

What Is SketchUp and How Do Interior Designers Use It?

What Is SketchUp?

SketchUp is a *polygonal surface modeling program*. *Polygonal* meaning that everything SketchUp creates is made from *polygons*. Those are *planes*—flat shapes bordered by straight lines (Figure 1-1). *Surface* meaning that everything SketchUp makes is hollow. *Modeling* meaning that the result is a three-dimensional (3D) digital drawing composed of lines and faces (planes). Collectively, those lines and faces are called *geometry*.

SketchUp is also a *vector* program, meaning it creates vector files. A vector file is a collection of lines and curves that scale up or down without loss of quality. Examples of vector files are PDFs (Adobe documents) and DWGs (AutoCAD documents). This is as opposed to a *raster* file, which is a collection of individual pixels and loses resolution quality when enlarged. Examples of raster files are JPGs and GIFs. SketchUp creates SKP and SKB files. SKP is the SketchUp file; SKB is an automatically created backup file. It preserves the next-to-last save. To change an SKB file into an SKP file, just over-type the SKB extension with SKP.

Objective: This chapter discusses what modeling is and how the SketchUp modeling program is used by designers.

Concepts and Functions: SketchUp Pro, SketchUp Free, SketchUp Shop, SketchUp Make 2017, model, solid/surface/t-spline/mesh model, BIM, geometry, plane, polygon, vector, raster

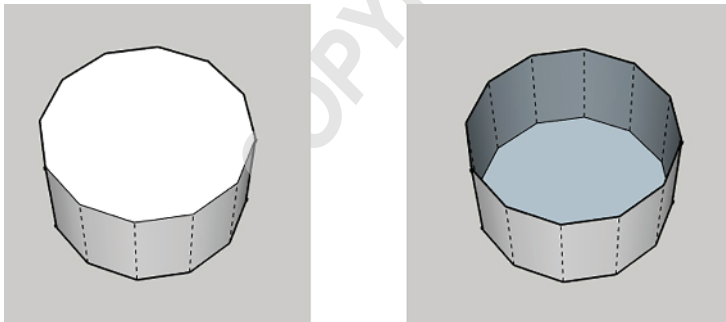


Figure 1-1: All SketchUp models, including circular ones, are made of polygons and are hollow.

What Is SketchUp Used For?

SketchUp is used to electronically sketch ideas three-dimensionally—to “get your doodle on.” It’s an alternative to pencil and tracing paper for thinking out ideas. Many use it for quick iterations, design studies, and presentations. Since you can sketch loosely (meaning without imputing numbers), SketchUp helps you think spatially. Height/width relationships are easy to see; for example, a hallway that seems wide in a floor plan may present dark and narrow when the vertical dimension is added. As with a physical foam core *model*, a digital model can be studied from any direction. However, SketchUp one-ups the foam core model with camera tools that let you stroll through at eye level.

Who Uses SketchUp?

SketchUp was written as a user-friendly alternative to complex modeling software in the architectural field, its original user base. However, it has since been widely adopted by diverse fields such as interior design, game development, filmmakers, woodworkers, catalog illustrators, packaging designers, landscapers, real estate agents and stagers.

SketchUp Pro

SketchUp Pro is a subscription product; compare prices at <https://sketchup.com/plans-and-pricing>. Educational pricing is available for students and faculty; academic proof must be submitted. One license permits two sign-ins.

SketchUp Pro works on both the PC and the Mac. Files made on one platform transfer easily to the other. It can be operated in limited fashion on some Wacom and Surface tablets, and on the iPad. A free viewer app can be downloaded at <https://www.sketchup.com/products/sketchup-viewer/downloads> or from the App store. This lets you open and look at SketchUp files without having the software.

SketchUp Free and SketchUp Shop

SketchUp Free is a web app (<https://app.sketchup.com/app?hl=en>). It targets K-12 students and is for noncommercial use. Access it from any WebGL-enabled browser. It’s version-less and always sports the latest release. You can save your work as an STL file, which is useful for 3D printing simple models. However, *Free* lacks important features such as the ability to install extensions or to save models as SKP. There is a subscription product called *SketchUp Shop* that is SketchUp Free with some added functionality. Free has a different interface than Pro (Figure 1-2).

