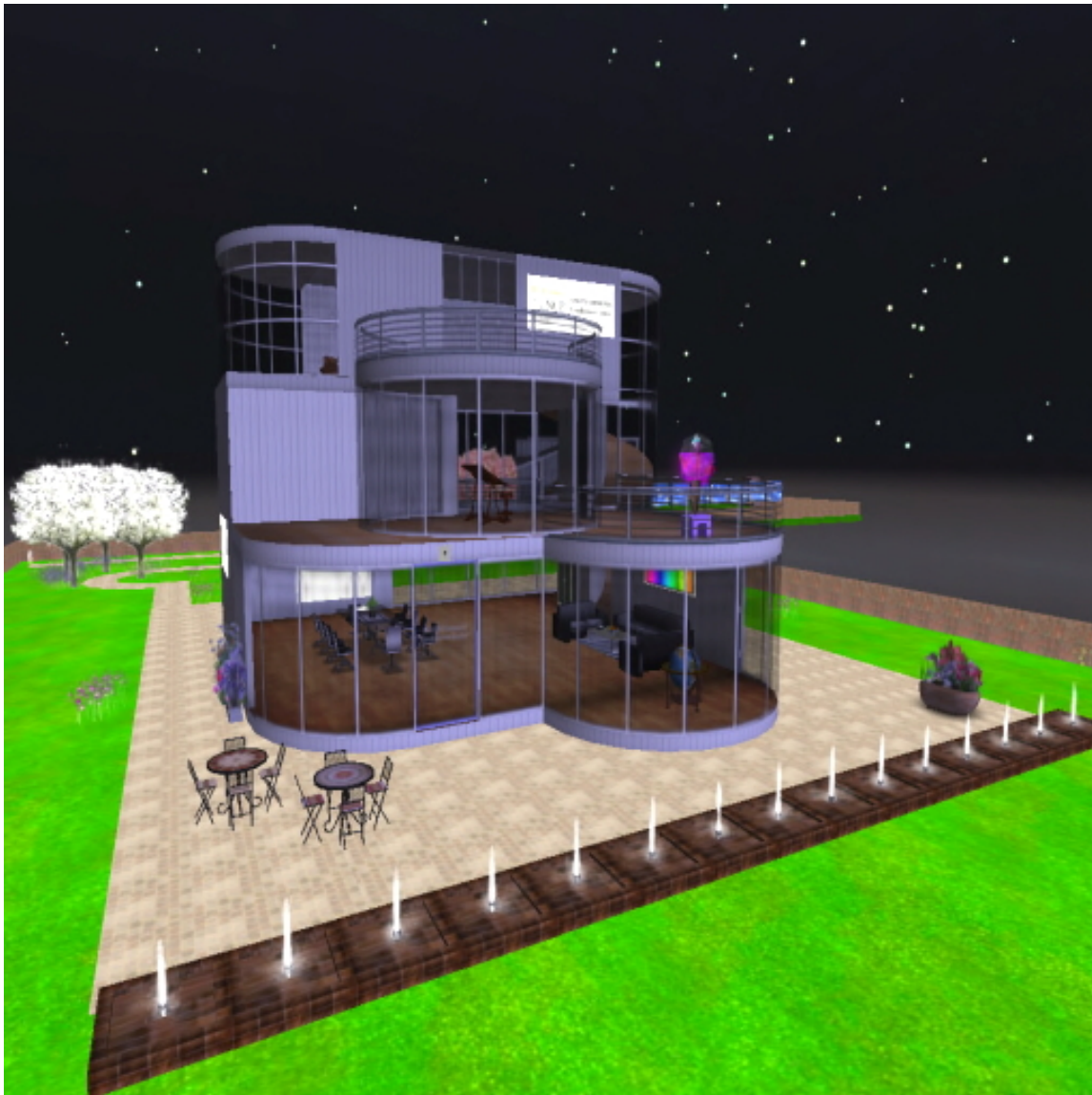


How To Build In Second Life

An introduction to constructing anything in a virtual world



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Second Life is a 3D virtual world created entirely by its Residents. –Linden Lab

What is it? Where is it?

Second Life is a three-dimensional virtual-reality world developed on the Internet by Linden Research, Inc. (a.k.a. Linden Lab), a San Francisco company.

