Project 1 – Make a Hat

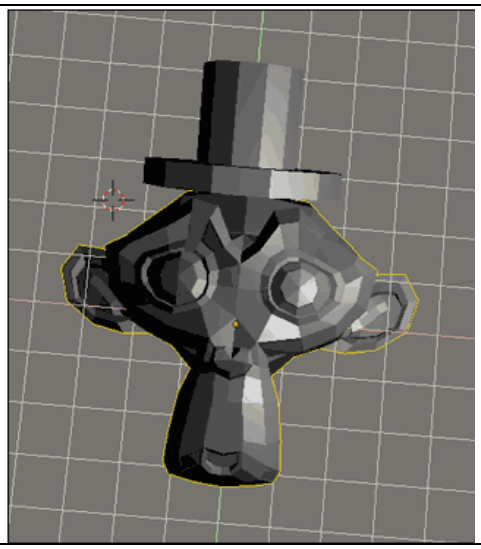
Introduction

In this project, you will:

- Learn about the Blender interface.
- Move around in 3D space.
- Create a hat for a monkey.
- Make your first 3D image

Project Preview

In this project, you'll make a hat for Suzanne the monkey. Here's an example of what you'll make.

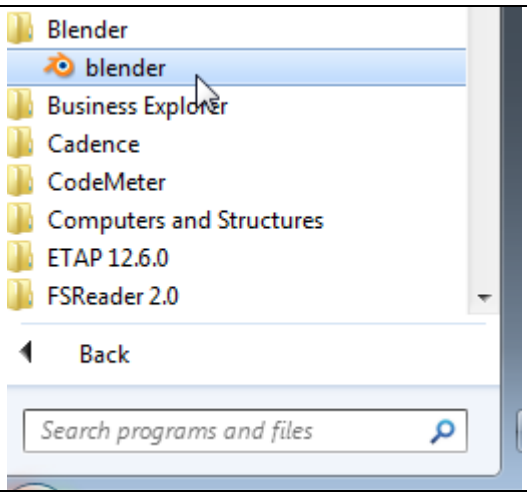
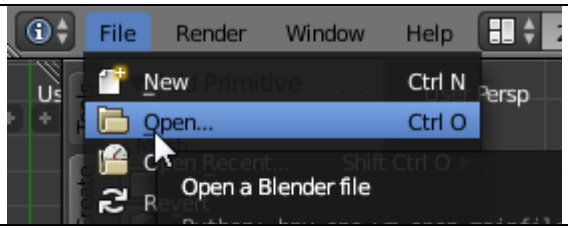
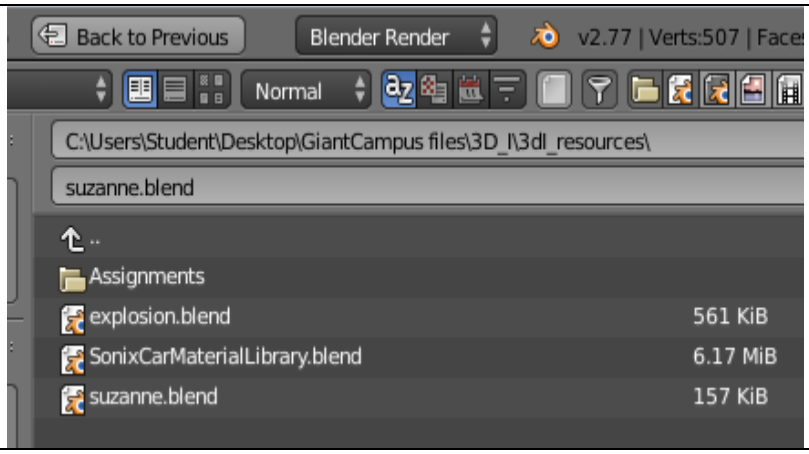
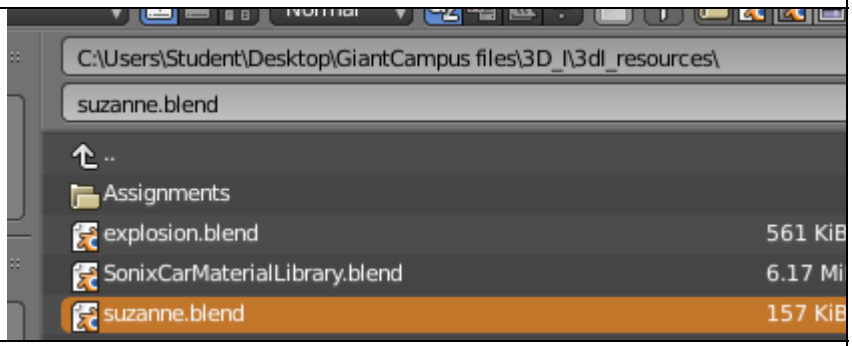


LAB 1 - Introduction

In this lab, you'll open Suzanne the monkey and use Blender's tools to move around in 3D space.

Open Suzanne.blend

You'll start by looking at an example of a 3D object. Complete the steps below to open a Blender file. If Blender is already open, skip the first step.

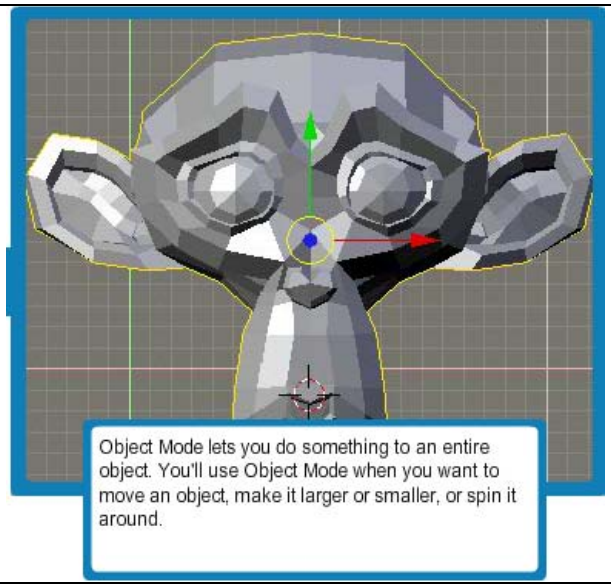
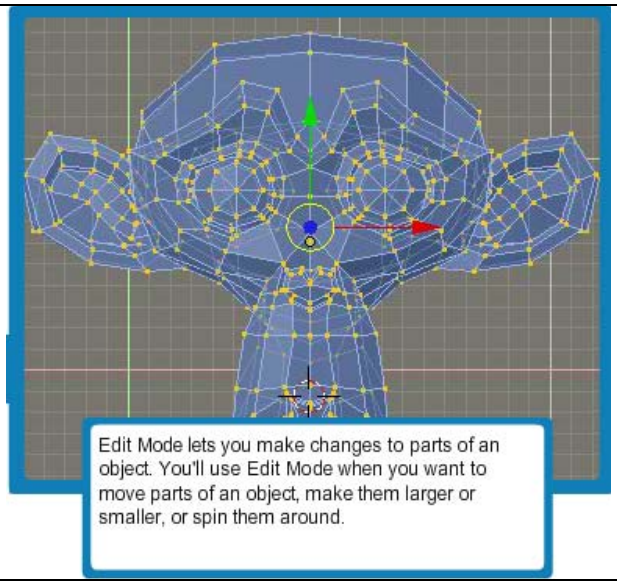
1. On the Start menu, left-click All Programs, left-click Blender Foundation, left-click Blender, and then left-click Blender again.	
2. On the File menu, left-click Open.	
3. In the Directory field, type this file path: C:\Users\Student\Desktop\UHD \3D Animation\. TIP: If your files are in a different place, type the file path for their location.	
4. Left-click Suzanne.blend.	

5.Left-click Open.		
Suzanne appears in 3D view.		

Modes

Blender has several different modes for interacting with objects.

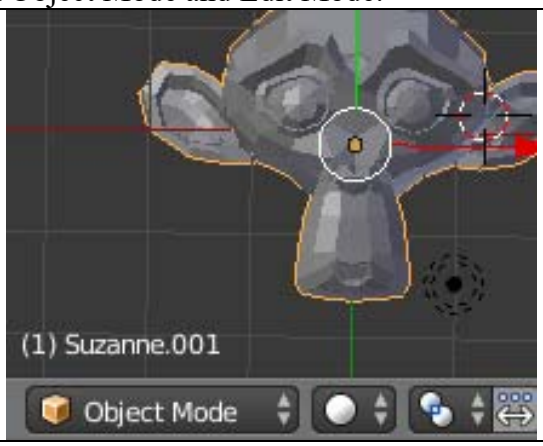
See the difference between Object and Edit mode.

Object Mode	
Edit Mode	

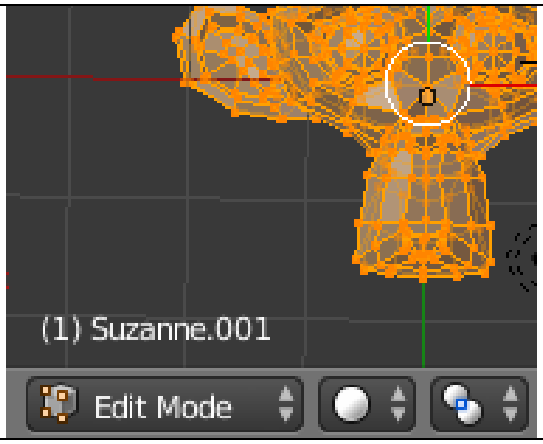
Switch to Object Mode

Complete the steps below to switch between Object Mode and Edit Mode.

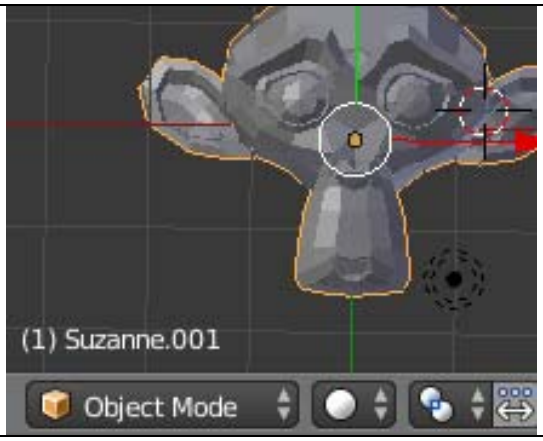
1. At the bottom of the 3D View window, left-click the Mode list and select Object Mode.



2. You can also press TAB to switch back and forth between Object Mode and Edit Mode.



3. After you've switched between the two, be sure to end in Object Mode.

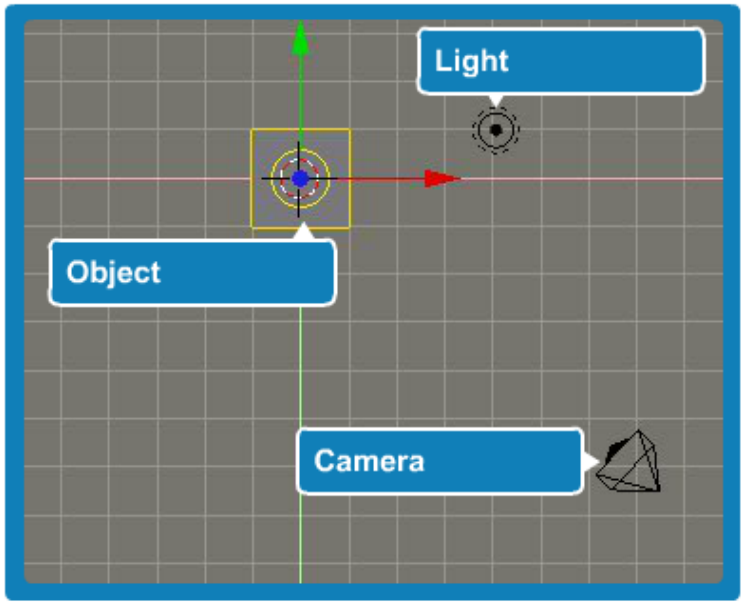


3D View Window

The biggest window in Blender is the 3D View window. This is where you can see your 3D objects and interact with them.

Your mouse pointer must be within the 3D View window to move around or make changes to 3D objects.

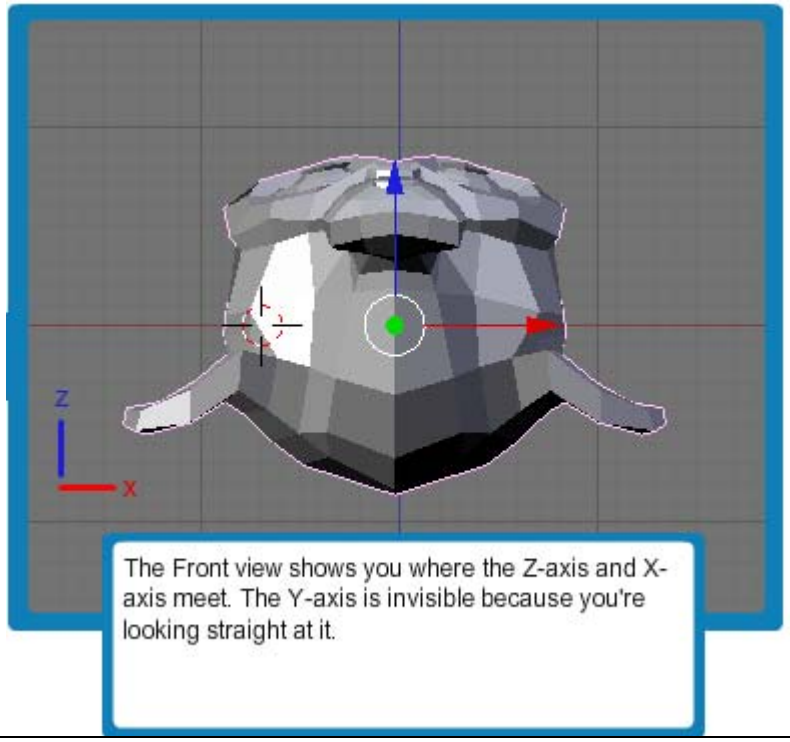
Click and drag the elements of the 3D View window to the correct location.

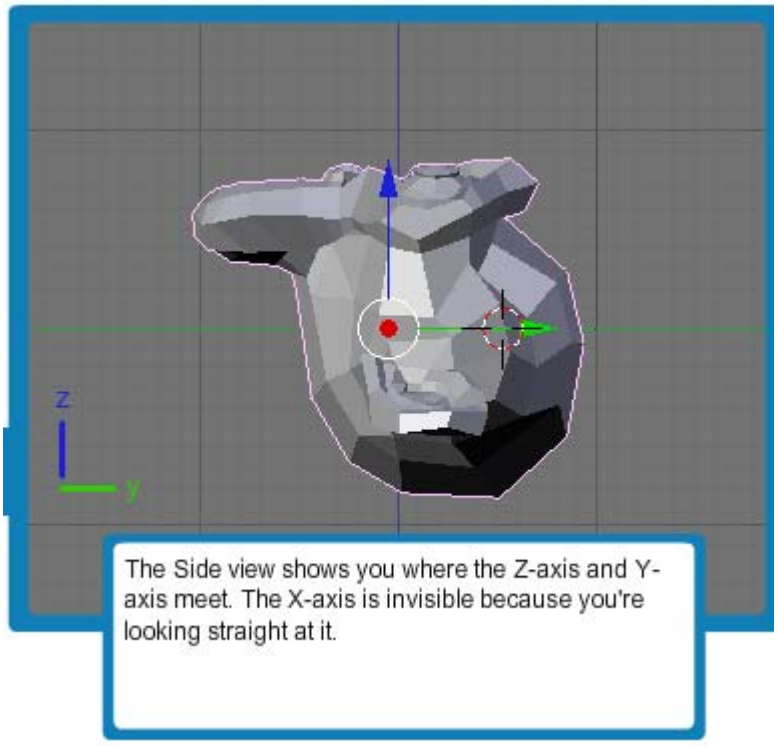
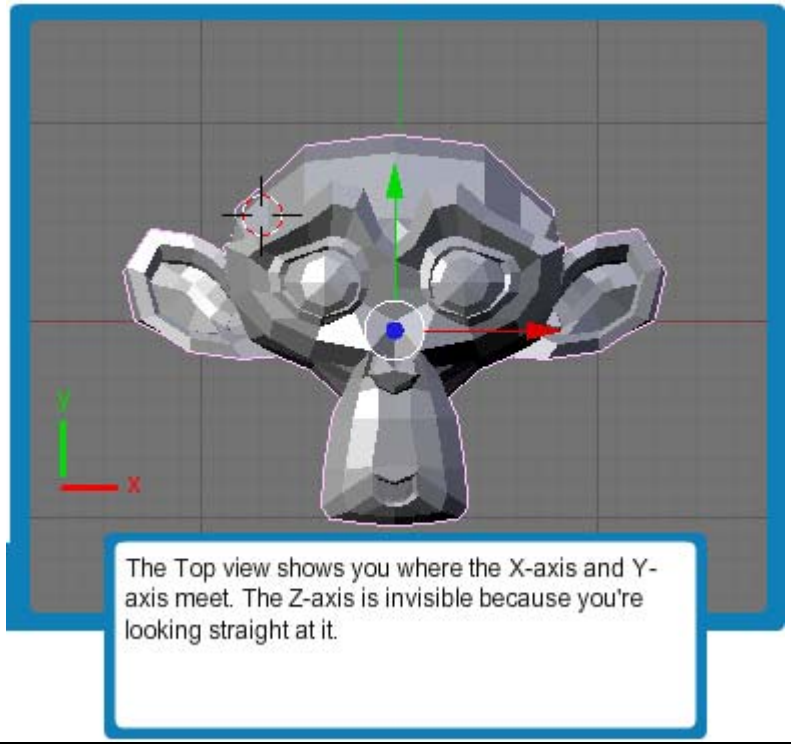


Preset 3D Views

Blender has four preset 3D views. These views are an easy way to move around in the 3D View window.

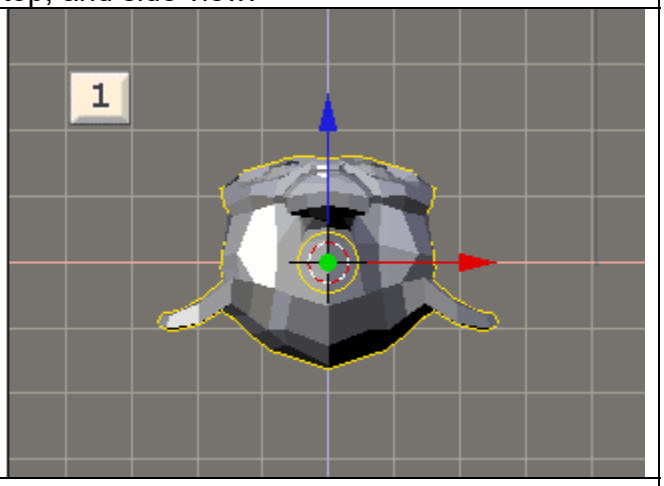
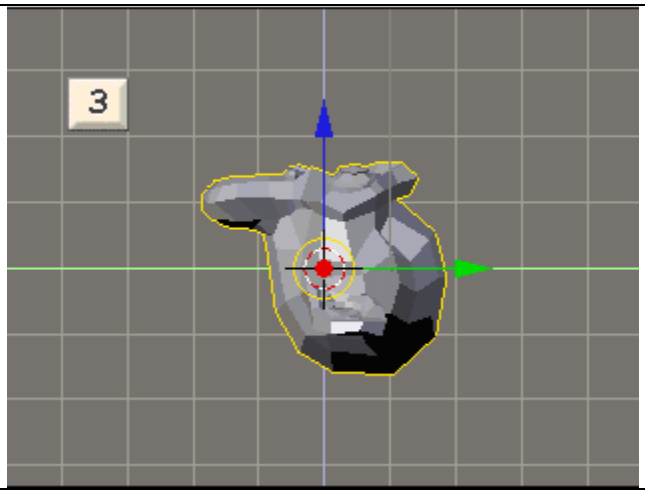
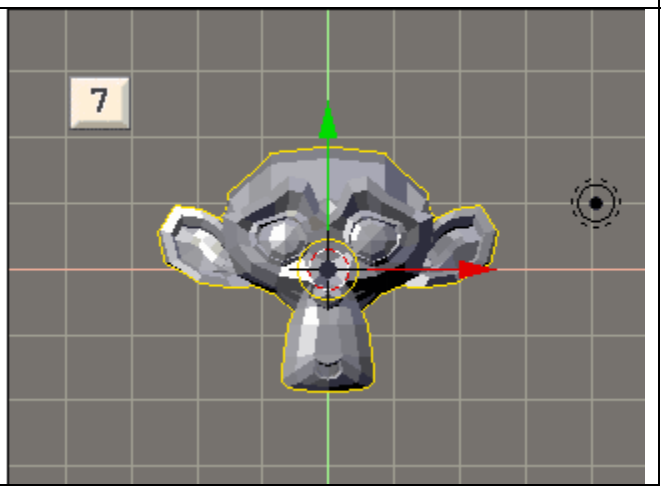
Front



Side	 z y The Side view shows you where the Z-axis and Y-axis meet. The X-axis is invisible because you're looking straight at it.
Top	 y x The Top view shows you where the X-axis and Y-axis meet. The Z-axis is invisible because you're looking straight at it.

Use Preset Views with the Keyboard

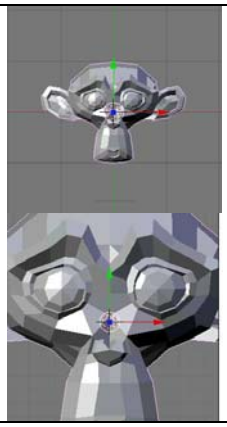
Complete the steps below to show the front, top, and side view.

1. Press NUM1 to see the Front view. TIP: Be sure to use the numeric keypad numbers and not the number keys at the top of the keyboard	
2. Press NUM3 to see the Side view.	
3. Press NUM7 to see the Top view	

Zooming

Zooming moves your point of view closer or farther away. Zooming does not change the actual size of the object at all.

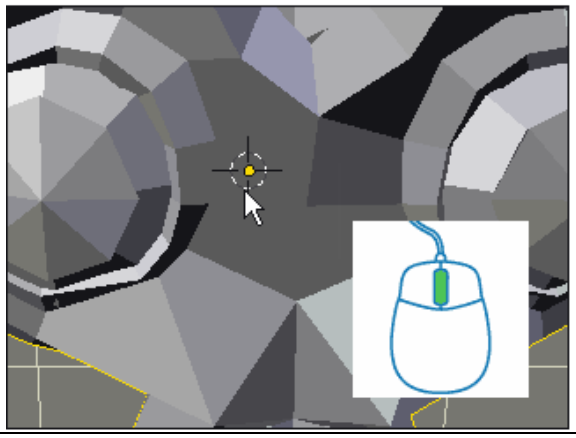
You'll zoom in when you want to make more detailed changes to your 3D object. You'll zoom out when you want to see the entire 3D object you're working on.



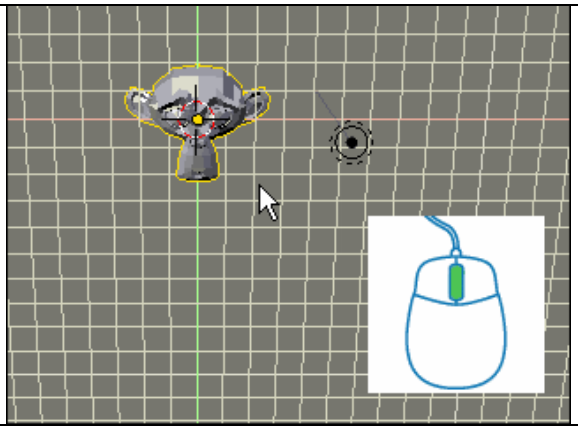
Zoom with the Mouse

Complete the steps below to zoom with the mouse.

1. Rotate the mouse wheel upward to zoom in.



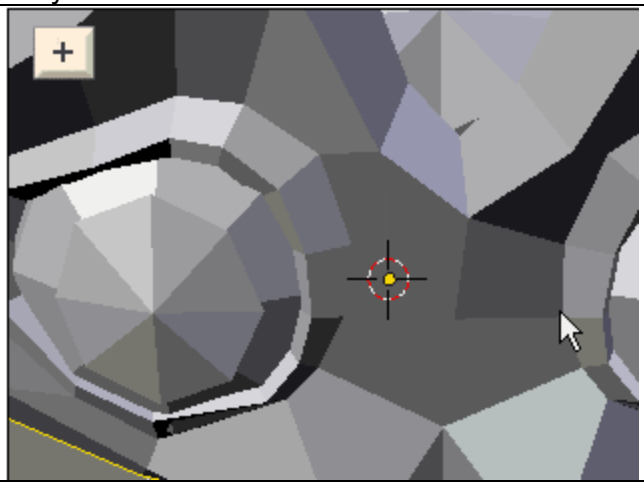
2. Rotate the mouse wheel downward to zoom out.



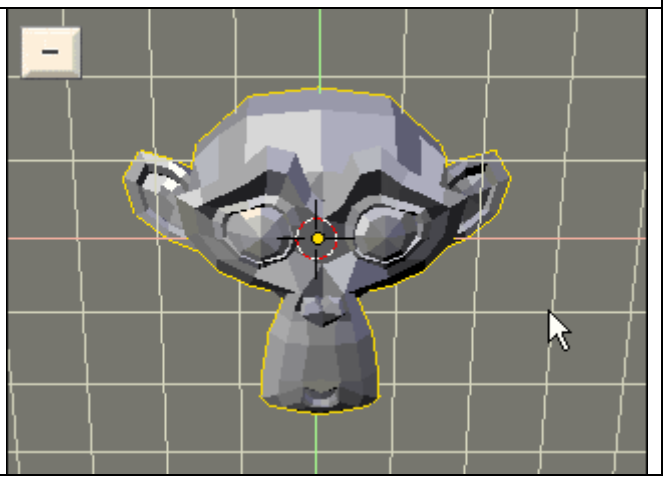
Zoom with the Keyboard

Complete the steps below to zoom with the keyboard.

1. With your mouse pointer in the 3D View window, press the + key to zoom in.



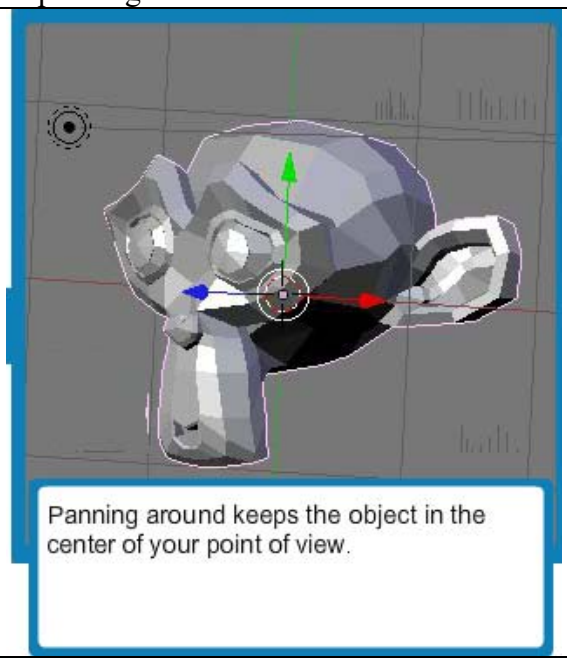
2. With your mouse pointer in the 3D View window, press the - key to zoom out.



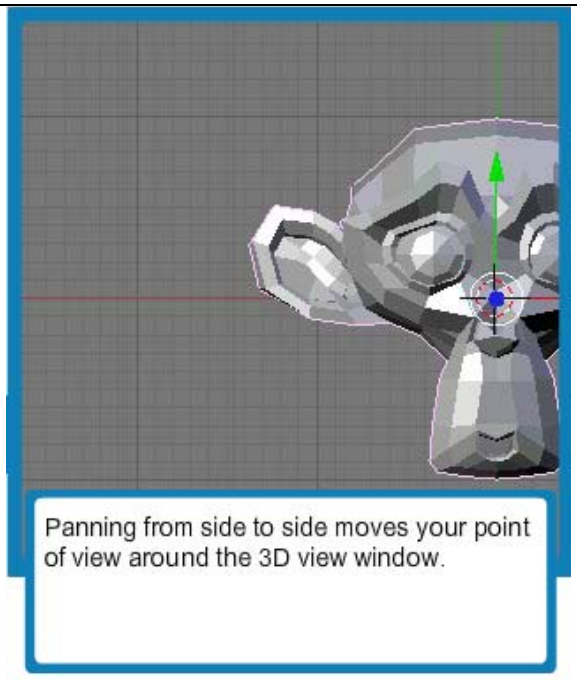
Panning

Panning moves your point of view around or alongside your 3D object. You can pan with the mouse or the keyboard.
In Blender, there are two types of panning. Click the buttons below to see the difference.

Panning Around



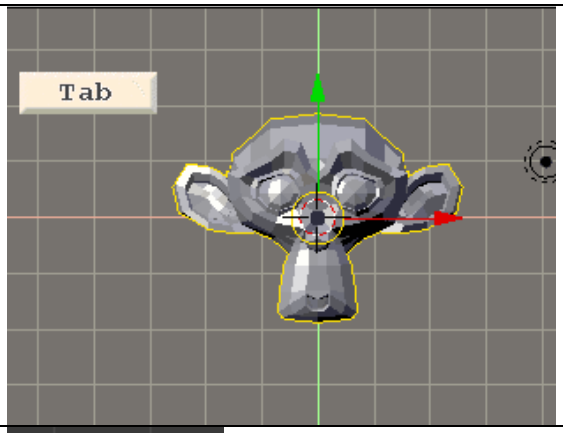
Panning Side to Side



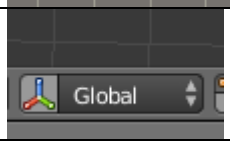
Pan with the Mouse

Before you pan with the mouse, you need to turn off the 3D Transform Manipulator. If it's turned on, you can accidentally make changes to your 3D objects.

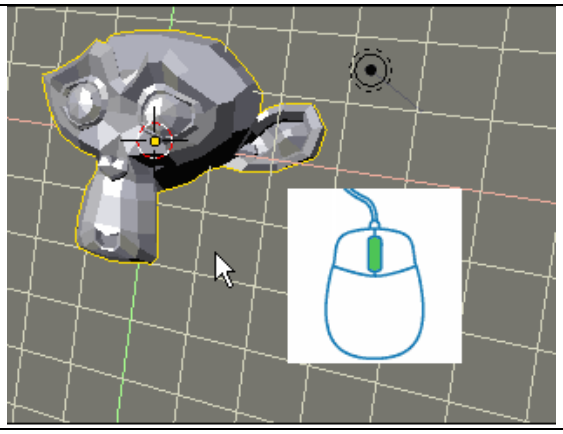
1. Make sure you are in Object Mode. If not, press the TAB key to switch to Object Mode.



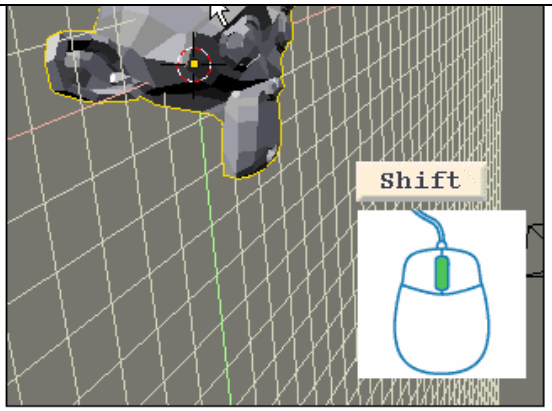
2. Left-click the Use 3D Transform Manipulator button to turn it off. TIP: Make sure your screen matches the example.

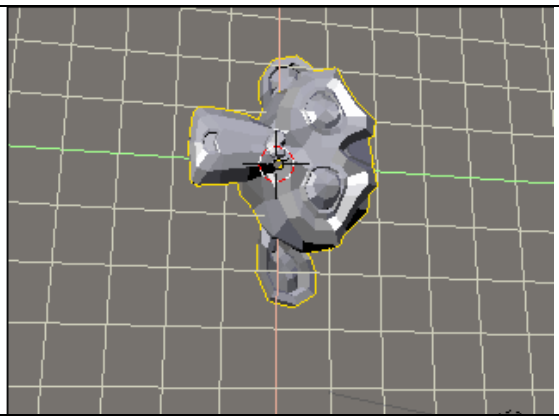


3. Press and hold the mouse wheel (or center mouse button) and move the mouse to pan around Suzanne. TIP: Make sure you're pressing down on the mouse wheel and not rotating it.



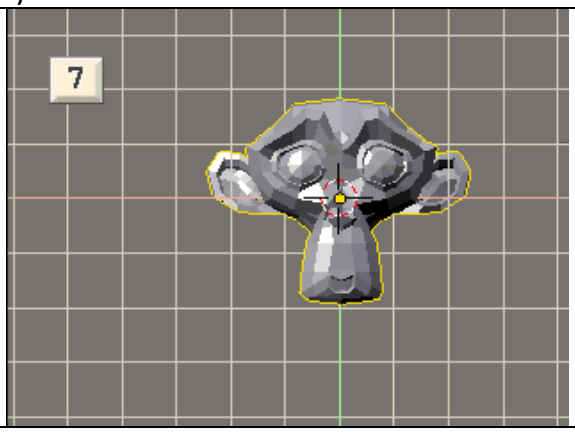
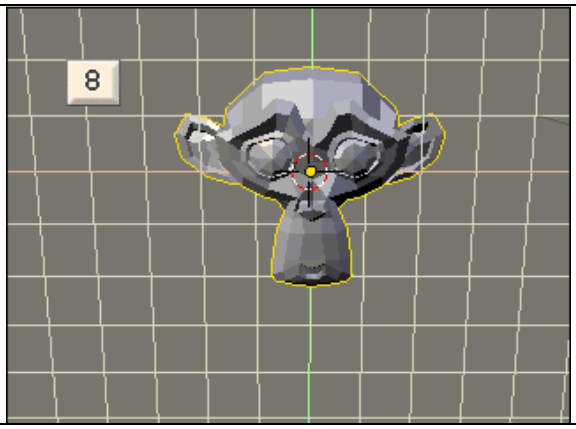
4. Hold down SHIFT while pressing the mouse wheel (or center mouse button) and move the mouse to pan along the object in a straight line.

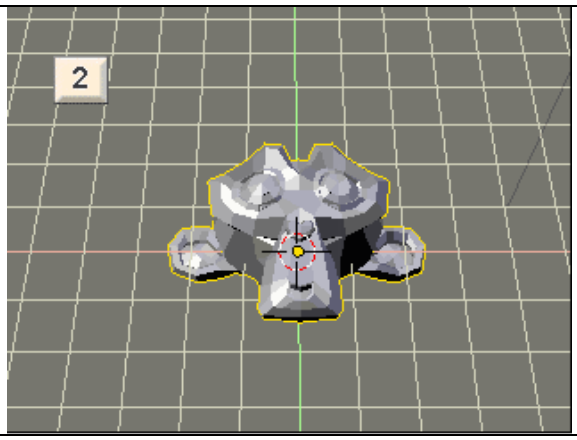
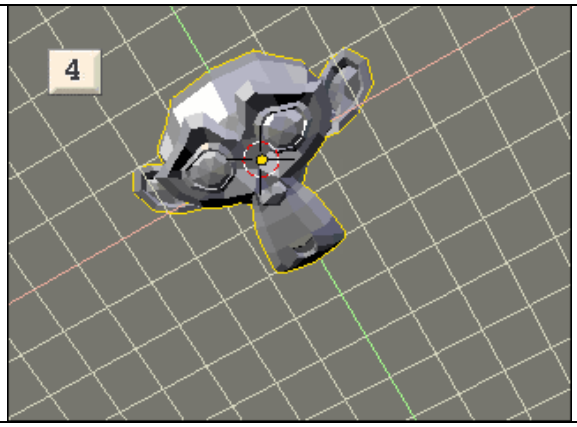
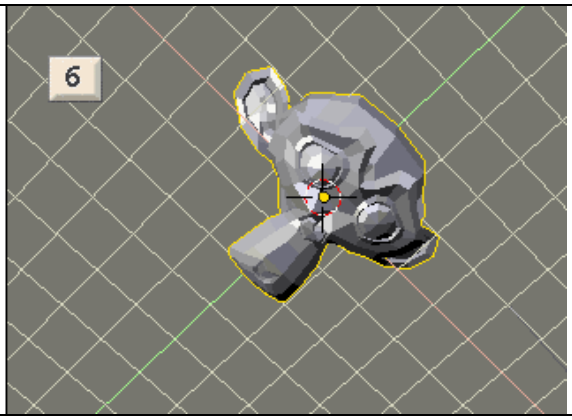


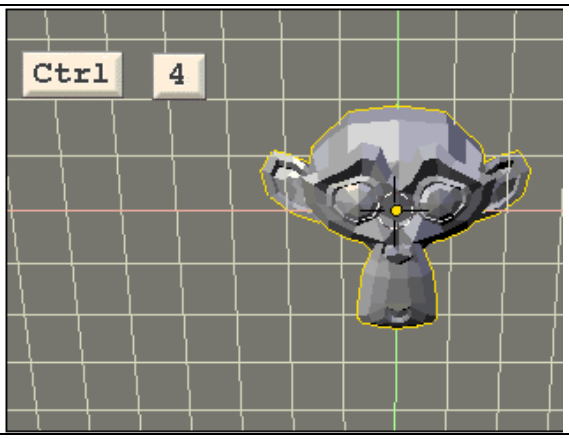
5. Pan around Suzanne until it matches the image as closely as you can get it.	

Pan with the Keyboard

Complete the steps below to pan using the keyboard.

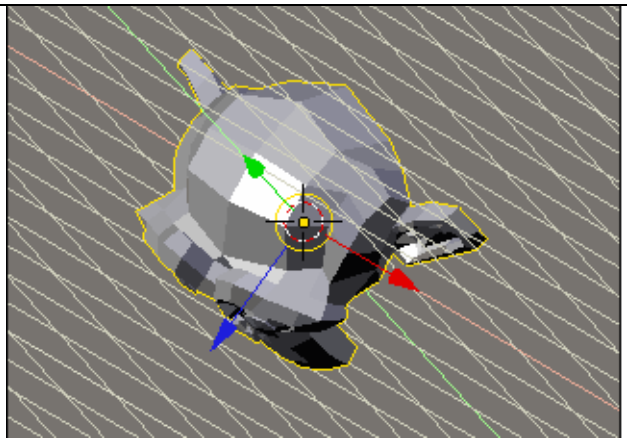
1. Place the mouse pointer over the 3D View window and press numeric keypad 7 (NUM7) to return to the Top view.	
2. Press NUM8 to pan around the object upward.	

3. Press NUM2 to pan around the object downward.	
4. Press NUM4 to pan around the object to the left.	
5. Press NUM6 to pan around the object to the right.	

6. Hold down the CTRL key while pressing NUM8, NUM2, NUM4, or NUM6 to pan in place (not around Suzanne) up, down, left, or right.	

Navigate in 3D

Complete the steps below to practice your skills with zooming and panning.

1. Practice moving around in 3D space by getting your image of Suzanne to look like the example. Do your best, but don't worry if you can't get it to match exactly. 2. Experiment with the mouse and keyboard commands to see which you like best. 3. If you're done for the day, you can close Blender without saving. If not, move on to the next lab	

SUMMARY	In this lab, you learned how to: • Switch between Object Mode and Edit Mode. • Use Preset Views in the 3D View window. • Pan and zoom in 3D space using the mouse and keyboard.

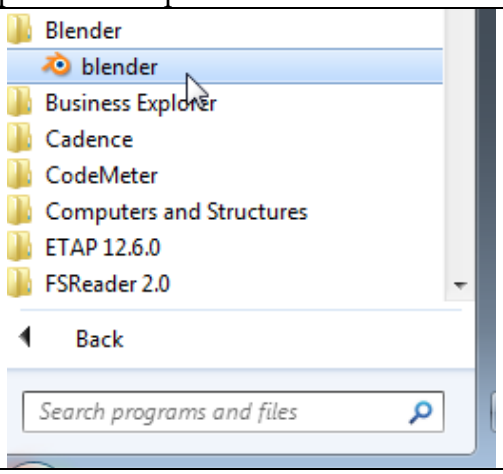
Lab 2 Introduction

In this lab, you'll move, spin, and resize Suzanne.

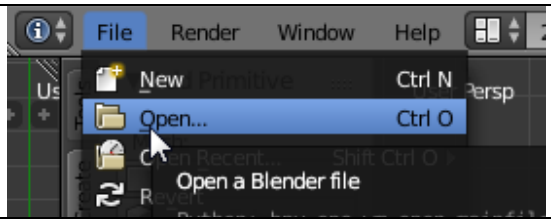
Open Suzanne.blend

You'll start by looking at an example of a 3D object. Complete the steps below to open a Blender file. If Blender is already open, skip the first step.

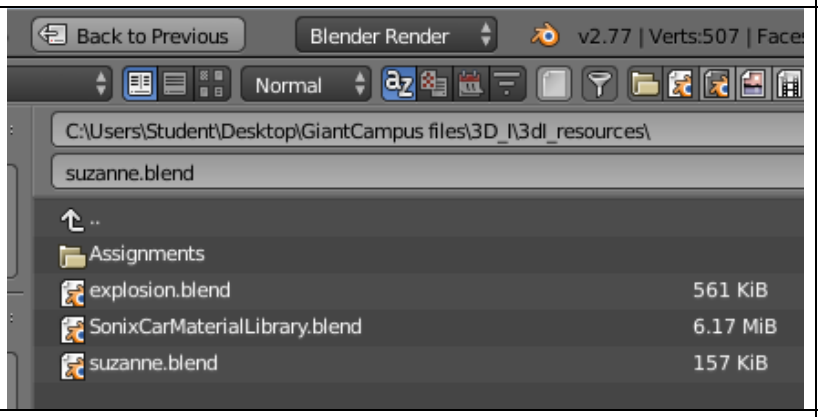
1. On the Start menu, left-click All Programs, left-click Blender Foundation, left-click Blender, and then left-click Blender again.

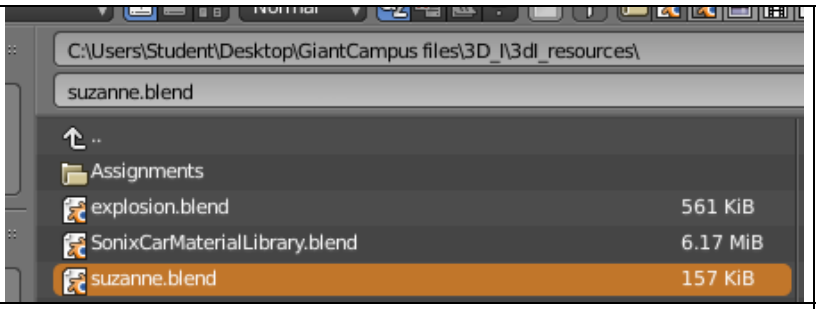


2. On the File menu, left-click Open.



3. In the Directory field, type this file path: C:\Users\Student\Desktop\UHD\3D Animation\. TIP: If your files are in a different place, type the file path for their location.

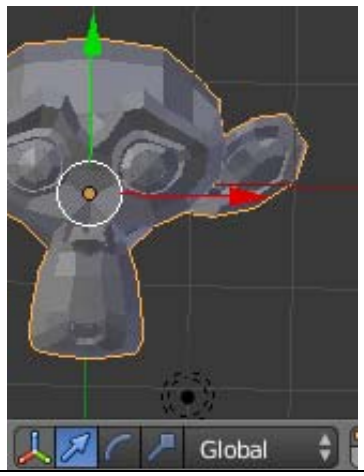


4. Left-click Suzanne.blend.	
5.Left-click Open.	
Suzanne appears in 3D view.	

The 3D Transform Manipulator

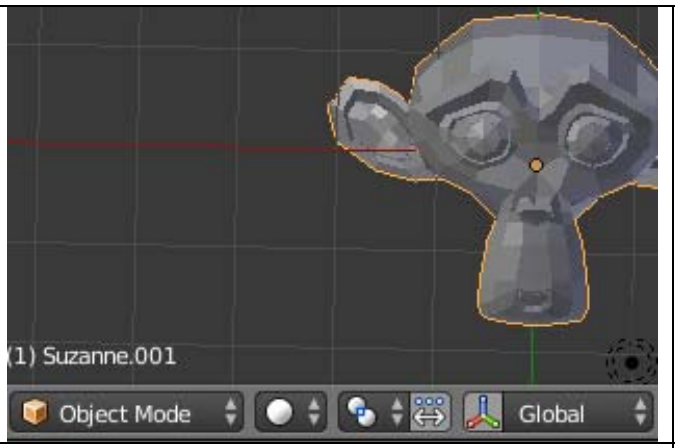
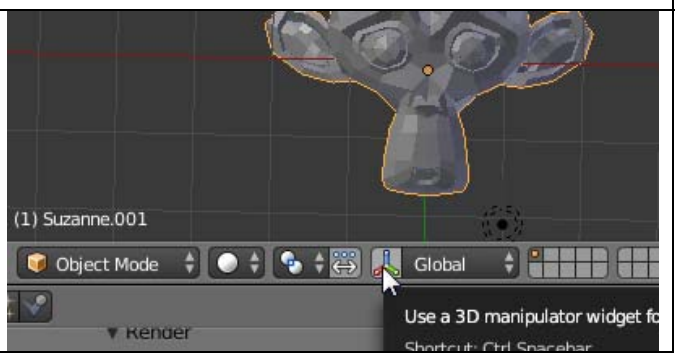
To make it easy to edit 3D objects, Blender uses the **3D Transform Manipulator**. Unless it's turned off, it will appear at the center of any object that you select.

The 3D Transform Manipulator lets you move, spin, and resize objects.



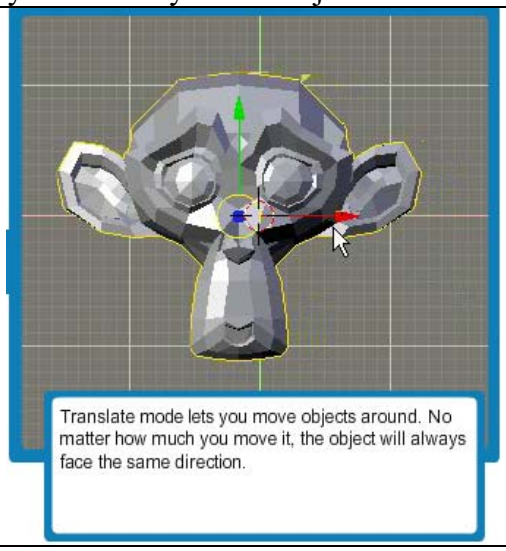
Turn On 3D Transform Manipulator Button

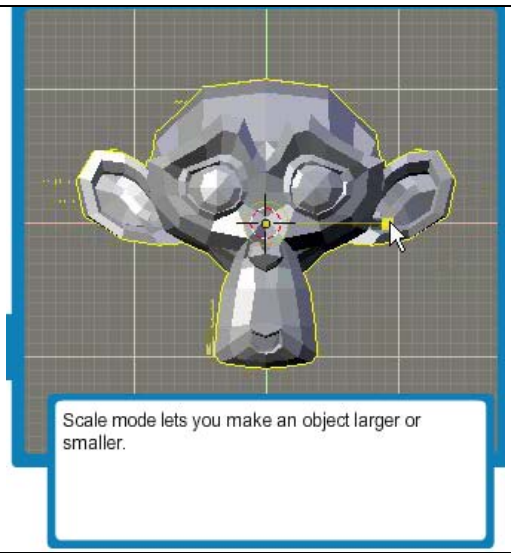
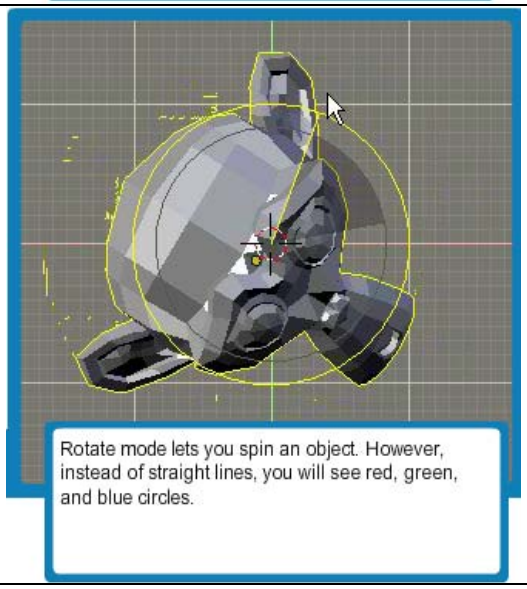
You turned off the 3D Transform Manipulator earlier so that you wouldn't accidentally change anything. Complete the steps below to turn it back on.

1. Make sure you are in Object Mode. If not, press the TAB key.	
2. Left-click the Use 3D Transform Manipulator button to turn it on. TIP: Make sure your screen matches the example.	

The 3D Transform Manipulator Modes

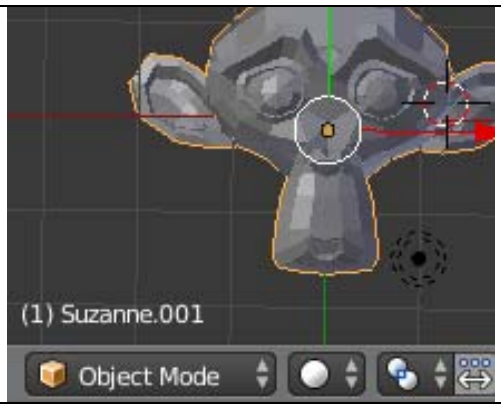
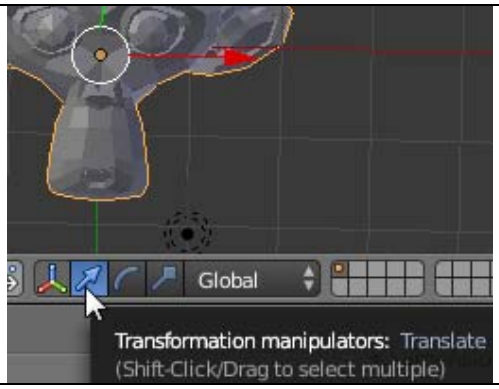
The 3D Transfrom Manipulator has three different modes: translate, scale, and rotate. Click the buttons below to see what each mode allows you to do to your 3D object.

Translate	

Scale	
Rotate	

Move Suzanne

Complete the steps below to move Suzanne using the Translate mode of the 3D Transform Manipulator. You'll know you've selected the 3D Transform Manipulator when the red, green, and blue arrows change to white.

1. Make sure you are in Object Mode. If not, press the TAB key to switch to Object Mode.	
2. Make sure Suzanne is still outlined or hilighted. If not, right-click to select her.	
3. Left-click the Translate manipulator mode button. The translate button looks like a blue arrow. The ends of the red, green, and blue lines will change to arrows.	
4. Left-click inside the 3D Transform Manipulator and move the mouse to move Suzanne.	
5. Left-click to stop moving Suzanne.	

The Undo Command

Blender is a complicated program, and it's easy to make mistakes. If you make a change that you don't like, you can undo the last thing you did by pressing CTRL + Z.

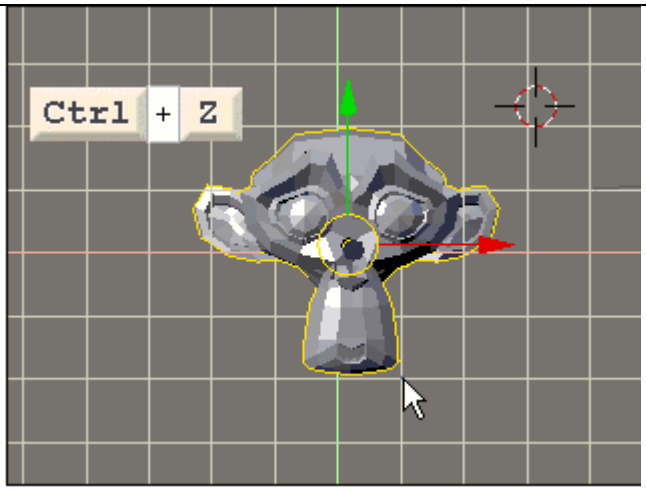
This is much easier than deleting everything and starting over.

CAUTION: Blender will only let you undo your last 32 changes. So you can't use Undo to fix everything you did in a project!

Undo a Change

Complete the steps below to undo a change.

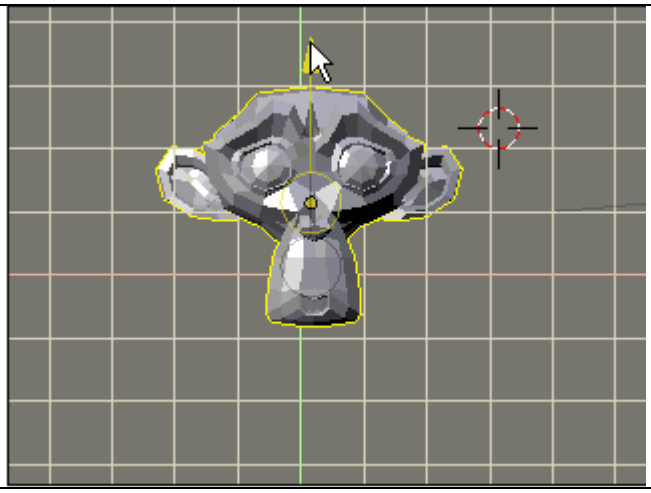
1. Press CTRL + Z to undo any mistakes. You may need to press it more than once to get it back to what you want.

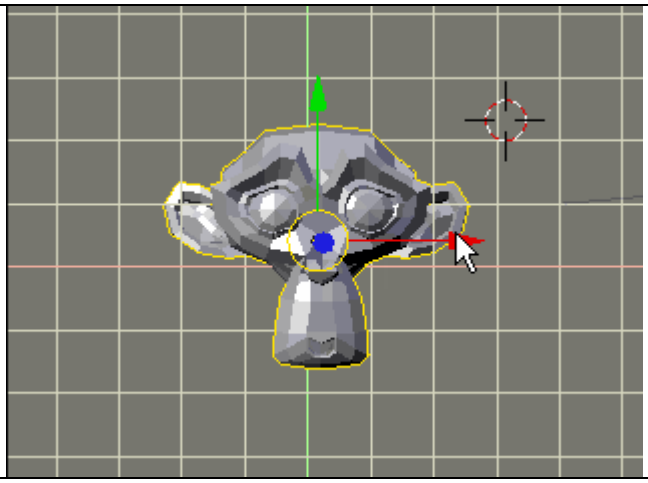
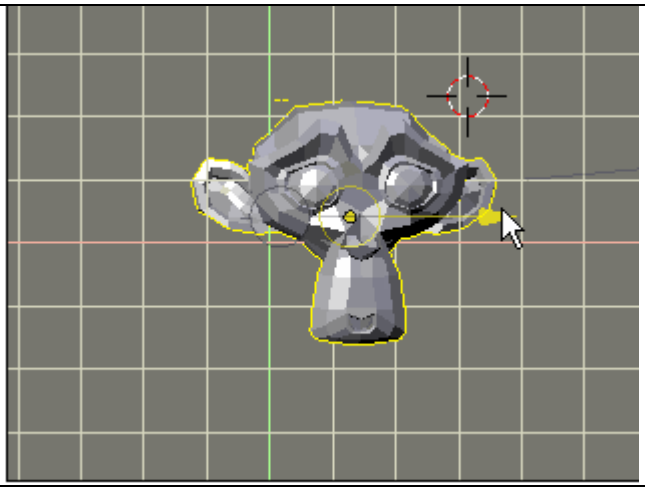


Move Along One Axis

Complete the steps below to move along the Y-axis.

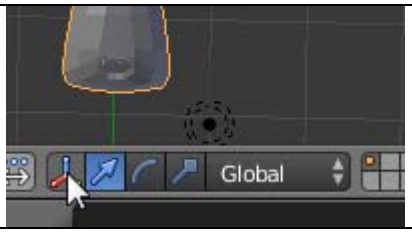
1.Left-click the 3D Transform Manipulator's green arrow and move the mouse. This moves Suzanne along the Y-axis.

