Mastering the Sectional Approach

Software like SketchUp has a funny way of providing moments of perfect simplicity, moments when you sit back, scratch your head, and think to yourself, "That's it? That's all there is to it?"

Sections in SketchUp offer one of those moments. To put it simply, *sections* are objects that cut away parts of your model so you can look inside. However, the sections don't actually split or otherwise alter a model's geometry. A section is temporary and easily hidden or removed, so that you can see your whole model again just as easily as you created the cutaway.

You place sections wherever you need them, use them to create views you couldn't otherwise get, and then delete them when you're done. When you move a section plane, you get instant feedback; the cut view of your model moves, too. If you want to get fancy, you can embed sections in scenes and even use sections in animations. Sections are the icing on the SketchUp cake: easy to use, incredibly important, and impressive as all get-out.

People use sections for all kinds of things:

- Creating standard orthographic views (such as plans and sections) of buildings and other objects
- Making cutaway views of complex models to make them easier to understand
- Working on the interiors of buildings without moving or hiding geometry
- Generating sectional animations with scenes

Cutting plans and sections

The most common use for sections is to create straight-on, cut-through views of your model. These views often include dimensions and are typical of the drawings that architects make to design and explain space.

Straight-on, cut-through views are useful because

- They're easy to read.
- You can take measurements from them (if they're printed to scale).
- They provide information that no other drawing type can.

REMEMBER The following terms (illustrated in Figure 11-9) can help you create different views of your model more easily:

- **Plan:** A *planimetric* view, or plan, is a top-down, two-dimensional, nonperspectival view of an object or space. Put simply, a planimetric view is every drawing of a house floor plan you've ever seen. You generate a plan by cutting an imaginary *horizontal* slice through your model.

Everything below the slice is visible, and everything above it isn't.

- **Section:** Not to be confused with sections (the SketchUp feature), a *sectional* view, or *section*, is a from-the-side, two-dimensional, nonperspectival view of an object or space. You make a sectional view by cutting an imaginary *vertical* slice through your model. Just like in a plan view, everything on one side of the slice is visible, and everything on the other side is hidden.

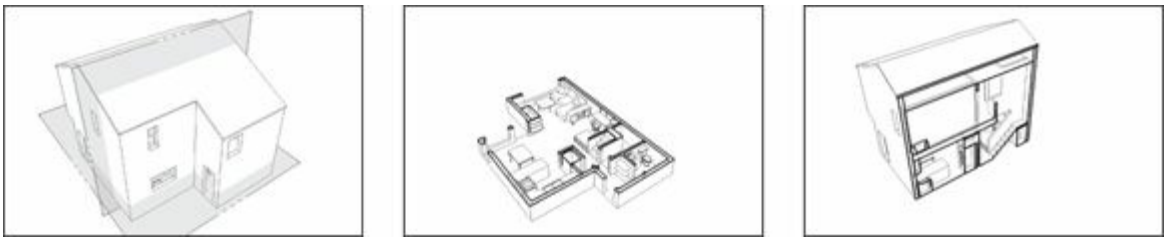

FIGURE 11-9: A plan is a horizontal cut, whereas a section is a vertical one.

CUTTING LIKE AN ARCHITECT

In architecture, the convention is to *cut* plans at a height of 48 inches, meaning that the imaginary horizontal slice is made 4 feet above the floor surface. This ensures that doors and most windows are shown cut through by the slice, whereas counters, tables, and other furniture are below it, and thus are fully visible. You can see what we mean in Figure 11-9. These details are important when you try to explain a space to someone. After all, architectural drawings are two-dimensional abstractions of three-dimensional space, and every little bit of clarity helps.

When it comes to architectural sections (as opposed to sections, the SketchUp feature), there's no convention for where to cut them, but you should follow a couple rules:

- **Never cut through columns.** If you show a column in a section, it looks like a wall. This is bad because sections are supposed to show the degree to which a space is open or closed. You can walk around a column, but you can't walk through a wall (at least we can't).
- **Try your best to cut through stairs, elevators, and other vertical circulation.** Showing how people move up and down through your building makes your drawings a lot more readable, not to mention interesting. See Figure 11-9 for an example.