It is a computer-simulated environment with real world rules such as physics, gravity, topography, locomotion, real-time actions, and communication. Users inhabiting Second Life interact with the environment and each other via their on-screen representatives known as avatars. An avatar is a person in Second Life. People are residents.



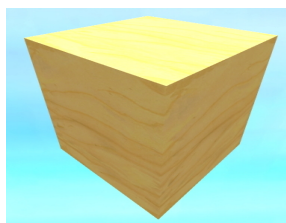
A free downloadable Second Life Viewer enables residents to interact, providing an extraordinarily advanced level of social networking. Social relationships are represented by three-dimensional graphical characterizations of multiple users appearing together.

How to start creating in Second Life

Here's an easy introduction to creating objects in Second Life.

The creation tools within Second Life will enable you to construct just about anything you want to make. With a bit of practice you'll have your own garden, furniture, mansion, clothing, car, boat, jet plane or biodiverse forest in no time.

Let's start with some small wooden boxes. ;-)



The primitive is the basic building block for everything in the virtual world

Prims

Prim is short for primitive. Prims are the building blocks of Second Life. Everything is constructed of prims. All objects in Second Life are made of prims, except for avatars, the natural ground, and some trees.

People sometimes say "prim dress" or "prim hair" or "prim shoes." They mean those objects have been made by someone from prims.

What do prims look like?

They come in 15 different original shapes. Your choice. The default shape is a cube.



Some samples of prim shapes

Prims can be colored and textured to look like anything you wish (explanation is below).

Where do prims come from?

Prims come out of your "magic wand" building tool.

People say they "rez" a prim. What is "rezzing?" To rez something means to create it or to pull it from inventory. A brand new prim comes from your "magic wand" building tool.

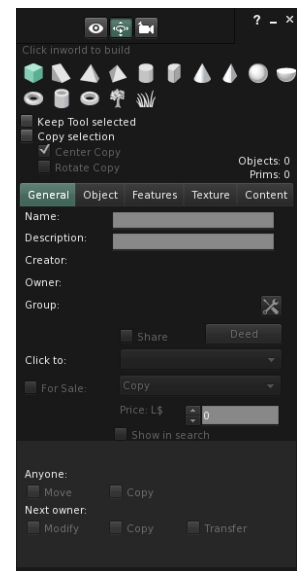
Note: Your inventory is all of the Second Life items you own or can access, except for any items you have placed in the world. Your inventory does include items attached to your avatar. Objects you make in-world and take into inventory are stored in an inventory system folder called Objects. They can be moved to other folders in inventory.

Prims can be made anywhere you are allowed to build.

Prims costs L\$0 (zero linden dollars) and are unlimited in supply. There is a limit to how many prims any one parcel of land can hold, but no limit on how many prims you can create in total.

If the maximum number prims on a parcel of land is reached, no more prims can be made until some are deleted or moved to inventory.

To see your "magic wand" building tool, go to menubar Build > Build or go to menubar Build > Select Building Tool > Create Tool. You also can use the keyboard shortcut CTRL-B (CMD-B on Mac) or CTRL-4 (CMD-4 on Mac).



The Build Window
sometimes called the
Build Toolbox.

Note: The equivalent to the Windows CTRL key usually is CMD on Mac. The Windows ALT key is OPT on Mac.

Where to build?

You can create prims, and build things with those prims, anywhere in Second Life where you have permission to build. That could be your own land, someone else's land with permission, or a public sandbox.

Landowners control the act of building on their land. You will find many landowners have that permission blocked. You always can ask them to turn it on for you, but don't expect that. Rather, go to a public build area known as a *sandbox*.

Sandboxes

At a sandbox you can build freely. There are many sandboxes across the SL world. Use the in-world Search to find sandboxes.

Sandboxes usually are "cleaned" by their owners automatically every few hours. The length of times between cleanings should be posted. Be sure to "Take" your work into your inventory periodically so you don't lose it entirely during a sandbox cleaning. To move it or a copy of it into your inventory, right-click on your object and select "Take" or "Take Copy" from the small menu that appears.

SLURL stands for Second Life URL, the Web link to a specific place in Second Life. To teleport to a Second Life location using a SLURL, type or paste it into the location bar of an ordinary Web browser. Or else type or paste it into the local chat window in the Second Life viewer, press Enter/Return, and click the resulting text chat displayed.