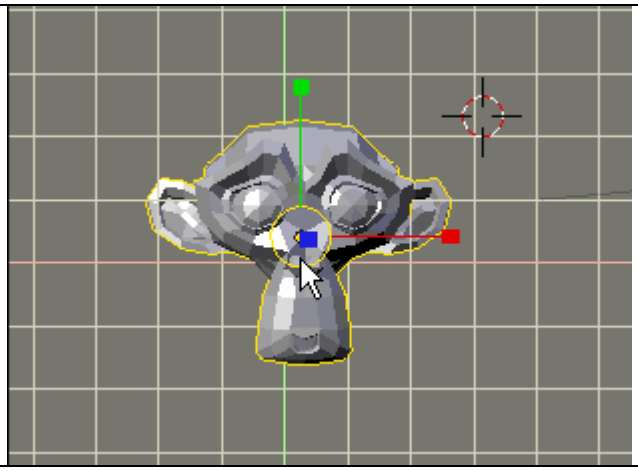
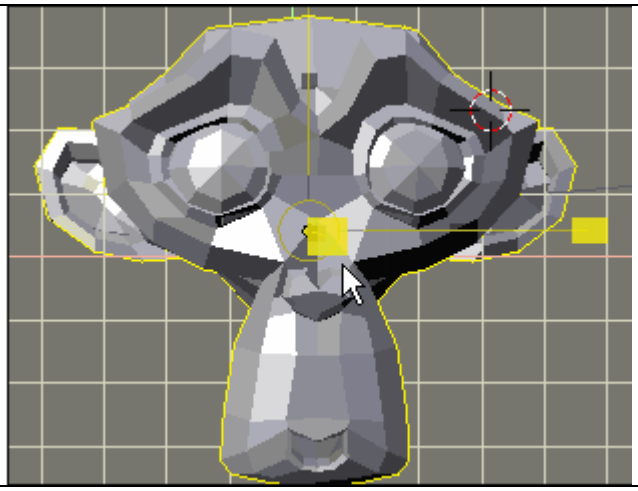


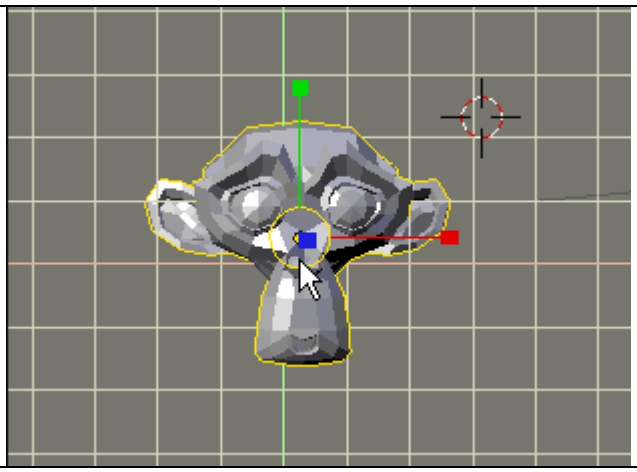
2.Left-click to stop moving Suzanne.	
3.You can move Suzanne along any axis by clicking just that arrow instead of inside the circle.	

Make Suzanne Larger

Complete the steps below to scale Suzanne.

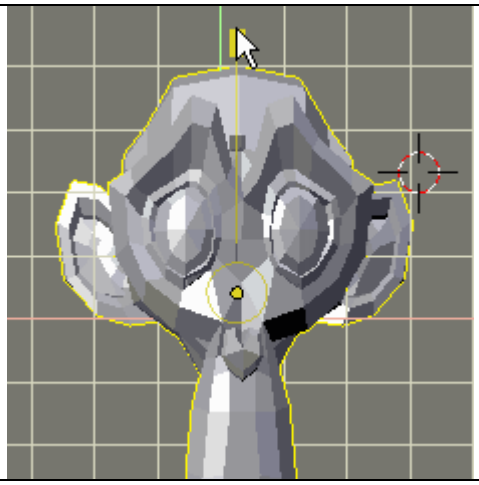
1.Right-click Suzanne to select her if she's not already. TIP: Selected objects will be surrounded by a highlight line.	
2.Check that the Use 3d transform manipulator button is turned on.	

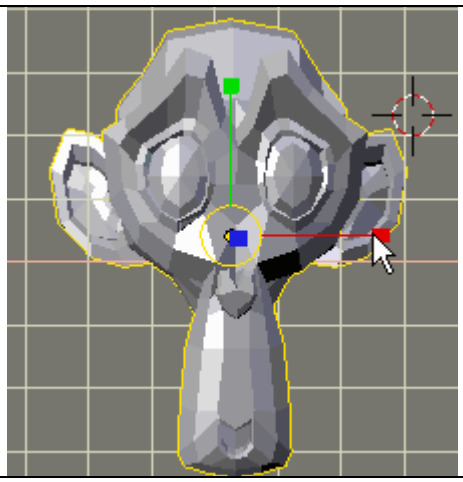
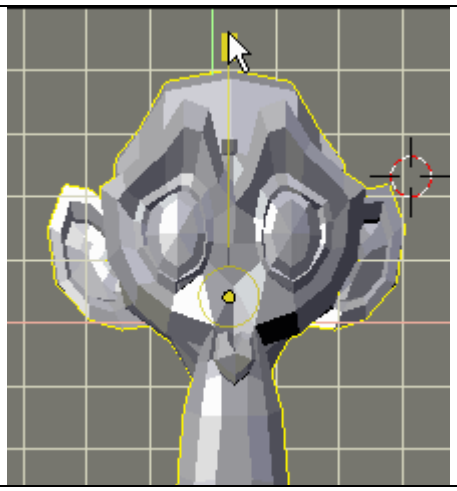
3.Left-click the Scale manipulator mode button.	
4.Left-click inside the 3D Transform Manipulator. Be careful not to click the square in the center or the red, blue, or green lines.	
5.Move the mouse pointer very slowly toward the edge of the yellow circle. As you move outward Suzanne will get larger. CAUTION: Do not move your mouse over the yellow dot in the center of Suzanne or she will flip over.	

6.Left-click to stop scaling. You can press CTRL + Z to undo your last move.	

Stretch in One Direction

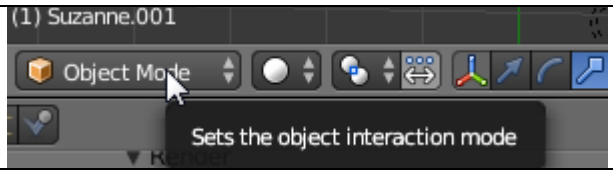
Just like moving, you can scale in just one direction. Complete the steps below to stretch Suzanne along the Y-axis.

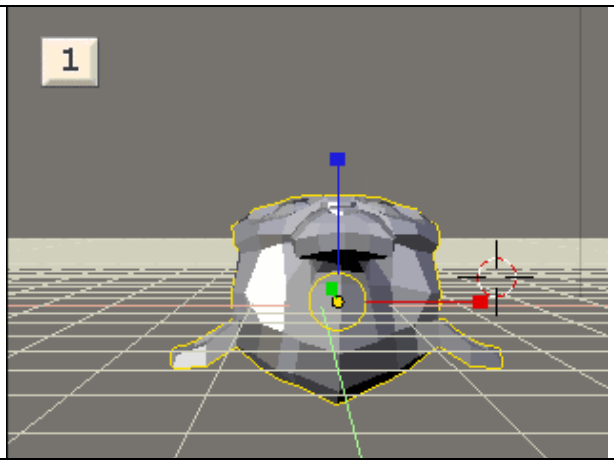
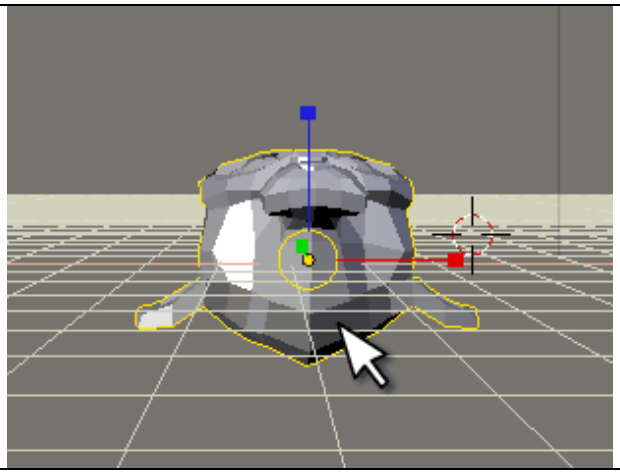
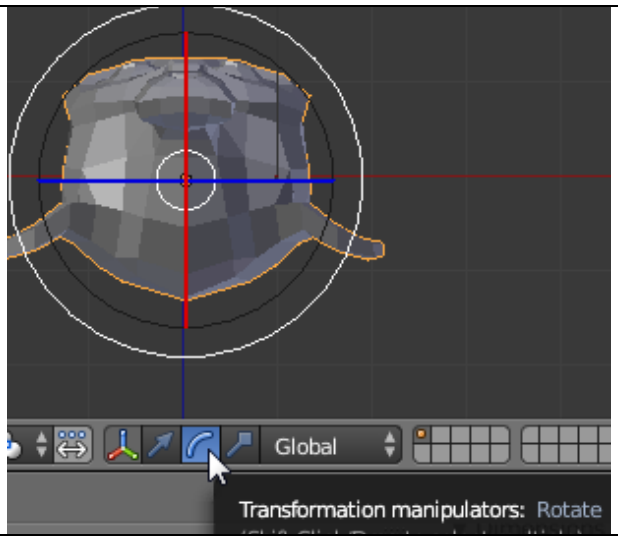
1.To scale Suzanne along the Y-axis, left-click the green box and move the mouse. Left-click again to stop scaling.	

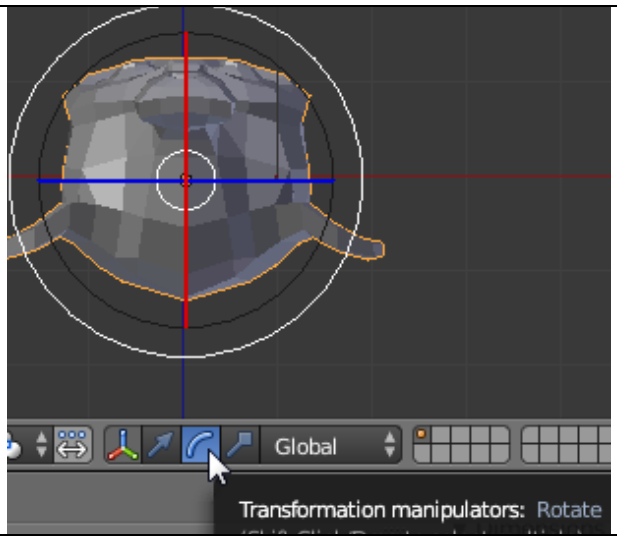
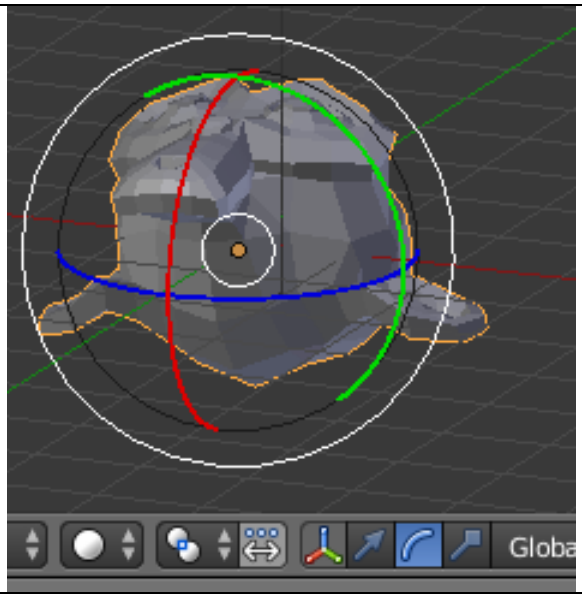
2.You can scale Suzanne along any axis by clicking the green, blue, or red square.	
3.Press CTRL + Z to undo any mistakes. You may need to press it more than once to get the object back to how you want it.	

Rotate an Object

Complete the steps below to rotate Suzanne.

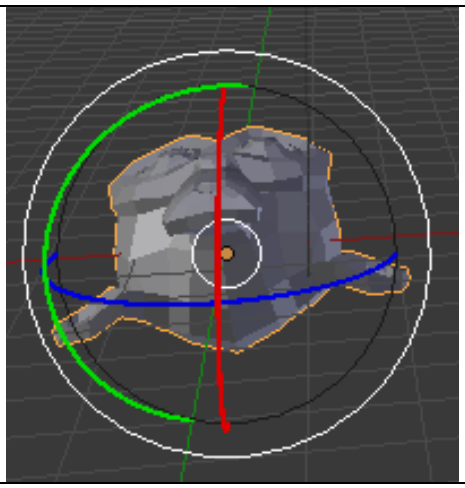
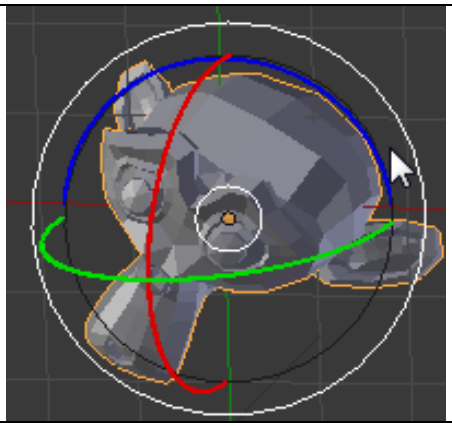
1.Check that you are in Object Mode. If not, press the TAB key to switch to Object Mode.	

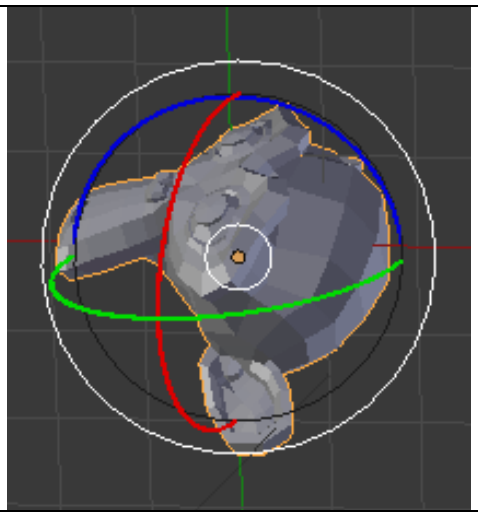
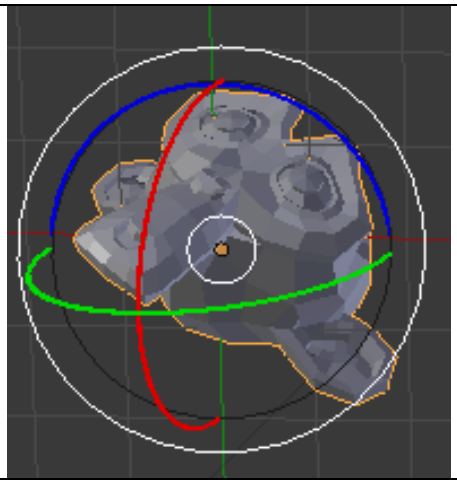
2.Press NUM1 to return to the Front View.	
3.Make sure Suzanne is still outlined in yellow. If not, right-click to select her.	
4.Left-click the Rotate manipulator mode button. The translate button looks like a blue arc.	

5.Left-click the outer white line of the 3D Transform Manipulator. Move your mouse to rotate. Left-click when you're done.	
6.Press and hold the middle mouse button to pan around Suzanne.	

Rotate Around One Axis

Complete the steps below to rotate around one axis.

1.Left-click the outer white line again and move the mouse. The object will spin around your new point of view. Left-click when you're done.	
2.If you can't see the blue line, use the scroll wheel or middle mouse button to rotate your view until you can see all three lines.	
3.Inside the 3D Transform Manipulator left-click the blue line and move the mouse right and left to rotate Suzanne along the Z-axis. Left-click to stop rotating.	

4.Inside the 3D Transform Manipulator, left-click the red line and move the mouse to rotate Suzanne along the X-axis.	
5.To rotate Suzanne along the Y-axis, left-click the green line and move the mouse. Left-click again to stop rotating.	
6.Press CTRL + Z to undo any mistakes. You may need to press it more than once to get the object back to how you want it.	

Check Your Work

1. Make sure you are comfortable rotating, moving, and scaling.

2. If you're done for the day, you can close Blender without saving. If not, move on to the next lab.

SUMMARY	In this lab, you: • Used Translate mode to move an object. • Used Scale mode to resize and stretch an object. • Used Rotate mode to spin an object. • Translated, scaled, and rotated on different axes.

Lab 3 Introduction

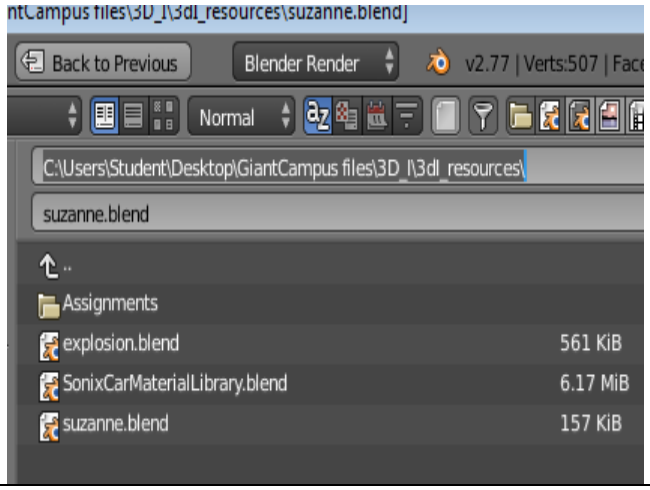
In this lab, you'll open and save your 3D modeling work.

The File Navigation Screen

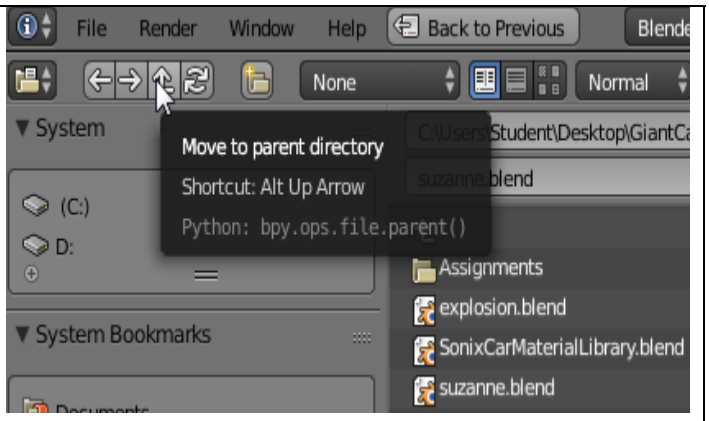
The Open command in Blender takes you to the file navigation screen. Here you can see the files and folders on your computer.

At the top of the file navigation screen, you'll see the current folder in the **Directory** field. The **current folder** is the folder you are in right now.

The white items in the list are folders that are inside the current folder. Clicking one will take you to that folder.

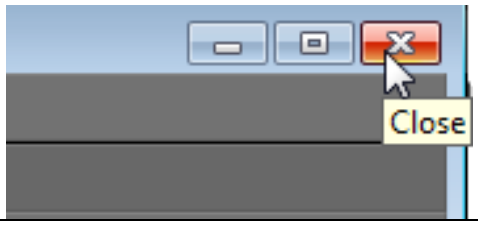
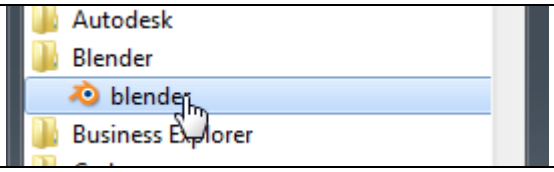
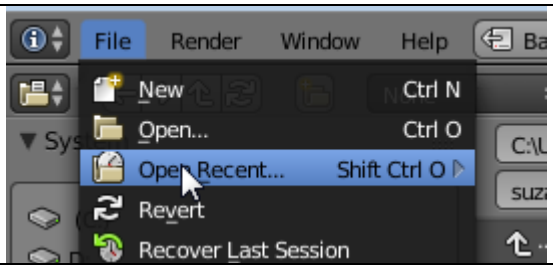


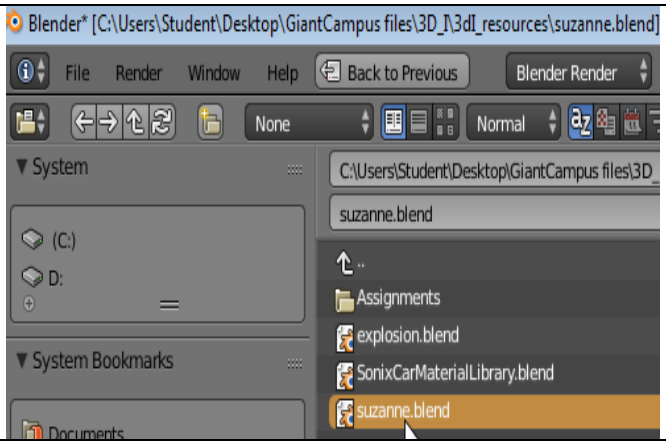
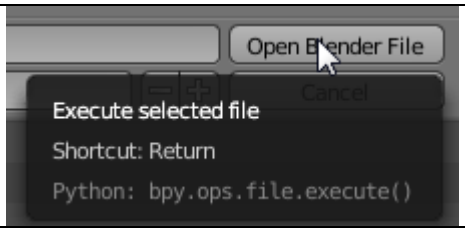
The Parent Directory

Clicking the **Move to the parent directory** button will take you to the folder that has the current folder inside it.	

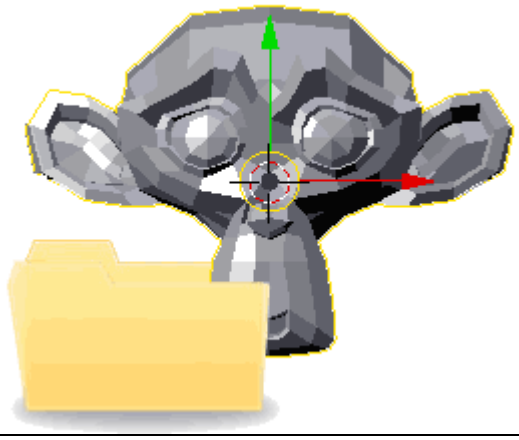
Open a File

Complete the steps below to open a saved file. You'll do this any time you want to open a file that has already been created.

1.Close Blender by clicking the X in the top right corner.	
2.On the Start menu, left-click All Programs, left-click Blender Foundation, left-click Blender, and then left-click Blender again.	
3.On the File menu, left-click Open.	

4.Left-click suzanne.blend. Notice that there's a yellow box next to that file name. That means it's a Blender file.	
5.Left-click Open.	

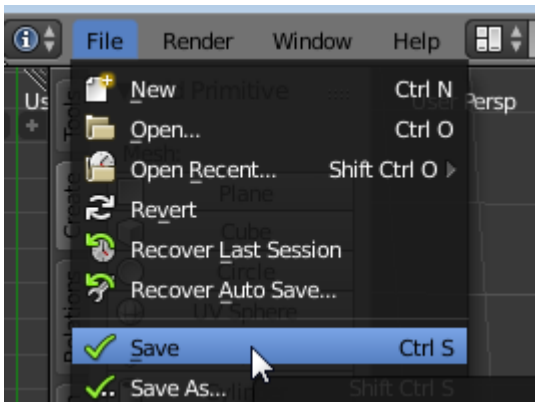
Saving Files

It's important to save your Blender file as you make changes. Saving your file keeps you from losing your work if your computer crashes or you make a major mistake. When you close Blender, it won't ask you if you want to save. Always save your work before closing Blender.	

The Save Command

One way to save a Blender file is the Save command. The **Save** command overwrites the older version of the file with any new changes that you've made.

You'll use Save after you've made a minor change that you're happy with.

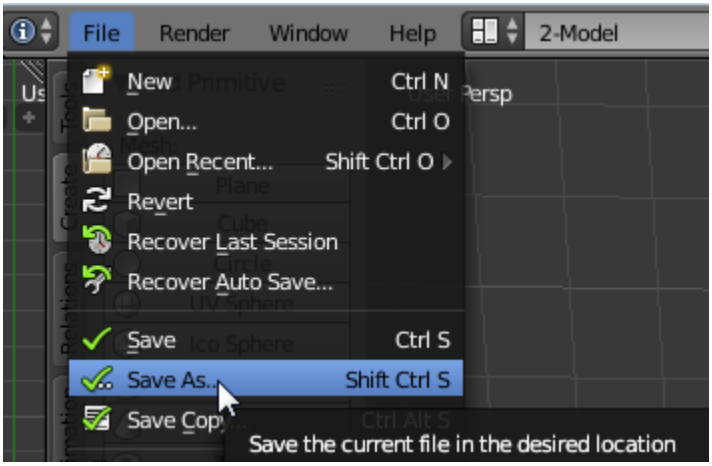


The Save As Command

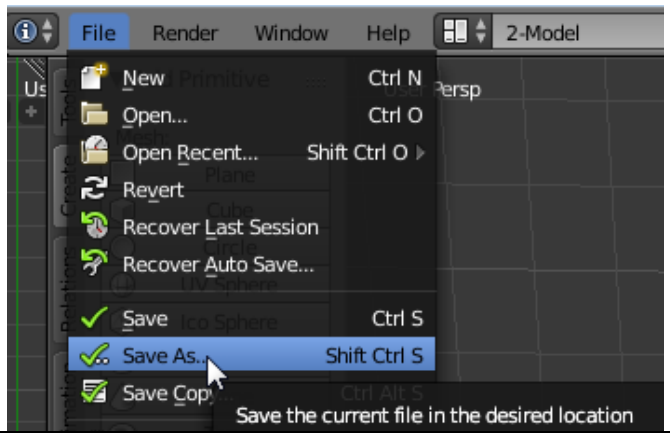
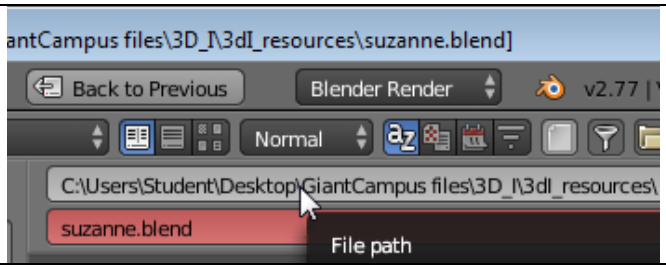
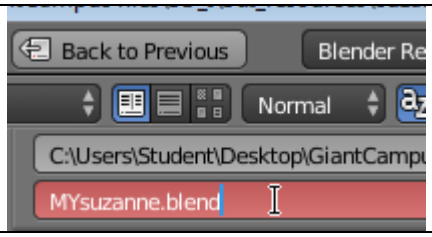
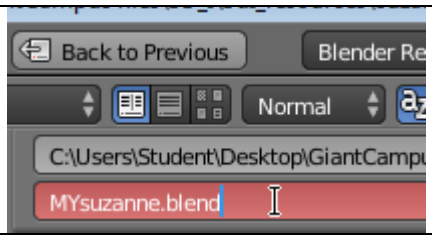
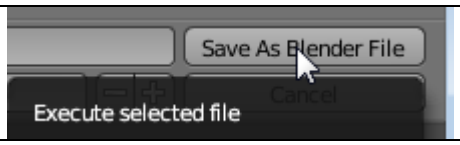
The second way to save a Blender file is the Save As command. The **Save As** command saves your current project as a new file with a new name.

That means the older version of your file will still be around in case you need it later.

You'll use Save As whenever you think you might want to keep a copy of your old file while continuing to work on the new version of your file.



Save Your Own Copy

1.On the File menu, click Save As.	
2.Make sure you're saving in the right folder. The file path should be: C:\Users\Student\Desktop\UHD\3D Animation\	
3.Left-click the name in the File field to highlight it.	
4.Type your new name for the file. We chose suzanne_2. You do not have to type .blend. Blender will add that file extension for you.	
5.Left-click Save As.	

Summary	In this lab, you: • Used the Open command to open a file. • Used the Save As command to save a file.

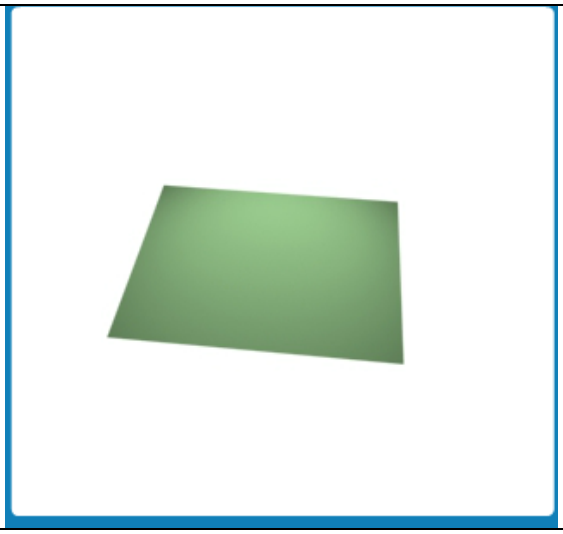
Lab 4 Introduction

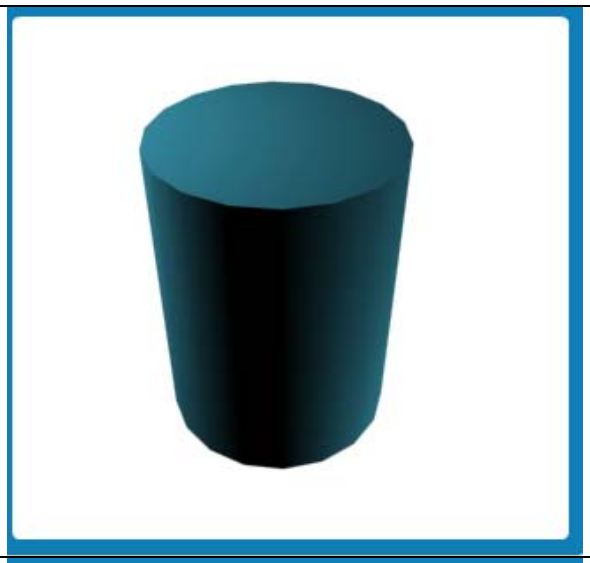
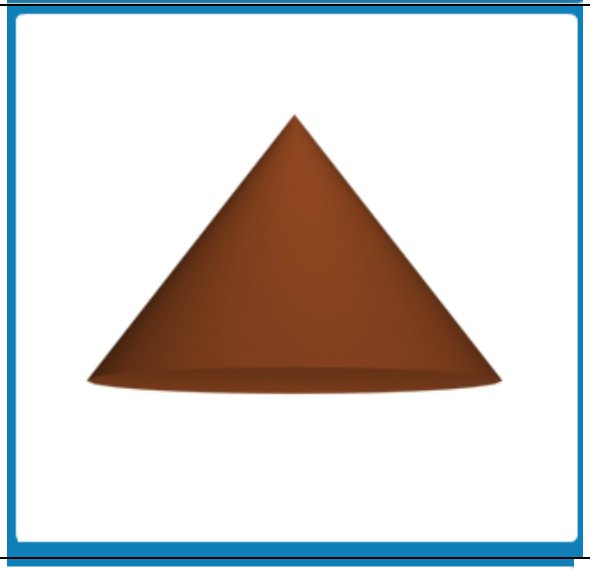
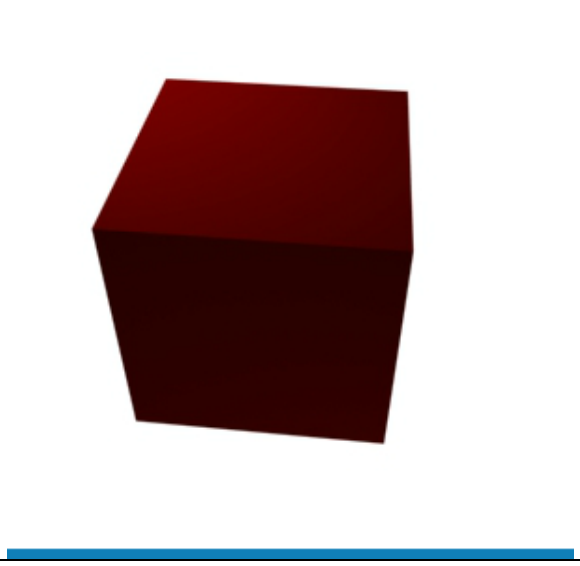
In this lab, you'll use simple shapes to make a hat.

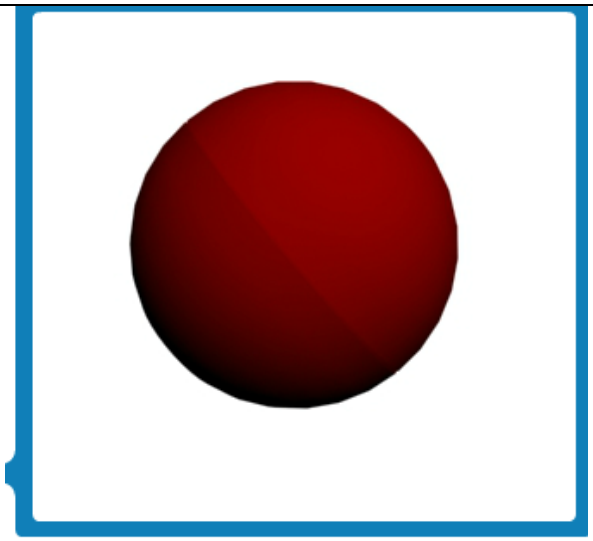
Meshes

Meshes are the basic shapes that are included in Blender. Most of them are 2D and 3D objects that you will join together to make more complicated 3D objects in Blender.

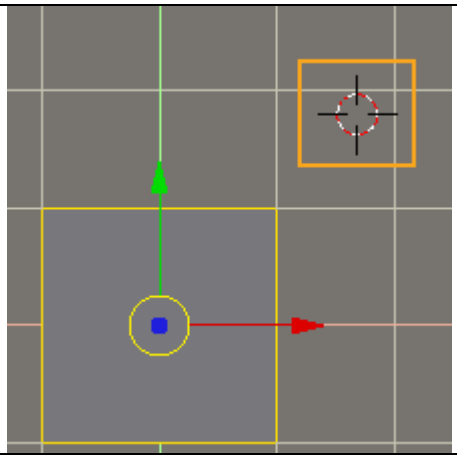
Click the buttons below to see the different types of meshes. Suzanne is also a mesh that was made just for Blender.

Plane	

Cylinder	
Cone	
Cube	

Sphere	

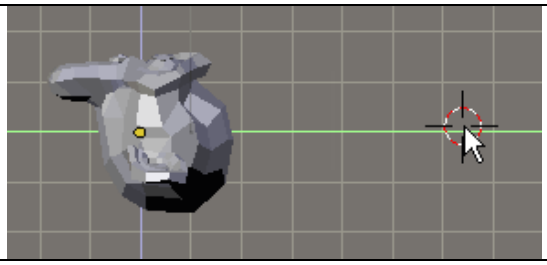
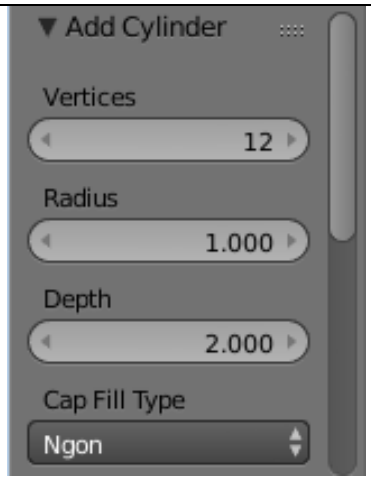
3D Cursor

The **3D cursor** controls where new objects appear in the 3D View window. You'll use the 3D cursor to add meshes to a certain location in the 3D View window.	

Add a Cylinder

You'll add a cylinder that will be the base of Suzanne's hat.

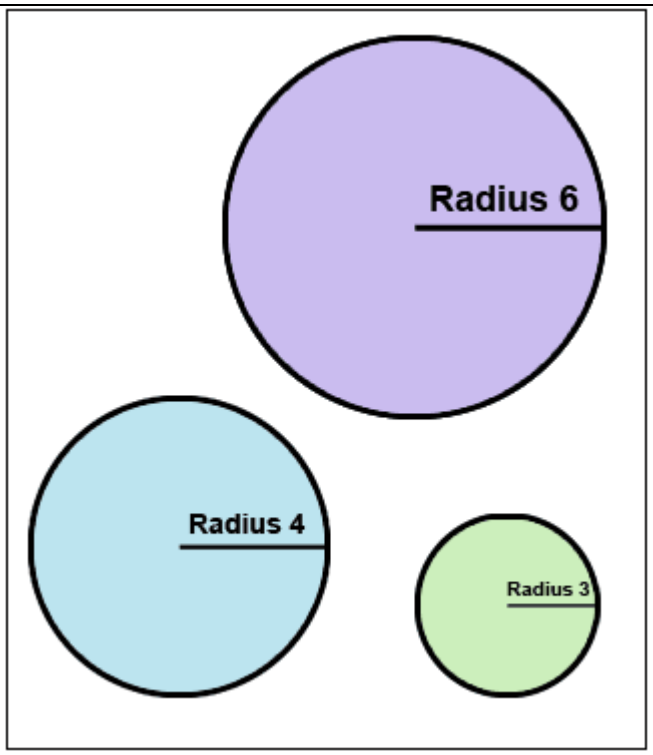
1.Make sure that everything is unselected. If you see any yellow lines, press the A key to deselect everything. TIP: The example is in Side View. It's ok if your screen doesn't match, as long as you know where the top of Suzanne's head is.	
2.Make sure you are in Object Mode. If not, press the TAB key to switch to Object Mode.	

3.Left-click above Suzanne's head. This will move the 3D cursor to where you want to place the hat.	
4.On the Add Primitive select the Create Tab then left-click Cylinder.	
5.In the Add Cylinder dialog box, left-click Vertices. Type 12 in the Vertices field. TIP: This number controls how smooth the cylinder is. 6.Left-click Radius. Type 1 in the Radius field. TIP: This number controls how wide the cylinder is. 7.Left-click Depth. Type 2 in the Depth field. TIP: This number controls how long the cylinder is. 8.Make sure Cap Ends is selected. TIP: This determines whether the flat ends of the cylinder are open or not. Cap Ends will close (or cap) the ends of the cylinder.	
9.Left-click OK.	

Radius

Radius controls how wide a circular object is. This affects the size of cylinders, cones, and spheres.

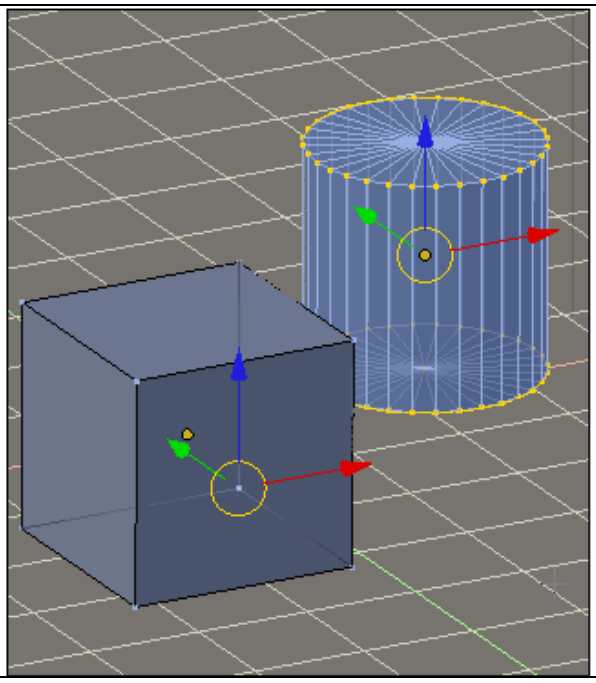
You'll edit the size of the radius whenever you create a circular object.



Vertex/Vertices

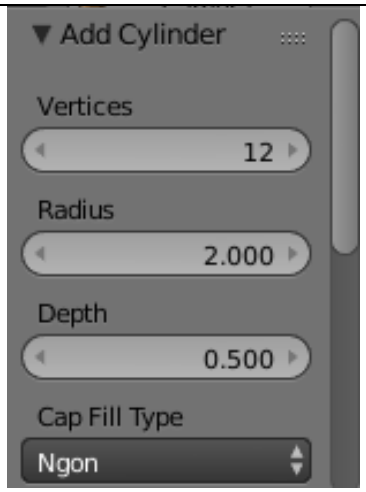
A **vertex** is the point at which two lines meet. A square has four vertices, and a cube has eight.

A cylinder can have as many vertices as you want. By adding more vertices, you can make the cylinder smoother.

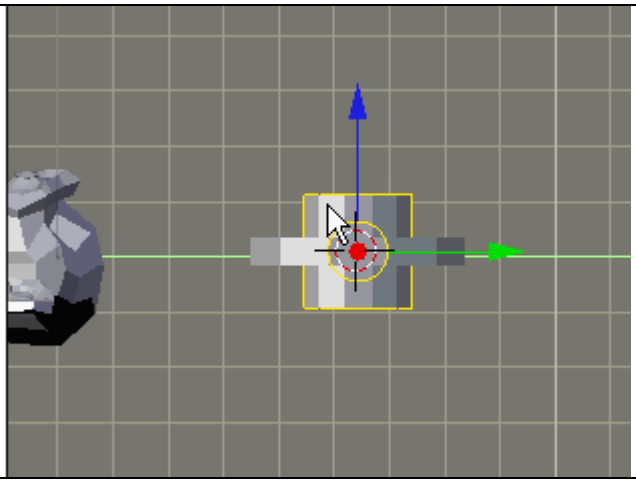
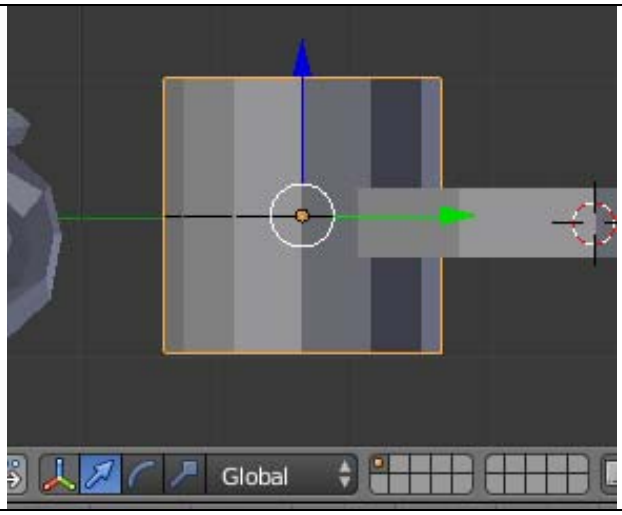
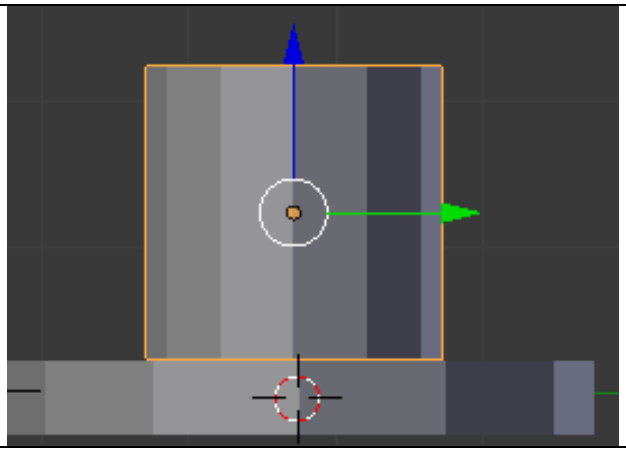


Add the Second Cylinder

You'll make a shallower cylinder for the brim of the hat.

1. Select the Create Tab to Add Primitive Cylinder, then left-click Cylinder.	
2.In the Add Cylinder dialog box, left-click Vertices. Type 12 in the Vertices field. TIP: This number controls how smooth the cylinder is. 3.Left-click Radius. Type 2 in the Radius field. TIP: This number controls how wide the cylinder is. 4.Left-click Depth. Type .5 in the Depth field. TIP: This number controls how long the cylinder is. 5.Make sure Cap Ends is selected. TIP: This determines whether the flat ends of the cylinder are open or not. Cap Ends will close (or cap) the ends of the cylinder.	
6.Left-click OK.	

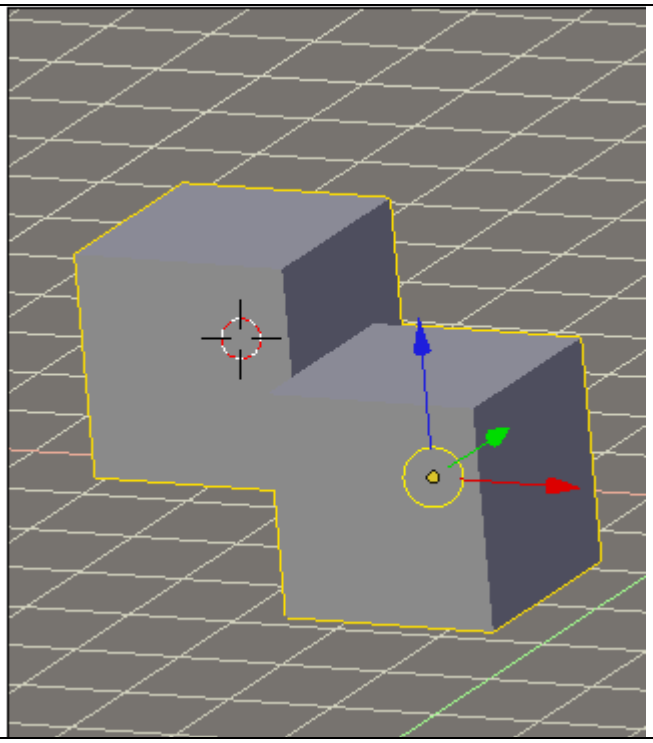
Move the Cylinders

1.Right-click the first cylinder to select it. Its edges will turn yellow when it's selected.	
2.Left-click the Translate manipulator mode button.	
3.Find the arrow pointing out from the flat surface of the first cylinder. Left-click that arrow and drag it until the first cylinder is on top of the second cylinder.	

The Join Objects Command

The **Join Objects** command takes two separate objects and turns them into one.

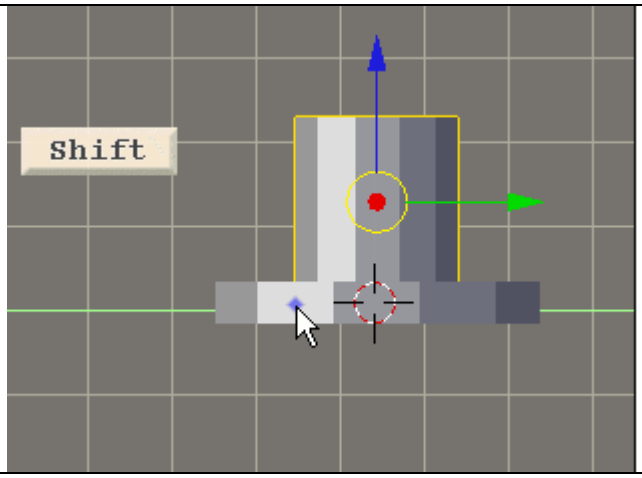
You'll join objects when you want to translate, rotate, and scale them together. It even works if they're not touching each other.

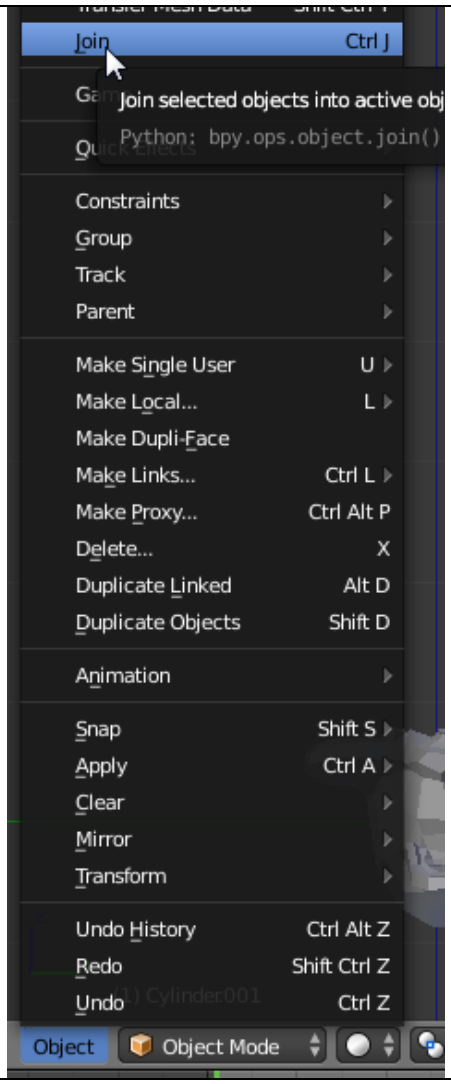
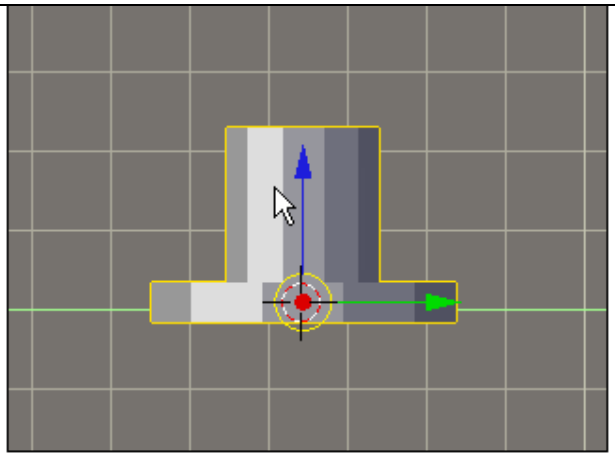


Join the Cylinders

Complete the steps below to make two objects into a single object. You'll do this whenever you want to join objects together.

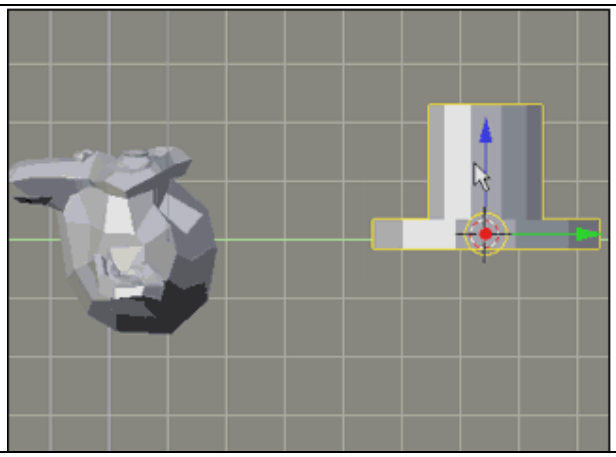
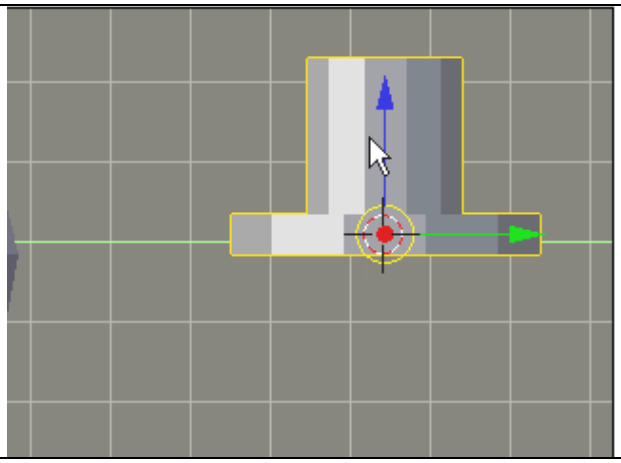
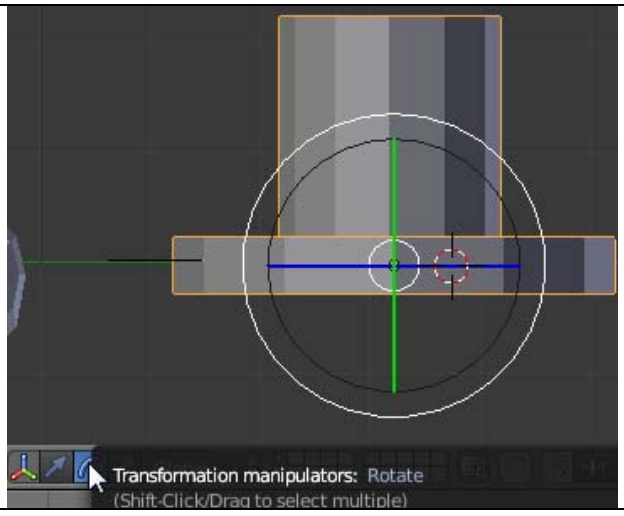
1.Press and hold SHIFT and right-click the second cylinder. Both cylinders will be outlined in yellow.

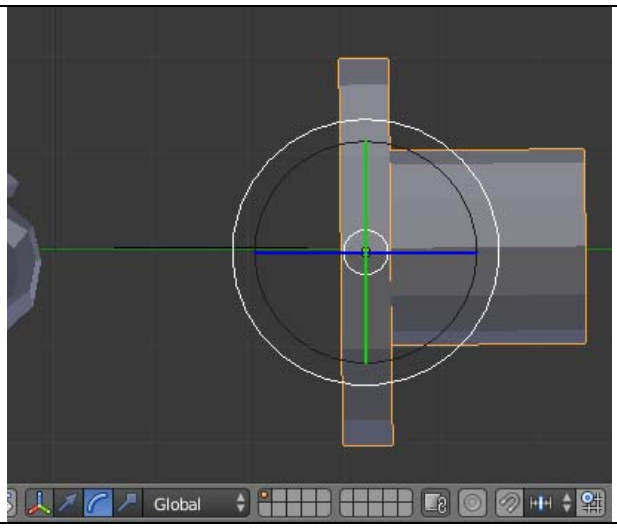
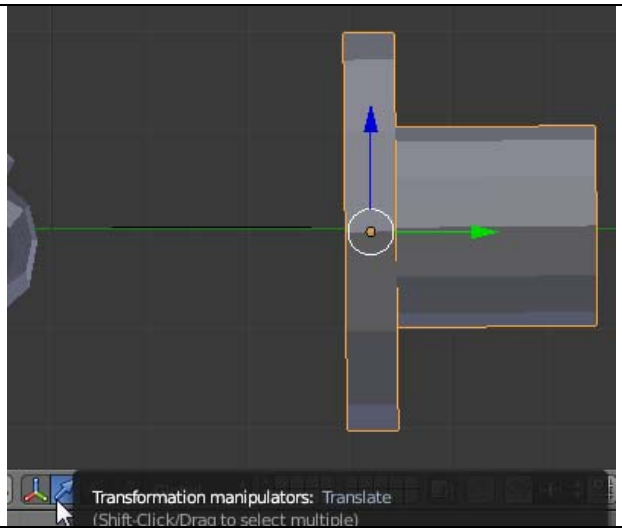
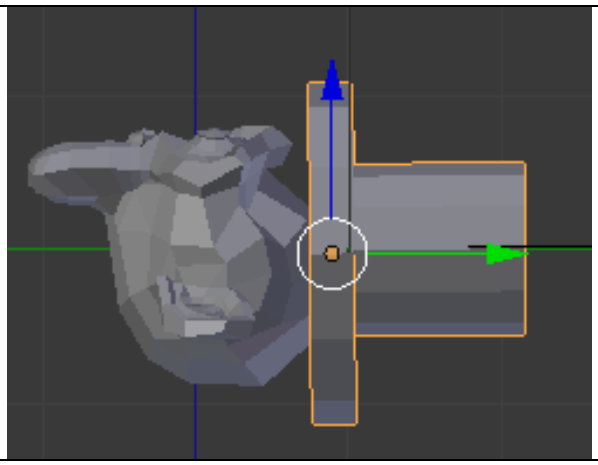


2.At the bottom of the 3D View window, left-click the Object menu, and left-click Join Objects. In the OK? box, left-click Join Selected Meshes.	
3.Press the A key to deselect everything.	
4.Left-click the hat to make sure that both pieces are highlighted in yellow. If they're not, repeat this process.	

Position the Hat

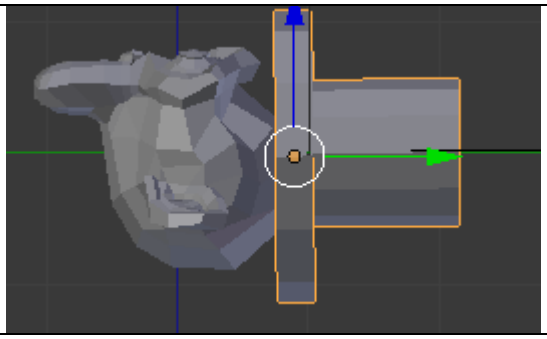
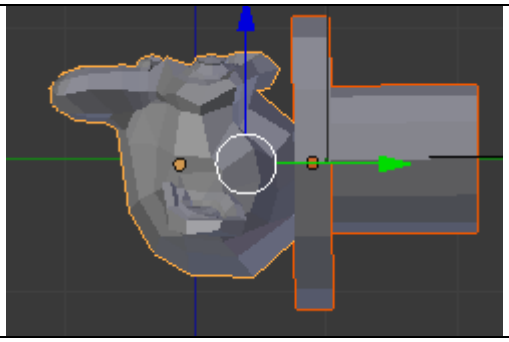
Complete the steps below to place the hat on top of Suzanne's head. You'll do this anytime you want to move 3D objects closer to or further from one another

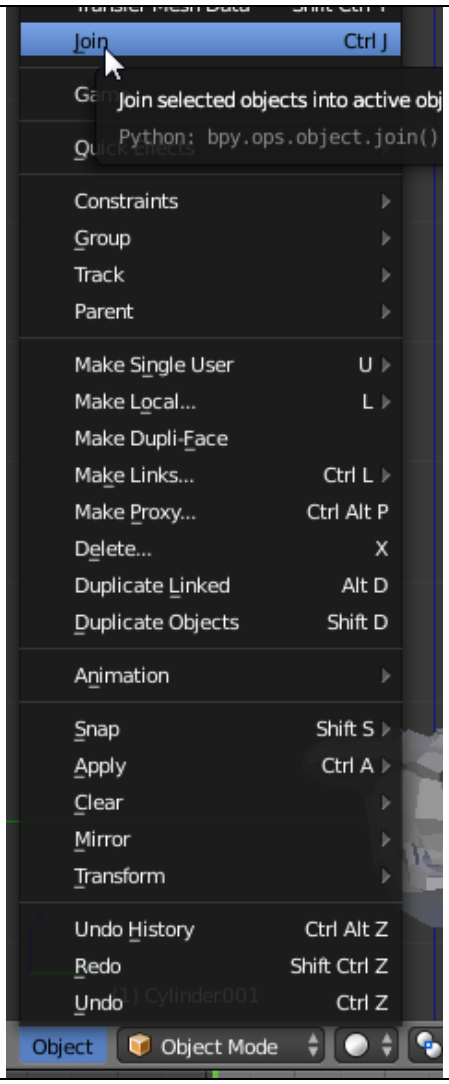
1.Position Suzanne and the hat so you can see both of them.	
2.Right-click the hat.	
3.Left-click the Rotate manipulator mode button.	