You cut plans and sections by adding section planes to your model. These are a little abstract because nothing like them exists in real life. In SketchUp, *section planes* are objects that affect the visibility of certain parts of your model. When a section plane is active, everything in front of it is visible and everything behind is hidden. Everywhere a section plane cuts your model, a slightly thicker section cut line appears.

TIP If you're using Windows, open the Section toolbar by choosing View ⇒ Toolbars ⇒ Section. If you're on a Mac, the Section Plane tool is in the Large Tool Set, which you can activate by choosing View ⇒ Tool Palettes ⇒ Large Tool Set. On both platforms, Section Plane looks like a white circle with letters and numbers in it.To add a section plane, follow these steps:

1. **Choose Tools ⇒ Section Plane to activate the Section Plane tool.**

   

   You can also activate Section Plane by choosing its icon from the Large Tool Set (or if you prefer, the Section toolbar on SketchUp for Windows).

2. **Move the Section Plane tool around your model.**

   Notice how the orientation of the Section Plane cursor (which is quite large) changes to be coplanar to whatever surface you hover over.

3. **After you figure out where you want to cut, click once to add a section plane.**

   To create a plan view, add a horizontal section plane by clicking a horizontal plane like a floor. For a sectional view, add a vertical section plane by clicking a wall or other vertical surface. You can, of course, add section planes wherever you want; they don't have to be aligned to horizontal or vertical planes. Figure 11-10 shows a section plane being added to a model of a house.

4. **Choose the Move tool.**

5. **Move the section plane you just added by clicking it once to pick it up and again to drop it.**

   You can slide your section plane back and forth in only two directions so that the section plane remains perpendicular to its cutting plane. When you're deciding where to locate your cut, the nearby sidebar, "Cutting like an architect," offers helpful pointers.

   After you add a section plane and move it to the desired location, you can rotate and even copy it, just like any other object in your model. The section plane never affects your geometry — just the way you view it.

6. **If you need to rotate your section plane, select it and use the Rotate tool.**

   Why rotate a section plane? In certain circumstances, rotating a section plane (instead of creating a brand-new one) can help explain a complex interior space. Showing a plan view *becoming* a sectional one is a powerful way to explain architectural drawings to an audience that doesn't understand them.

   Read more about the Rotate tool in Chapter 3.

7. **To make a new section plane by copying an existing one, use the Move or Rotate tool to do it the same way you'd make a copy of any other SketchUp object.**

   Chapter 3 explains these basic actions in detail.

   Copying section planes is a great way to space them a known distance apart. Spacing sections planes consistently can be trickier if you use the Section Plane tool to keep adding new ones, instead.

   Figure 11-11 shows moving, rotating, and copying a section plane.

