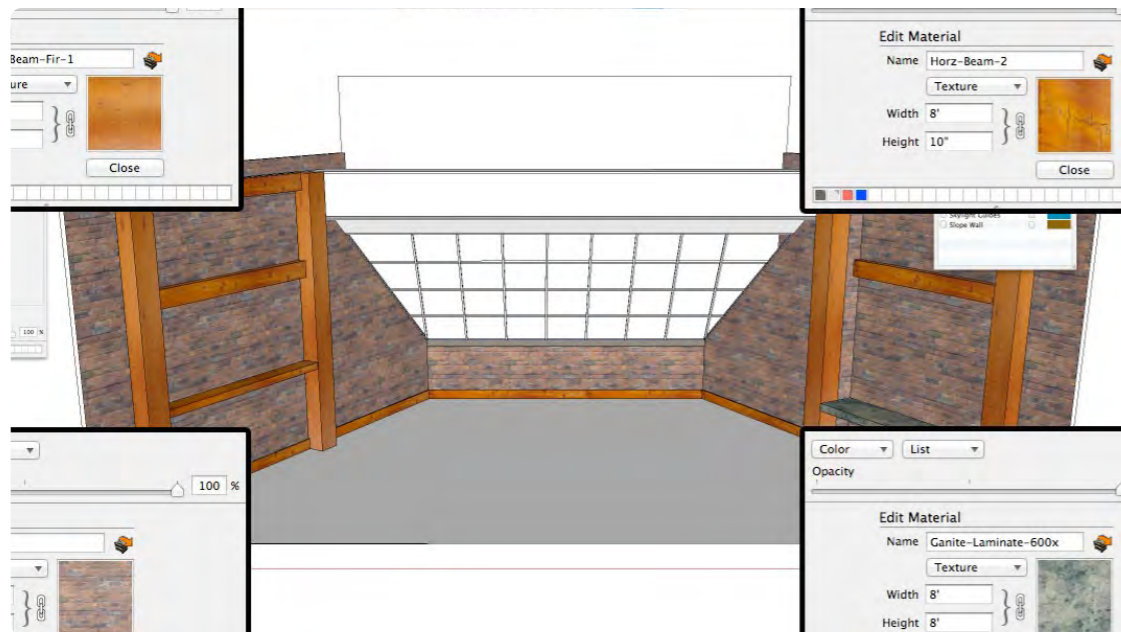
Apply textures to the shapes using the textures already in the Materials Library. Make sure **In Model** is selected so that the textures display correctly. In the figure above, the texture and scale are displayed. Texture can be applied to the entire object or to each face. In some cases, the Brick Walls, for example, it is desirable to texture only the front face with brick, because the back of the set would also be brick if the entire object was textured. For the Posts, Beams, Counter, Baseboard and Knee Wall Cap, select the entire component to texture; for the walls select the face only.

Three New Textures need to be added to the in Material Library for the Floor, Skylight and I-beam. Each texture is displayed in the images above respectively. All three of these objects can be textured in one shot. It is not necessary to texture each piece of The Skylight individually because it will not be viewed that closely and the steel texture is fairly random. The Floor texture image is already configured correctly and scaled so that each board would end up measuring 2 1/4" wide. The texture for the I-beam is random so it can be applied to the entire object. However, feel free to apply textures to each face individually: they can always be changed at later time.

03_Backdrop_0:04:57:17

04_Test Render_0:07:12:00
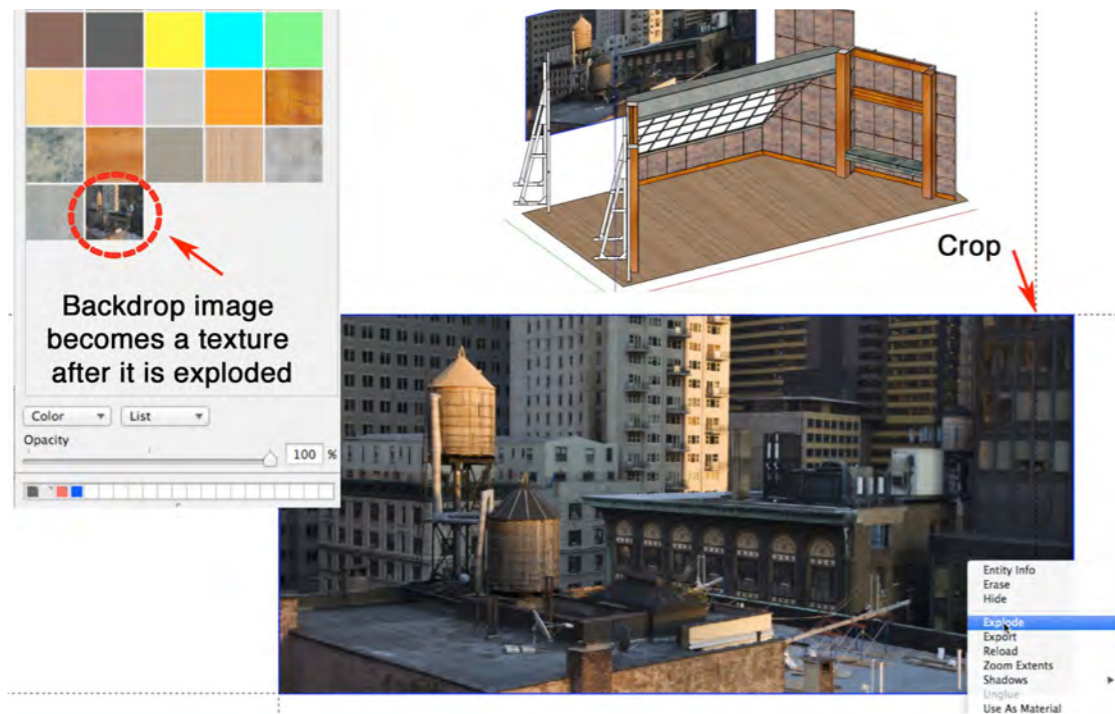
Delete the current Backdrop Component from the drawing and the Components Library. With the tape measure tool create a 24 ft wide x 12 high guide. From the file menu, choose import, and import the file labeled DT_backdrop. Click on the lower right-hand corner of the guide box and drag upward until it fills the guide: it flows past the guide on the right. Right-click on the image, choose explode, then use the Line Tool to crop the excess beyond the guide. Notice that after the Image was exploded it appeared in the Colors Window. Next, make the Backdrop into a Component and move it into position on the set.
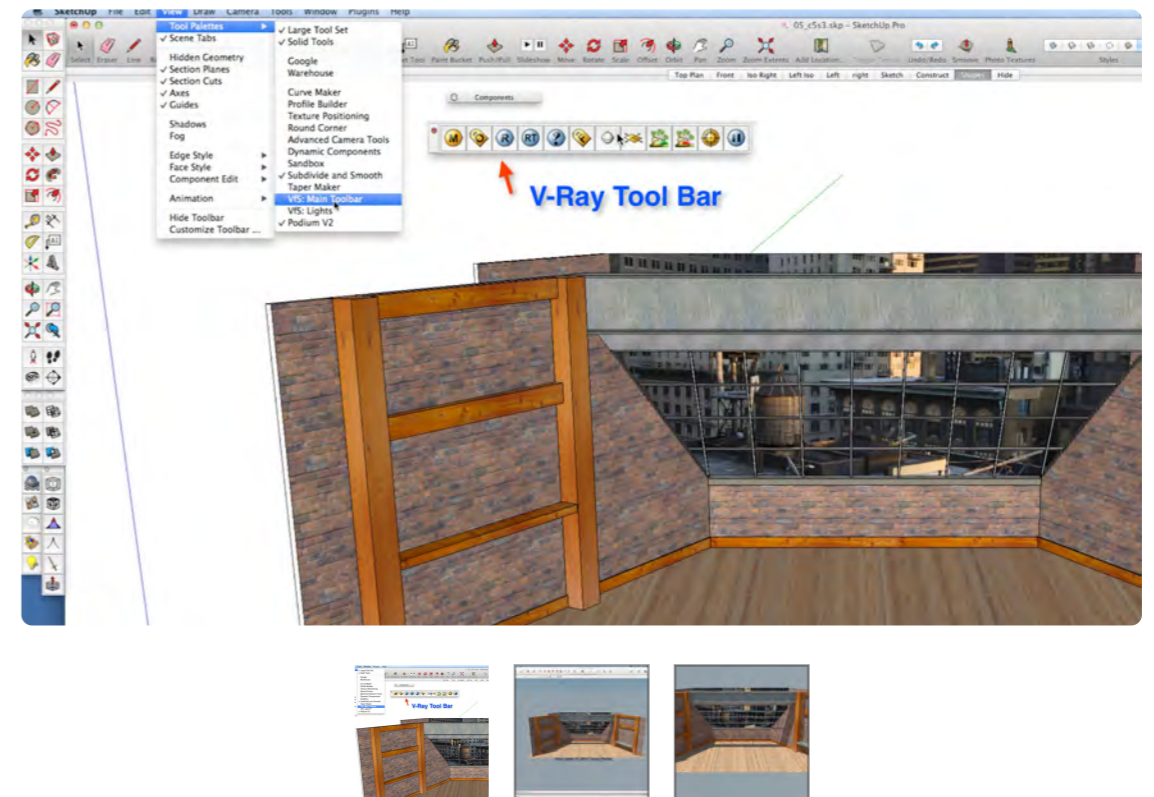
At this point it is difficult to not jump ahead and take a peek at V-Ray. If you do not have the V-Ray plug-in installed in SketchUp you will not be able to do this step. The V-Ray toolbar is located under: View, Tool Palettes,VfS: Main Toolbar. This video is a preview of V-Ray, it is not really teaching how to use V-Ray. It illustrates with just choosing the defaults in V-Ray and turning on shadows, and turning on the physical camera, and adjusting the F-STOP you can get fast results with V-Ray.

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Chapter 6

Adding Props

• Create a Component Collection of the props used
in the sketch

• Place the Props into the set and moving them into
position in the drawing.

• The Props are provided by the author and from
SketchUp Warehouse and SU Podium Browser.
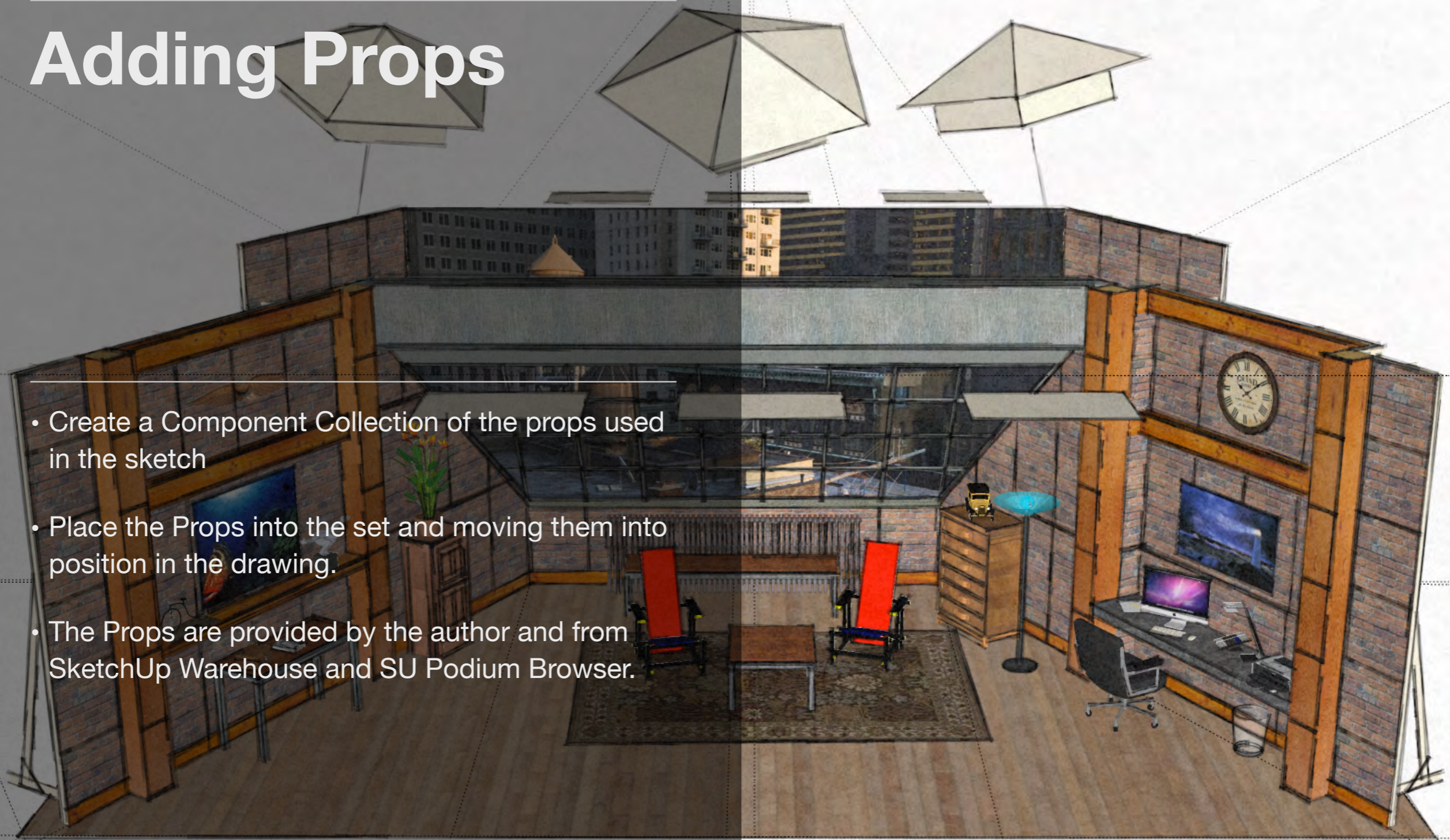
Adding Existing Props Part 1

Movie 6.1 Prop Component Collection

VIDEO MARKERS

1. **Create Props Collection**

2. **Load-in Props to Set**

3. **Moving Props in Place**

© Create Scenery and Props with SketchUp ® & V-Ray ®

Adding Existing Props Part 1

Open File: c6s1.skp

01_Create Component Collection_0:00:00:01

02_Load-in Props_0:01:55:04

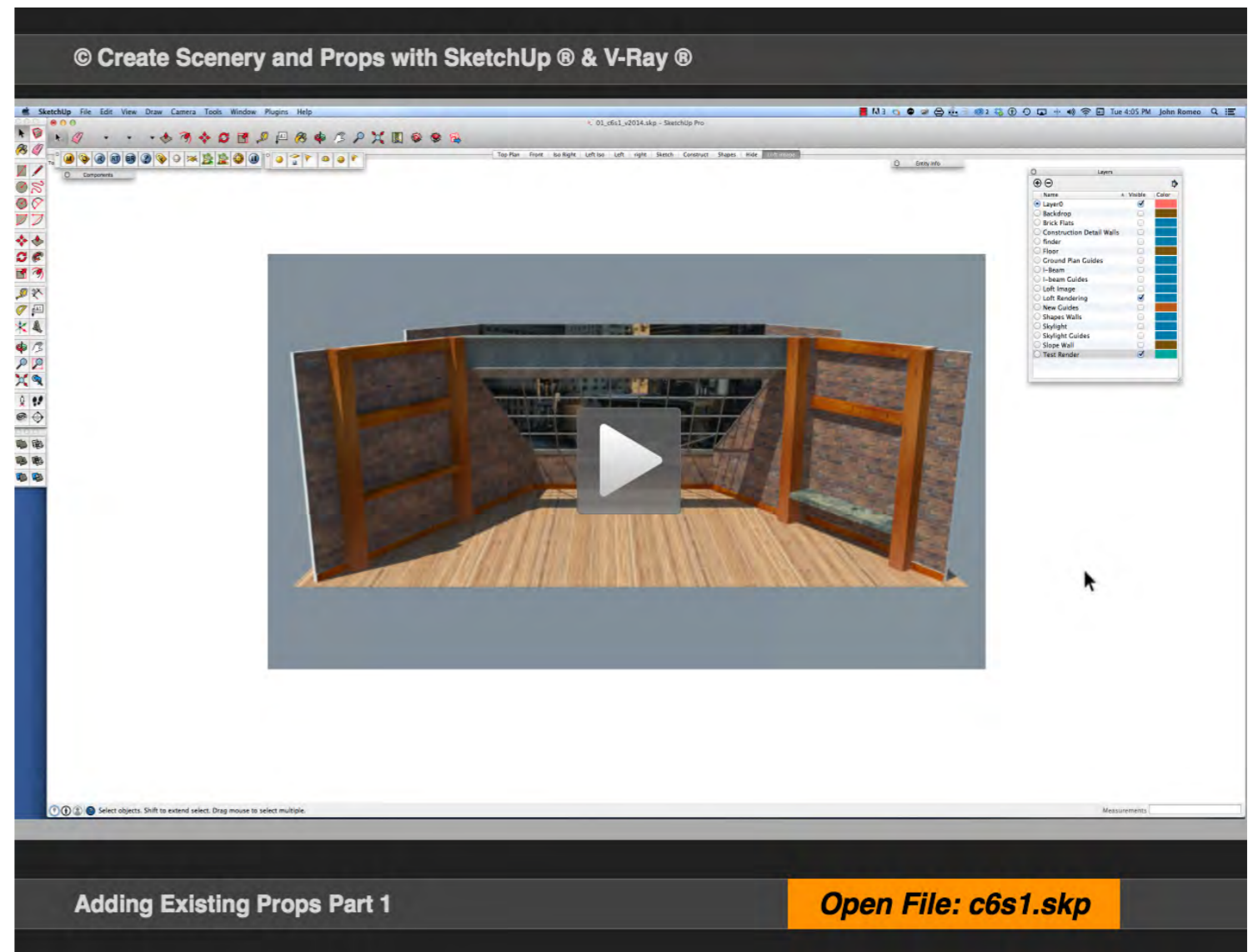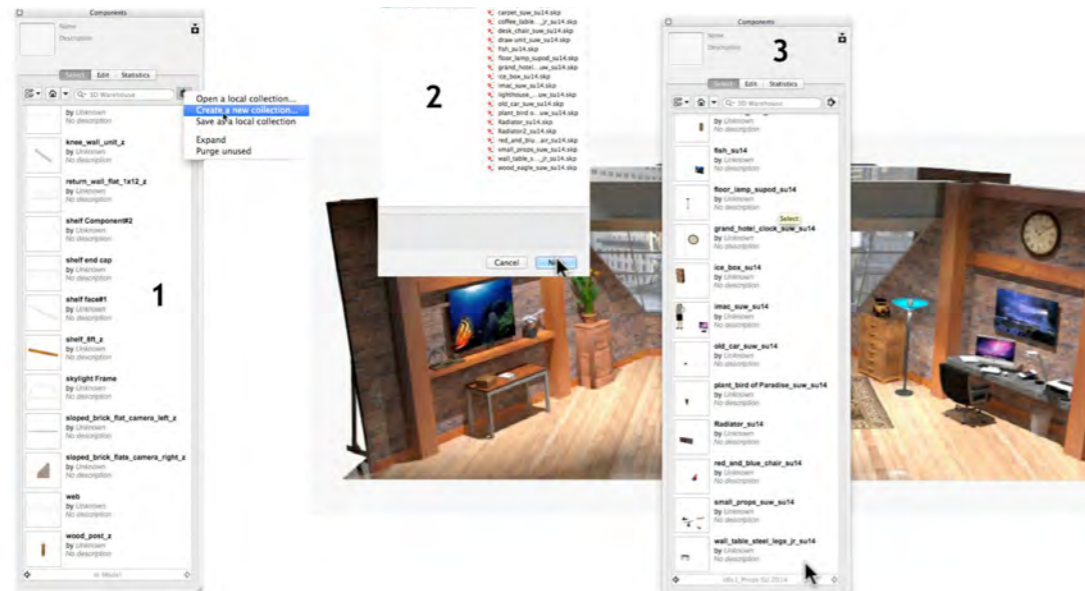The best way to organize Props in SketchUp is to create a Component Collection. In the Component Window select, Create a New Collection. When creating a collection choose the folder not an individual file: find the exercise file, c6s1_Props SU 2014, and click New. The new collection will open in the Components Window. Try to keep your SketchUp files in the same general folder and create collection in specific folders. Please note that if a Component is deleted from the Component Collection, the .skp file will be deleted from the folder that the collection was created from. So make sure that Component Folders are backed up.
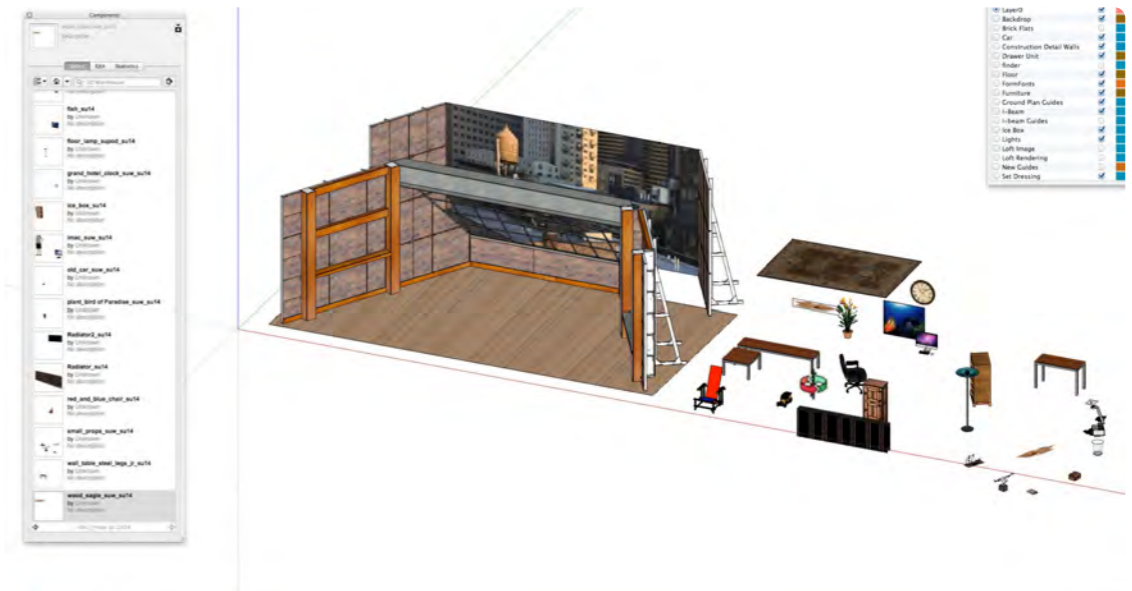
To load the Props onto the Stage, click on the Props Icon in the Component Window; holding the left Mouse Button, drag it onto the stage and release the button. Repeat this step until all the props are loaded on the floor behind the Camera Right Wall. If you click on the **House Icon** in the Components Window, it will switch to the **In Model Collection**. Once an object is placed in the drawing, it will appear in the **In Model cache.** The **In Model Collection** can be saved as a collection to a folder on the computer.

03_Move Props In Place_0:05:00:00
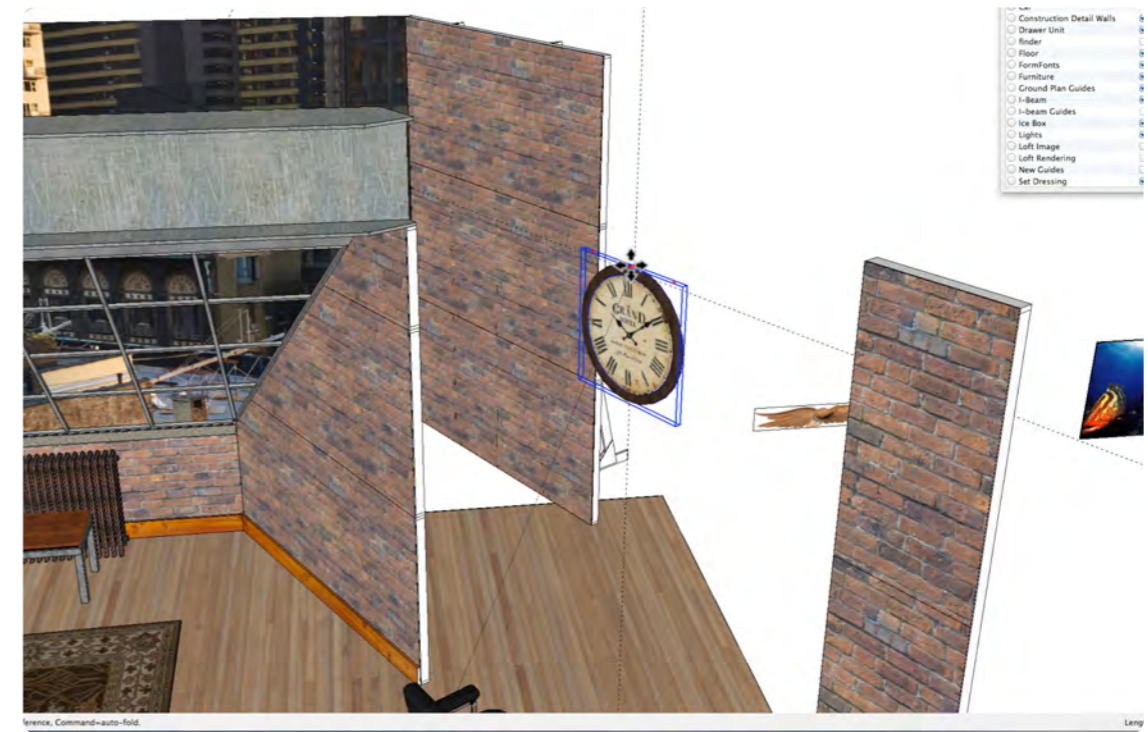
The props are loaded onto the Stage and in position to be moved into place on the set. When moving Props, constraining them to an axis will make it easier to be on the correct plane. Placing guides with intersecting points and selecting the midpoint of the object being moved will help with accuracy. Another aid in locating props is to hide the Wall or any object that is in the way, place the object and then unhide the hidden wall it in the outliner. Use the arrow keys to constrain axes: **Red axis for left and right (right arrow)**, **Green for upstage/downstage (left arrow)** and **Blue for up & down (up or down Arrow).**
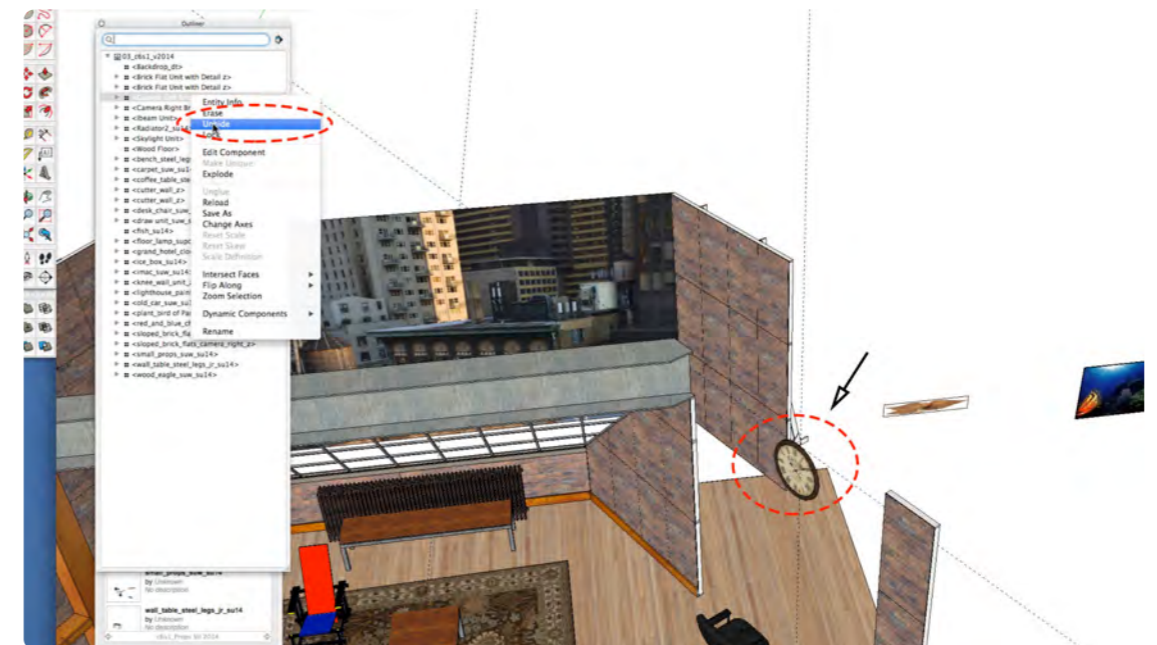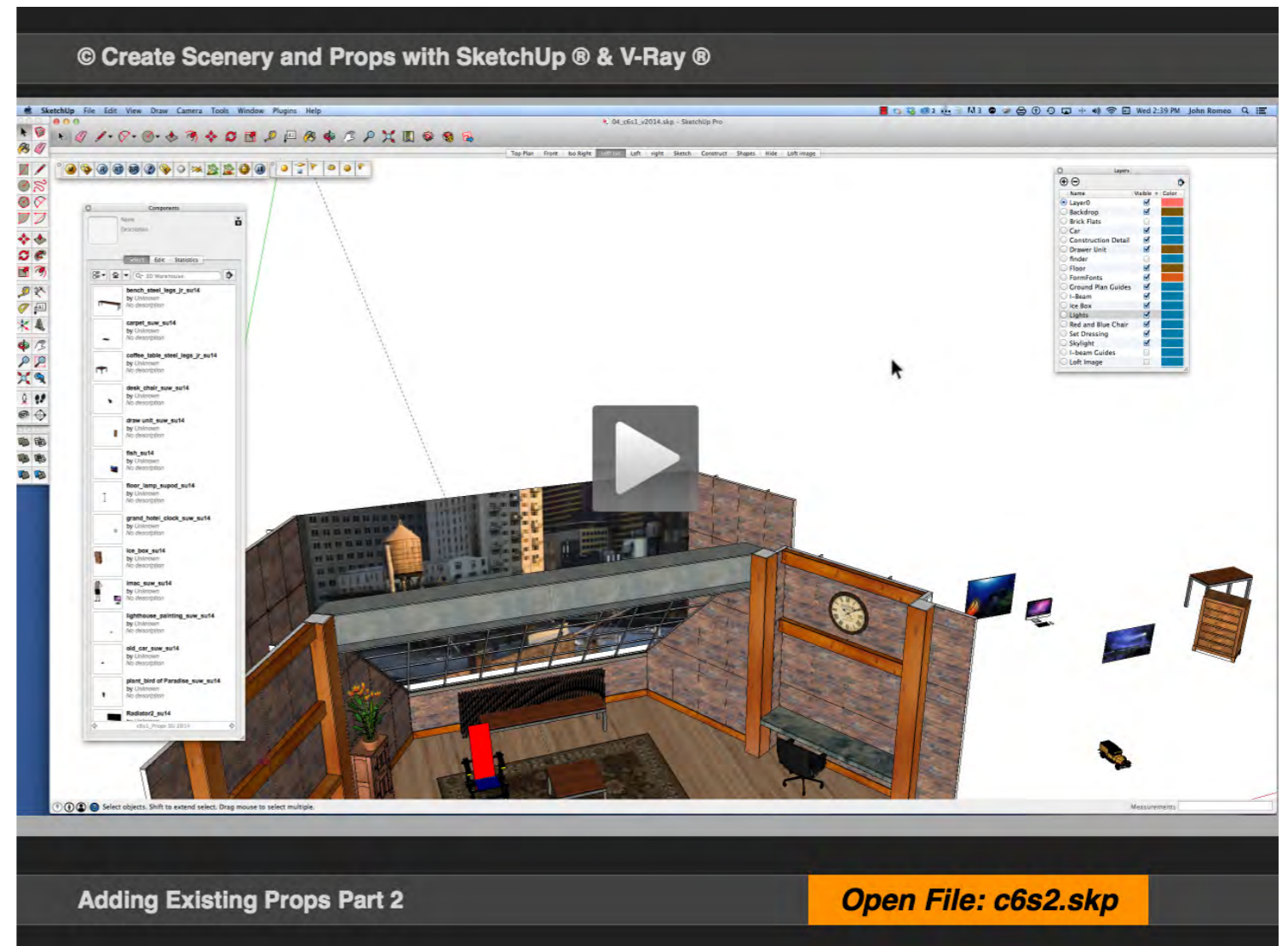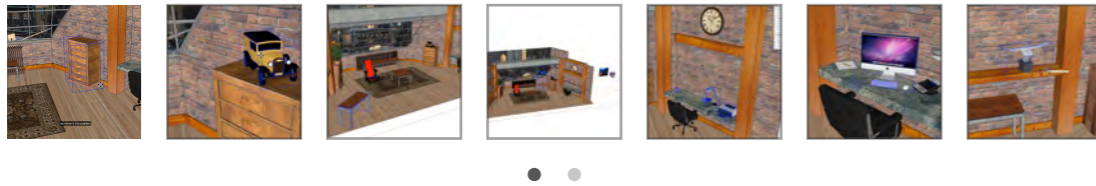
Adding Existing Props Part 2

Movie 6.2 Move Props & Test Rendering

VIDEO MARKERS

1. Moving Props Continued

2. Props Test Rendering

01_Moving Props Continued_0:00:00:01

02_Props Test Rendering_0:06:55:23

Moving props is an excellent way of refining SketchUp skills. This exercise will improve the speed with which you can move objects accurately around the drawing. Using guides to locate a specified point to snap to will also increase speed and accuracy. Hiding objects that create confusion should also be used. This lesson also illustrates how easy it is to create objects in separate SketchUp files and bring them into another drawing. Organizing the drawing will be a very important part of successful rendering.

The image size selected for the test rendering is 2560 x 1440 and cropped by selecting: Get view aspect. This is the image size, not the resolution, which is controlled by the function of subdivisions set at 8 (4 is the default value), to be discussed in a subsequent lesson. The video speed is set at 500% and the actual rendering time is about 2.5 minutes on an iMac core 7 quad with 16 Gigs of Ram. The Physical Camera f-stop was set to 10 and the shutter speed was set to 250; all the other setting for the rendering are the V-Ray default settings.