4.Rotate the hat until the top of the hat is pointing the same way as the top of Suzanne's head.	
5.Left-click the Translate manipulator mode button.	
6.Left-click and drag the arrows to move the hat to the top of Suzanne's head.	
7.Press the A key to deselect everything.	

Join the Hat and Suzanne

You did this process before when you joined the two cylinders together to make a hat. Remember to pan around Suzanne and the Hat to make sure they're positioned the way you want.

1.Right-click the hat to select it. It will be outlined.	
2.Press and hold the SHIFT key and right-click Suzanne to select her. The hat and Suzanne are now outlined or highlighted.	

3.At the bottom of the 3D View window, left-click the Object menu, and left-click Join Objects. In the OK? box, left-click Join Selected Meshes.	

Check Your Work

Complete the steps below to make sure your project is on track.

1. Press the A key to deselect everything.
2. Right-click Suzanne. Make sure the hat and Suzanne are outlined in yellow.
3. If they're not, you need to repeat the process for joining the objects.
4. If they are joined, save your work before moving on.

Summary

In this lab, you:

- Added differently sized cylinders.
- Used the Join command to make two objects into a single object.
- Used the 3D Transform Manipulator to move objects closer together.
- Positioned an object near another object.

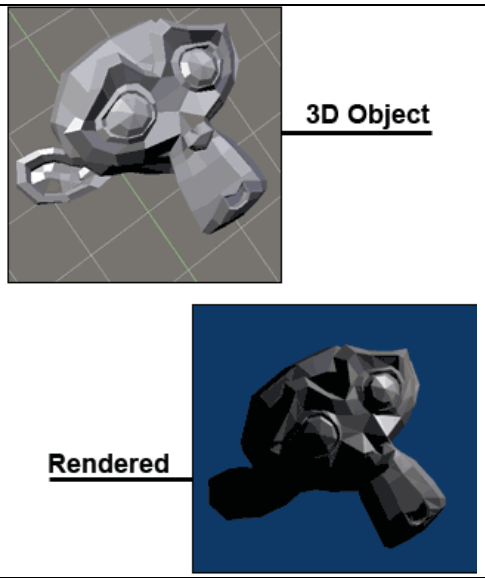
Lab 5 Introduction

In this lab, you'll create images based on your 3D objects.

Rendering

Rendering is the process of turning a 3D object into a 2D object, like an image file.

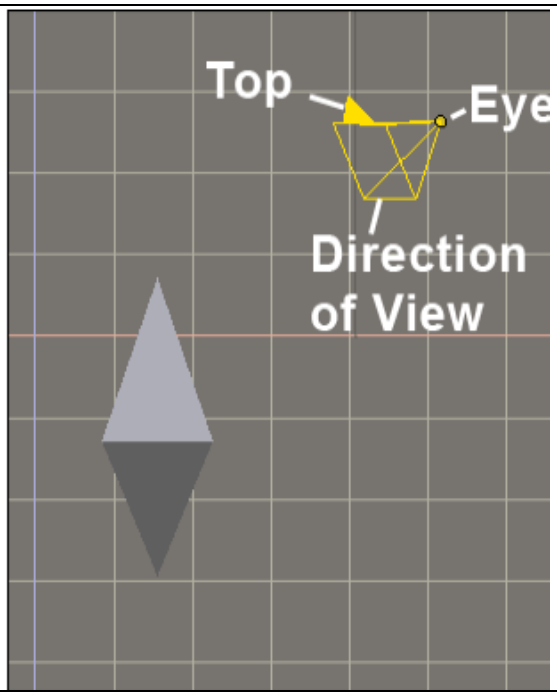
This process is like taking a photo of yourself. The photo is a 2D version of yourself



Using the Camera to Render

The 3D View window contains a camera. When you open a new Blender file, the camera points at the origin (where X, Y, and Z meet) by default.

When Blender renders an image, it renders everything that the camera can see.

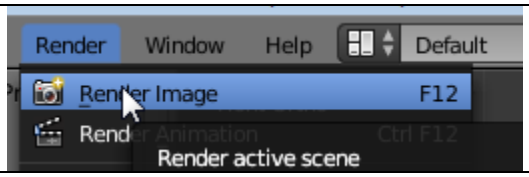


Render the Current Frame

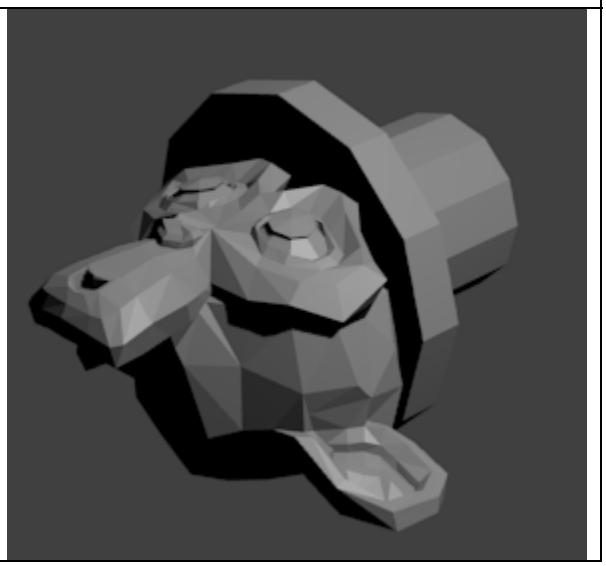
Complete the steps below to render your 3D object. You'll do this whenever you want to make a two-dimensional image out of your 3D object.

1.Make sure that you are in Object Mode.

2.On the Render menu at the top of the screen, left-click Render Image.



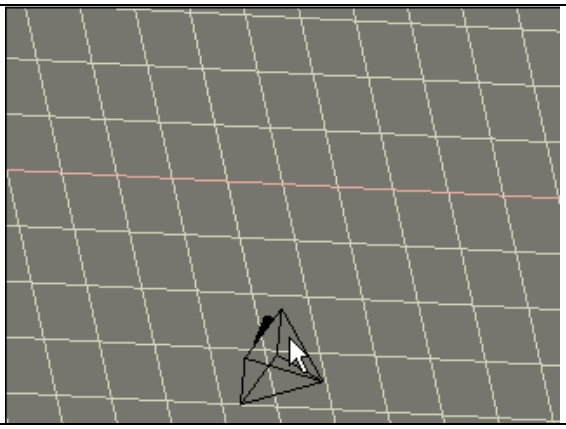
3.Look at the image and see how it's framed. Close the window when you're done.

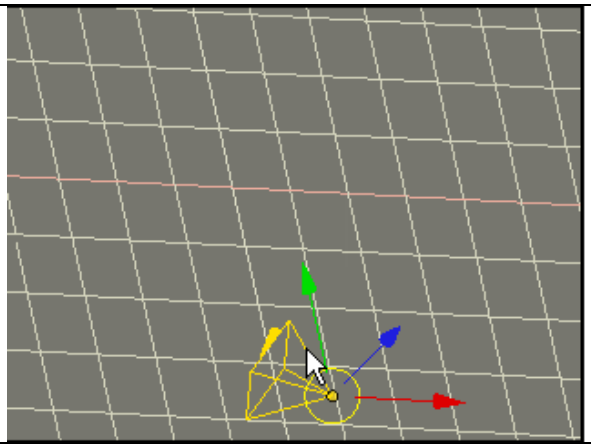
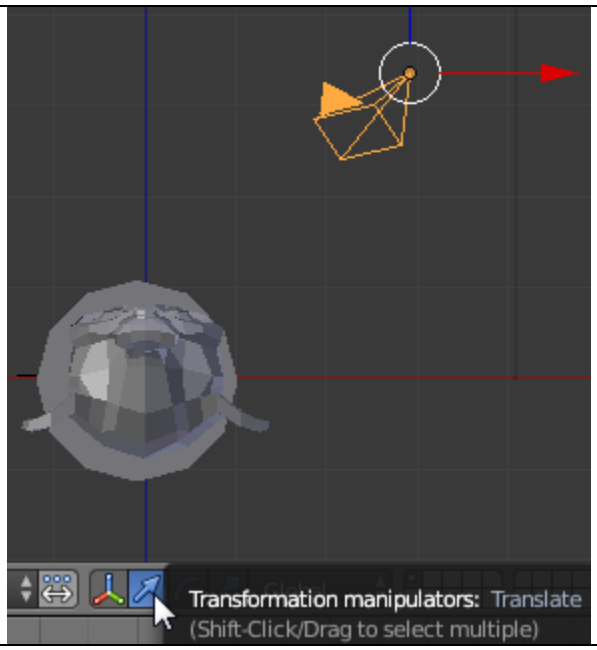
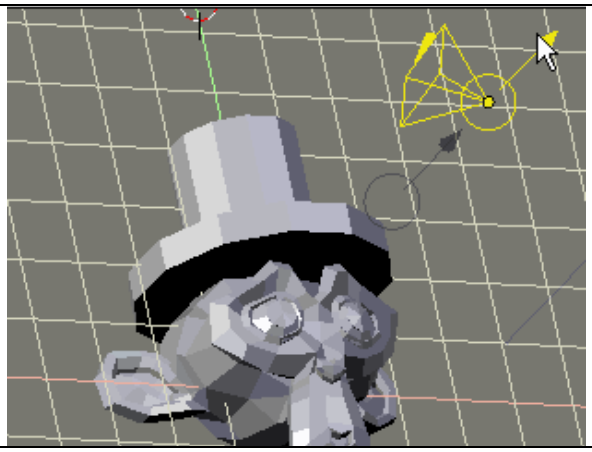


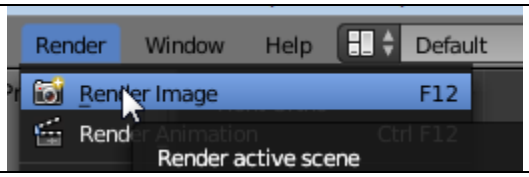
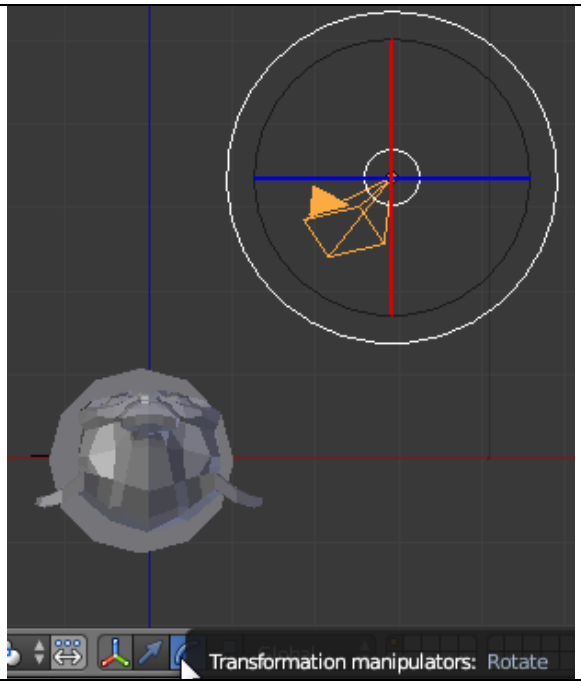
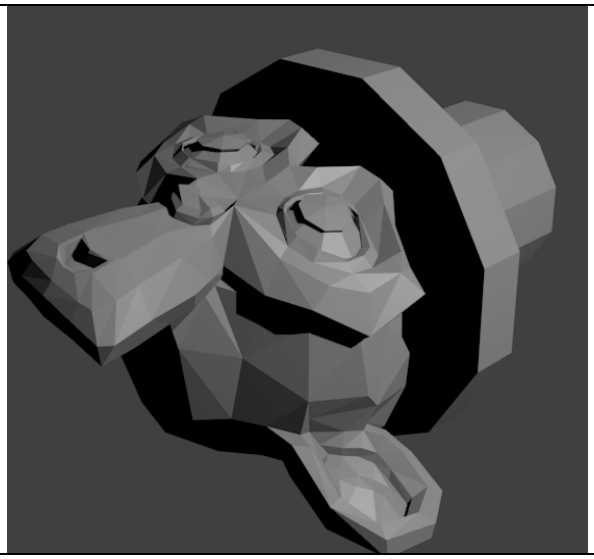
Render Your Image Again

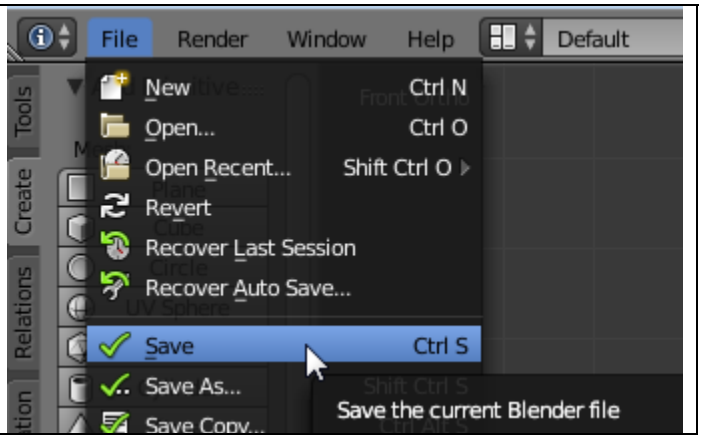
Complete the steps below to move Blender's camera. You'll do this whenever you want to change the way the rendered image looks.

1.If you want to change the angle, rotate your view until you can see the camera. It looks like a pyramid with a black triangle.



2.Right-click the camera.	
3.Left-click the Translate manipulator mode button to move the camera.	
4.Left-click and drag the arrows to move the camera until the big end of the pyramid is pointing at Suzanne.	

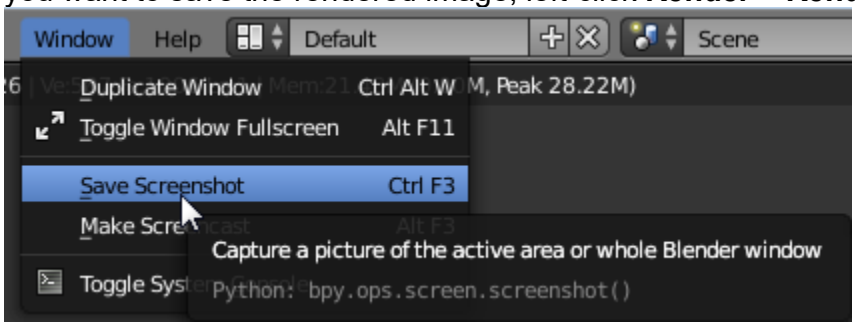
5.On the Render menu, left-click Render Image.	
6.If you want to rotate the camera, left-click on the Rotate manipulator mode button.	
7. On the Render menu, left-click Render Image again.	

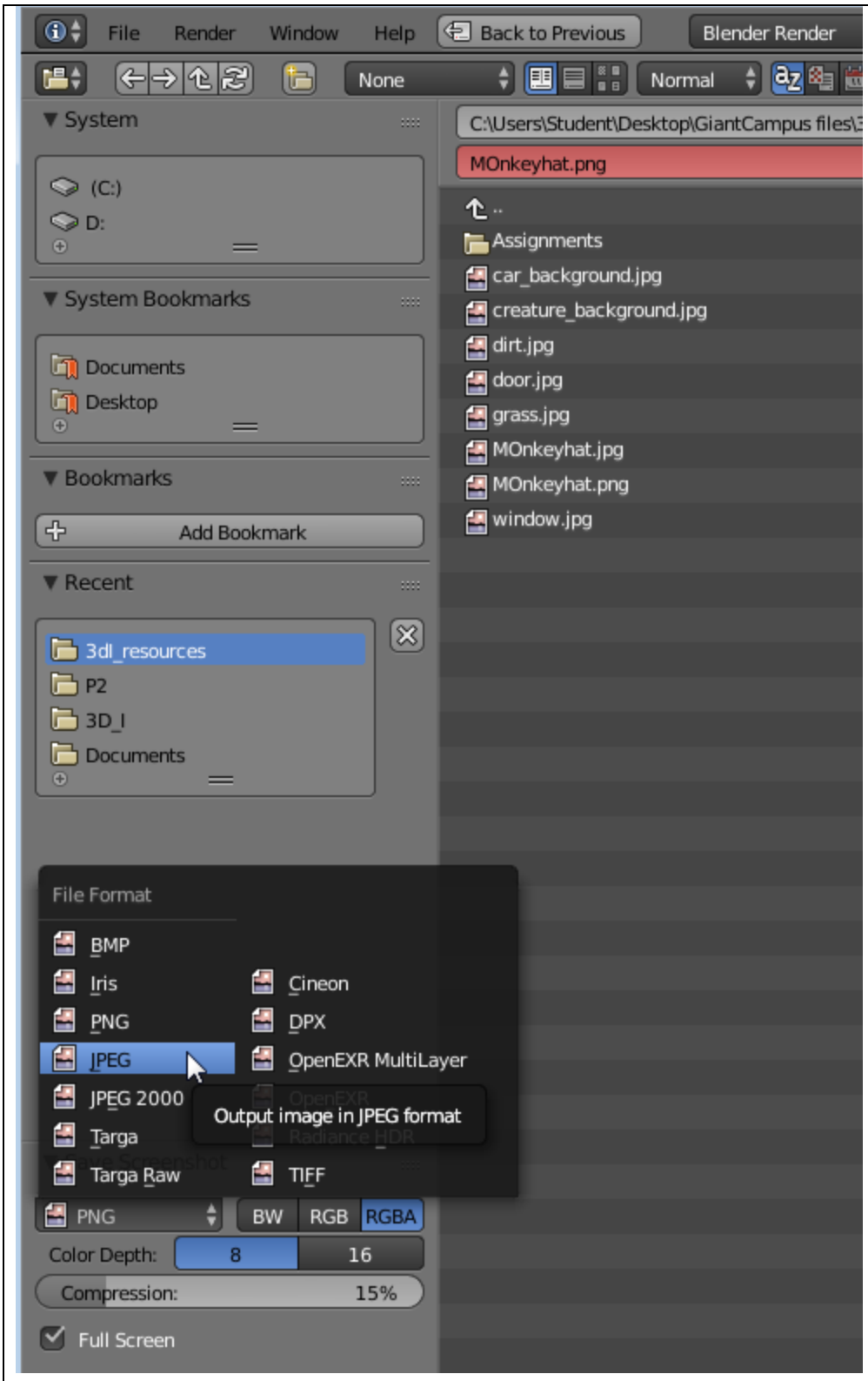
8.On the File menu at the top of the screen, left-click Save.	

Check Your Work

Complete the steps below to make sure your project is on track.

1. Make sure the monkey or its hat aren't cut off at the edge of the rendered image. If not, move the camera and render the image again.

2. If you want to save the rendered image, left-click **Render > Render Image** and left-click  Choose a name for your image and type that in the file name field. Left-click


File
Render
Window
Help
Back to Previous
Blender Render
None
Normal
System
(C:)
D:
System Bookmarks
Documents
Desktop
Bookmarks
Add Bookmark
Recent
3dl_resources
P2
3D_I
Documents
C:\Users\Student\Desktop\GiantCampus files\
MOnkeyhat.png
..
Assignments
car_background.jpg
creature_background.jpg
dirt.jpg
door.jpg
grass.jpg
MOnkeyhat.jpg
MOnkeyhat.png
window.jpg
File Format
BMP
Iris
PNG
JPEG
JPEG 2000
Targa
Targa Raw
Cineon
DPX
OpenEXR MultiLayer
OpenEXR
Radiance HDR
TIFF
Output image in JPEG format
PNG
BW
RGB
RGBA
Color Depth:
8
16
Compression:
15%
Full Screen

Save JPEG.

Summary

In this lab, you:

- Used the Render menu to create an image of a 3D object.
- Moved the camera to create different rendered images

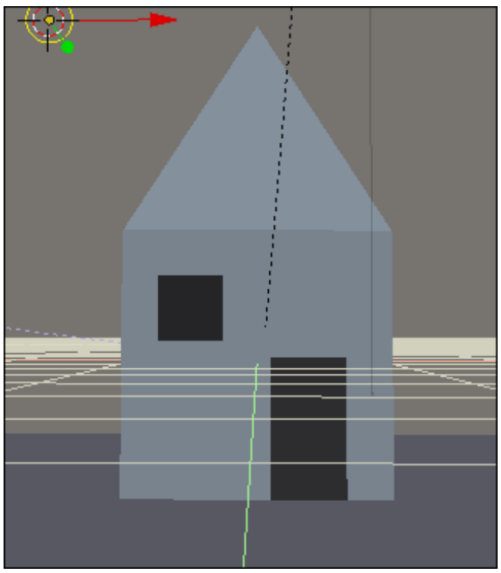
Review

Congratulations! You made a hat and put it on Suzanne's head.

In this project, you:

- Explored Blender.
- Moved, stretched, and spun objects in three dimensions.
- Used basic shapes to build a hat.

Project 2 – Build a House



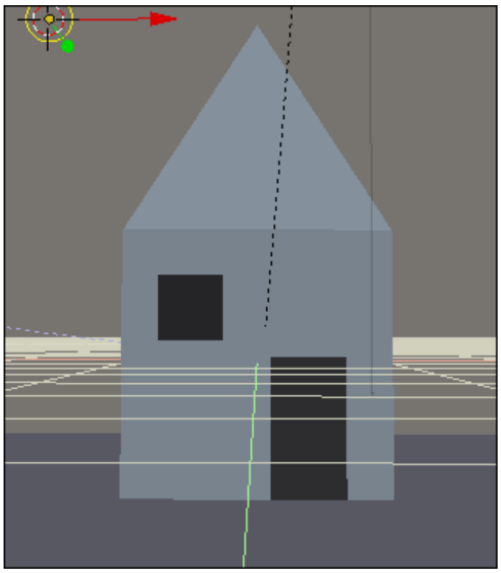
Introduction

In this project, you will:

- Build a house using basic shapes.
- Make a door and a window for the house.
- Paint the house different colors.
- Create an animation.

Project Preview

Here's an example of the house you'll make with basic shapes.



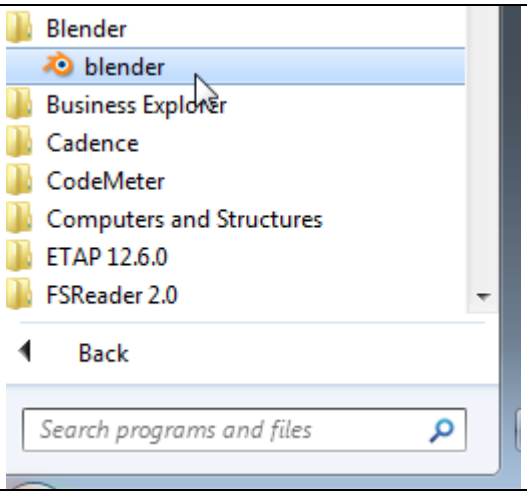
LAB 1 Introduction

In this lab, you'll add the basic shapes for your house. You'll use planes to make flat surfaces for the door and window.

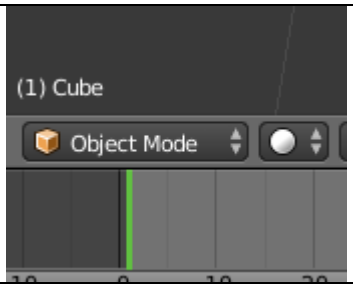
ADD A CUBE

In this lab, you'll add the basic shapes for your house. You'll use planes to make flat surfaces for the door and window.

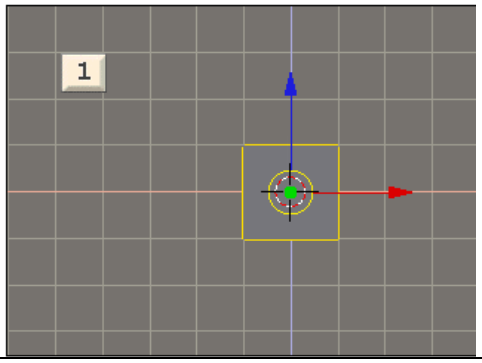
1. Open Blender.

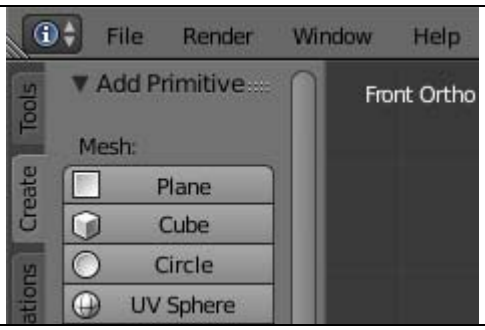
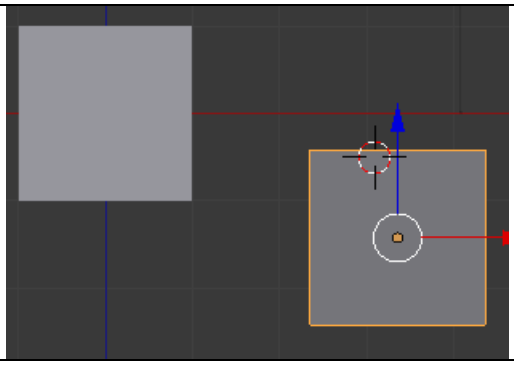
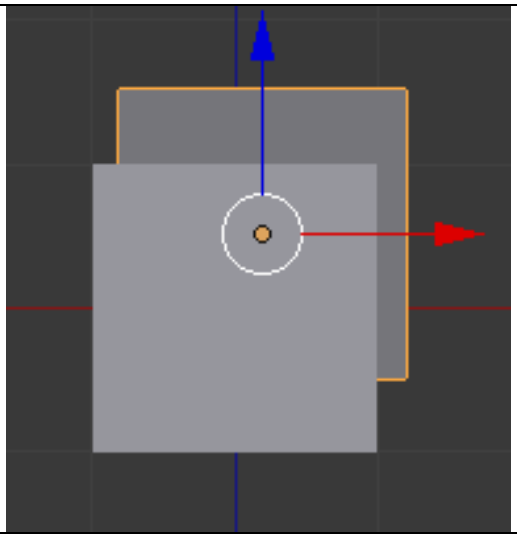


2. At the bottom of the 3D View window, make sure that you are in Object Mode. If not, press TAB.

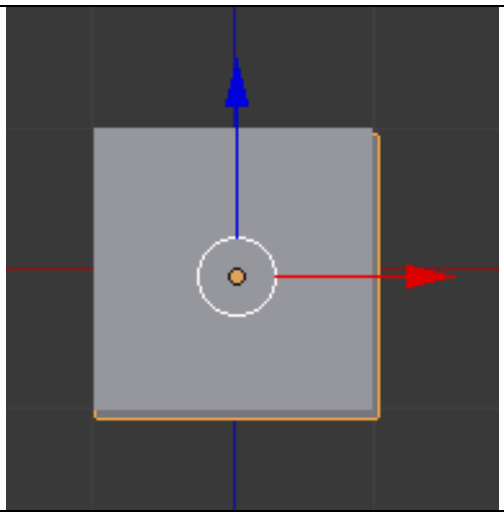


3. Press NUM1 to return to Front view.



4. Select the Create Tab to Add Primitive CUBE then left-click the Cube.	
5. Left-click the Translate manipulator mode button.	
6. 6.Left-click the 3D Transform Manipulator's blue arrow.	
7. Move the new cube on top of the original cube. TIP: Holding down the LEFT MOUSE BUTTON while moving the mouse might make this step easier.	

8. .Left-click to stop moving the cube.

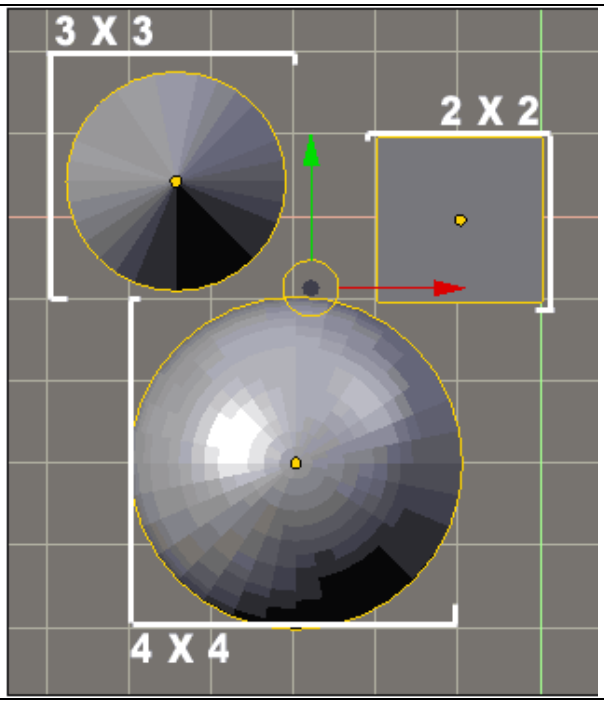


The Grid as a Guide

The **grid** is the series of lines in the background of the 3D View window's preset views. These lines form boxes.

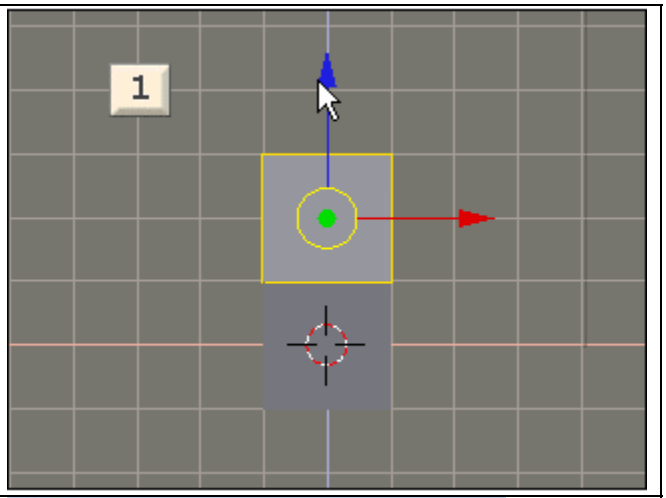
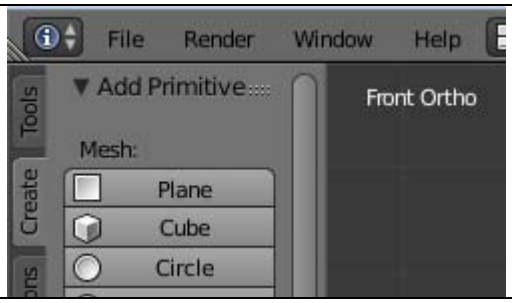
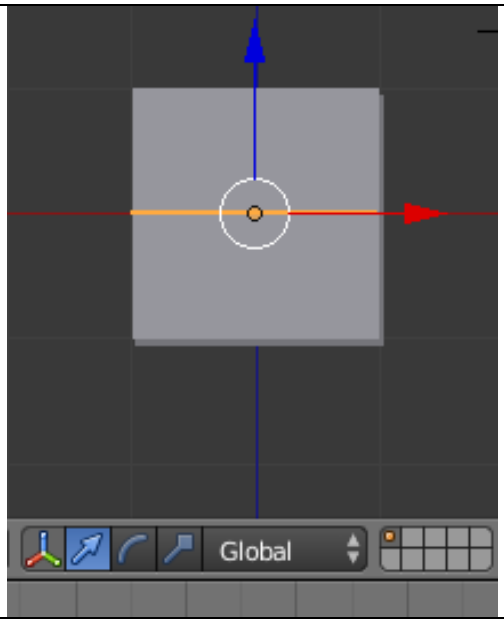
You'll use these boxes to help you make objects the right size.

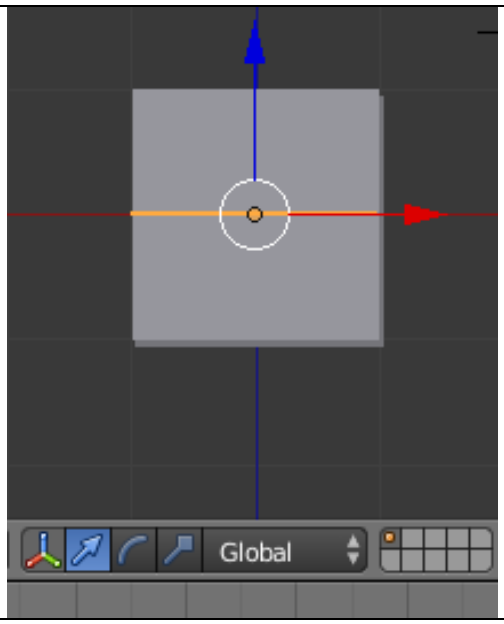
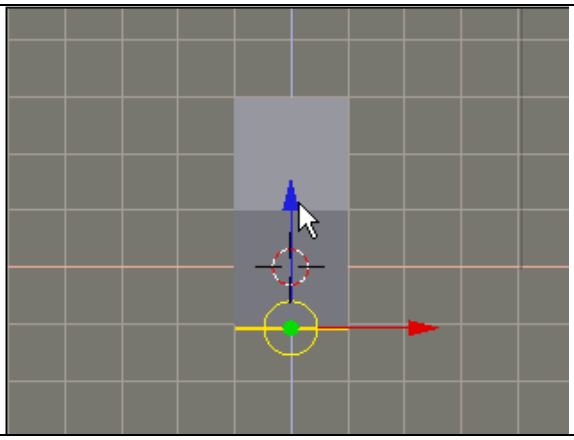
When you pan around, the grid forms a plane that you can use to remind you where up and down is.

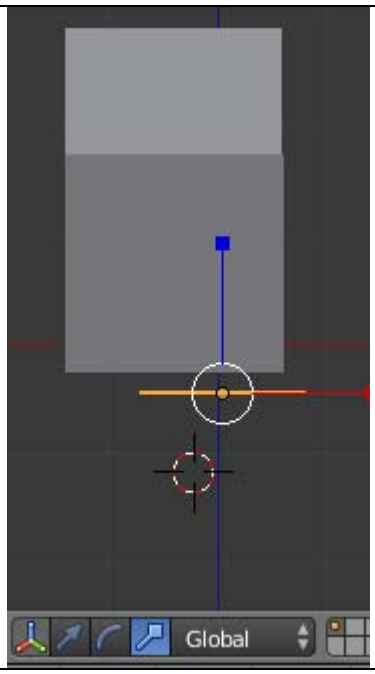
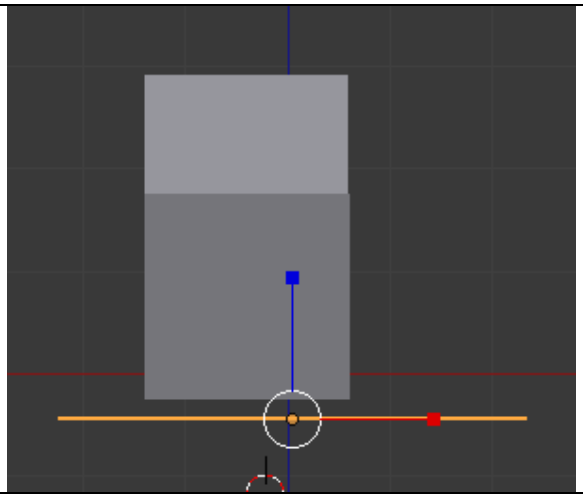


Add a Plane

Complete the steps below to add a plane. You'll add a plane any time you want to create a flat surface for your 3D objects to sit on.

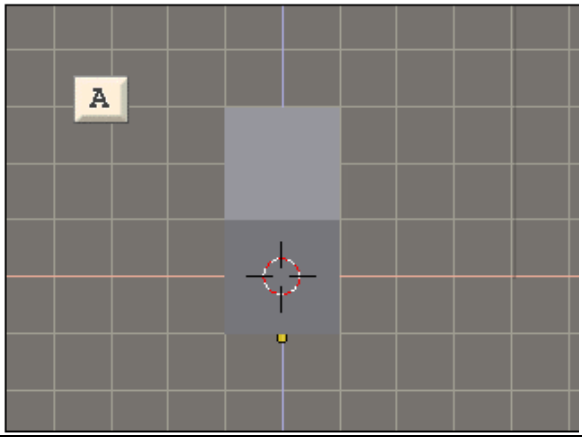
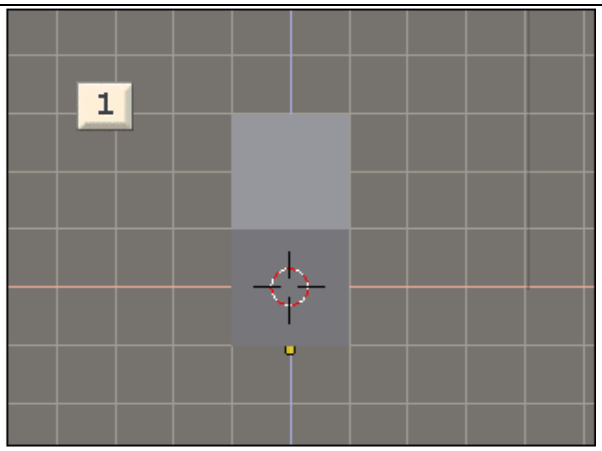
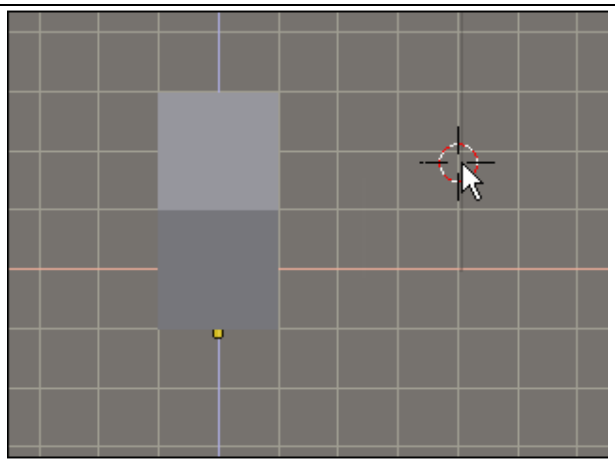
1. Make sure you're still in the Front view by pressing NUM1.	
2. Select the Create Tab to Add Primitive then add a PLANE then left-click the PLANE. The new plane will look like a straight line.	
3. Make sure you still have the Translate manipulator mode button selected.	

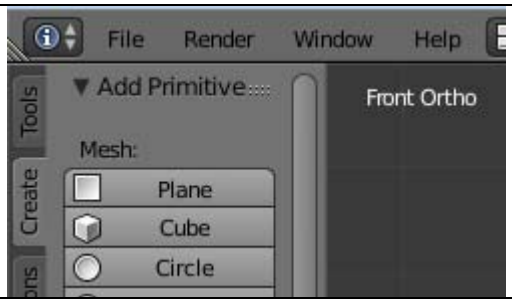
4. Left-click the 3D Transform Manipulator's blue arrow.	
5. Move the plane to the bottom of the original cube. Left-click again when it's in the right place.	

6. Left-click the Scale manipulator mode button.	
7. Scale the plane until it's about six boxes wide.	

ADD A DOOR

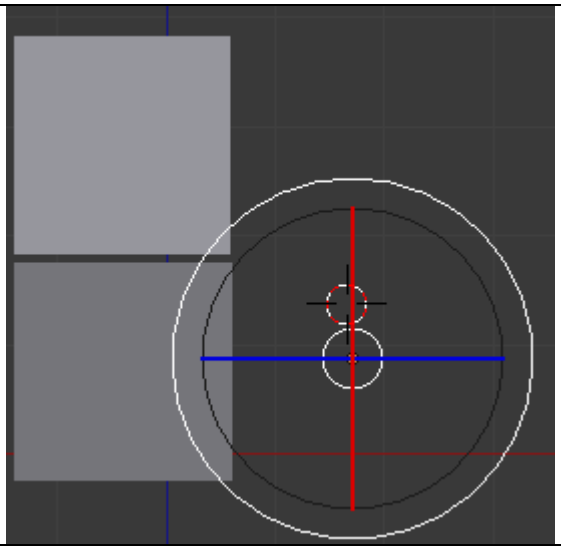
You'll add a door to the house by creating another plane.

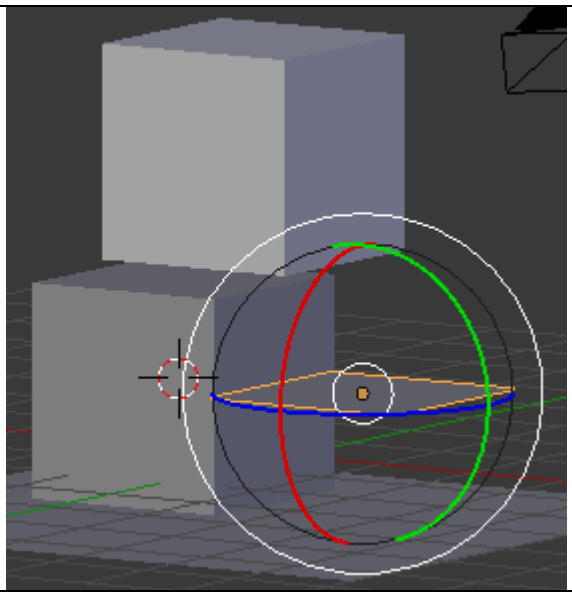
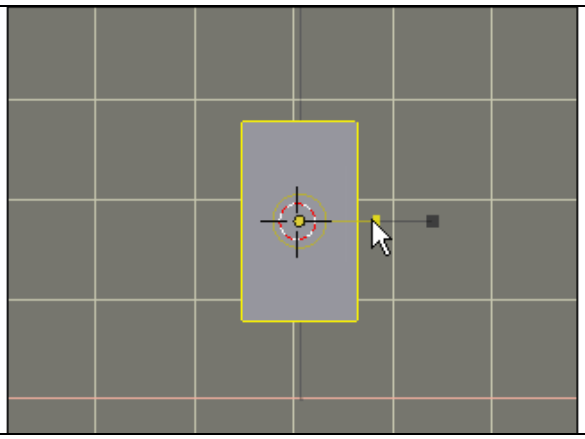
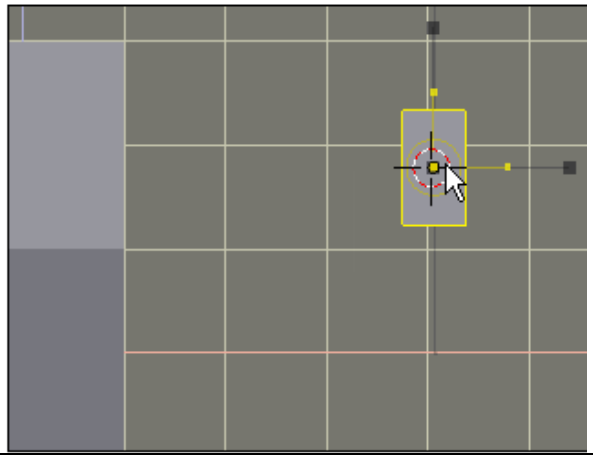
1. Make sure that nothing is selected. If something is selected, press the A key to deselect.	
2. Press NUM1 to return to the Front view of the house.	
3. Left-click outside the house to move the 3D cursor. This is where you will add the plane. You'll move it to the front of the house later.	

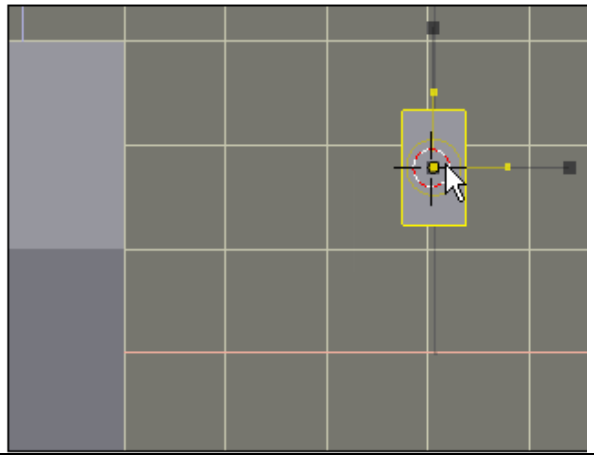
4. Select the Create Tab to Add Primitive then add a PLANE then left-click the PLANE. The new plane will look like a straight line.	

MOVE THE DOOR

Complete the steps below to resize the door and place it on the front of the house. You may need to scale and then move the door more than once to get it where you want.

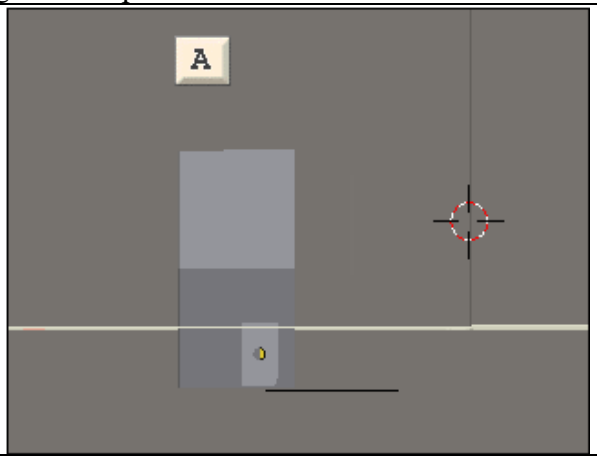
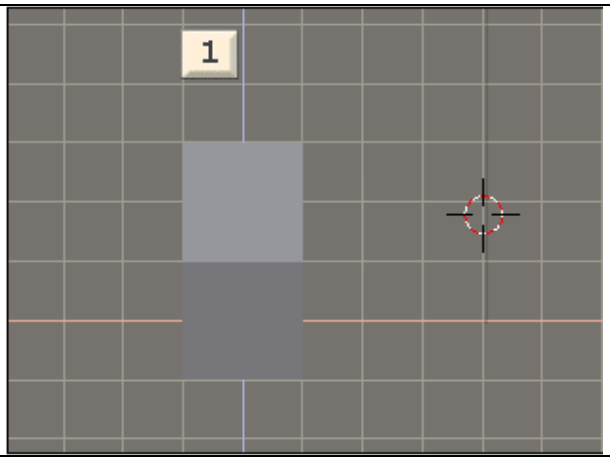
1. Left-click the Rotate manipulator mode button.	
2. If necessary, right-click the plane to select it.	

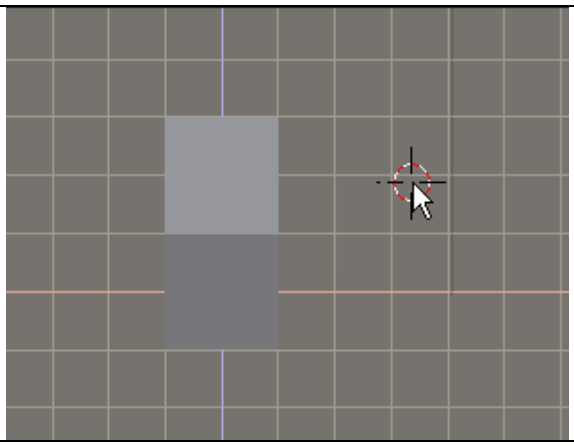
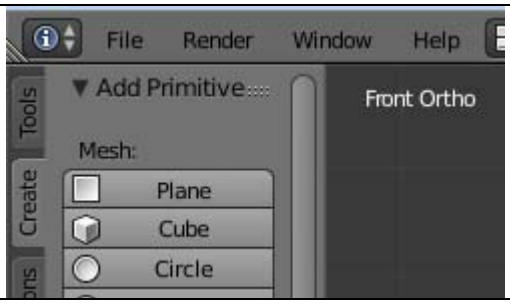
3. In the 3D Transform Manipulator, left-click the red circle to rotate the plane along the X-axis. You want to make the plane parallel to the house. Take a look at the example. TIP: Panning around the house so that you can see the plane from the side may make this easier.	
4. Left-click the Scale manipulator mode button and use the square handles to shape the plane into a rectangle.	
5. Once the plane is a rectangle, scale the entire rectangle to fit on the front of the house.	

6. Left-click the Translate manipulator mode to move the rectangular plane to the bottom right of the front of the house.	

ADD A WINDOW

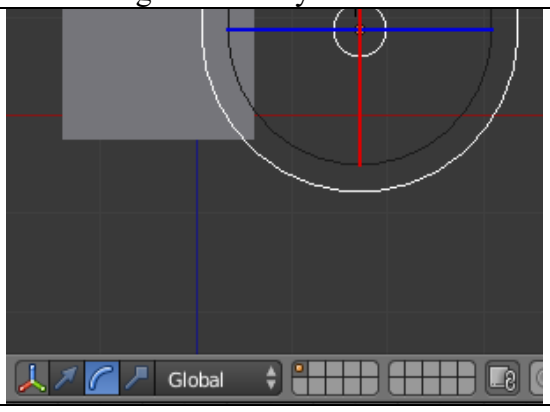
You'll add a window to the house by creating another plane..

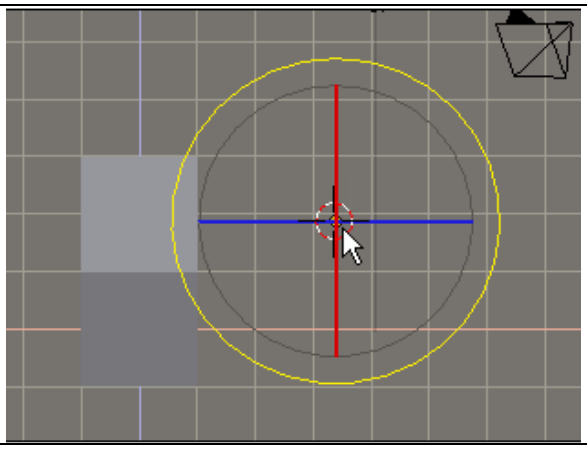
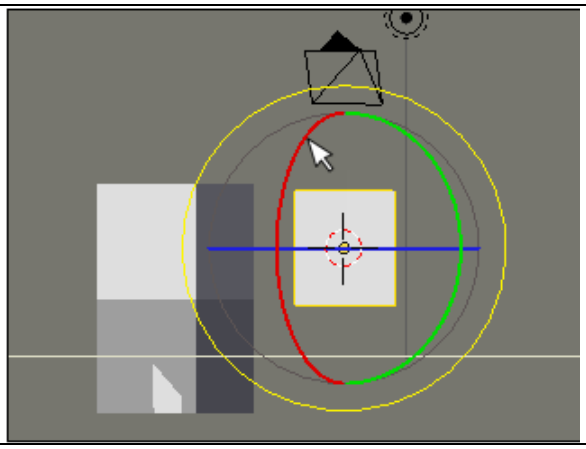
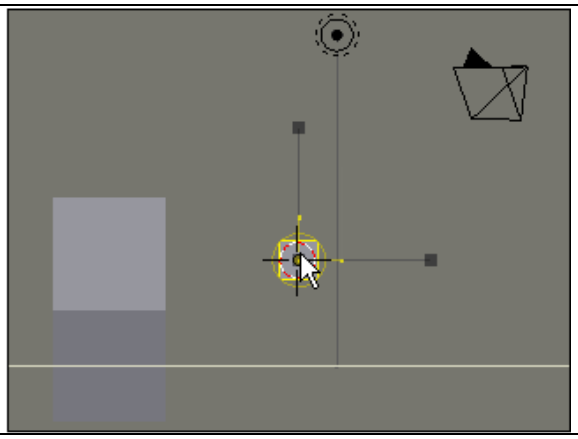
1. Make sure that nothing is selected. If something is selected, press the A key to deselect.	
2. Press NUM1 to return to the Front view of the house.	

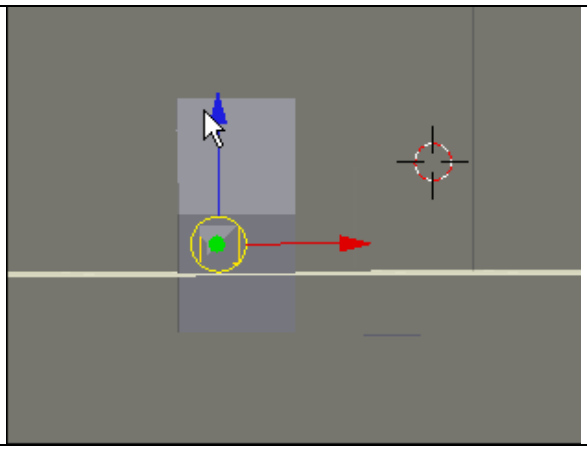
3. Left-click outside the house to move the 3D cursor. This is where you will add the plane. You'll move it to the front of the house later.	
4. Select the Create Tab to Add Primitive then add a PLANE then left-click the PLANE. The new plane will look like a straight line.	

MOVE THE WINDOW

Complete the steps below to scale the window and place it on the front of the house. You may need to scale and move the window more than once to get it where you want.

1. Left-click the Rotate manipulator mode button.	

2. If necessary, right-click the plane to select it.	
3. In the 3D Transform Manipulator, left-click the red circle to rotate the plane along the X-axis. You want to make the plane parallel to the house. Take a look at the example. TIP: Panning around the house so that you can see the plane from the side may make this easier.	
4. Scale the square to fit on the front of the house.	

5. Left-click the Translate manipulator mode and then move the plane to the front of the house.	

Check Your Work

Complete the steps below to make sure your project is on track	

1. Make sure your house has two cubes, a window, and a door.

2. Make sure the two cubes are right on top of each other with no gap between. You may need to rotate the camera to check this.

3. If everything is in the right place, save your project into the **C:\Users\Student\Desktop\UHD\3D Animation** directory before moving on.

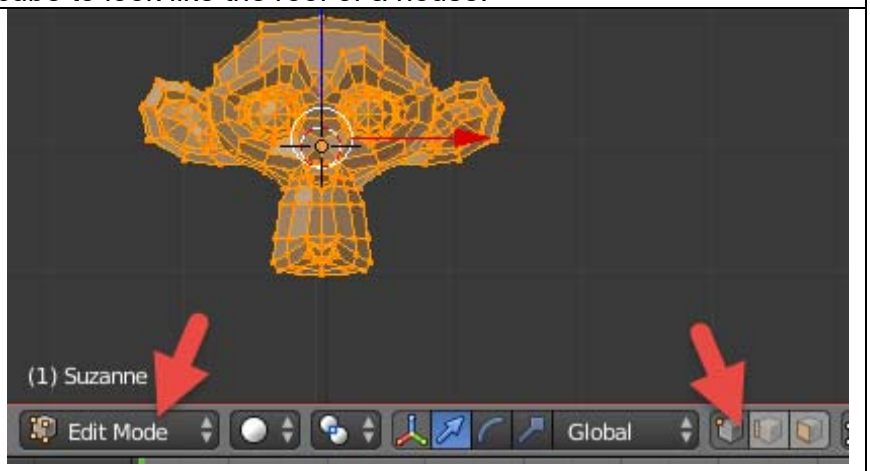
SUMMARY	In this lab, you: • Used simple shapes to build more complicated objects. • Added planes in different shapes and sizes. • Used the 3D Transform Manipulator to prepare the building blocks of a house.

LAB 2 Introduction

In this lab, you'll change a cube to look like the roof of a house.

VERTEX SELECT MODE

In Edit mode, the **Vertex Select Mode** button lets you select the points where the lines meet.

