Project 4 – Build a Car

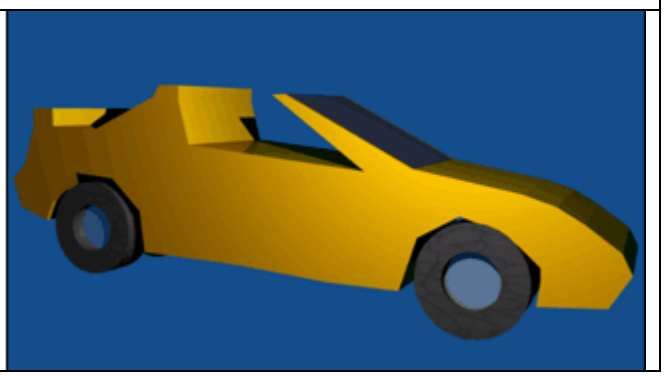
Introduction

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.

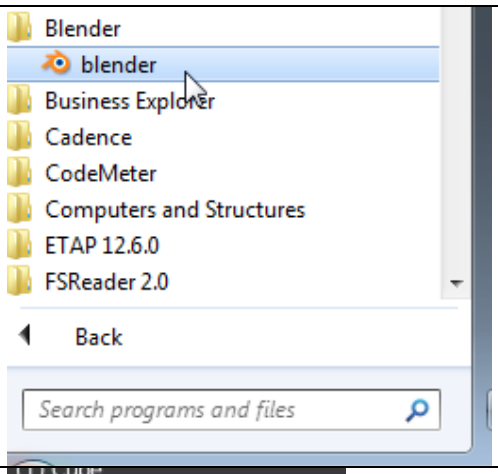
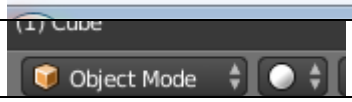
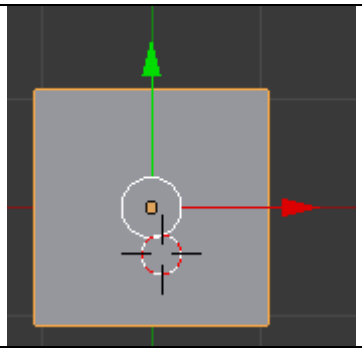
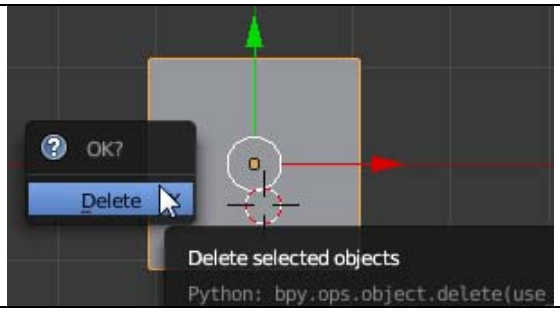


LAB 1 - Introduction

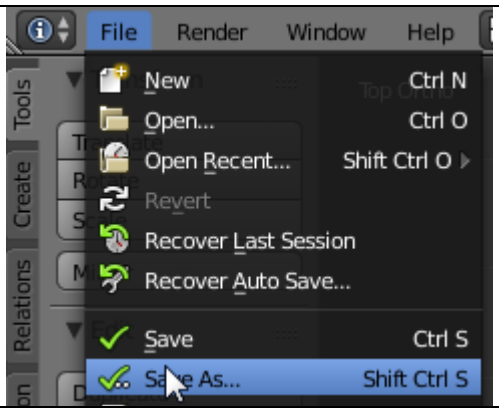
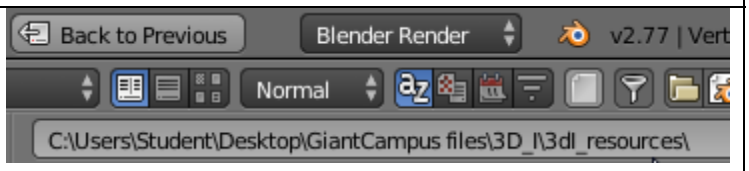
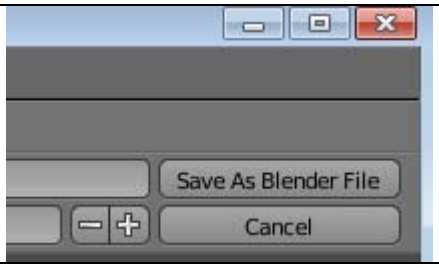
In this lab, you'll create the tire object for the car that you'll build later in this project.