Here's a landmark (a link SLURL) to UNCP's sandbox:
<http://maps.secondlife.com/secondlife/Myungsimbogam/27/215/61>

Here's the SLURL for a different sandbox, at the Morris Welcome Area:
<http://slurl.com/secondlife/Morris/196/84/32>

Here's a landmark for a sandbox at the Ivory Tower Library of Primitives:
<http://maps.secondlife.com/secondlife/Natoma/149/110/26>

How to start creating

There are two ways to obtain a fresh prim.

- Right-click on the ground and select "Build" from the small menu that opens. A Build Toolbox window will open on screen and your mouse cursor will turn into a magic wand. Click on the ground with the wand to create a plywood-looking virgin prim cube.
- Left-click "Build" in the menubar at the top of your viewer screen. Select:
Build > Build (CTRL-B on Windows or CMD-B on Mac) or
Build > Select Building Tool > Create Tool (CTRL-4 on Windows or CMD-4 on Mac).
When the Build Toolbox window opens and your mouse cursor turns into a magic wand, click on the ground to create a plywood-looking virgin prim cube.

Prims of different shapes

The default prim shape is a cube measuring 0.5m x 0.5m x 0.5 m.

To create a prim of a different shape, open the Build Toolbox window and select a prim shape from the 15 choices shown as tiny icons at the top of the Build Toolbox window. Right-click on the ground to generate a prim of that shape.

The 15 shapes are cube, prism, pyramid, tetrahedron, cylinder, hemi-cylinder, cone, hemi-cone, sphere, hemisphere, torus, tube, ring, tree and grass.

For instance, if you created a sphere, it would be 0.5m in diameter. A pyramid would be 0.5m in each dimension.

Give it a try

Experiment with creating various prim shapes. Create a prim and then, when you have finished with it, close the Build Toolbox window. Get rid of the prim by right-clicking it and selecting Remove > Delete from the small menu that opens.

The dimensions can be changed by clicking the Object tab in the Build Toolbox window and then changing the numbers in the X,Y, Z locations in the "Size (meters)" slots.

The shape can be modified further in the Object tab using the path cut, hollow, twist, taper, top shear and slice controls.

If you change your mind about the underlying basic shape, you can change it again in the pull-down menu in the Object tab.

The surface appearance of the material the prim is made of can be changed in the pull-down menu in the Object tab from wood to stone, metal, glass, flesh, plastic and rubber. (This is not the same as coloring a prim or adding a texture. More on those below.)

Don't litter

Please don't litter the Second Life environment by leaving prims around after you have finished building.

There's a limit on how many prims a parcel of land can hold. We need to conserve as well as keep the land attractive.

When you are done working with a prim, right-click it and select either Take or Remove > Delete.

- Clicking on Take moves the prim from the environment to your inventory.
- Delete does away with it.

Editing a prim

Right-click on the prim. Select Edit from the small menu that appears. This will expose red, blue and green drag arrows used to move the prim. Red is the x-axis. Green is the y-axis. Blue is the z-axis.

Alternatively, if you have the Build Toolbox window already open, you can select the Edit icon, which is immediately to the left of the Create icon. Click the Edit icon and then click the prim. This will expose the red, blue and green drag arrows used to move the prim.

Click on a colored arrow to move the prim in that direction.

An alternative way to move a prim is select the prim and click the Object tab in the Build Toolbox window and then change the numbers in the X,Y, Z locations in the "Position (meters)" slots.

Once you've got the basics, try experimenting with some of the other editing options -- hollow out a cube, squish a sphere, etc.

Naming an object

You can name and describe a prim in the Build Toolbox window General tab.

Right-click your new prim, select Edit and then the General tab. You will find it is named *Object*. Give it a different name. If you don't, and you take this Object and others into your inventory, you could find your inventory cluttered with items all labeled Object.

You can use the Description box in the General tab to elaborate on the characteristics and qualities of the object.

Changing the size of a prim

There are two ways to change the size of a prim.

A prim named *Tablecloth*, right, has a plaid texture and appears flat since its dimensions are set to 2x0.01x2.



To change a prim's size, open the Build Toolbox window and hold down the CTRL and SHIFT keys and small color axis boxes will appear on the edges and corners of the prim. Drag one to resize your prim in that direction.