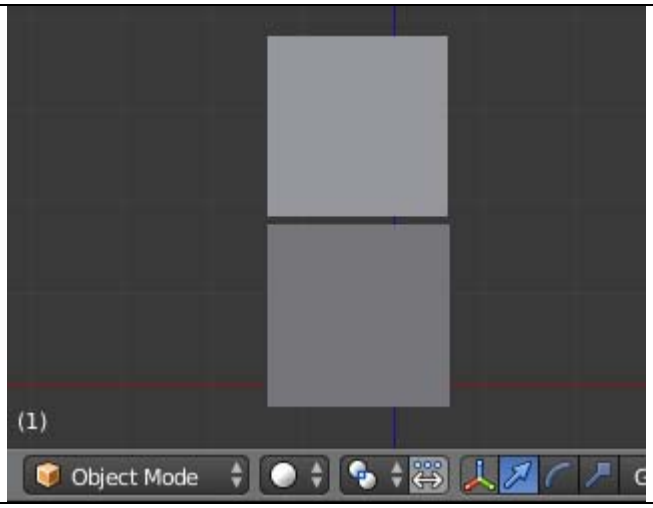


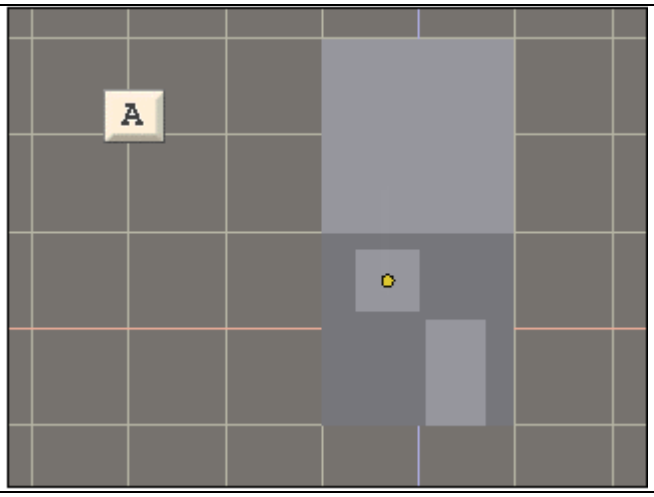
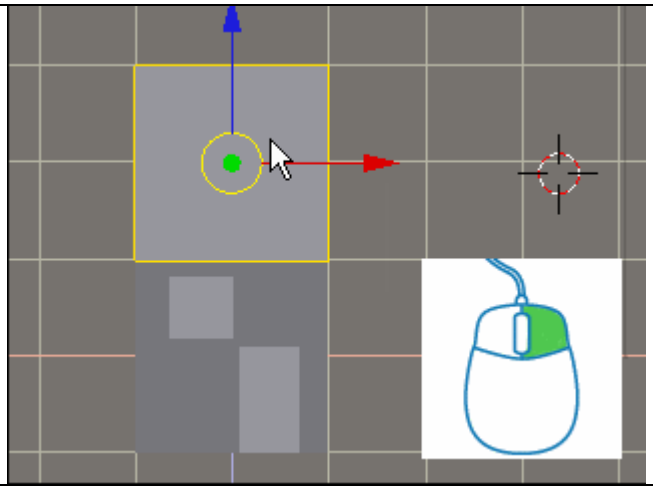
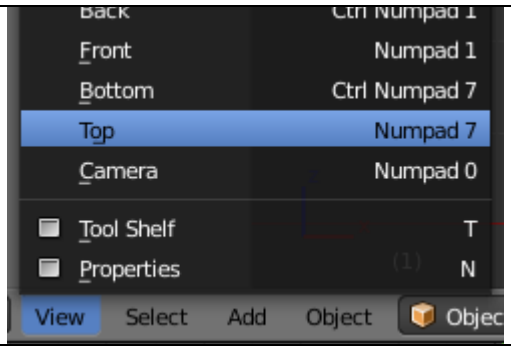
You'll use this button when you want to translate, rotate, or scale vertices.

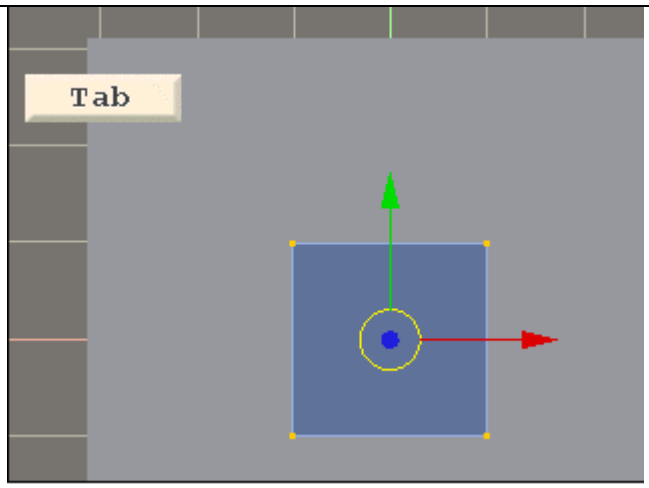
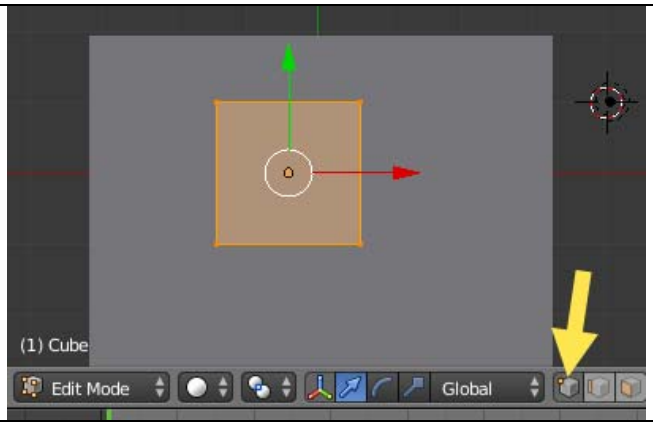
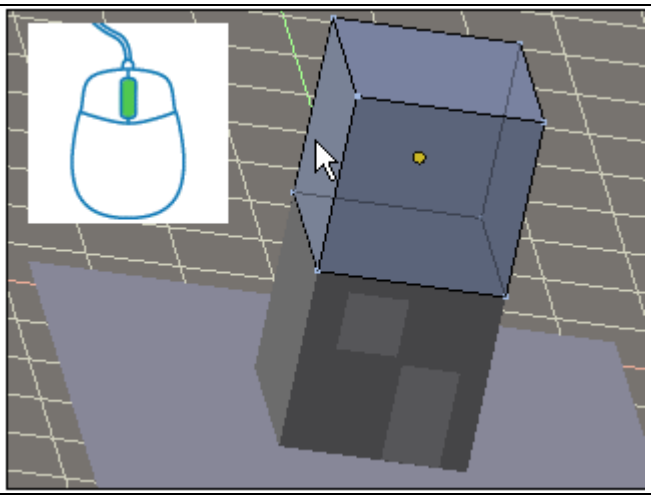
Create a Basic Roof

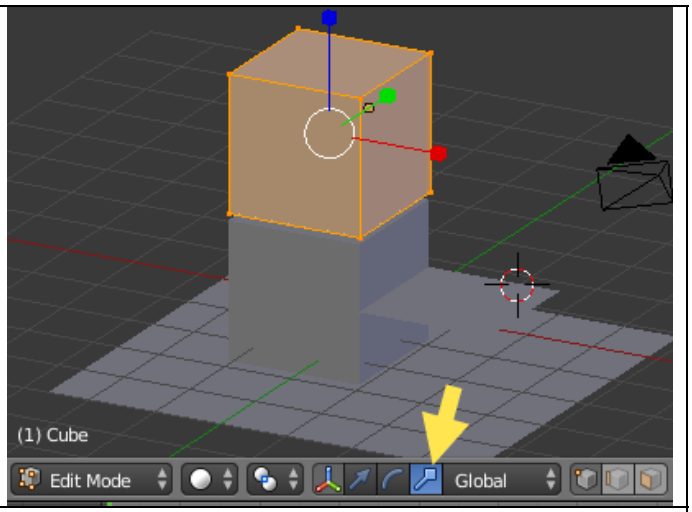
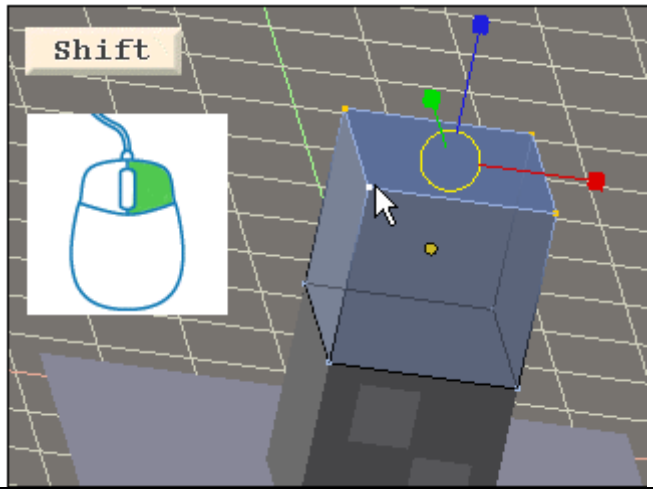
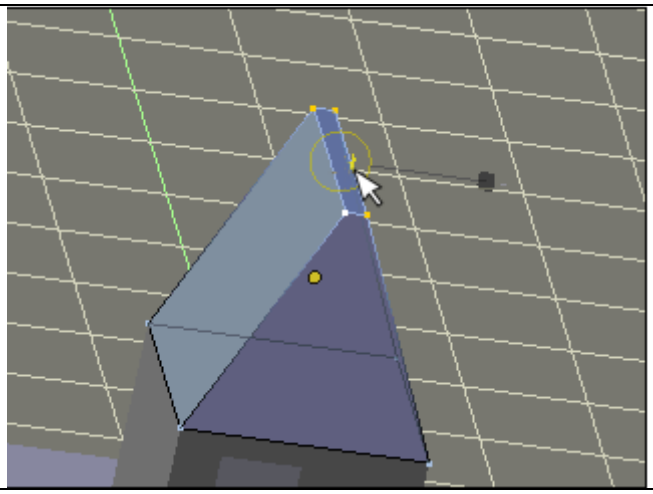
Complete the steps below to make a cube into a triangle. You'll select the vertices of the cube and scale it.

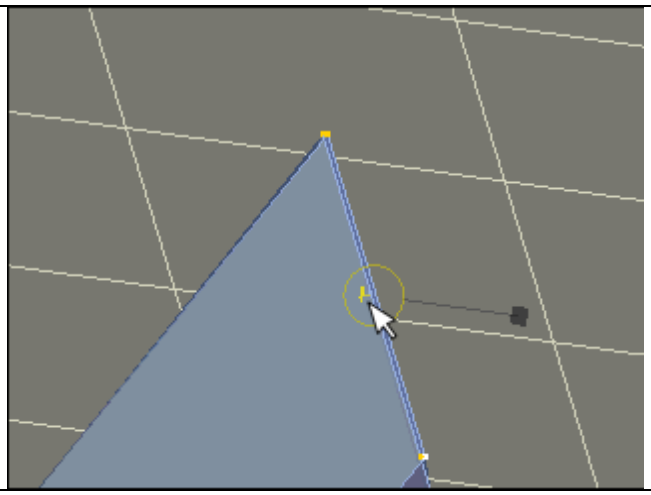
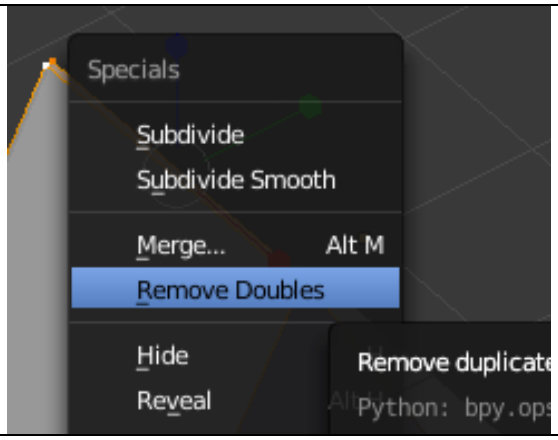
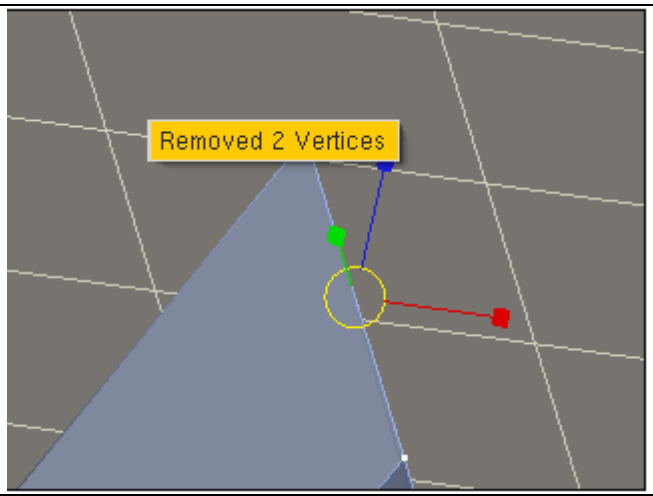
1.Make sure you are in Object Mode. If not, press TAB.



2.Press the A key until you don't see any yellow lines.	
3.Right-click the top cube to select it.	
4.On the View menu, left-click Top.	

5.Press TAB to switch to Edit Mode.	
6.At the bottom of the 3D View window, left-click the Vertex select mode button.	
7.Press and hold the scroll wheel to pan until you can see the top and sides of the cube. Make sure your cube looks like the example.	

8.Left-click the Scale manipulator mode button.	
9.Press and hold the SHIFT key while right-clicking the four vertices at the top of the cube. TIP: When all the face's vertices are selected, the top of the cube will turn a darker blue.	
10.In the 3D Transform Manipulator, left-click the red box and drag until the cube looks like a pointed roof.	

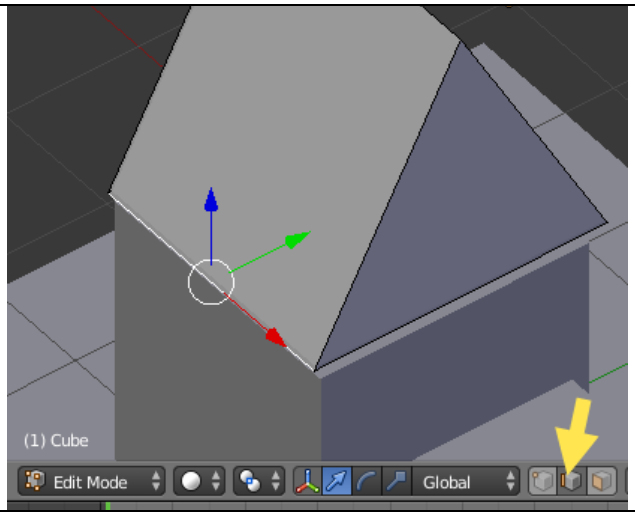
11.You may need to drag it back and forth to make it a look like a roof. Make sure the top lines up perfectly. TIP: Zooming in may make it easier to join the two edges together.	
12.Press the W key and then left-click Remove Doubles. This will remove the two vertices you don't need in a triangular roof.	
13.Make sure the message that appears says Removed 2 vertices. If it says Removed 0 vertices, press CTRL + Z to undo and do it again. CAUTION: You have to remove two vertices, or you will not be able to change the height of your roof.	

Edges

An **edge** is the line between two vertices. A triangle has three edges. A square has four.

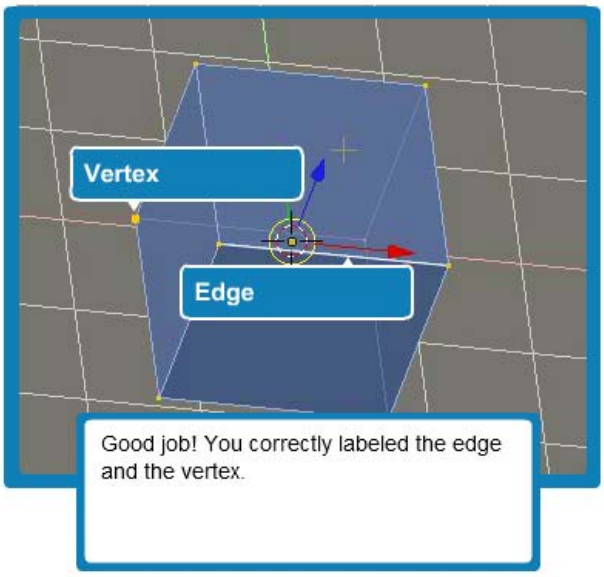
The **Edge Select Mode** tool lets you select specific edges in your 3D object.

You'll use this tool when you want to translate, rotate, or scale the edges of an object



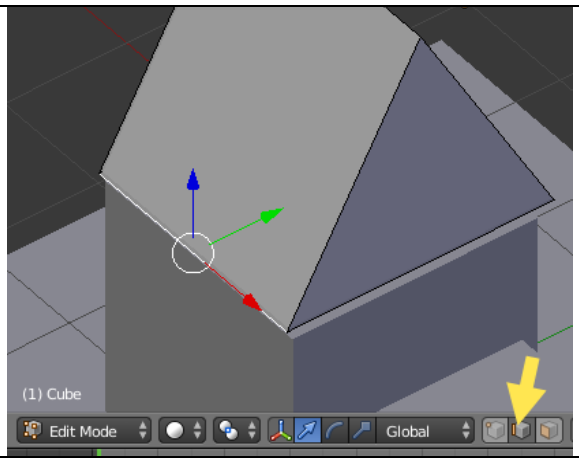
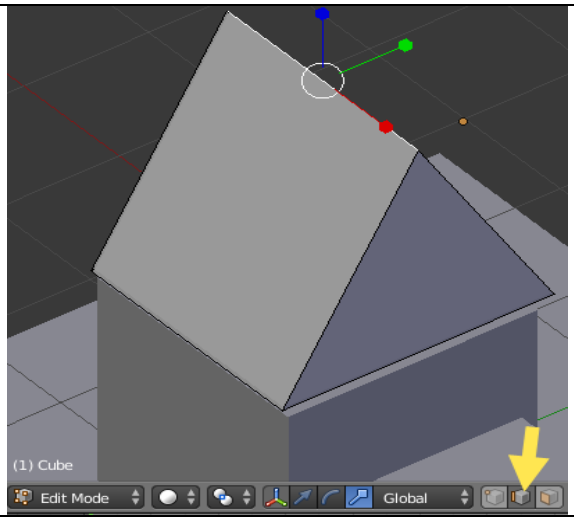
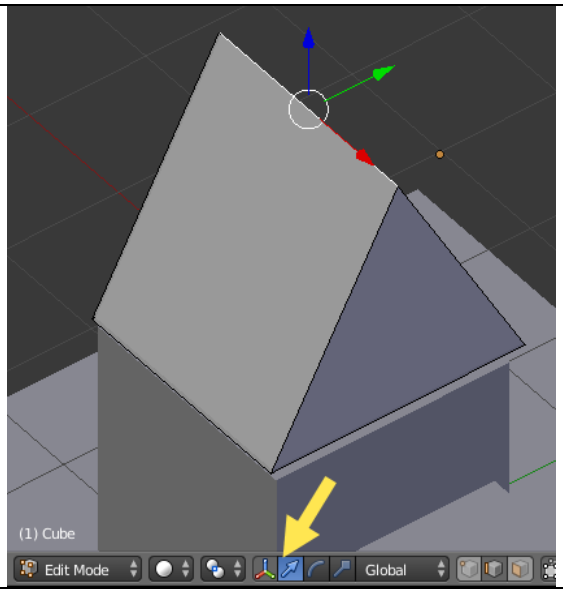
Test Yourself

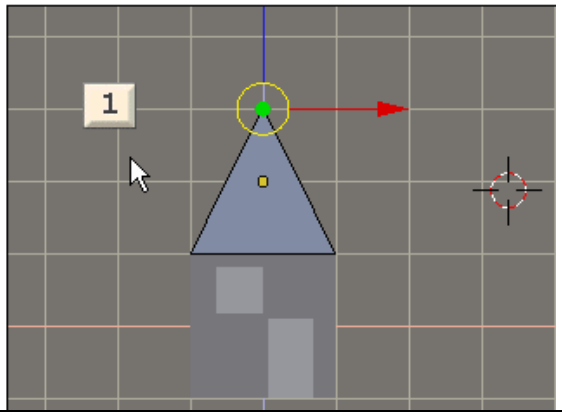
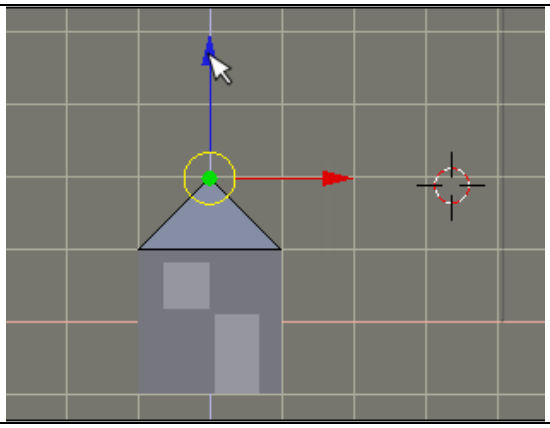
What is a Vertex?
Answer: A Vertex is simply a Point.
Describe an Edge?
Answer: A Edge is where to planes connect.



Change the Roof's Height

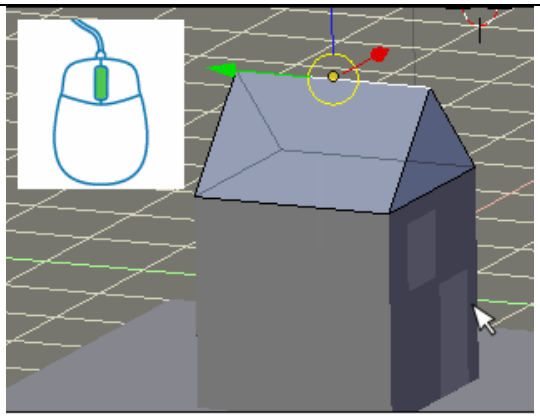
You'll use the Translate manipulator to change the shape of the roof. First, you'll change the height of the roof.

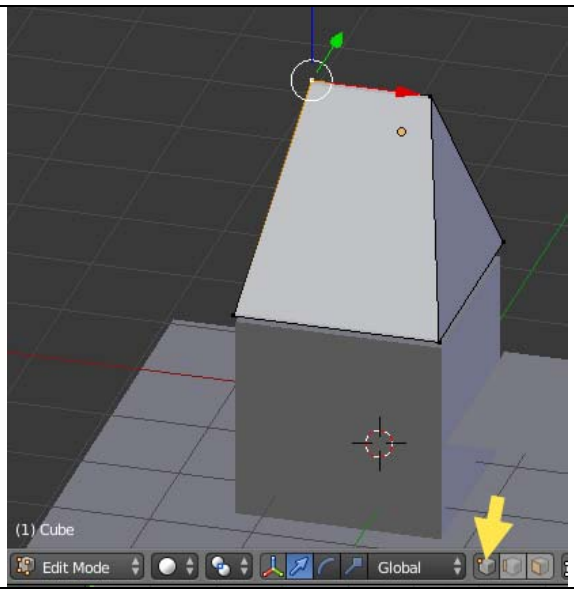
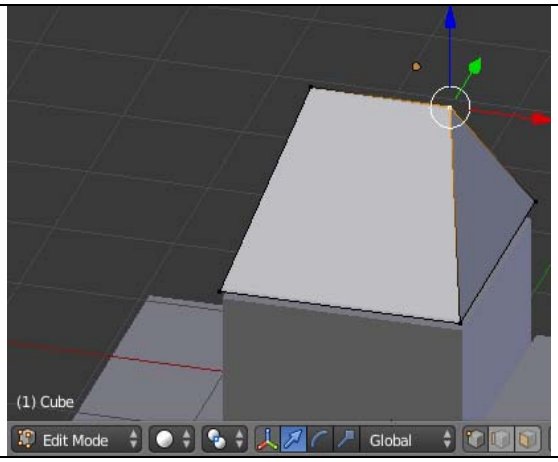
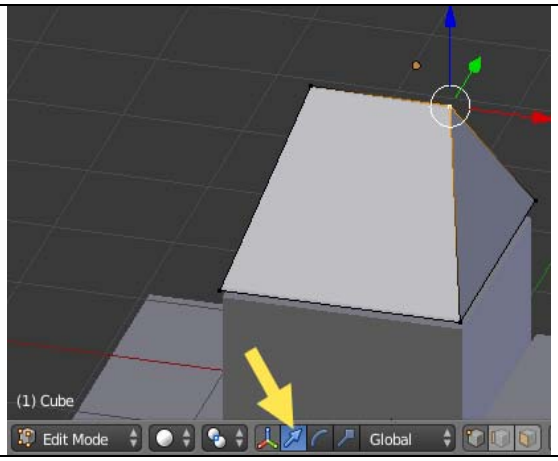
1.Left-click the Edge select mode button.	
2.Right-click the top edge of the roof. It will turn white when it is selected.	
3.Left-click the Translate manipulator mode button.	

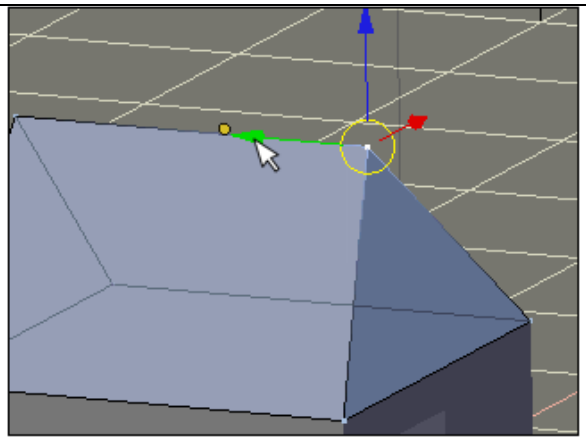
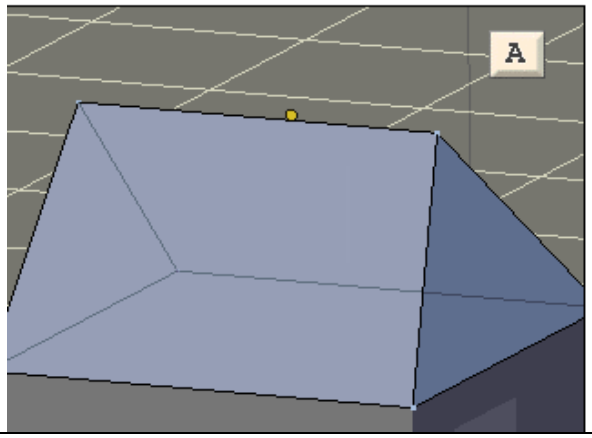
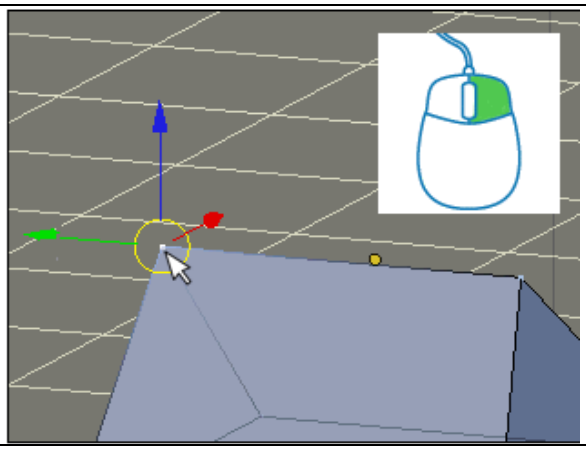
4.Press NUM1 to return to the Front view. TIP: You may need to zoom in or out to see the entire house.	
5.Left-click and drag the 3D Transform Manipulator's blue arrow until the roof is the height you want. You can look at the example for ideas on what your house should look like.	

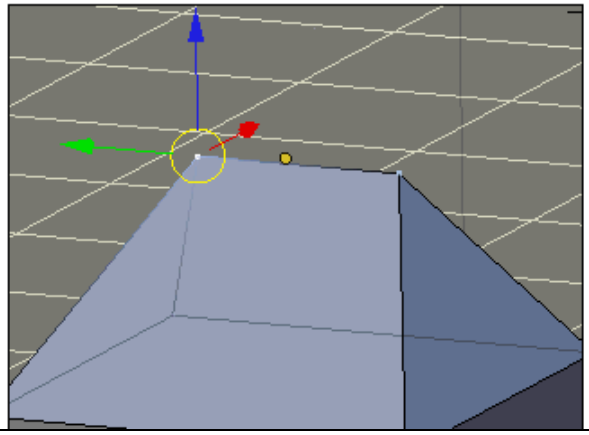
Change the Roof's Shape

Next, you'll angle the roof in so that it's not so straight. You'll select the top vertices of the roof and move them toward the center of the house.

1.Press and hold the scroll wheel to pan around the house until you can see the side of the house. Take a look at the example image.	

2.Left-click the Vertex select mode button.	
3.Right-click one of the top vertices.	
4.Make sure that you still have the Translate manipulator mode button selected.	

5.Using the 3D Transform Manipulator, left-click and drag the green arrow to make the top edge of the roof shorter.	
6.Press the A key to deselect the front top vertex. TIP: Pressing the A key is an easier way to deselect small things like vertices and edges that can be hard to click with your mouse.	
7.Right-click the other top vertex.	

8.Continue moving the top two vertices until the house has a shape that you like.	

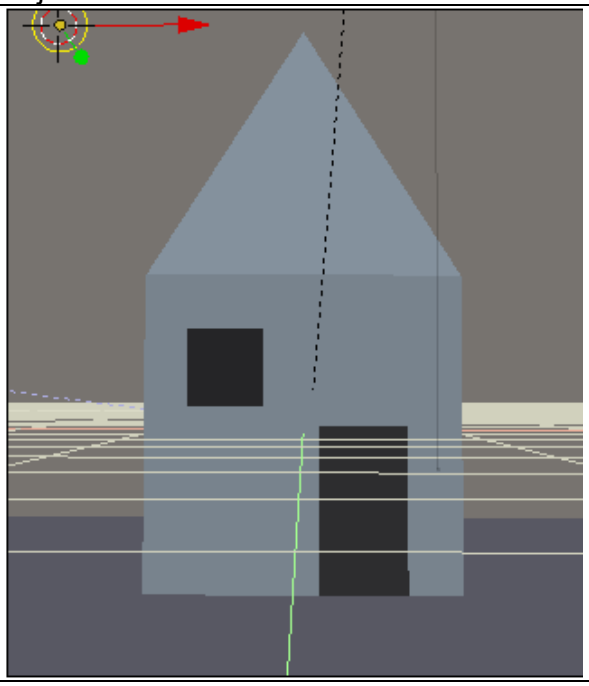
Check Your Work

Complete the steps below to make sure your project is on track.

1. Rotate around your house and check to see that the roof looks the way you want it to.

2. Make any changes to the height or angle of your roof.

3. If everything is in the right place, save your project before moving on.



SUMMARY

In this lab, you:

- Scaled vertices to change a cube into a triangle.
- Translated an edge to change the height of the triangle.
- Translated vertices to change the shape of parts of the triangle.

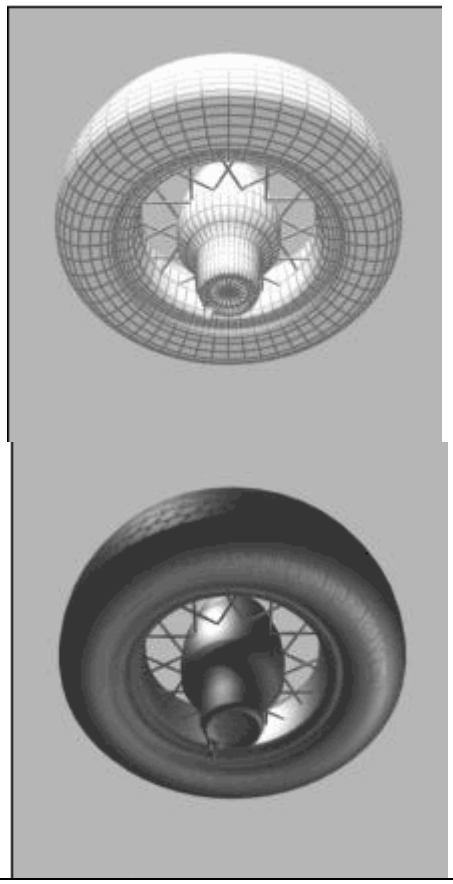
Lab 3 Introduction

In this lab, you'll change the color of your house. You'll use images to make the planes look like a window and door

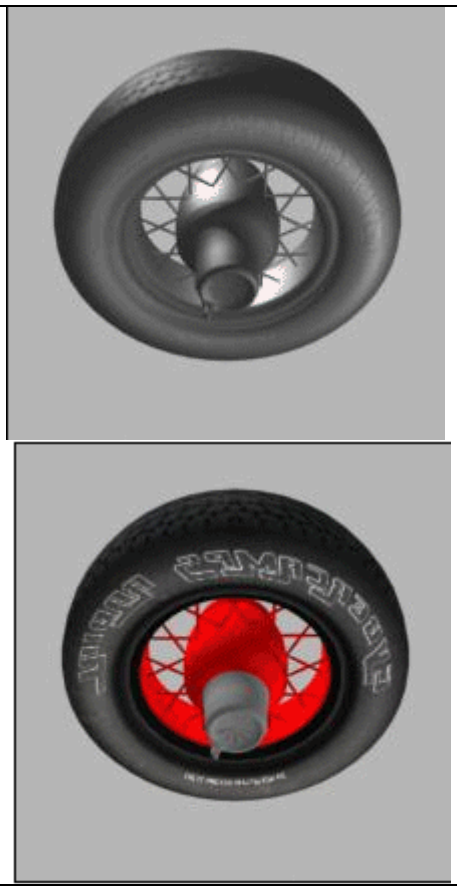
Material

Material is what lets you add color to your 3D objects in Blender. It also lets you change how shiny something is.

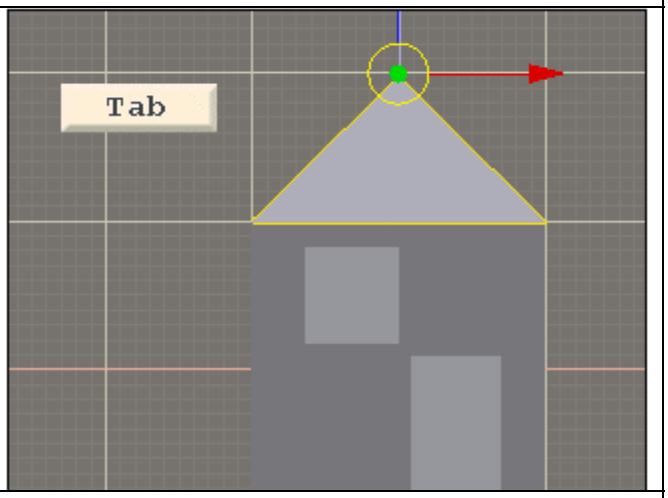
You can play around with materials as much as you want without affecting the shape of your 3D object.

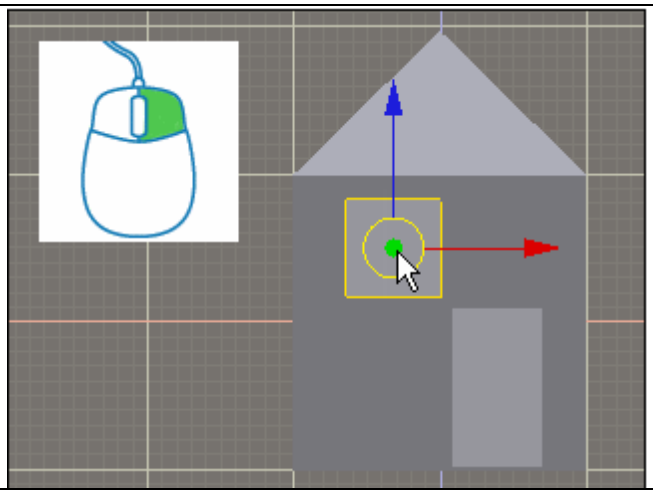


Texture

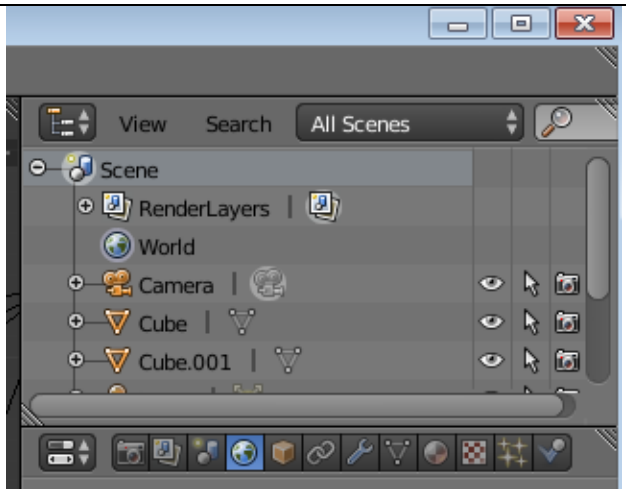
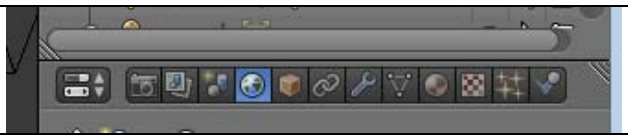
Textures are patterns or images that you can layer on top of a material to make it look different, like stripes on a zebra. They can also add bumpiness to your 3D object. You'll always need to add a material before you can add a texture.	

Select the Window

1.Make sure you are in Object Mode. If not, press TAB.	

2.Right-click on the house's window to select it.	

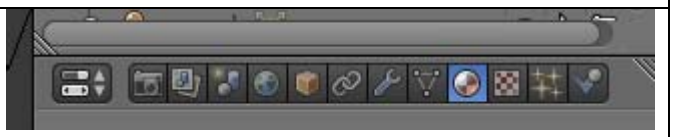
Buttons Window

Below the View, Search and All Scenes menu is the **Buttons Window**. The Buttons Window is made up of panels. **Panels** are how Blender breaks up groups of options. The panel buttons are an easy way to get to the options that you want.	
1. Find the Buttons window. You'll use it on the next screen	

Open the Material Editor

Complete the following steps to open the Material Editor. You'll do this any time you want to change how your 3D objects look.

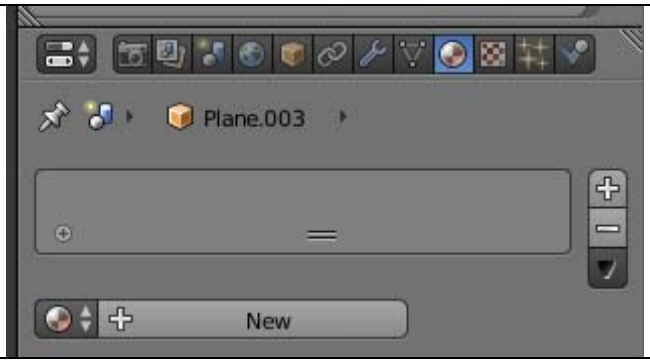
1.Left-click the Material Buttons button to select it. This will open the Material Editor. TIP: You can return to the Material Editor at any time by pressing F5.



Shading Panel

The **Shading panel** lets you add and change materials and textures for your 3D objects.

At first, it may look confusing, because there are a lot of buttons to choose from. These buttons can't mess up the shape of your 3D object, and you can always press CTRL + Z to undo a change you don't like

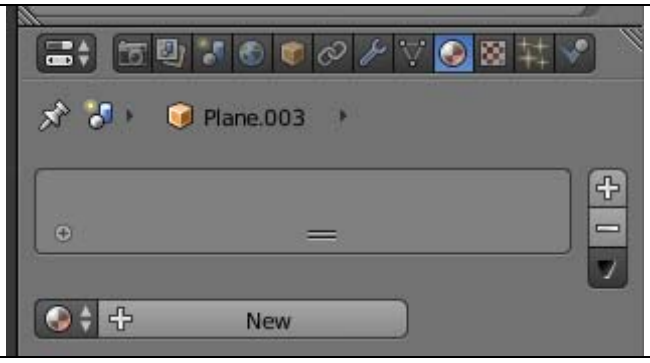


Property Editor Mini-Windows

Each panel in Blender is made of **Property Editor mini-windows**. The Property Editor miini-windows are simply addition options.
You'll use mini-windows to change the settings of the different panels option.

You can left-click the arrows to the left a property editor options to the left corner of each option.

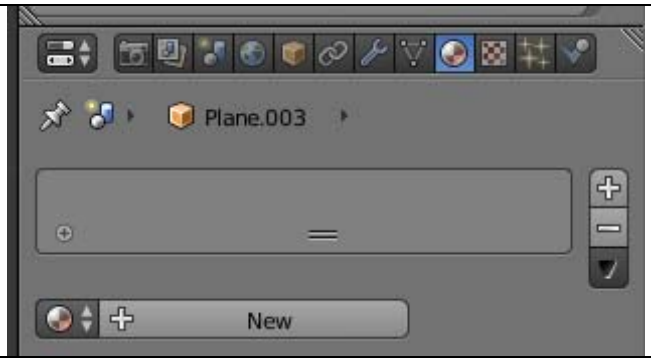
1. To access a material for an object you must first name it. Select the NEW button.



Add a New Material to the Window

You'll need to add a new material to a 3D object before you can change the object's color or add a texture to it.

1. To access a material for an object you must first name it. Select the NEW button.

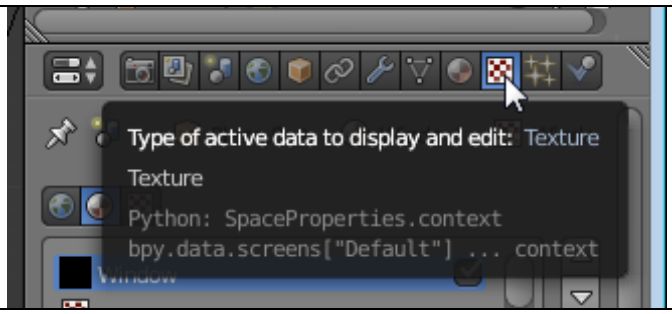


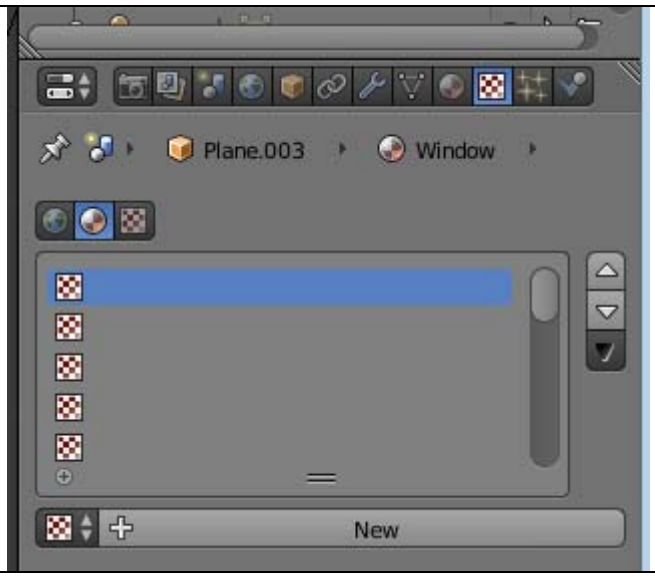
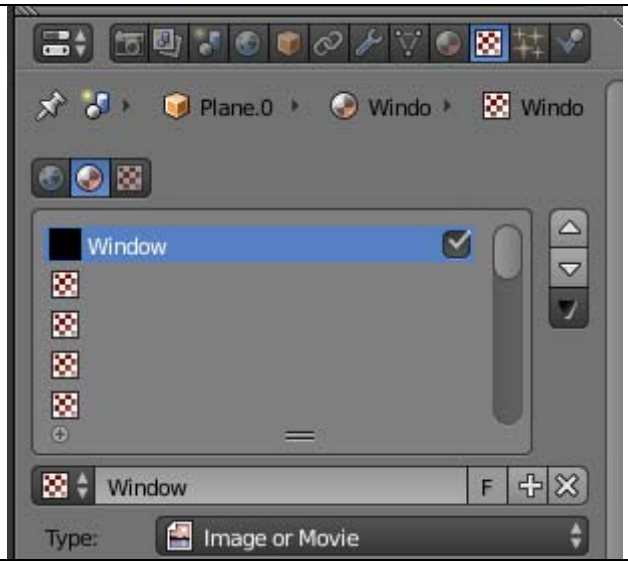
2. Left-click the Materials name field. This will highlight the material name. Type WINDOW for the window name and press ENTER.

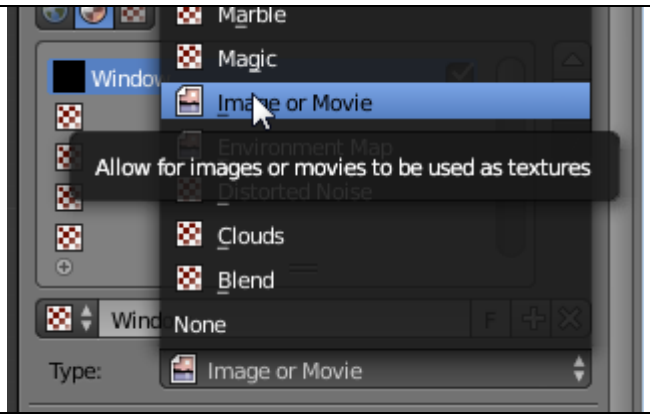
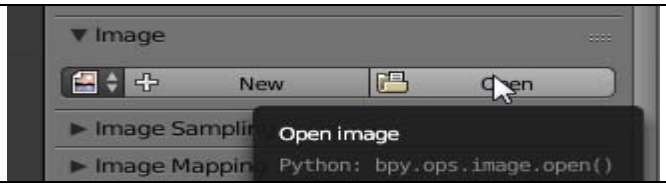
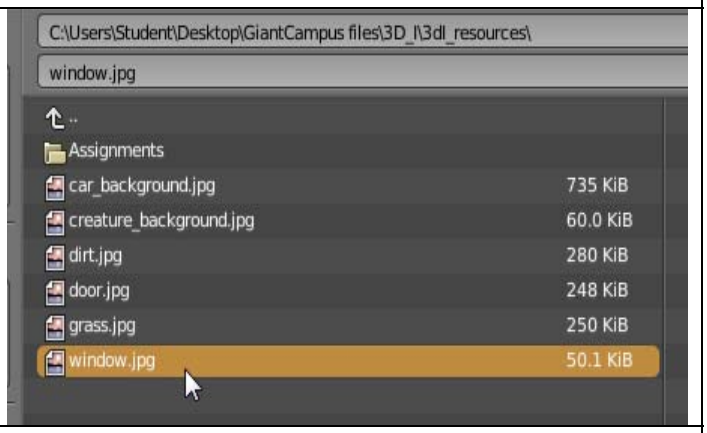
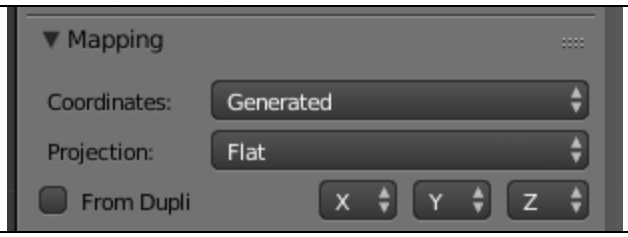
Add a New Texture to the Window

Complete the steps below to add an image as a texture to the window. After you complete this procedure, you'll render the image so you can see how it looks.

1.Left-click the Texture Buttons button to switch to the Texture Buttons panel.



2.Left-click New.	
3.Left-click the Texture name field. This will highlight the texture name.	
4.Type WINDOW and press ENTER.	

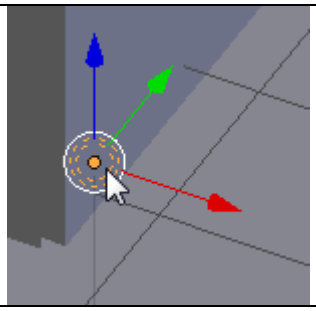
5.Left-click the Texture type list and then left-click IMAGE OR MOVIE.	
6.In the Image mini-window, left-click OPEN.	
7.Left-click window.jpg.	
8.Left-click OPEN IMAGE.	
NOTE: If image is not mapped correctly. Look at MAPPING and change coordinates to GENERATED.	

The Blender Lamp

Before you can see your textures in the rendered image, you need some light. The lamp provides light for your 3D objects.

This is important when rendering your 3D objects because without a light, it would be like taking a photo in a dark room.

1. Find the lamp. You'll use it on the next screen with the right mouse button.



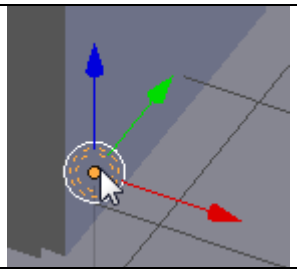
2.The Lamp tool button.

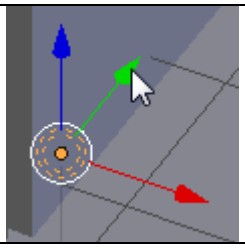
Move the Light

You can render the current frame, but the light might not be in the right place for the door and window to show up in the rendered image. Complete the steps below to move the light.

1.Make sure you are in Object Mode. If not, press TAB.

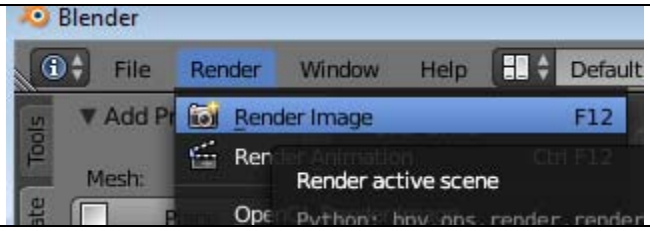
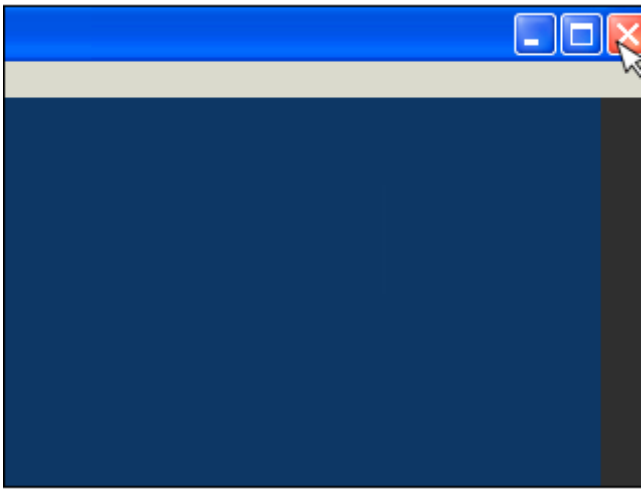
2.Right-click the light to select it.



3.Left-click the Translate manipulator mode button.	
4.Use the 3D Transform Manipulator to move the light in front of the house.	

Render the Image

You can render the current frame, but the light might not be in the right place for the door and window to show up in the rendered image. Complete the steps below to move the light.

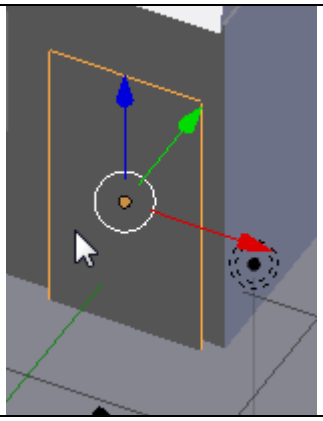
1.On the Render menu, left-click Render then Render Image.	
2.If your rendered image looks like the example, your camera isn't pointing at anything. Move and rotate the camera until you get it into position.	
3.Close the Render window when you're done or press the ESC. Key.	

Add a New Material to the Door

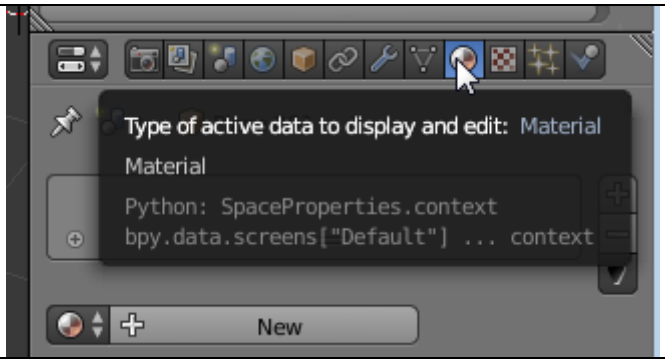
Complete the steps below to add a new material to the door. This is just like the process you used to add a new material to the window.

1.Make sure you are in Object Mode.

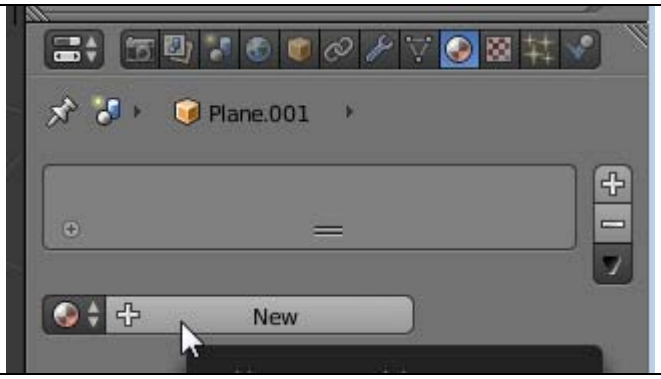
2.Right-click the door to select it.



3.At the top of the Buttons Window, make sure the Material Buttons button is selected. If not, press F5.



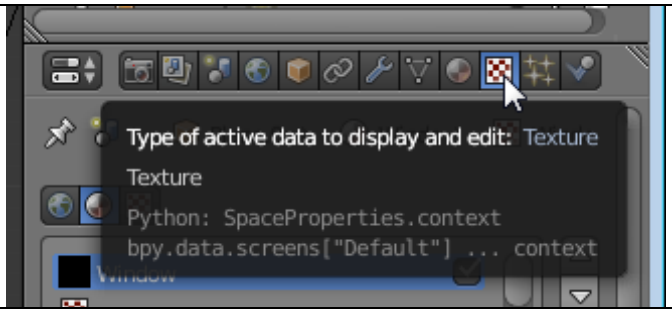
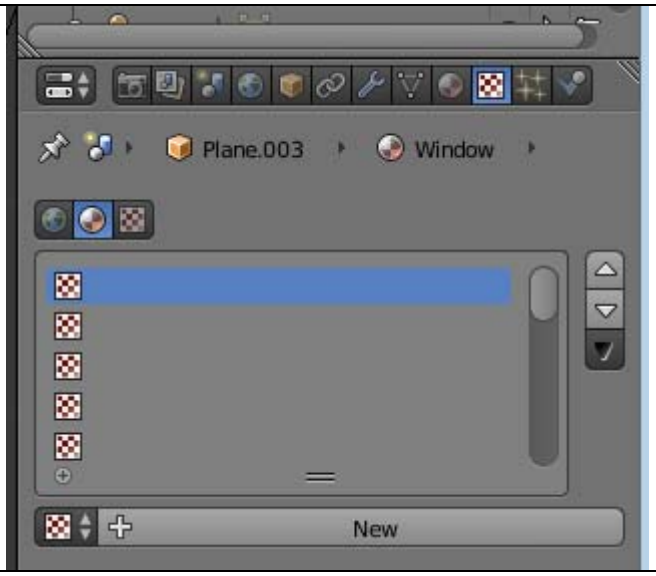
4.In the Properties Editor mini-window, left-click Add New.

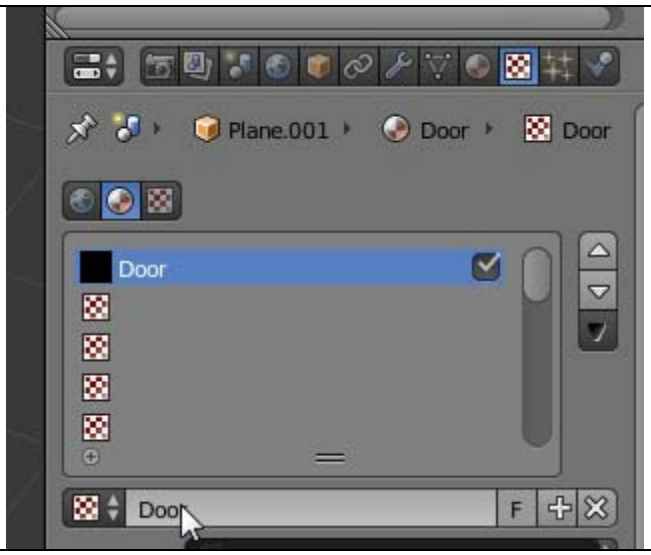
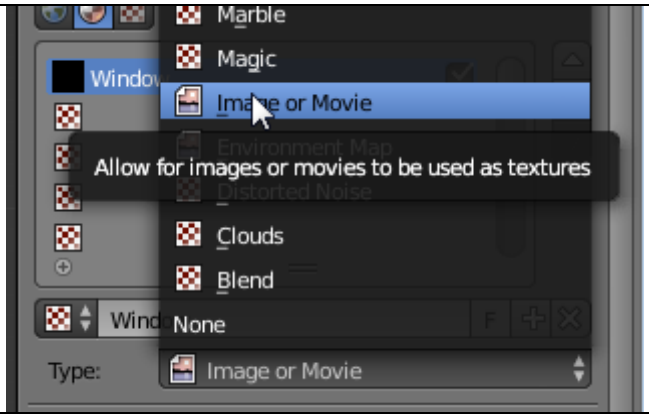
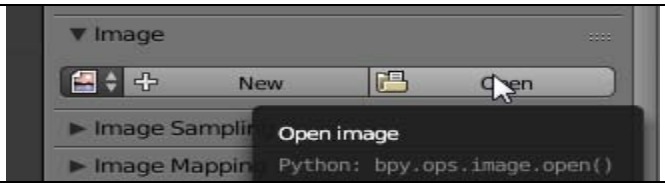


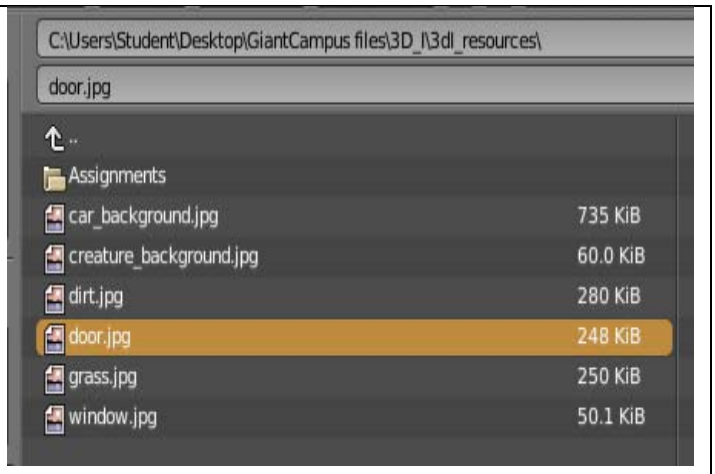
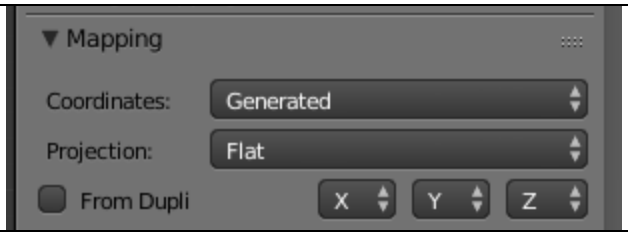
5.Left-click the Materials name field. This will highlight the material name. Type DOOR and press Enter.	