Set Up the Workspac

Complete these steps to set up an empty Blender workspace.

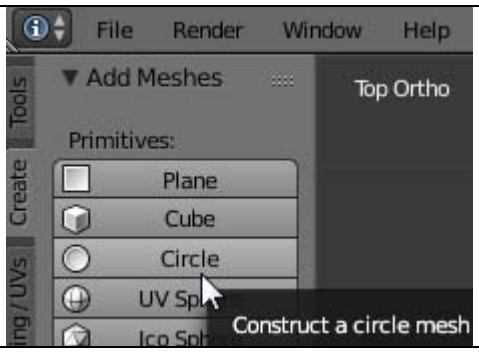
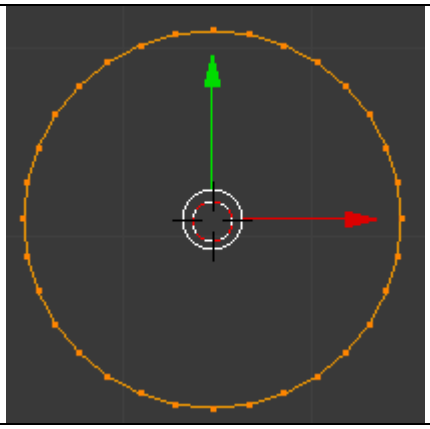
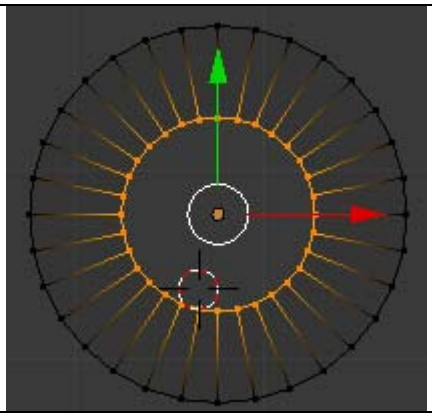
1.Open Blender.	
2.Make sure you are in Object Mode. You can also press the TAB key.	
3.Right-click the cube to select it.	
4.Press the X key.	
5.Left-click Delete Selected Object.	

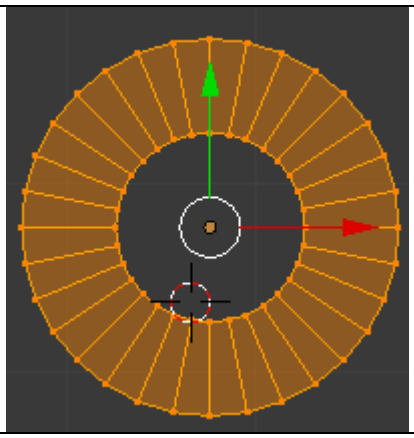
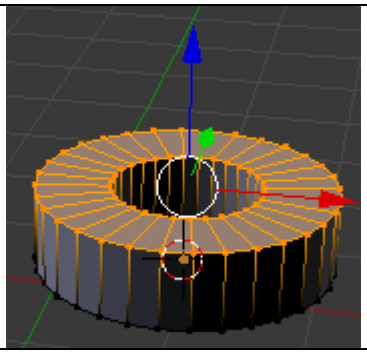
Save the Tire
Complete these steps to save your project.

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.	

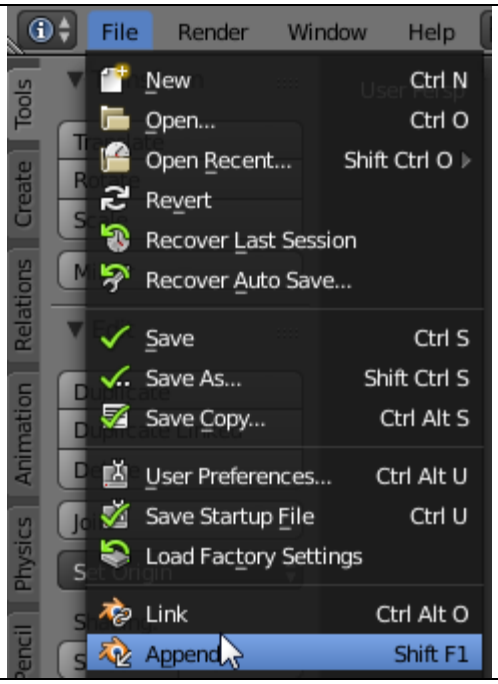
Library

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.