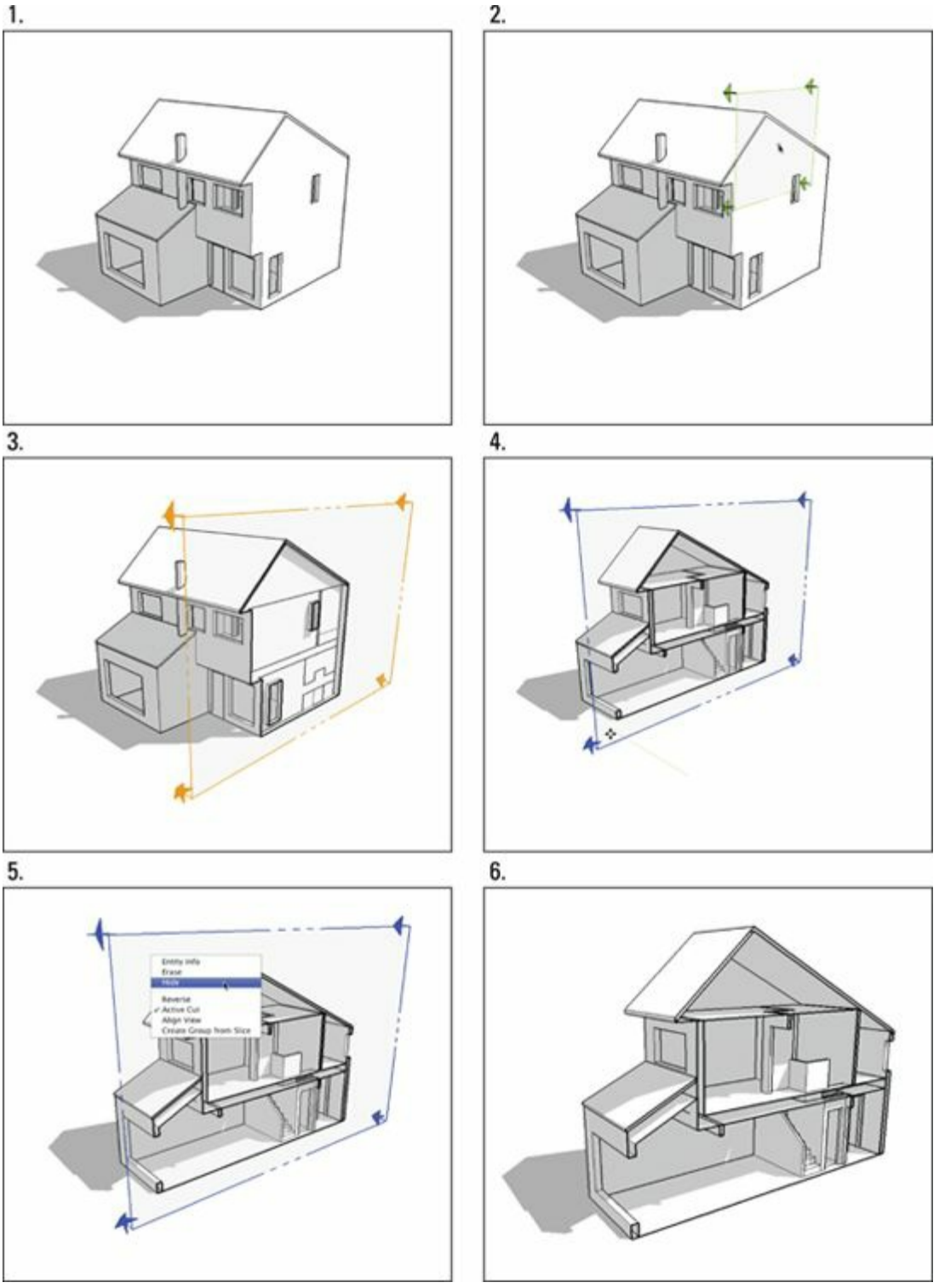

FIGURE 11-10: Add a section plane wherever you want one and then move it into position.

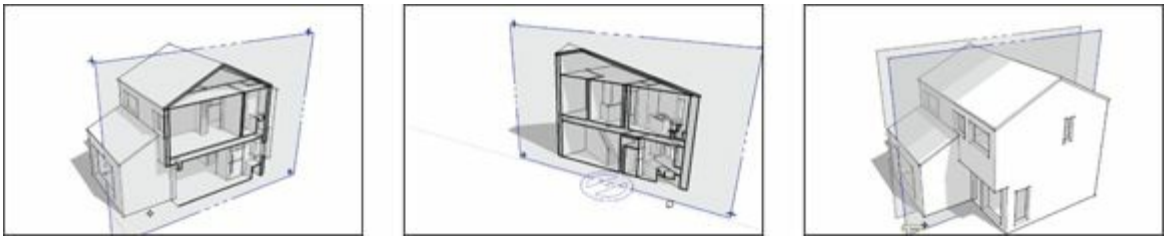

FIGURE 11-11: Moving, rotating, and copying a section plane.

When the section plane you've added is in position, you're ready to control how it affects visibility in a number of other ways. See the following sections for details.