Add a New Texture to the Door

Complete the steps below to add a new texture to the door. You'll be adding an image for the texture, just like you did for the window.

1.Left-click the Texture Buttons button to switch to the Texture Buttons panel.	
2.Left-click New.	
3.Left-click the Texture name field. This will highlight the texture name.	

4.Type DOOR and press ENTER.	
5.Left-click the Texture type list and then left-click IMAGE OR MOVIE.	
6.In the Image Properties Editor, left-click OPEN.	

7.Left-click window.jpg.	
8.Left-click OPEN IMAGE.	
NOTE: If image is not mapped correctly. Look at MAPPING and change coordinates to GENERATED.	

Check Your Work

Complete the steps below to make sure your project is on track.

1. Render an image of your house and make sure the textures look the way you want them to.

2. If everything looks good, save your project before moving on to the next lab!

SUMMARY

In this lab, you:

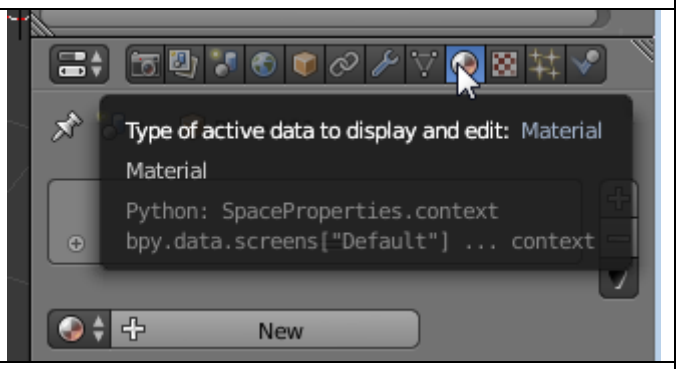
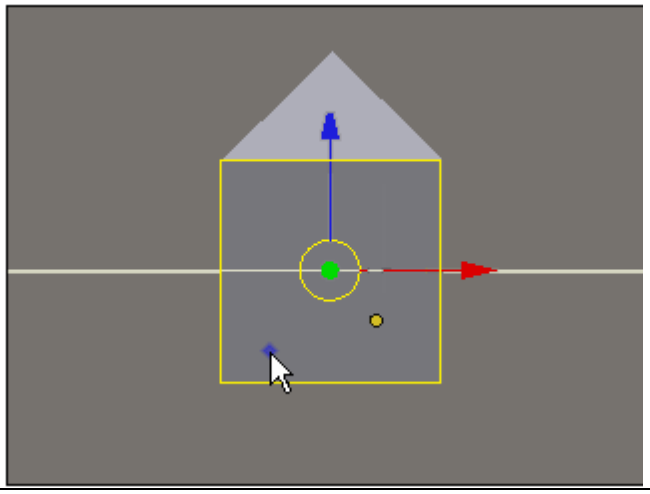
- Changed the appearance of objects by using materials and image textures.
- Moved the light to improve the rendered object's appearance.

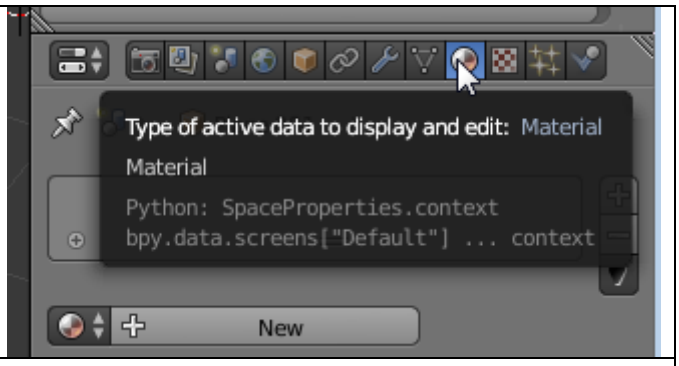
Lab 4 Introduction

In this lab, you'll use color with materials and textures to create new styles for your 3D objects.

Create a New Material for the House

Follow the steps you learned for creating materials to create a new material for the house. The exact steps aren't given, since you've done this before.

1.Make sure you're in Object Mode. If not, press TAB.	
2.Left-click the Material Buttons button.	
3.Right-click the bottom cube of the house to select it.	

4.In the Properties Editor, left-click the arrows next to the Material name and left-click Add New.	
5.Left-click the material name field and type House. Press ENTER.	

Color Picker

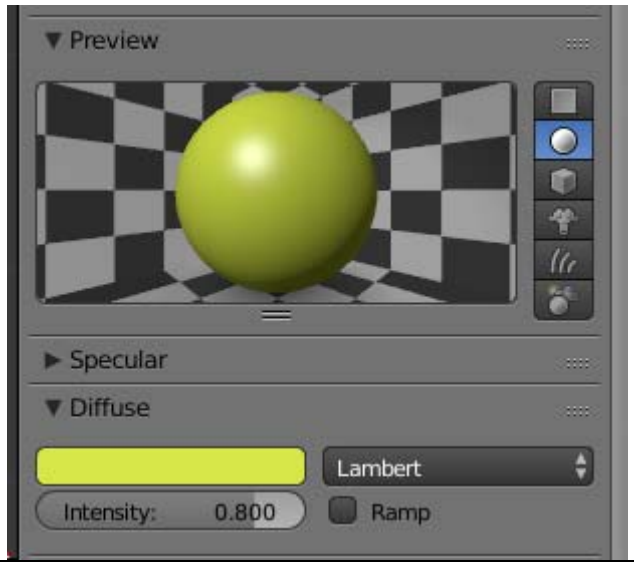
The **Color Picker** is how you choose colors for your 3D objects. You'll use the color picker any time you need to choose a color for part of your project.

The thin strip at the bottom of the Color Picker lets you select a color from all the colors of the rainbow.

The big box lets you pick a specific shade of the color you picked in the strip.

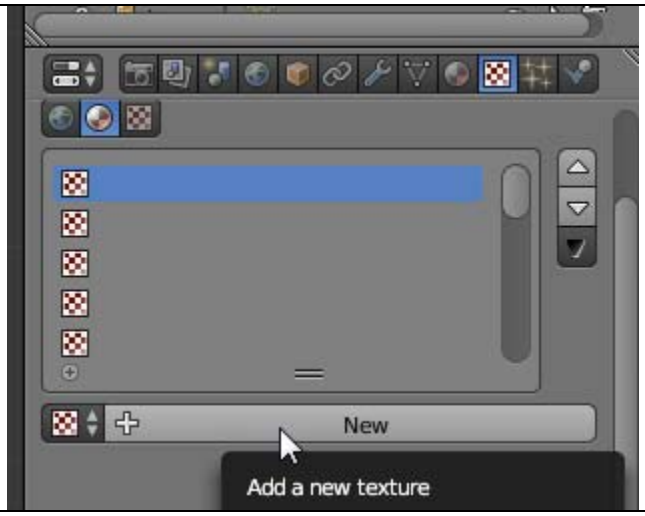
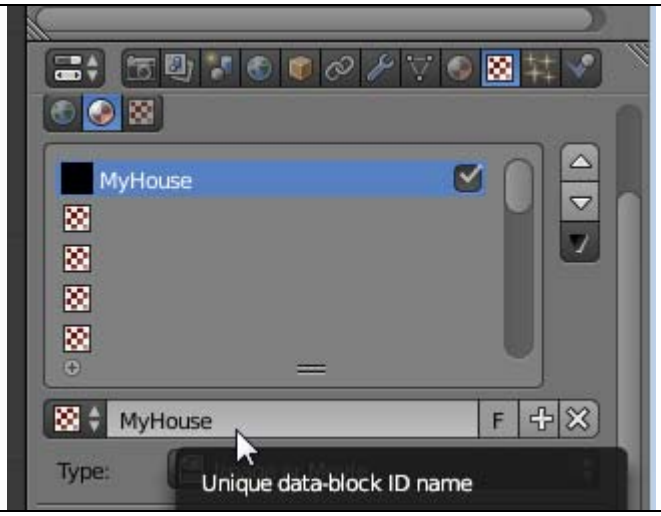
Add Color to a Material

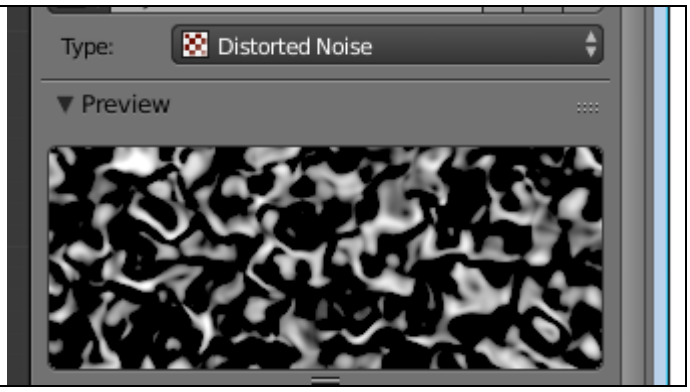
Complete the steps below to color the material for the bottom half of the house.

1.In the Material mini-window, left-click on the blank button to the left of the DIFFUSE button to change the material's color. This opens the Color Picker.	
2.In the Color Picker box, left-click the color you'd like to use. Don't pick white, because this color won't show up when you pick a texture for this material. TIP: You can always change it later if you don't like the first color you pick.	
3.Move the mouse pointer outside of the Color Picker to close it.	

Add a New Texture to the House

Complete the steps below to color the material for the bottom half of the house. Complete the steps below to add a texture to the house. Instead of an image, you'll use a different texture

type.	
1.Left-click the Texture Buttons button to switch to the Texture Buttons panel.	
2.In the Texture mini-window, left-click Add New. CAUTION: If you do not see Add New, left-click one of the blank buttons under the other texture names, and then left-click Add New.	
3.Left-click the Texture Name field. This will highlight the texture name.	
4.Type House and press ENTER.	

5.Left-click the Texture type list and then left-click Distorted Noise.	

The Map To Mini-Window

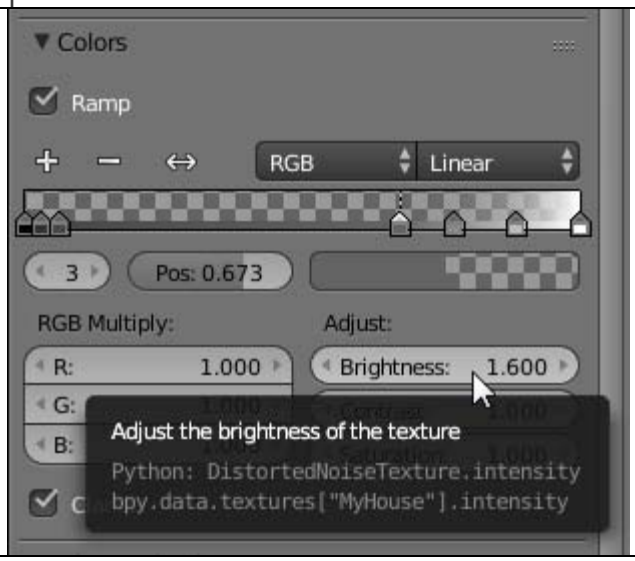
The **Map To** mini-window is what you will use to change the color of the texture that you have selected. There are lots of buttons in this mini-window. You'll learn what they're for when you need to use them.	

Color in Blender

Blender creates its colors by combining three colors: Red, Blue, and Green.

You'll use combinations of Red, Blue, and Green (or RGB) to create colors for your 3D objects

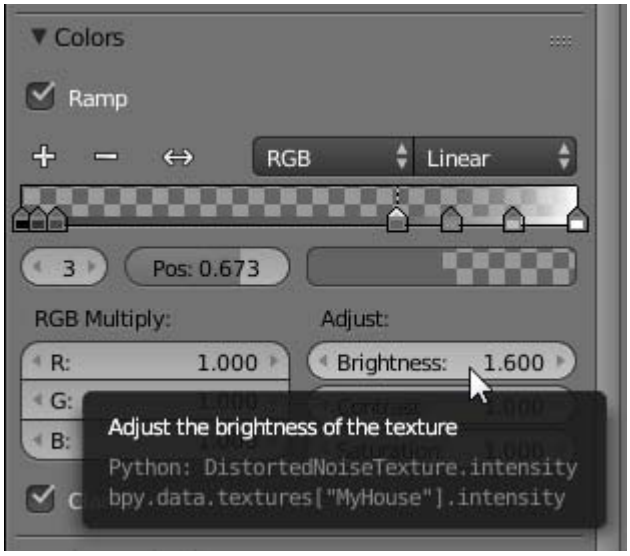
R	G	B		
0.000	0.000	0.000	Black	
1.000	1.000	1.000	White	
1.000	0.000	0.000	Red	
0.000	1.000	0.000	Green	
0.000	0.000	1.000	Blue	
1.000	1.000	0.000	Yellow	
0.000	1.000	1.000	Cyan	
1.000	0.000	1.000	Magenta	



Color Picker Arrows

Open the Color Arrow big box, there are three options labeled R, G, and B.

Moving a arrow to the left will decrease the amount of that color in the mix. Moving it to the right will increase it.

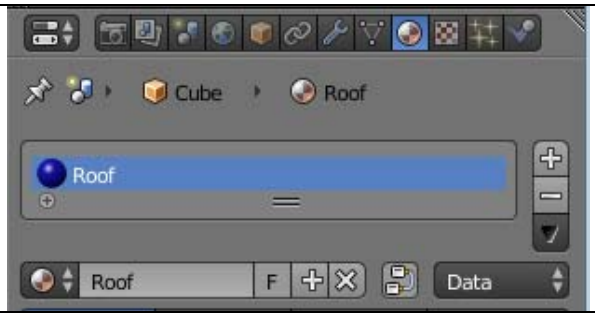
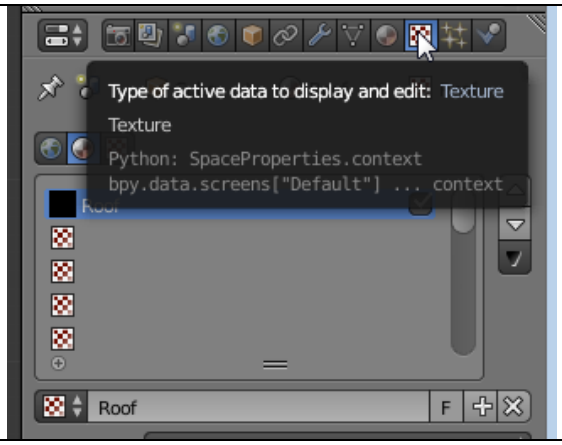


Change the Color of the Texture

When you change the color of the texture, you'll be able to see the color of the material and the color of the texture layered on top of it.

Select INFLUENCE then go to RGB to Intensity color bar. The Color palette will appear.

Create a New Material and Texture for the Roof

1.Make sure you're in Object Mode. Right mouse button to select the roof and name it.	
2.Right-click the roof of the house to select it. Name it first with Material and give it a color.	
3.Next with Texture name it also with Add New.	
4.Add a new material to the Roof. If you want to add color to the texture use INFLUENCE.	

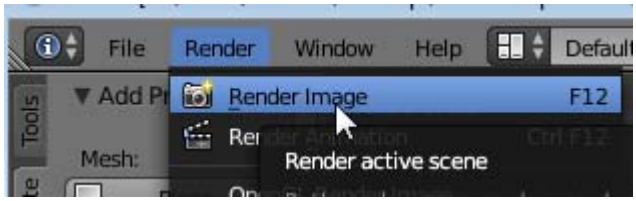
Check Your Work

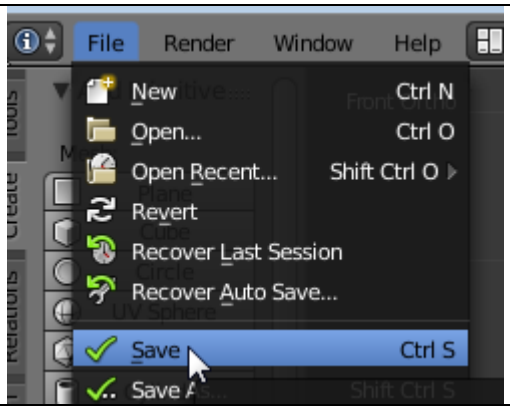
Complete the steps below to make sure your project is on track.

1. Render the house with the top menu. Select RENDER > RENDER IMAGE. Make sure the colors and textures are the way you want them.

2. Make any changes to the color or textures.

3. If everything looks good, save your project before moving on.





Summary

In this lab, you:

- Used color-based materials and textures to change the appearance of objects.
- Picked colors for materials and textures using the Color Picker.

Lab 5 Introduction

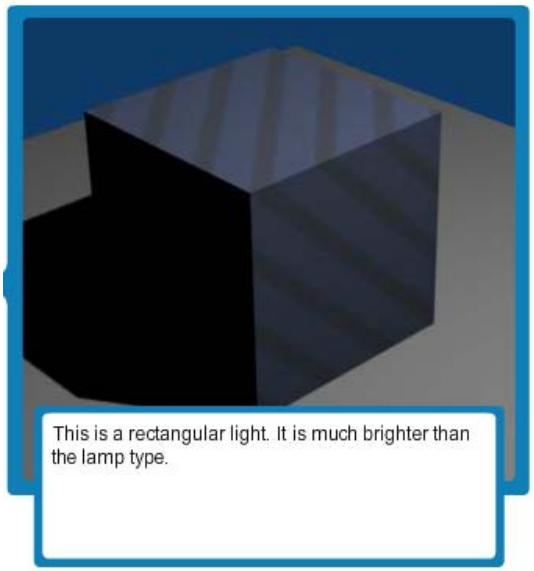
Earlier, you learned that rendering can be used to take snapshots of your 3D images.

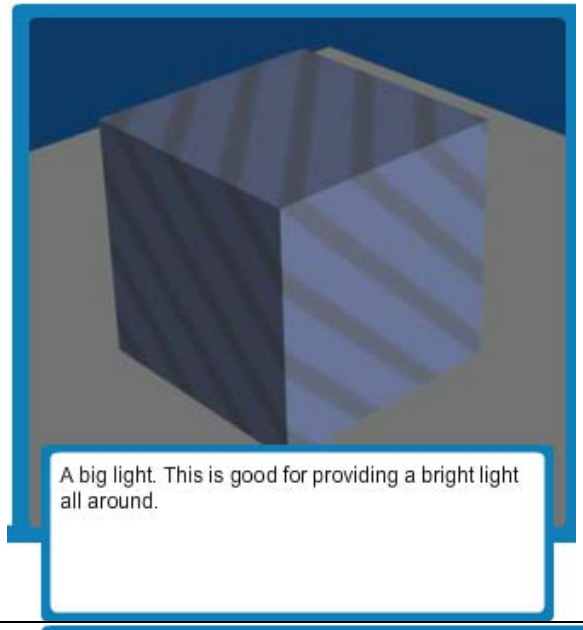
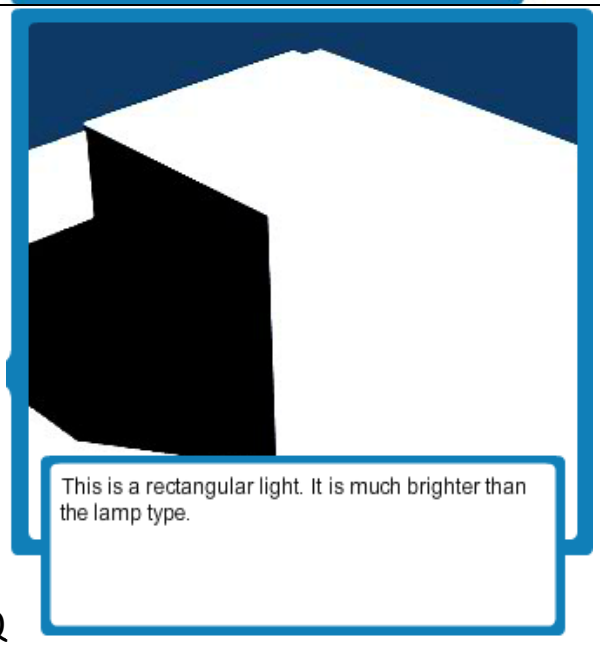
In this lab, you'll use rendering to make animated movies of your 3D objects.

Different Lighting Types

You can assign different lighting types to the lamp. This will change the way your 3D object looks when you render it.

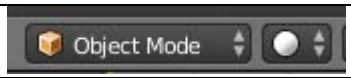
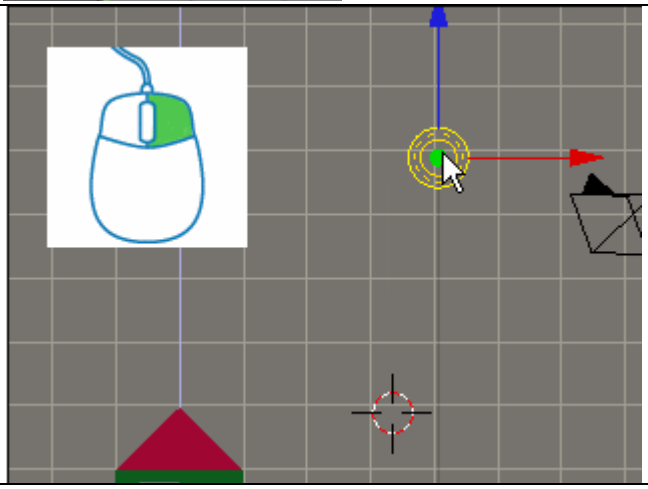
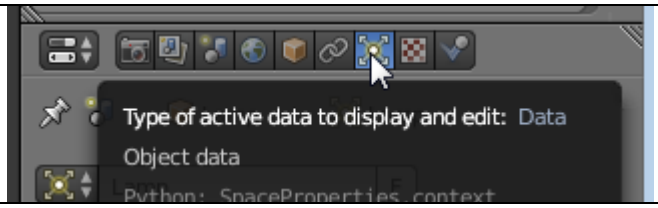
Click the buttons below to view the different lighting types.

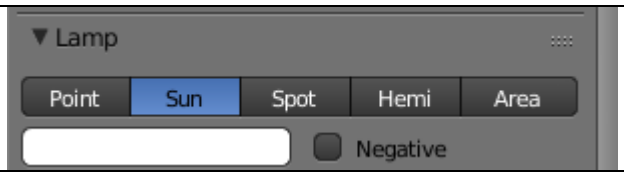
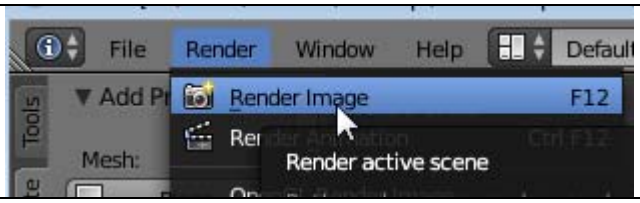
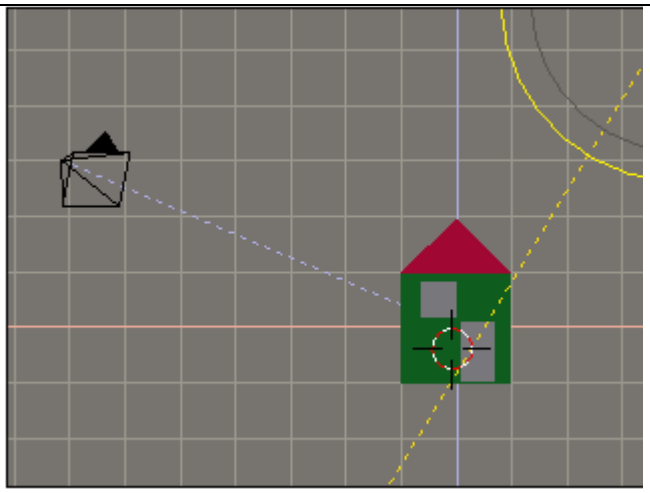
Lamp or Point	
Spot	

Hemi	 A big light. This is good for providing a bright light all around.
Area	 This is a rectangular light. It is much brighter than the lamp type. Q

Sun	

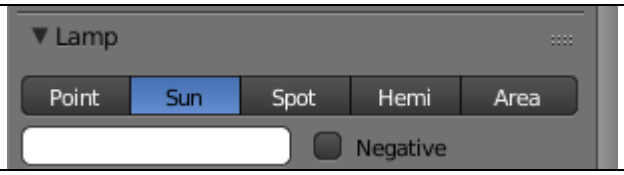
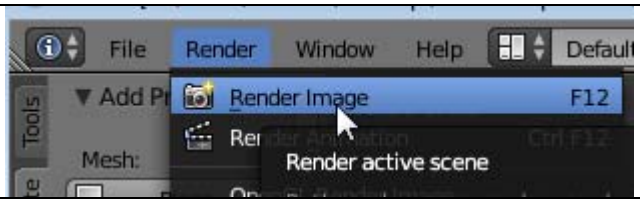
Change the Lighting

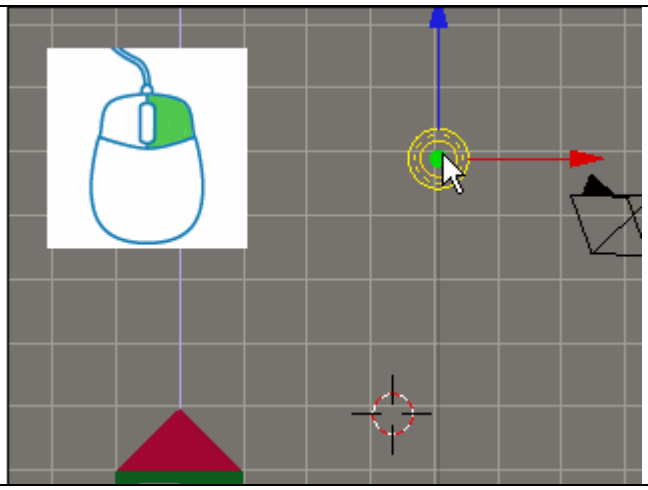
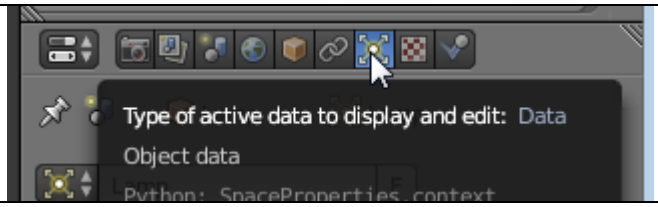
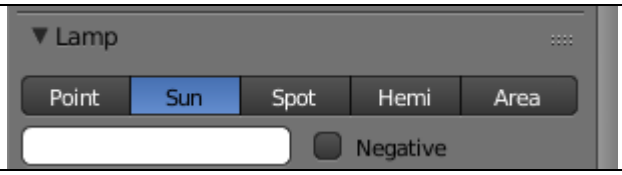
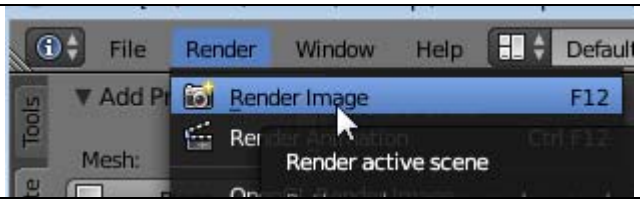
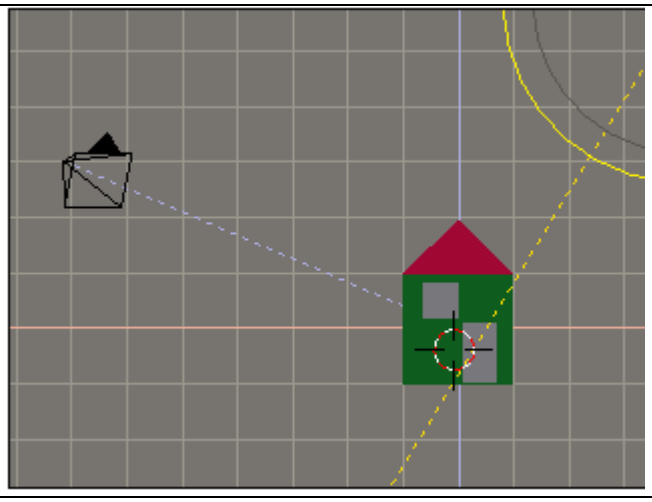
1.Make sure you are in Object Mode. If not, press TAB.	
2.Right-click the light to select it.	
3.Select the data object LAMP.	

4.Left-click the Lamp button.	
5.In the Render menu at the top of the screen Select RENDER > RENDER IMAGE see how your house looks with this lighting.	
6.If the rendered image is dark, rotate the lamp until the dotted line is pointing in the the general direction of the house.	

Try Other Lighting Types

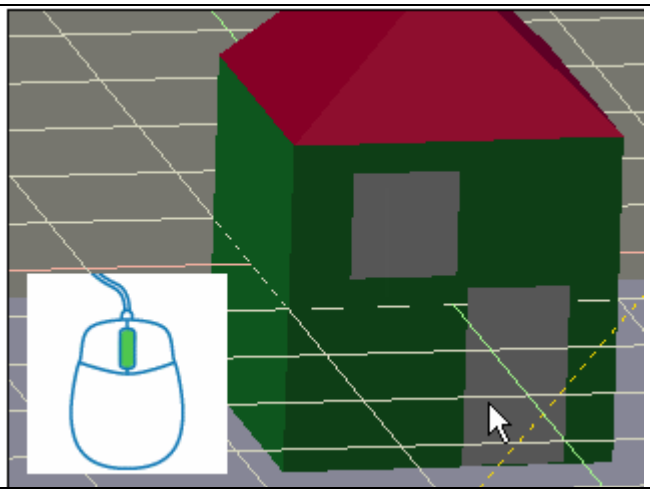
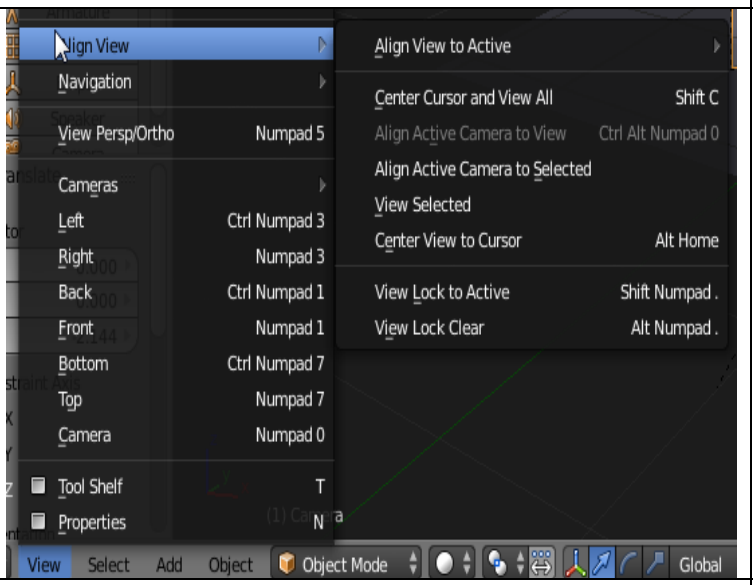
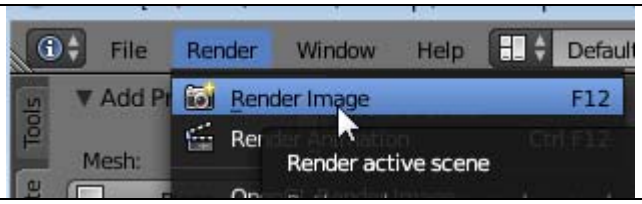
Explore the other lighting options.

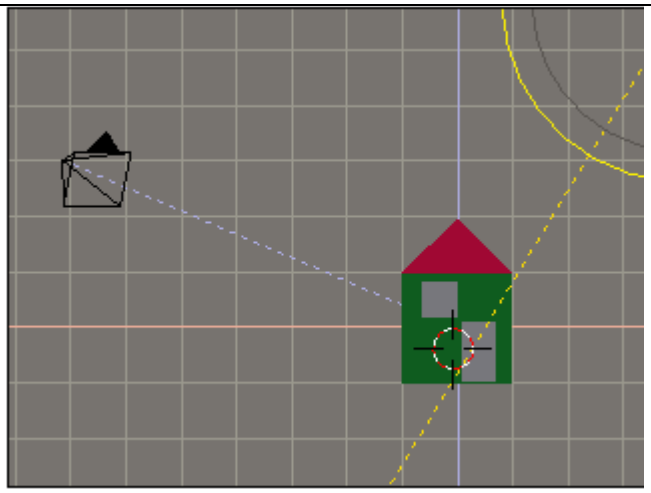
1.Repeat the previous steps for Area, Spot, and Hemi.	
2.Use the RENDER > RENDER IMAGE command to see how your house looks with the different lighting.	

2.Right-click the light to select it.	
3.Select the data object LAMP.	
4.Left-click the Lamp button.	
5.In the Render menu at the top of the screen Select RENDER > RENDER IMAGE see how your house looks with this lighting.	
6.If the rendered image is dark, rotate the lamp until the dotted line is pointing in the the general direction of the house.	

Set Camera Location

Complete the steps below to set the camera view to your current view. This is a way to change the camera position without moving the camera.

1.Make sure you are in Object Mode. If not, press TAB.	
22.Press and hold the mouse scroll wheel to pan around the house until you like how it looks.	
3.At the bottom of the 3D View window, left-click View, left-click Align View, and left-click Align Active Camera to View. TIP: You can also use CTRL + ALT + NUM0 to do this.	
4.In the Render menu at the top of the screen Select RENDER > RENDER IMAGE see how your house looks with this lighting.	

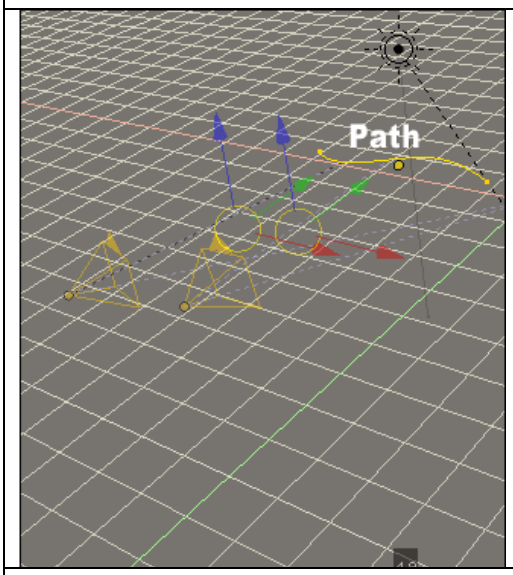
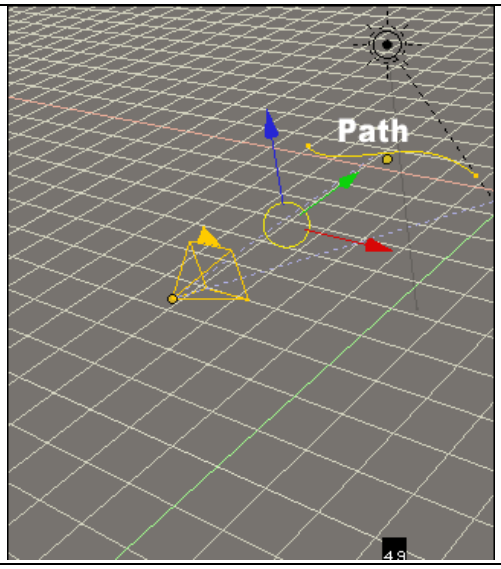
6.If the rendered image is dark, rotate the lamp until the dotted line is pointing in the the general direction of the house.	
7.**Save this file as a New name. You will use the old file to create a neighborhood or city to be used for a future project.**	

Path

When you want to make an animation of an object moving in 3D space, you'll make a path for the camera to follow. A **path** is a line or curve that an object will follow along when it's animated.

The path can be modified like any other Blender object. It can be translated, rotated, and scaled.

Like the Blender light, the path will be invisible when you render.

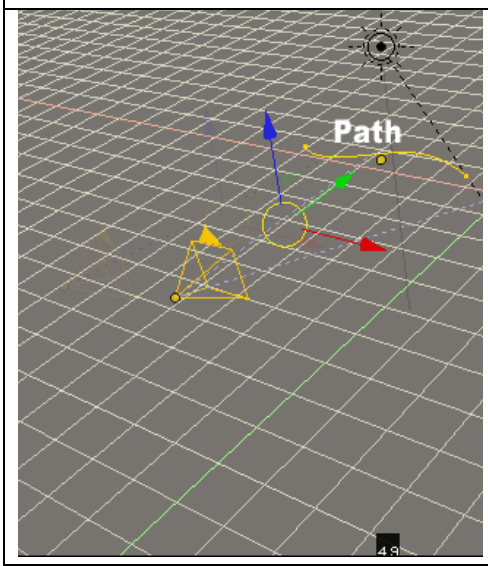
	

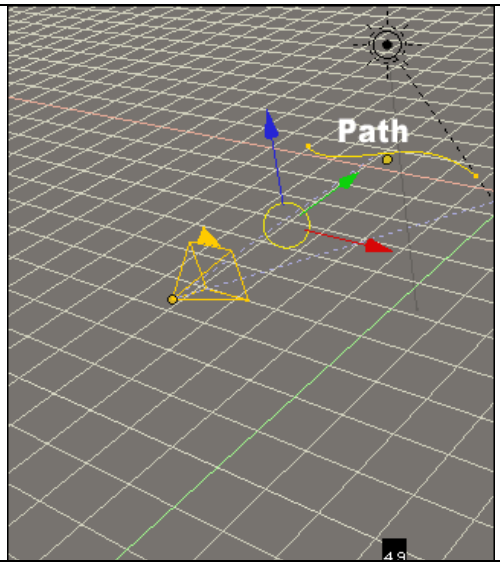
Path Constraint

Path constraint is the option you'll use to get the camera to follow along the path. The path constraint is like a leash connecting a path and an object.

With a path constraint, the camera will follow the path's direction, even if the camera is far away from the path.

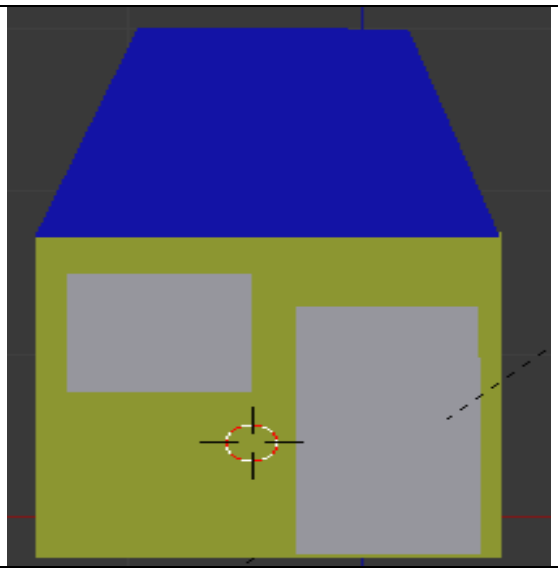
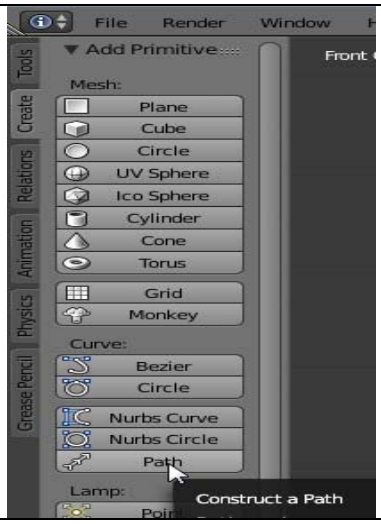
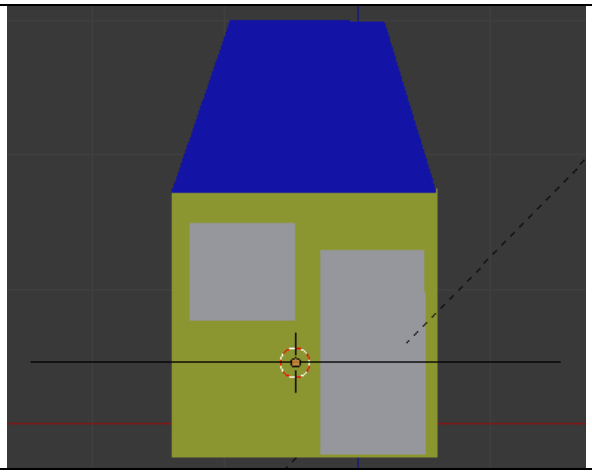
If you change the direction of the path, the camera's direction will change too.





Create a Path for the Camera

1.Make sure you are in Object Mode. If not, press TAB.	

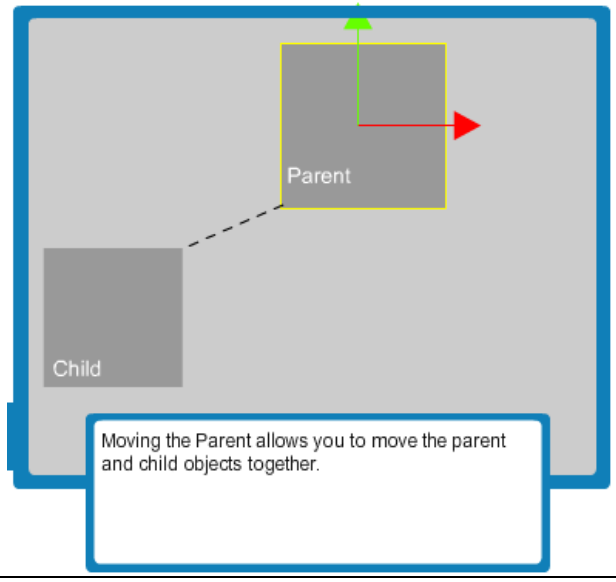
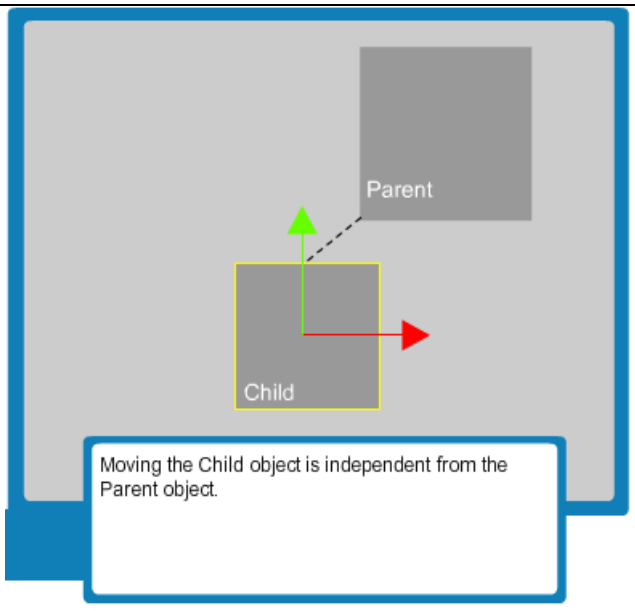
2.Left-click in front of the door to place the 3D cursor. This is where you'll add the path. TIP: Pan around the house to make sure the 3D Cursor is in front of the door.	
3. From the Create Tab use the Add Primitive menu then left-click Path.	
4.Press the A key to deselect the new path.	

Parent and Child Objects

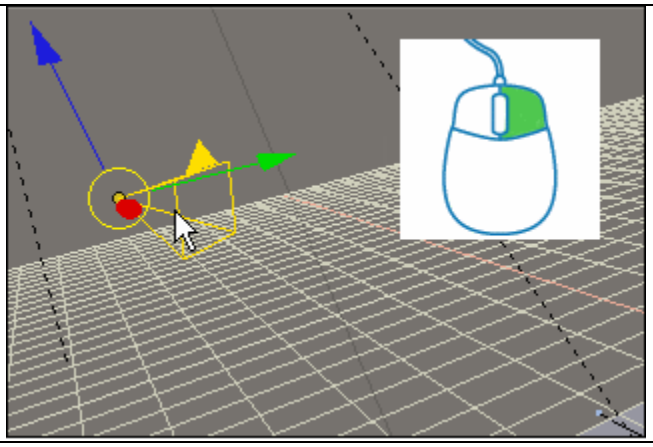
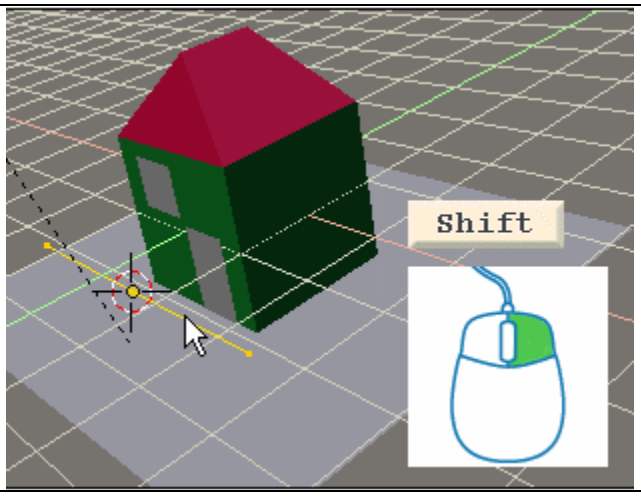
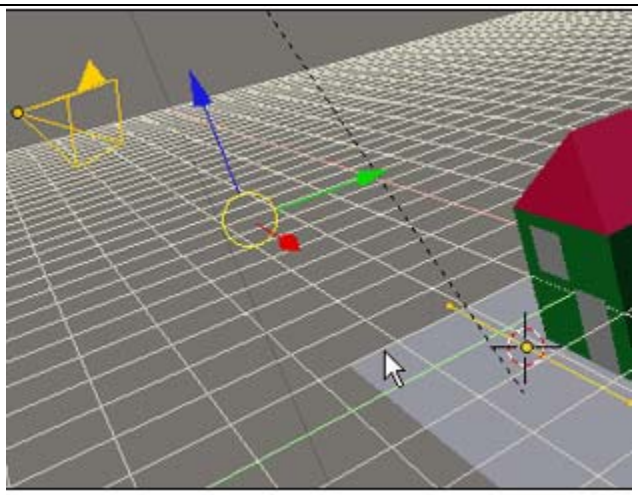
Before you can make a path constraint between the camera and path, you have to set up a parent-child relationship between them. The camera will be the parent, and the path will be the child.

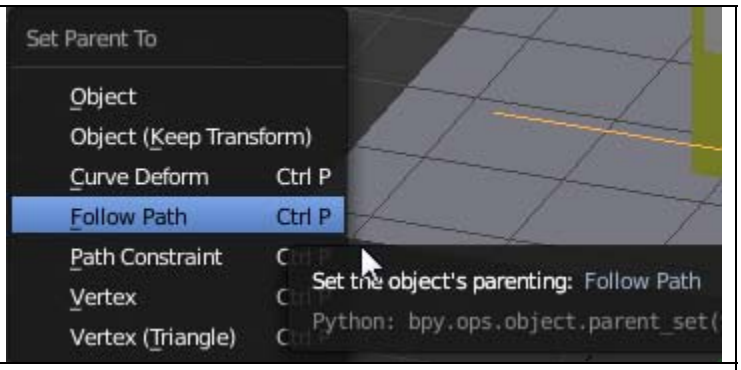
When you move, rotate, or scale a parent object, the child object will also move, rotate, or scale.

Changing a child object doesn't change the parent. Since the path will be the child, you'll be able to move the path wherever you want without moving the camera from its starting point.

Moving the Parent	
Moving the Child	

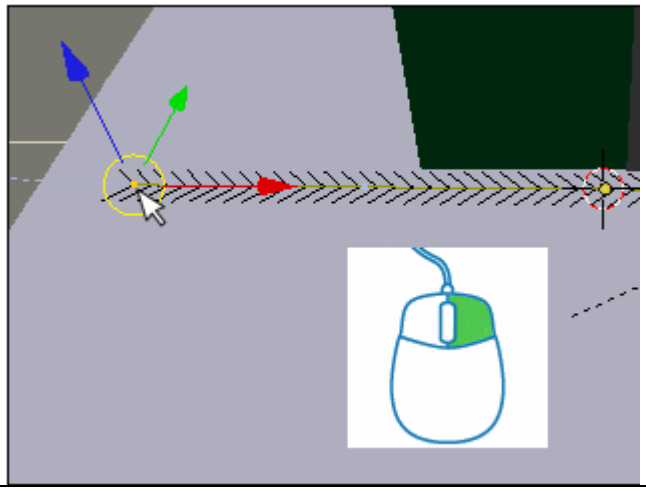
Constrain the Camera to the Path

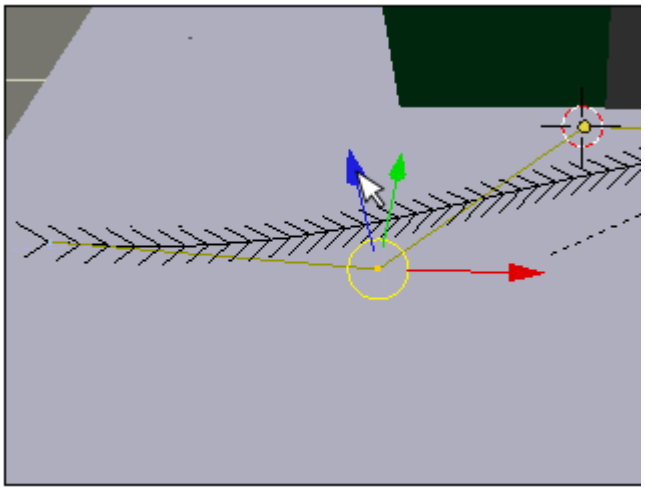
Complete the steps below to make the camera a parent of the path with a path constraint. You'll do this anytime you want to use the camera's movement to create an animated movie.	
1.Right-click the camera. TIP: By selecting the camera first, you are making it the parent object.	
2.Press and hold SHIFT and right-click the new path. TIP: By selecting the path last, you are making it the child object.	
3.Make sure that both the camera and the path are outlined in yellow.	

4.Press CTRL + P and then left-click Fololow Path. CAUTION: If the OK? box has only the Make Parent option, then you've selected things in the wrong order. Deselect everything and then follow the process again.	
5.Press ALT + A to watch the camera move along the path.	
6.Press ESC to stop the animation.	

Change the Path's Direction

Complete the steps below to change the shape of the path. You'll do this whenever you want the camera to move in a curving line.

1.Press the A key to deselect everything.	
2.Press TAB to enter Edit Mode.	
3.Left-click the Translate manipulator mode button.	
4.The path is made up of five points. Right-click along the path to select different points.	

5.Use the red, blue, and green arrows to move the points. This will change the curve of the path.	
6.Press ALT + A to watch the camera move along the curve of the path. TIP: The path constraint made the camera curve along with the path.	
7.Press ESC to stop the animation. When you're happy with the new path, you're ready to create an animation.	
1.Press the A key to deselect everything.	

Making Movies in Blender

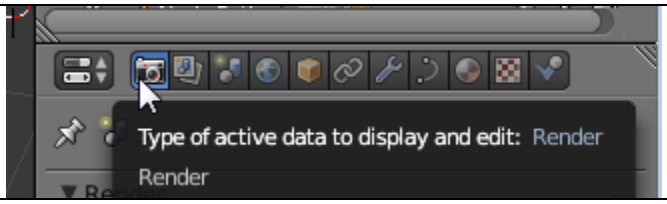
When you pressed ALT + A to see how the camera moved, you may have noticed numbers appearing at the bottom of the screen. These are the numbers of the frames in the animation.

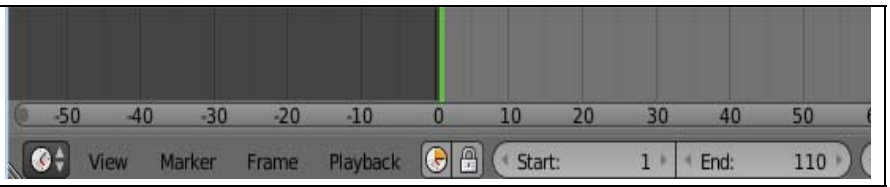
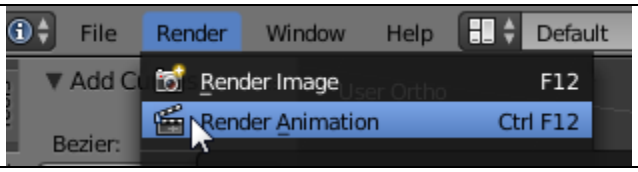
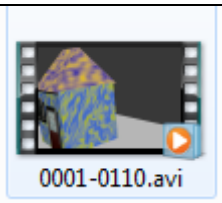
An **animation** is made up of a series of still images, which are called frames. The number of **frames** determines the length of your animation.

The more frames you have, the longer it will take for your computer to render the animation.

Save Time

Unless you have a very fast computer, rendering animations can take a while. Complete the steps below to speed up that process.

1.Save your project.	
2.In the Buttons Window, left-click the Scene button.	
3.In the OUTPUT, left-click the Images are saved in this file format button, and left-click AVI Jpeg. This means the image will be saved as a movie instead of an image. Note: You can use Mpeg with the VLC media player.	

4.At the bottom of your window find the START and END FRAME. Leave start frame at (1) and set end frame to (100).	
5.Select RENDER > RENDER ANIMATION. You are creating your Move.	
6.When last frame is finished press ESC key to close the render window.	
7.You can find your saved movie in the C:/tmp directory. It will be an .avi file. In the tmp directory, the .avi file will look like 0001_0010.avi.	

Check Your Work

Complete the steps below to make sure your project is on track. You'll use the Windows file system to complete these steps.

1. Go to **C:\tmp** to find your movie. Double-click it to watch it. Then close it.

2. In the **C:\tmp** folder, left-click your movie file to select it. Press CTRL + C to copy it.

3. Go to your project folder at **C C:\Users\Student\Desktop\UHD\3D Animation**, and press CTRL + V to paste.

4. Right-click on the movie file and then left-click **Rename**. Type **house_movie.avi** as the name, and press ENTER.

Summary

In this lab, you:

- Used different lighting types to change a rendered object's appearance.
- Created a path and used a path constraint to move the camera along a path.
- Sped up the rendering process.
- Rendered the scene to create an animation of the camera's movement.

Review

Congratulations! You built a house.

In this project, you:

- Used basic shapes to build a house.
- Manipulated vertices to make a cube into a roof.
- Used image files to create materials for the window and door.
- Used materials and textures to give your house color and shading.
- Picked the type of lamp that best lights your house.
- Created an animation based on the camera's movement down a path.

From a House to a Neighborhood to a City

Use your creativity. Create a Neighborhood or small city with streets, building, houses, street lights and other objects. You will be able to combine this later with another project.

Project 3 – Create Terrain

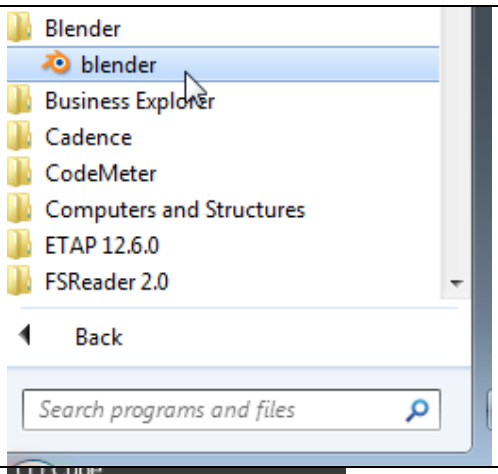
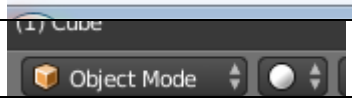
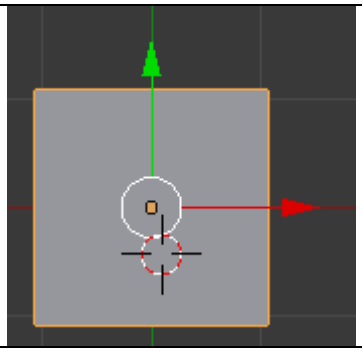
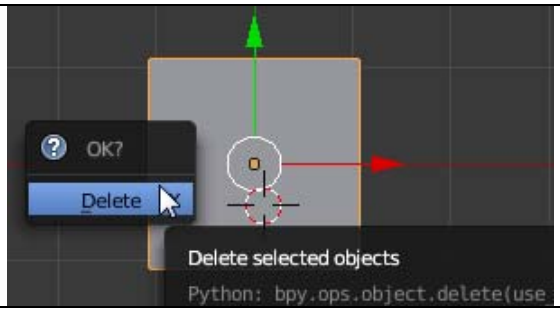
Introduction	Project Preview
In this project, you will: • Create a landscape of hills and valleys. • Add dirt and grass to the landscape. • Create a cloudy sky. • Create a colorful moon that glows. • Add stars to the nighttime sky.	Here's an example of what you'll make. 

LAB 1 - Introduction

In this lab, you'll transform a flat surface into hills and valleys.