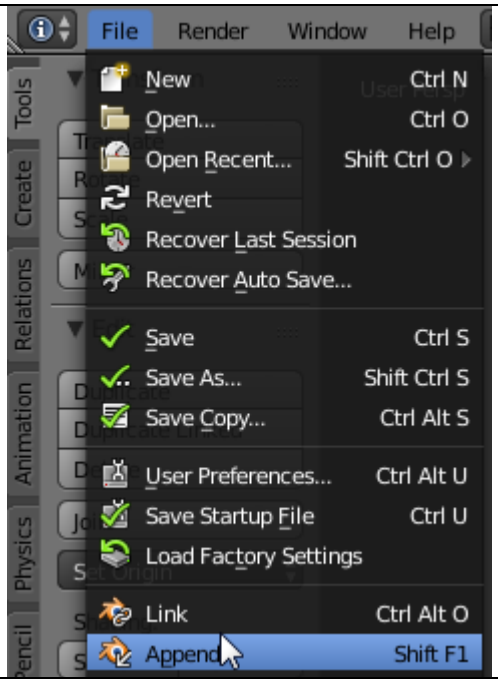
On the next page, you'll use the Append command to get premade materials for your tire.

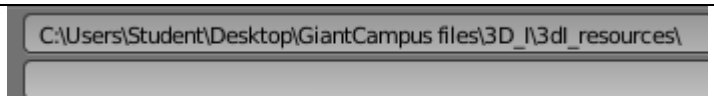
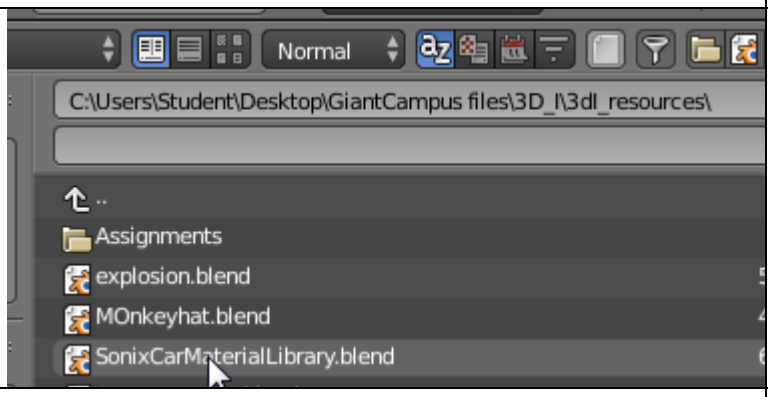
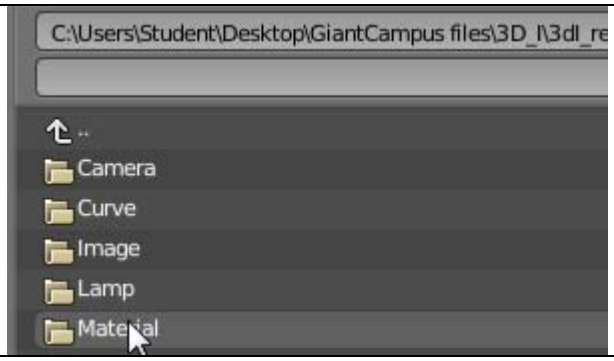
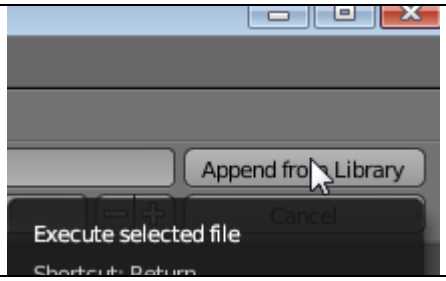