Controlling individual section planes

You can control the way section planes behave by context-clicking them to bring up a context menu, as shown in Figure 11-12. You see examples of what the following options do in the same illustration:

- **Reverse:** This option flips the direction of the section plane, hiding everything that was previously visible, and revealing everything that used to be behind the cut. Use this when you need to see inside the rest of your model.

- REMEMBER **Active Cut:** Although you can have multiple section planes in your model, only one plane can be active at a time. The *active cut* is the section plane that's actually cutting through your model; others are considered *inactive*. If you have more than one section plane, use Active Cut to tell SketchUp which one should be active. If you have only one section plane but can't see the cut, check whether the cut is active.

TECHNICAL STUFF You *can* have more than one active section plane in your model at a time, but doing so requires that you nest, or embed, each section plane in a separate group or component. You can achieve spiffy effects with this technique, but explaining how they work in detail is beyond the scope of this book. You can read all about groups and components in Chapter 5.

- **Align View:** When you choose Align View, your view changes so that you look straight on at the section plane. You can use this option to produce views like the ones described in "Getting different sectional views" later in this chapter.
- **Create Group from Slice:** This option doesn't have much to do with the other choices in this context menu; it's really a modeling tool. You can use the Create Group from Slice command to do exactly what it says: Create a group from the active slice, or section plane. The command is handy for creating filled-in section cuts for final presentations.