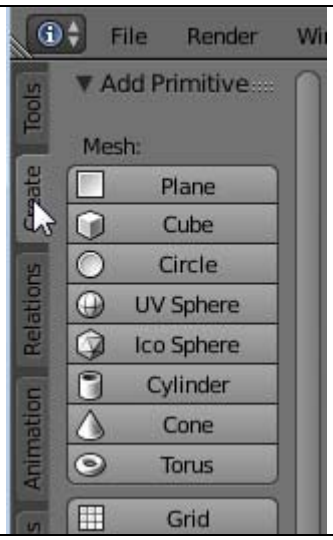
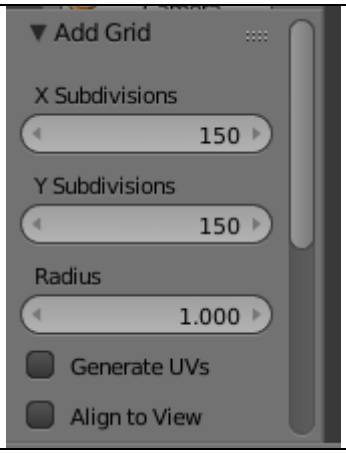
Set Up the Workspace

Complete these steps to delete the cube that Blender automatically adds to new projects. When you're done, you'll have an empty Blender workspace.

1. On the Start menu, left-click All Programs, left-click Blender Foundation, left-click Blender, and then left-click Blender again.	
2.Make sure you are in Object Mode.	
3.Right-click the cube to select it.	
4.Press the X key.	
5.Left-click Erase Selected Object.	

Add a Grid

Complete these steps to add a grid. This will help you create your terrain.

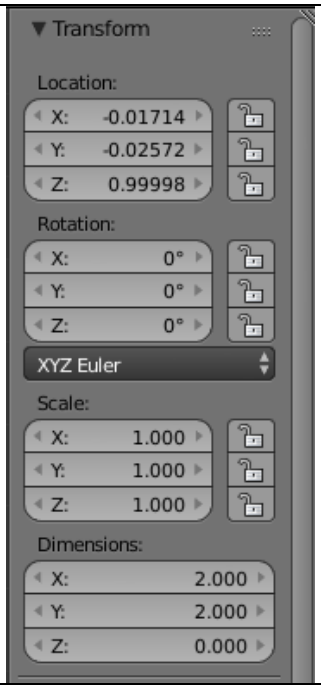
1.At the top of the 3D View window, left-click the Create Tab from Add Primitive and then left-click Grid.	
2.Left-click X res and type 150. This adds 300 vertices along the X-axis. Press ENTER. 3.Left-click Y res and type 150. This adds 300 vertices along the Y-axis. Press ENTER.	
4.Left-click OK.	
5.If Blender slows down too much on your computer, you may want to set the X and Y res to 100 or less.	

Transform Properties Panel

You can use the **Transform Properties Panel** to change the position, spin, and size of your 3D objects.

When you know exactly how much you want to translate, rotate, or scale a 3D object, you can type those numbers into this panel.

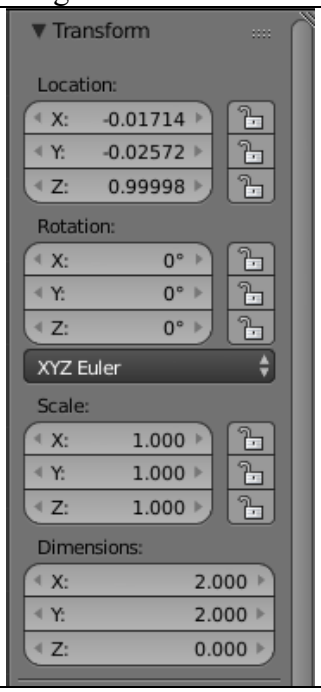
If you have the Transform Properties Panel open, it will update those numbers automatically when you use the 3D Transform Manipulator to modify the object.

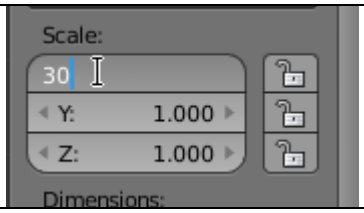
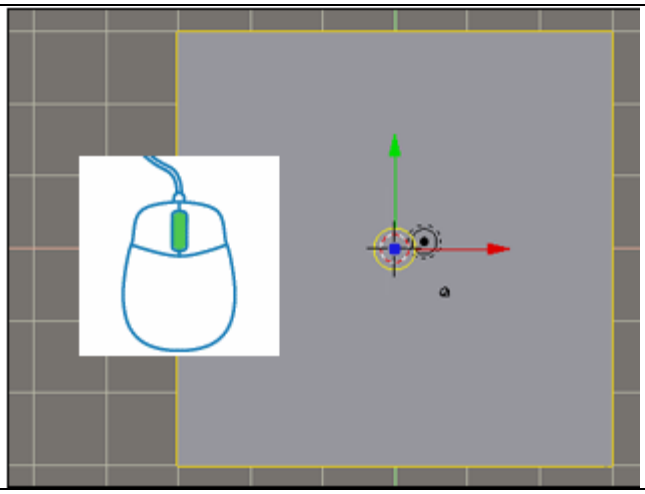


Scale the Grid

Complete these steps to increase the size of the grid.

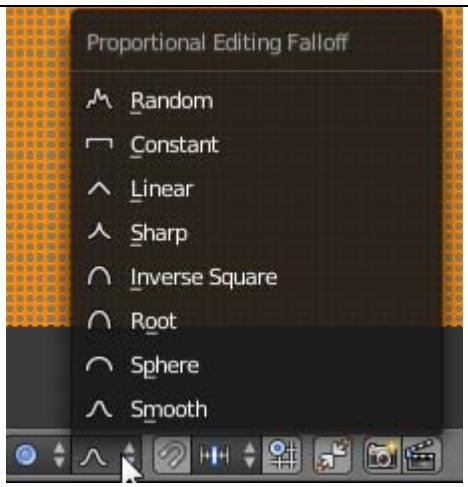
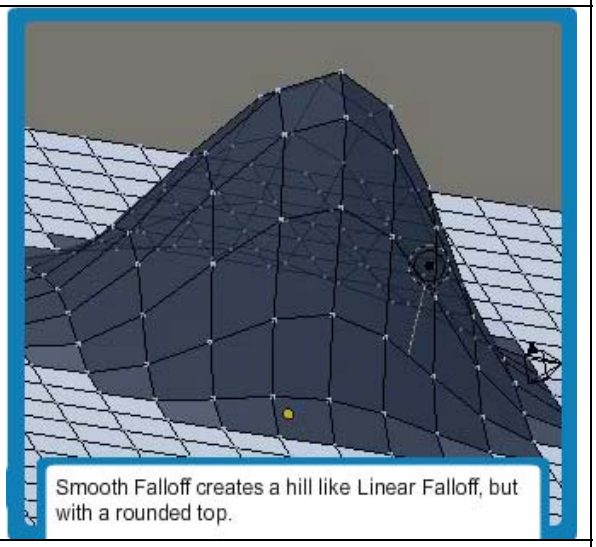
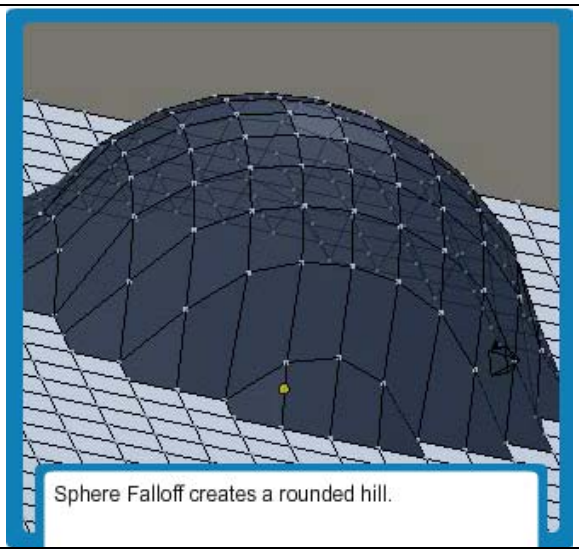
1.Press the N key to open the Transform Properties panel.

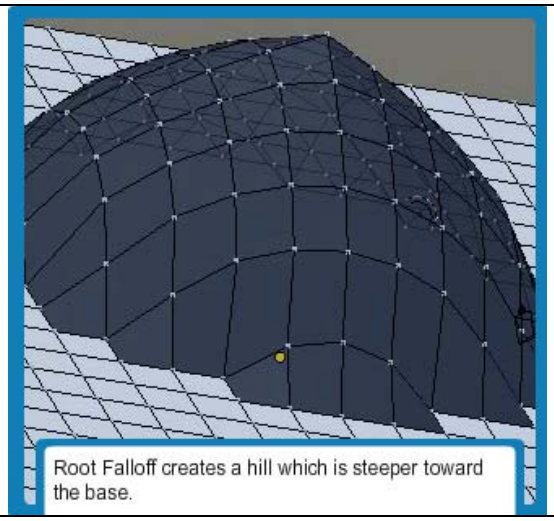
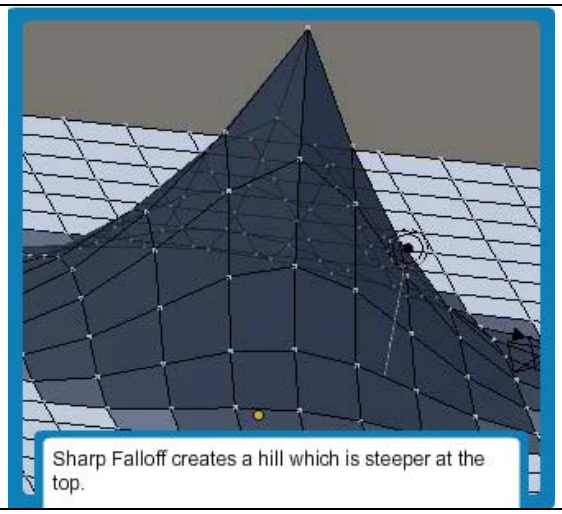
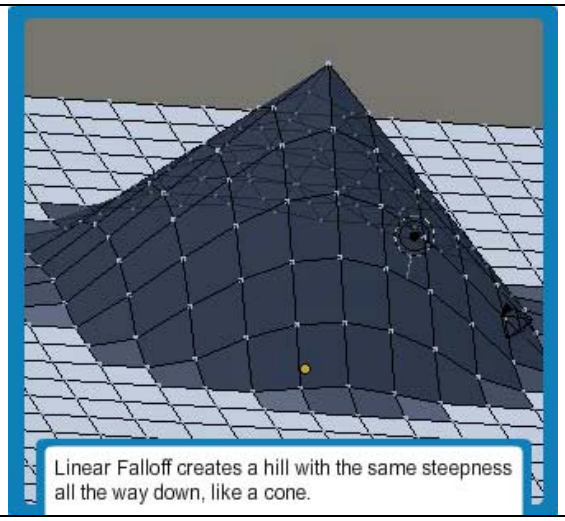


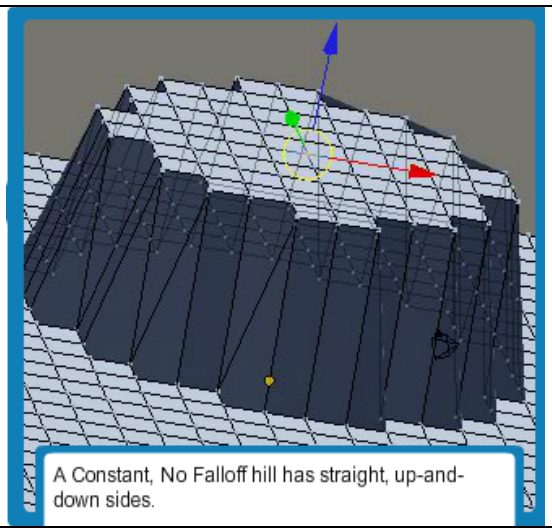
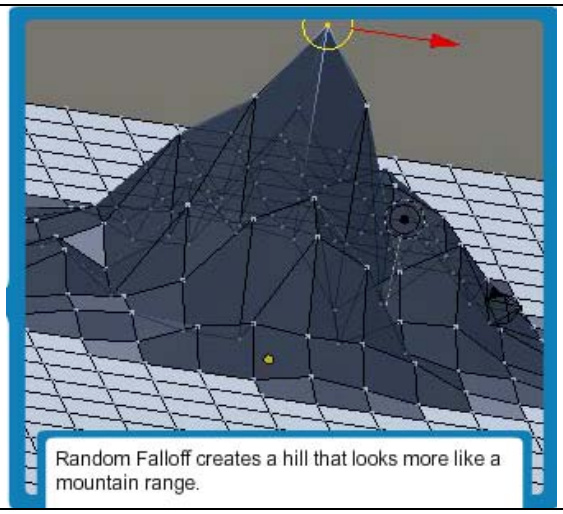
2.Left-click ScaleX and type 30 to increase the size of the grid along the X-axis.	
3.Left-click ScaleY and type 30 to increase the size of the grid along the Y-axis.	
4. Press the N key again to close it.	
5.Rotate the mouse scroll wheel downward to zoom out until you can see the entire grid.	

Proportional Edit

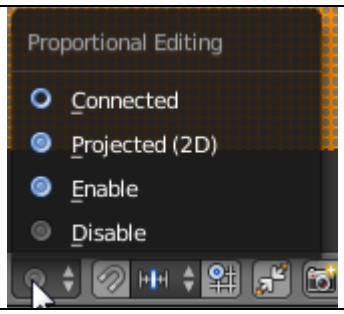
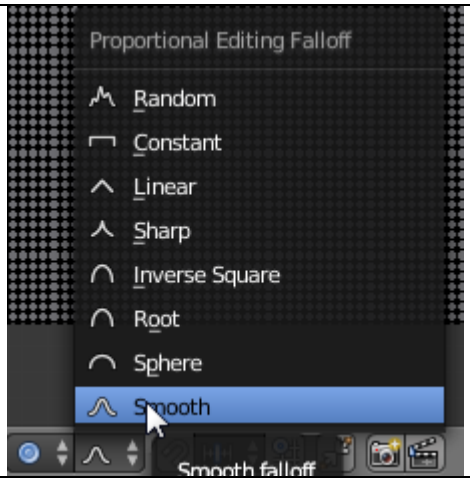
Falloff

The Falloff setting controls how the vertices inside the Proportional Edit circle behave. Falloff controls the type of curve created when you move a vertex. The types of fall off are listed with examples below.	
Smooth Falloff	
Sphere Falloff	

Root Falloff	
Inverse Square Falloff	
Sharp Falloff	
Linear Falloff	

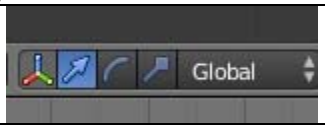
Constant, No Falloff	
Random Falloff	

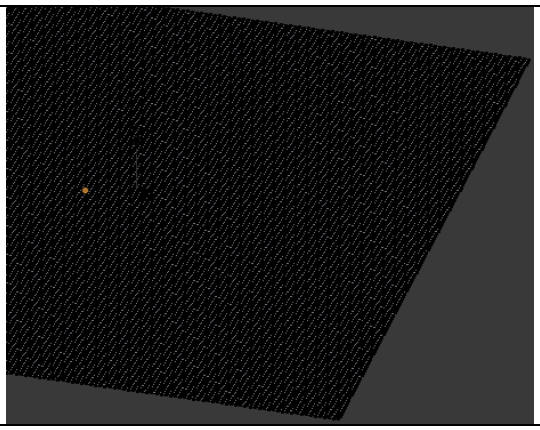
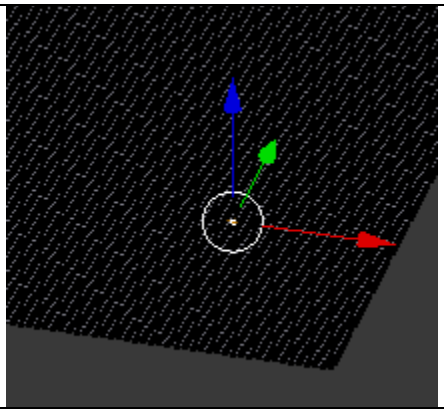
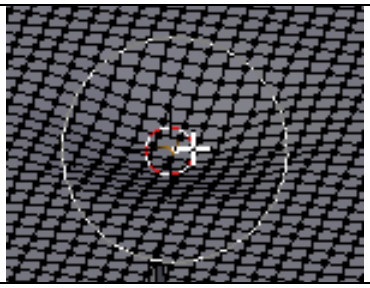
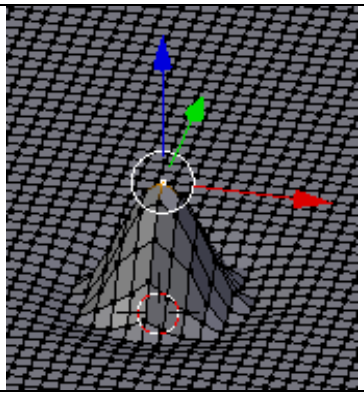
Turn on Proportional Edit	
Complete these steps to turn on the Proportional Edit tool.	
1.Make sure the grid is selected. If not, right-click the plane to select it.	
2.Press TAB to switch to Edit Mode.	

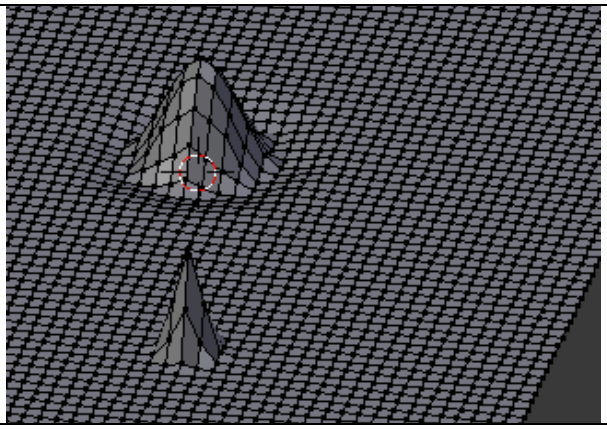
3.Left-click the Proportional button and left-click On. The button should now be blue.	
4.Left-click the Proportional Edit Falloff button and left-click Smooth Falloff. TIP: Try different Falloff options to see which ones you like best.	
5.Press the A key to deselect everything.	

Make a Hill

Complete these steps to add a hill to the grid.

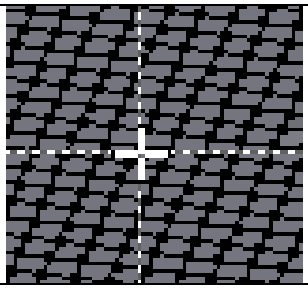
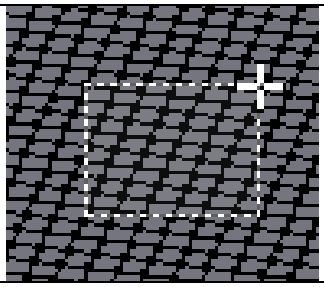
1.Make sure the Translate Manipulator Mode button is turned on. If not, left-click it.	

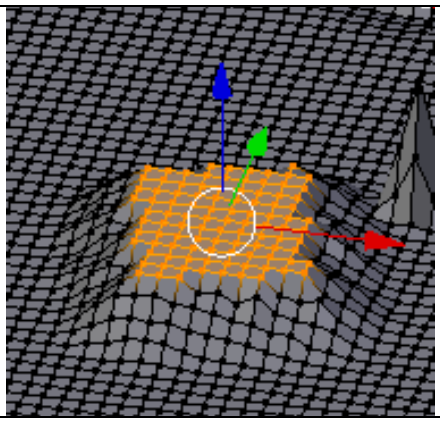
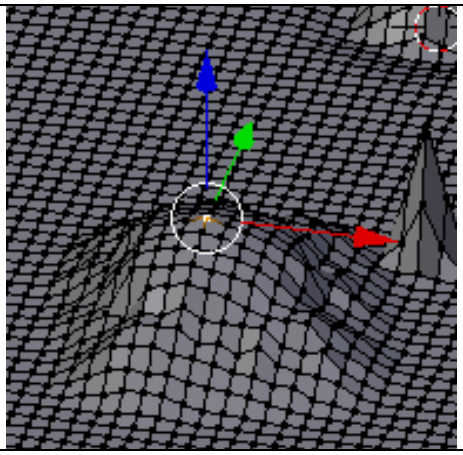
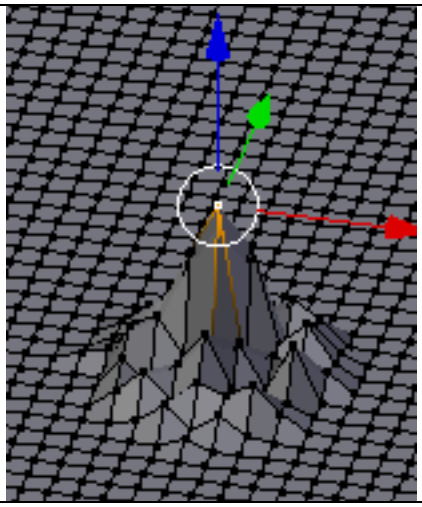
2.Pan down around the grid so that you're not looking at it from straight up. Look at the example if you need help.	
3.Right-click a vertex and left-click the blue Z-axis translate arrow. Move the mouse to increase and decrease the hill's height.	
4.Hold the left mouse button down and at the same time scroll the mouse wheel downward to increase the area changed by the proportional editing. Scroll the mouse wheel upward to decrease it. TIP: This step will only work if you have a vertex selected.	
5.Left-click again when you like the size of the hill.	

6.Press the A key to deselect everything.	

Make More Hills and Valleys

Complete these steps to add more hills to the grid and experiment with different Proportional Falloff types. The spaces between the hills will be valleys.

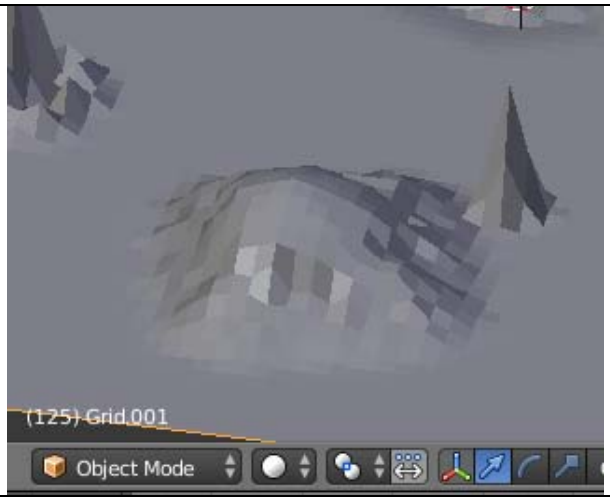
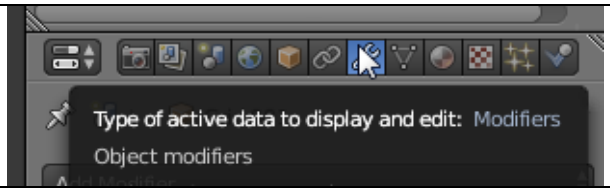
1.Press the B key to use Box Select Mode.	
2.Draw a box around some vertices.	

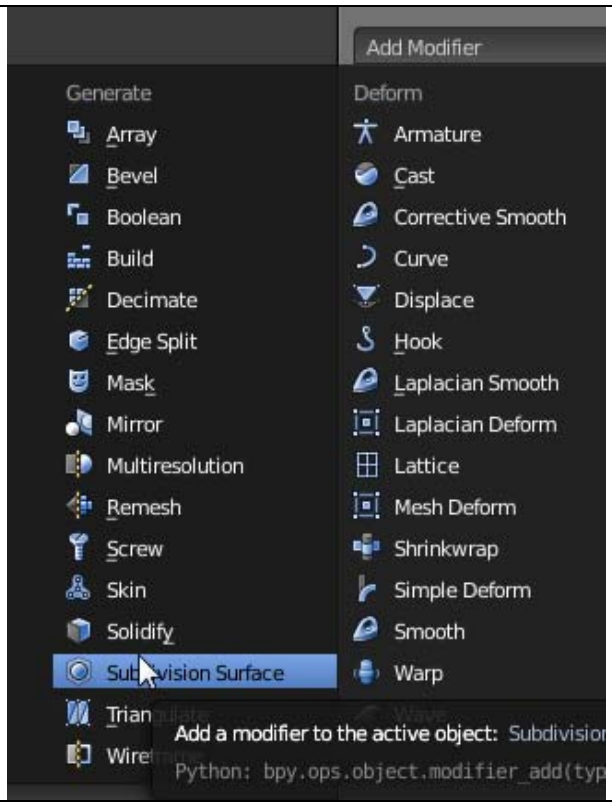
3.Right-click a vertex and left-click the blue Z-axis translate arrow. Move the mouse to increase and decrease the hill's height.	
4.Scroll the mouse wheel down to increase the area changed by the proportional editing. Scroll the mouse wheel up to decrease it.	
5.Press the A key to deselect everything.	
6.Left-click the Proportional Edit Falloff button and left-click a different Falloff type.	
7.Repeat this process until there are several hills on the	

grid.	

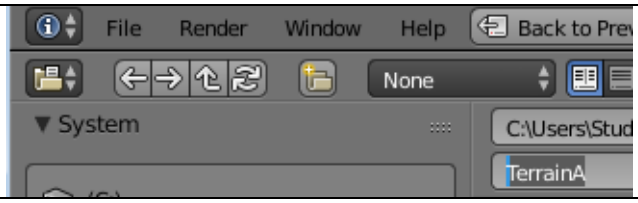
Smooth the Hills

Complete these steps to make the hills smoother.

1.Press TAB to switch to Object Mode.	
2.At the Buttons too bar, left-click the Modifiers button.	

3.In the Modifiers mini-window, left-click Add Modifier and left-click Subsurf. Your hills will look smoother.	

Save Your Terrain

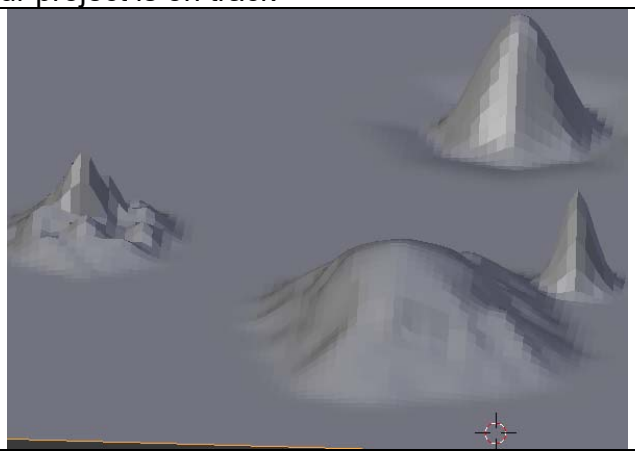
1.On the File menu, click Save As, and then name the project terrain.	

Check Your Work

Complete the steps below to make sure your project is on track

1. Are you happy with how the grid looks? If not, add some more hills or change the height of the hills you have. You may want to remove the Subsurf modifier first by clicking on the X in the top right corner of that mini-window.

2. When you're done making changes, save your project.



SUMMARY

In this lab, you:

- Added a grid with lots of vertices.
- Made the grid much larger using the Transform Properties Panel.
- Used Proportional Edit and Falloff with selected vertices to create hills and valleys.
- Smoothed the hills with the Subsurf modifier.

Lab 2 Introduction

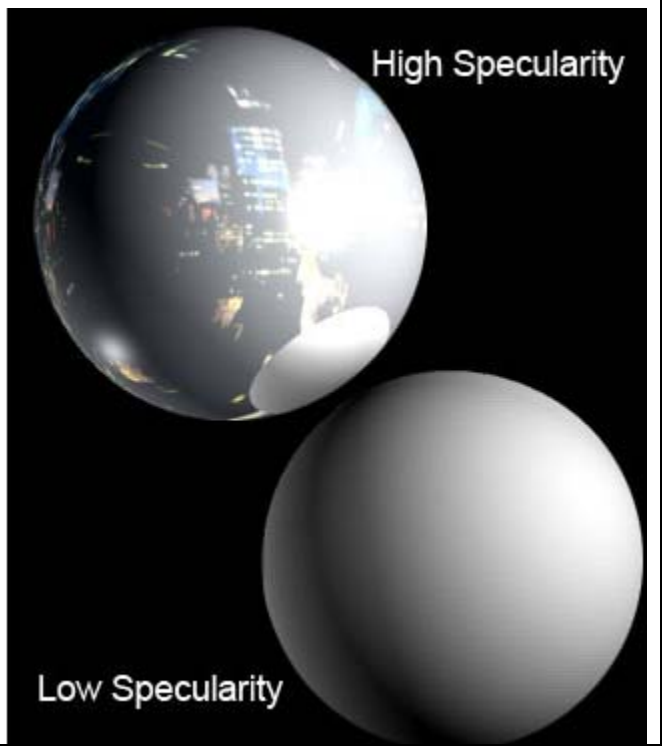
In this lab, you'll add grass and dirt to the landscape.

Specularity

Specularity is how reflective an object is. For example, a mirror has a high specularity because it reflects a lot of light.

In Blender, you can use specularity to control how much light is reflected back from an object. You can also change the color of the light that's reflected from an object.

On the next screen, you'll change the specularity of the hills' material.

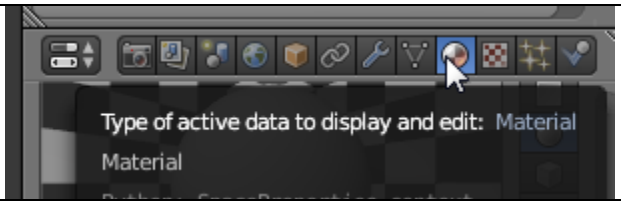


Add a Material to the Hills

Complete these steps to add a material to the hilly grid and make it unreflective.

1.At the right select Buttons Too Bar, left-click the Material button.

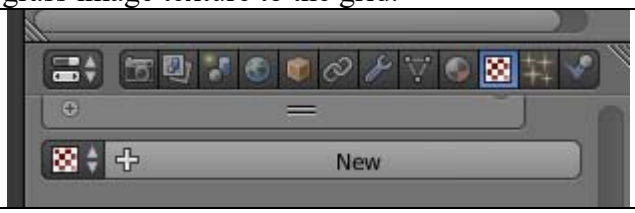
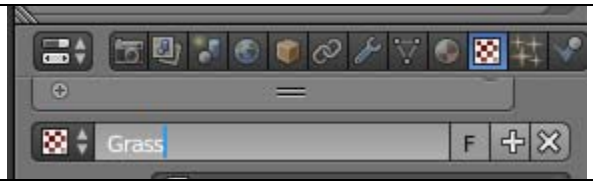
2.Make sure that the Material Buttons button is selected. If not, left-click to select it.

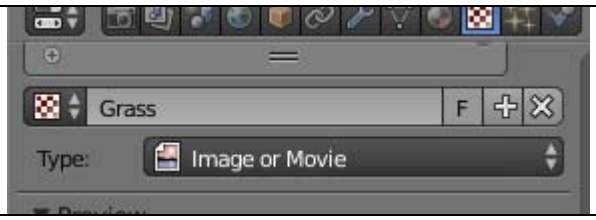
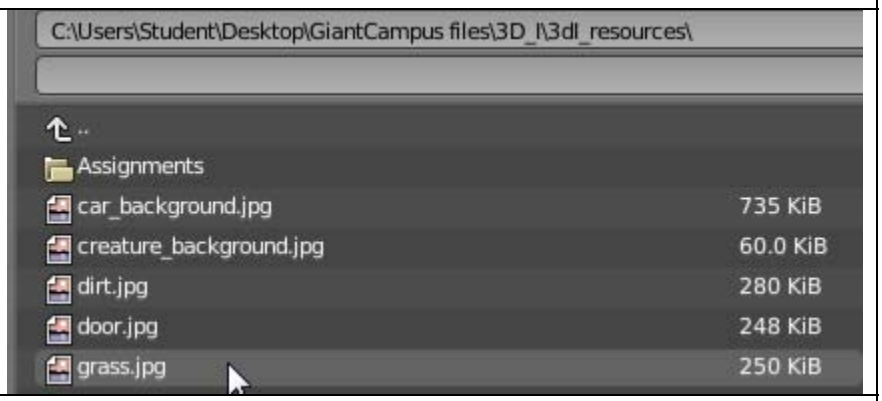


3.In the mini-window, left-click Add New.	
4.In the Material mini-window, left-click the arrow beside SPECULAR button to change the new material's Specular value.	
5.Left-click and make the R, G, and B values 0.	

Add a Grass Texture to the Hills

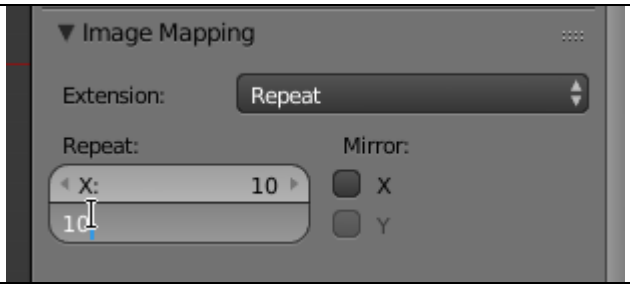
Complete these steps to add a grass image texture to the grid.

1.Select the Texture tool, left-click Add New.	
2.Left-click TE:Tex.001 and type Grass. Press ENTER.	
3.At the top of the Buttons window, left-click the Texture Buttons button. TIP: You can press the F6 key to get to the Texture panel quickly.	

4.In the Texture mini-window, left-click the Texture Type drop-down list and then left-click Image.	
5.In the Image mini-window, left-click Open.	
6.Left-click grass.jpg.	
7.Left-click SELECT IMAGE.	

Change Grass Texture Settings

Complete these steps to make the grass texture more detailed.

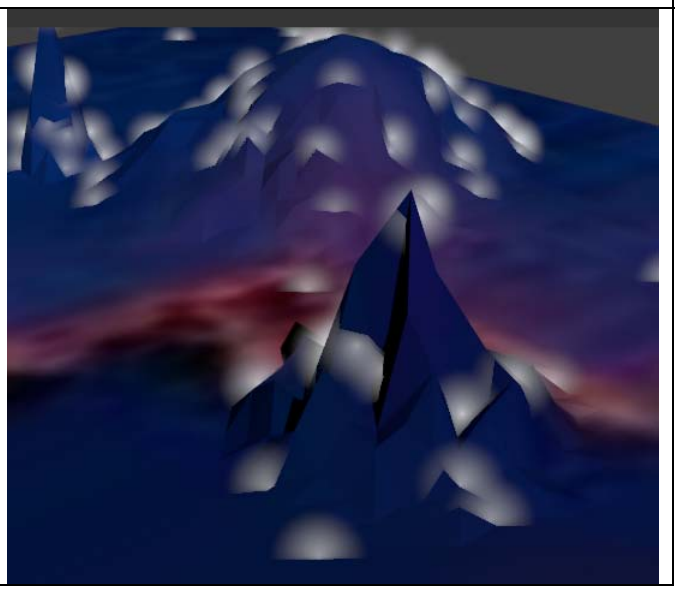
1.In the Map Image mini-window, left-click the Normal Ma button. This makes the image use RGB values.	
2.In the Map Image mini-window, left-click Xrepeat and type 10. Press ENTER. 3.In the Map Image mini-window, left-click Yrepeat and type 10. Press ENTER.	

Check Your Work

Complete the steps below to make sure your project is on track.

1. Are you happy with how the landscape textures look? If not, you can change the Stencil texture to a different texture type.

2. When you're done making changes, save your project.



SUMMARY

In this lab, you:

- Added grass and dirt textures to the terrain.
- Used a Stencil texture to change the way the grass and dirt textures layer on top of one another.

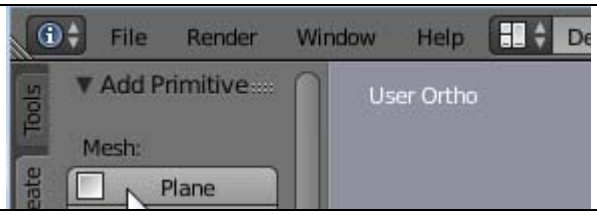
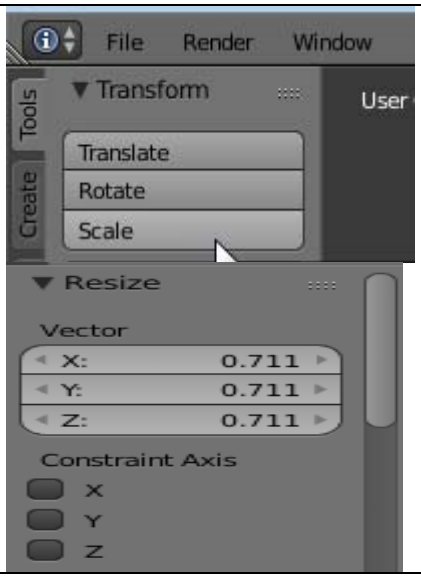
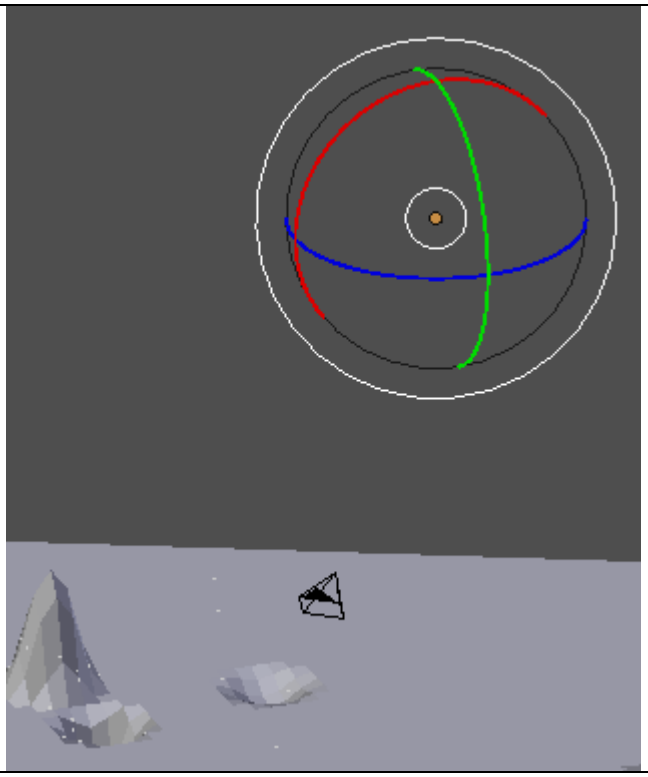
Lab 3 Introduction

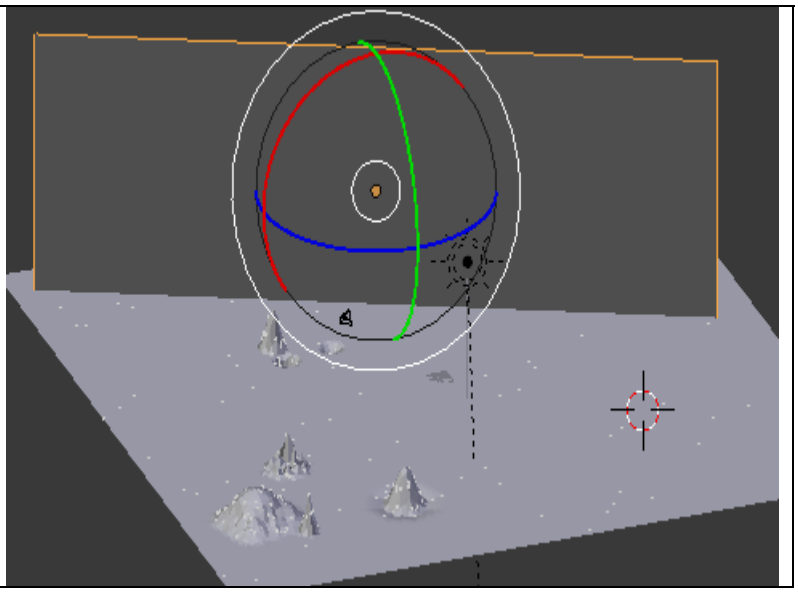
In this lab, you'll add a cloudy sky to the landscape.

Add a Plane

Complete these steps to add, resize, and position the plane that will become the sky

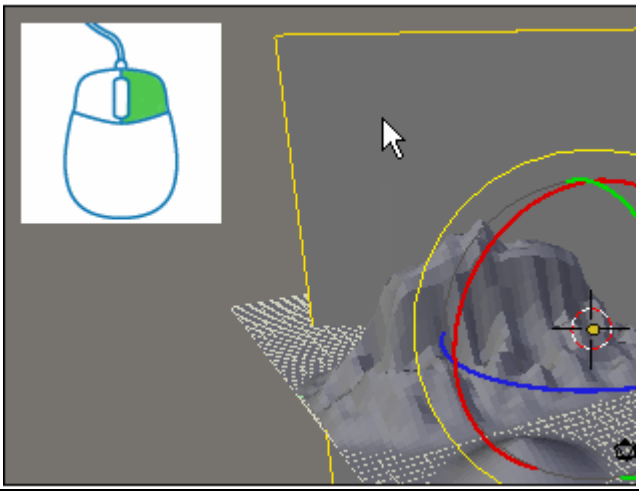
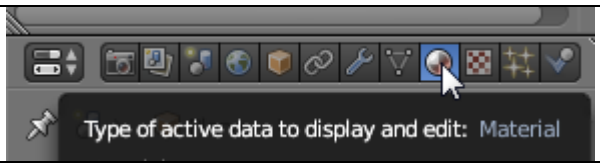
1.Make sure you're in Object Mode. If not, press TAB to switch to Object Mode.	

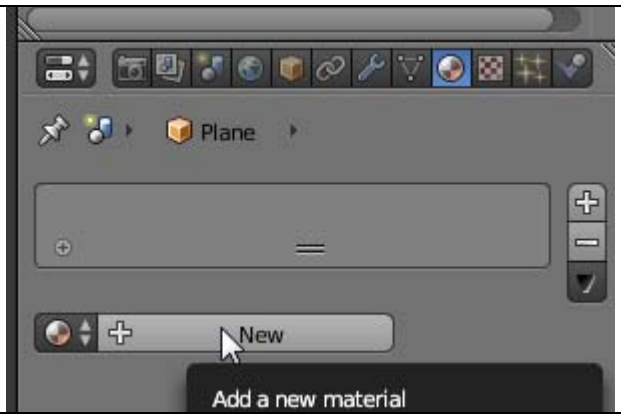
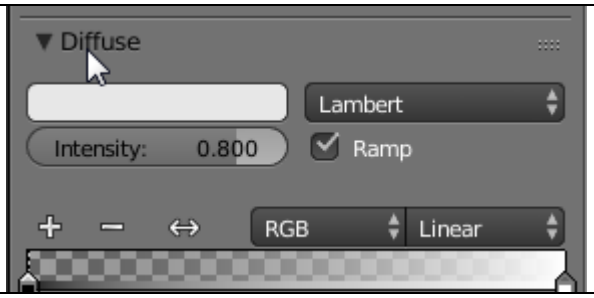
2.From the Create Tab in Add Primitive Select Plane.	
3. Select the Tools tab and scale graphically using the mouse or type in 30 for X and Y press ENTER.	
4.Left-click the Rotate Manipulator Mode button.	

5.Rotate the plane until the flat surface of the plane is lined up with the Z-axis.	

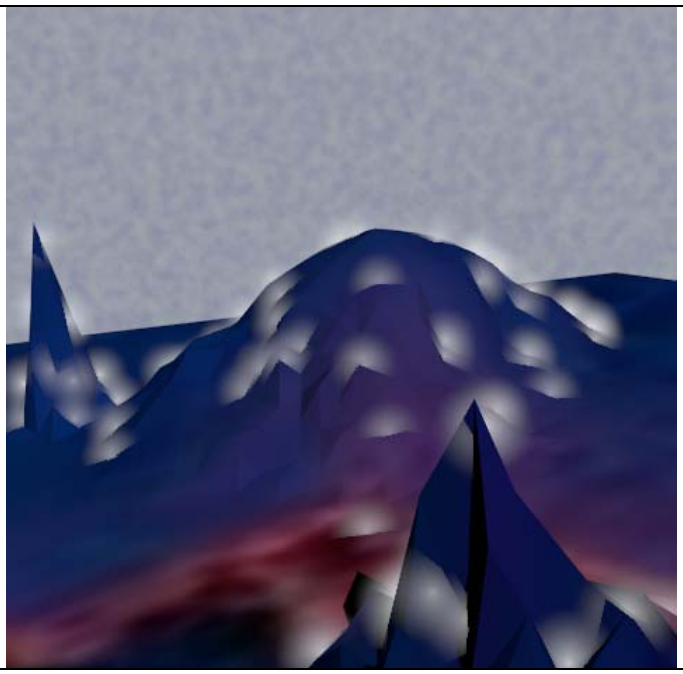
Color the Sky

Complete these steps to add color and texture to the plane to make it look like a cloudy sky.

1.Make sure the new plane is selected. If not, right-click the plane to select it.	
2.Left-click the Material button.	

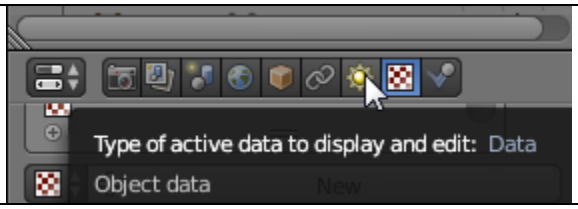
3.Left-click Add New to add a material to the plane. Name it Sky.	
4.In the Material mini-window select Diffuse of the COL button, left-click on the blank button to change the material's color.	
5.In the Color Pallette, left-click the color you'd like to use.	
6.Move the mouse pointer outside of the Color Picker to close it.	

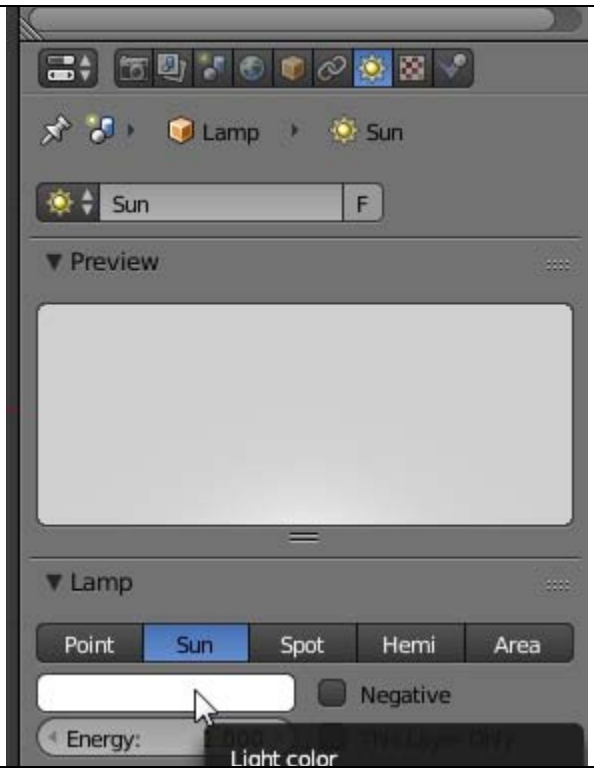
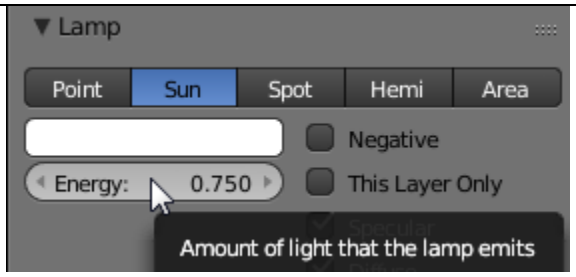
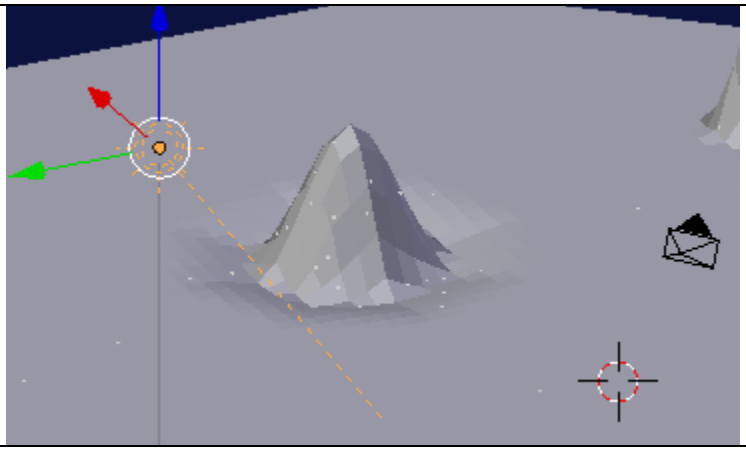
7.In the Texture mini-window, left-click Add New. Name it Sky.	
8.Left-click the Type and select Cl0ouds.	
9.Select Clouds and change any of the parameters listed eg. Grayscale or Color.	

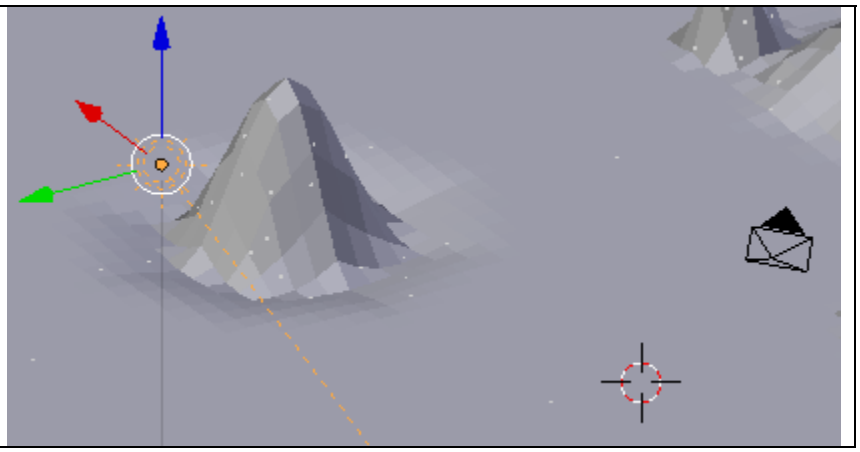
10. Now try Render > Render Image to see what you have. If you like it save it. If not change other parameters.	

Add a Sun or Change Your Lamp to a Sun

Complete these steps to add a sun lamp to light the landscape.

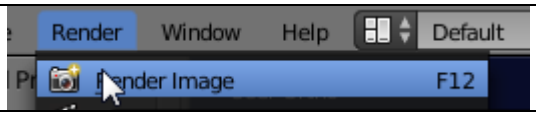
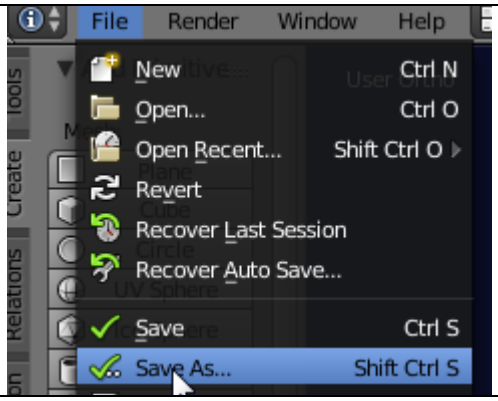
1.Make sure you're in Object Mode. If not, press TAB to switch to Object Mode.	
2.Right click on your Lamp, and make it a sun. or	

Add a new light source Sun. Note: You can change your sun to any color and increase or decrease the Energy of your sun. Try it.	
3.At the top of the Buttons window, left-click the Lamp Buttons button. 4.In the Lamp mini-window, left-click Energy and type .75. Press ENTER. This will decrase the brightness of the sun.	
5.Left-click the Translate Manipulator Mode button.	

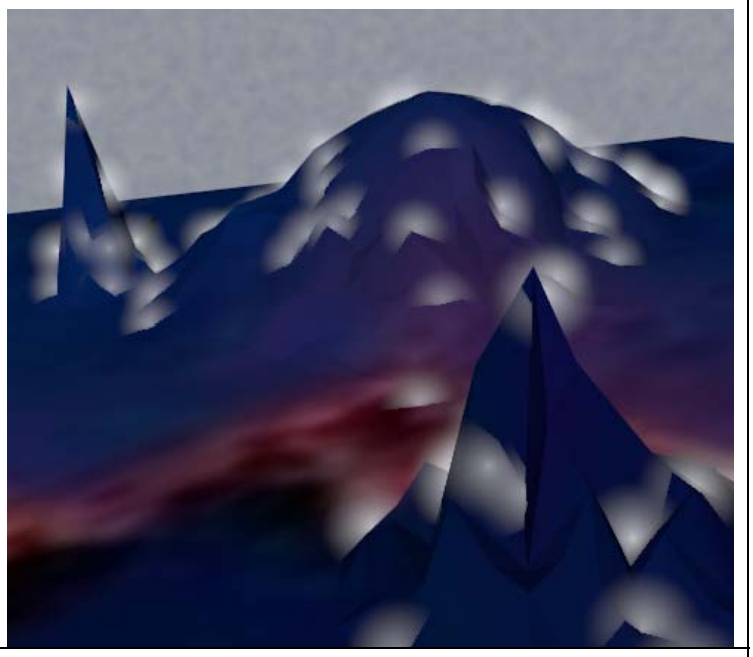
6.Move the sun up along the Z-axis until it's out of the camera's view.	

Render the Image

Complete these steps to render the image and save the file with a new name.

1.At the top of the 3D View window, left-click Render > Render Image.	
2.At the top of the 3D View window, left-click File and left-click Save As.	
3.Name the file as a new file name sunny_terrain. Do not save over the terrain.blend file.	

Check Your Work

Complete the steps below to make sure your project is on track. 1. Do you like how the sky looks? If not, change the marble texture settings and color. You can also try a different texture type. 2. Did you like how the landscape rendered? If not, move the camera and render again. 3. When you're done making changes, save your project.	

Summary

In this lab, you:

- Added a plane, made it bigger, and moved it into place to become your landscape's sky.
- Added color and texture to the plane to make it look more like a cloudy sky.
- Added a sun lamp to the project to add natural-looking light.

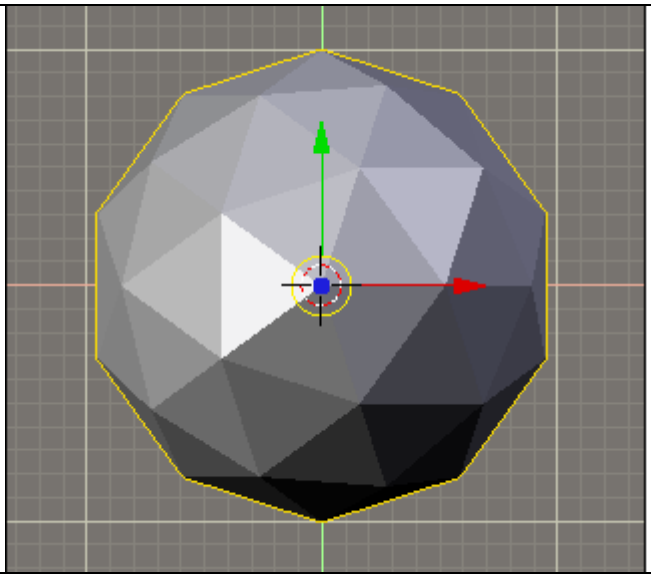
Lab 4 Introduction

In this lab, you'll create a moon for the landscape.

IcoSphere

An **IcoSphere** is a sphere made up of triangles.

It's one of the standard mesh objects that Blender provides for you.

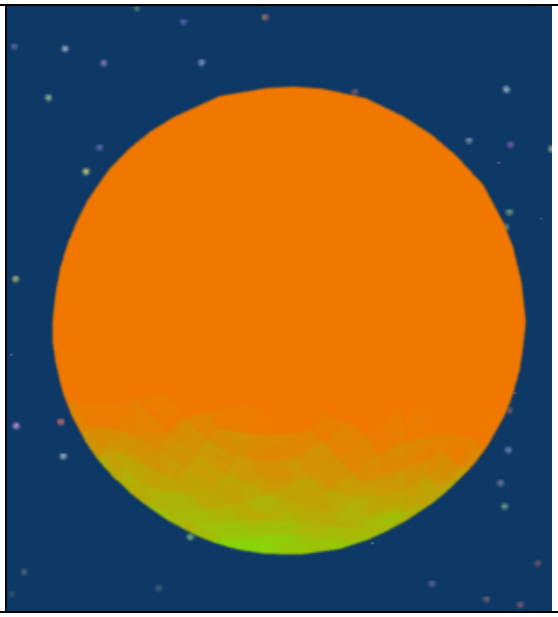


Transparency Button

The **ZTransparency** button makes materials transparent so that light can shine through them.

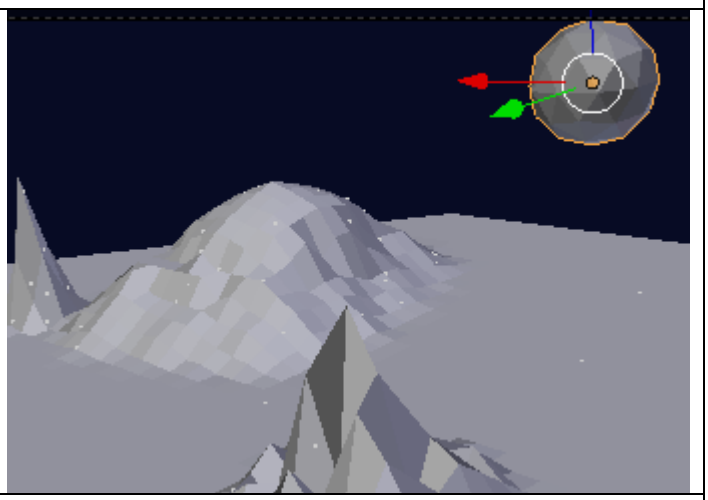
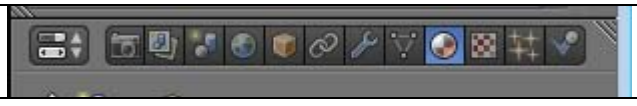
You'll use the Ztransparency button when you want to create objects that glow.