An alternative way to resize a prim is click the Object tab in the Build Toolbox window and then change the numbers in the X,Y, Z dimensions in the "Size (meters)" slots.

A prim can be no larger than 64x64x64. To create larger objects, link several prims.

The smallest dimensions possible are 0.01m x 0.01m x 0.01m

Rotating a prim

After you right-click on a prim and select Edit, there are two ways to rotate it.

Hold down the CTRL key to turn the red, blue and green drag arrows into rotation handles (circles or bands). This is different from holding SHIFT and CTRL keys to produce stretch handles. Use the mouse to drag a color band to rotate the prim around that axis.

An alternative way to rotate a prim is click the Object tab in the Build Toolbox window and then change the numbers in the X,Y, Z dimensions in "Rotation (degrees)."

Don't like plywood?

A default prim has the appearance of wood and has a texture that looks like plywood. No matter their shapes, all prims look like plywood when first rezzed.

The surface appearance of the material the prim is made of can be changed in the pull-down menu in the Object tab from wood to stone, metal, glass, flesh, plastic and rubber. This is not the same as coloring a prim or adding a texture. For instance, the material selection won't change the plywood texture. You will have to do that separately by making a selection of texture or color at the Texture tab. (More on those below.)

So what does the material change accomplish? It changes the surface feel of the object and how the object acts and reacts. For instance, it makes a prim sound different if someone were to bump it or jump on it. It also changes how physics affect a prim. For example, a rubber ball will be more bouncy than a stone ball, and make a different sound if dropped.

Texturing a prim

Prims start out looking like plywood. That effect is totally changeable. Adding a texture can make a prim or set of prims look like something recognizable. (Similarly for coloring. See below.)

To add or change the surface texture of a prim, go into the Build Toolbox window to the Texture tab and click the small image at left labeled "Texture."

If you have not changed it previously, the Texture will look like plywood. Clicking that small image will open the "Pick Texture" panel. There you can browse or search through the textures in your inventory. Find one you like and click "Select."

For example, scroll down the Pick Texture window list to Library > Textures and locate any texture you might like to try out. For instance, you might select Fabric.

You control the brightness of the texture on the prim by checking or unchecking the Full Bright option on the Texture tab.

You can make your own textures outside of Second Life and import them using menubar Build > Upload > Image. Linden Lab charges L\$10 per upload. That's the equivalent of about 4¢ U.S.

Note: Textures are stored in inventory in a system folder called Textures. Photos in Second Life are the same as textures. Photos shot in Second Life are stored in inventory in a system folder called Photo Album. Imported photos and textures are saved in inventory as textures and stored in the Textures folder.

There are buttons on the Pick Texture panel labeled "Default" and "Blank."

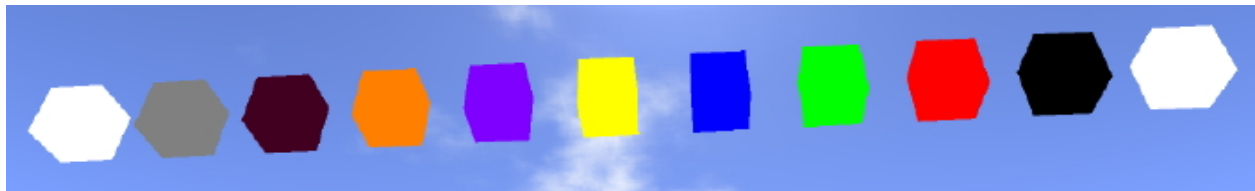
- Default returns the prim to the plywood texture
- Blank makes the surface white with no pattern.

(See examples of textured prims in the practice exercise walls below.)

Coloring a prim

To change a prim's surface color, go into the Build Toolbox window to the Texture tab.

- Click the small Texture window and then click Blank to make the surface white with no plywood or other texture pattern. Click OK to leave the Pick Texture panel.
- Click the small Color window at center. If you have never changed the prim's color, it will be white. Choose a color. Click Okay to leave the Color Picker panel.



Some samples of prim colors

The Color Picker panel allows you to select from 32 predefined colors. Or you can change values in the color mixing area above the predefined colors.

Making see-through things

You can turn a prim into glass, plexiglass or clear plastic by using the Transparency control under the Texture tab in the Build Toolbox window. The range of transparency is from zero to 90 percent. (See transparent windows in the practice walls below.)