SketchUp Make 2017

SketchUp Make 2017 is a legacy version that has most of Pro’s features but lacks some features that designers may need, such as the ability to import DWG files and geolocation data.

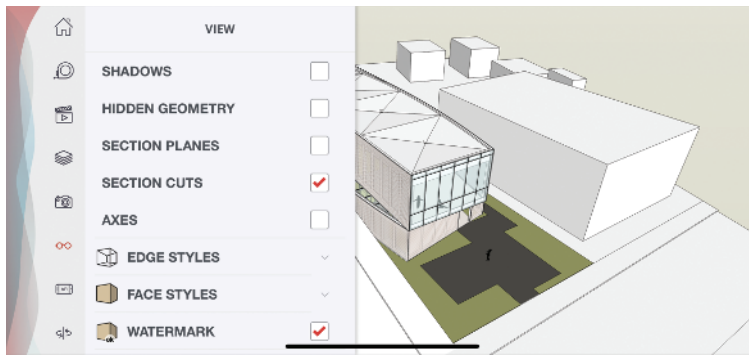


Figure 1-2: The Free interface.

Download 2017 free at <https://help.sketchup.com/en/downloading-older-versions>. Pro and Make cannot both be installed on the same computer.

Is SketchUp Easy to Learn?

It's probably easier than other commercial industry-standard modeling programs, as it has fewer features and is somewhat intuitive. But "easy" is relative. Like everything else, SketchUp still takes practice—you probably didn't make great pencil sketches right away, either.

Know that there are many ways to do the same thing in SketchUp, and no one right way. Some ways may take a few more steps, but if you make learning SketchUp the priority, efficiency will follow.

Do I Need to Know AutoCAD?

AutoCAD or any other two-dimensional (2D) drafting program is not a prerequisite to learning SketchUp. This is because drafting and modeling programs operate differently. If your computer drafting experience has only been with traditional 2D software, you will find that modeling requires a different approach. You may also find that you never want to go back to 2D software once you see the power of 3D.

Difference between Traditional CAD Drawings and Models

With traditional 2D computer-aided drafting (CAD) software such as AutoCAD, the mouse is an electronic pencil with which you replicate the hand-drafting process. 3D drawings made with 2D software are really just a collection of 2D pieces assembled to give the illusion of three dimensions.

A model, however, is a true 3D object that you can orbit around to view from any direction (Figure 1-3). By default, SketchUp displays the model as a 3-point perspective. That is, all parallel lines converge to left, right, and top or bottom vanishing points. However, SketchUp

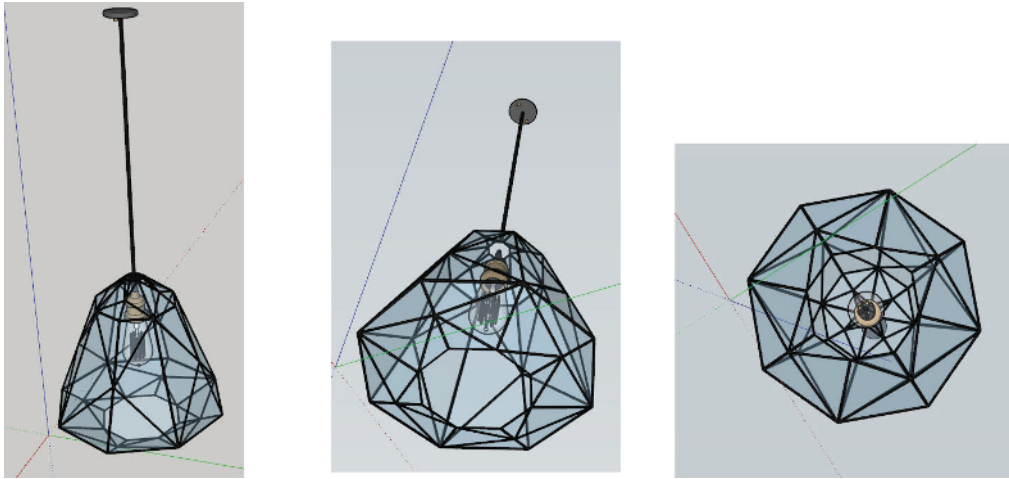


Figure 1-3: Orbit around a model to view it from any position.

can be set to display as a 2-point perspective, as an *isometric* (3D view in which parallel lines remain parallel), and orthographically (plan, elevation, and section views). Orthographic (2D) views are generated from the model. A model makes the jump to scaled construction documents in the LayOut program that installs with SketchUp.