Drawing Props: Red & Blue Chair

Draw Props from scratch guided by draftings shown in Layout bundled with SketchUp Pro. The Red and Blue Chair by Garrett Reitvelt is the first prop drawing created with step-by-step component structure, moving objects in 3-D space using component attributes
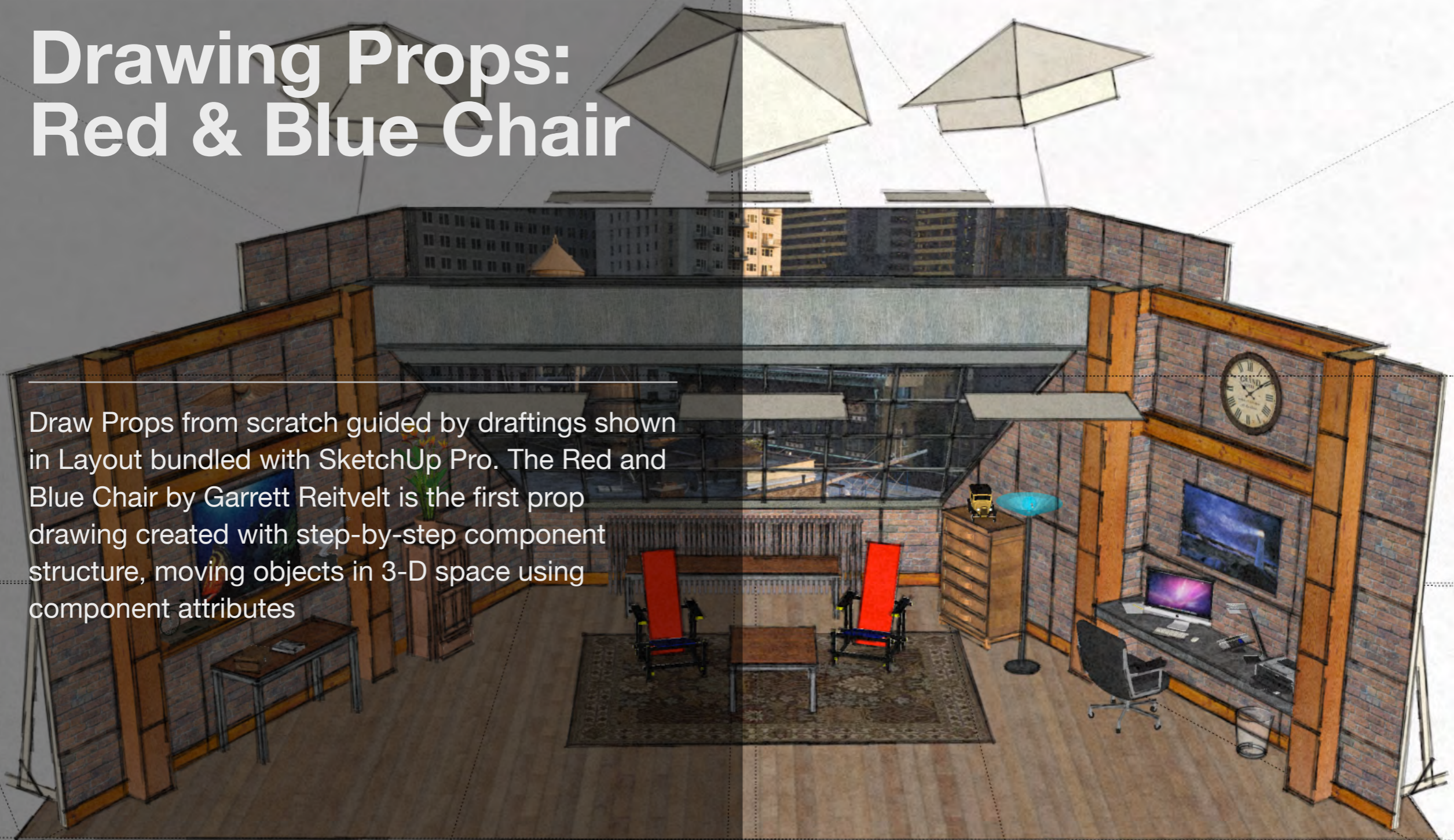
Red and Blue Chair Part 1 – Making the Parts

Movie 7.1 Red and Blue Chair Part 1

VIDEO MARKER

1. Overview 2D and 3D

2. Legs and Arm Supports

3. Horizontal Rails

4. Arms, Seat and Back

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Drawing the Red and Blue Chair Part 1
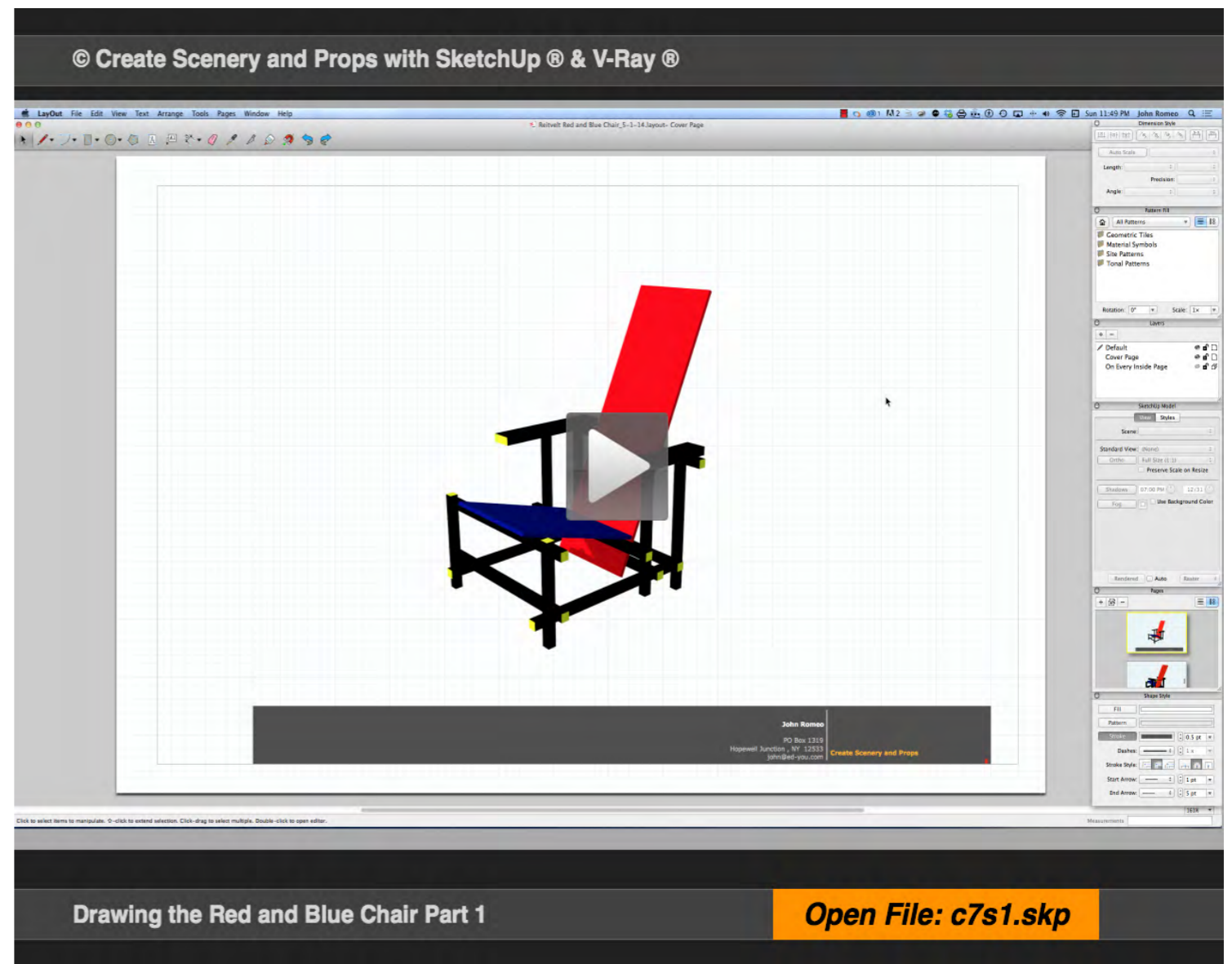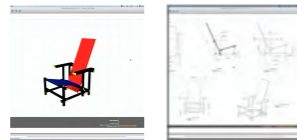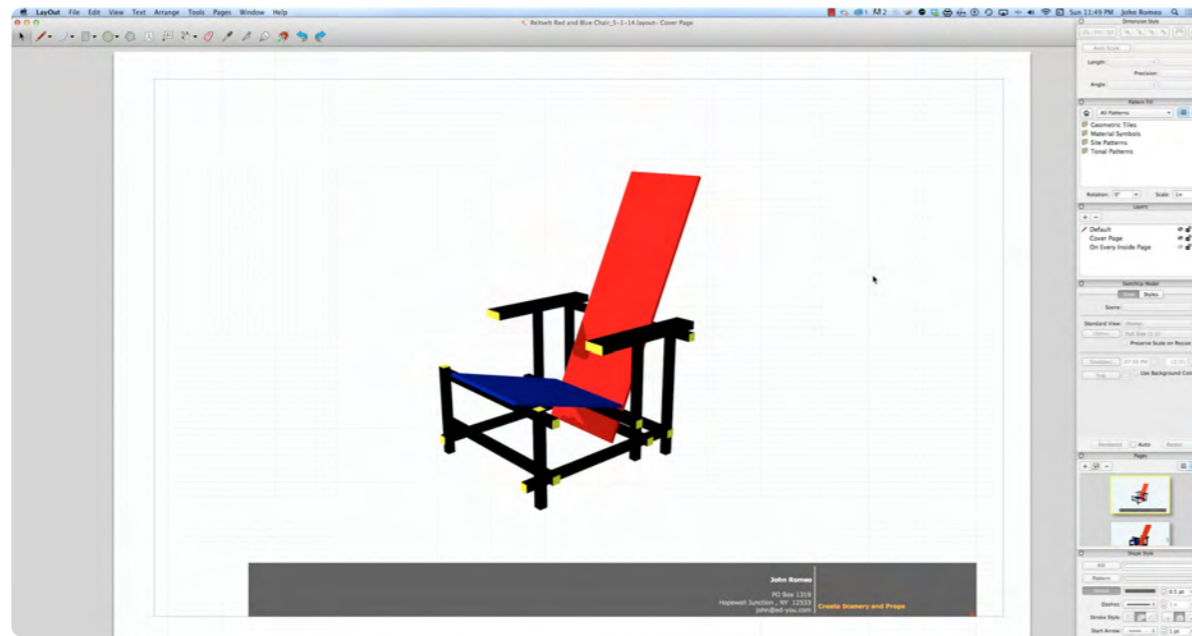
Open File: c7s1.skp

01_Overview 2D and 3D_ 0:00:00:01

The Red and Blue Chair is a great project for Creating Props with SketchUp. It is a collection of simple 3D components that is challenging to locate in 3-D space. The still images illustrate the finished product featured as a rendering, and a SketchUp Model and an orthographic projection in Layout. The Layout version bundled with SketchUp 2013 and 2014 works like Paper Space in AutoCad and Sheets in VectorWorks. This video will not cover Layout, but I think it is important to see how the structure of the 3-D Model will develop into a 2-D drafting.

02_Legs and Arm Supports_0:02:10:07
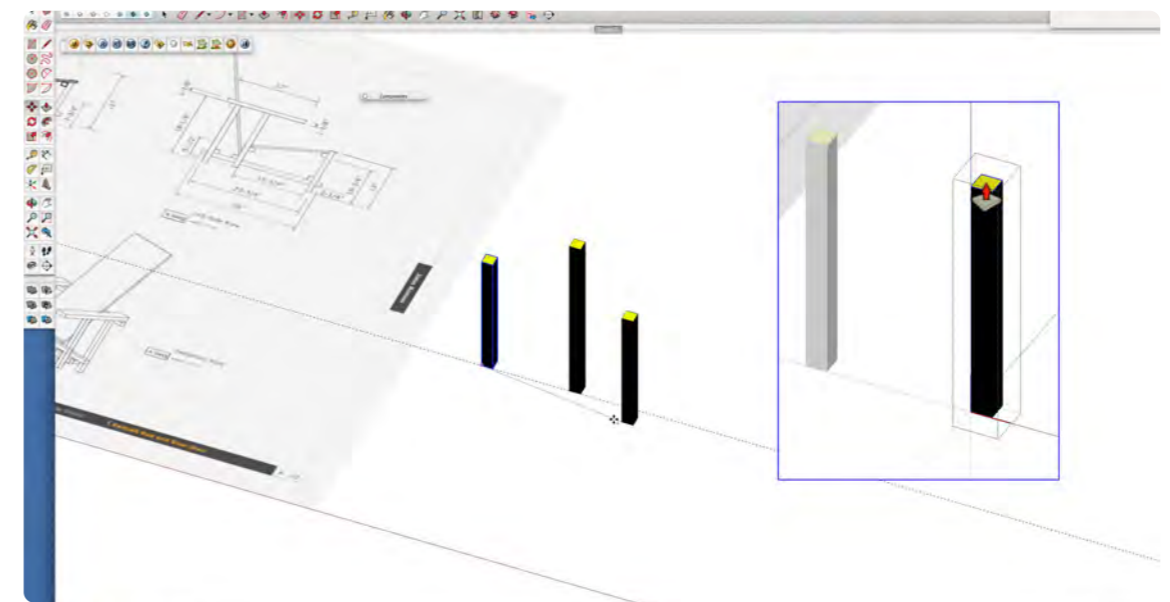
The Legs and Arm Supports are the vertical elements in the chair, starting from a rectangle 1 1/8 x 1 1/8. The Front Leg is Extruded to 13 inches. The Back Leg is created from an instance of the Front Leg, made unique and extended 5 1/8 inches with the Push Pull Tool and the Arm Support is extended 4 inches. Do not use quotation marks to represent inches or the apostrophe for feet when naming components. To add color, double-click on the object to select the entire object, then select black from the color window and apply with the paint bucket tool. Select the top end and paint it yellow.

03_Horizontal Rails_0:05:33:13
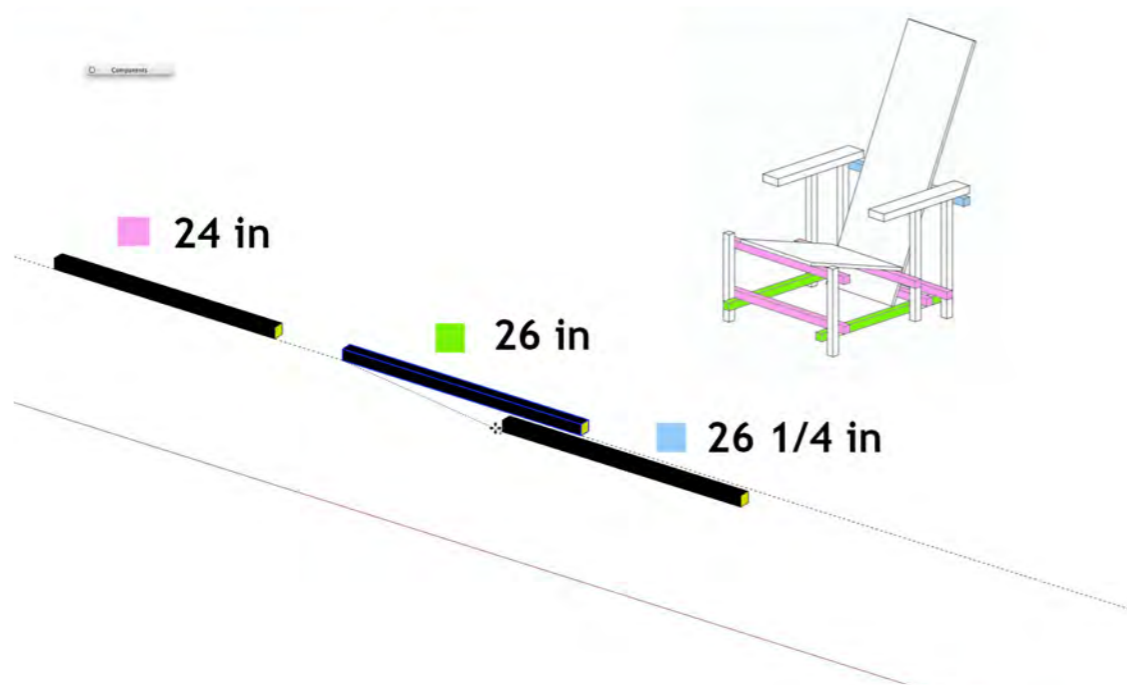
The Horizontal Rails are created horizontally so they won't have to be rotated. There are 3 size needed: 24 in, 26 in and 26 1/4 in. Draw a rectangle 24" x 1 1/8"; make it into a Component, then Extrude it to 1 1/8" with the Push Pull Tool. Create an instance of the 24" rail and make it unique and highlight one end and extend it 2" with the Push Pull Tool, to make it 26" long. Repeat this step for the 26 1/4" piece intending it 2 1/4". Make sure you relabel the piece after making them unique.

04_Arms, Seat and Back_0:08:09:04
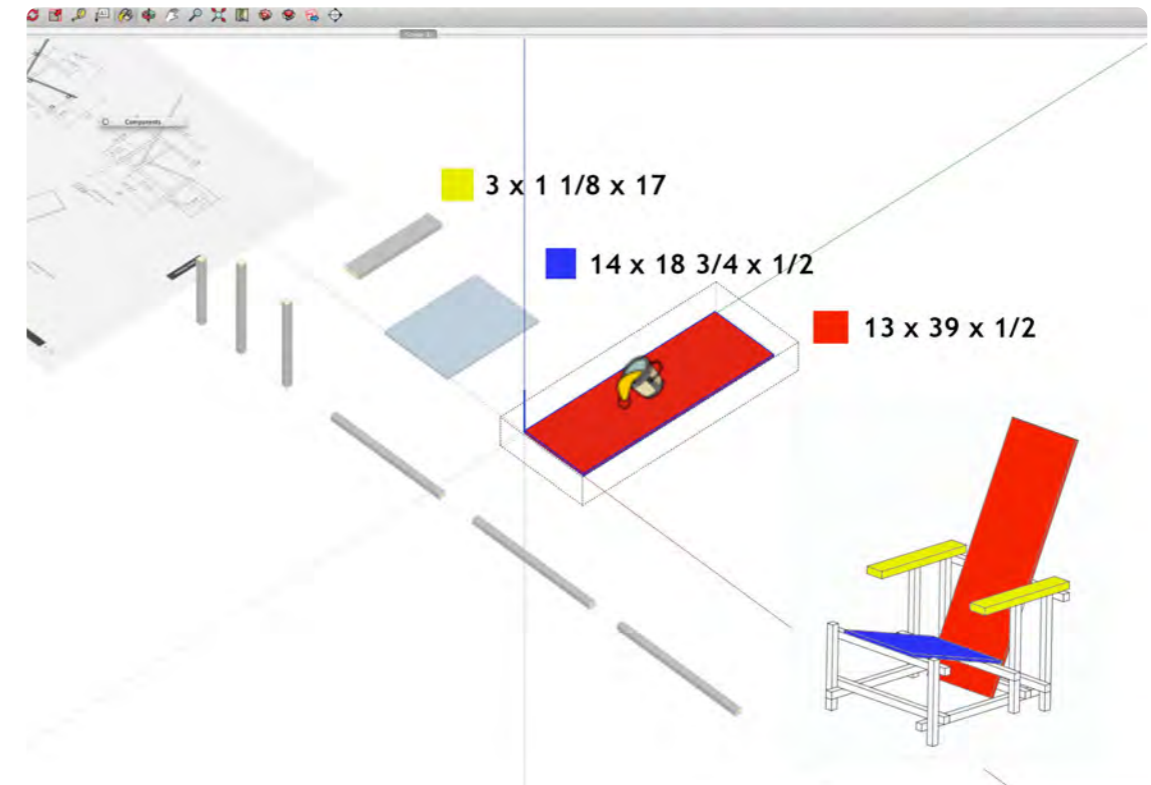
The Arm, Seat and Back, like all the other pieces, are created on the ground plane to be move and elevated into position later. In many cases it is easier to make a part outside the model. It would not be difficult to make the rails in place, however, that is not the case for the arms, seat and back. The overlapping adjacent geometry make the arms move difficult to locate and the Slope of the seat and back makes navigation more difficult.

Red and Blue Chair Part 2 – Positioning

Movie 7.2 Red and Blue Chair Part 2

VIDEO MARKER

1. Locate Legs Position

2. Left and Right Rails

3. Front Rails

4. Arm Support

5. Bottom Back Rails

6. Top Back Rail
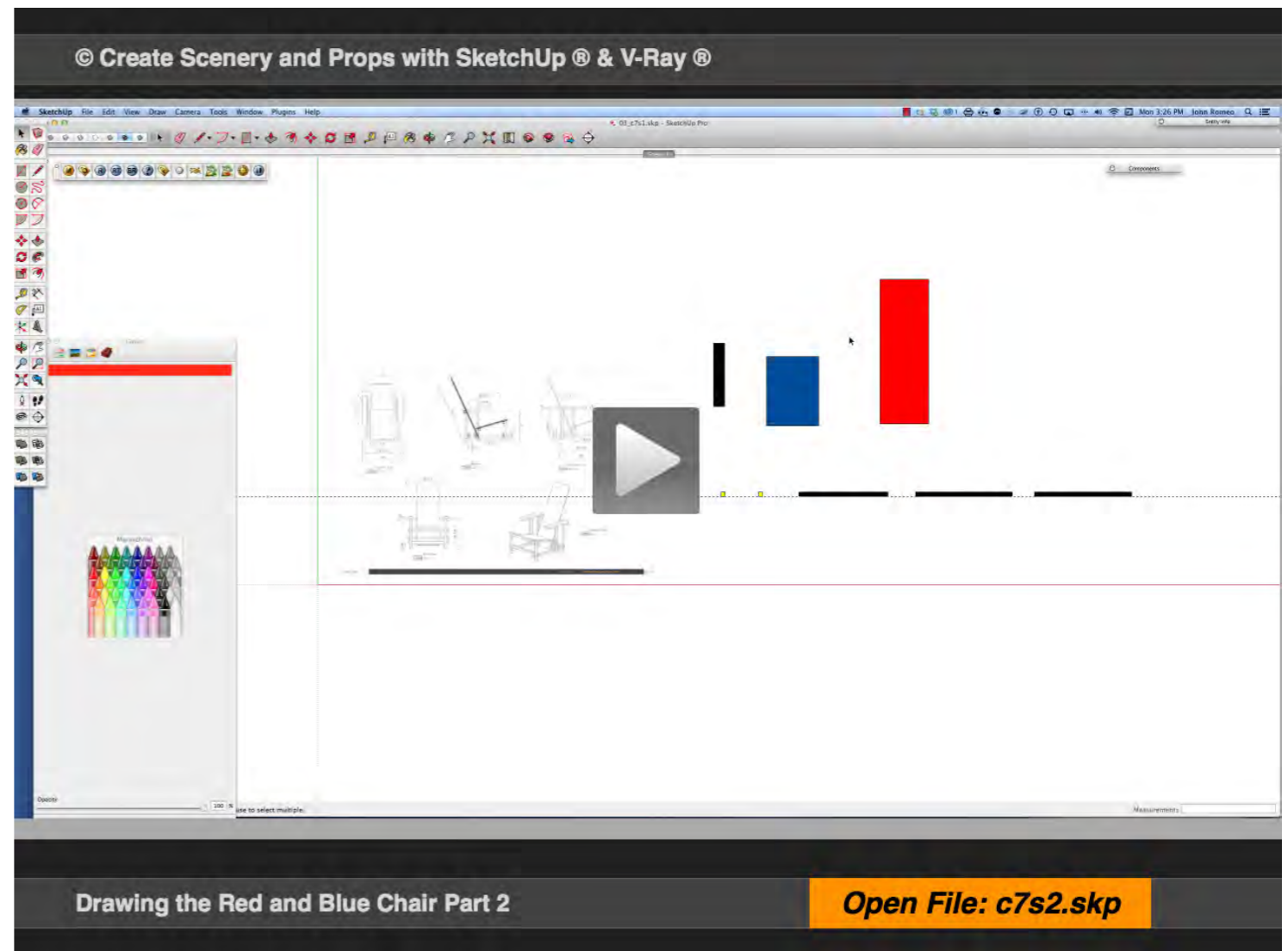
01_Locate Legs Position_0:00:00:01

02_Left and Right Rails_0:01:40:00

This drawing of the Red and Blue Chair is based on the offset dimension of 1 1/8" x 1 1/8" at the end of each piece of the frame that intersect. The best way to set the legs is to make a rectangle with guides 21 3/4" wide x 23 3/4" deep and place another set of guides offset to the inside 1 1/8. Then move the legs to the appropriate corners. Once the legs are in place it is easy to locate all the other parts
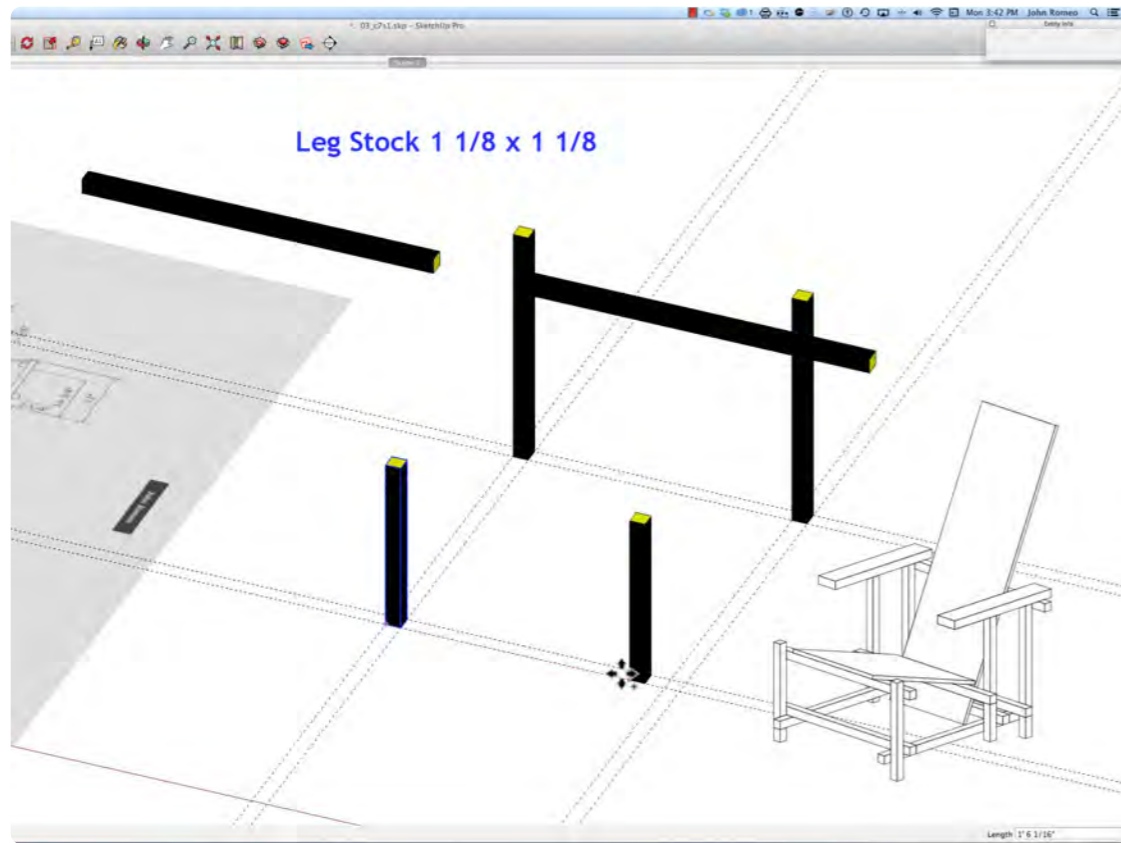
The Left and Right Rails sit 2 3/4" off the floor and offset the legs by 1 1/8, so the easiest way to locate the position on the ground plane (x & y axis) is with midpoints. To locate the height above the ground plan add a Positions Attribute (all) in the Attributes Window and type in 2.25 in the Z axis box. The x and y box will display the position in the drawing, do not change them. Make sure that the rail is in the correct position on the ground plane before setting the Z height.

03_Front Rails_0:04:035:23

Top Rail +10 3/4"h

Bottom Rail

Bottom Rail +3 3/8"h

Top Rail
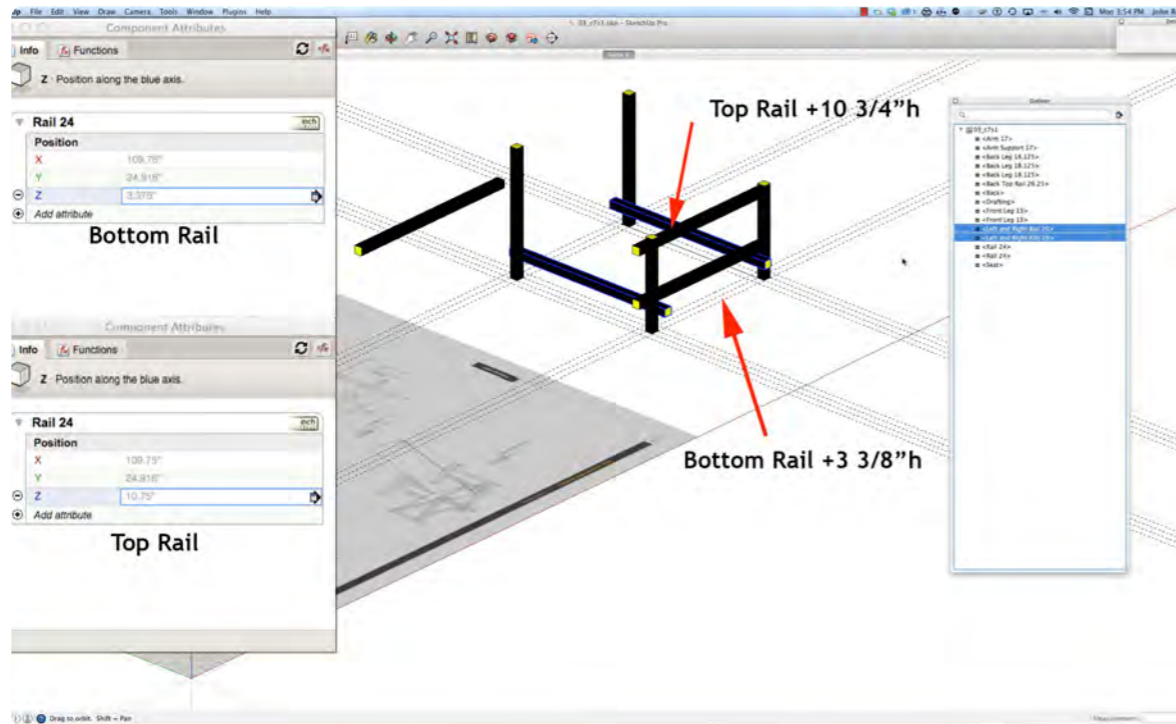
The position of the Front Rails is obscured by the Side Rails. Use the Outliner to turn off the Side Rails. Move the 24" rail into position on the floor and in the Components Attributes Window add Position (add all) Attribute, type in 10.75 in the Z box, and the rail will move 10 3/4" off the floor. This method is faster than locating guides in 3-D space. However, the ability locate guides in 3-D space is a great feature in SketchUp that most other programs do not have.

04_Arm Support_0:06:18:29

Double Click Here to open box below

Front Leg 13

1 Please enter a new object name:
Front Leg 13
Cancel   OK

2 Please enter a new object name:
Arm Support Right
Cancel   OK

Re-label Option
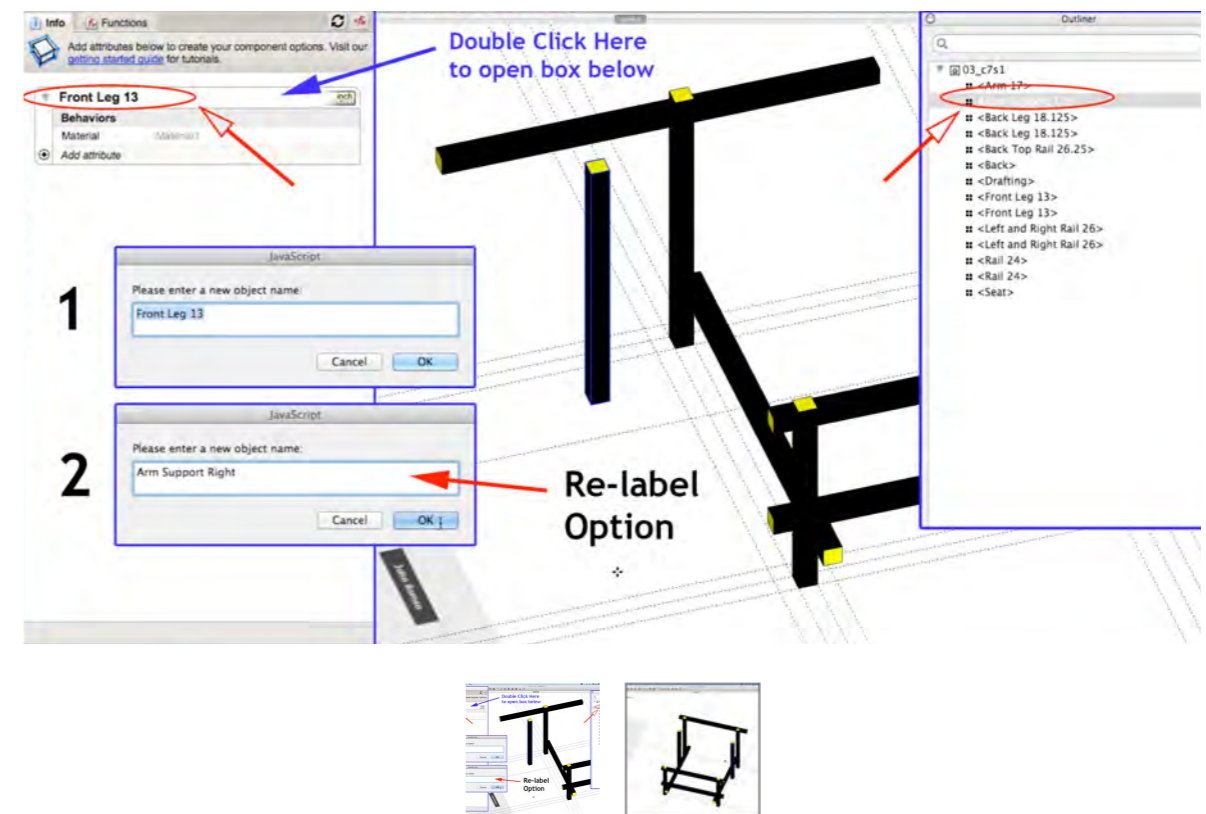
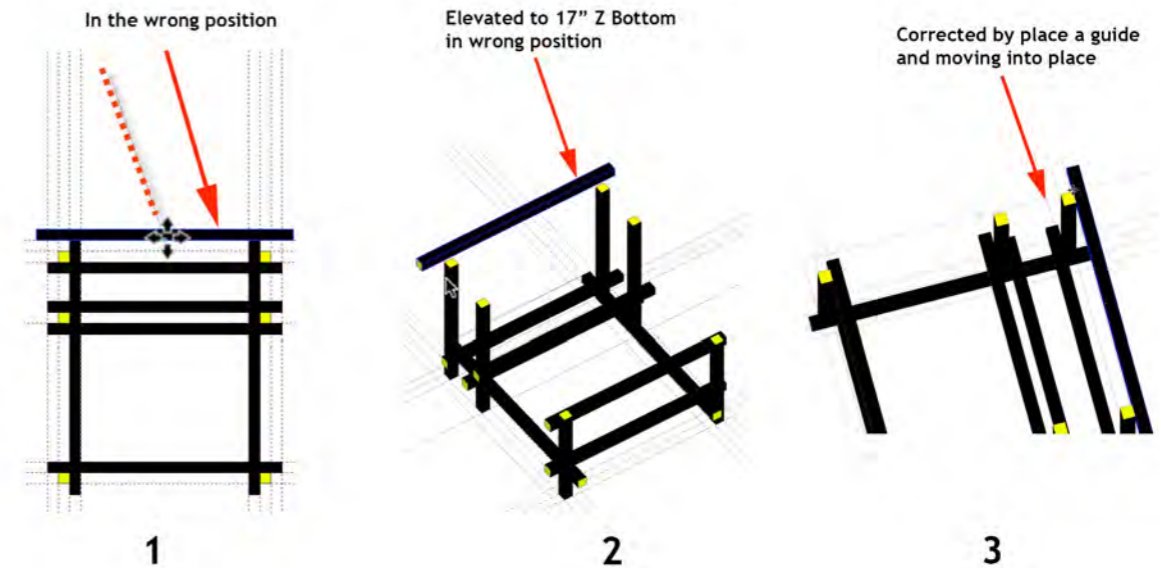The Arm Support sits 1 1/8" above the ground plane (the floor). Drag a guide back on the ground plane 15 1/4" from the guide at the back of the front leg. Move the Arm support into position on the ground plane. Raise it up 1.25" in the Z box of the Component Attributes. Note that an instance of a component (child) that was NOT MADE UNIQUE can be moved and rotated without changing the position of the original component (parent).

05_Bottom Back_Rails_0:08:37:02

z= 3.375"
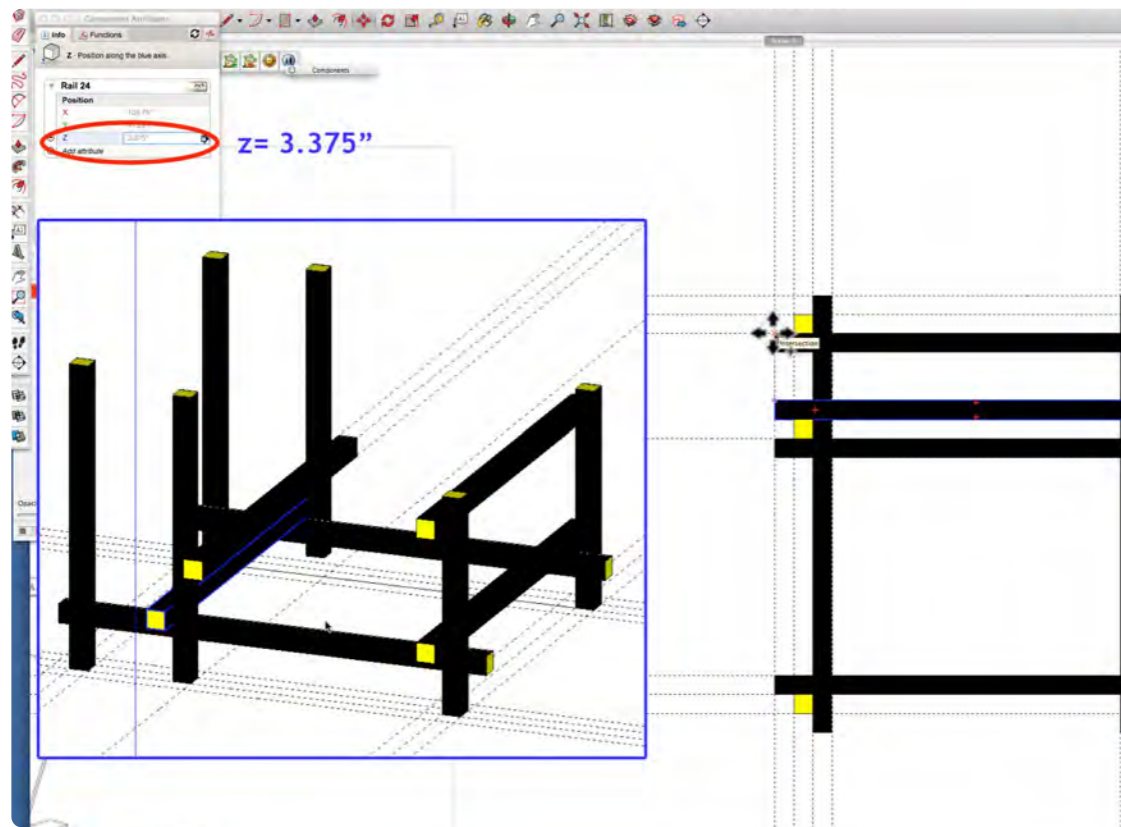
The back rails are not easy to place in 3-D space because of the offsets. Move the rails into position on the ground plane: if they end up below the floor or in some random elevation, that is okay. It is the Z bottom height entered in Component Attribute Z box that maters. Position Attribute is an excellent method to locate the exact position using the coordinate system built into SketchUp.

06_Top Back Rail_0:10:33:18

In the wrong position

Elevated to 17" Z Bottom in wrong position

Corrected by place a guide and moving into place

1   2   3

In the video the Top Back Rail ended up in the wrong place. This is a typical occurrence when moving pieces around. In figure 1 you can see the initial position was away from the legs by 1 1/8 inches, which is an easy mistake to make. Although it was elevated correctly, it ended up 1 1/8 inches away from the legs. I corrected it by adding a guide (see figure 3) and using the intersection to snap to when I moved the rail. Using the undo command (Command Z) is another way to go back to fix a problem.