You can make your objects glow from a little bit to a lot in a brightness range of zero to 1.0 using the Glow control right below the Transparency control.

Let there be light

An object can be set to emit light, so avatars nearby can see a halo effect and the object will appear brightly lit. An example might be a light bulb when turned on.

In the Features tab in the Build Toolbox window, click the Light checkbox. The intensity, the radius of the circle of light, and the falloff distance from the light can be adjusted.

Generating light this way sometimes has an effect on performance of the viewer, so a good alternative is to check the Full Bright option under the Texture tab.

Copying a prim

There are two ways to make a copy of your prim.

Right-click on your prim. Select edit. This will expose the red, blue, green position arrows used to move the prim.

Hold down your SHIFT key, grab one of the arrowheads, and drag off a copy of the prim. Release the SHIFT key and stop dragging the arrowhead. You will have a copy of the original prim.

Alternatively, you can duplicate a prim while in Edit by selecting your prim and pressing the CTRL and D keys. The prim will be duplicated and offset from the first by 0.5m.

Linking prims

To create larger or more complex objects, you can link several prims together to form a set that will allow you to move the prims in unison.

Prims can be linked temporarily for moving sets around or linked permanently.

To temporarily link a group of prims, hold down the SHIFT key as you click on each prim. This is referred to as *shift-selecting*.

When you have all the prims grouped and shift-selected, you can move them as one. However, deselecting them will break the link.

There are two ways to link prims together permanently to form more complex objects.

To make a permanent link, shift-select the objects, then press CTRL + L to link them. Press CTRL + SHIFT + L to unlink them.

Alternatively, you can link multiple shift-selected objects by using Link at menubar Build > Link. Just shift-select all the prims you wish to link together and select Build > Link. Now they all will move in unison.

You can unlink objects by choosing Unlink at menubar Build > Unlink.

You can link up to 255 prims together in one grand object. The prims must be no farther than 30m apart. You can select Edit Linked Objects in the Build Toolbox window to move and modify one prim in a linked set.

Sculpting a prim

A sculpted prim, known affectionately as a sculptie, is an object that has an organic shape and is more complex than the ordinary geometric prim shapes we have been talking about here.

Sculpties are textures created outside of Second Live with 3D modeling software and then uploaded to Second Life and applied to a prim.



This plate of sculptie fruits is at Linden Lab

Making a prim do something

You can add behaviors to objects by using scripts written in LSL -- the Linden Scripting Language. A script is a snippet of computer code, which tells an object what to do.

As an example try this out:

- Create a cube. Right-click it and select Edit to open the Build Toolbox window.
- Click the Content tab in the Build Toolbox window.
- Click on New Script. A default script named New Script will appear.
- Double click the New Script to see its lines of LSL code.
- If you change anything in the script, click Save and Reset.
- Click the Script window "x" to close it.
- Close the Build Toolbox window and click the prim to see its reply.

```
default
{
state_entry()
{
llSay(0, "Hello, Avatar!");
}
touch_start(integer total_number)
{
llSay(0, "Touched.");
}
}
```

A clicked prim with this default script replies "Hello, Avatar!" and "Touched."

You can change what the prim says:

- Right-click the prim and selecting Edit.
- Clicking the Contents tab.
- Double-click the script.
- Replace "Hello, Avatar!" and "Touched" with words of your choice.
- Save the changes.
- Close the Build Toolbox window.
- Click the prim. It will chat your new text.

In Second Life you will be able to find and use thousands of free scripts written by many people. When you locate one you want, take or buy a copy of it.

Note: Scripts are stored in inventory in a system folder called Scripts.

However, making just the right script for you can be easy and fun with ScriptMe! and with the graphical building blocks in Scratch for Second Life.

ScriptMe!: <http://www.3greeneggs.com/autoscript/>

Scratch: <http://s4sl.blogspot.com/>

You tell either of those websites what you want and they will generate script lines to add interactive elements to things you build. You do not have to know how to write code. You simply copy and paste the generated lines from the Web page into a blank script in any object and it's ready to do what you have asked.