You'll use it to create a glowing moon on the next screen.



Add a Moon

Complete these steps to add the sphere for the moon and make it glow.

1.Open the terrain.blend file.	
2.From the Create Tab select IcoSphere from the list of Add Primitive and click OK.	
3.Move the IcoSphere up along the Z-axis until it's above the landscape and in view of your camera. Set your view to Camera to make sure you can see the IcoSphere.	
4.Click the Material Buttons button.	

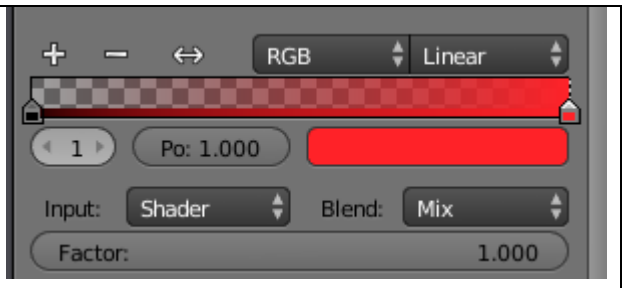
5.In the Properties Editor, left-click Add New.	
6. Name it Moon.	
7.Select the arrow next to Transparency and check Transparency to turn on the option.	

Ramps

The **Ramps** mini-window lets you add a color gradient to a material.

A **color gradient** is a gradual change from one color to another. A rainbow is an example of something which has a lot of color gradients, as it goes from red to violet.

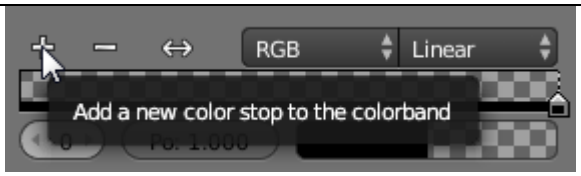
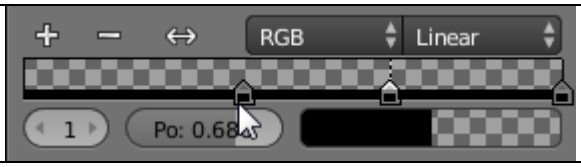
Colorband

The **Colorband** is the way that Blender represents color gradients. It's also the tool you'll use to create color gradients. The black and white lines are position markers which you'll use to set specific colors in the Colorband gradient. There are two in the example, at the right and left ends of the Colorband. You'll use the Colorband to create things like planets and tie-dyed cloth.	

Set Up the Colorband

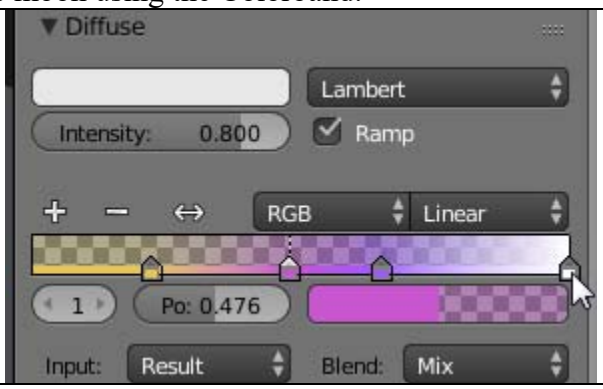
Complete these steps to set up the Colorband so you can add color to the moon.

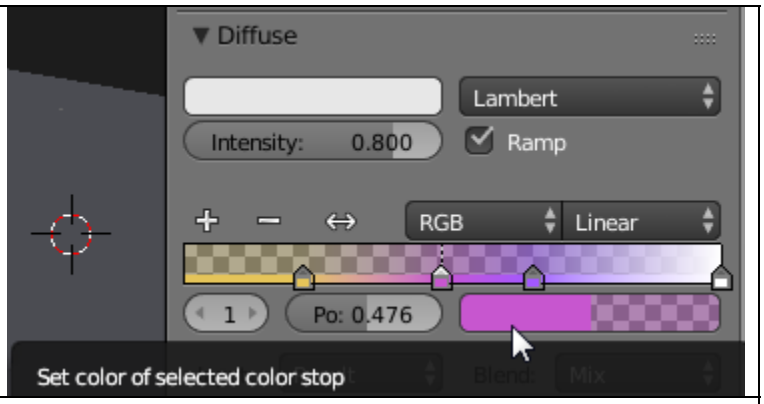
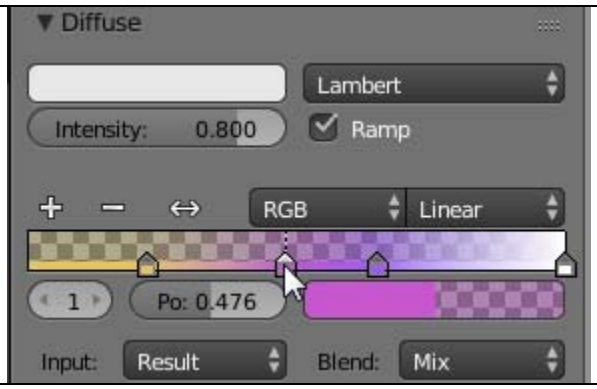
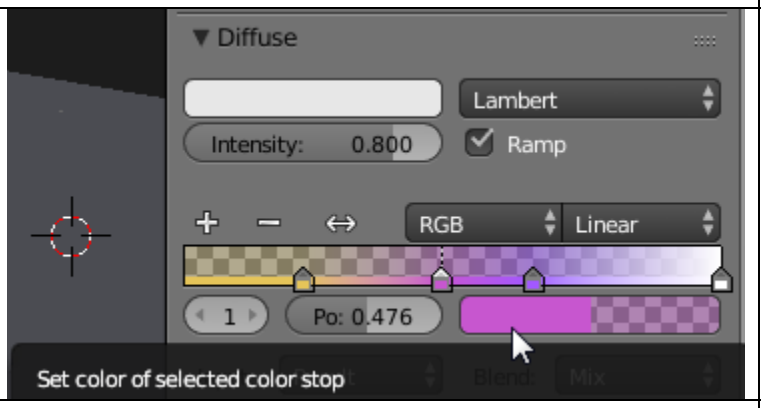
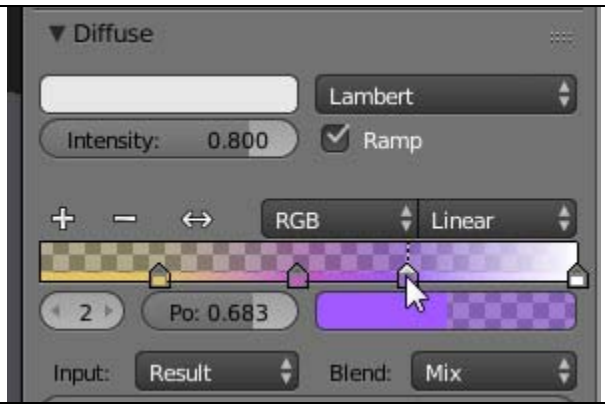
1.Left-click the Ramps option in the Diffuse Properties Editor to create a band of colors.	
2.Left-click Colorband to create a band of colors.	
3.Left-click the Input drop-down list and left-click Result. This will show you what the Colorband will look like when you render.	

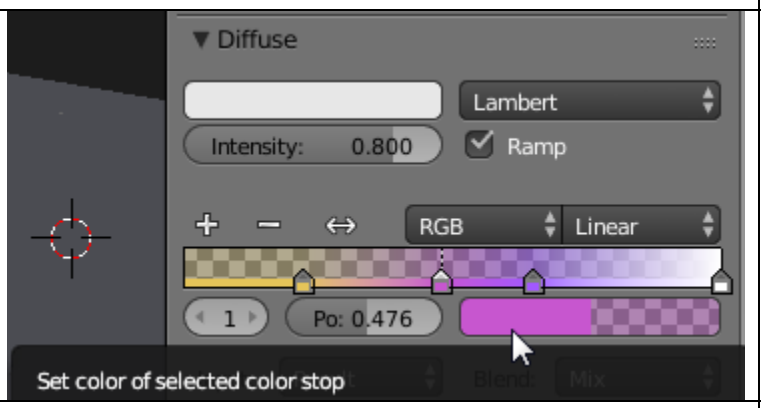
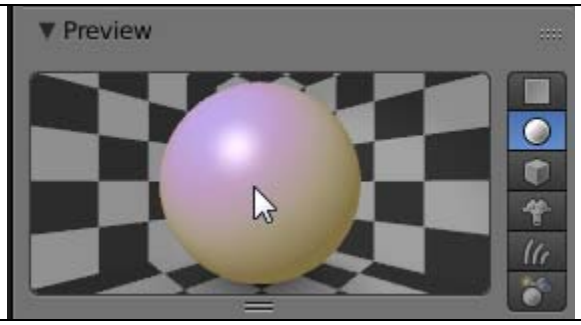
4.In the Ramps Properties Editor, on the right of the Colorband button, left-click the Del button to delete the colors there.	
5.Left-click and drag the position marker toward the left end of the Colorband.	
6.Left-click the Add button. Another dotted position marker will appear in the Colorband. TIP: When position markers are unselected, they look half white and half black.	
7.Left-click and drag the new position marker toward the right end of the Colorband.	
8.Left-click the Add button. Another dotted position marker will appear in the Colorband.	

Create a Colorband for the Moon

Complete these steps to add color to the moon using the Colorband.

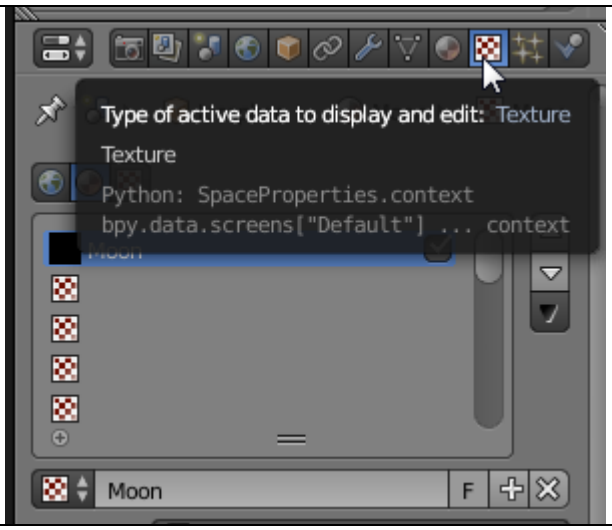
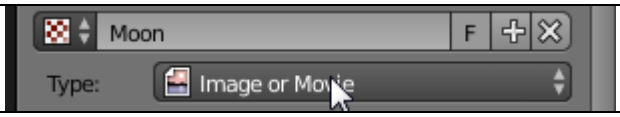
1.Left-click the left position marker to select it. It will become a black and white dotted line.	

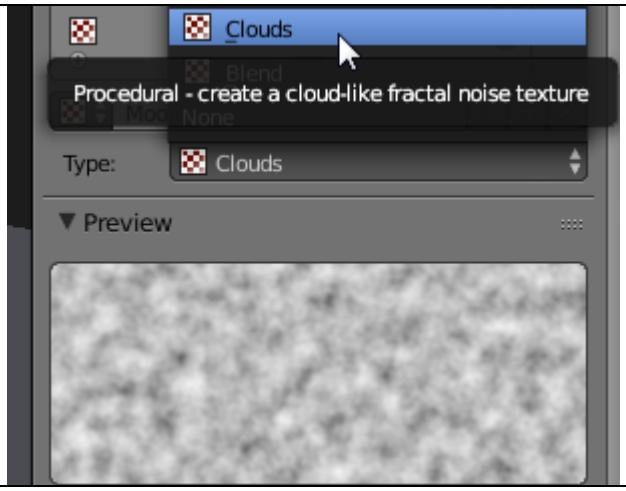
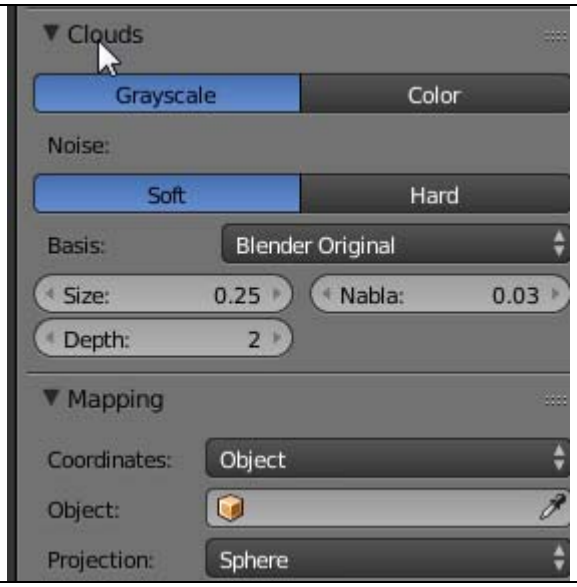
2.Under the Pos button, left-click the blank color button to open the Color Picker. Left-click a color that you like.	
3.Left-click the center position marker to select it.	
4.Use the Color Picker to pick a different color.	
5.Left-click the right position marker to select it.	

6.Use the Color Picker to pick a third color.	
7.Change the colors for the three or more position markers until you like how they look in the Preview mini-window.	

Add a Texture to the Moon

Complete these steps to add a texture to the moon.

1.Use the Texture tool to add a texture to the moon, left-click Add New. Name it Moon.	
2.At the top of the Buttons window, left-click the Texture Buttons button.	

3.Left-click the Texture Type drop-down list, and left-click Clouds. TIP: You can pick another texture that you like better.	
4.Try some of the Properties in the Cloud properties list and Render > Render Image. See what you like.	

Smooth the Moon

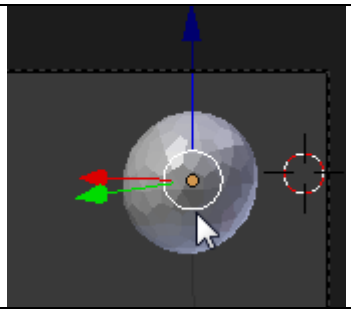
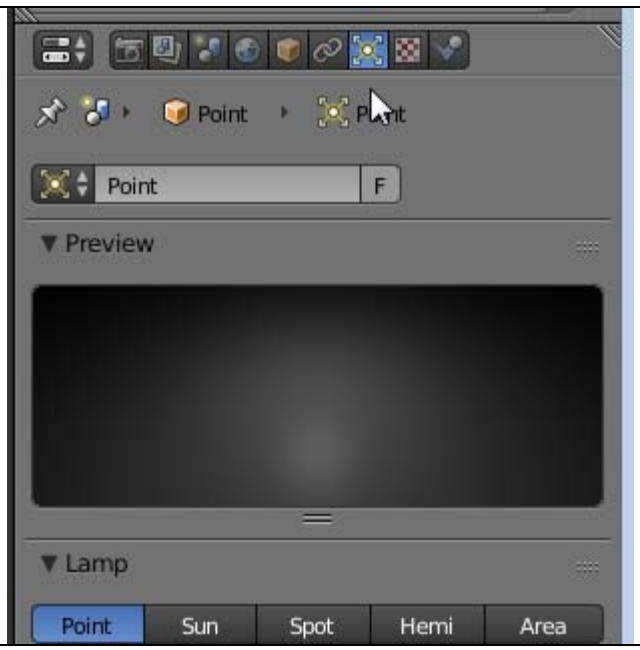
Complete these steps to add a Subsurf modifier to make the moon smoother.

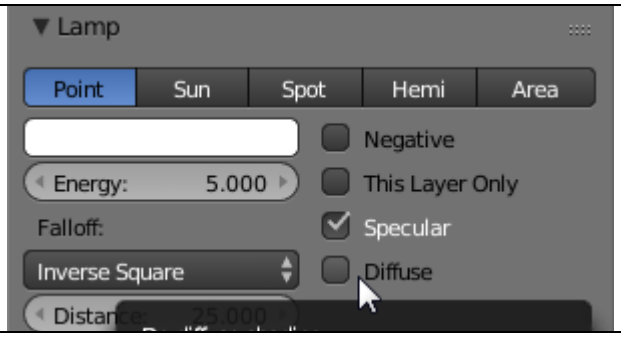
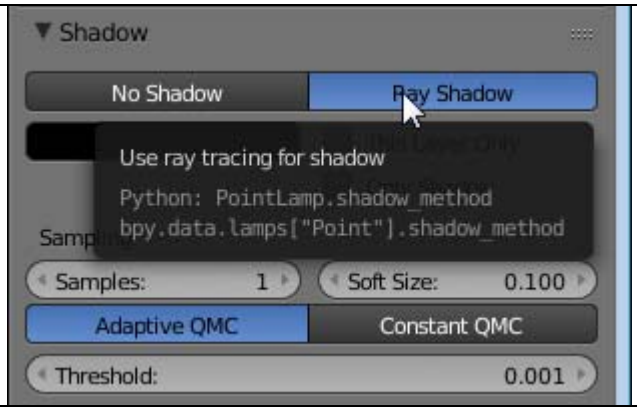
1.Now select the Modifier tool.	
2.In the Modifiers mini-window, left-click	

Add Modifier and left-click Subdivision Surface.	
3.Press the A key to deselect everything.	

Add a Light Inside the Moon

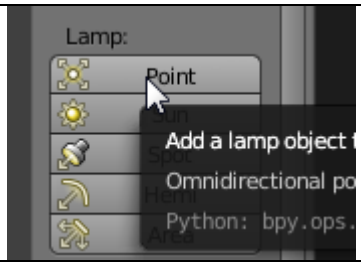
Complete these steps to make the moon shine.

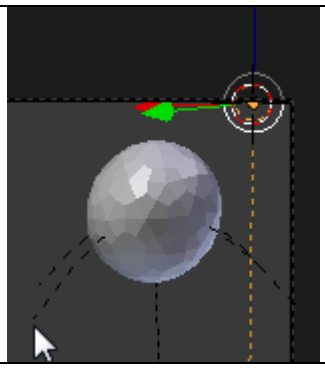
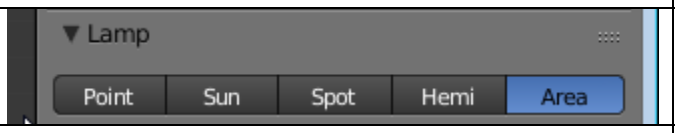
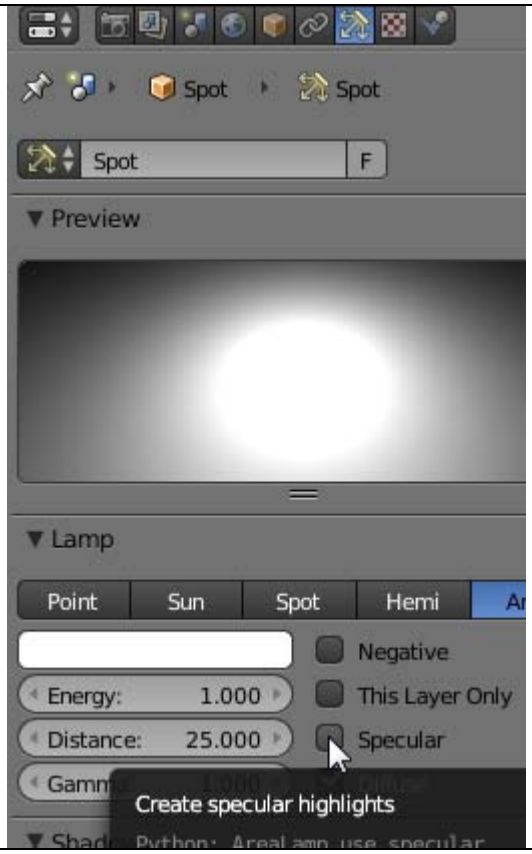
1. Select the Create Tab to Add Primitive Lamp then select a Lamp.	
2.Left-click the Translate Manipulator Mode button and move the lamp inside the sphere. TIP: Pan around the moon to make sure the new lamp is inside it.	
3.At the top of the Buttons window, left-click the Shading button and left-click the Lamp Buttons button.	

4.In the Lamp mini-window, left-click No Diffuse. This will let the light shine through the surface of the moon.	
5.In the Shadow and Spot mini-window, left-click Ray Shadow. This will make more realistic looking shadows.	
Note: Try Different Lamps and increase the Energy. Then Render > Render Image to see what you have. When you are satisified save the file.	

Add a Light Outside the Moon

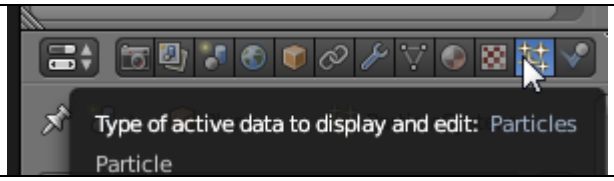
Complete these steps to make extra light for the moon. This will make it look more like a moon.

1.From the Create Tab list Add Primitive click Add a Lamp.	

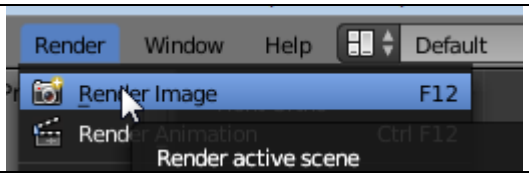
2.Move the new lamp right next to the sphere.	
3.Select your Lamp Type	
4.In the Lamp mini-window, left-click No Specular. This will keep the light from shining off the moon or terrain.	

LAB 5 - Option

Add Stars

1.Select the Particles button eft-click it.	
2.Left-click the World Buttons button. This panel will let you add background color and stars to the whole 3D environment.	
3.In the Mist/Stars/Physics mini-window, left-click the Stars button. This will add stars to the 3D background.	
4.In the Mist/Stars/Physics mini-window, left-click StarDist and type 8. Press ENTER. This will increase the number of stars.	
5.In the Mist/Stars/Physics mini-window, left-click Size and type 1. Press ENTER. This will add stars of different sizes.	
6.In the Mist/Stars/Physics mini-window, left-click and drag the Colnoise slider. This will add colored stars.	
7.Change these settings until you like how the stars look. You'll render the scene on the next page.	

Render the Image

1.At the top of the 3D View window, left-click Render > Render Image.	
2.At the top of the 3D View window, left-click File	

and left-click Save As.	
3.Name the file moon_terrain.	

Check Your Work

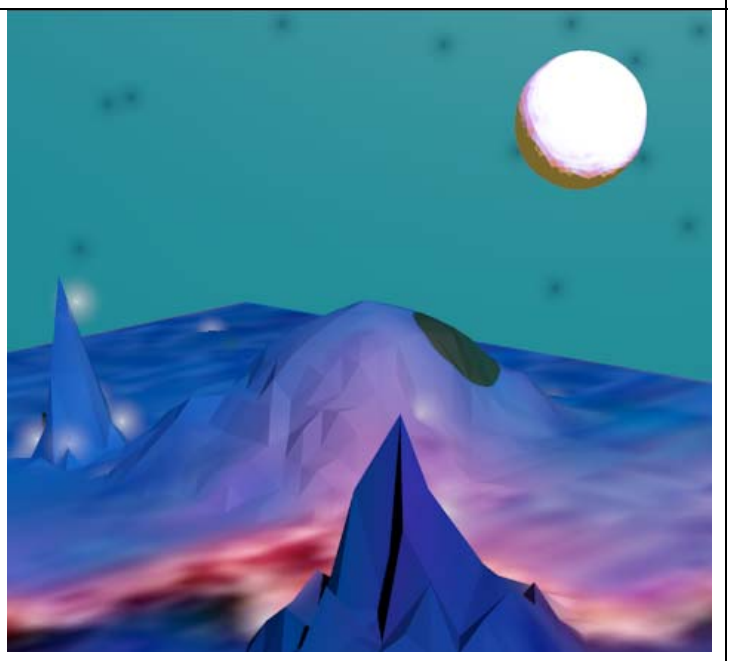
Complete the steps below to make sure your project is on track.

1. Do you like how the moon looks? If not, you can change its Colorband settings to give it different colors. You can also change the texture type of the moon to something else.

2. Do you like how the sky looks? If not, you can change the Star settings on the World Buttons panel. You can use the Color Picker in the World mini-window to change the color of the sky.

3. Did you like how the landscape rendered? If not, move the camera and render again.

4. When you're done making changes, save your project.



Summary

In this lab, you:

- Used a sphere to create a glowing moon.
- Added texture and a color gradient to the moon.
- Added stars to the sky.

Fly your Camera Around the Terrain

Use your experience from the House project.

Create a path that moves through your terrain and put the camera on it.

Project 4 – Build a Car

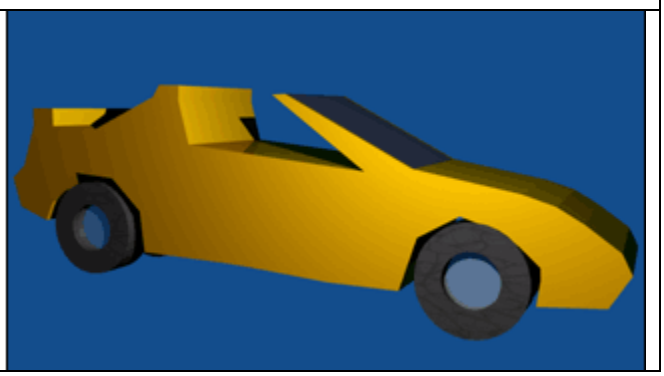
Introduction

In this project, you will:

- Make a rubber tire with a chrome hubcap.
- Build a 2D model of a car and stretch it into 3D.
- Create a windshield for the car.
- Paint the car.
- Create asphalt for the car to drive on.
- Make a movie of the car driving.

Project Preview

Here's what your car could end up looking like.

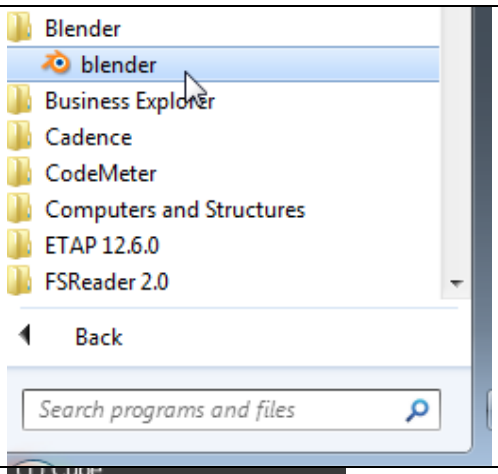
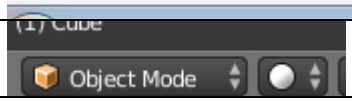
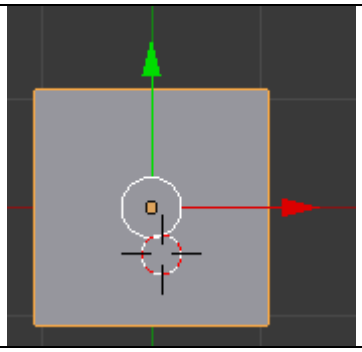
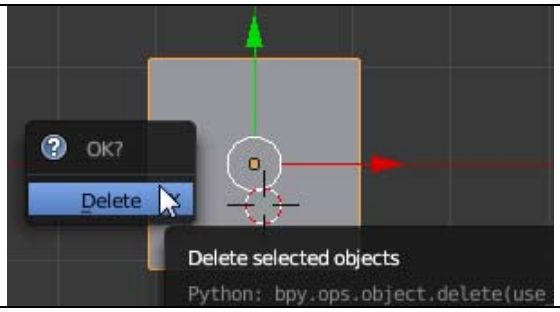


LAB 1 - Introduction

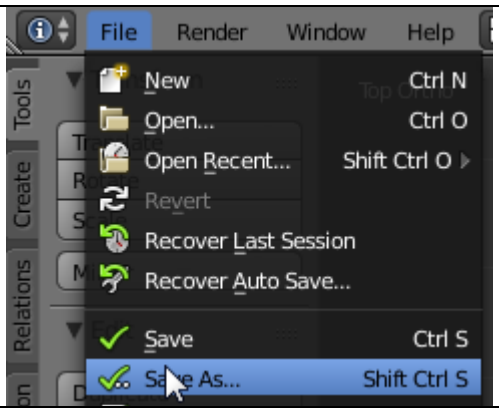
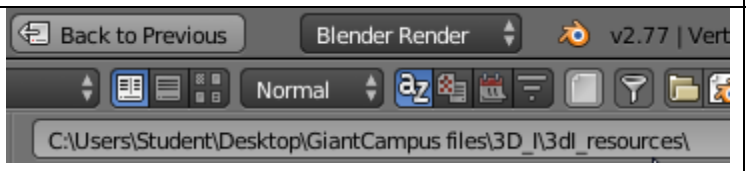
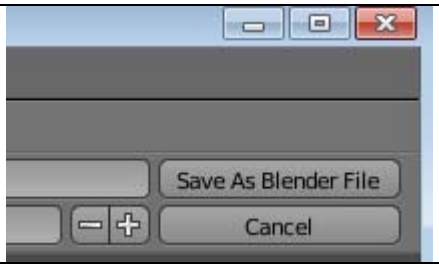
In this lab, you'll create the tire object for the car that you'll build later in this project.

Set Up the Workspac

Complete these steps to set up an empty Blender workspace.

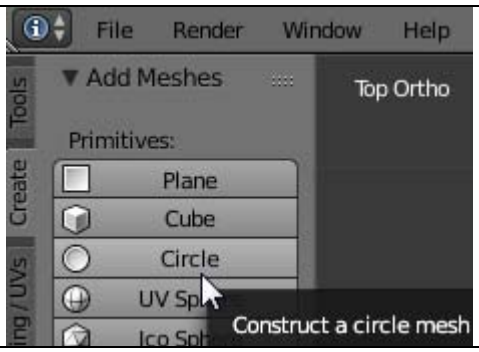
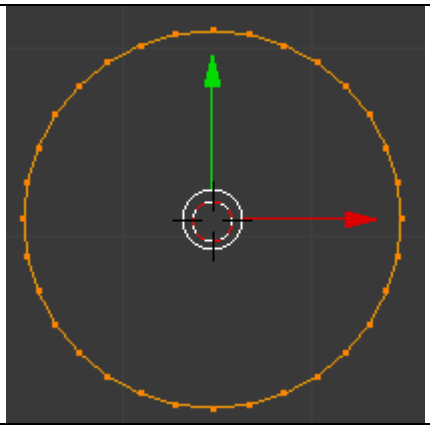
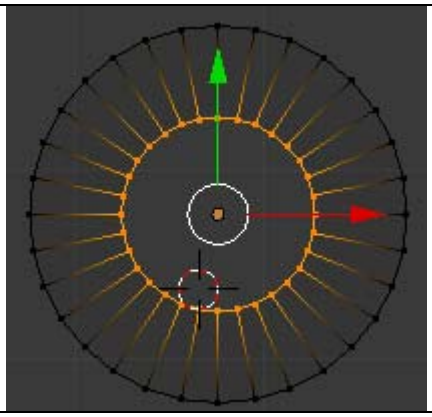
1.Open Blender.	
2.Make sure you are in Object Mode. You can also press the TAB key.	
3.Right-click the cube to select it.	
4.Press the X key.	
5.Left-click Delete Selected Object.	

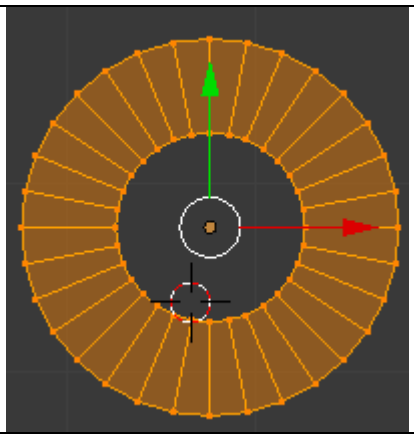
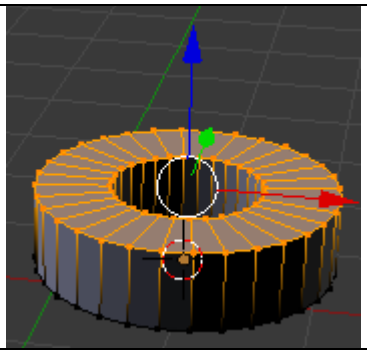
Save the Tire
Complete these steps to save your project.

1.At the top of the 3D View window, left-click File and left-click Save As.	
2.Check to make sure you're saving in the right folder for your 3D Modeling projects. **C:\Users\Student\Desktop\UHD\3D Animation**	
3.In the File field, left-click the name to highlight it and type tire.	
4.Left-click Save As.	

Make the Outside of the Tire

Complete these steps to create a basic tire shape.

1.At the left of the 3D View select the Create Tab and Add Primitive window, and left-click Circle.	
2.Left-click OK.	
3.Press TAB to switch to Edit Mode.	
4.Make sure all the circle's vertices are selected. If not, press the A key to select all of the circle's vertices.	
5.Press the E key to extrude. In the Extrude box, left-click Only Edges. Then press the S key to scale the extruded vertices. Move the mouse pointer toward the center of the circle. This is how thick your tire will be.	

7.Press the A key to select all of the circle's vertices. TIP: You may have to press the A key twice.	
8. . If you're still in the Front view, you may need to pan around the circle. Go to the Tools Tab and select Extrude Region. TIP: This will extrude the circle up along the Z-axis	
9.Move the mouse pointer until you like the width of the circle. This is how wide your tire will be.	

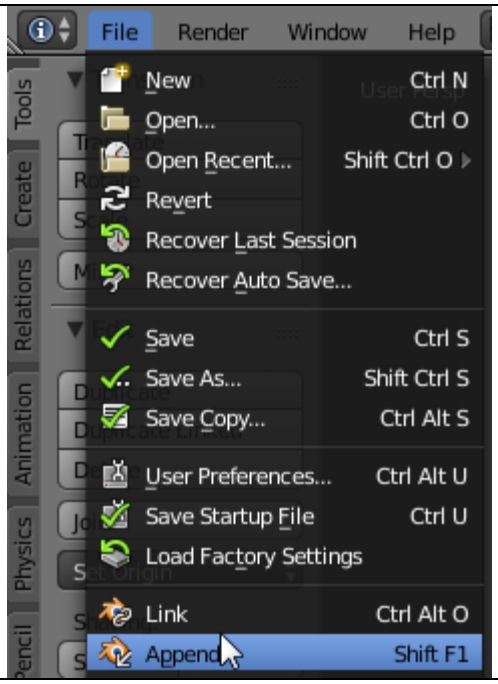
Library

A **Library** is a collection of all of the things you create when you build a 3D model, such as objects, materials, textures, animations, and armatures. For example, you could grab your creature's fur texture and add it to your house's roof. The longer you work in Blender, the bigger your library of stuff to use in future projects will become.	

The Append Command

With the **Append** command you can grab work from a previous project and bring it into your current project.

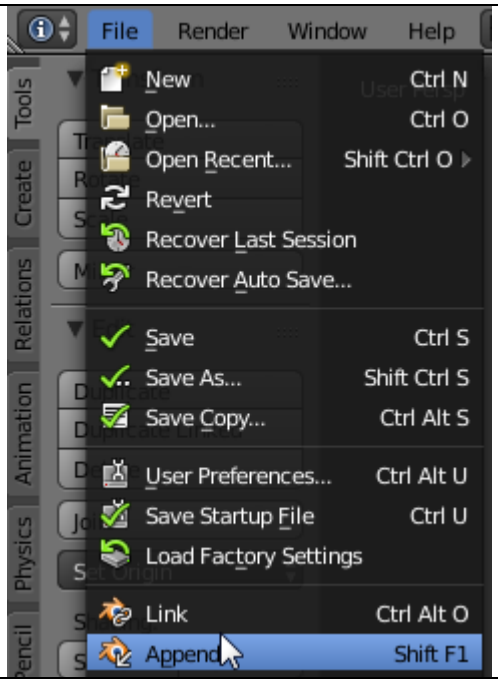
On the next page, you'll use the Append command to get premade materials for your tire.

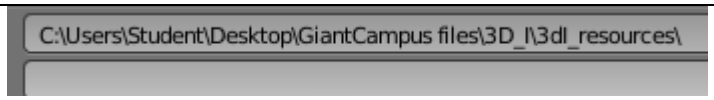
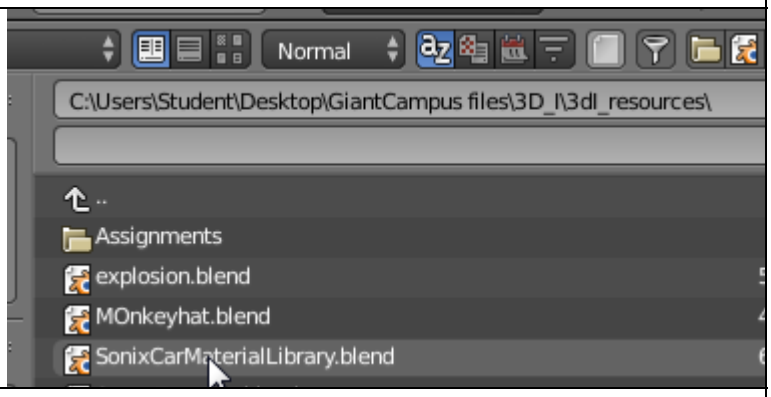
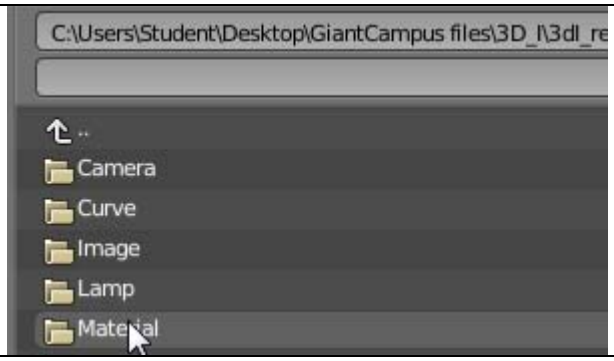
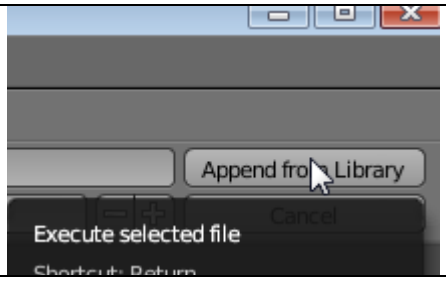


Append Car Tire Rubber

Complete these steps to append a rubber material for your tire.

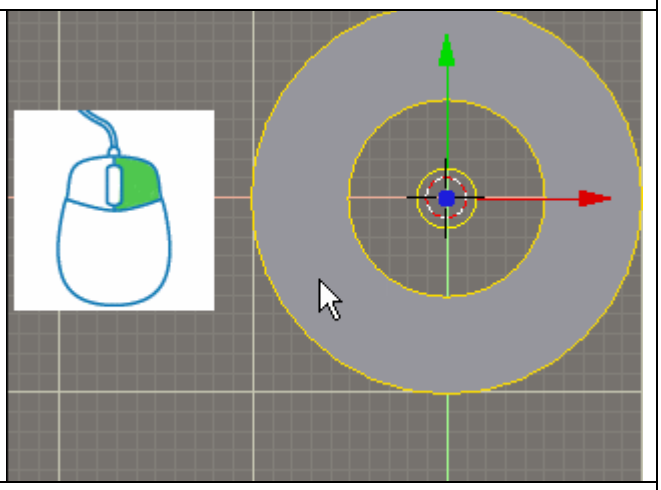
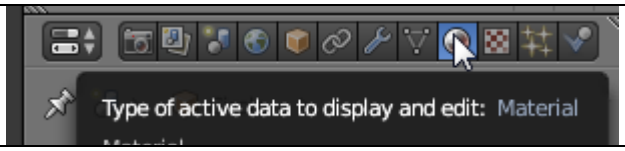
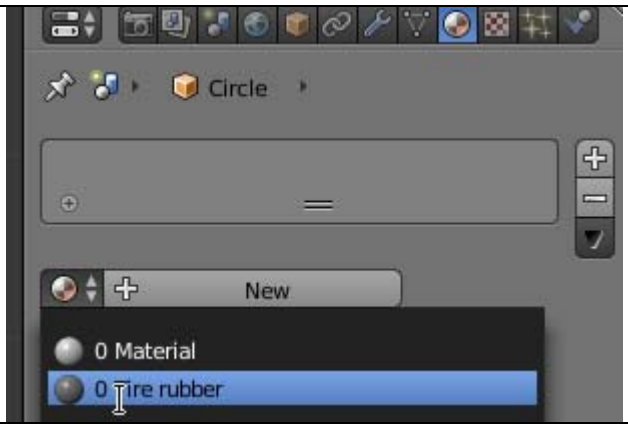
1. Make sure you are in Object mode. At the top of the 3D View window, left-click File and left-click Append.



2.Make sure you're in the **C:\Users\Student\Desktop\UHD\3D Animation**. If not, navigate to it.	
3.Left-click SonixCarMaterialLibrary.blend.	
4.Left-click Material.	
5.Left-click Tire Rubber.	
6.Left-click Load Library.	
2.Make sure you're in the C:\profiles\username\3D_Modeling_Resources folder. If not, navigate to it.	

Add the Rubber Material

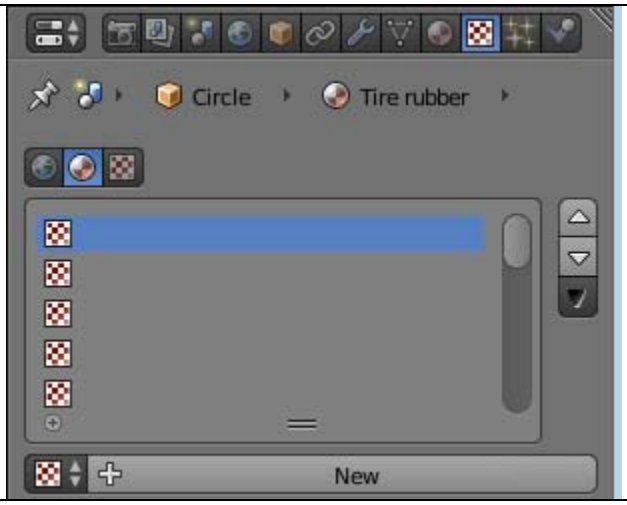
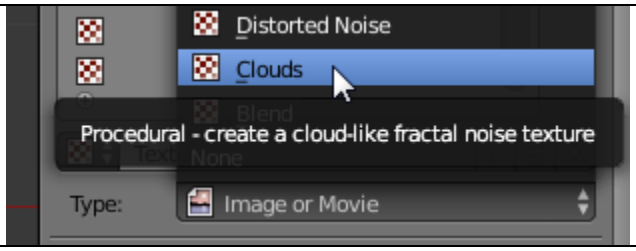
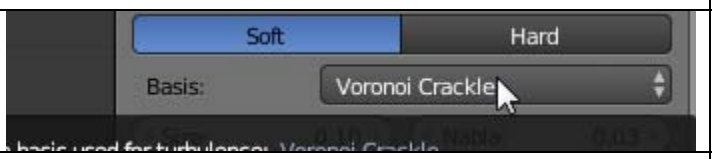
Complete these steps to add a rubber-like texture to the tire.

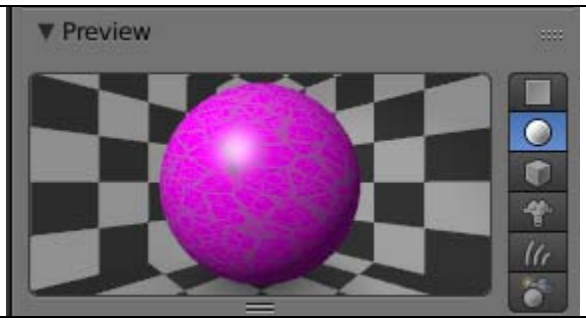
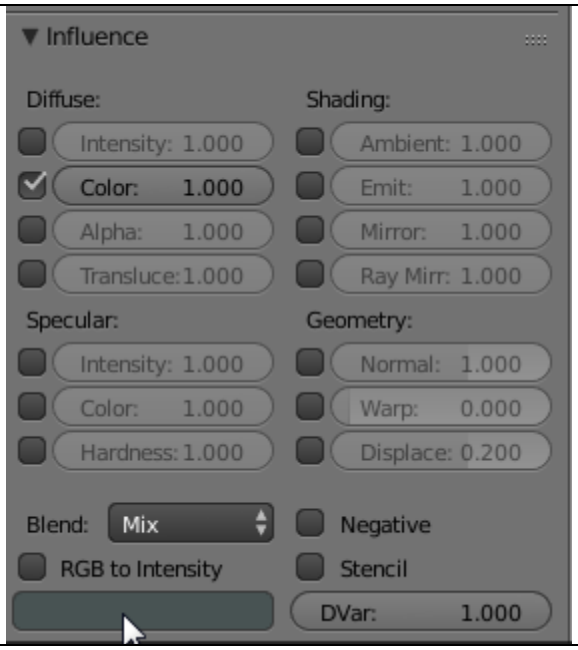
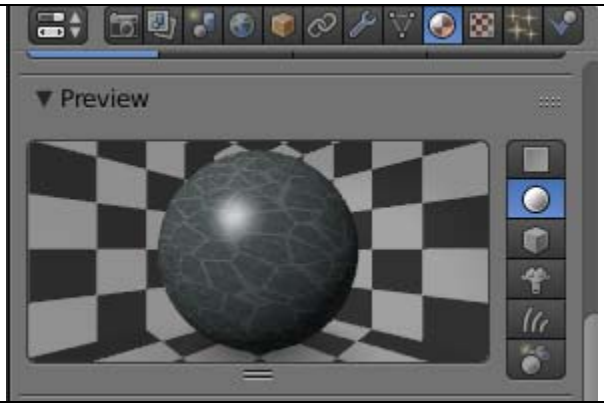
1.From Object Mode.	
2.Make sure the tire is still selected. If not, right-click the tire to select it.	
3. Select the Material Button and left-click it to select it.	
4.Next to Add New, left-click the drop-down arrows button and left-click Tire Rubber.	

Add Texture to the Rubber Material

Complete these steps to add a texture to the rubber material.

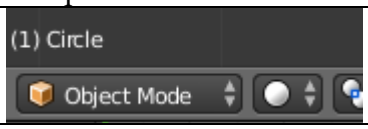
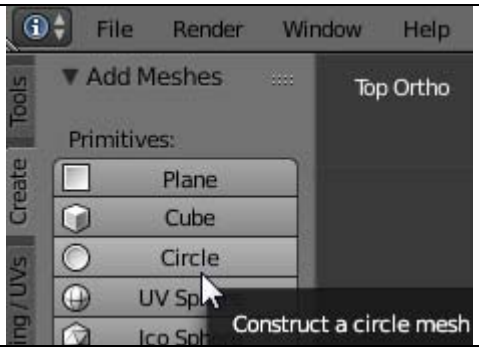
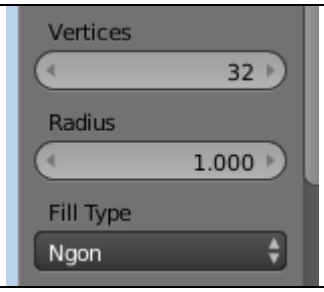
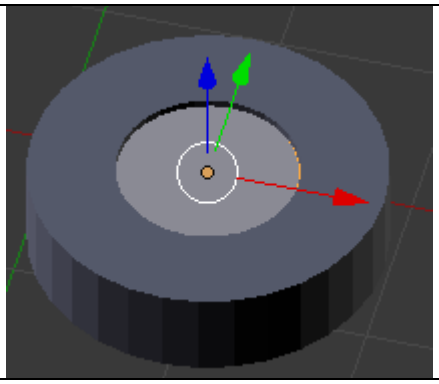
1. Select the Texture Button and left-click it to select it.	

2.In the Texture mini-window, left-click Add New. TIP: If you don't see Add New, left-click the drop-down arrows button next to TE:Tex and left-click Add New.	
3.Left-click the Texture Type list and then left-click Clouds.	
4.In the Clouds mini-window, left-click Noise Size and type 0.1. Press ENTER. This makes the cloud texture more detailed.	
5.In the Clouds properties editor, under Noise Basis, left-click Blender Original and left-click Voronoi Crackle.	

6.Look back at the Material Button. The Preview mini-window shows the material and texture together.	
7.In the **Influence** properties editor, left-click the purple Color Picker button and pick a color for the tire. TIP: You may need to scroll the mouse wheel up to see the Map To mini-window.	
8. Return to the Material Preview window and look at your tire color.	

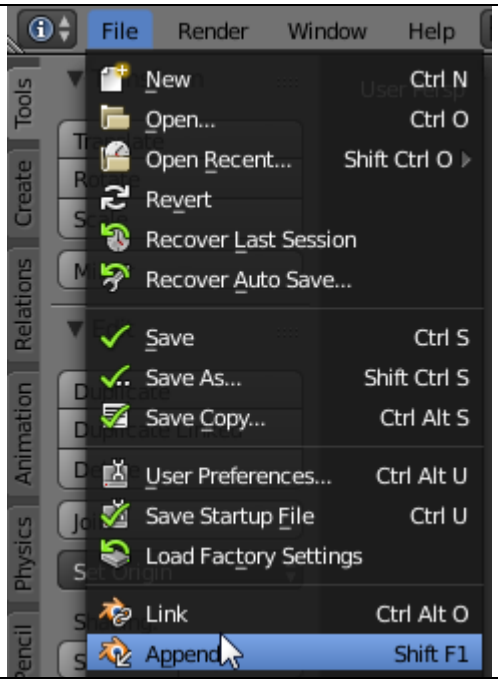
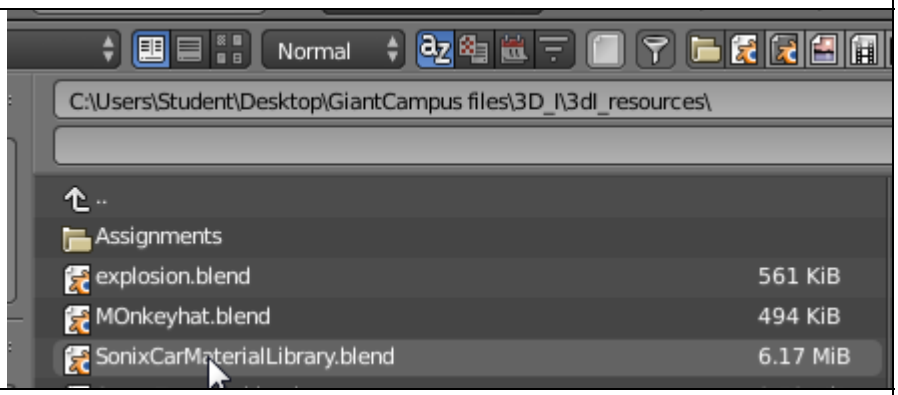
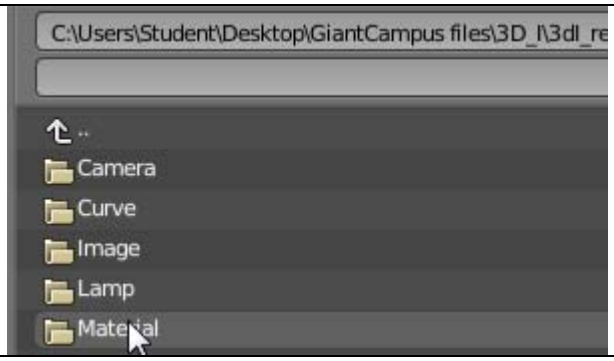
Make the Hubcap

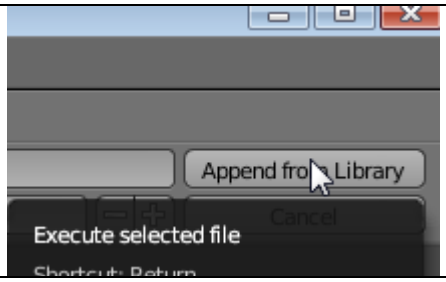
Complete these steps to add a hubcap to the tire.

1.Make sure you're in Object Mode. If not, press TAB.	
2. At the left of the 3D View select the Create Tab and Add Primitive window, and left-click Circle.	
3.Left-click Fill and left-click OK. This creates a face for the circle.	
4.Size the circle to fit inside your tire just like a wheel. Then move the wheel to inside your tire with the 3D cursor, the new circle will be added on one side of the tire. You may need to pan around the tire to see it.	

Append Chrome Material

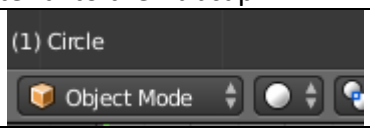
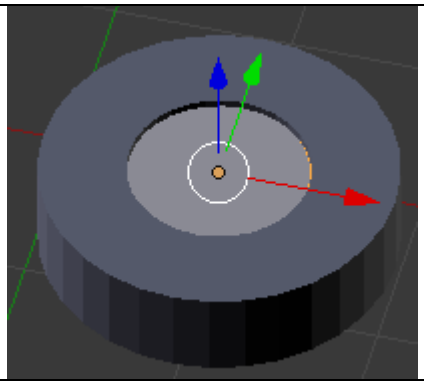
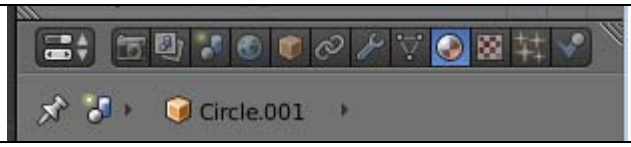
Complete these steps to make the hills smoother.

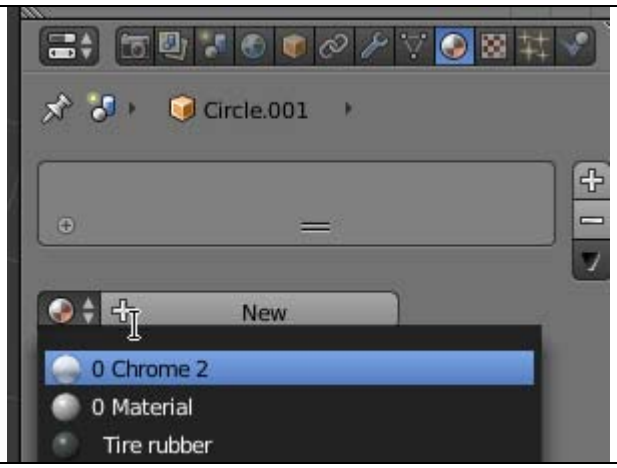
1.At the top of the 3D View window, left-click File and left-click Append.	
2.Left-click SonixCarMaterialLibrary.blend.	
3.Left-click Material.	

4.Left-click Chrome 2.	
5.Left-click Load Library.	

Add the Chrome Material

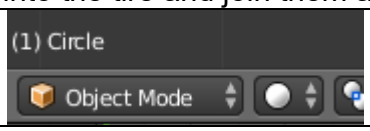
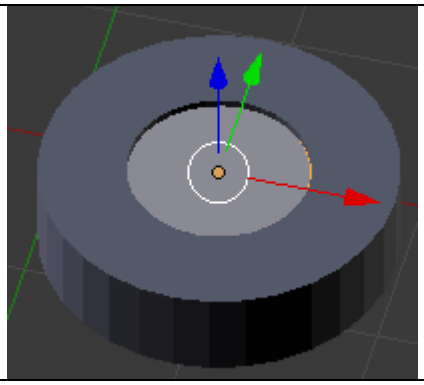
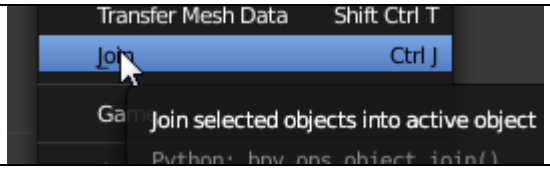
Complete these steps to add the chrome material to the hubcap.

1.Make sure you're in Object Mode. If not, press TAB.	
2.Make sure the hubcap is still selected. If not, right-click the hubcap to select it.	
3.Select the Material Button.	

4.Next to Add New, left-click the drop-down arrows button and left-click Chrome 2.	

Move and Join the Hubcap into the Tire

Complete these steps to move the hubcap into the tire and join them as one object.

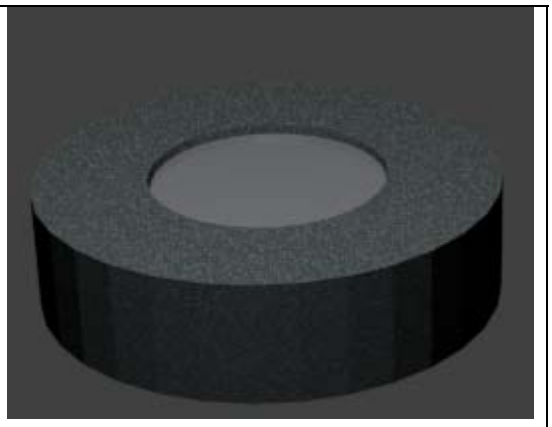
1.Make sure you're in Object Mode. If not, press TAB.	
2.Make sure that the hubcap is still selected. If not, right-click it.	
3.Use the Translate Manipulator Mode to move the hubcap to the center of the tire.	
4.Press and hold SHIFT and right-click the tire.	
5.At the bottom of the 3D View window, left-click Object and left-click Join Objects.	