There are five model types: *solid*, *surface*, *t-spline* (Figure 1-4), *mesh*, and *building information model (BIM)*. It's helpful to know a bit about them all, as this may affect time spent trying to achieve a specific result in SketchUp. No model type is best, as all have different abilities. For example, designs that require a constant wall thickness are better drawn with a solid modeler. Designs that require organic forms are better drawn with a sculpting modeler. A common workflow is to start a model in one program and export it to another for further development. This exploits the capabilities of both.

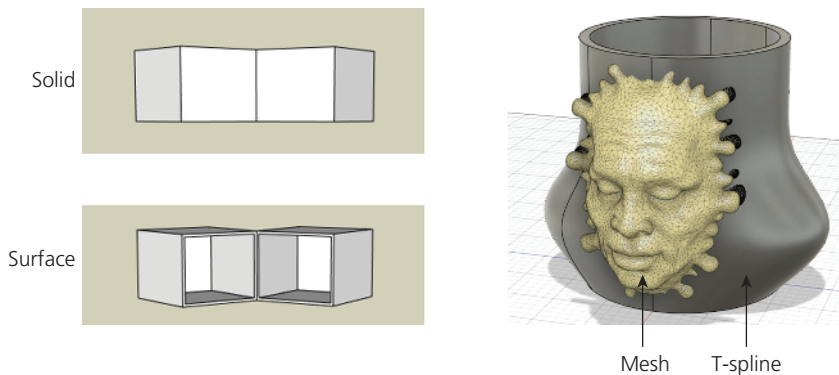


Figure 1-4: Solid, surface, mesh, and t-spline models.

Solid Models

These are filled solid inside; think rock. They contain data like interior volume, mass, and weight. This enables you to perform tasks like specifying a constant wall thickness or connecting and curving adjacent edges. Create solid models by adding and subtracting primitive geometric forms, such as cubes and cylinders, to and from each other, or by sketching shapes and extruding them into solid forms. Solid models are used to create product models that have many parts and details. SolidWorks and Fusion 360 are popular solid modeler programs.

Surface Models

These are hollow with a skin composed of lines and faces. You can create complex curves and forms, but they have hard, not smooth, edges. Only surface data, such as area, is stored. A surface model doesn't recognize geometry as specific features; for example, where a solid model would recognize a staircase and perform relevant calculations, a surface model just sees the staircase as lines and faces. Surface models are used when the designer is primarily concerned with form and appearance. SketchUp is a popular surface modeler for building design; Fusion 360 and Catia are popular surface modelers for product design.

T-spline Models

This is a type of surface model that is free-flowing and curvy, and composed of four-sided polygons. It's used to create organic forms. You sculpt a t-spline model by pushing and pulling the polygons and dragging control (editing) points. Blender and ZBrush are popular t-spline programs.

Mesh Models

A mesh is a type of surface model that is created when a raw model is exported as an STL file from whatever software it was designed in. STL is a 3D printing format. Mesh models often have very high polygon counts. Ones with low polygon counts can be imported into SketchUp for further development.

Building Information Management (BIM)

A BIM model contains all building systems: architectural, electrical, plumbing, and heating, ventilation, and air conditioning (HVAC). The model lives on a server and can be accessed by anyone authorized to do so. BIM models also contain nongraphical data, such as material, fire resistance class, color, and cost of the objects in it. Revit and Chief Architect are popular BIM programs with architects and interior designers. SketchUp is not BIM, but with downloaded extensions it can have BIM properties.

What SketchUp Pro Can Do

With this program you can:

- *Model complete interiors and exteriors of buildings (Figure 1-5).*



Figure 1-5: This house is completely modeled inside and out.