Red and Blue Chair Part 3 – Seat & Back

Movie 7.3 Red and Blue Chair Part 3

VIDEO MARKERS
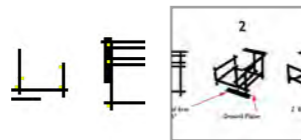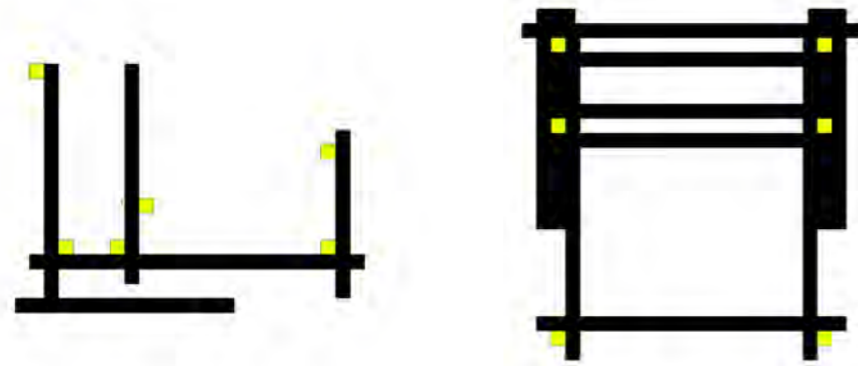
1. Locate Arms

2. Seat and Back
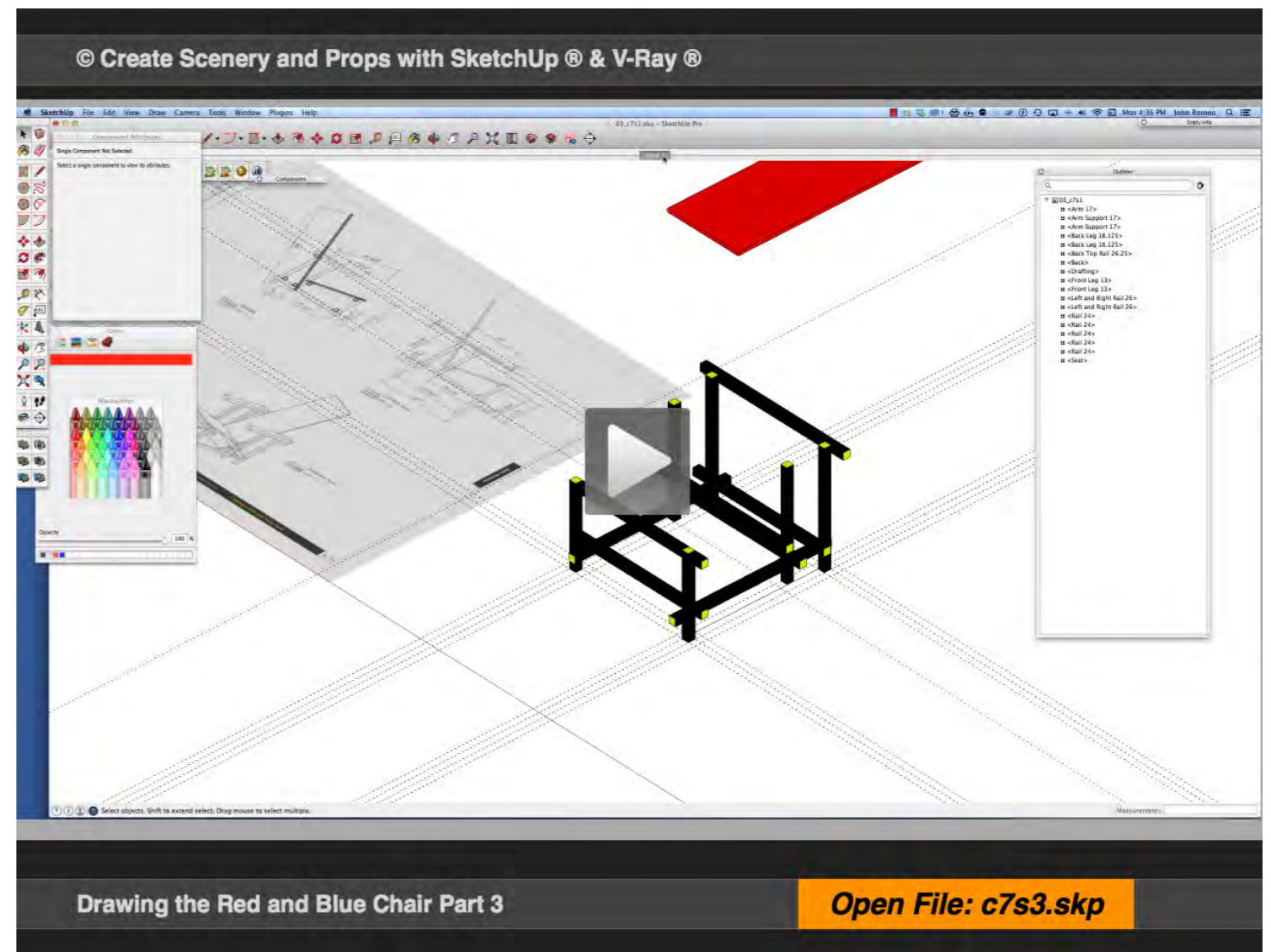
01_Locate Arms_0:00:00:01

The best way to move the Arms into place is to move it into position on the ground plane. But first, with the tape measure tool, add one more guide constrained to the green (y) axis 1 1/8" from the guide at the back of the chair. Place the Arm at the guide intersection on the rear left. Notice that the Z bottom of the Arm is at -1.125", that is because the top left corner or the Arm snapped to the ground plane making the bottom be at -1.125". Drag an instance to make the left Arm, and elevated both pieces individually in the Z box of Positions Attributes.

02_Seat and Back_0:02:48:01
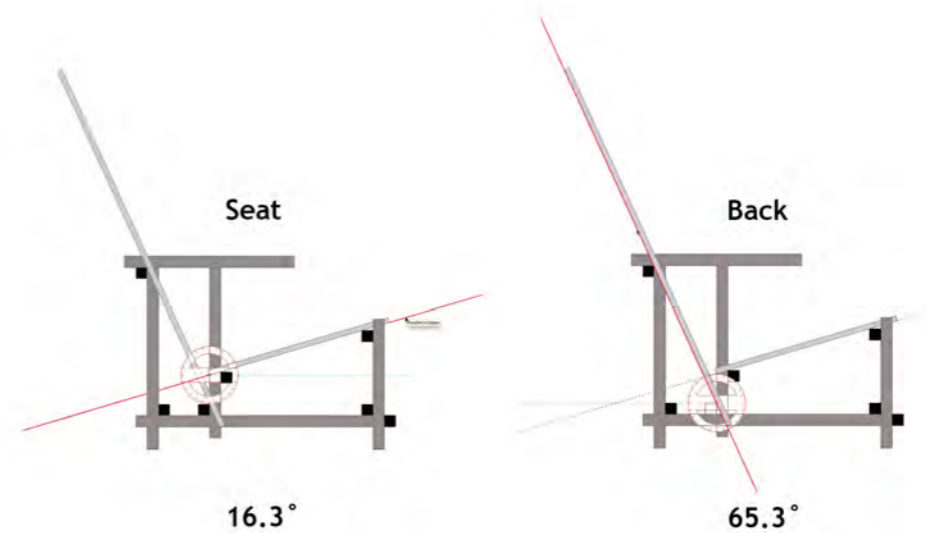
The seat and back were created on the ground plan so that they can move into position with the Move Tool. The positioning the seat and back can be difficult, however, using a few sequential steps with the Rotate Tool, The Tape Measure Tool and the Move Tool make it seem easy. The end point 1.125 x 1.125 rectangle are convenient points to snap to with the rotate tool. Use the Tape Measure Tool to create offset guides and centering guides. This positioning method, in combination with Component Attribute Positioning command, enables locating almost anything in 3-D space.

Drawing Props:
Antique Icebox

Create a detailed drawing the Antique Icebox prop including the tongue & groove joint details. Expand on the locating objects in 3-D space using Component Attributes Positioning.
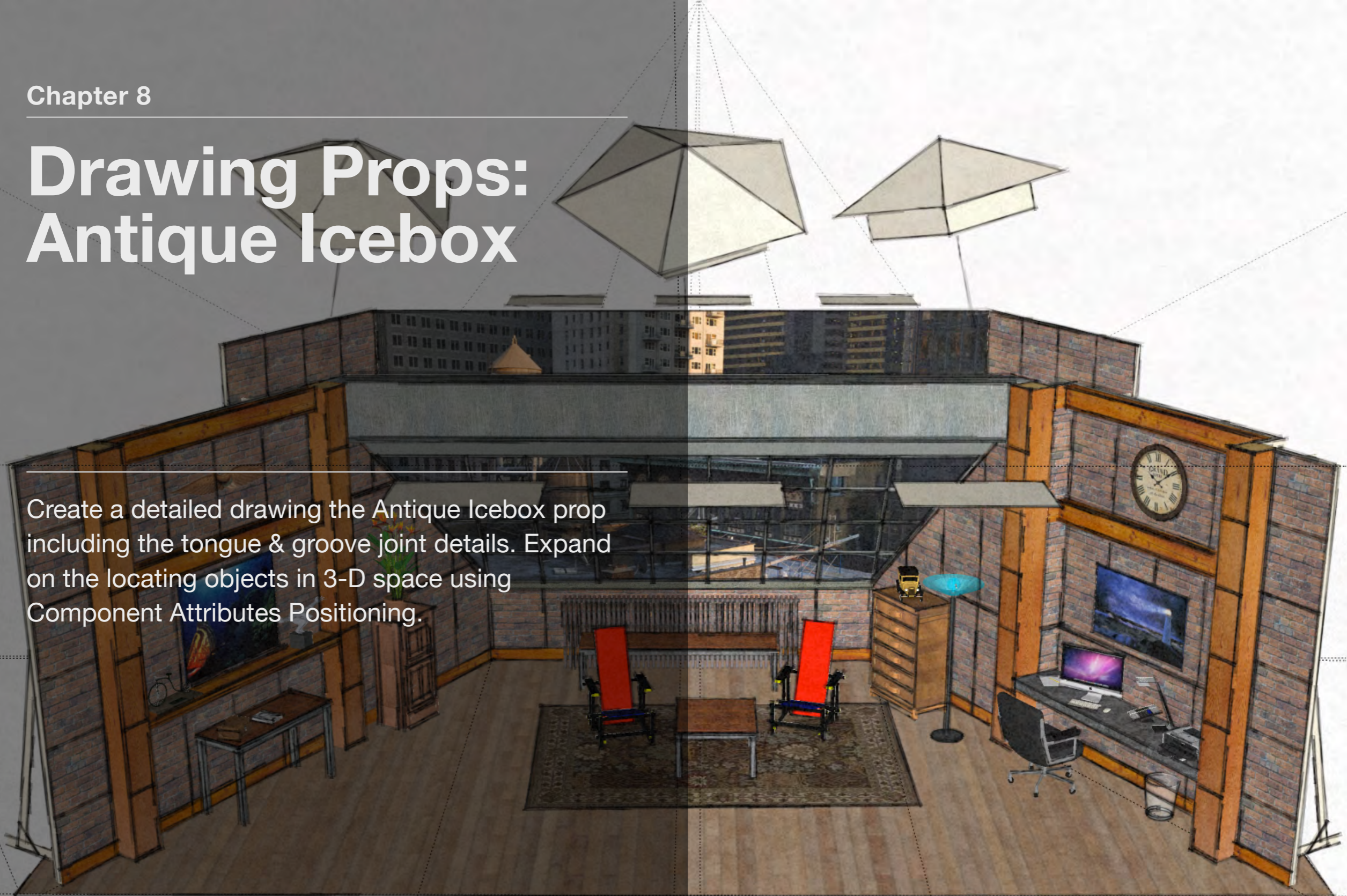
ICEBOX Part 1 – Side Frame

Movie 8.1 Icebox 2D Plan with Guides

VIDEO MARKS

1. **Icebox Introduction**

2. **Right Side Frame**

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Hopewell Juction, N Y 12533
john@ed-you.com

Create Scenery and Props

ICEBOX Part 1

Open File: c8s1.skp
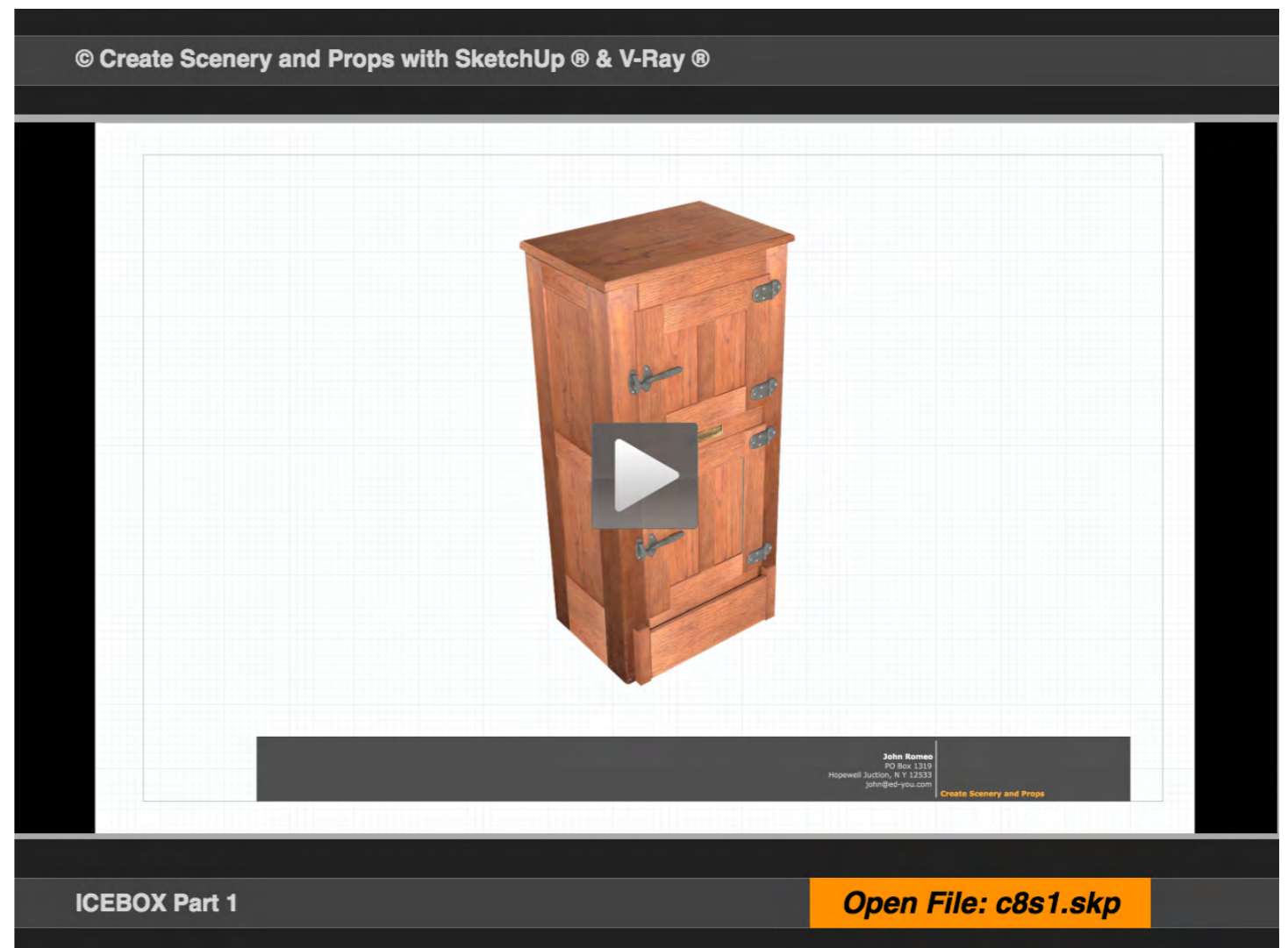
01_Icebox Introduction_0:00:00:01

The Icebox Prop Lesson covers a wide range of drawing and drafting solutions for a fairly complex piece. The video starts with a preview the finished rendering and the 2-D drafting assembled in Layout and viewed as a Layout Presentation. This section of the book expands the level of detail to illustrate props construction from a Designer and Woodworker perspective. I provided an image of the hinge and latch creation and provided them in the exercise file. Creating the hinge, latch and textures are not include, so that this project wouldn't get excessively complicated. The drawing is setup with a multiple view reference image to provide easy access to the details of the Icebox.

02_Right Side Frame_0:01:00:14
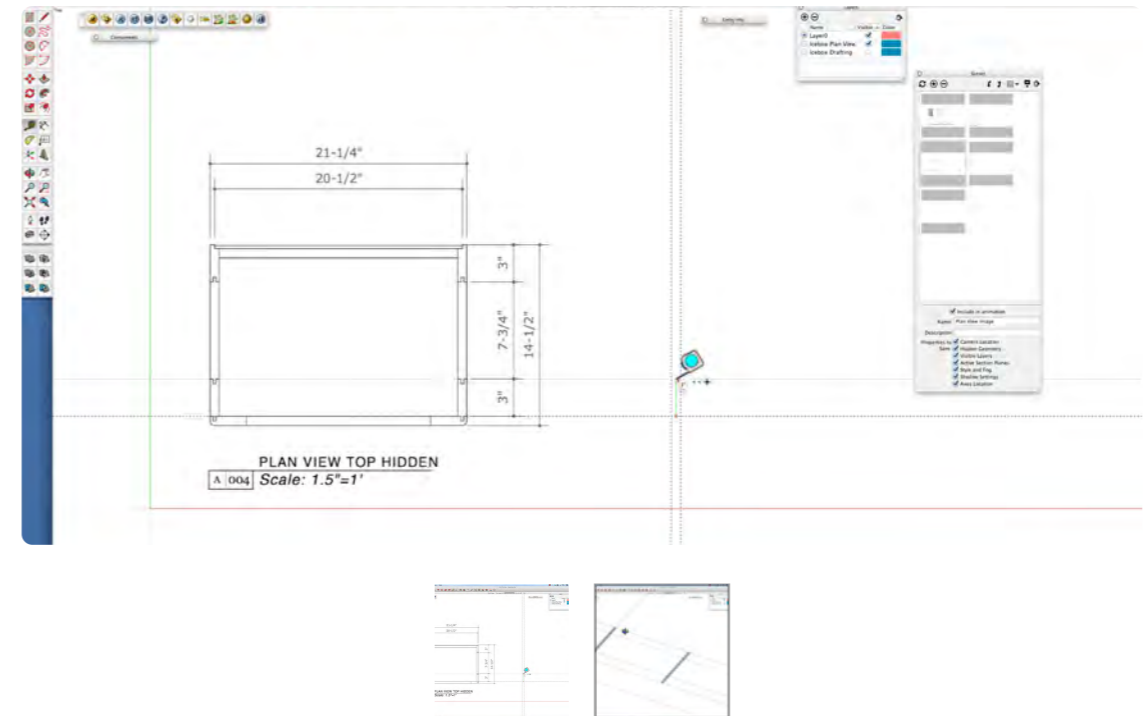
The exercise file for the Icebox is setup with scene tabs for easy navigation. The workflow begins with creating a 2-D Ground Plan, beginnings with the Right Side. Guides are used to layout the tongue & groove joining detail and the rabbit for mounting the back. Drawing many 2-D shapes before extruding them with The Push Pull Tool keeps snapping on the ground plane rather than on a point elevated by the extrusion of the adjacent piece. The horizontal rails are easy to place in 3-D space after the vertical rails are extruded. Use guides to locate the height of the center horizontal rails. You can also use the POSITION ATTRIBUTES to locate the Z-bottom as shown in the previous lesson.
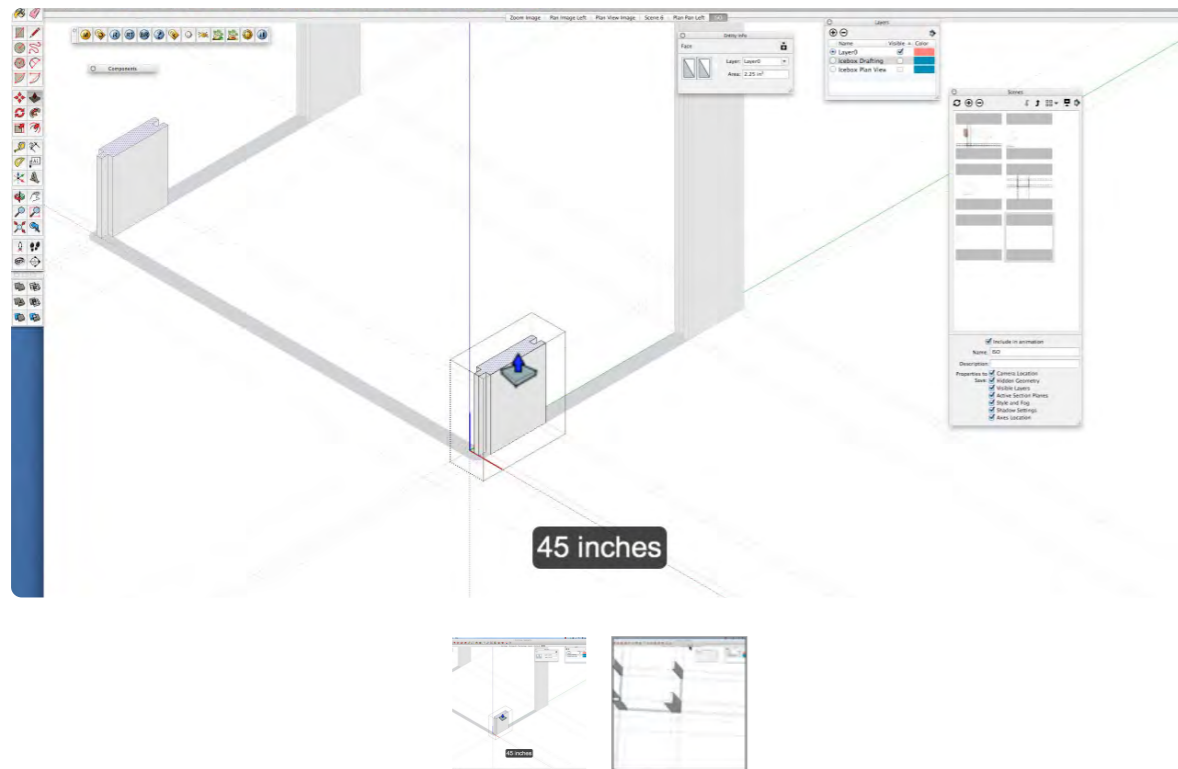
ICEBOX Part 2 – Extrude Objects

Movie 8.2   Extrude Objects

VIDEO MARKER

1. Extrude Sides

2. Horizontal Rails

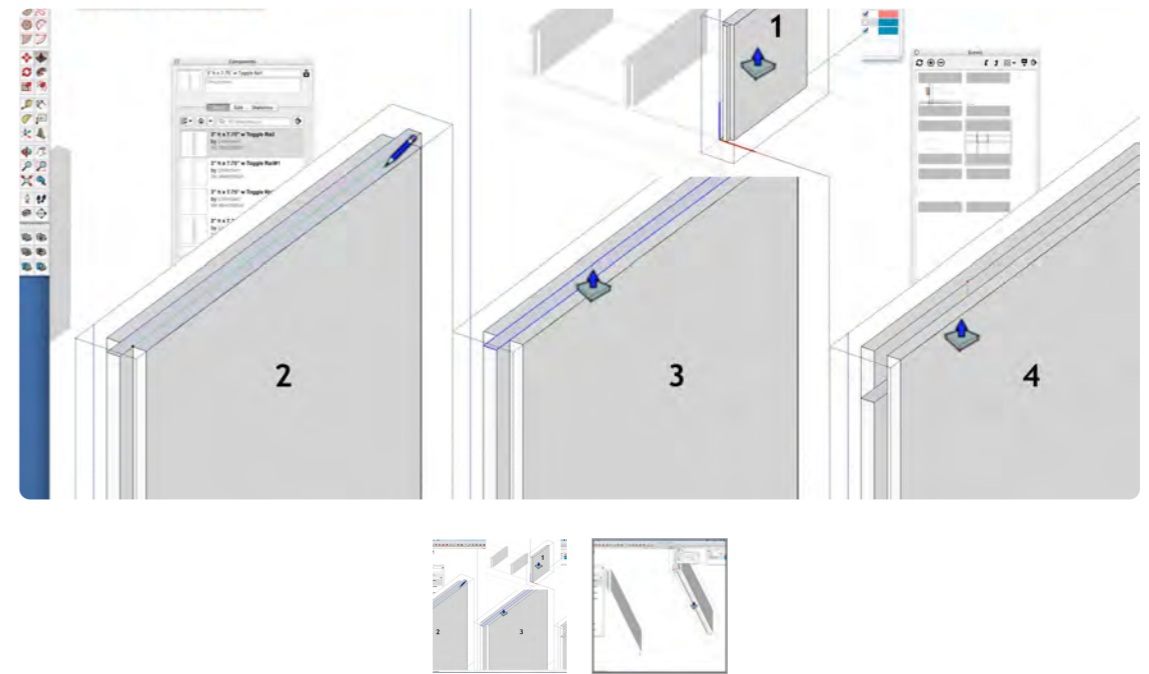3. Front Horizontal Rails

4. Back Rails
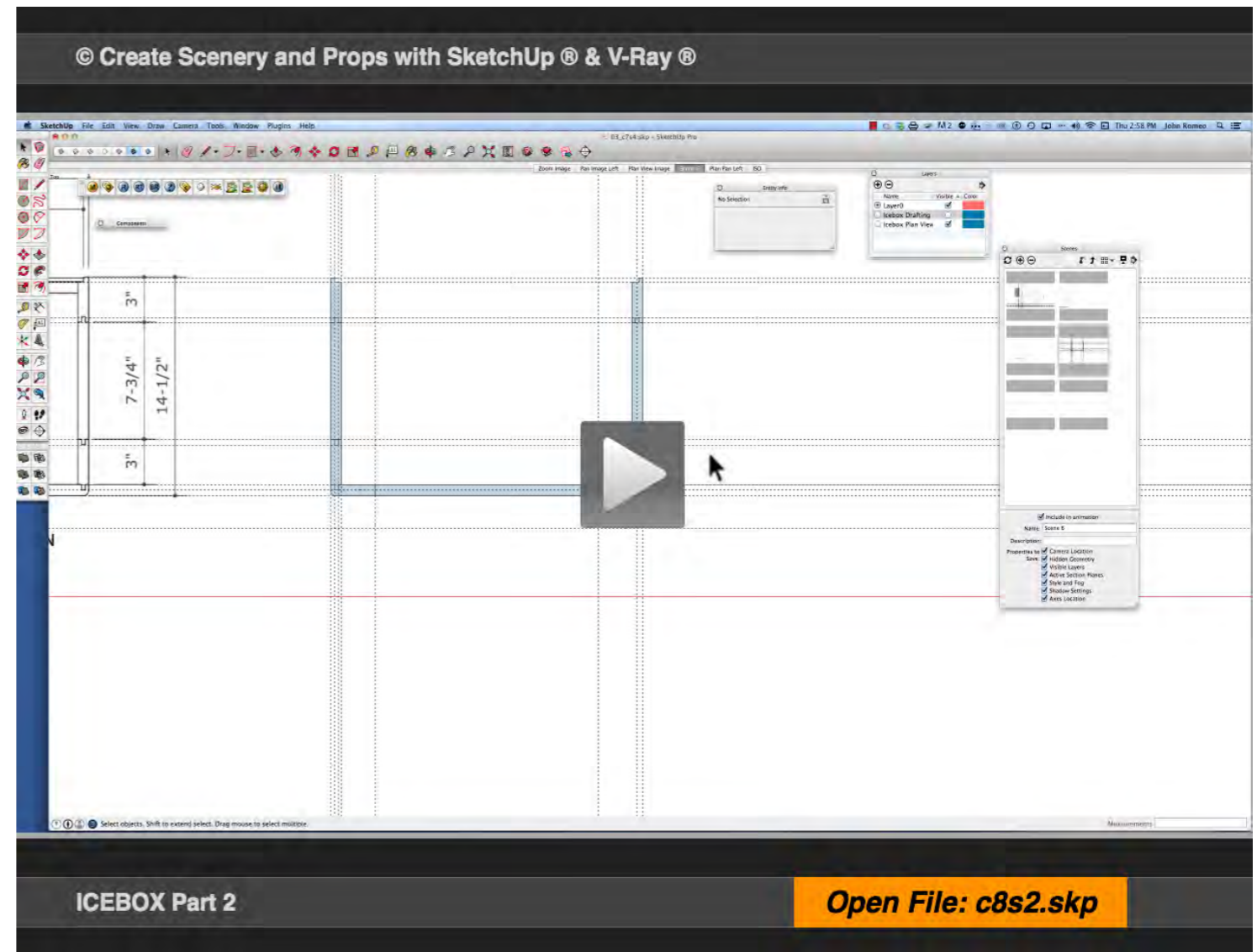
01_Extrude Sides_0:00:00:01

02_Horizontal Rails_0:01:22:15

Extrude or not to Extrude is the question. In this case, it is advantageous to Extrude the Vertical Rails after the 2-D geometry is established. The figure above shows the 2 Front Rails extruded simultaniously, that is because one rail is an instance of the other, so if you extrude one, the other one will extrude as well. Unlike Scale and Rotate, which if you rotate or scale an instance, the other instances will not be effected. Whenever there is a doubt about the effect a change may have on an object, make the object unique. So to be clear, an instances cannot be extruded differently without making them unique.

The Vertical Rails include the dado groove in the extrusion, but the groove needs to be subtracted from the Horizontal Rails. The Top Rail needs a grove on the bottom; the Center Rail needs a groove on the top and bottom and the Bottom rail needs a grove on the top. Make sure you are inside the component when placing the lines and pushing in 3/8 with the Push Pull Tool.

To put the groove on the bottom of the pieces, orbit to the bottom and make the grooves working from the bottom.

03_Horizontal Rails_0:06:39:17

04_Back Rails_0:07:56:08
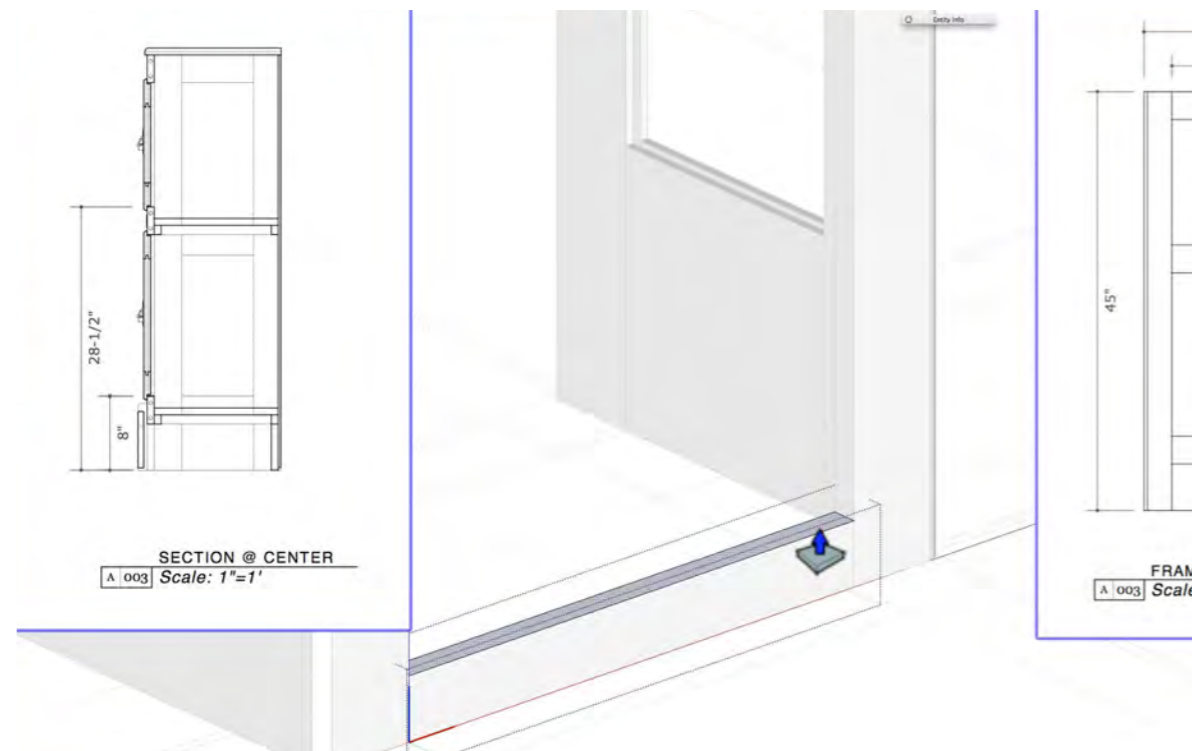
Extrude the Front Horizontal Rail 3" high with the Push Pull Tool. Holding the Option Key, select the Move Tool and drag an instance of the rail to the top. The Front Center Rail does not lineup with the side rails and is not on center. Select the Zoom Image Scene tab and locate the section drawing and see that the top of the Front Rail is 28-1/2" from the floor and the Bottom Rail is at 8" AFF. Click on the Scene 7 Tab; select the Tape Measure Tool and place a guide at 28-1/2" and 8". Move the Bottom Rail up to 8" and drag an instance of the rail to 28-1/2".
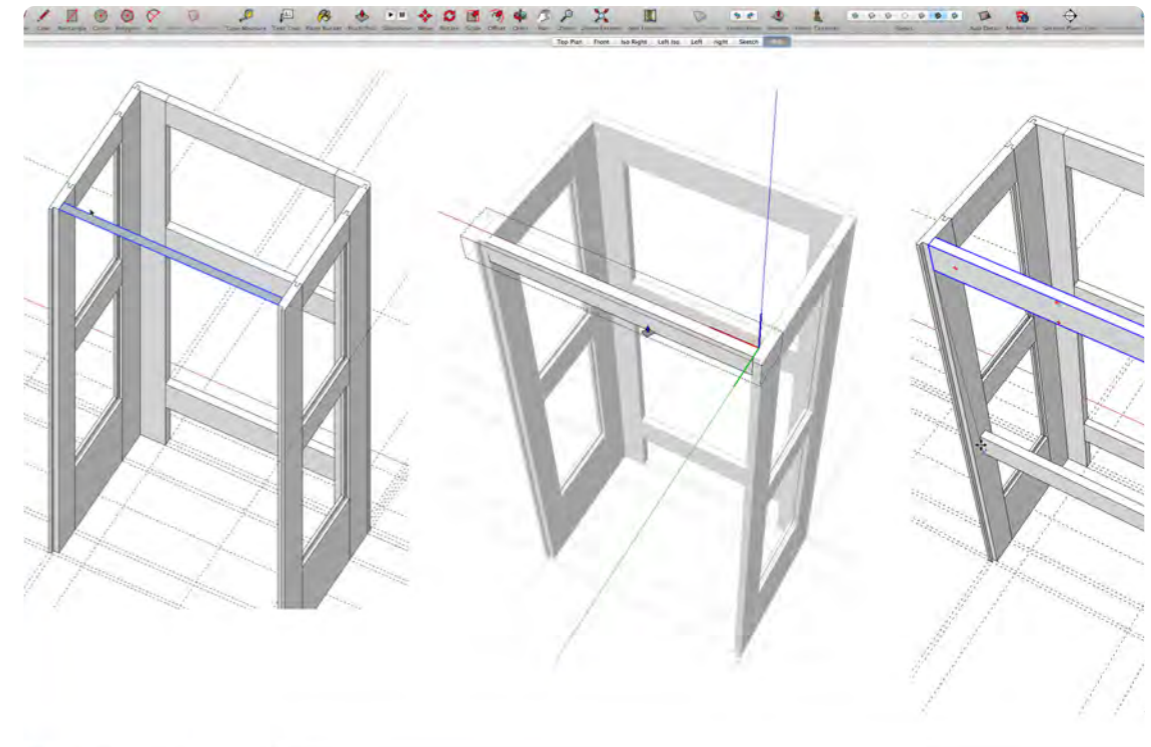
The initial Back Rail Rectangle was placed in the plan view after the vertical pieces were already extruded, which means it snapped to the top of the vertical rail. This is a good example of how 3-D works. This is actually a good method, because instead of pulling-up to extrude the rail, pushdown. The rail should lineup with the inside edge of the rabbit cut to accept the back panel. The rail will be doweled to the frame. This step completes the frame of the Icebox. Note that the shelves are not included this video.
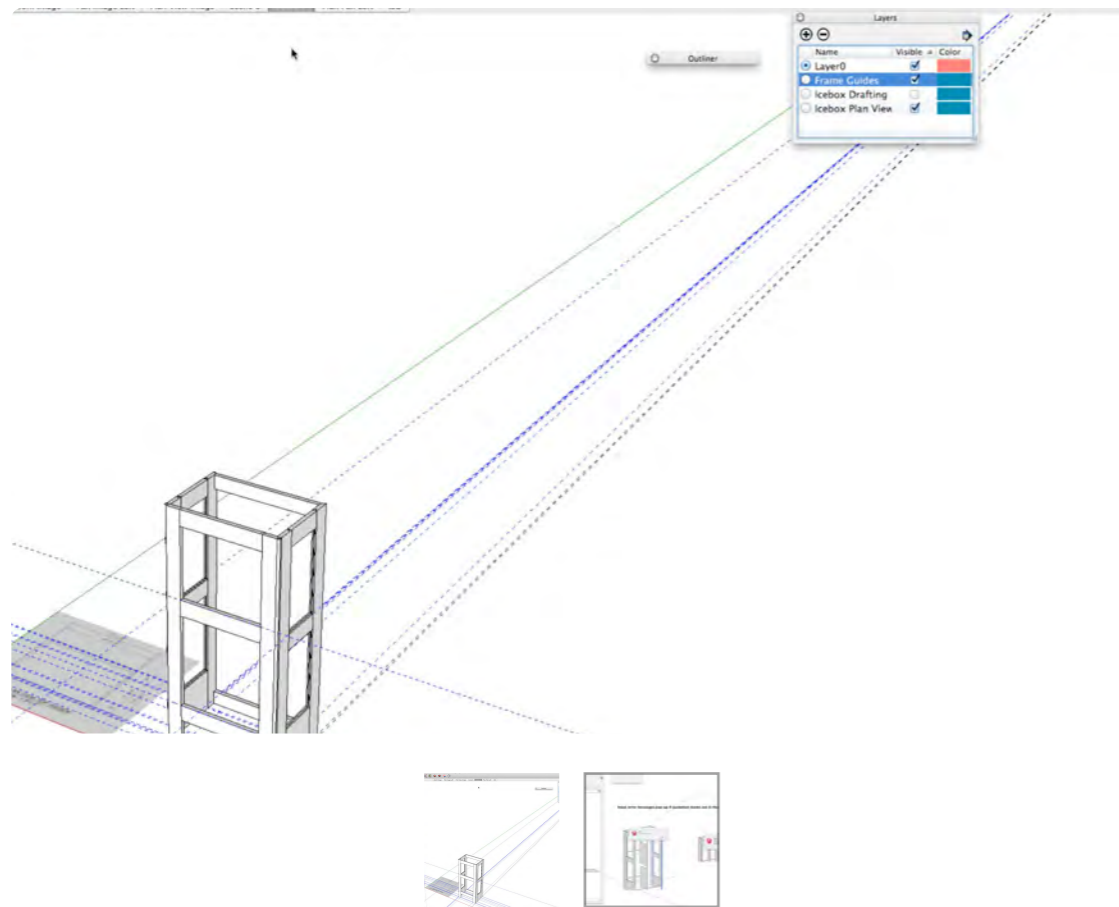
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ICEBOX Part 3 – Panels