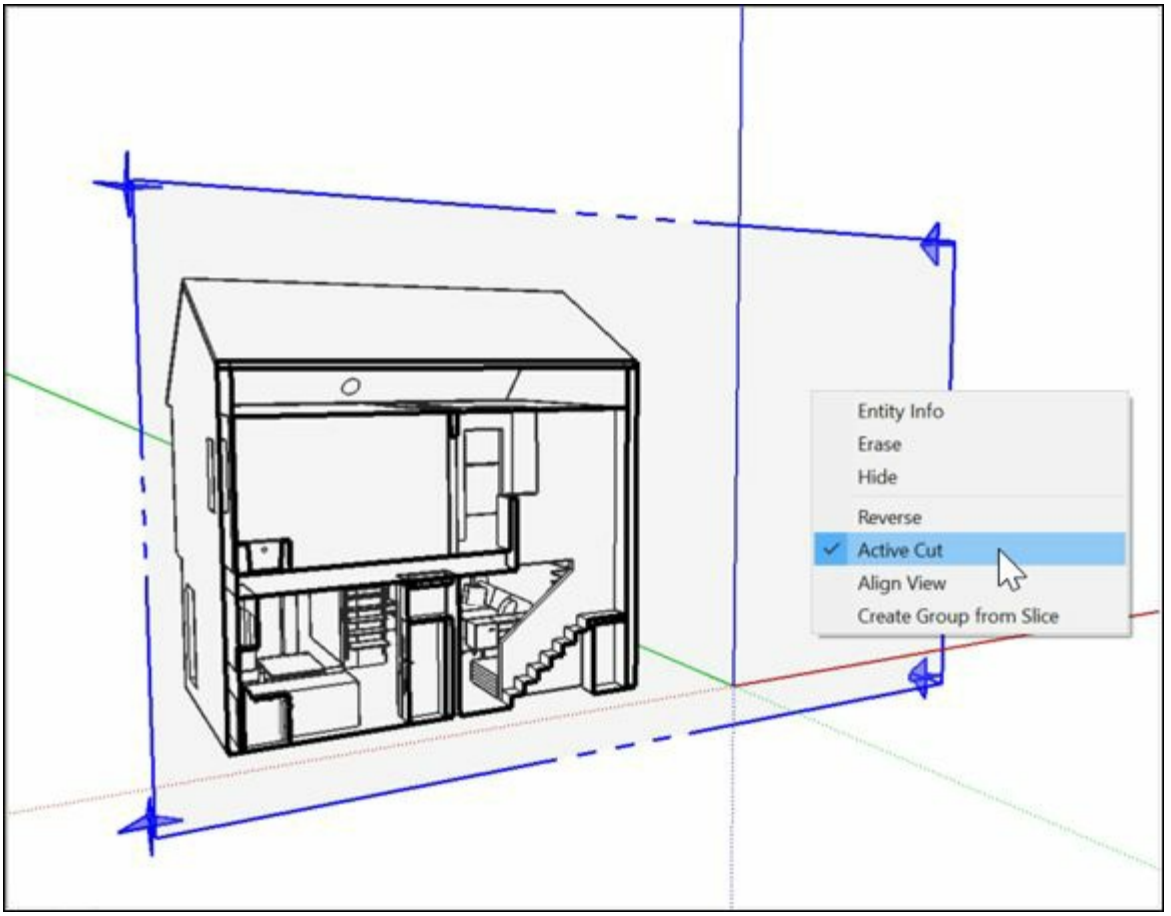

FIGURE 11-12: Context-clicking a section plane gives you some options.

Setting section-plane visibility

REMEMBER If you want to control the visibility of all your section planes at once, a couple menu options can help. Use both of these toggles in combination to control how section cuts appear in your model. These two options, shown on the View menu, are illustrated in Figure 11-13:

- **Section Planes:** This choice toggles the visibility of section-plane objects without affecting the section cuts they produce. More simply, deselecting Section Planes hides all the section planes in your model, but doesn't turn off the section cut effect, as shown in the middle image in Figure 11-13. This view is how you probably want to show most of your sectional views, so this toggle is pretty important.
- **Section Cuts:** This option toggles the section cut effect on and off without affecting the visibility of the section-plane objects in your model. This choice is sort of the opposite of Section Planes, in the previous point, but it's every bit as important.