Append Car Tire Rubber

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

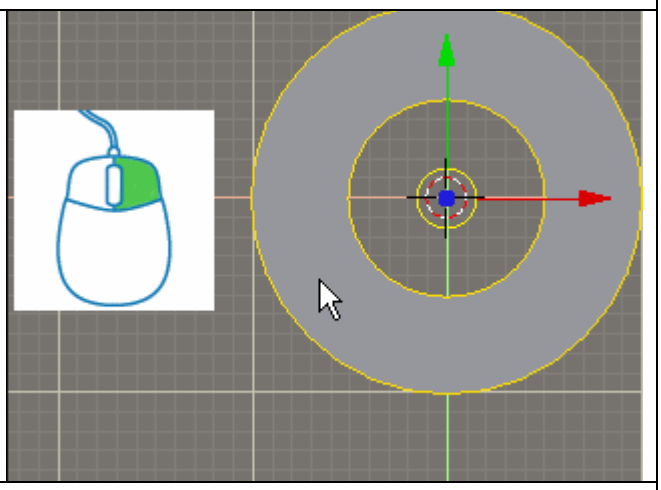
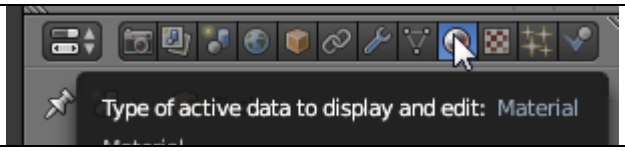
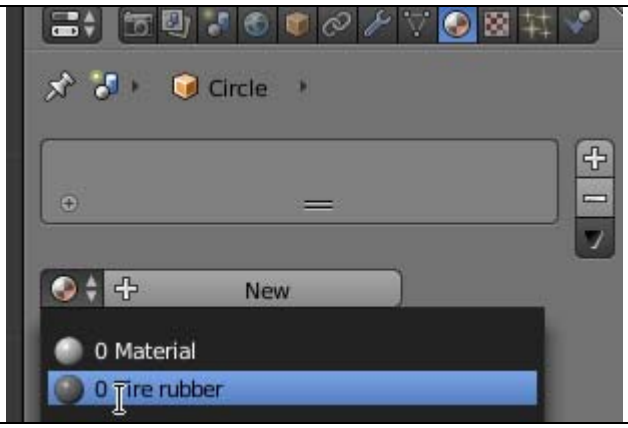
1. Make sure you are in Object mode. At the top of the 3D View window, left-click File and left-click Append.



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

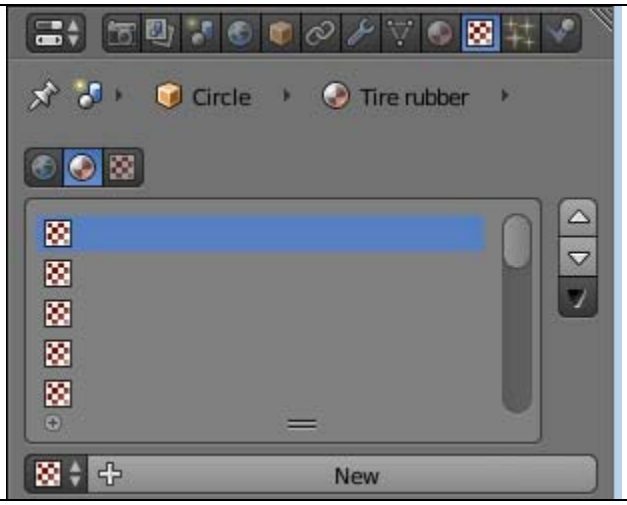
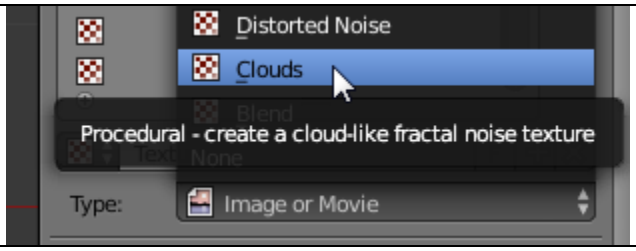
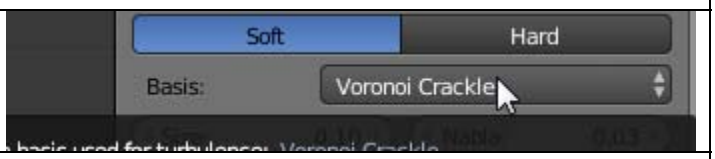
Complete these steps to add a rubber-like texture to the tire.