Movie 8.3 Icebox Panels, Top & Back

VIDEO MARKERS

1. Cleanup Drawing

2. Right Side Panels

3. Place with Attributes

4. Top

5. Back
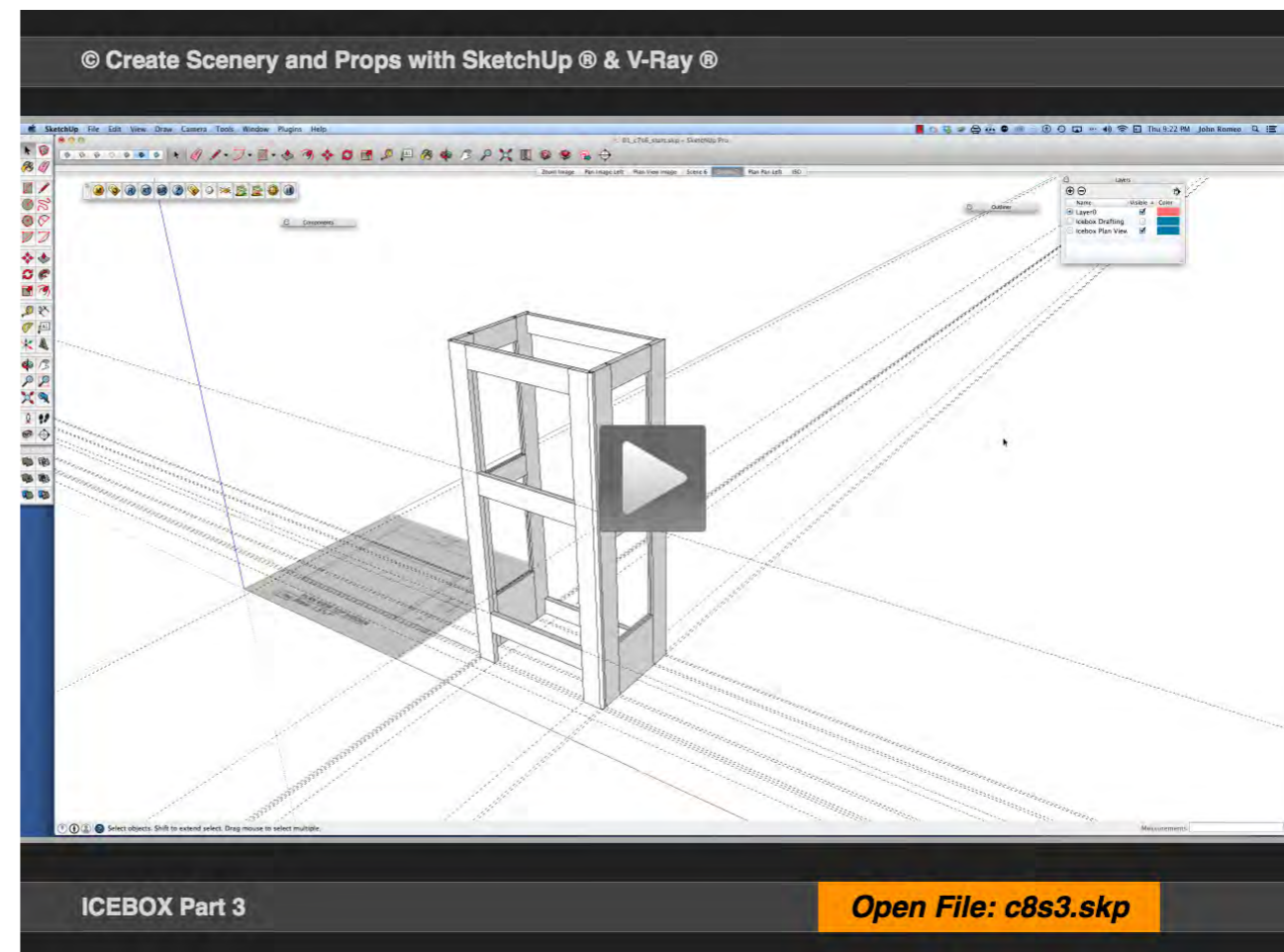
01_Clean-Up Drawing_0:00:00:01

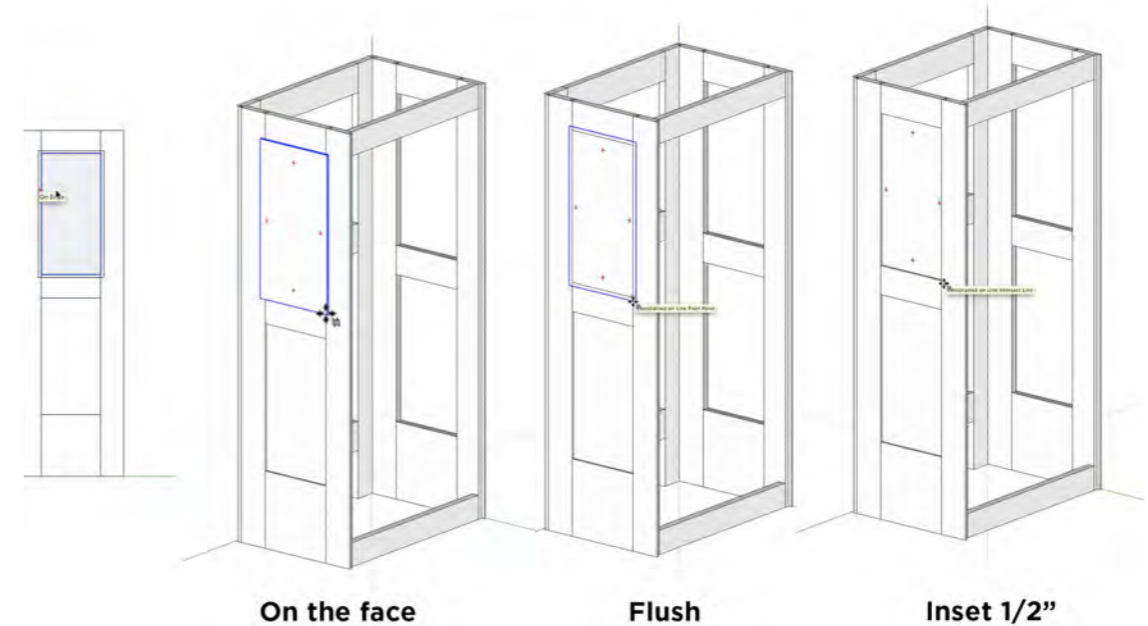## 02_Right Side Panels_0:01:45:00

**On the face**   **Flush**   **Inset 1/2"**

A drawing can get cluttered with guides. SketchUp has a command to delete all guides, which I normally don't use, because if you use, delete guides, they are gone for good. Create a guide layer (or several guides layers) and move the guides to the new Layer in the Entity Info Window. In this video, I point out a second time the peril of using quotation marks in naming a component. I deliberately left this in the video to illustrate how easy it is to unconsciously, out of habit, use quotation marks for inches.

The Side Panels are 3/4 inch (3/8+3/8) larger than the opening in the frame, in width and height. Draw a Rectangle in the frame and offset it 3/8 inch; delete the original Rectangle; make the new offset Rectangle into a Component and Extrude it 1/4" thick. The panel needs to be moved to the center; select the Move Tool, and holding the right arrow key, push back 1/2 inch. Remember, from the right view, constrain the red axis. Next, make a copy of the panels for the left side.

03_Place w/Component Attributes_0:04:24:13

Panels Placed Using Component Attributes

04_ The Top_0:05:19:19

Top 22"w x 14.75"d
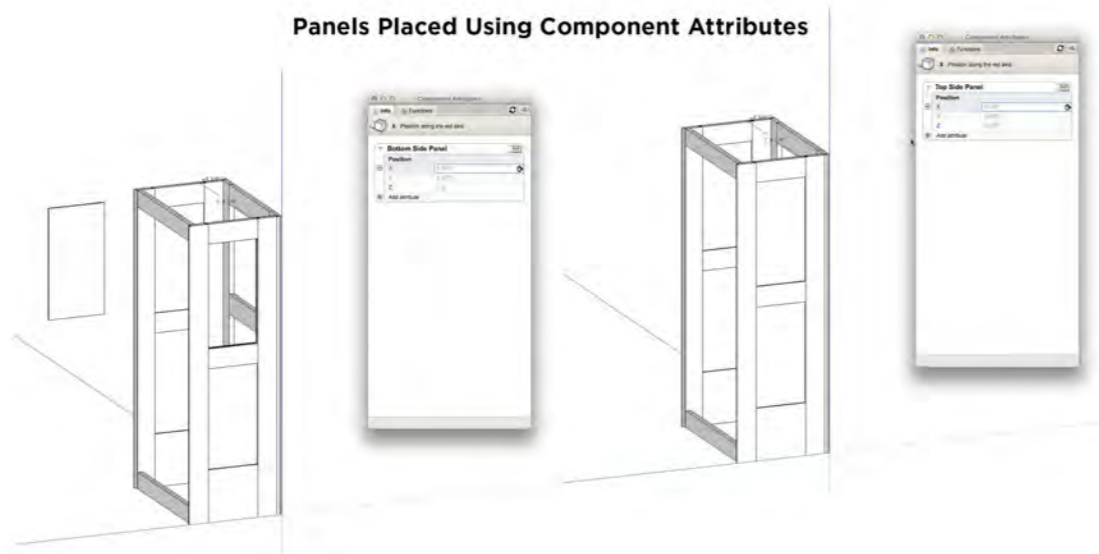
Move the Bottom Left Side Panels using Component Attributes. Select the Bottom Panel and type in the following coordinates : *X_.375, Y_3.75* and *Z _7.5*. The panel should move into the correct position, and if it does not move correctly, type in, X-0, Y-0 and Z-0 to bring the panel to the origin and start over. Use the dimension tool to get the coordinates if you are unsure. The top panel coordinates are: X_.375, Y_3.75 and Z_ 28.75. Remember to hit the enter (return) key after typing each coordinate.
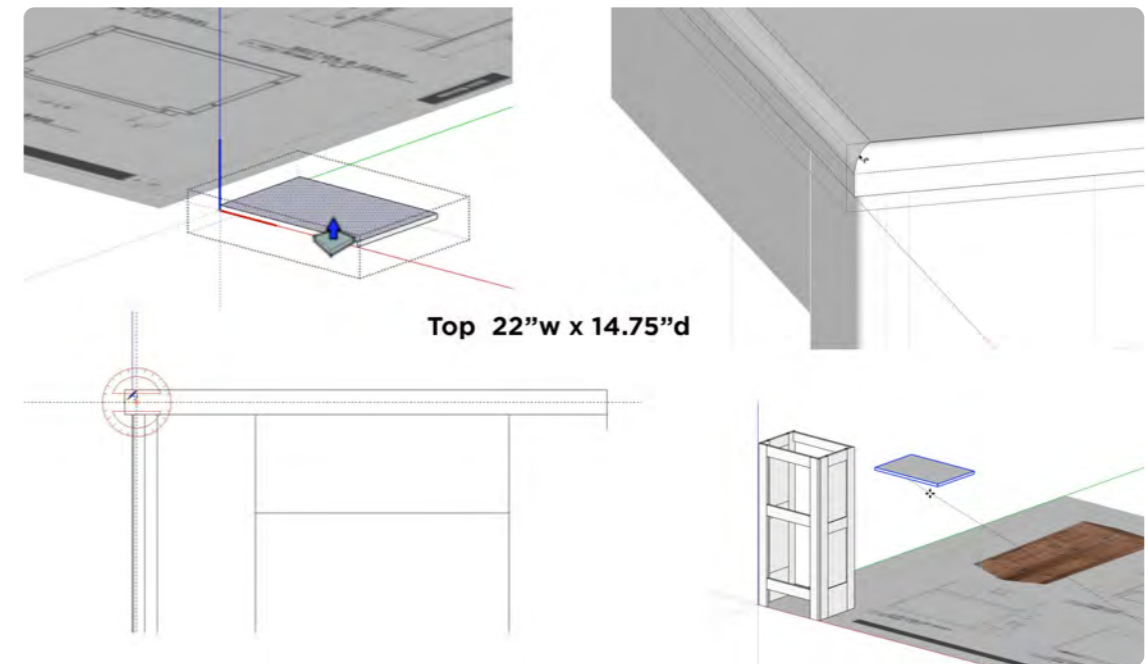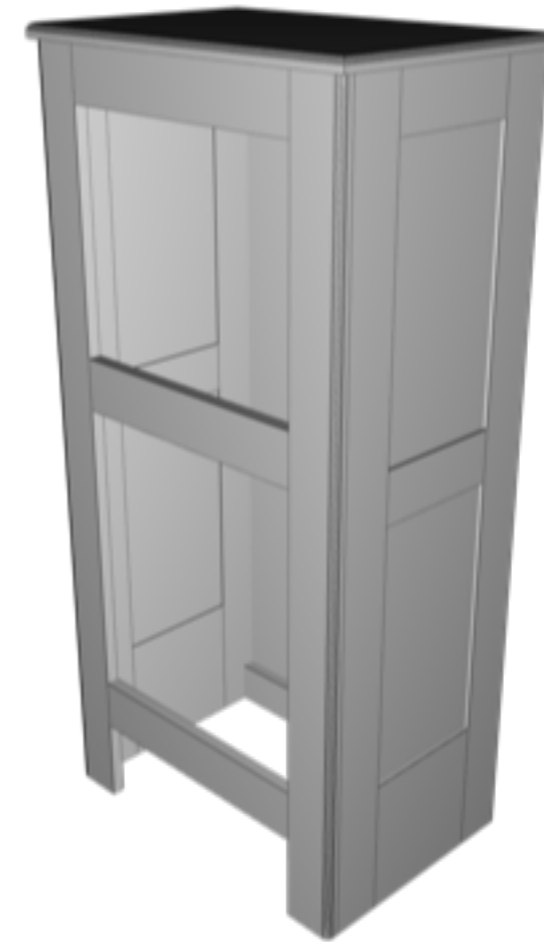
The Icebox Top is solid oak, 3/4" thick. Draw a Rectangle 22" w x 14 3/4" d and Extrude it to 3/4" thick (high) and make it into a Component. Select it from the midpoint at the top back and move it to the center of the Top Back Rail. Move it back 5/16" to aline it with the back edge of the side. After the top is in place, select the Tape Measure Tool to insert guides to center the round over 3/8". Make sure the arc is inside the Top Component. Double-click and select the top edge perimeter; with it highlighted, select the Follow Me Tool and click on the edge to execute the round over.

05_Back_0:07:31:07

Interactive 8.1 ICEBOX Collada File
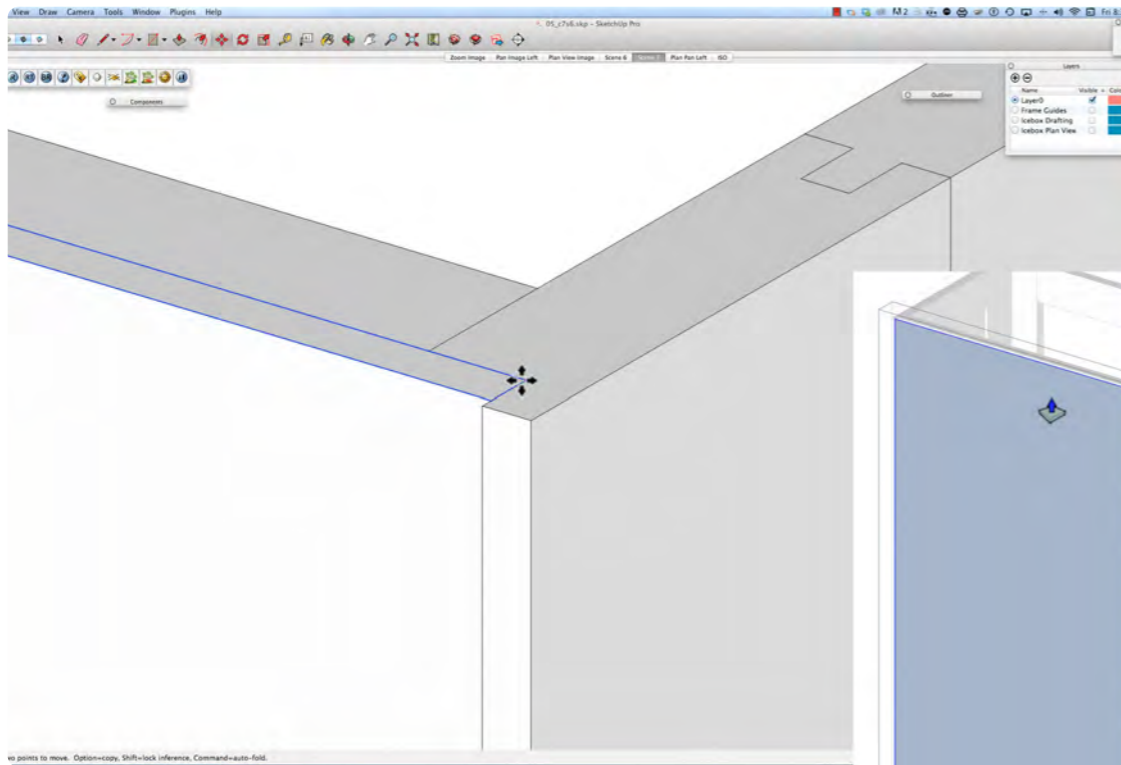
The Back Panel sits inside the rabbit cut into the side vertical rails. Switch to the Back View; turn off the top, select it, right click and choose hide. Then draw a Rectangle inside the rabbit groove from the top left corner, to the bottom right corner. Right click, Make Component, and select the Push Pull Tool; push in .25". The rabbit is 1/16" deeper than the back panel, so it needs to be moved forward 1/16 inch. Open the outliner window to unhide the Icebox Top.
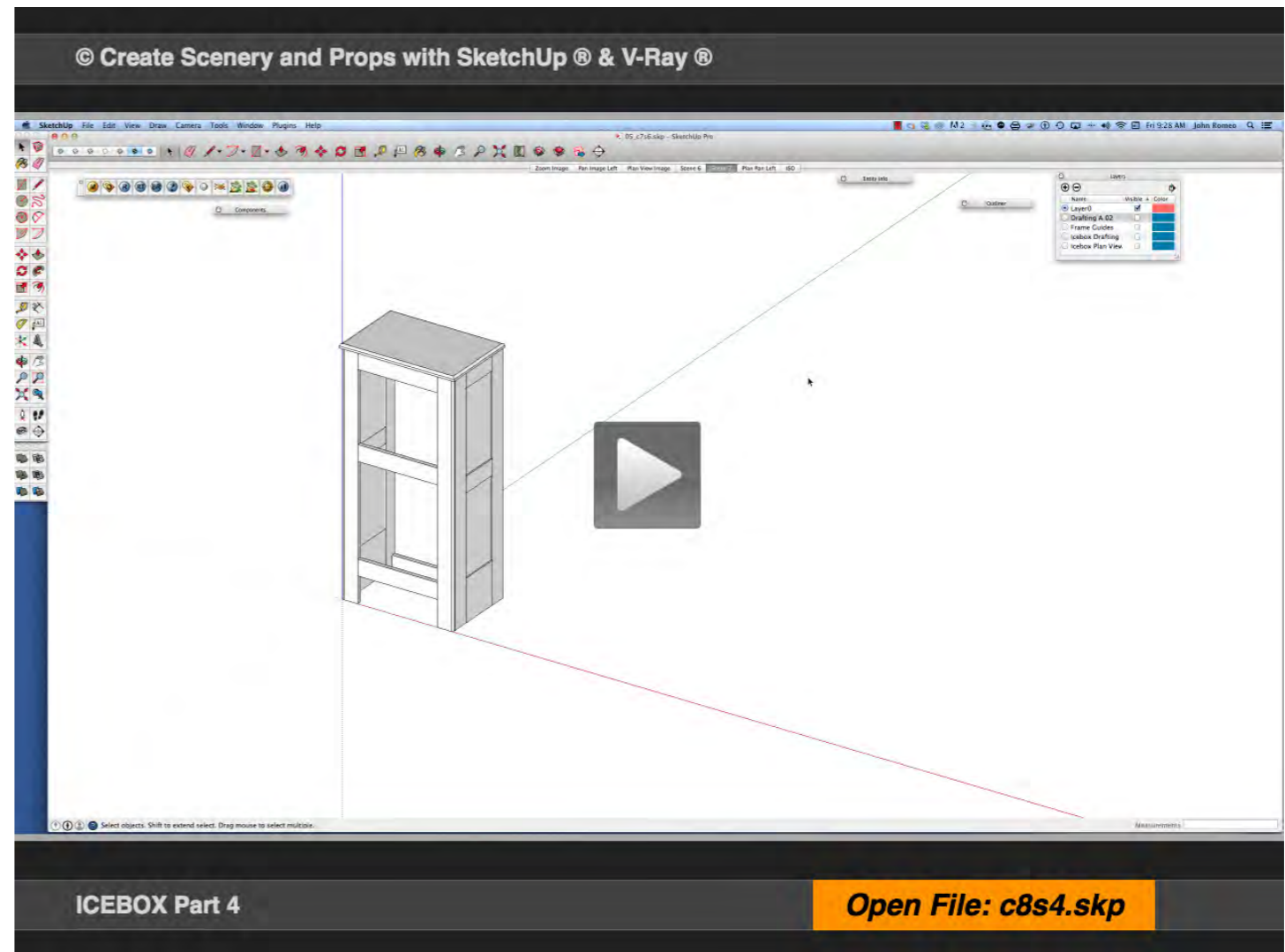
*Download file to play Collada file: **Rotate the image with the mouse or finger***

ICEBOX Part 4 – Doors

Movie 8.4   ICEBOX DOORS

VIDEO MARKERS

1. The Doors

2. Extrude

3. Door Rabbit

4. Bottom Door.

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ICEBOX Part 4

Open File: c8s4.skp

01_The Doors_0:00:00:01


02_Extrude_0:04:34:09
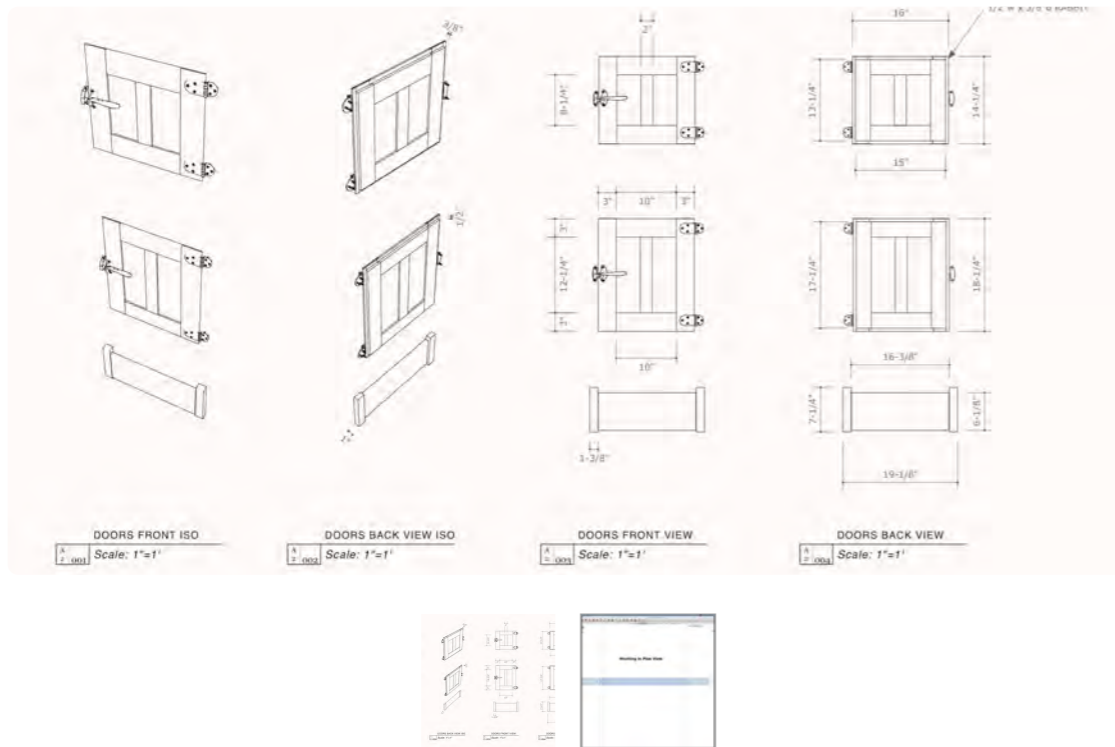
The Doors are created with the same procedure as the Side Panels: starting with guides, then the plan view and then extrude the pieces. In this video, I am skipping the center vertical rail in the doors to save time: it requires the same steps that are used center rail on the front of the icebox frame. The clearance around the perimeter of the doors is really important for the doors to work correctly. The round-over detail on the edges of the doors will be added later. At this point most of the steps should be familiar if you watched the Icebox lessons from the beginning.
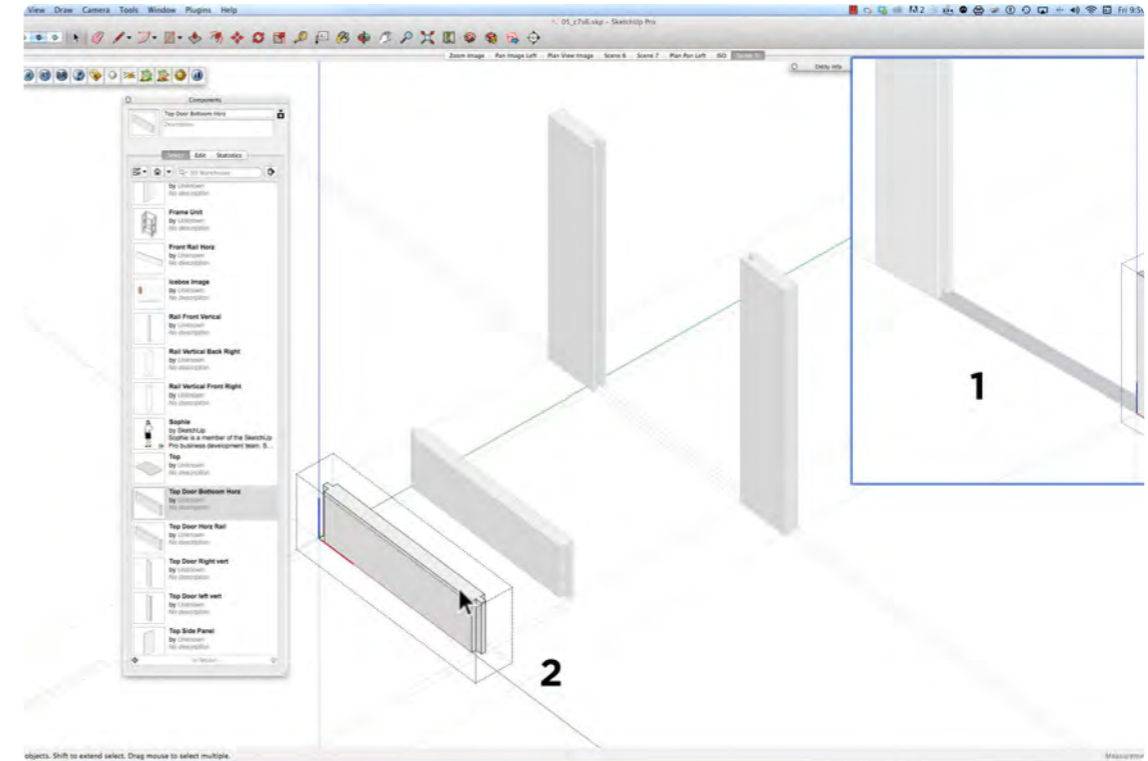
Extruding the Vertical Rails is a one step process because all the details to make the tongue and groove are already in the plan view. The Horizontal Rail is a little different: you don't want the groove lines in place in 2-D before extruding, or those lines will divide the rail into 3 segments. Layout the groove after the Horizontal Rail is Extruded, and make a top and bottom. The groove in the Top Rail is made by orbiting and drawing from the bottom. The scale tool is another method of making the mirrored object.

03_Door Rabbit_0:07:29:21
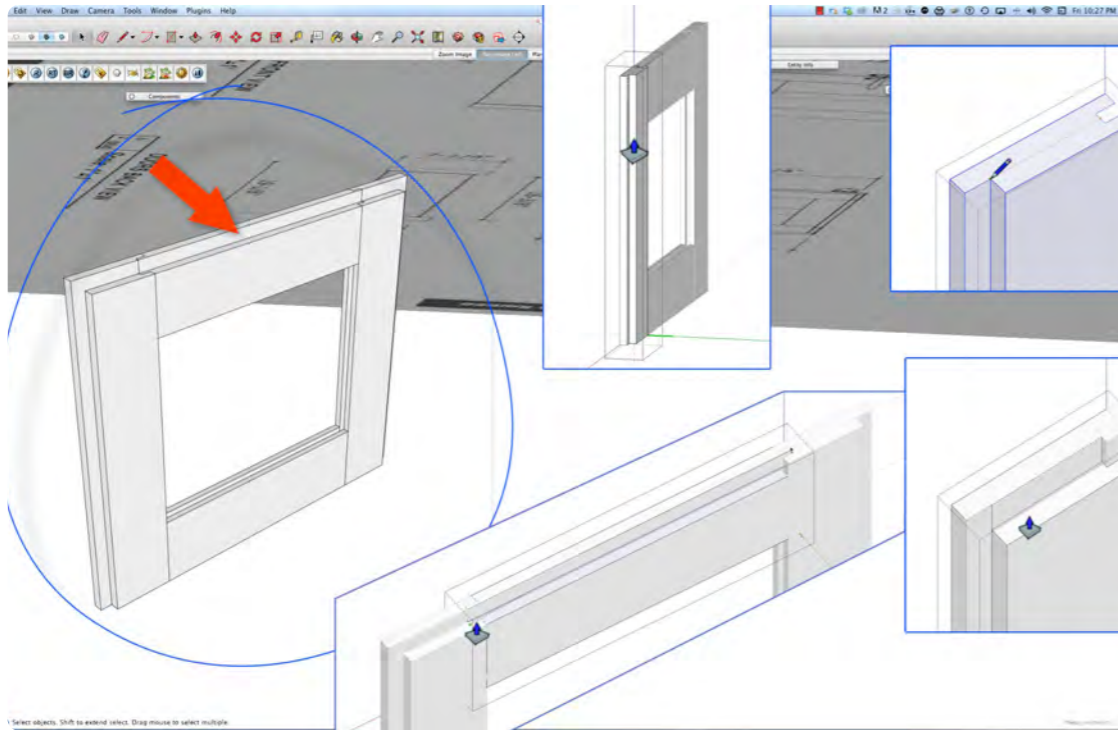
Rabbited panel doors is a classic style that takes more planning than drawing a simple solid door. Make a copy of the two vertical rails, after completing the rabbit and use the copies for the bottom door and make sure you make them unique. Put the rabbit in the top ends of the vertical rails first, then connect the points for the horizontal rails and push down .5". The rabbit is 1/2" and will overlap the face frame by 3/8; this leaves room for expansion and clearance. Note, delete the 1/2 artifact lines that are left after pushing in the rabbit.

04_Bottom Door_0:12:30:00
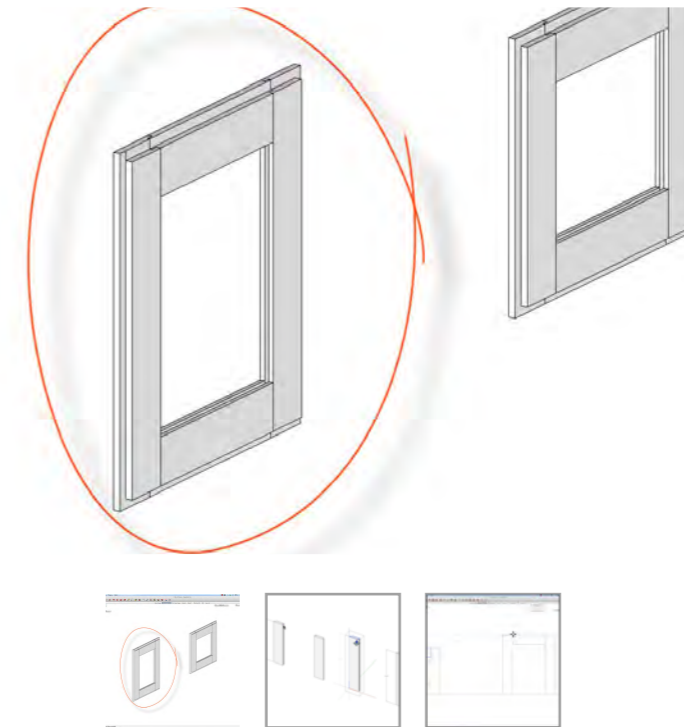
The Bottom Door is 4" taller than the Top Door, so extend the copies make of the Top Door Rails. Use the Push Pull Tool to pull it 4" up. The Horizontal Rails are the same width in the Bottom and Top Doors; drag a copy of the Top Door Horizontal Rail and snap to the Bottom Door top edge and bottom edge respectively. The rabbit already exists in the horizontal rails, so all that is needed is the rabbit at the ends of the vehicle rails.
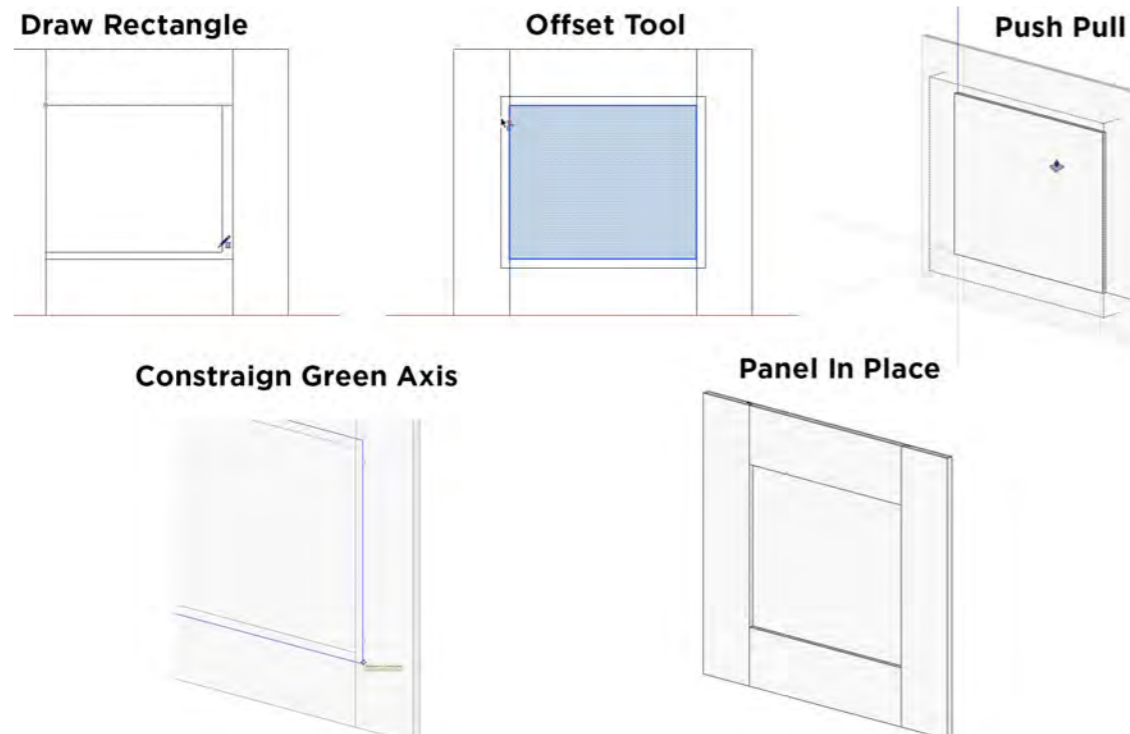
ICEBOX Part 5 – Positioning