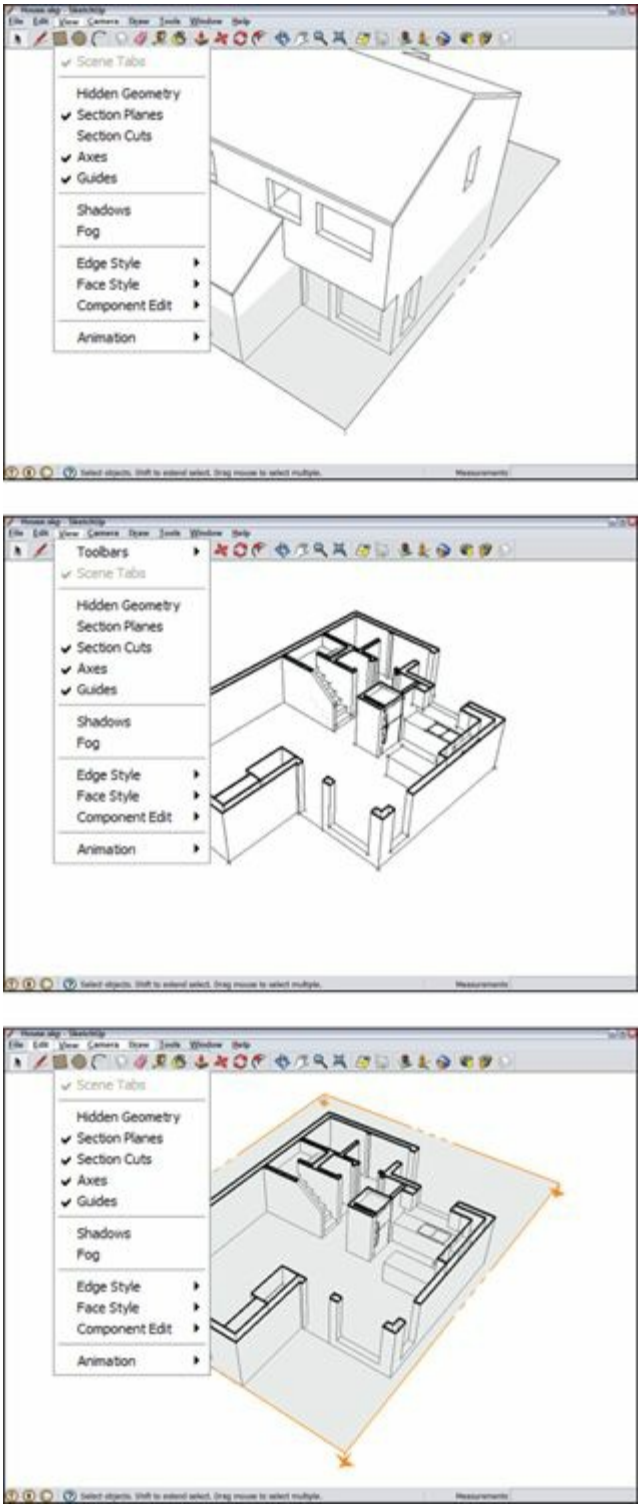

FIGURE 11-13: Control section plane visibility with Section Planes and Section Cut.

Getting different sectional views

Using section planes, you can create a couple useful and impressive views of your model without

much trouble. The second builds on the first, and both are shown in Figure 11-14. A section perspective (left) is a special view of a three-dimensional space. The second type, an orthographic view (right), is straight on and doesn't use perspective.

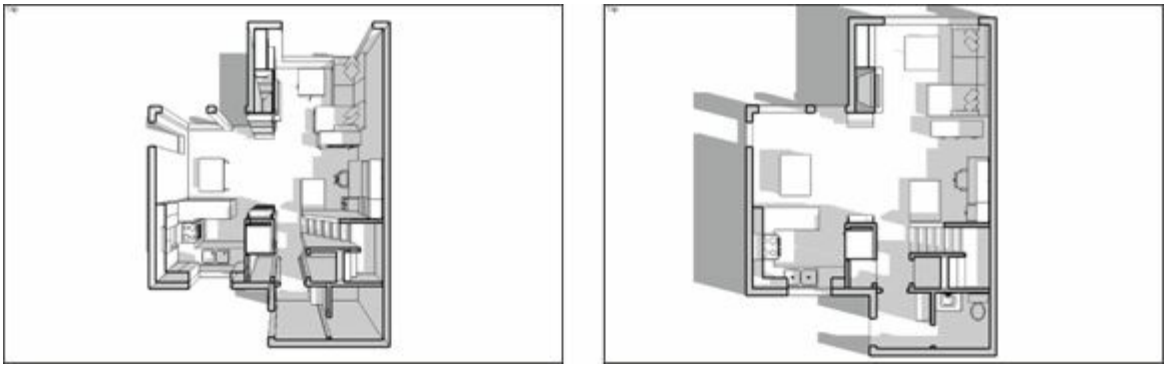

FIGURE 11-14: Turn on Perspective for a section perspective; choose Parallel Projection to produce an orthographic view.

MAKING A SECTION PERSPECTIVE

If you imagine cutting a building in half and then looking at the cut surface straight on while looking inside, you have a section perspective. The *section* part of the term means that the building has been cut away. The *perspective* part indicates that objects inside the space seem smaller as they get farther away.

Section perspectives show interior space in a way most people can understand — and section perspectives look incredibly cool, too. To create a section perspective using the Section Plane tool in SketchUp, follow these steps:

1. **Select the section plane you want to use to make a section perspective by clicking it with the Select tool.**

   When the section plane is selected, it turns blue, (assuming that you haven't changed the default colors in the Styles panel).

2. **If the selected section plane isn't active, context-click it and choose Active Cut.**

   Active section planes cut through their surrounding geometry. If your section plane is visible but isn't cutting through anything, it's not active.

3. **Context-click the selected section plane and choose Align View.**

   This aligns your view so that it's straight on (perpendicular) to your section plane.

4. **If you can't see your model properly, choose Camera ⇒ Zoom Extents.**

   This zooms your view so that you can see your whole model in the modeling window.

GENERATING AN ORTHOGRAPHIC SECTION

Ever seen a technical drawing that included top, front, rear, and side views of the same object? Chances are that was an *orthographic projection*, which is a common way for 3D objects to be drawn so that they can be built.

Producing an orthographic section of your model is pretty easy; it's only one extra step beyond making

a section perspective. Here's how to do it:

1. **Follow Steps 1 through 3 in the preceding section, as if you're making a section perspective.**
2. **Choose Camera ⇒ Parallel Projection.**

   This switches off Perspective, turning your view into a true orthographic representation of your model. If you printed an orthographic view at a specific scale, you could take measurements from the printout.