Check Your Work

Complete the steps below to make sure your project is on track.

1. Do you like the way the tire looks? If not, go back and change the colors and settings of the tire's materials and textures.

2. If everything looks good, save the tire before moving on



SUMMARY

In this lab, you:

- Extruded a circle's edges and faces to create a basic tire shape.
- Appended a rubber material and used a texture to change its appearance.
- Added a filled circle as the tire's hubcap.
- Appended a chrome material to make the hubcap look more metallic.

.

Lab 2 Introduction

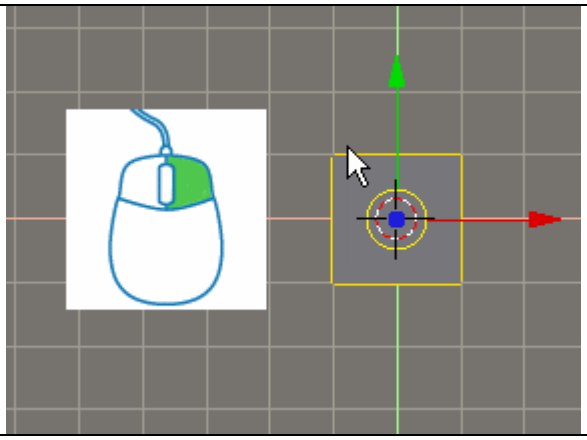
In this lab, you'll build the basic car shape.

Set Up Your Workspace

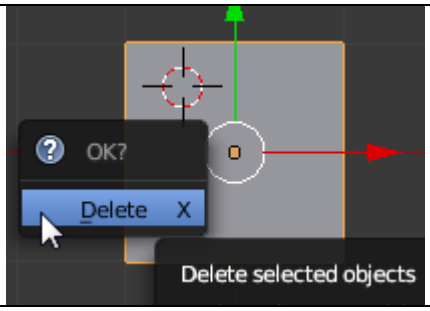
Complete these steps to set up your workspace with a background image. You'll use this background image as a guide to help you build a car.

1.Open a new Blender project.

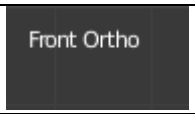
2.Right-click the cube to select it.

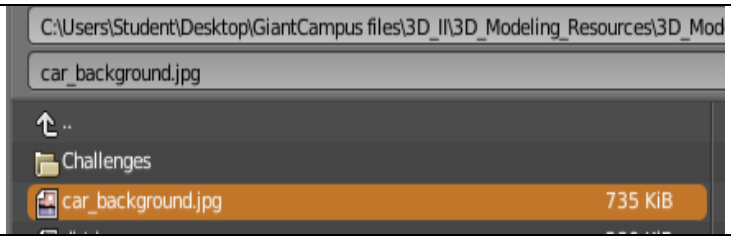


3.Press the X key and left-click Erase Selected Object(s) to delete the cube.



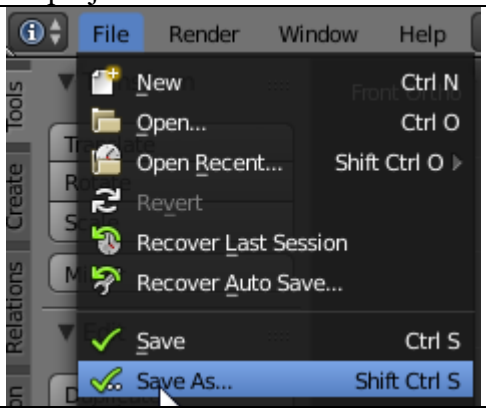
4. Set your view to Front Ortho, Number 1. We will use this view to add a Background image of the side of a car

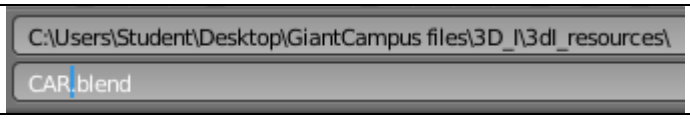
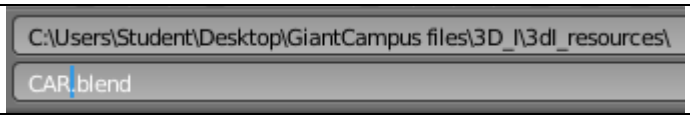
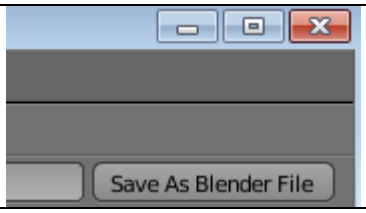


4.To add a Background image press the 'N' Key on your keyboard and a panel will appear on the right of your window. Left-click the arrow to the left of Background and Select it with the check mark.	
5.Left-click the Open button.	
6.Left-click car_background.jpg from the Modeling Resources folder and then left-click OPEN IMAGE.	
7.At the bottom of the Background Image box, left-click Size and type 11. Press ENTER.	
8.To hide the panel just press the letter 'N' again.	

Save the Car

If you haven't already done so, save your project now.

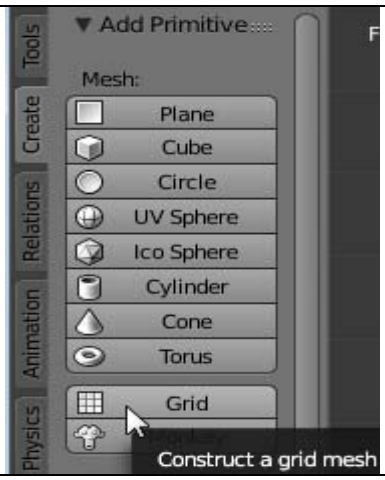
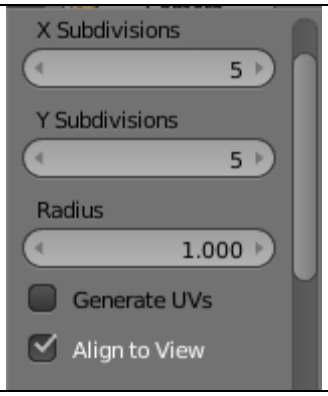
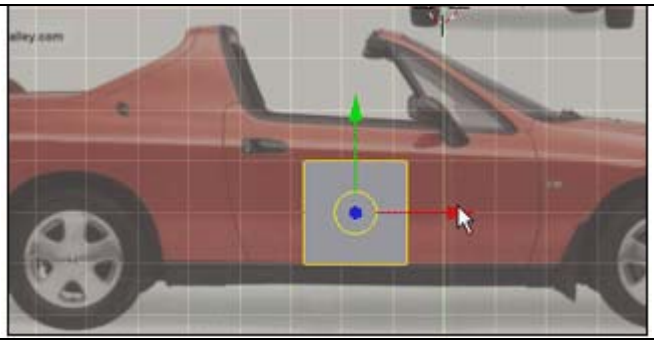
1.At the top of the 3D View window, left-click File and left-click Save As.	

2.Check to make sure you're saving in the right folder. The same folder where you save the Tire.	
3.In the File field, left-click the name to highlight it and type CAR.	
4.Left-click Save As.	

Add a Subdivided Grid

Complete these steps to add a grid and subdivide it. This will create the vertices that you'll need to start building the car.

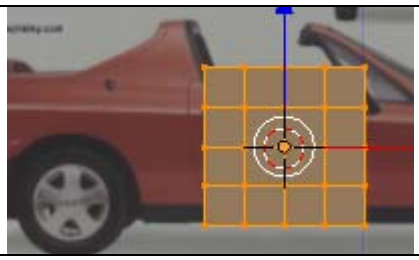
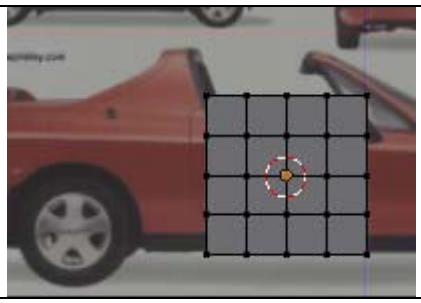
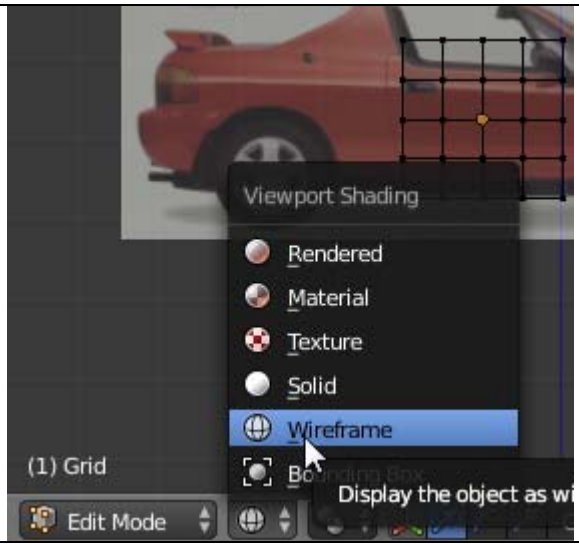
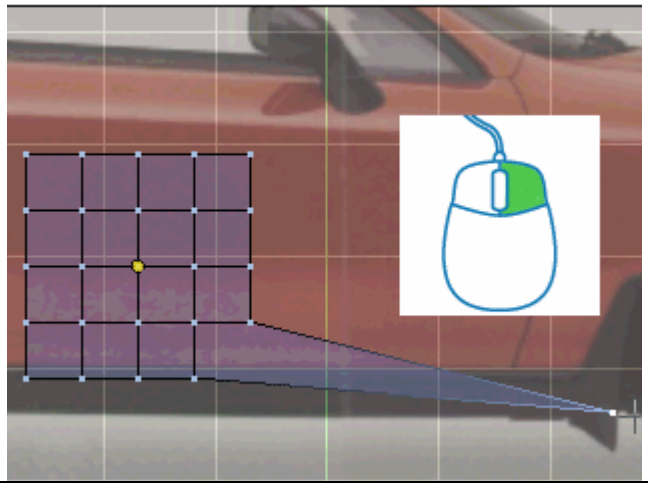
1.You should still be in the Front Ortho View.	
2. Place the mouse marker in the center of the door of the car image.	

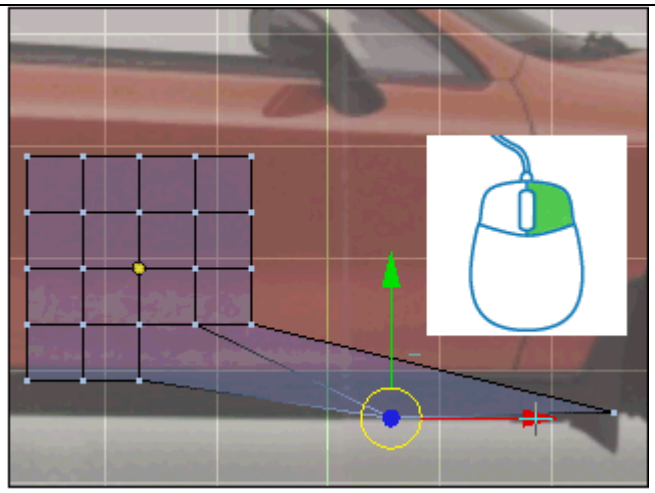
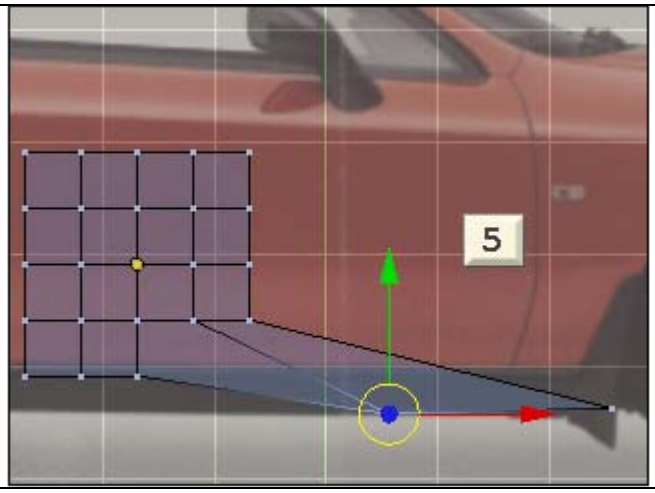
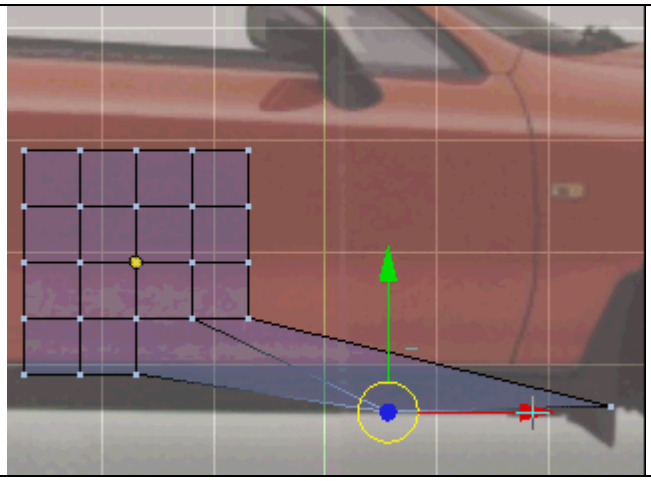
3.From the Create Tab and Add Primitive select Grid.	
4.In the Add Grid box, left-click X res and type 5. Press ENTER. In the Add Grid box, left-click Y res and type 5. Press ENTER. Left-click OK. Check the Align view option.	
The entire grid should be on the side view of the background car image. TIP: Check the example image to see how it should look.	

Start the Grid

This is similar to what you did in the terrain project, but for the car project you'll stretch vertices along two dimensions to start creating the side of the car.

1.You should still be in the Front Ortho View	

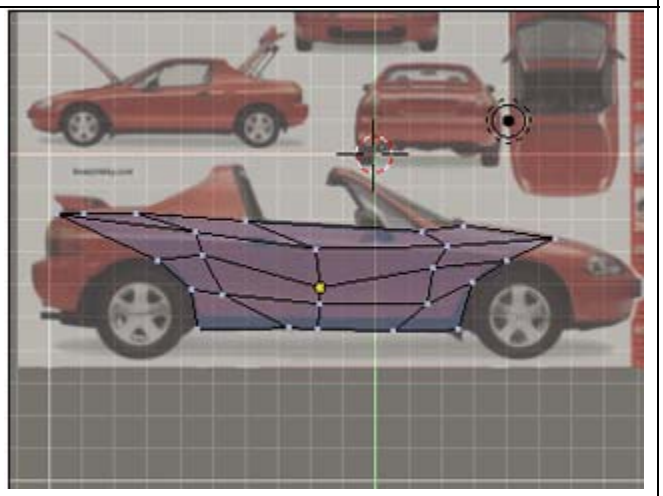
2.Now change the mode to Edit Mode or press TAB to see the grid.	
3.Make sure all of the vertices are unselected. If not, press the A key.	
4.Press the Z key to switch to the Wireframe Draw Type. This will make it easier to see the background image as you stretch out the grid.	
5.Right-click and drag the bottom right vertex of the grid until it reaches the front tire. Left-click to stop moving the vertex. TIP: Once the vertex starts following the mouse, you can stop pressing the right mouse button.	

6.If you have trouble moving the vertices by right-clicking and dragging, you can also move them by right-clicking a vertex and left-clicking the red and green arrows of the Translate Manipulator Mode.	
7.Remember, if at any time the background image disappears, press NUM5 to get it back.	
8.Stretch a couple of vertices and then move on to the next screen, which will show you an example of how to continue stretching the grid.	

Stretch the Grid

Complete the steps below to finish stretching the grid to match the background image. You'll extrude lines on the following page to finish the side view of the car.

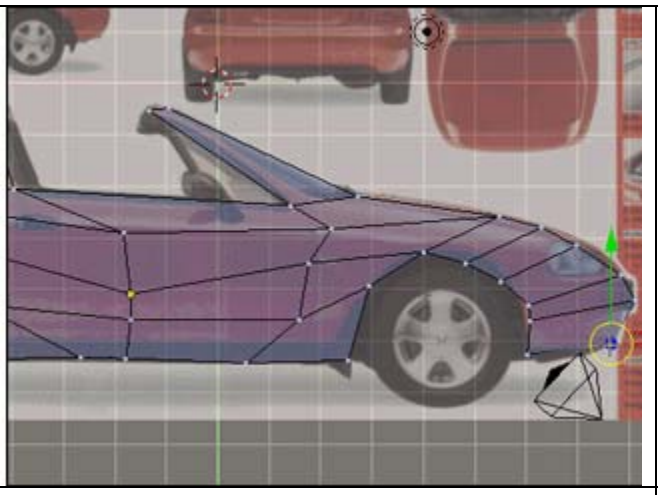
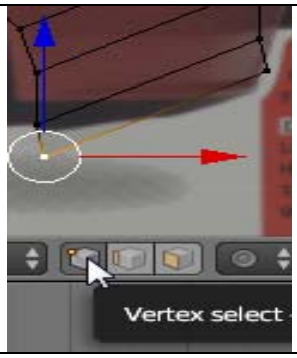
1.Continue stretching vertices to get the grid to match the background image. TIP: Watch the demonstration movie for one example of how to do this. You won't have to do the top or the nose or back end of the car yet.



Finish the Grid

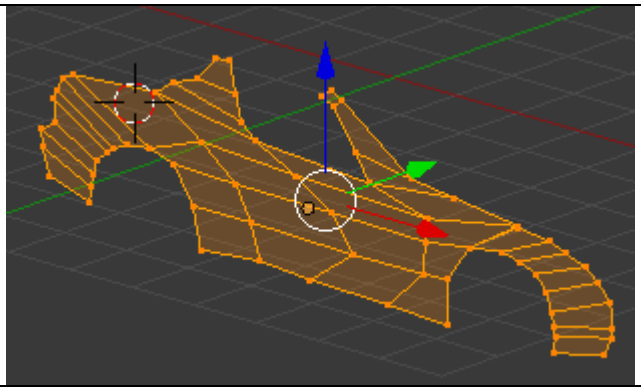
Complete the steps below to extrude the grid's lines into the rest of the car's shape.

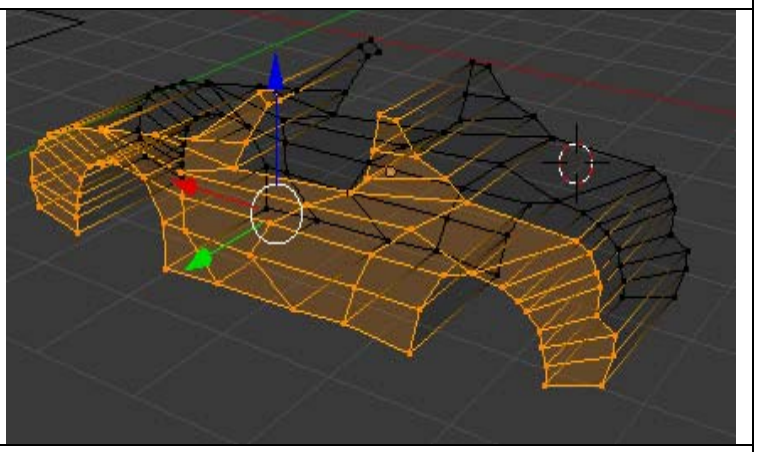
1.Extrude the grid's lines to sketch out the rest of the car's basic shape by using the Edge Select. This change from selecting a point to and edge.
After you select and edge press eht 'E' the move your mouse to extrude that edge.

2.Stretch the vertices of the extruded grid pieces to finish matching the grid to the car's shape.	
3. You can change from the Edge Select to Vertex select to move individual point into position.	
4.When you're finished stretching the grid, save the project as a new file named CAR_2D.	

Add Depth to the Car

Complete these steps to extrude the two dimensional grid frame into a three dimensional car shape.

1. Press the A key to select everything	
2. Pan around the vehicle until you can see the edge of the plane.	

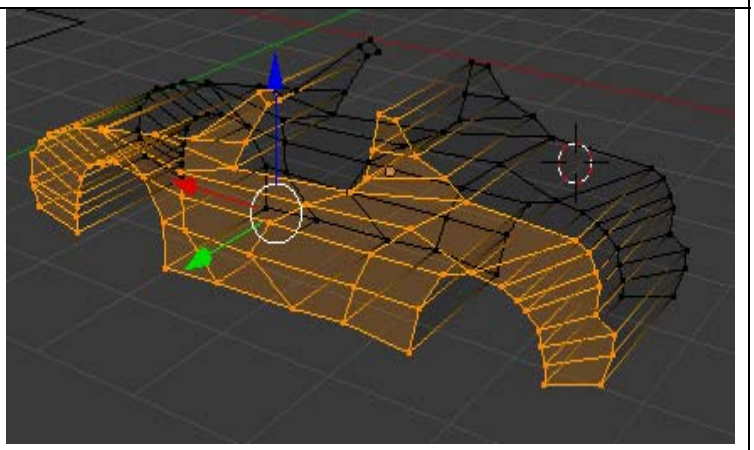
3.Press the E key to extrude and left-click Region.	
4.Extrude the plane up along the Z-axis about 4 boxes. You don't need to get this exactly right.	
5.Save the car as a new file name CAR_3D.	

Check Your Work

Complete the steps below to make sure your project is on track.

1. Do you like how the car looks? If not, you can open the **car_2D** file and adjust the car's vertices. Then repeat the **Add Depth to the Car** steps.

2. If everything looks good, save the car as **car_3D** before moving on.



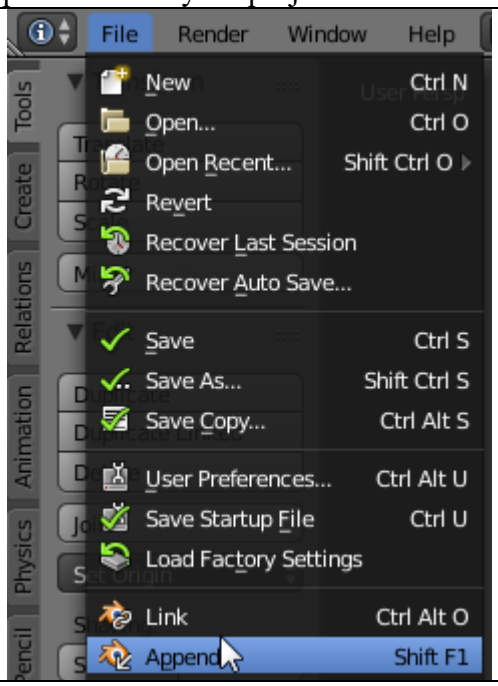
SUMMARY	In this lab, you: • Added a background image guide and a subdivided grid. • Stretched the vertices of the grid to create a 2D model of the side view of a convertible. • Extruded the 2D model along the Z- axis to make it 3D.

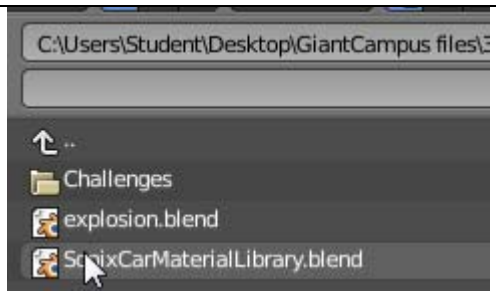
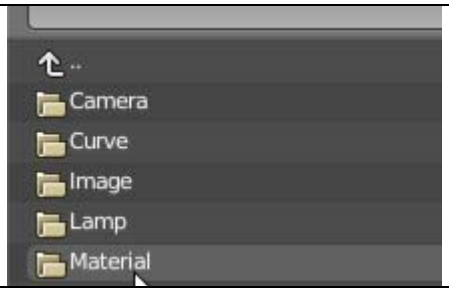
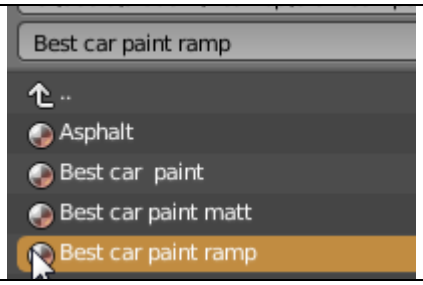
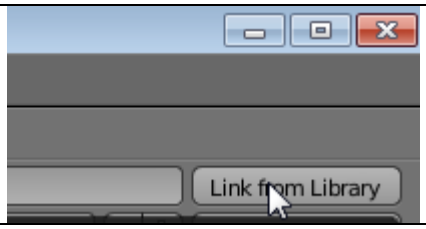
Lab 3 Introduction

In this lab, you'll add materials and textures to the car.

Append Car Paint

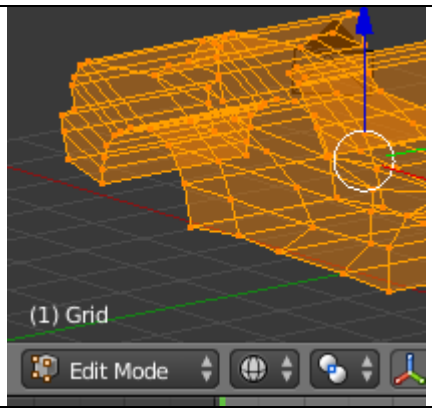
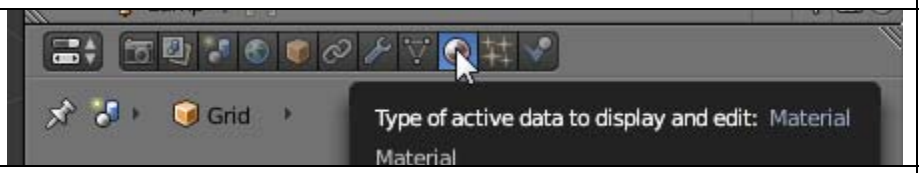
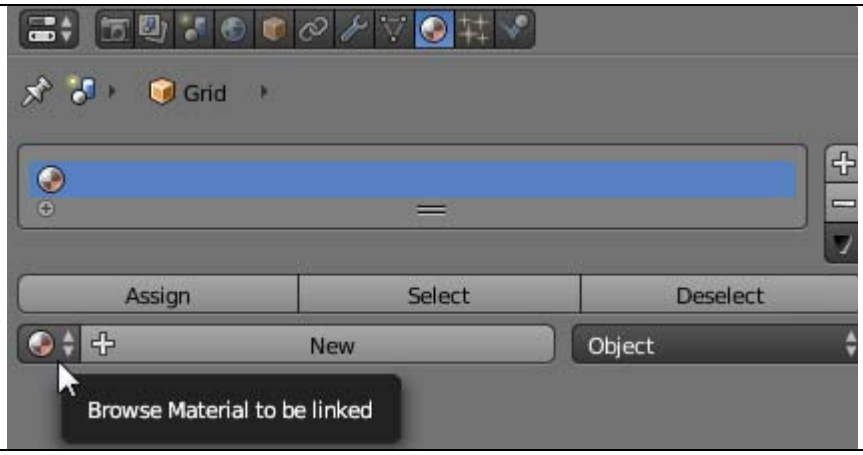
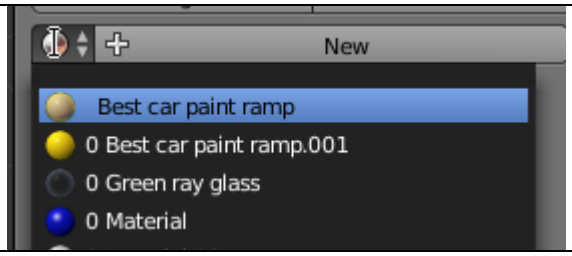
Complete these steps to append a premade car paint color to your project.

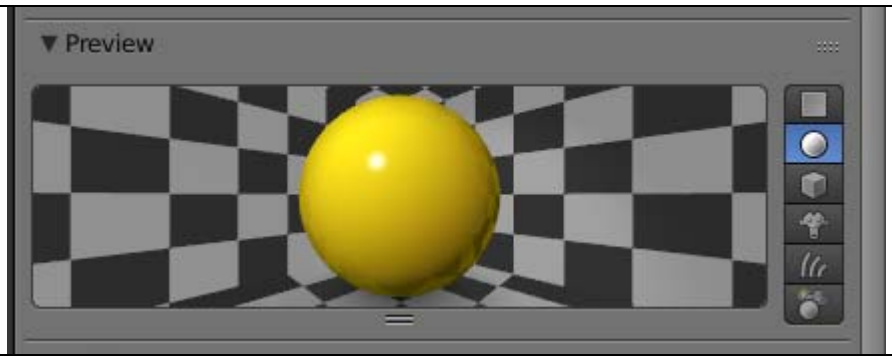
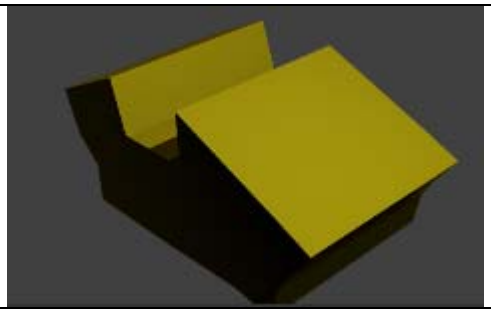
1.At the top of the 3D View window, left-click File and left-click Append or Link. TIP Append or Link is not accessible in Edit Mode so change to Object Mode.	
2.Make sure you're in the C:\profiles\username\3D_Modeling_Resources\ directory. If not, navigate to it.	

3.Left-click SonixCarMaterialLibrary.blend.	
4.Left-click Material.	
5.Left-click Best car paint ramp.	
6.Left-click Load Library.	

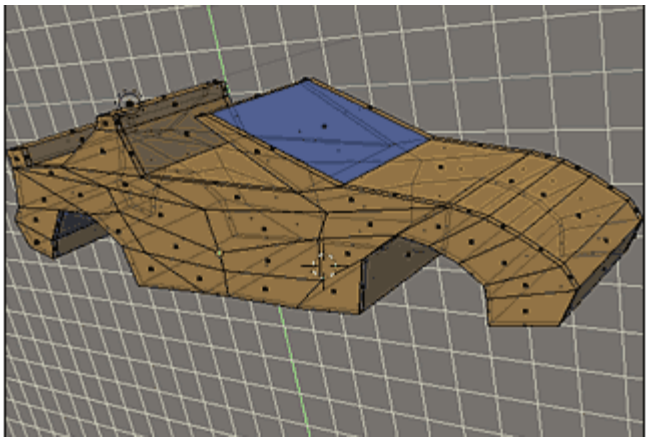
Paint the Car

Complete these steps to apply the car paint material to the car.

1.Make sure that you are in Edit Mode and that you can see the car's vertices. If not, make sure the car is selected and press TAB.	
2.At the top of the Buttons window, left-click the Editing button.	
3.Press the A key to select all of the car's vertices.	
4.Select the material tool button.	
5.From the browse material to be linked button select the material from the list.	
6.Select from your list of materials.	

7. You will see the color preview window appear.	
8.This will assign the material to your car. Render to see the color.	

Check Your Work

Complete the steps below to make sure your project is on track. 1. Do you like the color of the car? If not, in the Shading Panel, select the Best car paint ramp material and change its color to one you like. 2. If everything looks good, save the car before moving on.	

Summary

In this lab, you:

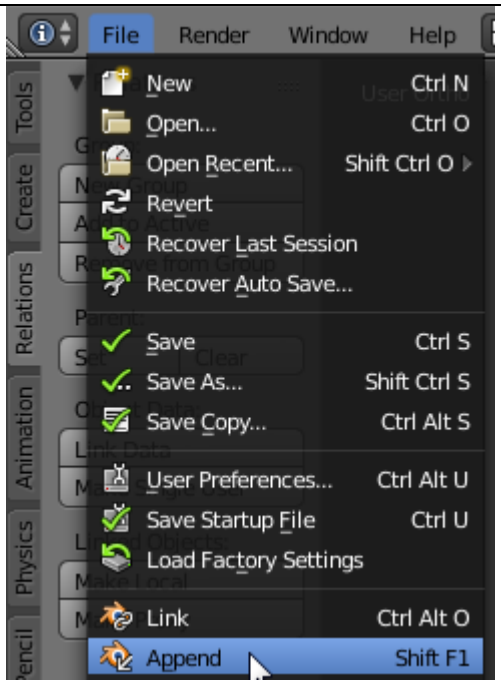
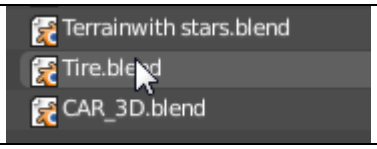
- Created a windshield for the car.
- Added color to the car.

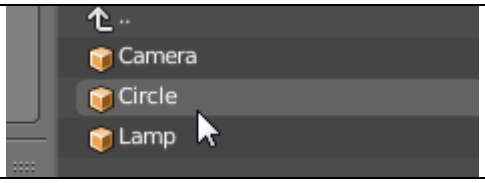
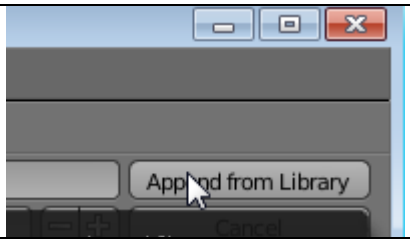
Lab 4 Introduction

In this lab, you'll add tires to the car and animate the car.

Append the Tire

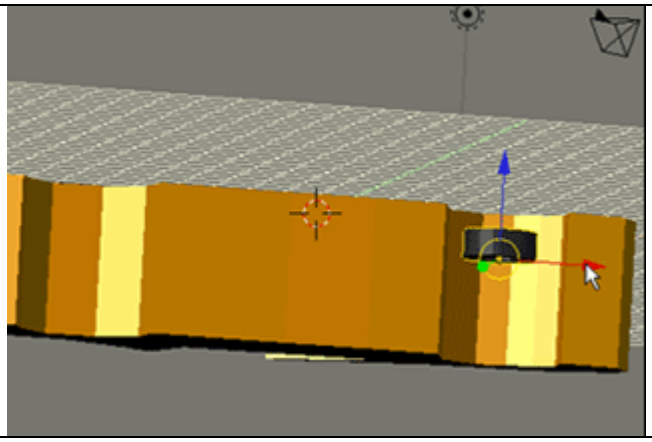
Complete these steps to append the tire you made earlier into the vehicle project.

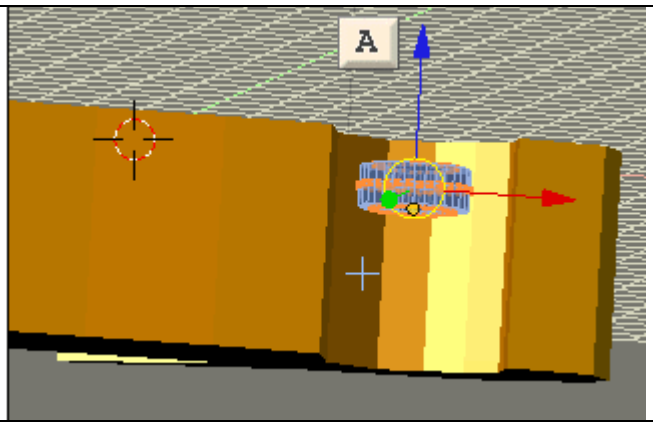
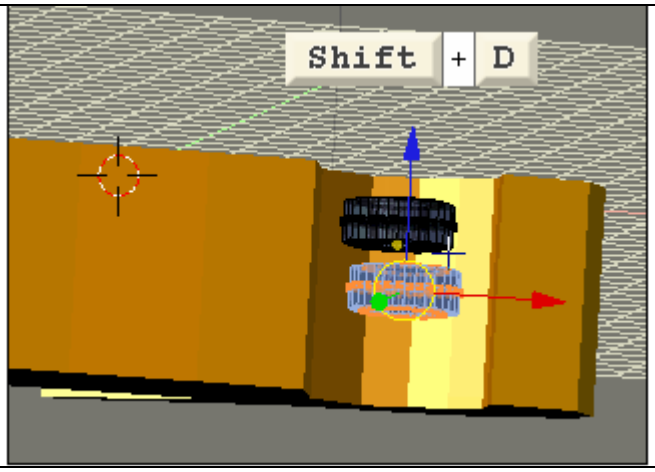
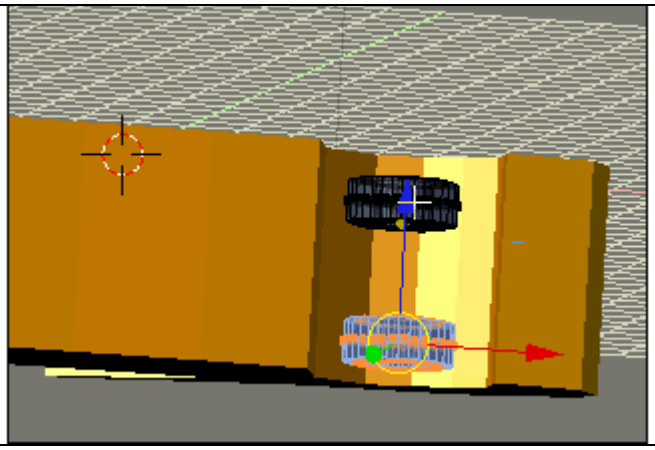
1.Make sure you are in Object Mode. If not, press TAB to switch to Object Mode.	
2.At the top of the 3D View window, left-click File and left-click Append or Link.	
3.Make sure you're in the C:\profiles\username\3D_Modeling_Resources directory. If not, navigate to it.	
4.Left-click tire.blend.	

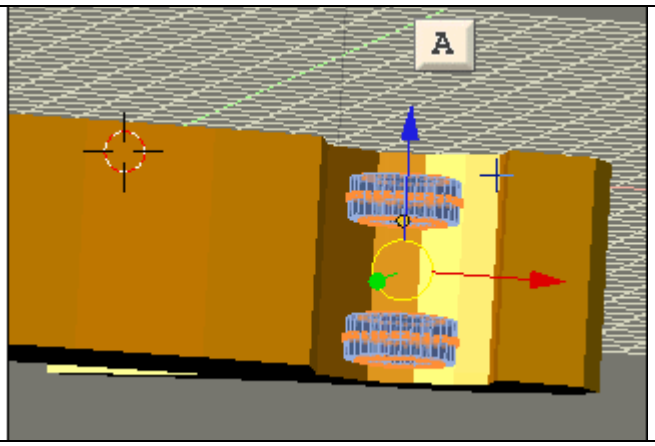
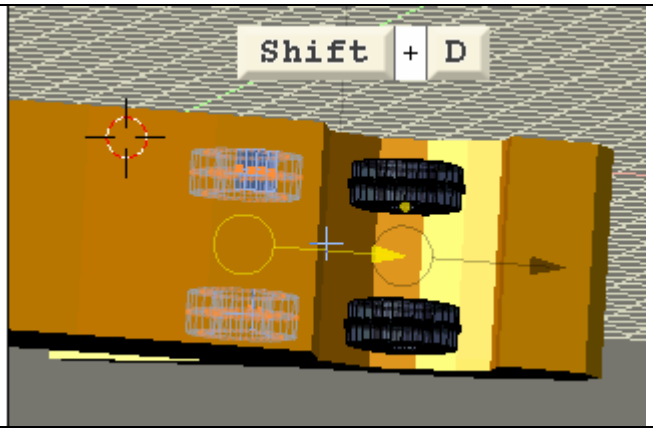
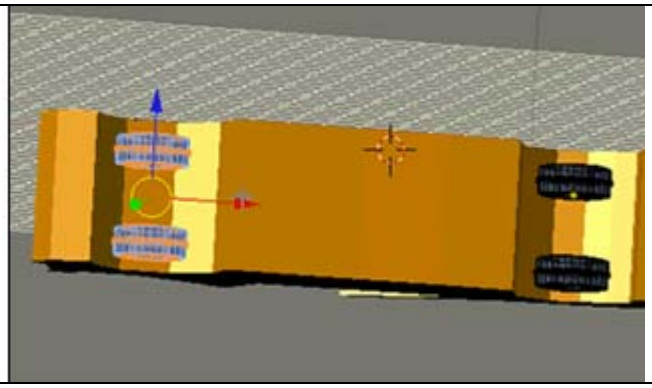
5.Left-click Object.	
6.Left-click Circle. TIP: It's possible that Circle may have some other number at the end of it, but that doesn't matter.	
7.Left-click Load Library. You should see the tire you made in the 3D View window.	

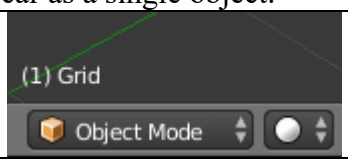
Arrange the Tires

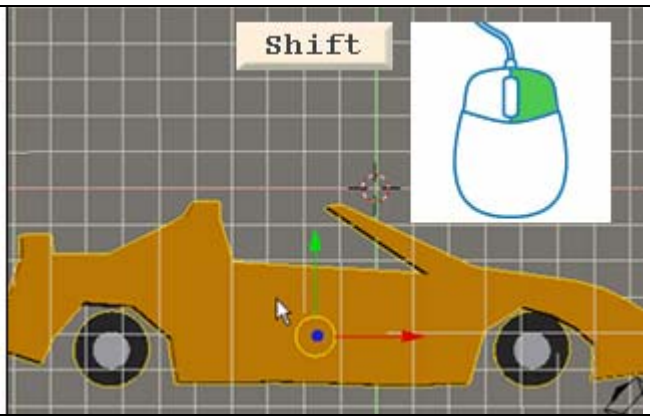
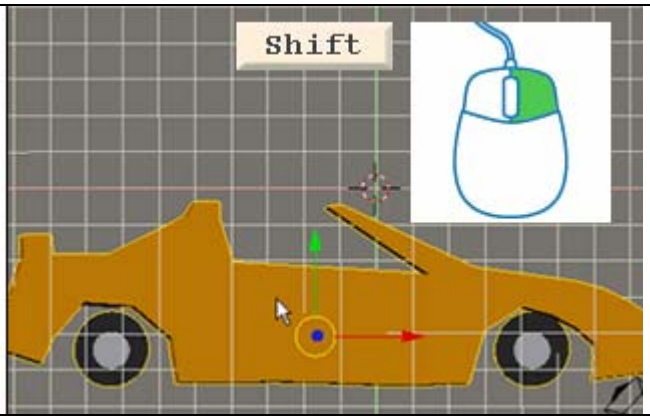
Complete these steps to copy the tires and move them into place at the bottom of the car.

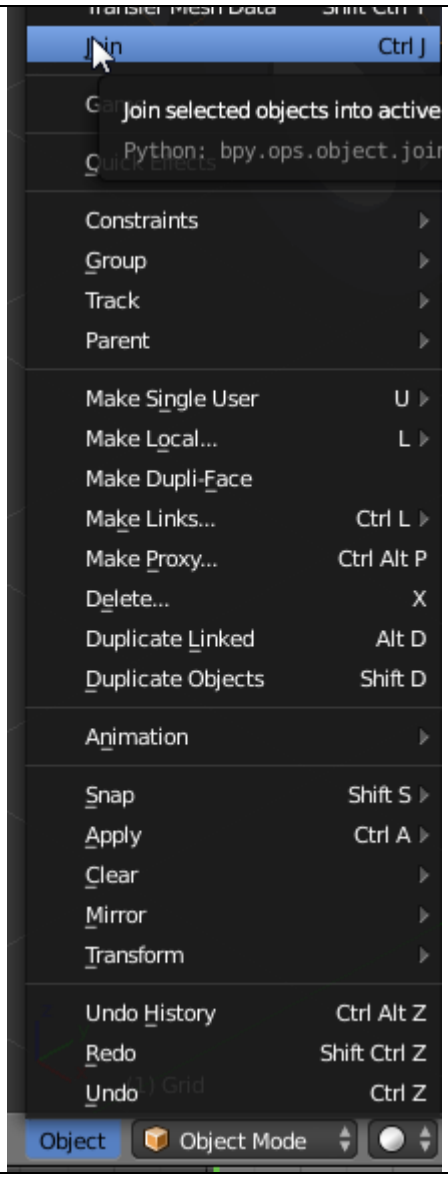
1.Using the Translate Manipulator Mode, move the tire to the bottom of the car in the spot where it should go. TIP: Look at the example if you get stuck.	
2.Press TAB to switch to Edit Mode. This will make sure that all of your tires are grouped together as one object.	

3.Make sure the whole tire is still selected. If not, press the A key until it is.	
4.Press SHIFT + D to create a copy of the tire.	
5.Using the Translate Manipulator Mode, move the tire to the bottom of the car in another spot where a tire should go.	

6.Once you have the second tire where you want it, press the A key until both tires are selected.	
7.Press SHIFT + D to create a copy of the two tires.	
8.Using the Translate Manipulator Mode, move the two new tires to the other side of the bottom of the car.	

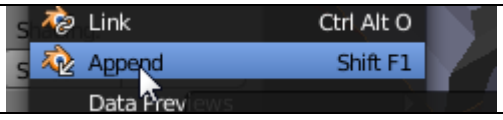
Join the Tires to the Car	
Complete these steps to join the tires to the car as a single object.	
1.Press TAB to switch to Object Mode.	

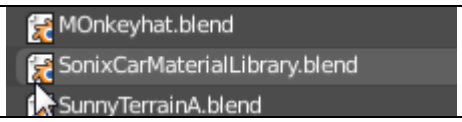
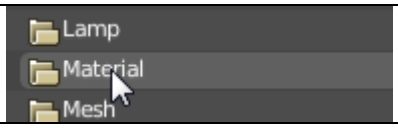
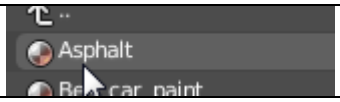
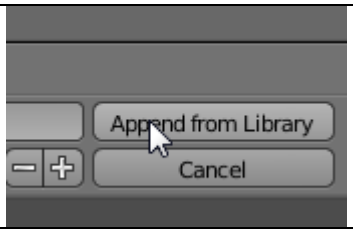
2.Press and hold SHIFT and right-click the tires and the car to select them. TIP: The tires are a single object. Clicking one tire will select them all.	
3.Make sure that all four tires and the car are selected. If not, press and hold SHIFT and right-click the unselected car or tire.	

4.At the bottom of the 3D View window, left-click Object and left-click Join. In the OK? confirmation box, left-click Join selected meshes.	

Append Asphalt

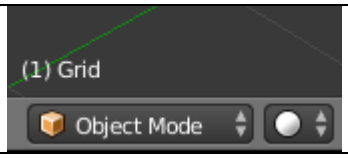
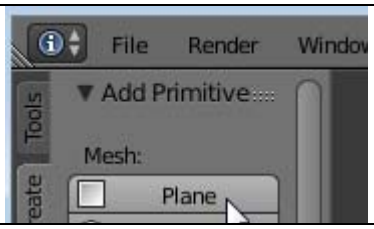
Complete these steps to append an asphalt texture for the car to drive on.

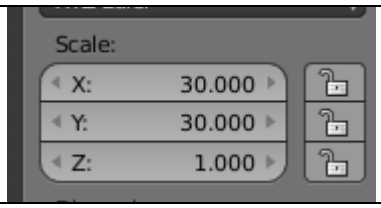
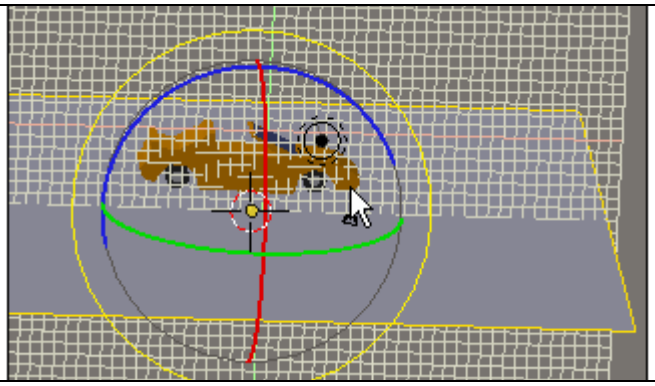
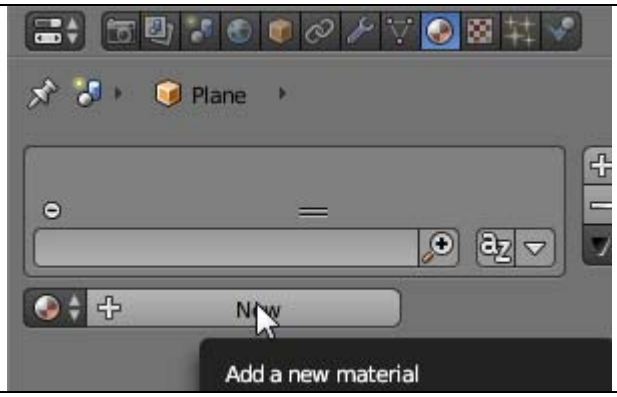
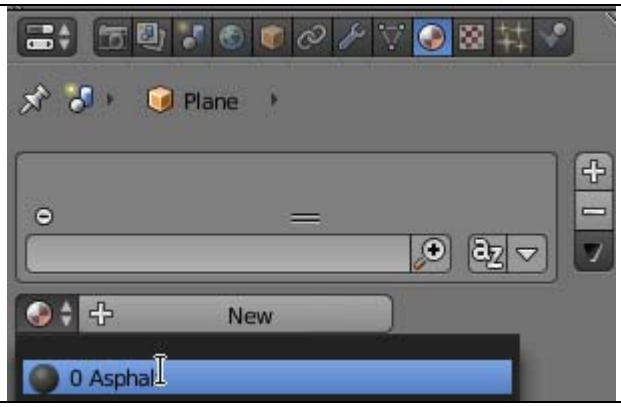
1.At the top of the 3D View window, left-click File and left-click Append or Link.	
2.Make sure you're in the C:\profiles\username\3D_Modeling_Resources directory. If not, navigate to it.	

3.Left-click the SonixCarMaterialLibrary.blend file.	
4.Left-click Material.	
5.Left-click Asphalt.	
6.Left-click Load Library.	

Make the Ground

Complete these steps to add and resize a plane. This will become the ground under the car.

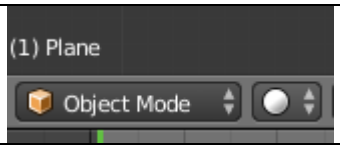
1.Make sure you're in Object Mode. If not, press TAB.	
2.From the Create Tab and Add Primitive left-click Plane.	
3.Press the N key to bring up the Transform Properties panel.	

4.Left-click ScaleX and type 30 to increase the size of the plane along the X-axis. 5.Left-click ScaleY and type 30 to increase the size of the plane along the Y-axis.	
6.Rotate and move the plane until it looks like a flat surface the car could drive on.	
7.At the top of the Buttons window, left-click the Shading button and left-click the Material Buttons button.	
8.Lleft-click Add New.	
9. Link to Object, left-click the arrow button and left-click Asphalt.	

Move the Car

You'll create a path for the car to follow. This will add basic movement to the vehicle.

1.Make sure you're in Object Mode. If not, press TAB.

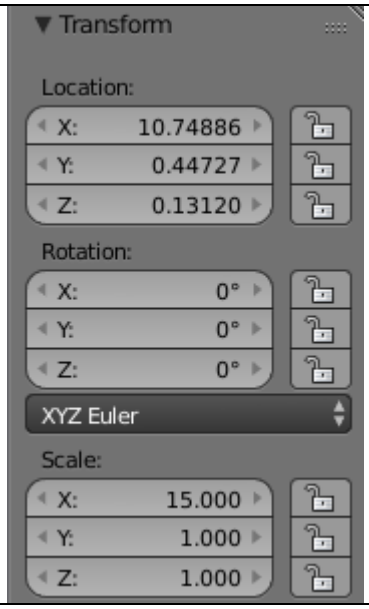


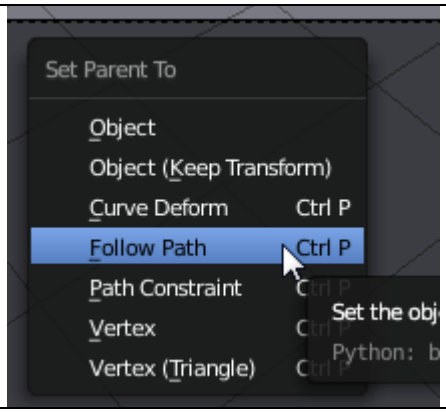
2.From the Create Tab and Add Primitive left-click Path. TIP: You may need to move the path above the plane so that you can see it.

3.Press the N key to bring up the Transform Properties panel.

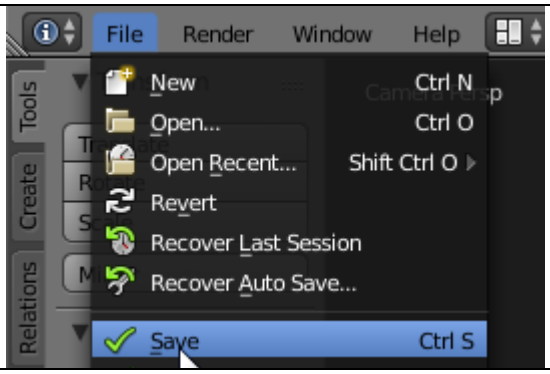
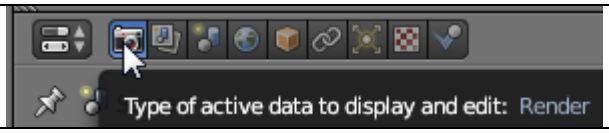
4.Left-click the Link Scale button. This will scale the path to the correct size, regardless of which direction it's pointed.

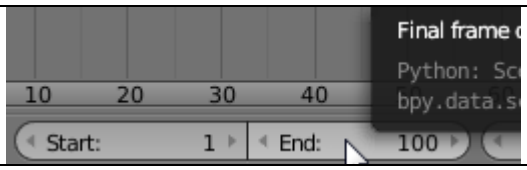
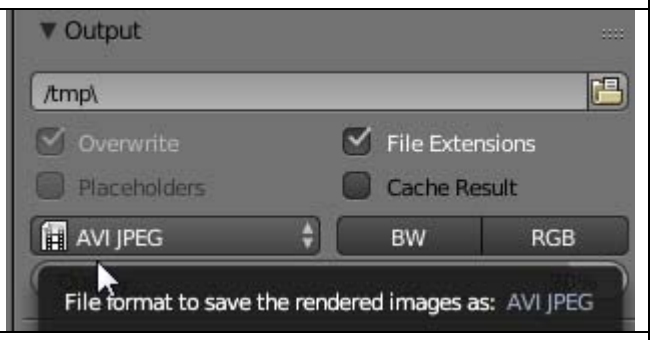
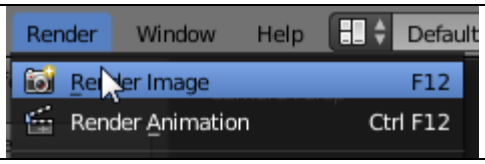
5.Left-click ScaleX and type 15. Press ENTER.



6.Right-click the car to select it.	
7.Press and hold SHIFT and right-click the path.	
8.Press CTRL + P to make the path a parent of the car. 9.In the Make Parent confirmation box, left-click Follow Path.	
10.Press ALT + A to preview the animation. Press ESC to stop the animation. Note: Set you view to Camera first.	

Render the Animation

Complete these steps to render the car's animation.	
1.Save your project.	
2.At the top of the Buttons window, left-click the Scene button.	

3. On the Timeline, left-click End: 100. Type 100 and press ENTER.	
4.In the Output properties, left-click the Images are saved in this file format button, and then left-click AVI Jpeg. This means the image will be saved as a movie instead of an image.	
5.Select from the top left menu Render > Renter Animation	
6.Your movie AVI file will be in the C:\tmp directory.	

Check Your Work

Complete the steps below to make sure your project is on track.

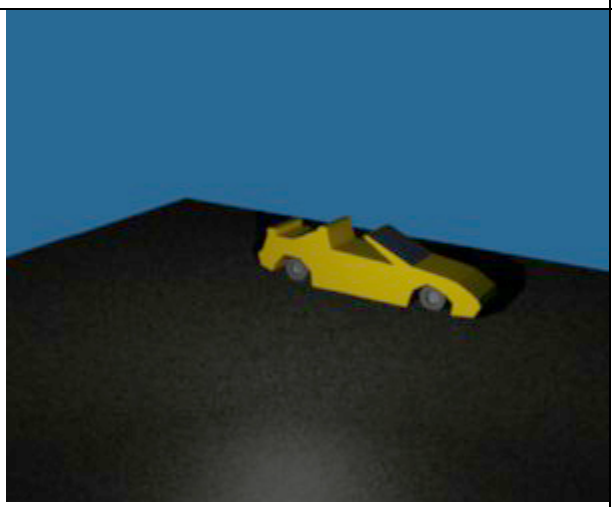
1. Is the car in the movie window? If not, you may need to move the camera.

2. You can change the shape of the path to move the car in a different direction.

3. Go to **C:\tmp** to find your movie. Double-click it to watch it. Then close it.

4. In the **C:\tmp** folder, left-click your movie file to select it. Press CTRL + C to copy it.

5. Go to your project folder at **C:\profiles\username\3D_Modeling_Resources**, and press CTRL + V to paste.



6. Right-click on the movie file and then left-click **Rename**. Type **car_movie.avi** as the name, and press ENTER. 7. If everything looks good, save the car before moving	

Summary

In this lab, you:

- Added the tires you made in Lab 1 to the car.
- Created ground for the car to move on.
- Added a path to create a moving car animation.

Combine the House, Neighborhood or City and Car

Use your creativity. You created a Neighborhood or small City in project two. Now combine that with some cars on different paths.