Movie 8.5 Door Panels & Basin Door

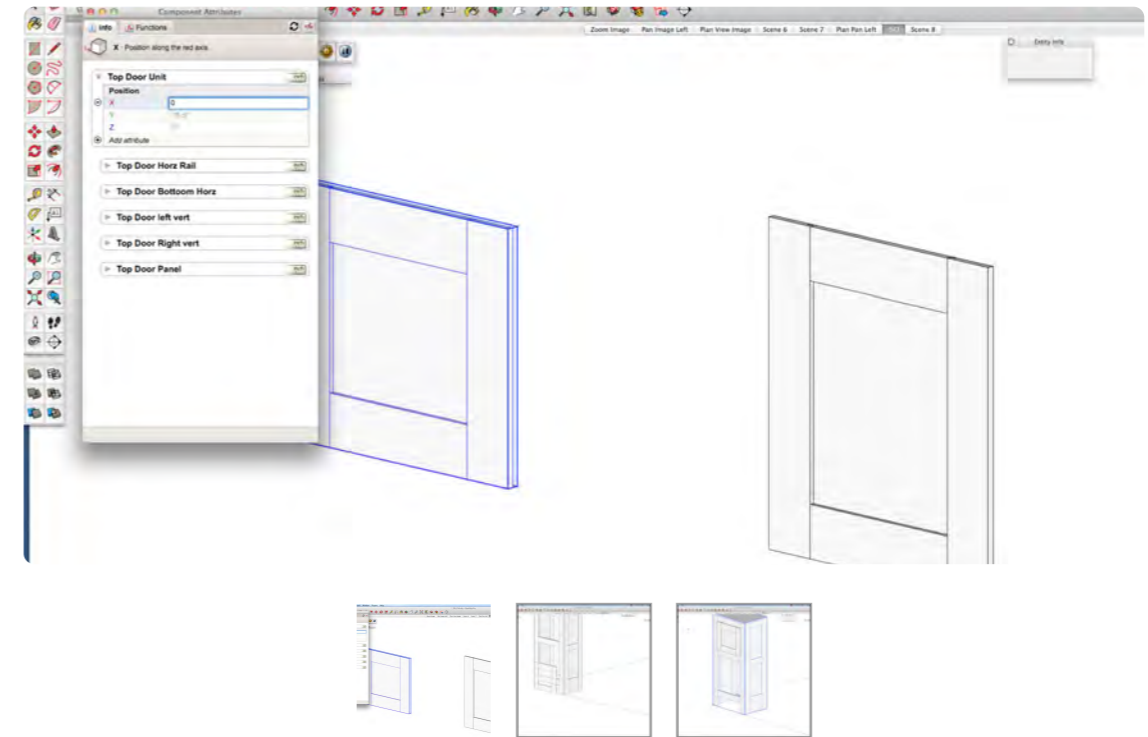## VIDEO MARKERS

1. Door Panels

2. Put Doors in Position

3. Basin Door
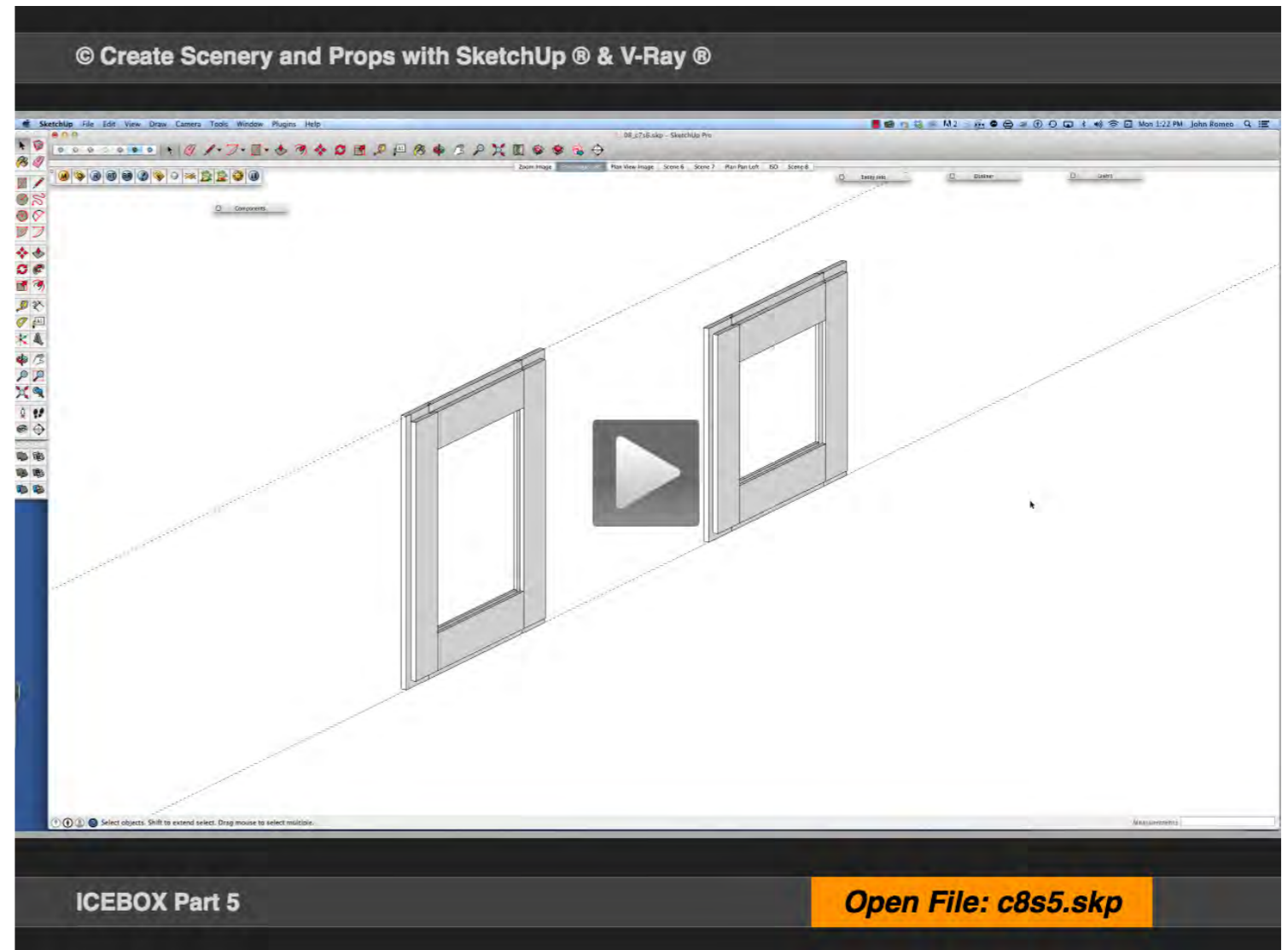
01_Door Panels_0:00:00:01


02_Put Doors in Position_0:03:12:13

The panels are 1/4" thick and set into the center of the door frame, which is 3/4" thick. The first step is to draw a rectangle that fills the opening of the frame, select the Offset Tool, then offset the frame 3/8 inch and delete the inner original rectangle. Extrude the rectangle to 1/4" thick and with the Push Pull Tool, push the panel back 1/2", holding the left arrow key to constraint the green axis. The Bottom Panel is located using Component Attributes Position Commands.

Putting the doors in the correct position can be a real challenge because of the offsets and clearance. Set the X,Y, and Z to Zero (0) so that the door is at the origin. Make sure that the Icebox frame is sitting at 0,0,0. Use the Dimension Tool to measure the height . Once the Top Door is in place, only the Z-bottom needs to be changed. You don't have to be at the origin (0,0,0) to use to use the co-ordinate system, working from 0.0.0 is just easier to follow.

03_Basin Door_0:06:43:28

Interactive 8.2 Icebox 3-D
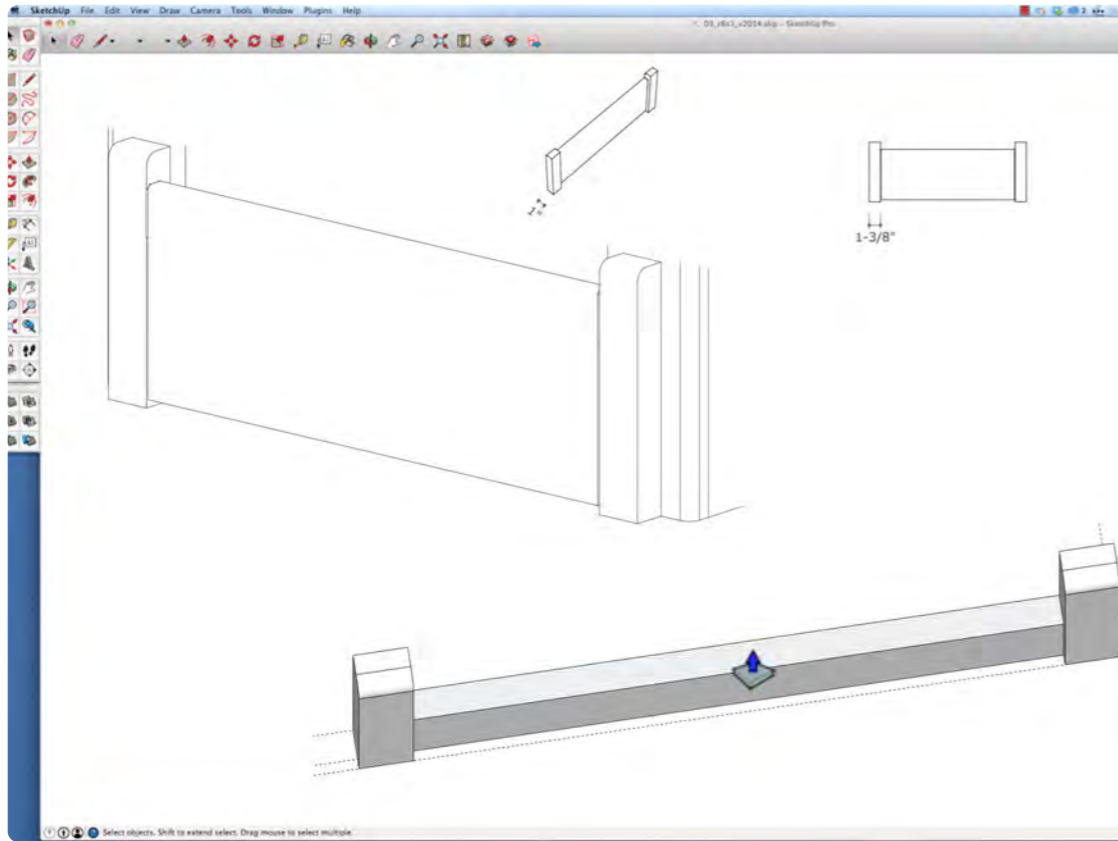
The Basin Door consists of 2 blocks of wood 1-3/8"w x 6 1/8"h x 1" spaced 19-1/8" apart. Layout the blocks in plan view and extrude them to 6-1/8". The Door Flapper is 3/4" thick and pivots between the blocks. Set a radius of 3/8" on the end with the arc tool and select the the edge; select the follow me tool and click on the arc to round over the block. The end pivots are not shown in this video.
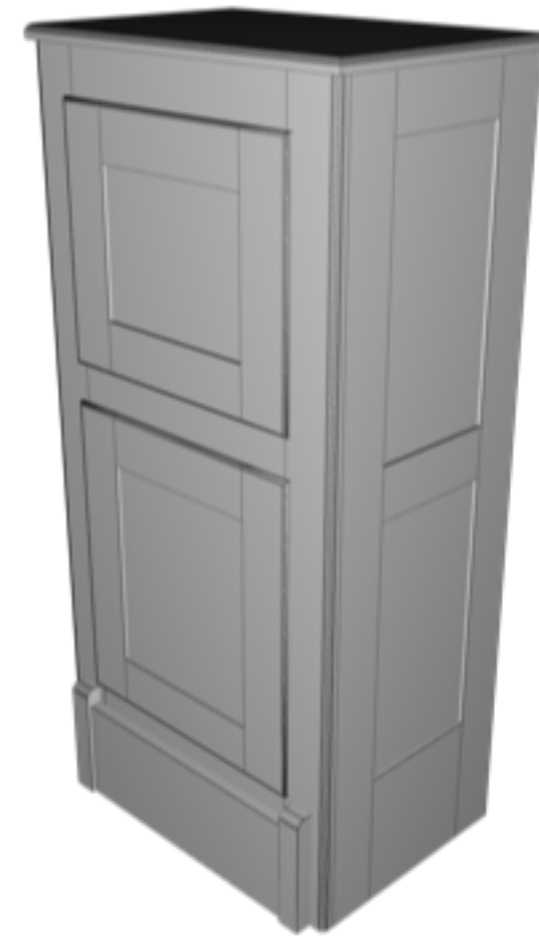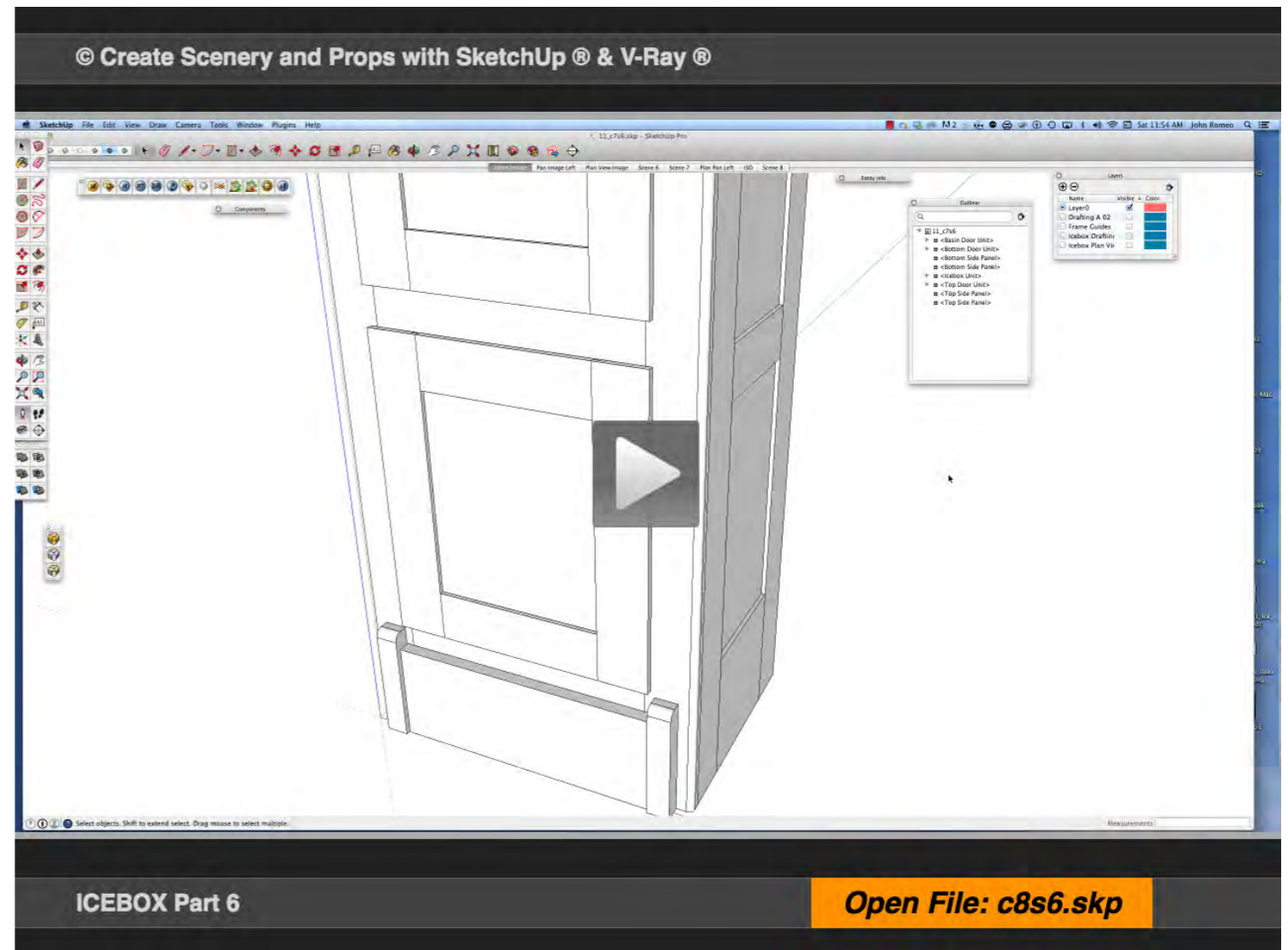
*Downlload Collda File: **ORBIT with the mouse or finger***
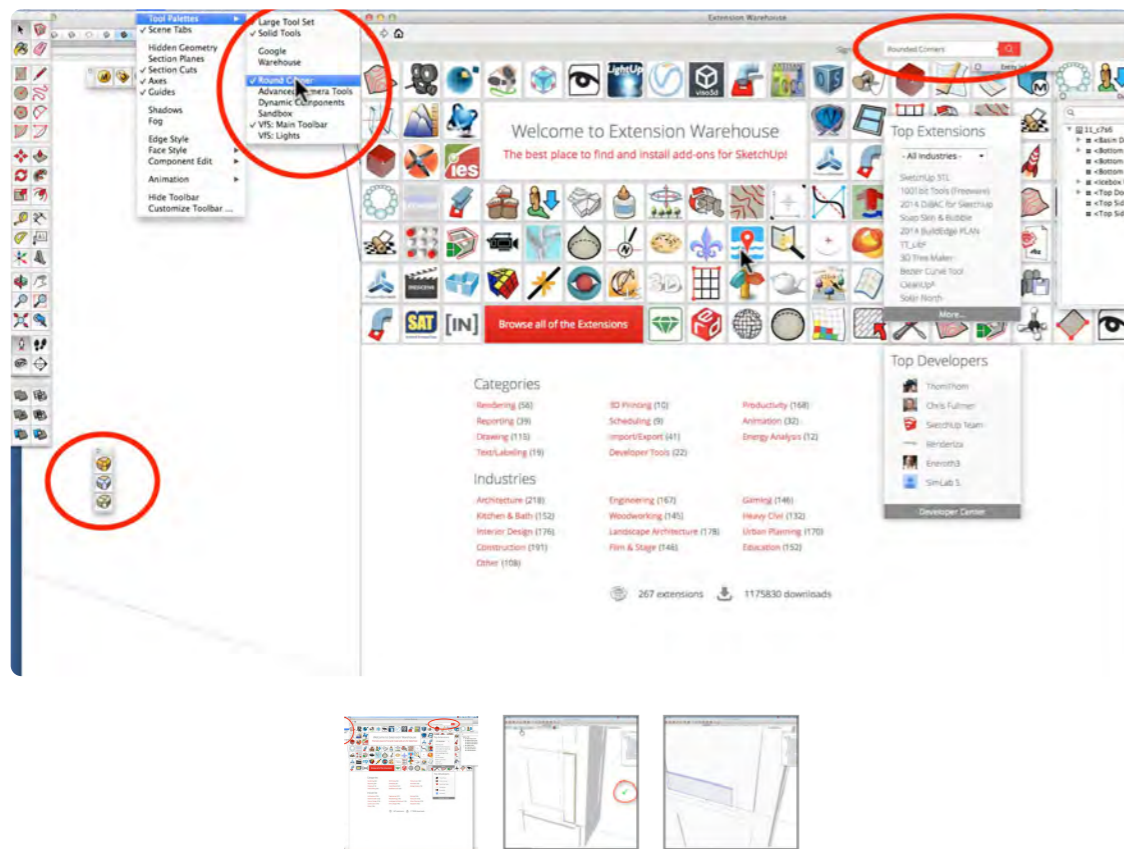
ICEBOX Part 6 – Texture

Movie 8.6 Icebox Finishing Touches

VIDEO MARKERS

1. Round-over Edges

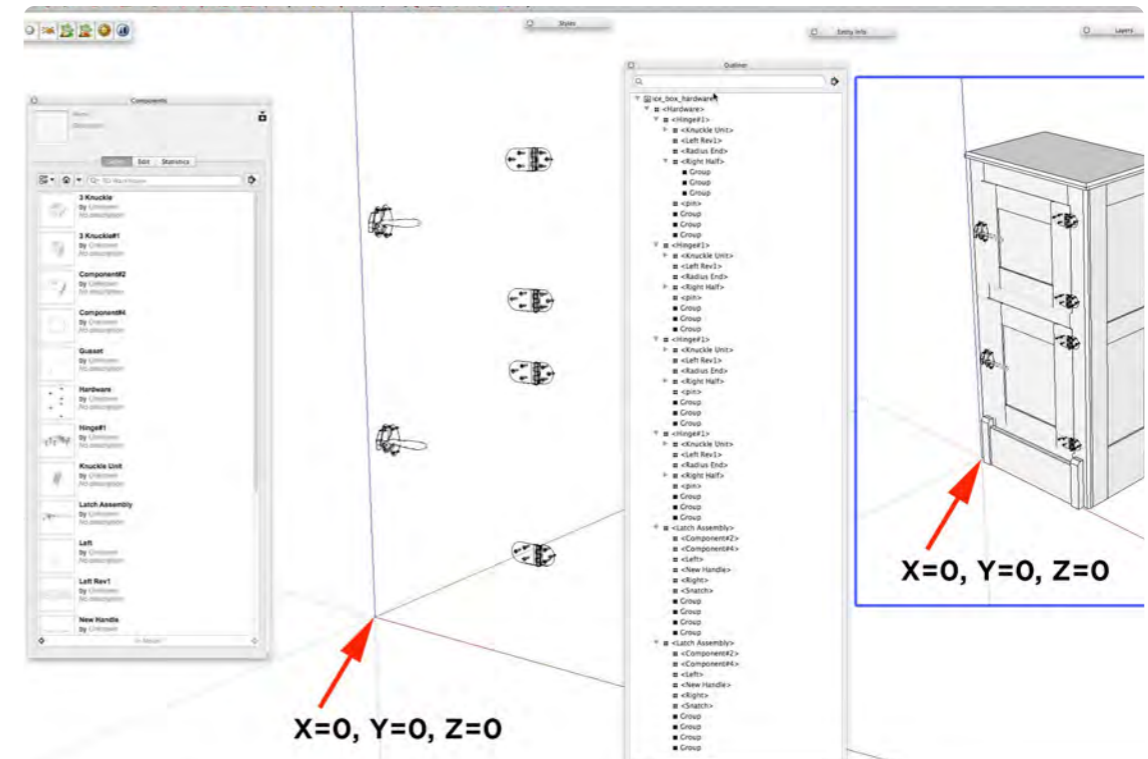2. Hardware

3. Textures

4. Render Icebox

01_Round-over Edges_0:00:00:01

In previous videos we rounded edges with an Arc and the Follow Me Tool. This time I would will like to use a round-over plug-in, which you can get from the SketchUp Extensions Warehouse. If you're not familiar with plug-ins this is a good opportunity to experiment with plug-ins. Figure 1 above, shows where the round-over corners is located. Select the round-over Icon and the toolbar at the top will pop up; with the green arrow (turns red on the edge) click on and edge (hold the shift key for multiple edges). Move the curser off the image and a green check mark appears, click to execute.
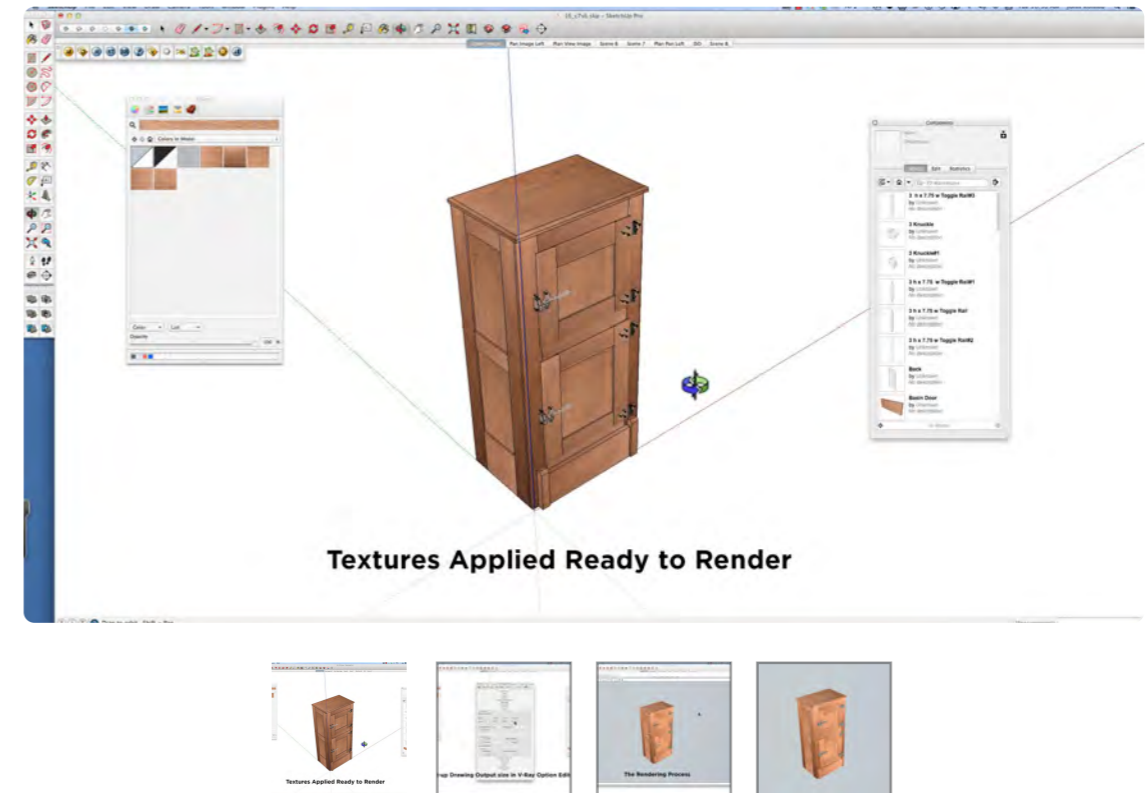
02_Hardware_0:02:40:26

The Hinges and Latches are complex objects to draw. The Outliner is open in the figure above and you could see how many details there are to create them. So I decided to leave this part out of this video and provide the completed hardware objects in the exercise file. The Icebox in the exercise file is located at the origin, and the new icebox we just created is also located at the origin, so they can be cut from the exercise file and pasted directly on to the new drawings and be in the correct position. Using the origin is an excellent way of adding details from other sources.

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03_Textures_0:03:29:11

04_Render Icebox_0:09:54:18

Textures Applied Ready to Render
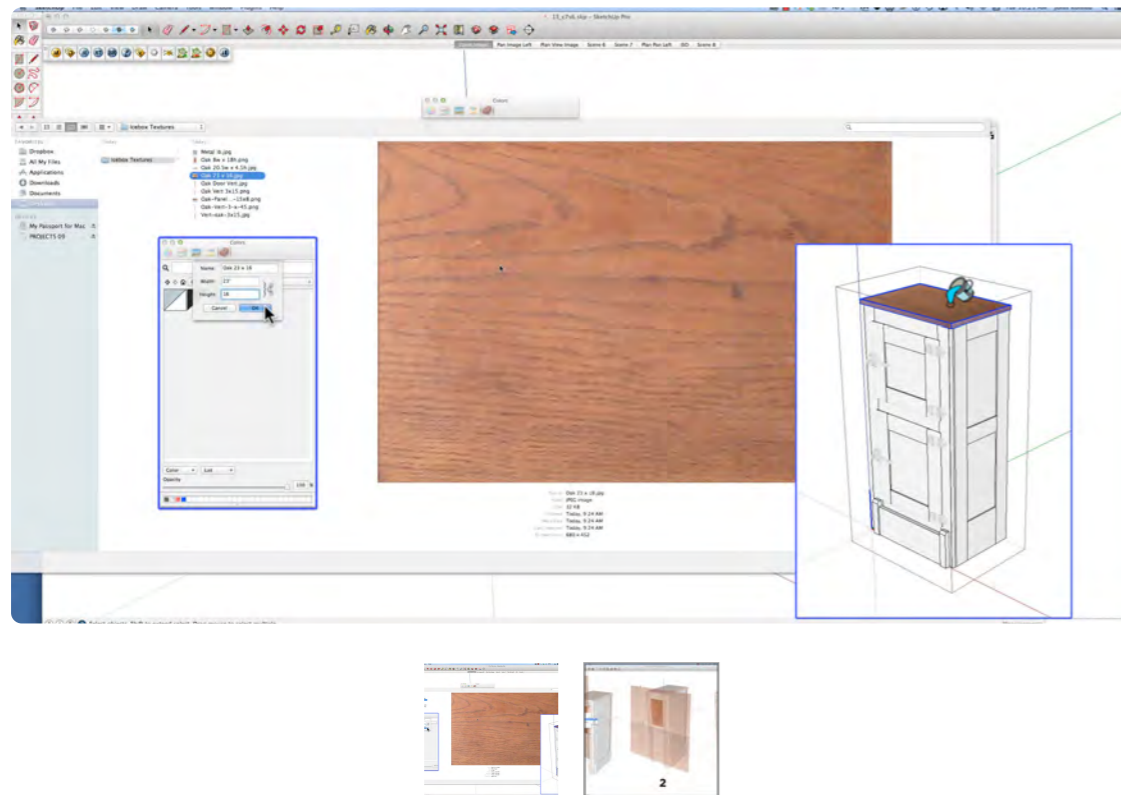
Textures are a vital part of rendering, especially realistic rendering. Textures are all around us and almost any digital camera can be used to capture them. The textures used on the Prop Icebox are from photographs of an Antique Icebox that sits in my kitchen. The texture are provided in the exercise files. There are 3 important details that to focus on: the direction of the grain, the variety of the grain and the position of the grain. It is a good idea to get rid of unused textures that may cause confusion. Make texture unique is a quick way to setup a texture with specific attributes.

The Icebox Project is not complete without a sample rendering. The rendering is very basic without reflections, refractions and lighting (global illumination only). The first image above uses the Shaded with Textures Style and works great for presentation and the second image displays the V-Ray Option Editor Output. This menu is where the size of the image file is determined and how and where it is saved. The third image shows the sampling process that creates the rendered image and lastly, the rendered icebox. Chapter 9 focuses on rendering with the bells and whistles.

Rendering
with V-Ray®

- Overview of V-Ray® for SketchUp® starting with looking at the composition of a finished rendering and compare it with the default settings in place when V-Ray® is opened for the first time.

- We return to the SketchUp® Loft Drawing from Chapter 6, Section 2 as the starting place the rendering workshop.

- Explore V-Ray Light Types

- Light The LOFT SET
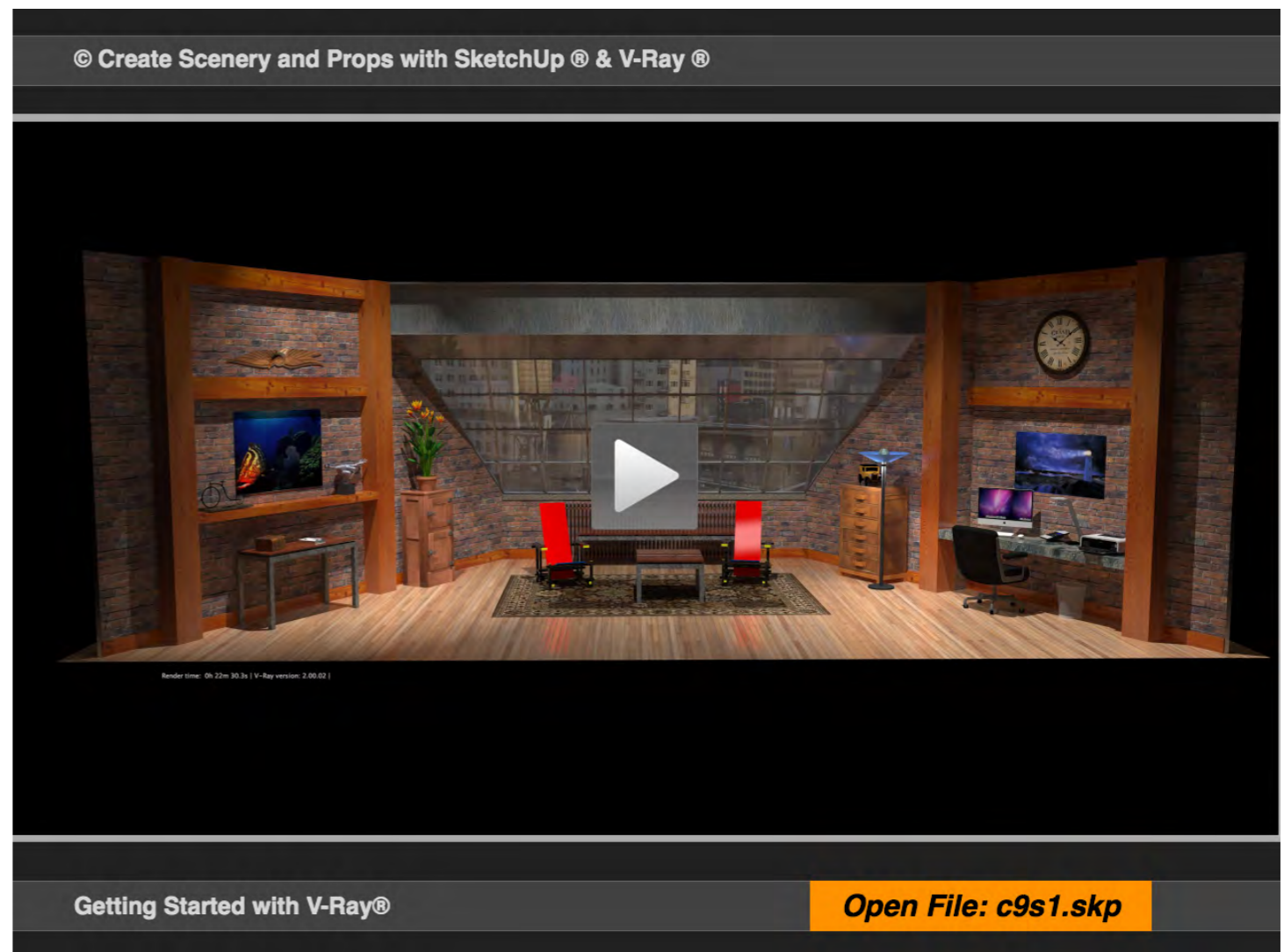
- Final Rendering of the set
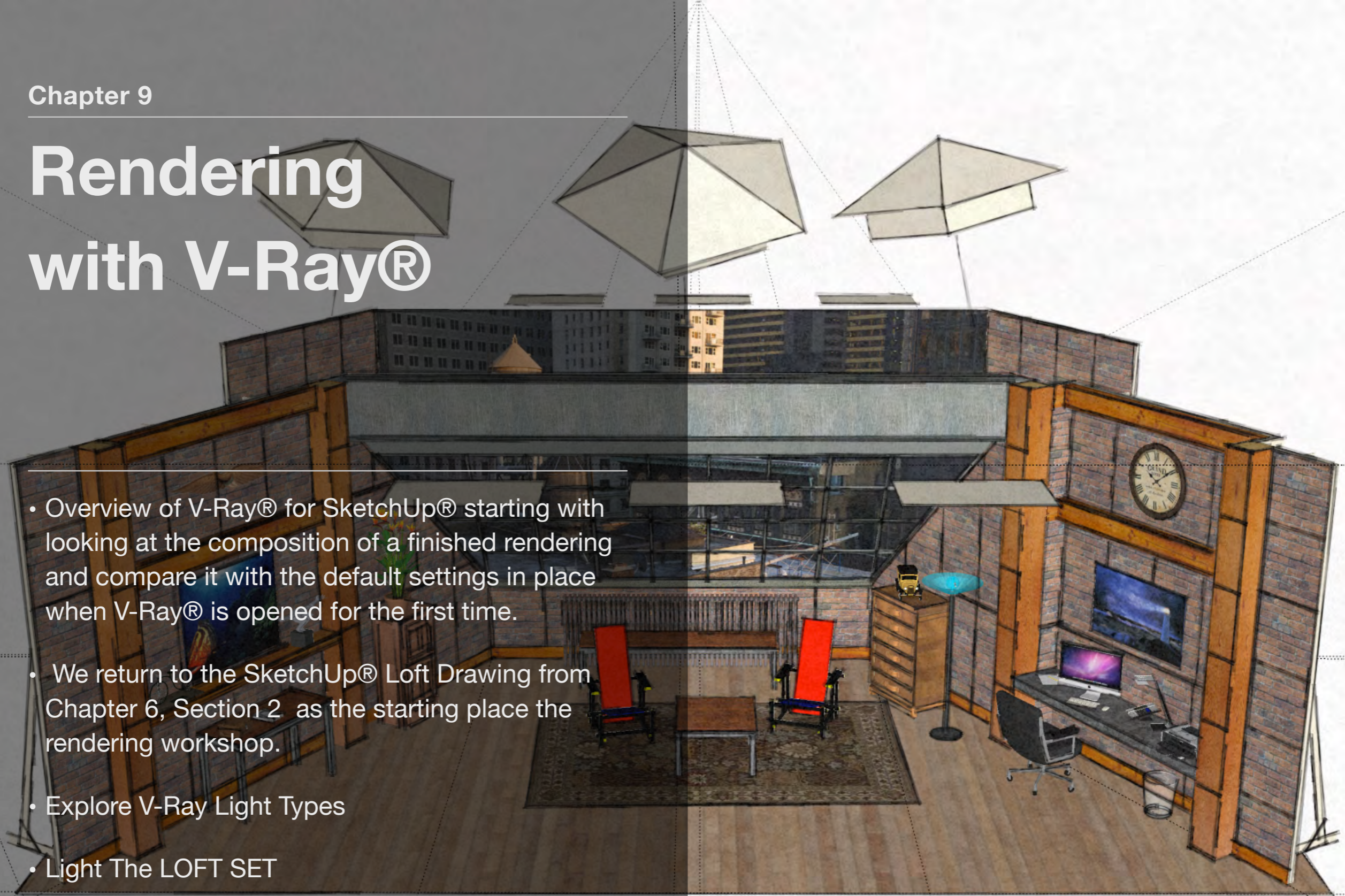
Getting Started with V-Ray®

VIDEO MARKERS

1. V-Ray® Introduction

2. Back to Chapt. 6, Sec. 2

3. Adding Reflections

4. Changing Output Resolution

5. Save Rendered Image

6. Shadows

Movie 9.1 V-Ray® Introduction

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Render time: 0h 22m 30.3s | V-Ray version: 2.00.02 |

Getting Started with V-Ray®

Open File: c9s1.skp

01_V-Ray® Introduction

V-Ray® can be very intimidating when you look at it for the first time. As with many other programs and plugins the most difficult part is always framed by the question: Where do I Start? The good news is that V-Ray's® default presets let you get started right away. The V-Ray® plugin needs to be installed on your computer to actively participate in this exercise. V-Ray® for SketchUp® Version 2.0 and SketchUp® 2014 are used in Chapter 9 of this Book. A free 30 day demo version is available for download at: http://www.chaosgroup.com/

Installation Manual

http://help.chaosgroup.com/vray/help/sketchup/100/VRSU_Install_mac.pdf

The V-Ray® Manuals can be used to add context to terms and functions that are used in the video. The lessons would be to waited down in information if all this information was included. The manual can also be accessed in the SketchUp@ plugin tab.
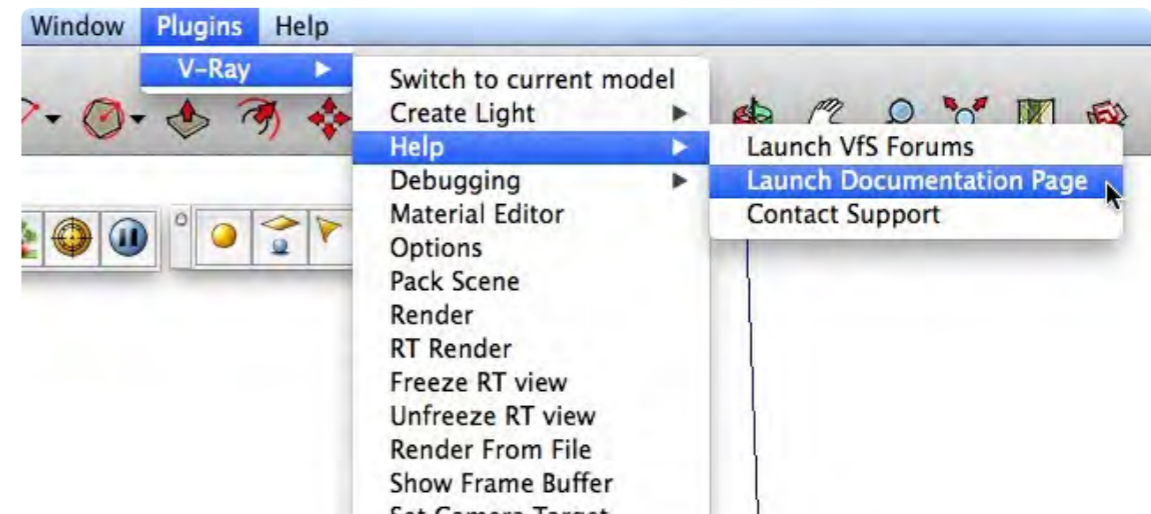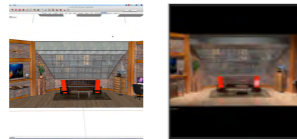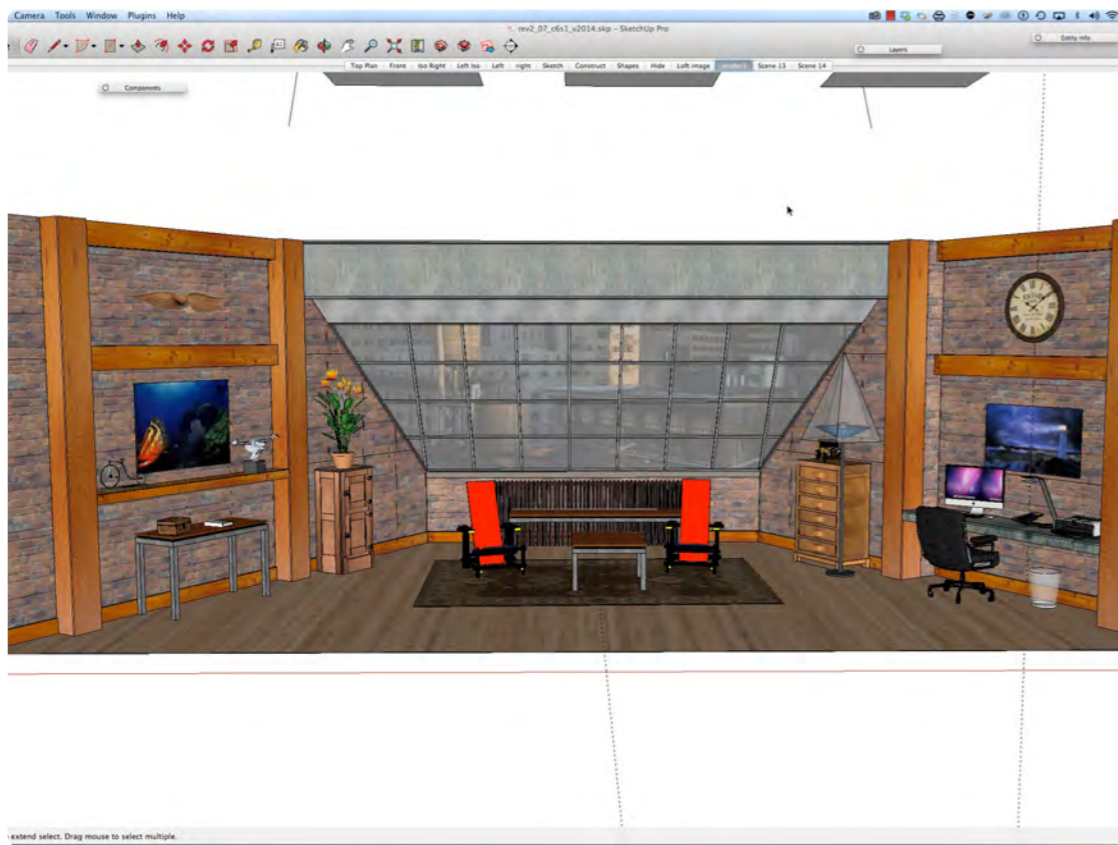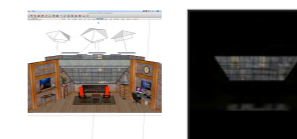
Figure 9.1 SketchUp® Drawing vs V-Ray® Rendering


Figure 9.2 Lights vs. No Lights

The 1st image above is a SketchUp® Drawing of the Loft and the 2nd image is it rendered in V-Ray®. This lessons is a quick overview of how this V-Ray® Rendering was produced. It isn't necessary follow this video step by step on your computer. Watch the video to see where we are headed in Chapter 9, Section 2. I have tried to edit out a lot of the process and focus on a few essential steps.