TIP To print a plan or section view of your model at a particular scale, have a look at Chapter 12, which explains the whole process. If you have SketchUp Pro, see Chapter 14; printing to scale is among the things LayOut was created to do.

Animating sections with scenes

Combining section views with scenes to create an animation is both a useful and impressive way to show off your model. The basic idea is that you can use scenes to create animations where your section planes move inside your model. Here are a few reasons you may want to use this technique:

- If you have a building with several levels, you can create an animated presentation that shows a cutaway plan view of each level.
- Using an animated section plane to "get inside" your model is a much classier transition than simply hiding certain parts of it.
- When you need to show the relationship between the plan and section views for a project, using an animated section plane helps to explain the concept of different architectural views to 3D beginners.

Follow these steps to create a basic section animation; a simple example is illustrated in Figure 11-15:

1. **Add a section plane to your model.**

   For help with this step, see "Cutting plans and sections," earlier in this chapter.
2. **Add a scene to your model.**

   The earlier section "Creating scenes," explains how to add scenes.
3. **Add another section plane to your model.**

   You can add another section plane in one of two ways:

   - *Use the Section Plane tool to create a brand-new one.* This is probably the easiest option, which makes it ideal for beginners.
   - *Use the Move tool to copy an existing section plane.* The earlier section "Cutting plans and sections" introduces this technique.

Make sure that your new section plane is active; if it is, it cuts through your model. If it's not active, context-click the section plane and choose Active Cut from the context menu.

4. **Add another scene to your model.**

   This new scene remembers which is the active section plane.

5. **Click through the scenes you added to view your animation.**

   You see an animated section cut as SketchUp transitions from one scene to the next. If you don't, make sure that you have scene transitions enabled: Choose Window ⇒ Model Info and then choose the Animation panel in the Model Info dialog box. Make sure the Scene Transitions check box is selected.

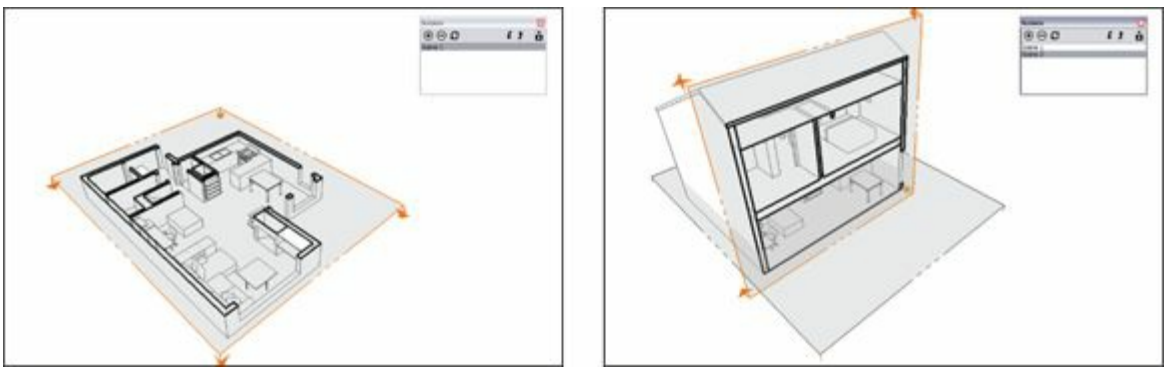

FIGURE 11-15: Making a section animation is a fairly straightforward process.

TIP If you don't like seeing the section-plane objects (the boxy things with arrows on their corners) in your animation, switch them off by deselecting Section Planes on the View menu. Then you see the section cuts without any ugly rectangles flying around.

REMEMBER The hardest thing to remember about using scenes and section planes to make section animations is this: *You need a separate section plane for each scene that you create*. That is to say, SketchUp animates the transition from one active section plane to another active section plane. If all you do is move the same section plane to another spot and add a scene, this animation technique won't work.