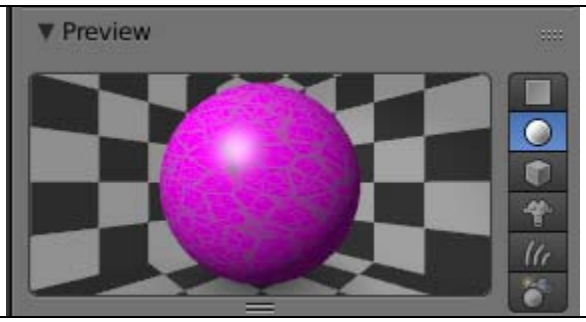
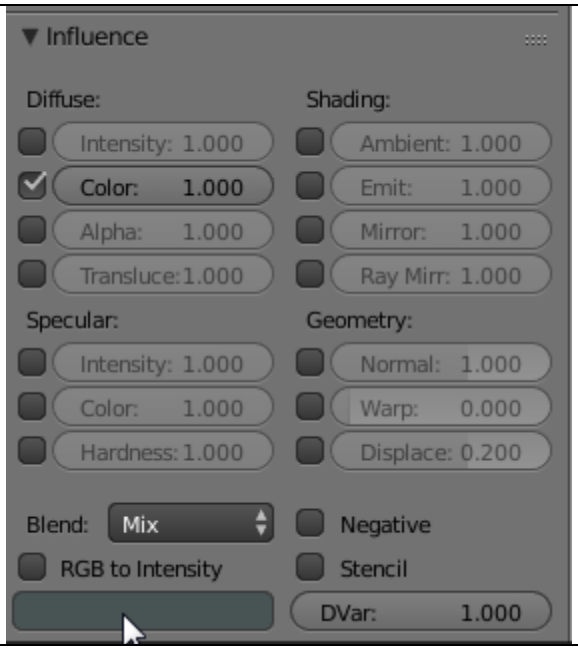
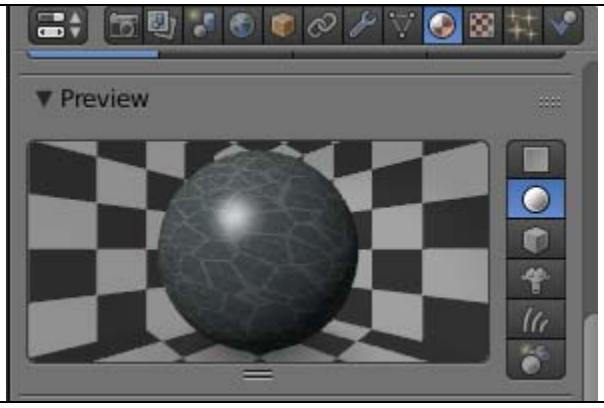
1.From Object Mode.	
2.Make sure the tire is still selected. If not, right-click the tire to select it.	
3. Select the Material Button and left-click it to select it.	
4.Next to Add New, left-click the drop-down arrows button and left-click Tire Rubber.	