- *Import real-life terrain contours and geolocation information (Figure 1-6).*

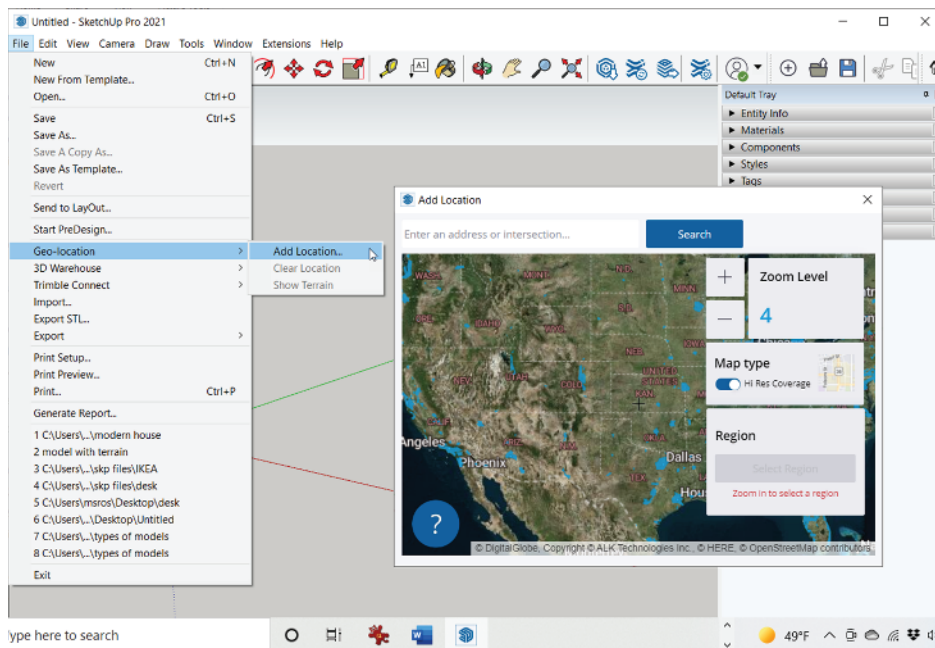


Figure 1-6: Access land contours and geolocation data anywhere in the world through SketchUp.

- *Apply artsy styles with one click* (Figure 1-7). Export as high-resolution JPGs or animations for marketing and presentations.

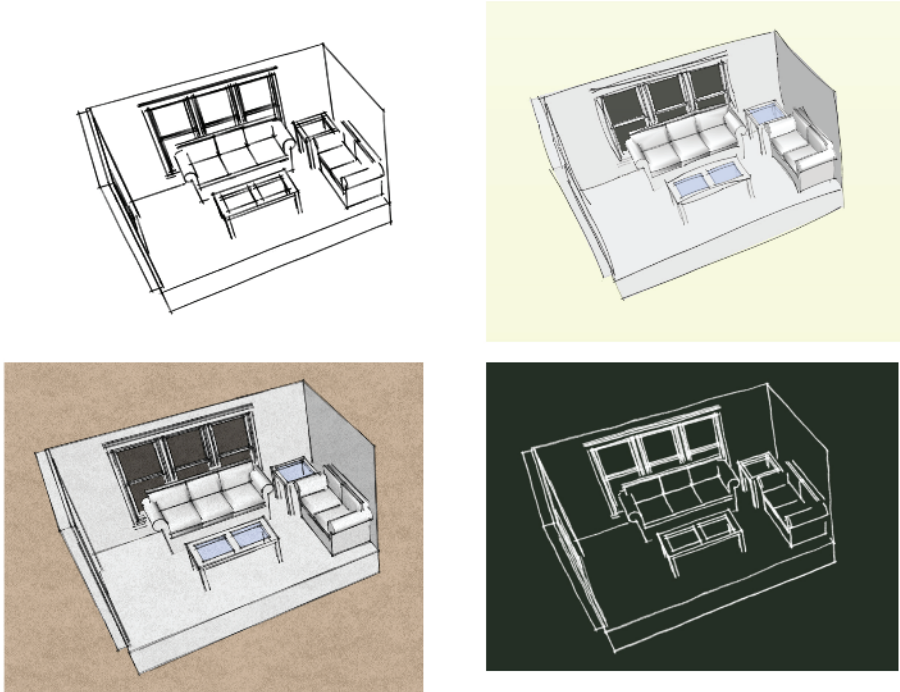


Figure 1-7: Four of the many line types and styles in SketchUp.