To make a blank script inside an object:

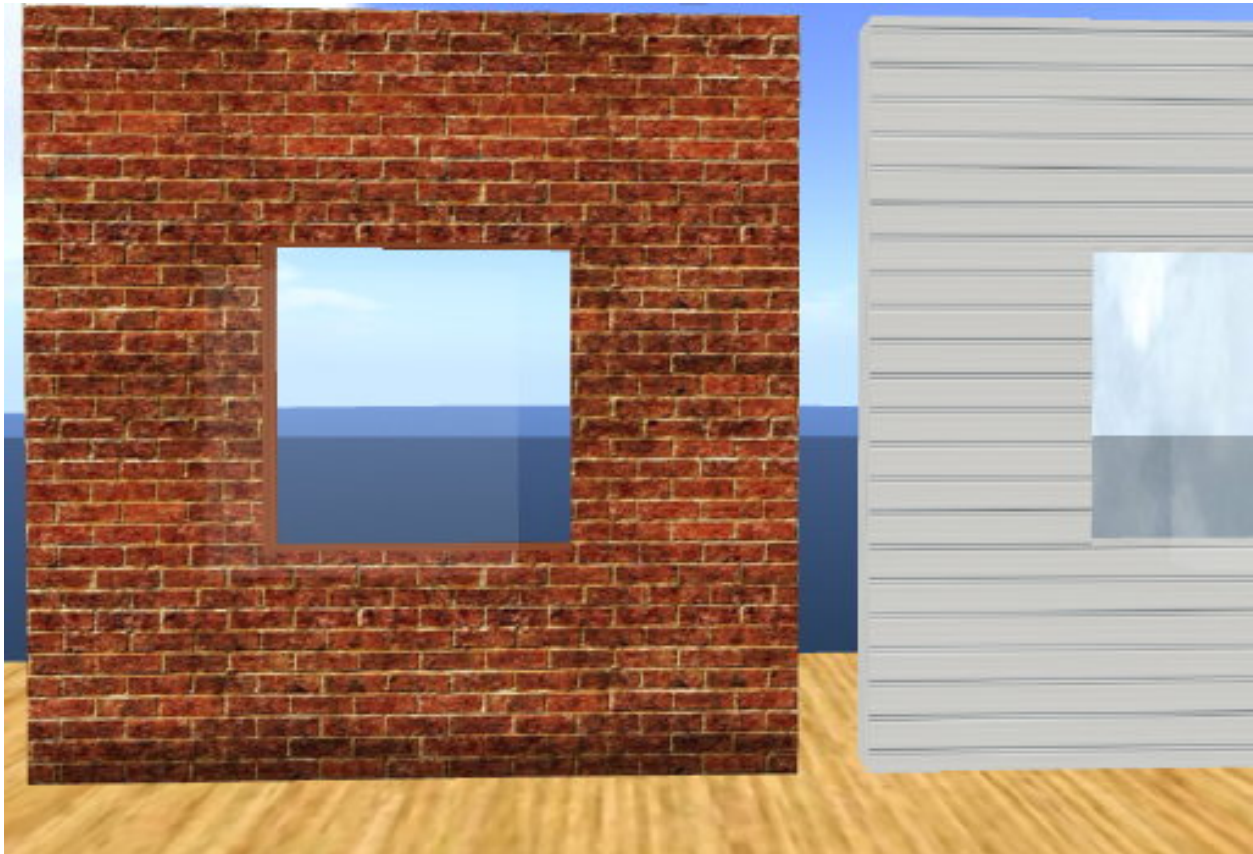
- Right-click the object and select Edit to open the Build Toolbox window.
- Click the Content tab in the Build Toolbox window.
- Click on New Script. A default script named New Script will appear.
- Double click the New Script to see its lines of LSL code.
- Select and delete all the lines of the default script.
- Paste in the lines of your new script.
- Click Save and Reset.
- Click the Script window "x" to close it.
- Close the Build Toolbox window
- Click the prim to see it do whatever the script orders.

A fun practice exercise

Put a window in a wall by hollowing out a prim and inserting a glass.

- Create a cube prim.
- In the Edit window of the Build Toolbox, click the Object tab.
- Locate the Hollow percentage setting. It will display the default 0 percent.
- Increase the percentage and watch a hole open in the top face of the prim. Set the hollow percentage to 40 percent.
- To see the hollow more clearly, rotate the prim so the hole faces you.