Understanding lighting, reflections, and refractions and how they interact with materials and surfaces and using the Physical Camera helps understand how V-Ray® works. In the first image, the lights are turned on and in the second image, the lights are turned off. Notice the Backdrop is lit up; that is because it has an Emissive Layer added to it, so it lights up like a Duratran or Translite. I left it on so you can see the how much a light emitting material can add to the scene.
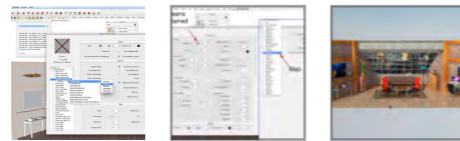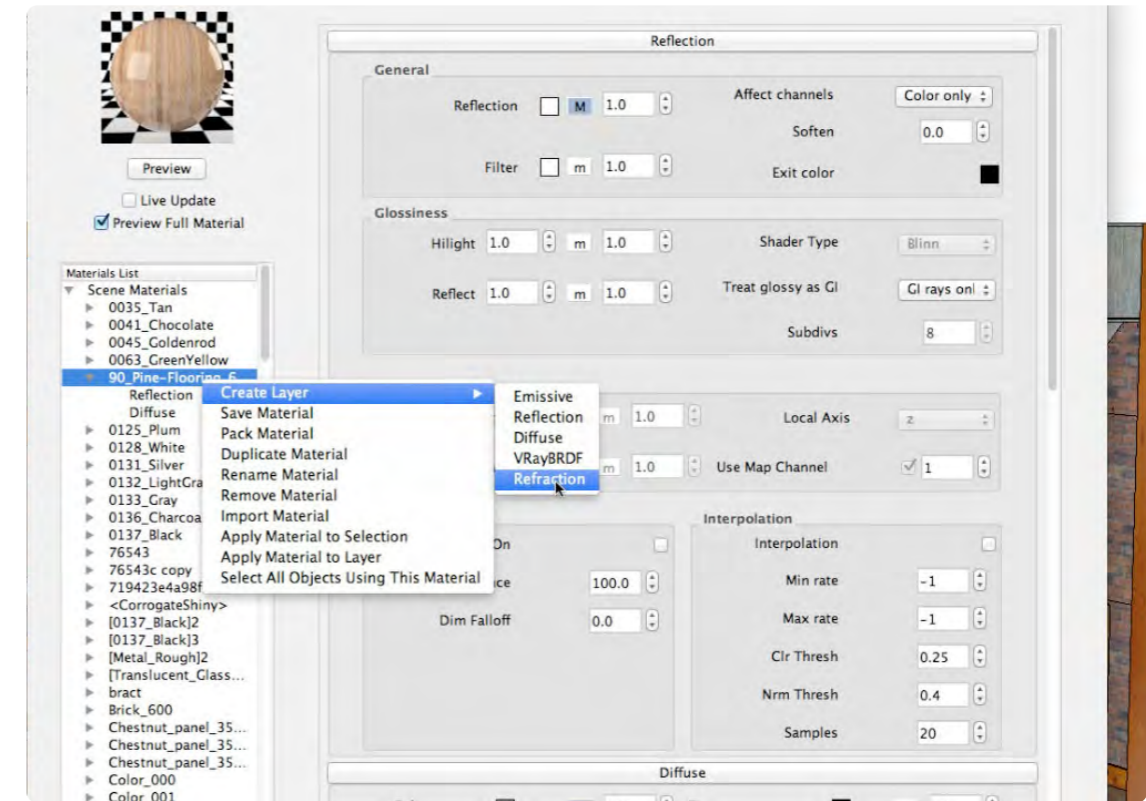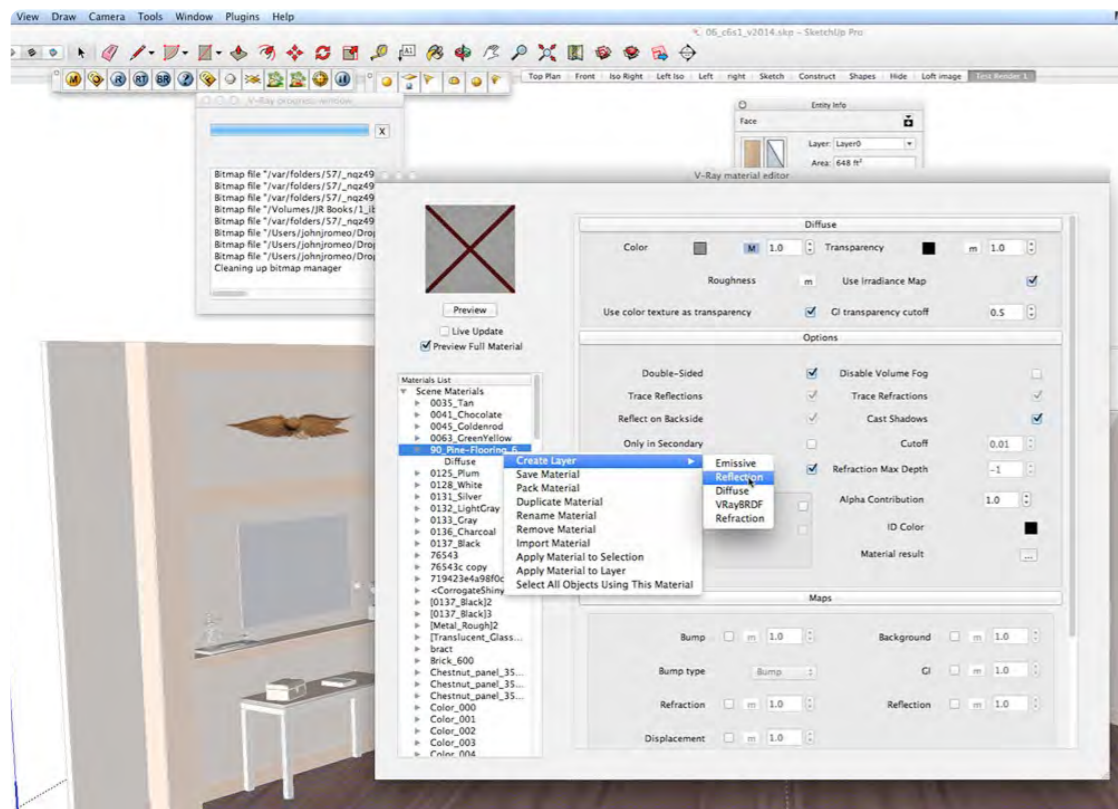
134
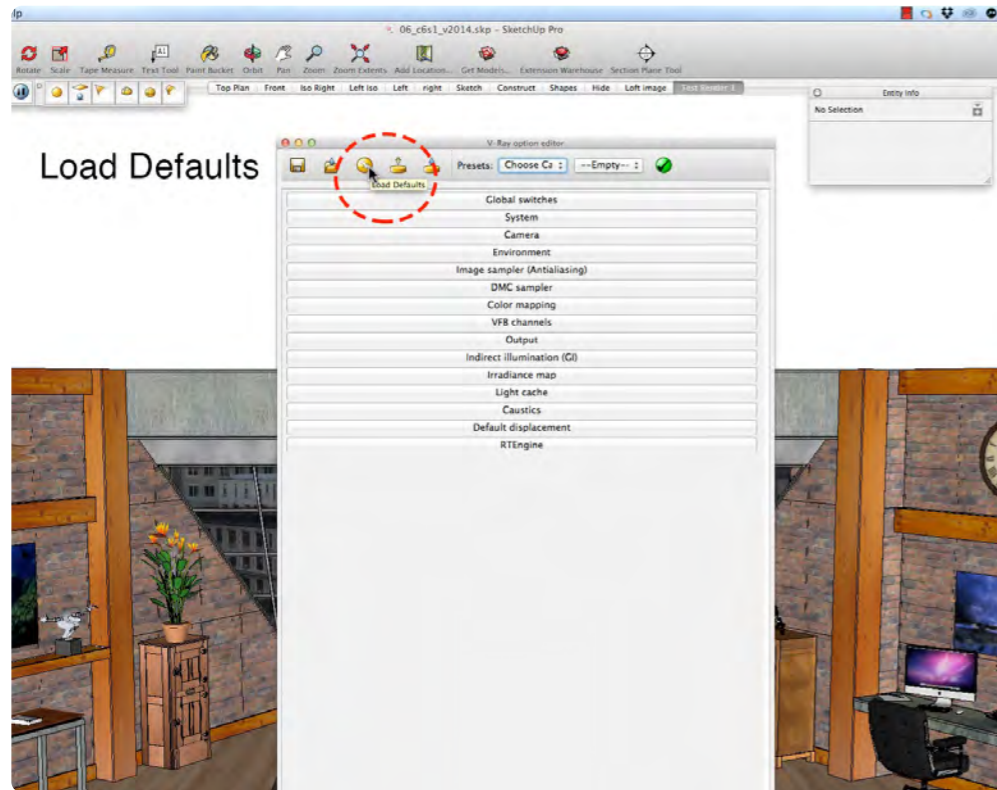
I returned to the Chapter 6, Section 2 SketchUp file: a test rendering done in V-ray (file name c6s1.skp). Open the V-Ray® Options Editor and select Load Defaults. Select the Environment tab to reveal Global Illumination, Reflection and Refraction controls. Notice there is a Reflection / Refraction control for just the background. The GI is the default or automatic lighting in V-Ray®, notice there are no lights in the set. Select "R" in the V-Ray® Tool Bar to do a rendering.
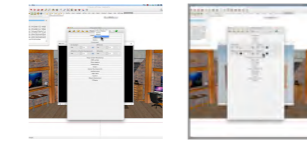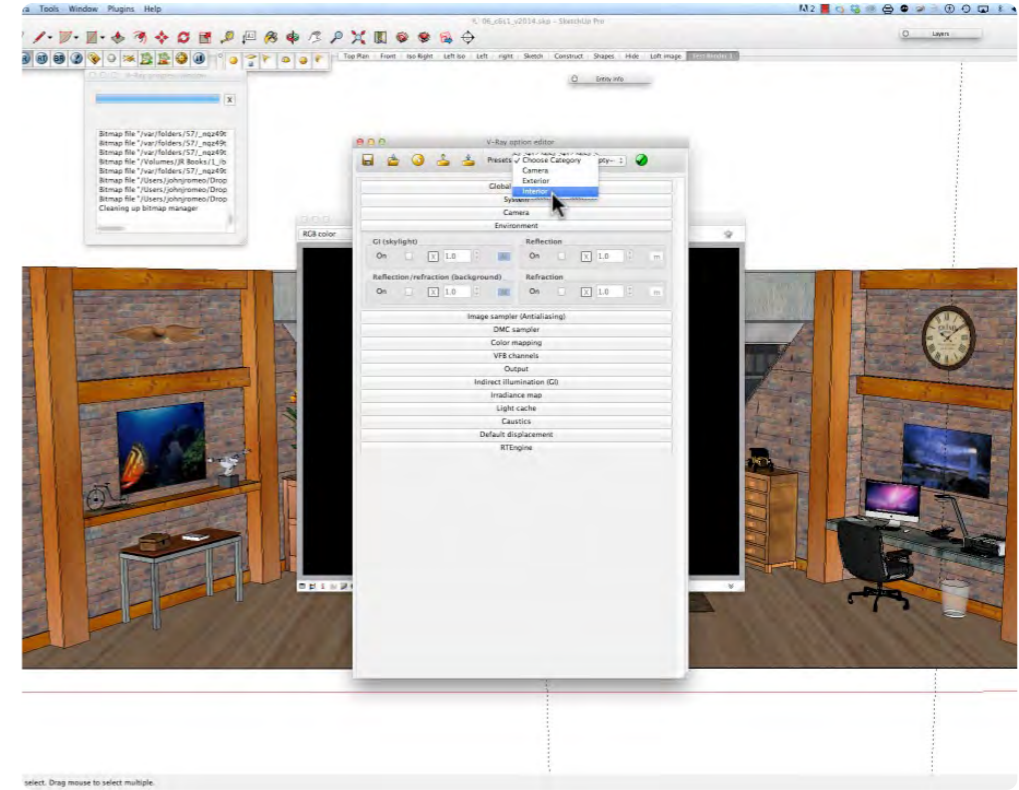
If you go back to the Environment tab and UN-check Global Illumination, the set will render black, because there is no light in the set. If the Background is unchecked, it will render totally black. In the Options Editor, under Presets, select Interior, Very High Quality. Then select Environment, and check GI, Reflections and Refractions. This will demonstrate that no reflections will occur unless reflections are applied to the material.

03_Adding Reflections 0:05:08:11

The V-Ray Materials editor works with the SketchUp Materials behind the scenes. Refection Layers are added to V-Ray® in the V-Ray® materials editor. Find 90_Pine-Flooring_600w in the V-Ray® materials editor and create a Reflections Layer (image 1). Notice the Capital "M" next to reflections. The "M" means there is a MAP in the map slot. Click on the M and the TexFresnel Map is revealed. Select R in the V-Ray® Tool Bar and see that reflections are added.

**Figure 9.3** Refraction Image

Reflections without Refraction added can look unrealistic, so to get that diffused look add Refraction Layer. A Refraction Layer is added the same way the Reflection Layer is added in the V-Ray® Materials Editor. Remember, we are still working with mainly the default lighting settings, but the light level can be changed in the Camera settings. If you uncheck the Reflection/Refraction Background, the background will render black.

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04_Change Output Resolution 0:09:18:27

2560 X 1440
Screen Resolution
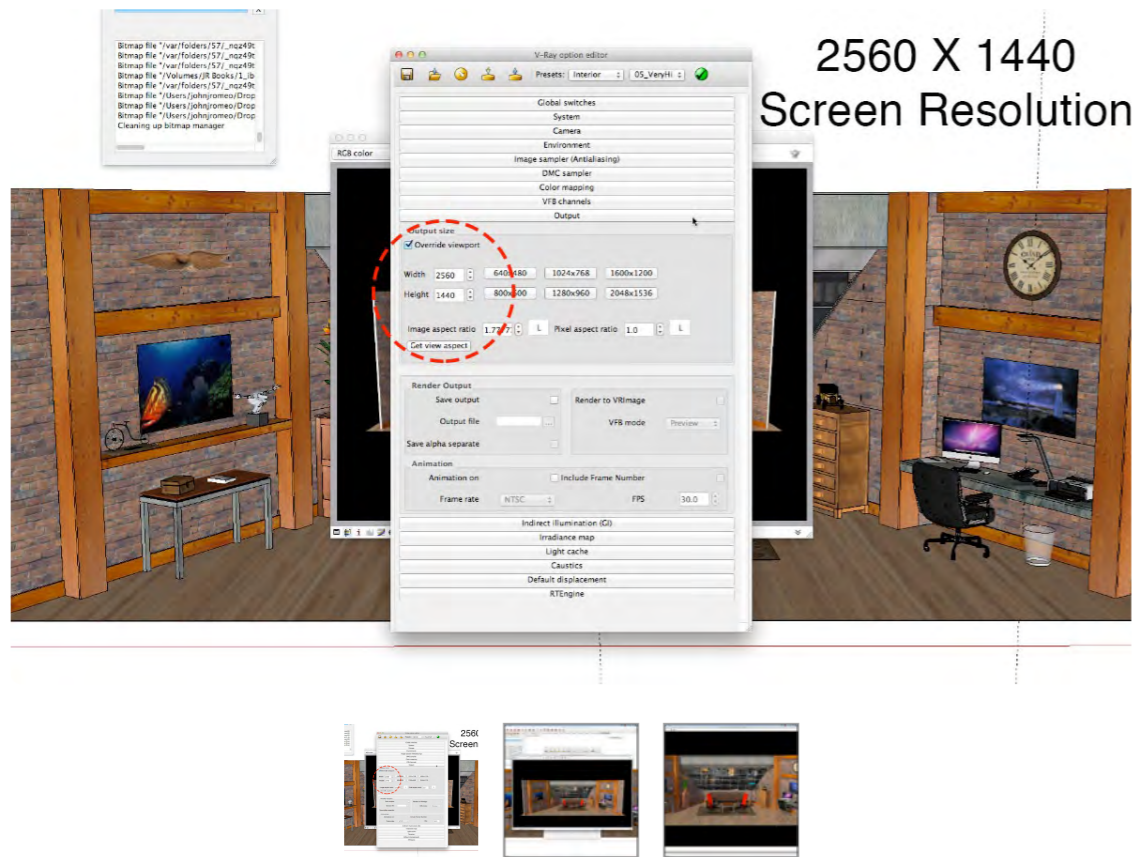
Open the Output Tab in the V-Ray® Options Editor, and select a screen size close to your screen resolution. I am using an iMac with a 2560 x 1440 resolution. Remember, the higher screen resolution, the longer it will take to render. At the lower right hand corner of the rendered image, click on the Time Stamp Icon and it will place a time stamp showing how long it took to render.

05_Save Rendered Image 0:10:29:14
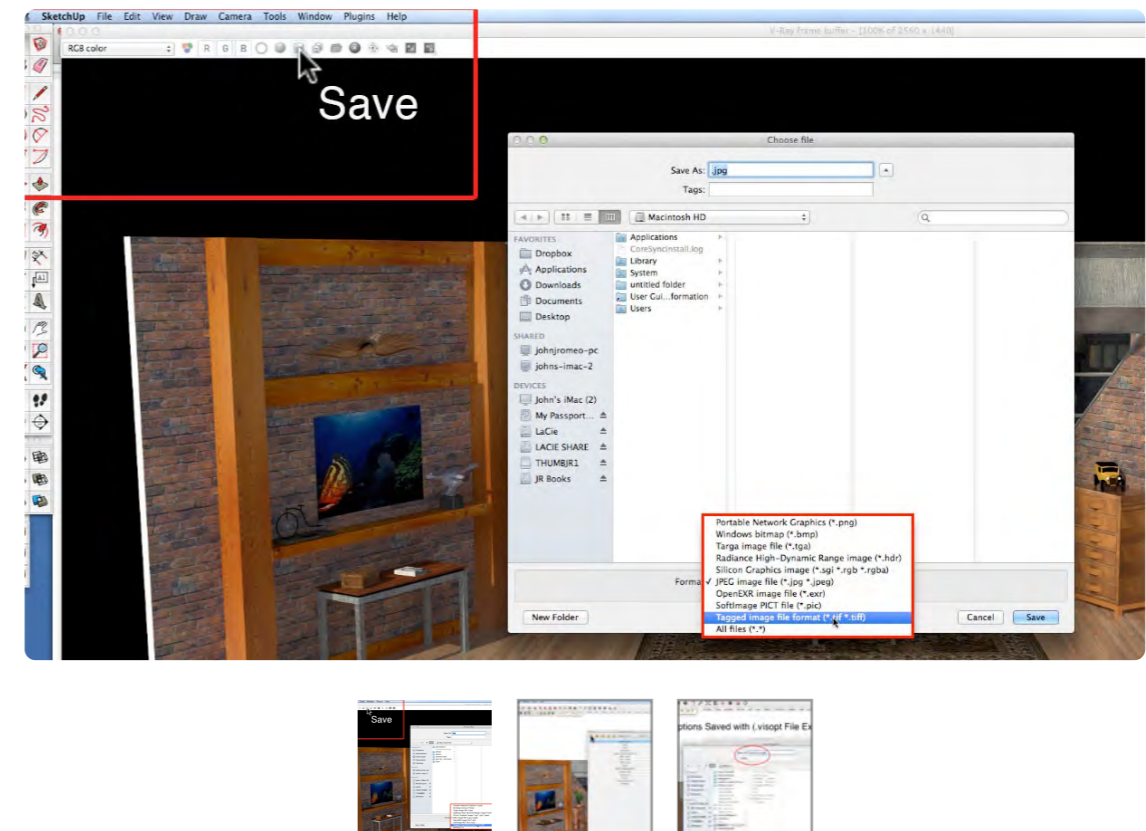
The rendering can be saved in many file formats. I generally save my renderings as tiff files. The image can be saved as many times as you like, and in different formats as well. Also, if you select the Save Icon that is 2 disks, you can save it with the Alpha channel as well. If the image is closed before saving, it can be brought back by clicking on the "F" in the V-Ray® Tool Bar. The Edit Options can be saved and brought back at any time, even in a different SketchUp drawing (see image 3).

06_Shadows 0:12:15:12

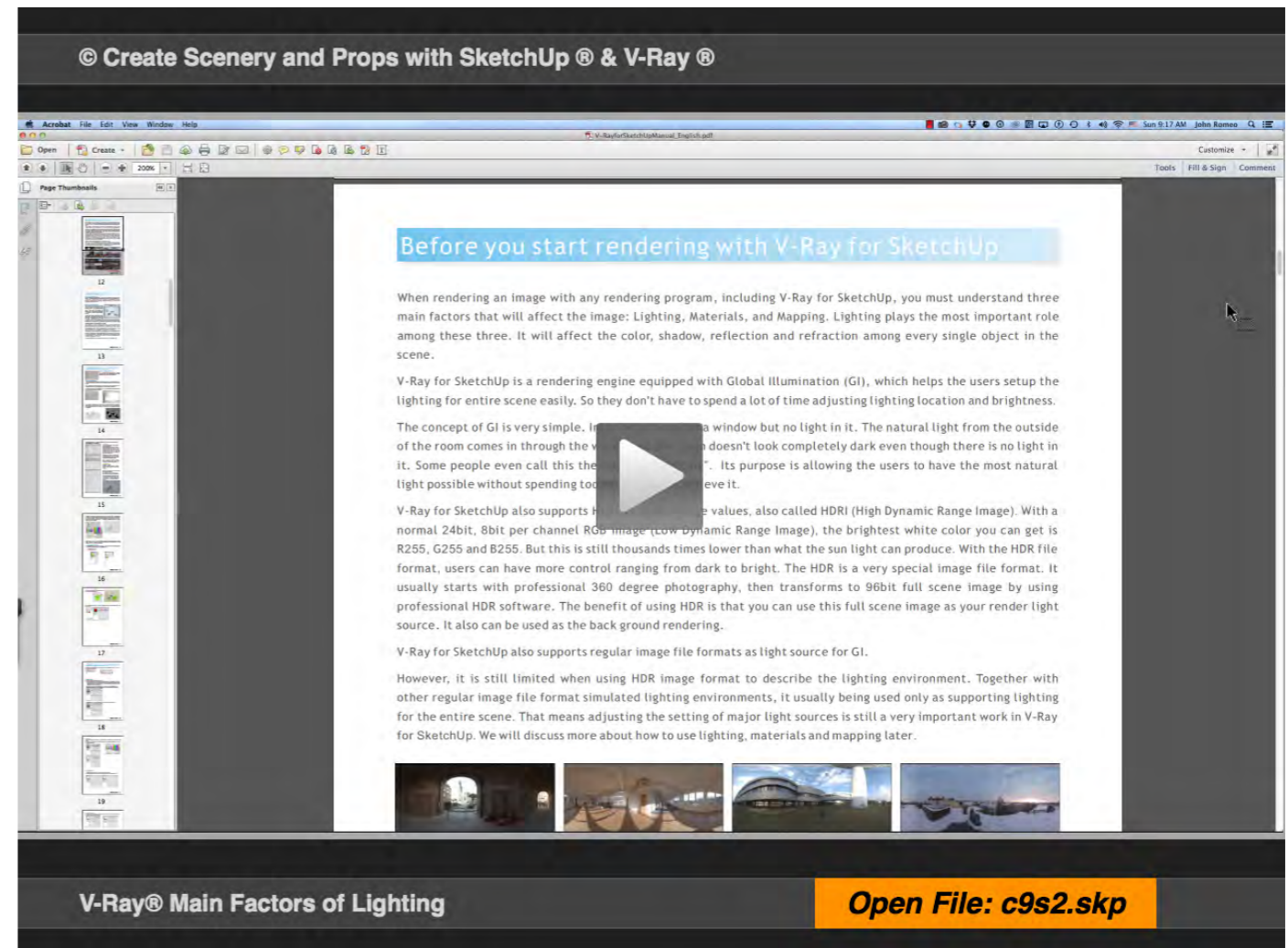you can see the shadows cast through the Skylight into the set.
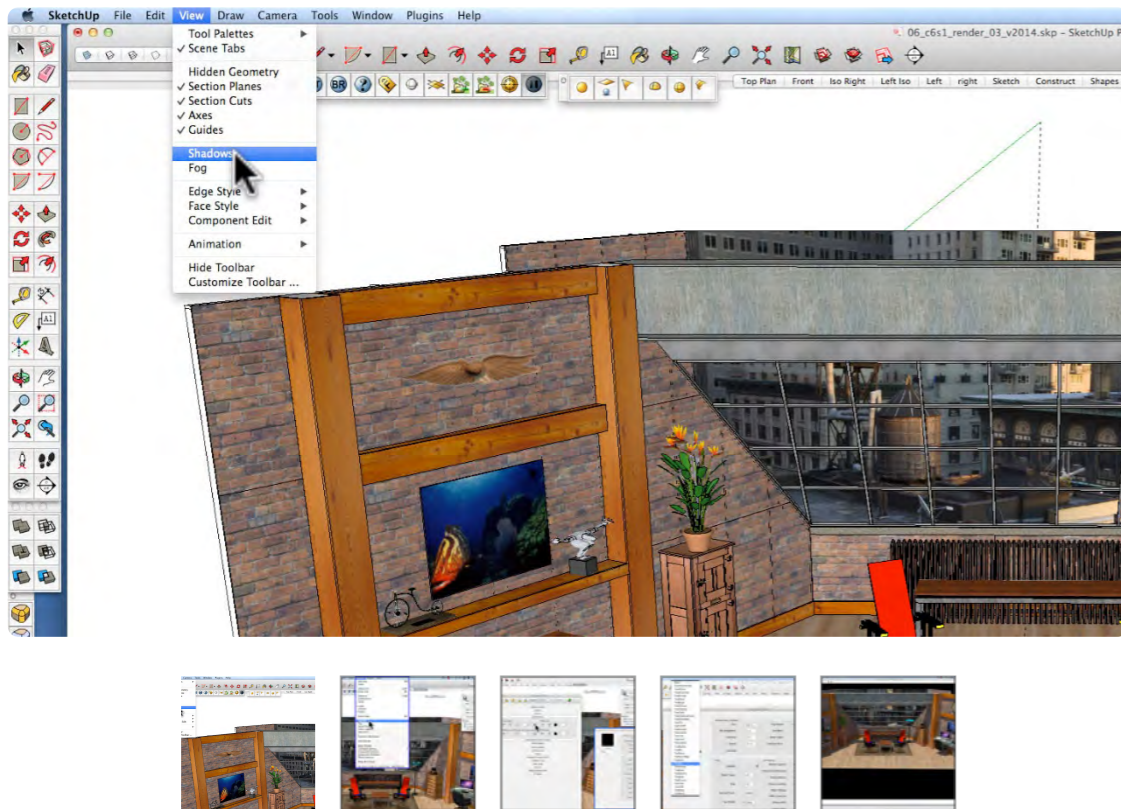
V-Ray® can work with the SketchUp Shadows. From the main menu choose view, Shadows: this turns shadows on. From the main Menu choose Window, Shadows: this opens the shadows controller.You can set the UTC code for a specific time zone. The Sun and Sky are enabled in the default settings.The TexSky Map is also in the default setting. The Sun and Sky may need to be disabled when lighting is added to the set. Select the "R" to start a new rendering, and

V-Ray® Main Factors of Lighting

VIDEO MARKERS

1. V-Ray® 3 Factors

2. V-Ray® Option Editor

3. Environment

4. Camera

5. Image Sampler

6. Output

7. Caustics

8. V-Ray® Materials

9. Component Attributes

10. Light Editor

Movie 9.2 Main Factors

01_V-Ray 3 Factors 0:00:00:02

Lighting, Materials, and Mapping in V-Ray are similar to Components and Groups in SketchUp in terms of the Structure of the Rendering and the Structure of the Drawing. The first V-Ray rendering you do will prompt many questions about the resulting image created. A basic understanding of how Lighting Materials and Mapping will affect color, Shadow, Reflection and Refraction, will save many hours of frustration. Using the Four Windows: V-Ray Option Editor, V-Ray Materials, The Components Window and The Light Editor, will move the rendering progress way passed the default settings into a much more interesting rendering.

02_V-Ray Options Editor 0:00:30:27
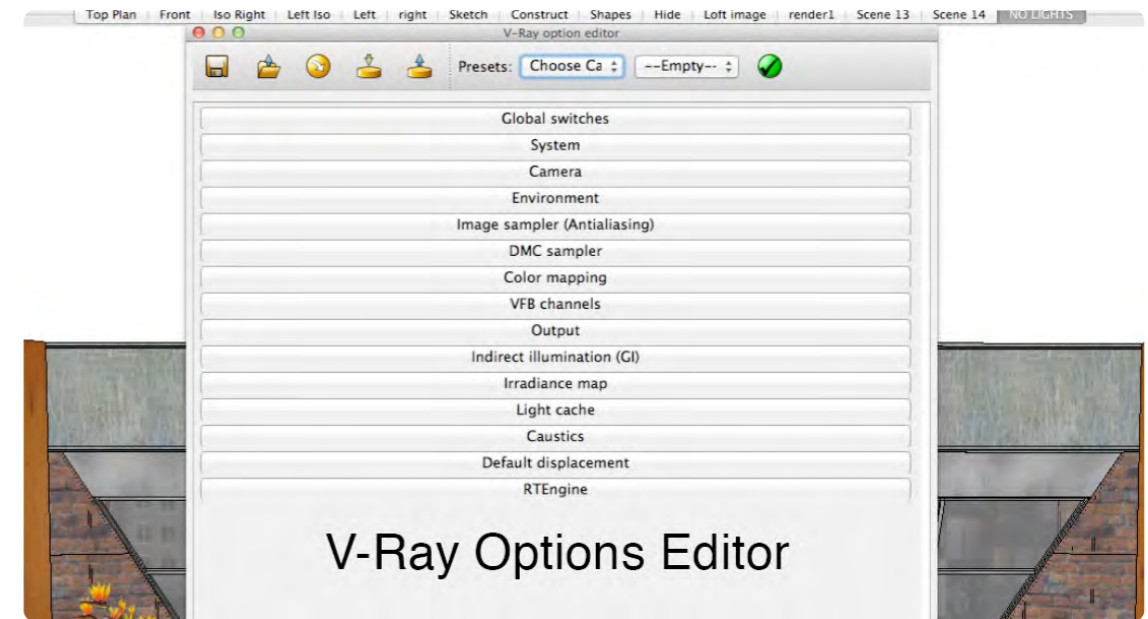
The V-Ray option editor is extremely deep in the amount of control options it provides. When I first looked at V-Ray, I was totally intimidated by this Menu and I said,"no way," only to discover that the default setting allowed me to get started quite easily. Finding your way through all these options is not so easy, so I am using how I dealt with these vast menus, by focusing on a few essentials and skipped the others initially. In my experience, focusing on Environment, Camera, Image Sampler, Output and Caustics, first worked out well. As I gained more experience with V-Ray®, I expanded into other menu options.