- *Access high-quality, ready-made models from the 3D Warehouse*, including products from manufacturer catalogs (Figure 1-8).

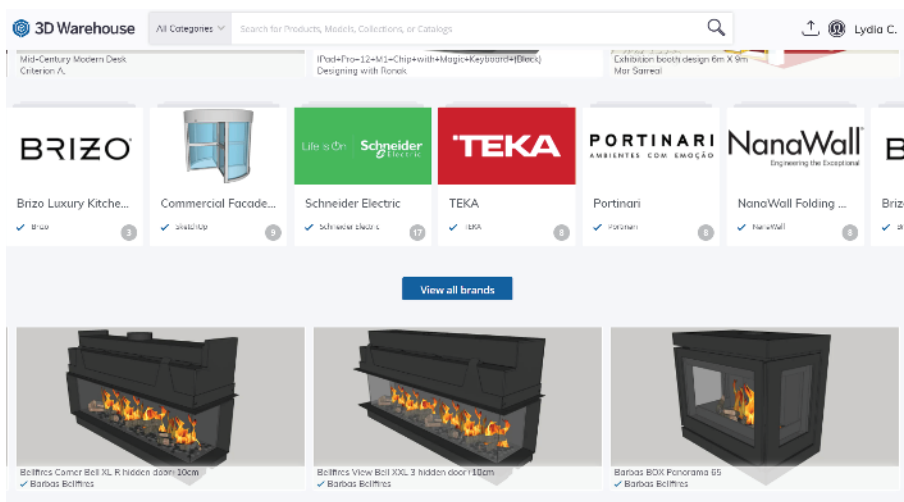


Figure 1-8: Catalogs of product models in the 3D Warehouse.

- ▶ Access extensions (add-on tools) from the Extension Warehouse.
- ▶ Import JPG files of floor plans to trace and model.
- ▶ Import DWG (AutoCAD) files of floor plans to trace and model (Figure 1-9). DWG files become SketchUp geometry.
- ▶ Export SketchUp models as a DWG file for import into AutoCAD, Revit, or 20/20 for further development.
- ▶ Create presentation boards and scaled drawings from the model with LayOut, a program that installs with SketchUp (Figure 1-10).

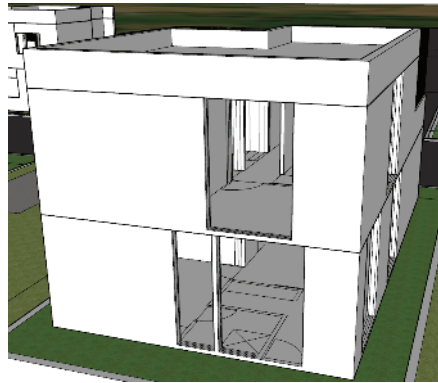


Figure 1-9: This model was made from an imported AutoCAD plan.



Figure 1-10: Create scaled drawings from the model in LayOut.

- ▶ Use, create, and edit dynamic components. These are models programmed to store information and perform specific actions. For instance, staircases can add steps when height is adjusted; cabinets can open doors with a mouse click; price and parts information can be stored.
- ▶ Perform additive and subtractive modeling tasks called Boolean operations. This saves modeling steps, making for a faster workflow (Figure 1-11).