- Use the CTRL and SHIFT keys to resize the prim so it looks like a wall. Or use the Size (meters) settings under the Object tab. Try 4.0 x 4.0 x 0.2. The number 0.2 will be the thickness of the wall.
- Create a second prim.
- Resize it to slightly thinner than the wall. The window can be wider and taller than the hole because its thinner and therefore you can't see that part of the window inside the wall. If the wall is 0.2, try 0.19 for the window thickness and 1.325 x 1.325 for the window width and height. Your dimensions may have to be slightly larger.
- Move the window so it fits in the hole in the wall.
- Change the texture of the window to Blank.
- Increase the window's transparency percentage to something between 80% and 90%.
- Look through the window in the wall.



Each of these walls with windows is composed of two prims and is an example of how this practice exercise might turn out. The wall at left is composed of a prim with a brick texture and a transparent glass window prim. The wall at right has a prim with a house-siding texture and a transparent glass window prim. In each case, the prim that is the glass window is set at 85 percent transparency. Notice the light reflecting from the glass.

Where to learn more about building

The **Ivory Tower Library of Primitives** is the place in-world where hundreds of thousands of people have learned what they know about building in Second Life. The Ivory Tower Library makes it easy to understand and use basic, intermediate and advanced building techniques.

Ivory Tower SLURL: <http://slurl.com/secondlife/natoma/210/164/27/>

Ivory Tower website: <http://ivorytowerlibrary.com/>

The famous and funny **Torley Linden** offers a 10-minute YouTube video tour of the Ivory Tower showing how to explore it, use it and build something in the sandbox next door.

Torley Linden YouTube video tour of the Ivory Tower

<http://www.youtube.com/watch?v=jcdtU485BqQ>

All of Torley Linden's tutorials on how to build, script and do other stuff in Second Life:

http://wiki.secondlife.com/wiki/Video_Tutorials

Torley Linden's YouTube Channel

<http://www.youtube.com/user/Torley>

Natalia Zelmanov Tutorials

<http://www.mermaididiaries.com/2006/11/build.html>

Second Life official help guides:

Second Life Wiki: Category: Building Objects

http://wiki.secondlife.com/wiki/Category:Building_Objects

Second Life Wiki: Building Tools

http://wiki.secondlife.com/wiki/Building_Tools

Second Life Wiki: Texture Tools

http://wiki.secondlife.com/wiki/Texture_Tools

Second Life Wiki: Creation Portal

http://wiki.secondlife.com/wiki/Creation_Portal

Create

<http://secondlife.com/whatis/create/>

Create Anything

<http://secondlife.com/whatis/create.php>

Create: Builders

<http://secondlife.com/whatis/create/builders/>

Sculpted Prims:

Second Life Wiki: Sculpted Prims: Creator's Guide

http://wiki.secondlife.com/wiki/Sculpted_Prims:_Creator%27s_Guide

Second Life Wiki: Sculpted Prims: 3d Modeling Software Guide

http://wiki.secondlife.com/wiki/Sculpted_Prims:_3d_Software_Guide

Second Life Wiki: Sculpted Prims: Technical Explanation

http://wiki.secondlife.com/wiki/Sculpted_Prims:_Technical_Explanation

A popular, easy-to-use 3D creation tool is Sculptypaint
<http://www.xs4all.nl/~elout/sculptypaint/>

Linden Script Language: how to make your objects do things by giving them directions written in LSL:

Scripting is quick and easy with this ScriptMe! autoscripser
<http://www.3greeneggs.com/autoscript/>

Torley Linden video tutorial on Autoscript
<http://blogs.secondlife.com/community/features/blog/2008/07/19/get-started-scripting-with-autoscript--video-tip-of-the-week-42>

Building a script is fun with graphical building blocks in Scratch for Second Life
http://web.mit.edu/~eric_r/Public/S4SL/

Second Life Wike: LSL Portal
<http://secondlife.com/badgeo/wakka.php?wakka=HomePage>

Second Life website guide: Create Coders
<http://secondlife.com/whatis/create/coders/>

The UNCP Commons Conference Center, right, at noon on the university's campus in the 3D virtual-reality Internet world Second Life.

The photo on the cover is the conference center at midnight.

The conference center is used for classes, workshops, presentations, faculty development, colloquia, symposia and conferences.

<http://www.uncp.edu/home/acurtis/NewMedia/SecondLife/WhatsOnCampusInSL.html>

For help with building while in Second Life, send an in-world IM to the author: Stone Semyorka



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