03_Environment 0:00:49:11

04_Camera 0:01:14:04T
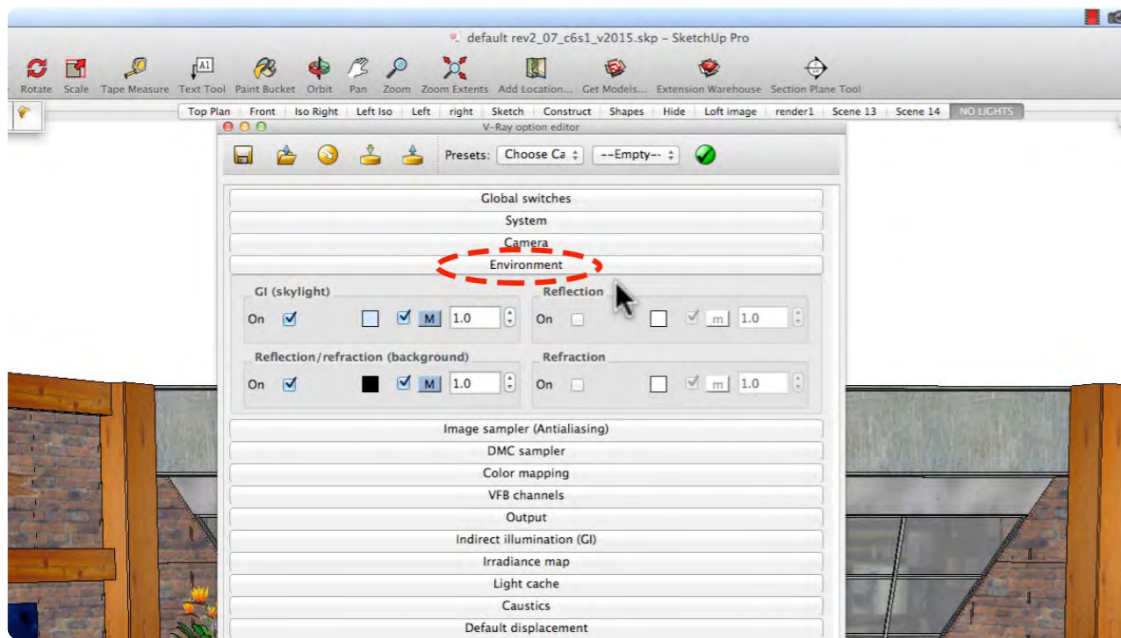
The Environment Option default setting is Global illumination (GI) turned on. Under GI, is a map slot "M" and in the map slot TexSky is enabled and under TexSky the Sun is enabled. The GI will behave as if a giant dome light was place over the scene. The GI intensity can be raise or lowered by entering a higher or lower value in the spinner of with the Physical Cameras

 If GI Skylight is un-check and no physical Lights are in the scene, the scene will render black. We will most likely disable the GI when we light the set with light objects.
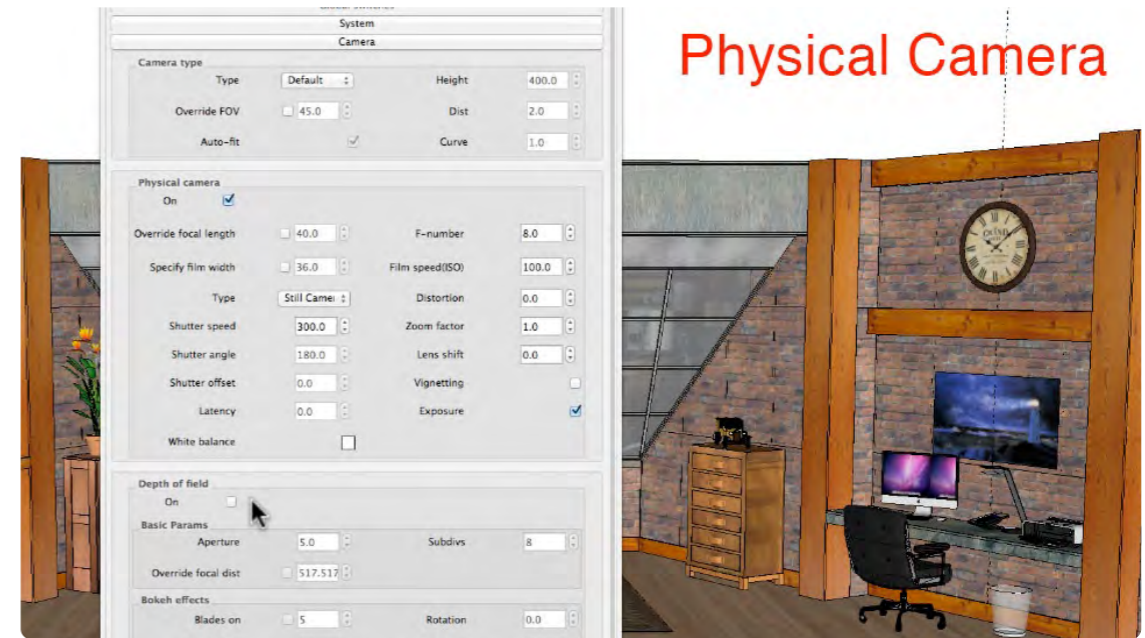
The V-Ray Physical Camera functions just like a Real World Camera. Notice that there are 2 different camera type drop downs: under Camera Type, select Default and under Physical Camera select Still Camera. The Physical Camera is turned on by default. Use the F-Stop and Shutter Speed to control the amount of light in the scene. Use the film speed to make the image lighter or darker so that the depth of will not be affected. The Depth of Field Option and Motion Blur are un-check in the default setting. The Physical camera can be used in conjunction with or without Global illumination.

05_Image Sampler 0:02:00:01

Image Sampler

06_Output 0:02:43:06

Output
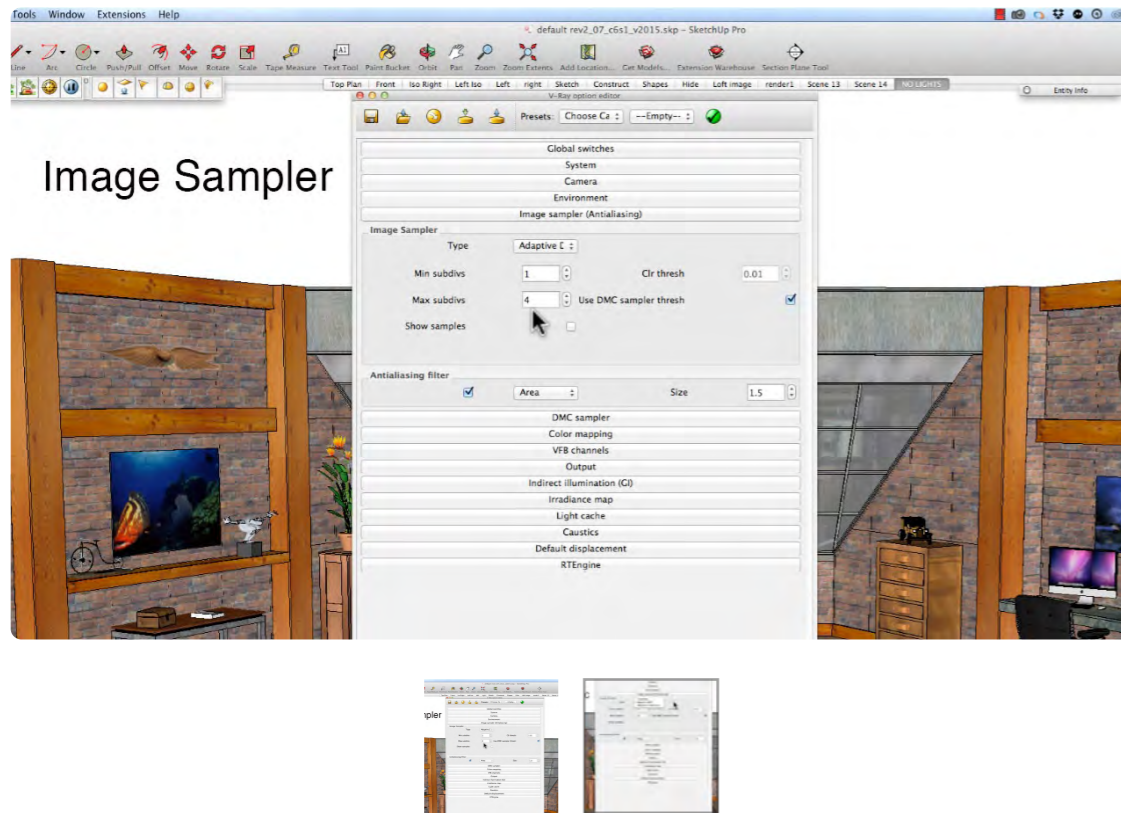
The Image Sampler determines the type of Rendering Engine and the quality of the drawing. Adaptive DMC is sort of a hybrid between fixed rate and Adaptive subdivision. The higher the number of subdivisions, the higher the quality of the rendering. The default number of subdivisions is 4 and 10 would be very high. Test renderings should be between 4 and 8 would be good for the final rendering. Max Subdivision set at 8 will take a long time to render.
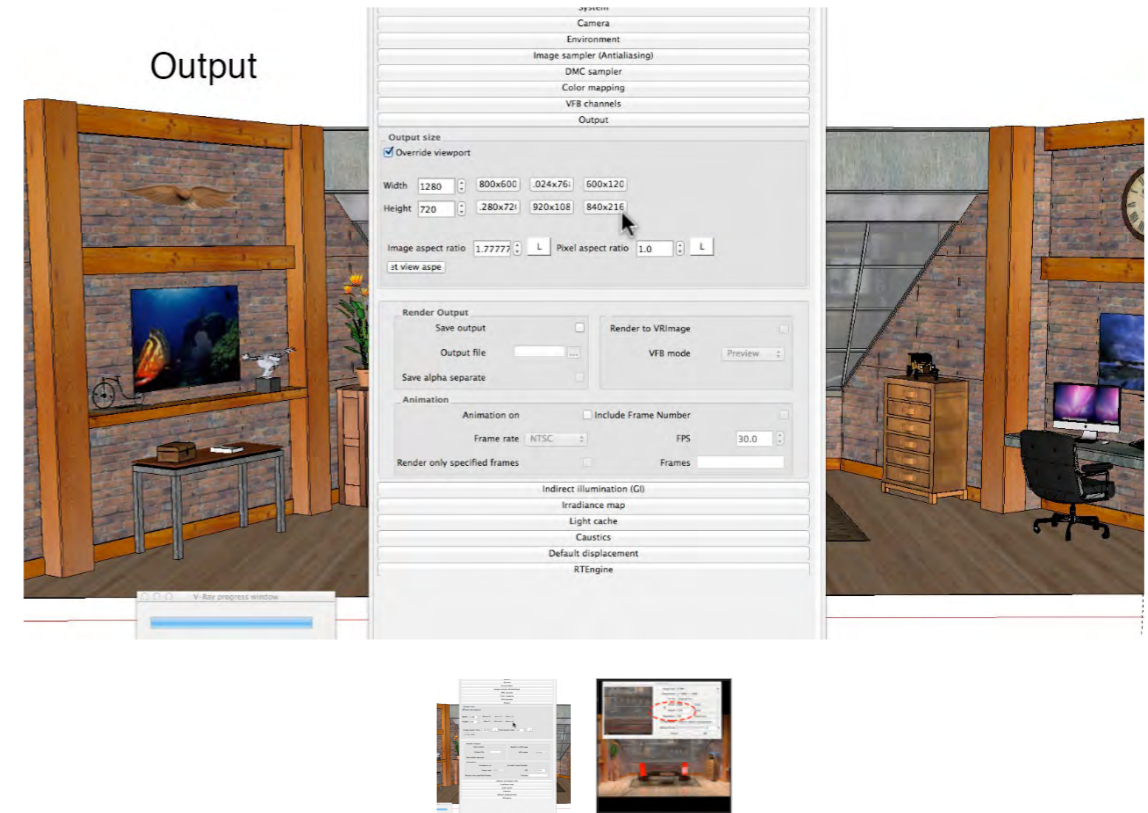
The Output determines the size of the rendering. The default setting is 800 x 600 pixels, which is a good choice for test rendering, since it will render quickly at that resolution. Choose from the presets or type in a custom image size. I generally leave, Save Output un-check, but if you want to save all the test renderings check Save Output and click the 3 dots to choose a location to save the files. V-Ray saves the image at 300dpi and I have not figured out where to change that setting.

07_Caustics 0:03:43:03
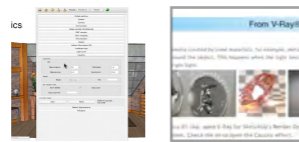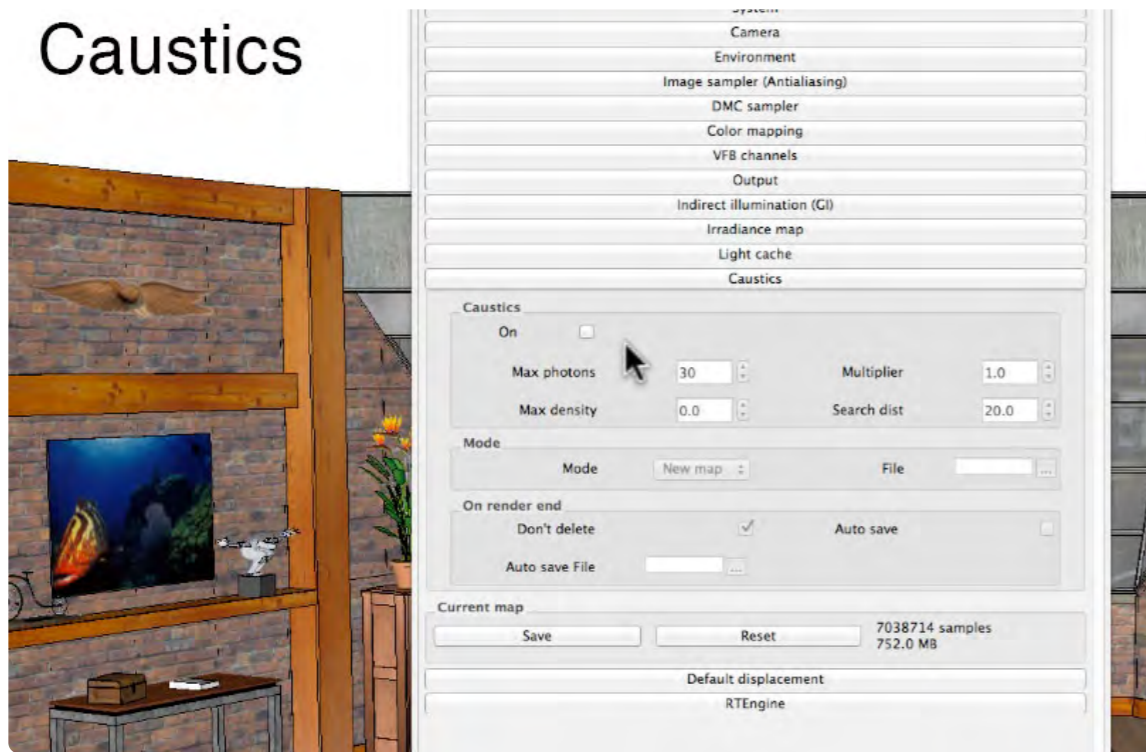
Caustics reflect or refract light around an object, that is either highly reflective or translucent. It is disabled by default and it will slow rendering down considerably. It makes water look very realistic, whether it is in a glass or in a pool. Image 2 shows how refracted light seems to be projected from one object to another and adds depth to the object projecting the light onto an adjacent surface.

08_V-Ray Materials 0:04:02:10
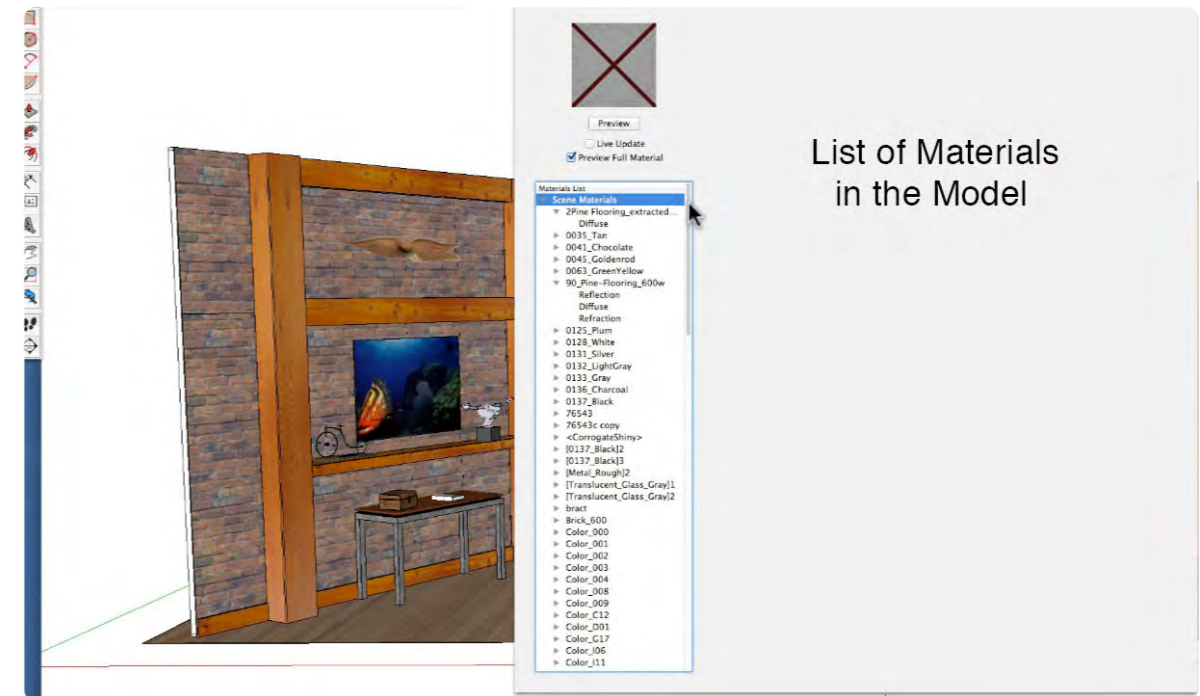
 When you open The V-Ray Materials Editor it is populated with SketchUp's IN MODEL MATERIALS (Image 1). The main functions of the V-Ray Materials Editor is to enhance SketchUp Materials, Load Materials from the V-Ray Library or Create New Materials. It doesn't have a default reset like the Option Editor. All Materials include a Diffuse Layer (Image 2). Right Click on the material, mouse over Create Layer and click on Reflection to create a Reflection Layer. Notice the Map, TexFresnel is added by default; click preview to see the reflection was added (see iImage 4).When the reflection

Increased to 3

Focus Light by Changing Position and Rotation Coordinates
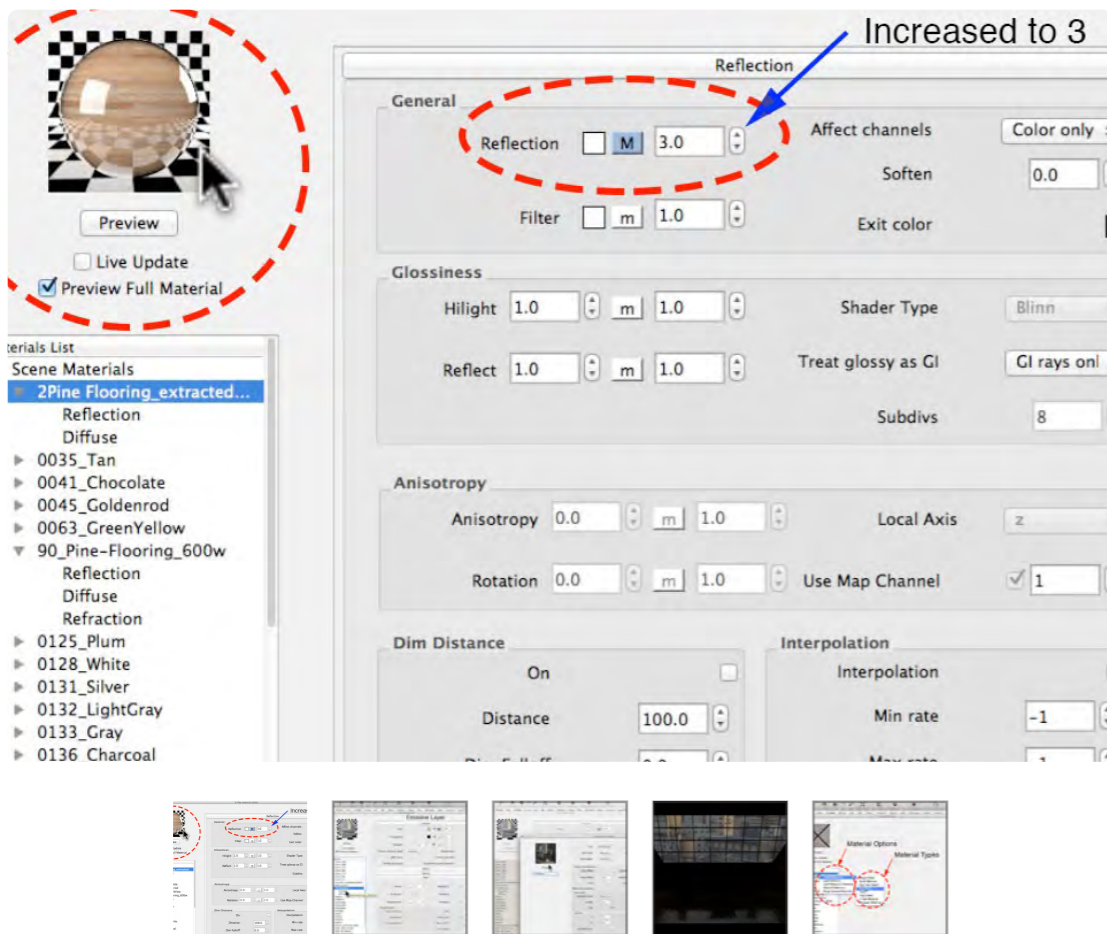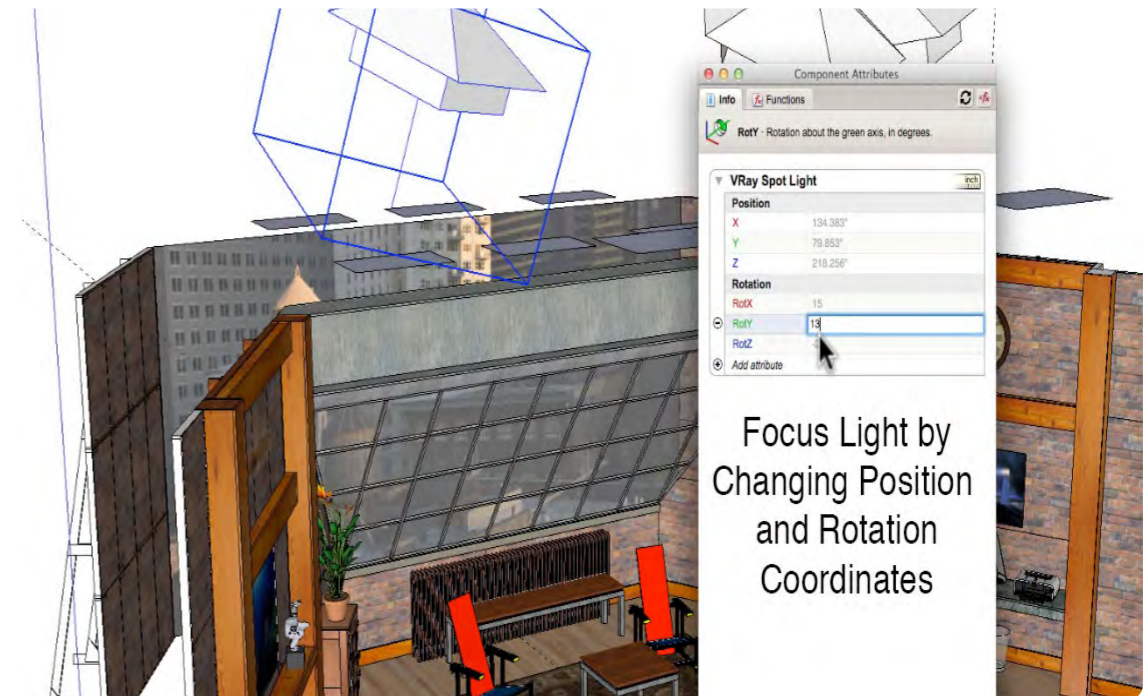
number is increased to 3, the reflection increases substantially. The Backdrop in the set, needs to emit light, so it needs an Emissive Layer (see Image 4). Right click on the DT_Backdrop Material, right click and add Emissive Layer. TexBitmap will be added in the Map slot. The DT_Backdrop image should have been added. If it is not there, click on the 3 dots next to File and locate the image file on your computer. The V-Ray Materials Editor has many different types of materials (see Image 5). The Standard Material is what we will be using, plus an image file 600 x 600 pixels.

The Components Attribute Window is a great place to focus lights, but first you have to add the Position and Rotation Attributes. Focus the light by changing the X,Y and Z coordinates. You can change the position and rotation of the light with the Move Tool and Rotate Tool, but it takes a lot of practice. It is a good practice to limit changes made to the light object by changing a Component's Attribute Position and X,Y-rotation.
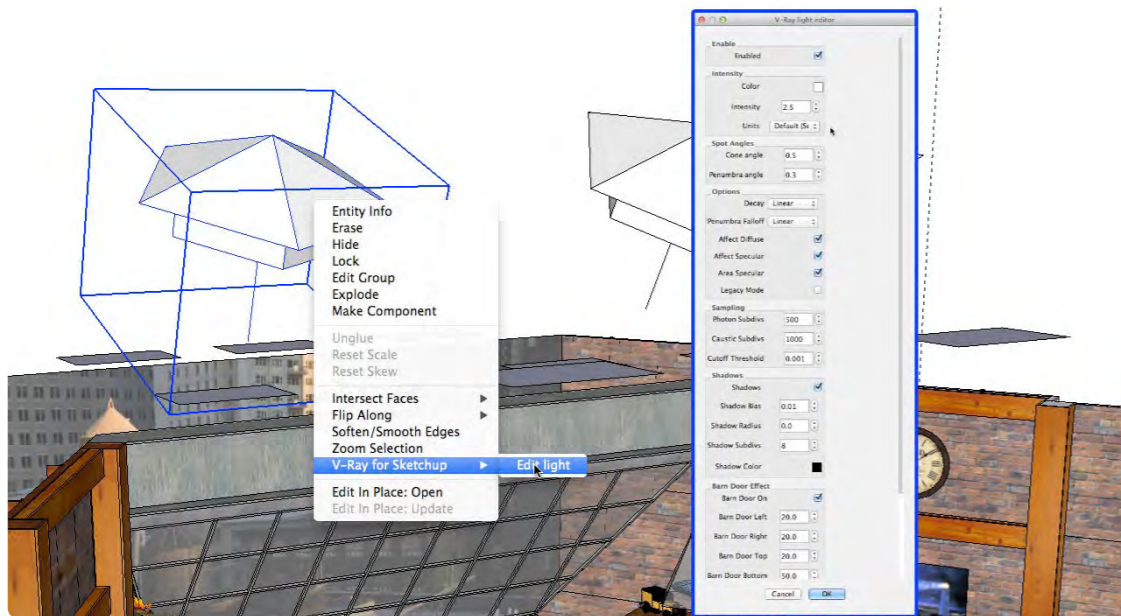
The V-Ray Light Object has its own options menu, which is accessed by right clicking on the Light and select V-Ray for SketchUp; Edit Light. This menu is used to change the properties and options. All options will move with a copy made of the light and remain unique with respect to the other lights. For some reason, V-ray has not included position and rotation in this menu, so we have to use the Component Attributes for that. A Focusing Guide can be added to the Light Object with the Protractor Tool to help direct the light.
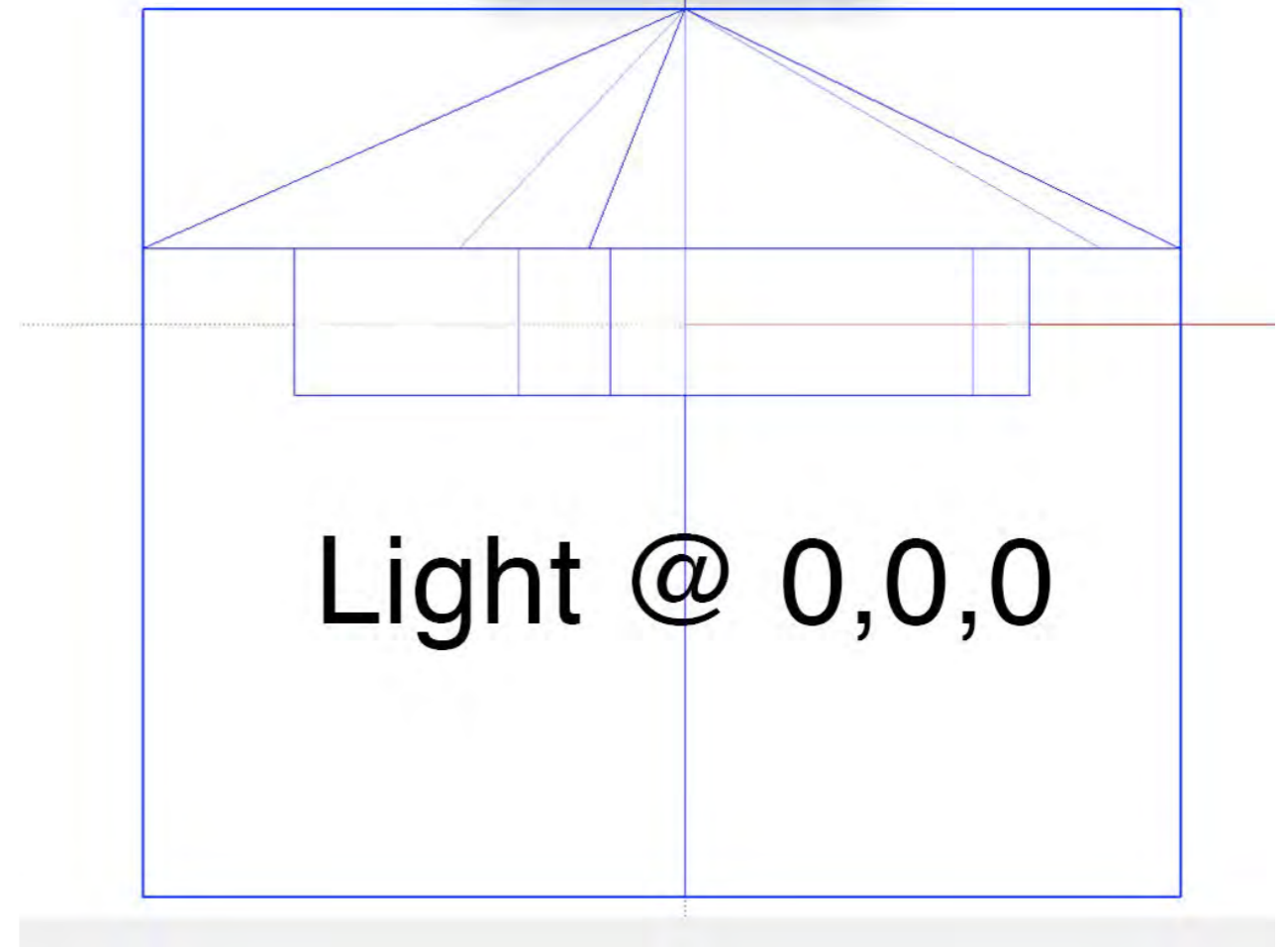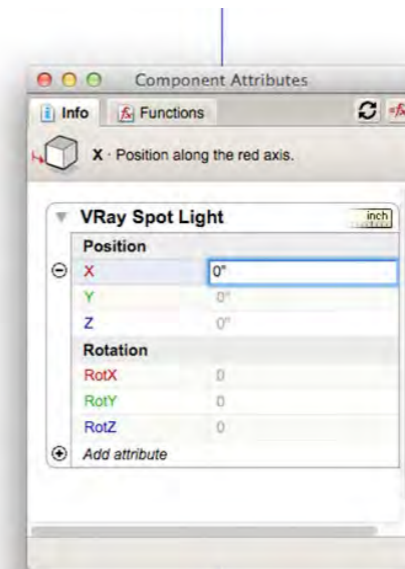
Light @ 0,0,0

V-Ray® Lighting Units

01_V-RAY LIGHTS

02_SPOTLIGHT

03_RECTANGLE

04_OMNI LIGHT

05_FLOOR LAMP

06_TWO SIDED

07_IES LIGHTS

Movie 9.3 V-Ray Lights

© Create Scenery and Props with SketchUp ® & V-Ray ®

V-Ray® Lighting Units

Open File: c9s3.skp

01_V-Ray Lights 0:00:00:01
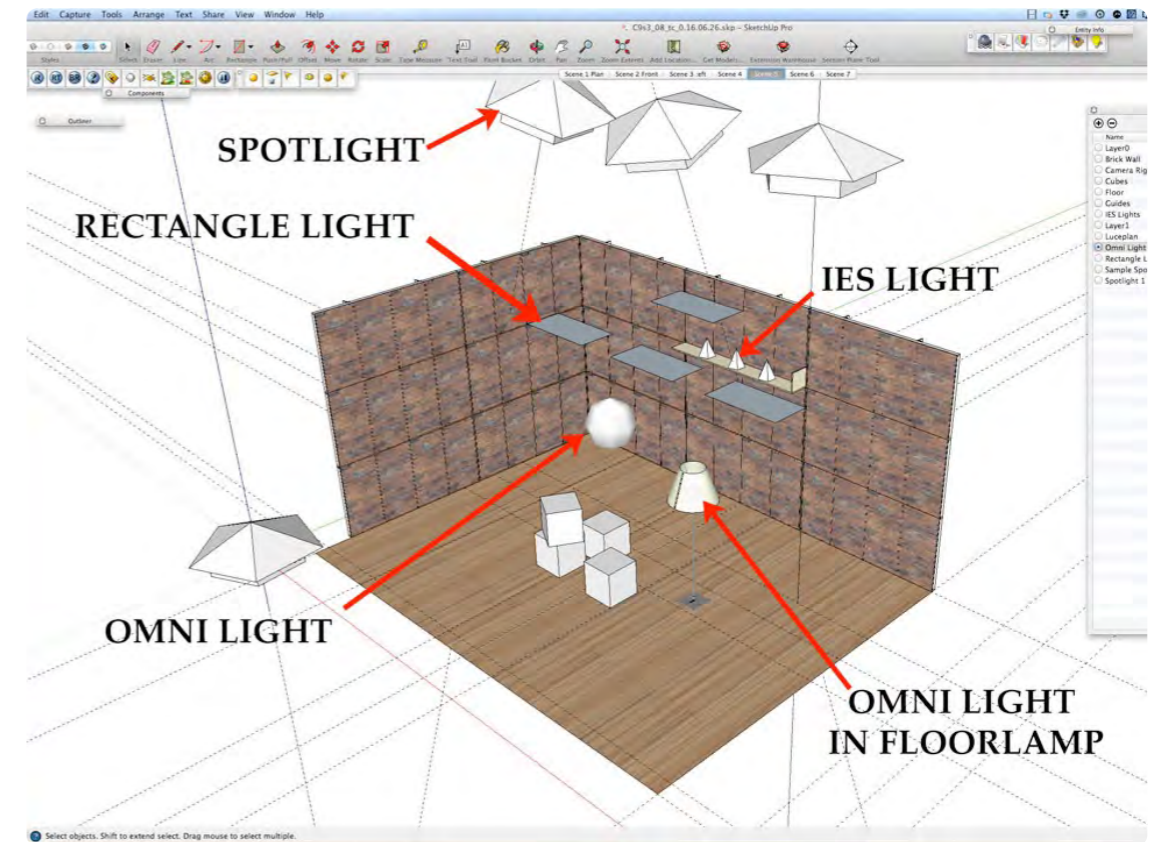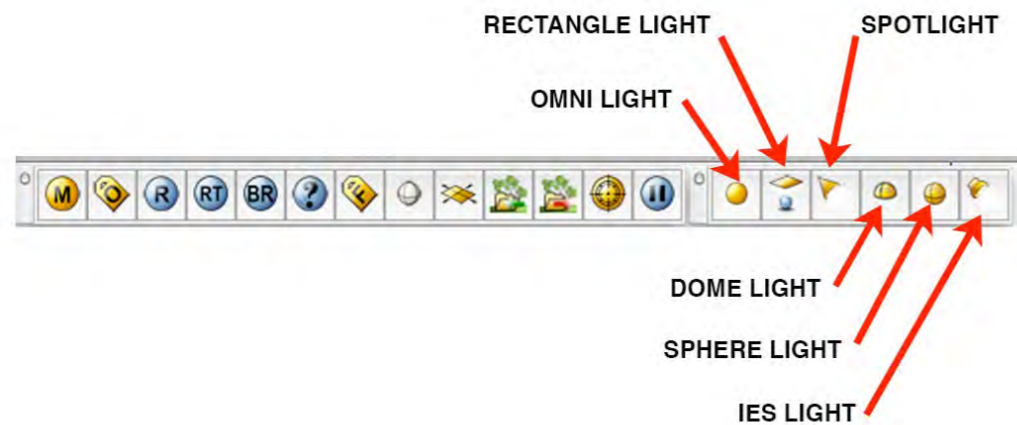
V-Ray® Lights Specs From Manuel

VRay Spot Light - V-Ray 2.0   VRay Dome Light - V-Ray 2.0

VRay Rectangular Light - V-Ray 2.0   VRay Sphere Light - V-Ray 2.0

VRay Omni Light - V-Ray 2.0   VRay IES Light - V-Ray 2.0

VRaySun and VRaySky Parameters - V-Ray 2.0

V-Ray® has six light types that can be used to simulate theatrical and film lighting or architectural lighting: Spotlight, Rectangle Light, Omni Light, IES Light, Sphere Light and Dome Light. The Spotlight functions like an Ellipsoidal and Fresnel; the Rectangle light functions like a fluorescent light or a light box; the Omni Light functions like a lightbulb in space and the IES Light works from a data file of a real world light. The Dome Light, Sphere Light and Sun and Sky are not covered in this section.