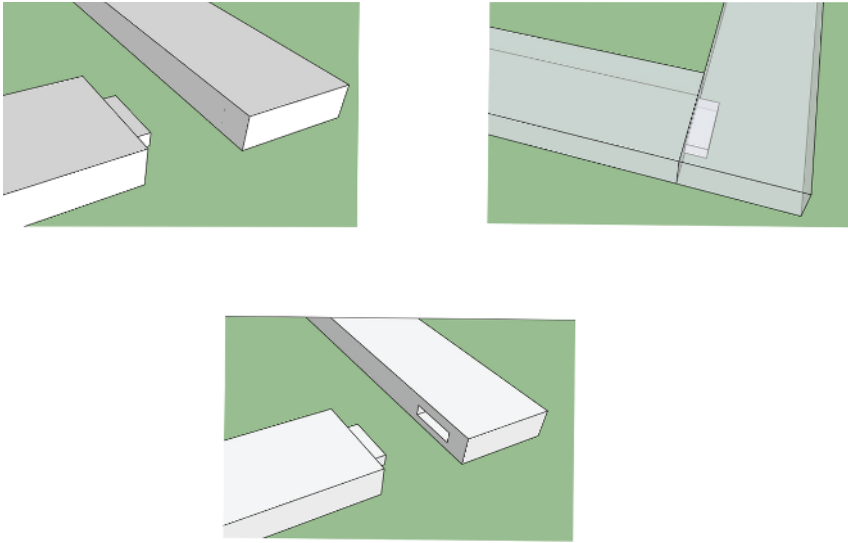


Figure 1-11: With solid modeling tools, a tenon is pushed into a block of wood, then pulled away, revealing a clean mortise joint created.

- *Generate reports, which are tables of information of the objects in the model.* These tables can be lists and quantities of materials that are helpful for cost estimating, such as deciding how much paint to buy based on the area of walls in the model. Reports are generated with one click and downloaded as a CSV (Excel) file (Figure 1-12).

Generate Report

Generate Report | Template Manager | Report Contents

COMPONENT QUANTITIES REPORT

Definition Name	Quantity
besta_top horiz#6	2
besta_top horiz#7	1
besta_vert sides	2
besta_vert sides#1	3
besta_vert sides#2	2
blanda_matt_wood bowl	1
bolt generic	8
corner	24
ingo/stefan_table chairs	1
ingo_side table	1
ingo_table	1
ingo_table_leg	4
ingo_table_leg#1	4
ingo_table_top	1
ingo_table_top#1	1
karlstad_cushion	4
karlstad_cushion#1	2
karlstad_leg	4
karlstad_loveseat	1
karlstad_loveseat_half	2
karlstad_loveseat_half#1	2
kassett_box	2
kassett_box#1	3
kassett_box#2	1
kassett_dvd Box	4
kassett_dvd Box#1	6

Go Back Save Changes Download

Figure 1-12: A materials list of objects in the model.

- ▶ *Receive one year of free technical support via phone and e-mail with a Pro subscription. After that, a Maintenance and Support subscription is needed to receive support.*
- ▶ *Import hand sketches into SketchUp, trace and model.*
- ▶ *Do shadow studies.*
- ▶ *Export the model as a JPG and import it into a digital imaging program to add color (Figure 1-13).*

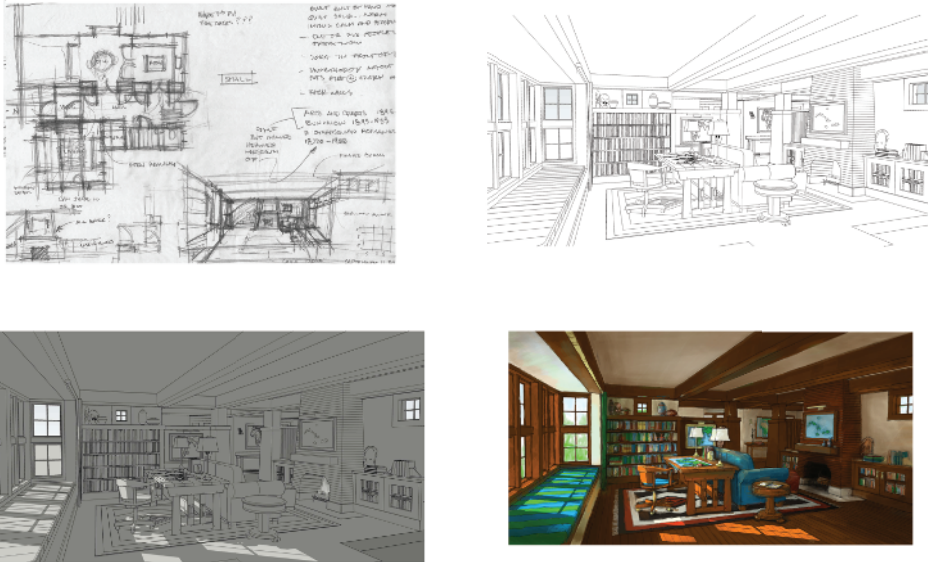


Figure 1-13: Hand sketches imported, modeled, shadow-studied, and then colored in Photoshop. Courtesy of mkerrdesign.com.

- ▶ *Incorporate artwork and photos into the design. The tabs at the top of Figure 1-14 are preset scenes for a slideshow presentation.*

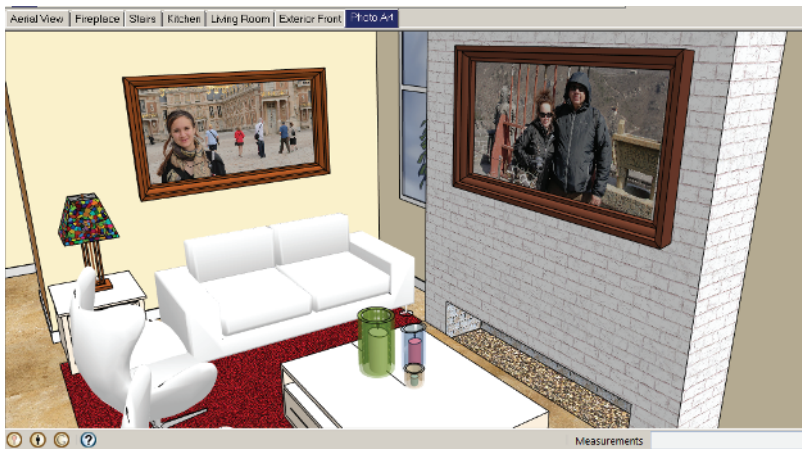


Figure 1-14: Incorporate artwork and photos into the design.

- ▶ *Import images of the textiles to be used in the design (Figure 1-15).*
- ▶ *Save models locally on your own computer or on the Trimble Cloud for remote collaboration (Figure 1-16). You have unlimited online storage.*



Figure 1-15: A textile pattern imported and applied to a drapery model.

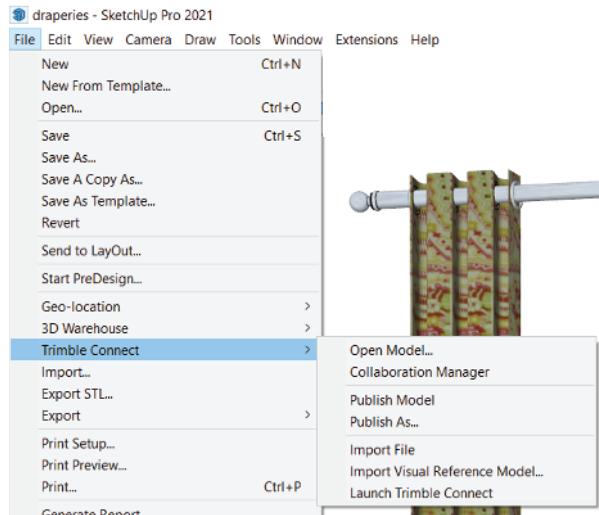


Figure 1-16: Upload your model to the Trimble Cloud directly from SketchUp and collaborate with others on it.

Want to learn more? Join me in Chapter 2, where we'll discuss what's needed to run SketchUp, put it on your computer, and explore its interface.

Summary

SketchUp is a surface modeling program used by interior designers for space planning, conceptual design, client presentations, and document drawings. Users can think through an idea, study design options, and present them creatively.

Further Resources

The Official SketchUp Blog: <http://sketchupupdate.blogspot.com/>

Buy SketchUp here: <https://store.sketchup.com/>

Learn about SketchUp on the iPad: <https://www.sketchup.com/products/sketchup-for-ipad>

SketchUp for Web: <https://www.sketchup.com/products/sketchup-for-web>

Download a free SketchUp viewer: <https://www.sketchup.com/products/sketchup-viewer/downloads>

Compare plans and prices: <https://sketchup.com/plans-and-pricing>

SketchUp Shop: <https://help.sketchup.com/en/sketchup-web/whats-included-sketchup-shop>

Learn about other modeling types: *Fusion 360 for Makers*, 2nd edition by Lydia Sloan Cline.
San Francisco: Maker Media.