02_Spotlight 0:00:18:19

Step 2
Add Attributes

Step 3
Add Height "Z" Value

Step 1
Place Spotlight at 0,0
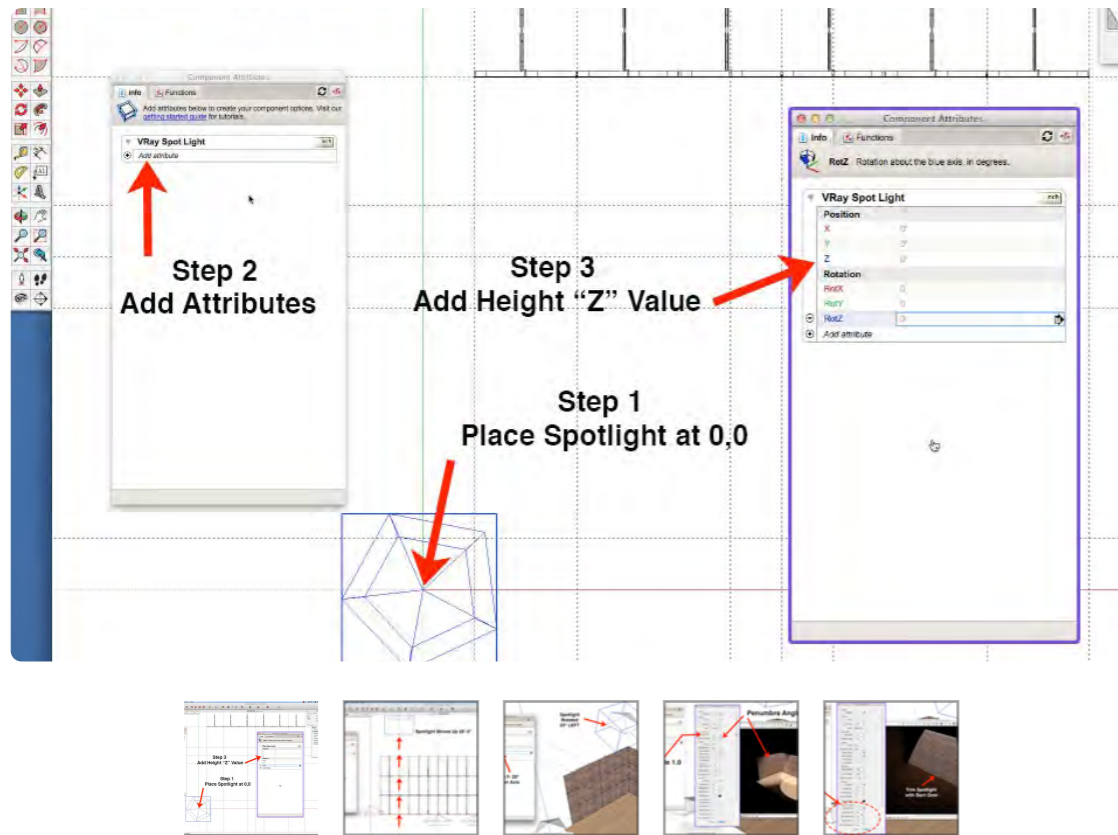
Placing a Spotlight in the set and then moving it with the Move Tool can be very frustrating and challenging. The easiest way is to locate the light, is to place it ground plane and then elevate the Z-Position in the Component Attributes Window. Change the Rotation Attribute to focus the angle of the light. The Beam size is controlled by adjusting the Cone Angle and change the hard edge of the beam by adjusting the Penumbra angle. The Spotlight has a built-in Barn Door function to trim the beam of light: change the Barn Door settings before changing the Penumbra Angle.

03_Rectangle Light 0:06:44:05

1st Click
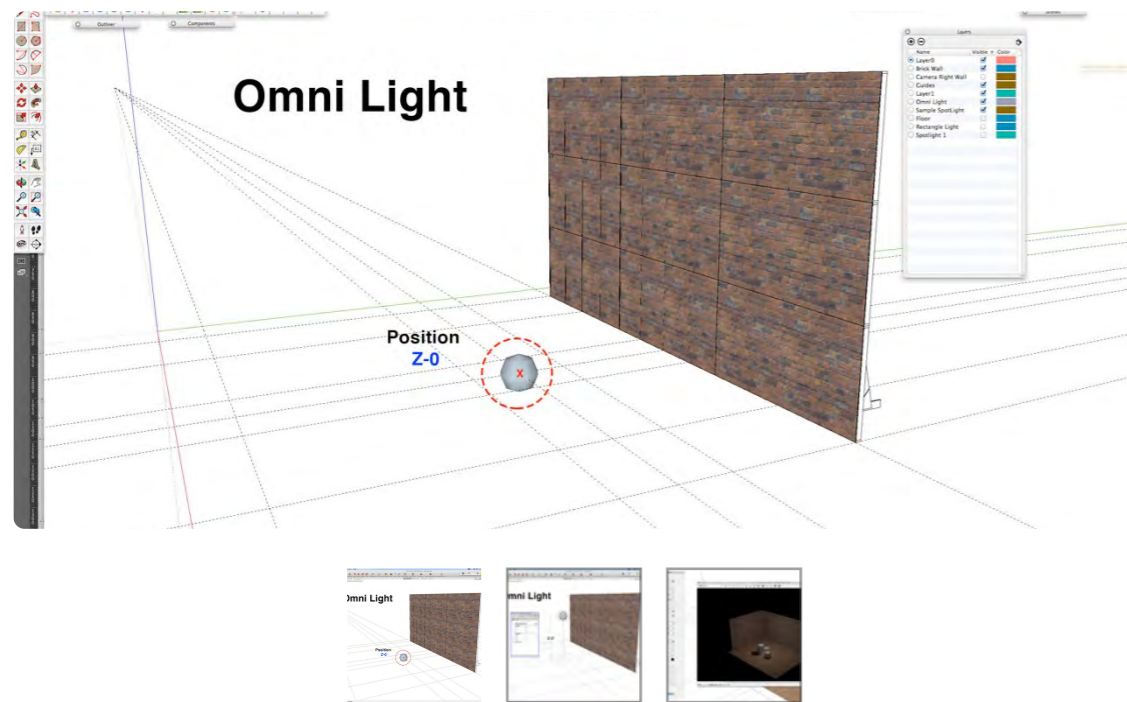
2nd Click
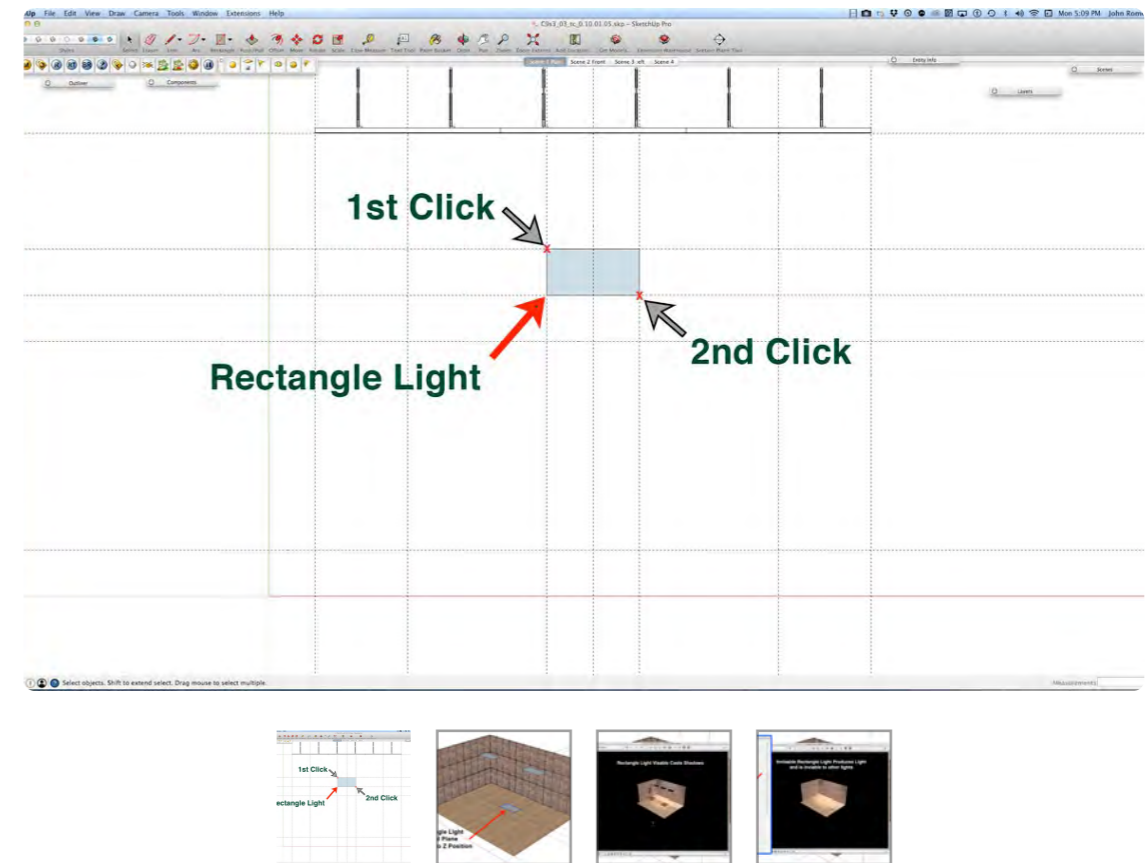
Rectangle Light

The Rectangle Light is created from two diagonal points, so it is a good practice make a rectangle layouts with the Tape Measure Tool and click on two diagonally opposite corners. It can also be formed by dragging in the X and Y like the Rectangle Tool, but you can't type in the size coordinates. Elevate using the Component Position Attributes. The bigger the area of the Rectangle Light, the more light it emits. An image file can be added to Light's Texture Map Slot and creating a virtual light box or translight. The Rectangle Light can be Double Sided and it can be made invisible.

The Omni Light is like placing a lightbulb in space or in a lamp. When you select the Omni light and click on a point on the ground plane, the Z-height will be at 0. In image 2 a line 8 ft high is drawn on the Z-Axis, and if you click on the top of the line, the center of the light will be placed at 8 ft. off the floor. In the V-Ray® Light Editor, Change the Units to, Lumious Power, and the Intensity to 7500 and keep the default setting for all the other options. A test render will reveal an evenly lit image that cast shadows. Light emitted from the Omni light is blocked by objects placed in its path and it will cast shadows.

Placing an Omni Light in the Floor Lamp is easy if you follow the 8 steps in the images above: turn off the lampshade; Draw a cross with the Line Tool; place an Omni Light on the intersection of the cross; Scale it to the approximate size of a lightbulb; draw a short stem with the Line Tool at the Bottom of the Light; switch to the X-Ray Mode; drag the top of the stem to the cross and the light is exactly on top center of the floor Lamp. Open the V-Ray® Light editor and set the Intensity to 10,000, the Units to Lumious Power and the Decay to Inverse. Do a test render, and you can see the light is functioning properly, however the light is blocked by the lampshade.

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06_Two Sided Material 0:13:13:12
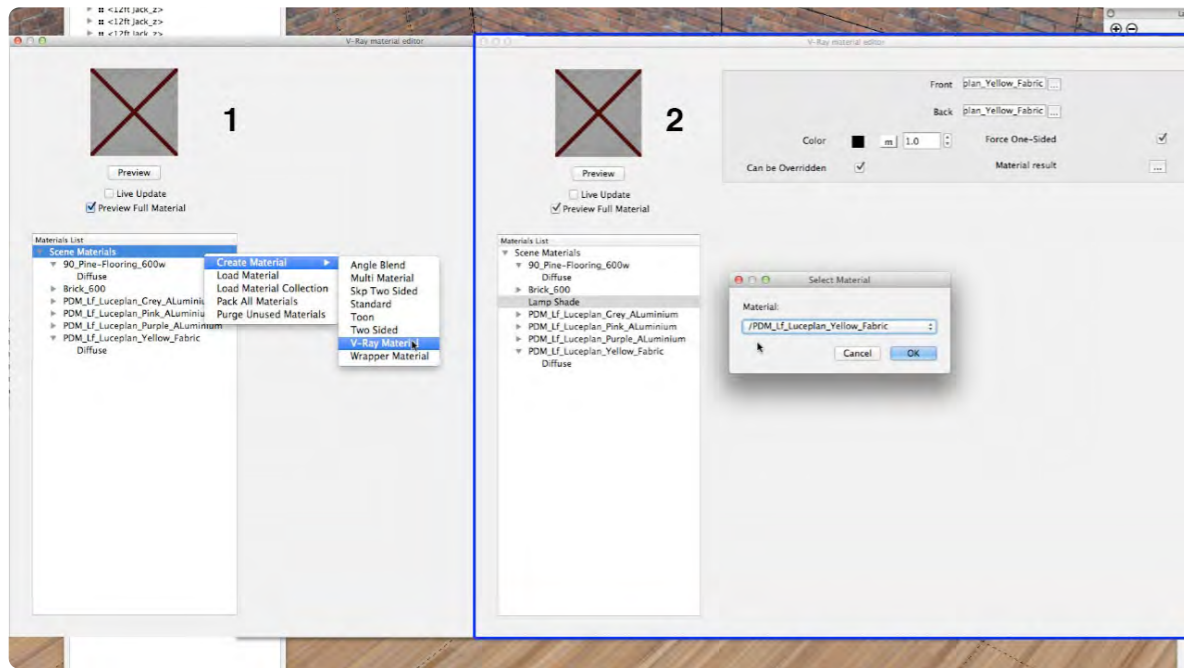
The Two Sided Material allow light pass through the material. In the V-Ray® Materials Editor, with Scene Materials Selected, Right Click; Create Material; Left click on Two Sided Material and rename the material Lampshade. Notice that there is a map slot for the Front Material and the Back Material. Essentially, one new material is created from two and in this case I am using the same material: different materials can be used. The default color is set to black and that needs to be changed toward white (grey), so I typed it a vale of 127. Next, Select Lampshade and go back to the
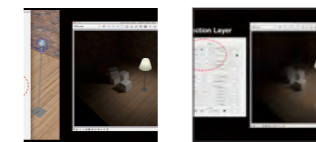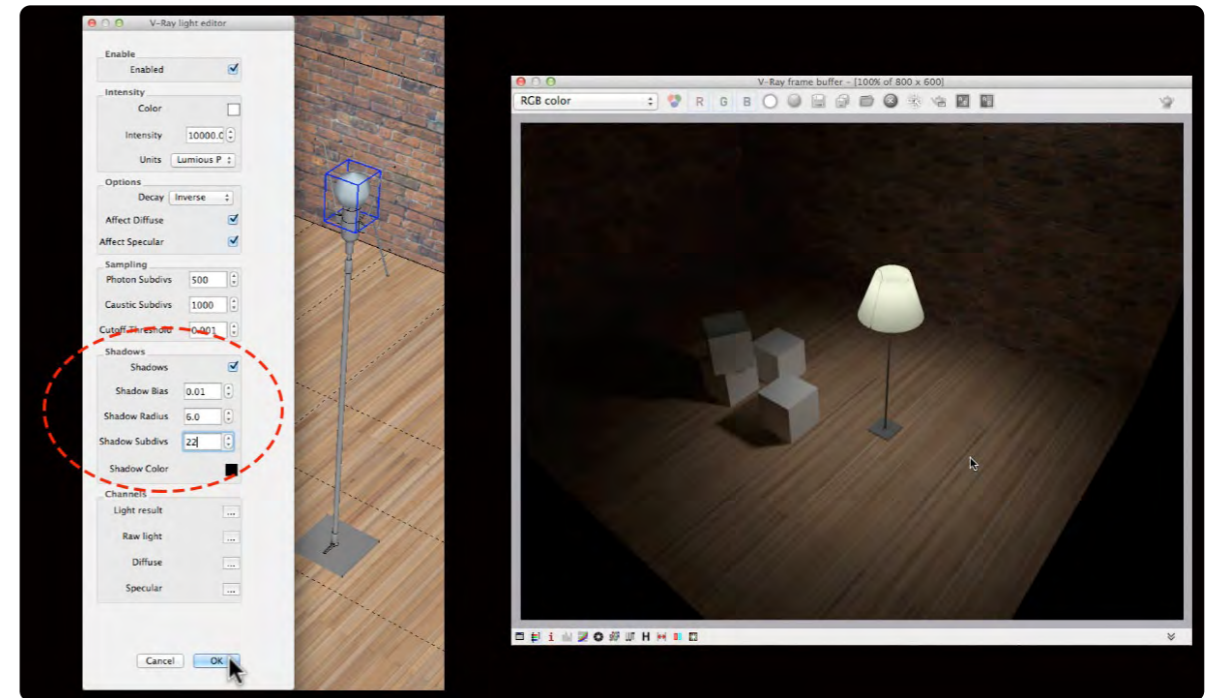
Materials Editor, right click on Lampshade, and select Apply Material to Selection. The test render shows the light passing through the Lampshade, but the light landing on the floor needs to be softened. In the V-Ray® Light Editor, Change the Shadow Radius to 6, and change the Shadow Subdivisions to 22; the shadow radius is softened. Next, add a reflection layer to the Pine Floor Material and do a test rendering. The light looks more natural and adding a gloss to the floor gives it more depth.

07_IES Light 0:16:25:06
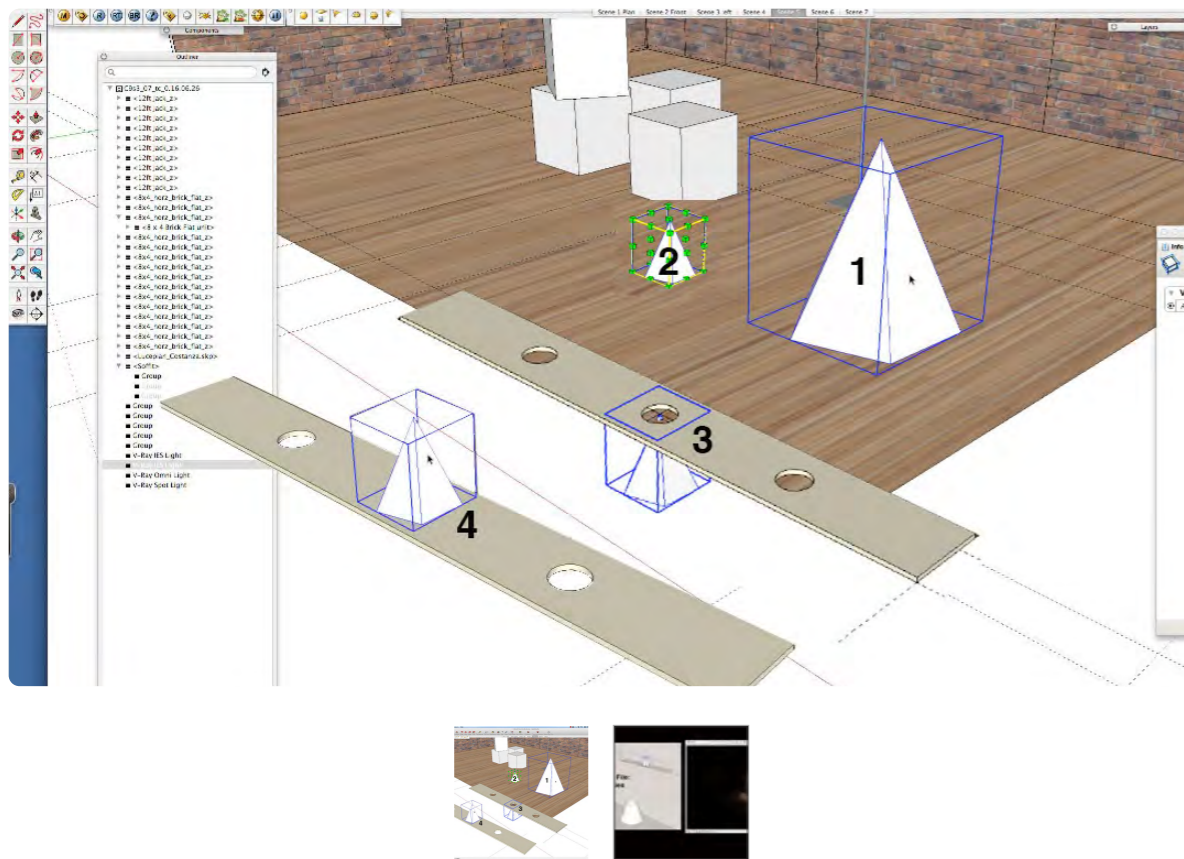
The IES Light's functionality comes from a data file, which emits light only from the bottom. It is very useful for simulating Recessed Lights and Wall Mounted Lights. Select the IES Light and click on a point on the ground plane or snap to a reference line and follow the 4 Steps in image one: 1.) Place the light; 2.) Resize the IES Light with the Scale Tool: 3.) Move it to the soffit; 4.) Change its bottom height. Note, scaling the size of the light does not affect the amount of light supplied.

In the V-Ray® Light Edit Map Slot, click on the 3 dots, from the exercise files choose: 5.ies and click OK.

The Data file controls the quality and intensity of the light, however the intensity can be overridden in the V-Ray® Light Editor. There are many IES Light Data files available from light manufacturers' websites or just search IES lights. Image files of what the IES light looks like are usually paired with the IES data file.

Lighting & Rendering the Set

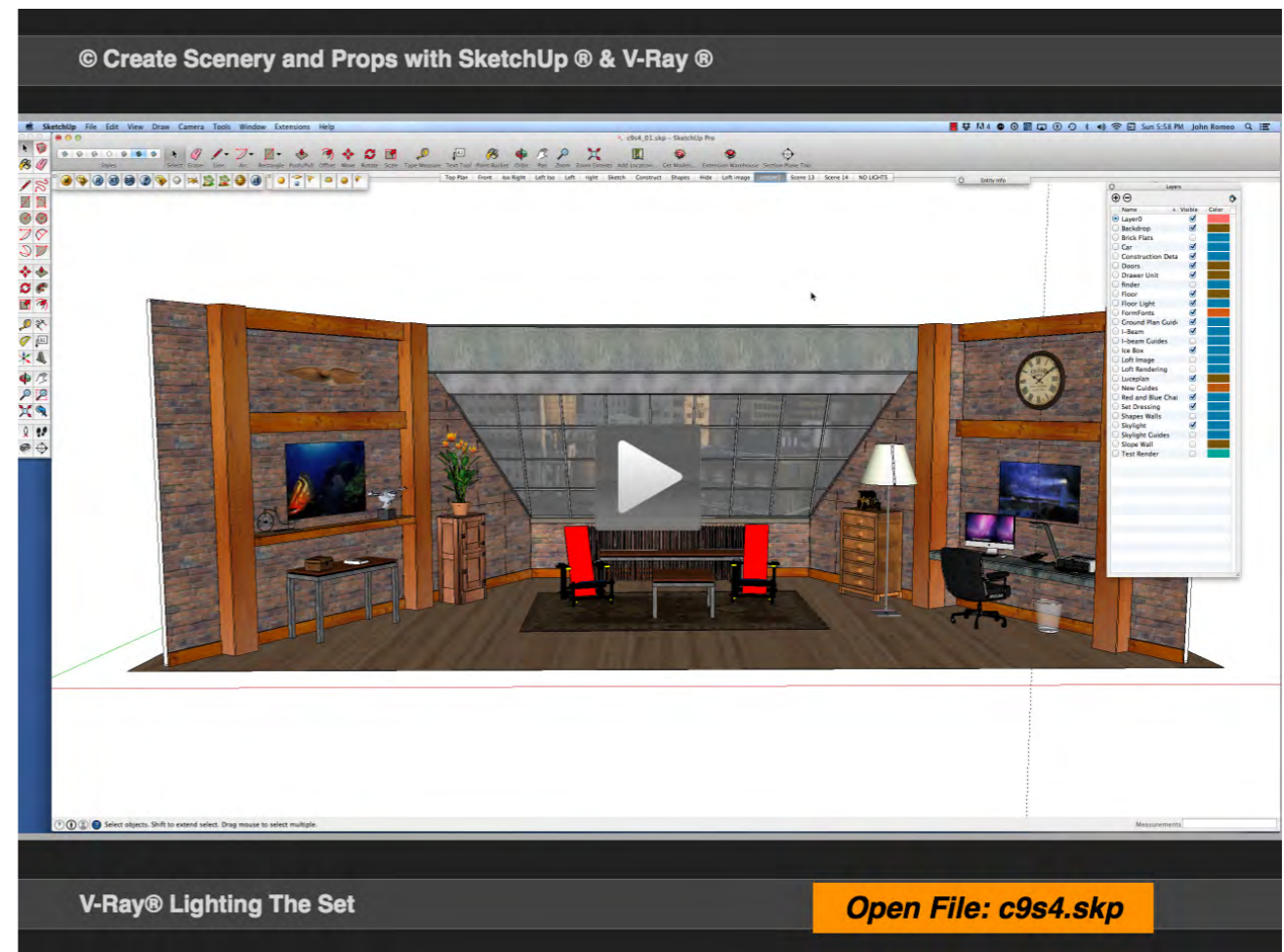**Movie 9.4** Lighting The Set

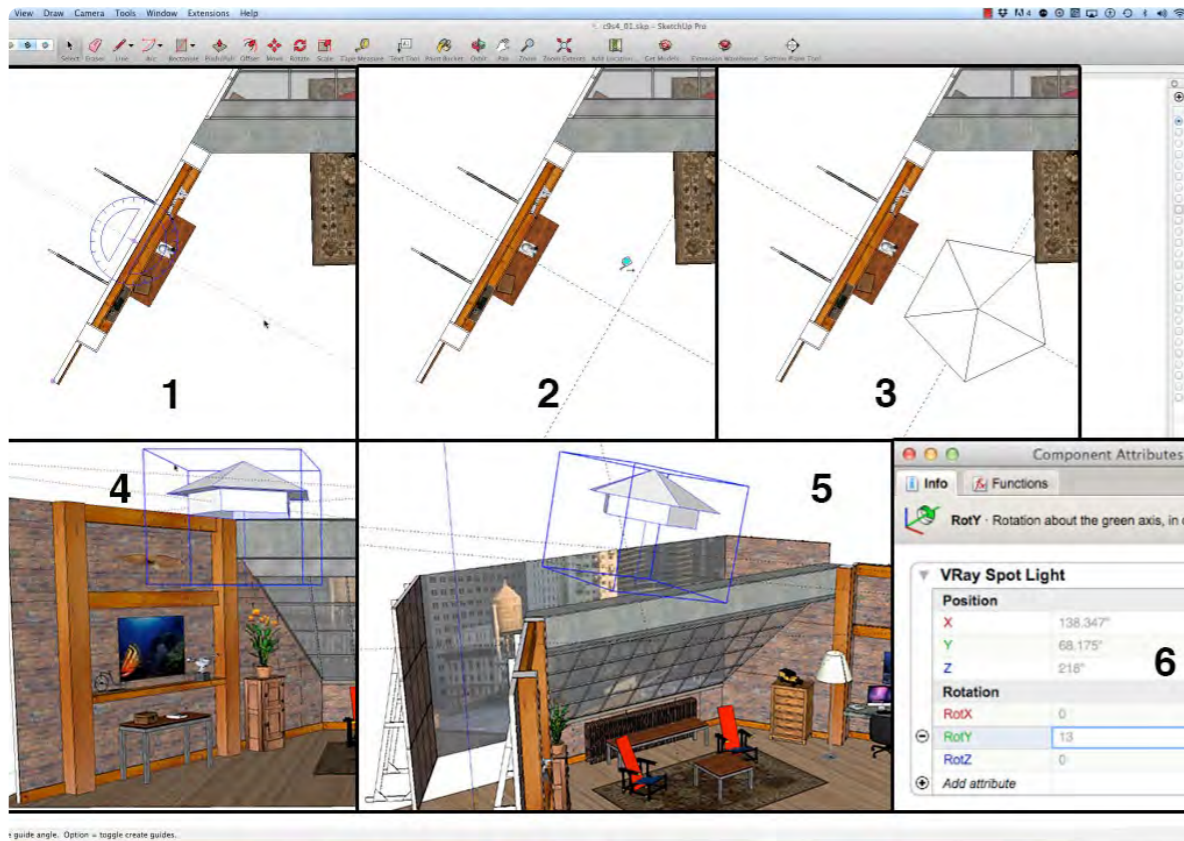01_Wall Wash Spotlights

02_Fill & Downlight

03_Practical Light

01_Wall Wash Spotlights 0:00:00:01

Use Spotlights to create a wash of light on the Camera Left and Camera Right Walls and fill light in the center. Start by placing guides with the Protractor and the Tape Measure Tools, as shown in image 1 step 1 & 2, to locate the lights. The guide will most likely snap to the top of the set as in image 1, step 3 and not land on the ground plane, even though the plan view is selected. Each light was added

separately so you could see how each light changed the scene. In the Component Attributes Window, add position and rotation to focus the light on the Camera Right Wall.

The first light, in image 2, is very bright and has a hard edged cone: change the Intensity to 2.5, make the Cone Angle .5 and the Penumbra to .3; select Area Specular, check Barn Door and give the Bottom Barn Door a value of 50. Do a test render and the Intensity is reduced and the edge of the cone is softened. Notice the reflection of the Emissive Backdrop on the floor. This illustrates the amount of control available to selectively light areas of the scene.

The second Spotlight was copied and moved into an approximate position CR by dragging it constrained to the X-axis. Once again, change its position and rotation in the Component Attributes Window. The second Spotlight retained the attributes of the first since it was copied. Only the X-axis position is changed because it was dragged to a random X position. The Third Spotlight was copied to the floor, so it's position needs to be elevated and rotated. The lighting of the scene is taking shape using only 3 Spotlights and al ittle help from the Emissive Light from the Backdrop and the floor's reflective surface. Further experimenting with levels can achieve the selective visibility and create the mood of the scene.

02_Fill and Downlight 0:05:30:00
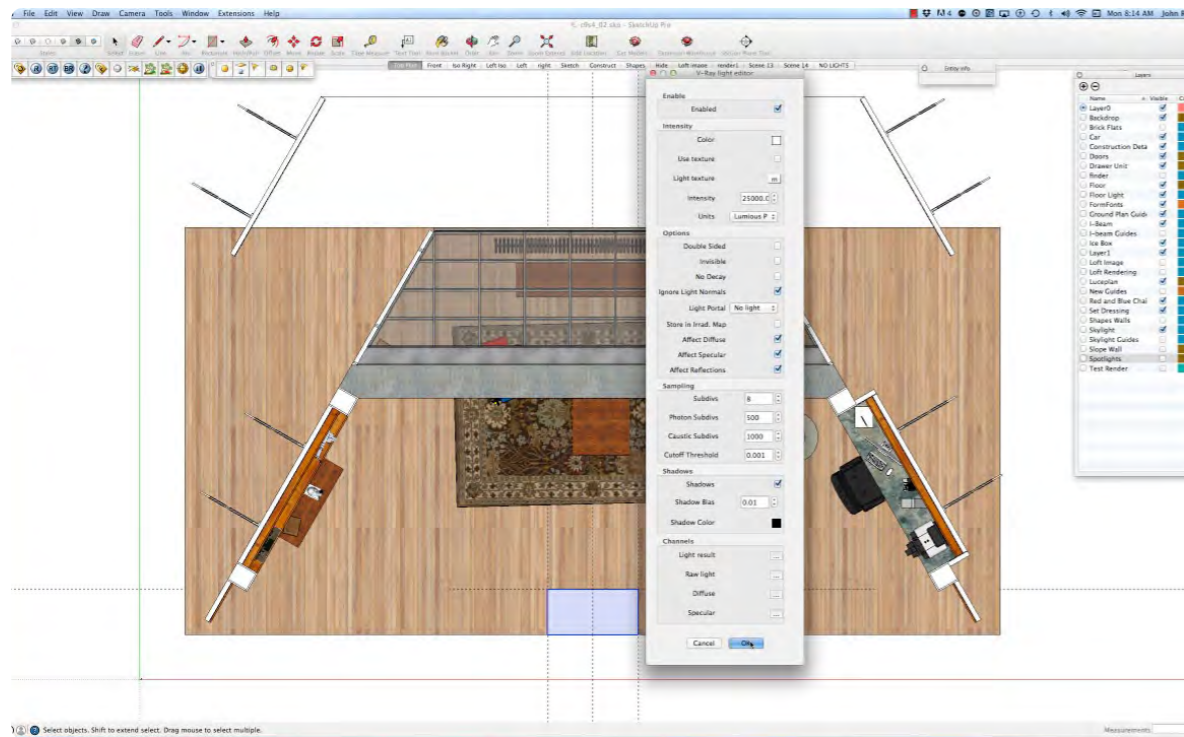
The Rectangle light is used in the set as downlight and fill light, similar to the function of fluorescent lights. Size matters, because a 24" X 48" Rectangle Light will emit twice the light of a 24" X 24" Light. Use guides to place and size a Rectangle Light downstage center on the ground plane, making sure that it snaps to the ground plane. Change the Attributes of the 1st Rectangle Light: Change to Lumious Power, type in 25000. Place a light 24" left of center and 24" right of center; hold the Shift Key and select the 3 Lights;

holding the Option Key, select the Move Tool, snap to the upstage center of the center light and place one copy on the upstage edge of the floor and another copy behind the Backdrop.

At downstage center, draw a vertical line, constrained to the blue axis, 15'-0" high. Hold the Shift Key and select all 9 lights; click on the downstage edge of the center light and snap it to the top of the 15'0" vertical line.

A test rendering shows the affect of the Rectangle Lights, which make the scene much brighter and softer. Notice the Lights are visible and the Spotlights above cast shadows from the Rectangle lights. Select edit light and check invisible to turn off the visibility of all 9 Rectangle Lights: this keeps the light on but it will not be visible or cast shadows. The shadows did create some interesting results in the scene on the floor and the skylight. Change the output to 1920 X 1080 to get a higher quality rendering. The overall lighting in the scene is much brighter and softer. Experiment with varying the Intensity of the Rectangle Light to break up the evenness of the 9 lights.

The Rectangle Light can be used to create a light box effect for the backdrop, as an alternate to the emissive layer by adding the backdrop image to the Rectangle Light Map Slot.

03_Practical Light 0:09:10:01
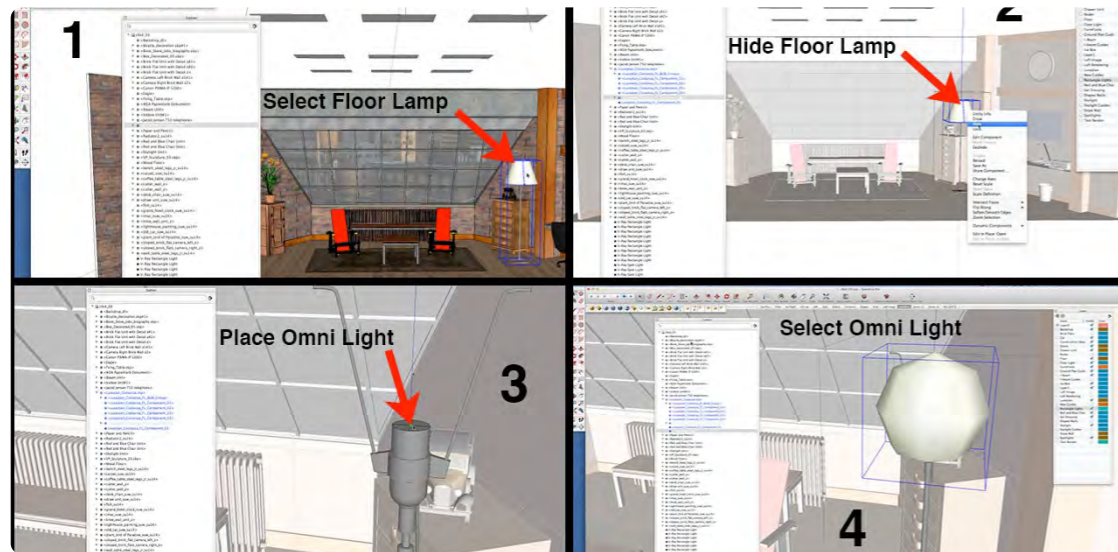
Making the Floor Lamp into a practical should be easy If you watched the Chapter 9, Section 3 video. Images 1, 2 and 3 are a quick review of the steps to place an Omni Light into the Floor Lamp. A Two Sided Material is already applied to the Lampshade from the previous video (see image 4). Place the Omni Light in the Floor Lamp and do a test render. Notice in the rendering, that the overall brightness of the set obscures the illumination from the Floor Lamp. Turn off the Spotlights and the Rectangle Lights and render the set with only the Floor Lamp on: the Loft looks very real. The Soft warm light from the Floor Lamp projects light up to the I-beam and cast interesting shadows.
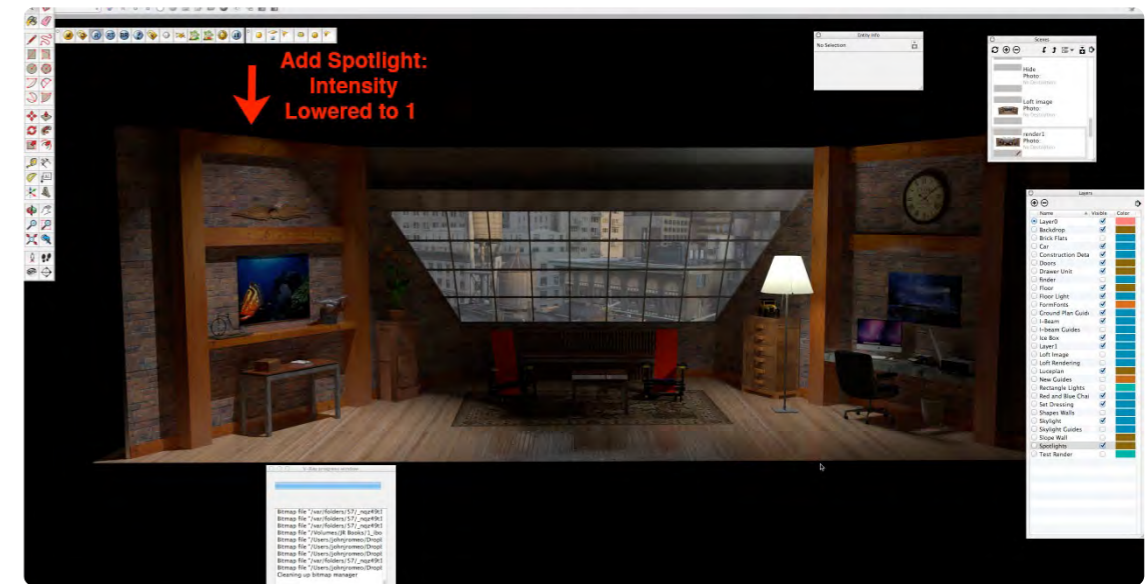
The Emissive Backdrop projects its image in a diffuse daylight reflection on the floor. Turn on the Camera Left Spotlight and lower the intensity to 1 and render and see the diffuse cone of light raked on the brick wall creating highlights, dark areas and shadows. Next, Turn on the Center and Camera Right Spotlights, lower the Intensity of both lights to .5 and render the set. The Loft Set image is greatly enhanced using very few lights with many interesting areas of varying quality and intensity. The Emissive Light from the Backdrop adds depth and a subtle cool reflection to the image. V-Ray® adds enormous control to SketchUp, so experimenting produces exponential possibilities.

Image 9.1 Final Image

Rendering of the Loft Set

Conclusion