Add Texture to the Rubber Material

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

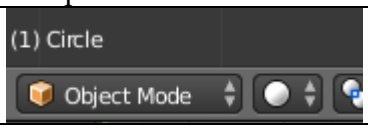
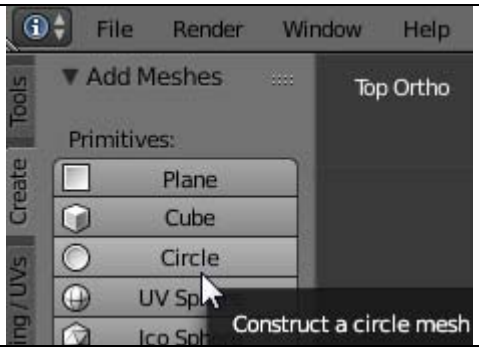
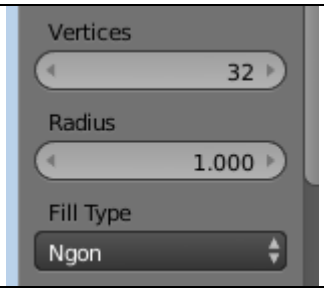
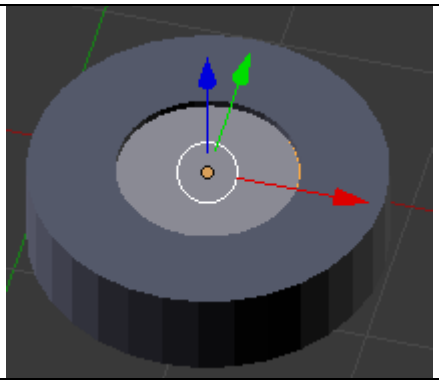
1. Select the Texture Button and left-click it to select it.	

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.	

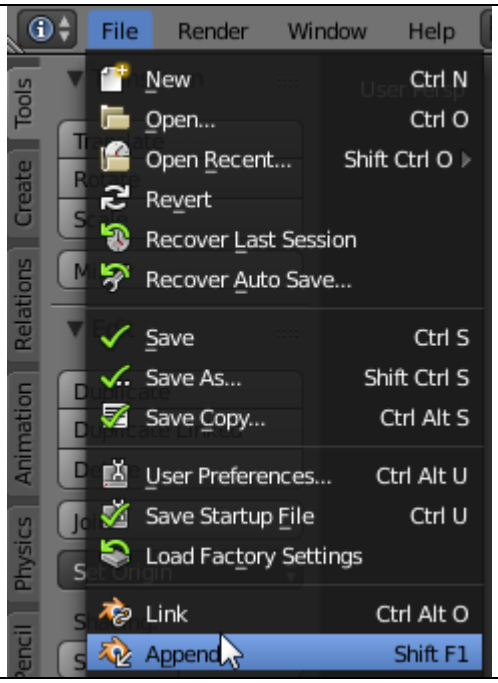
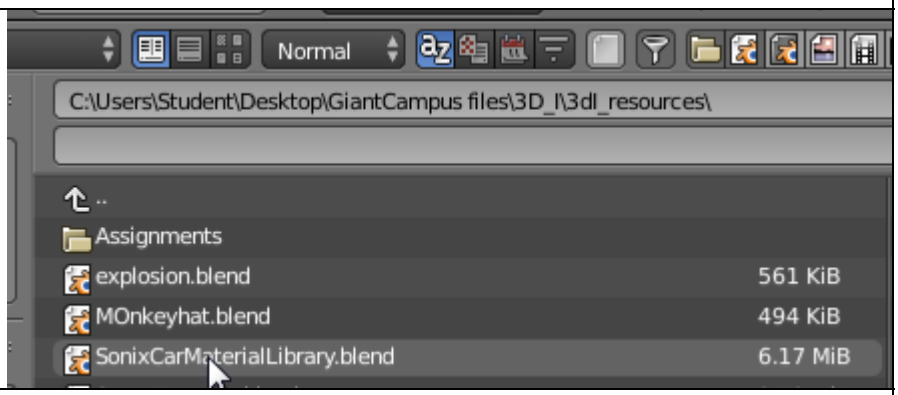
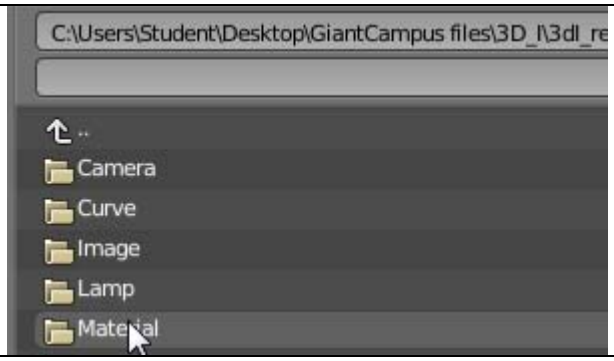
Make the Hubcap

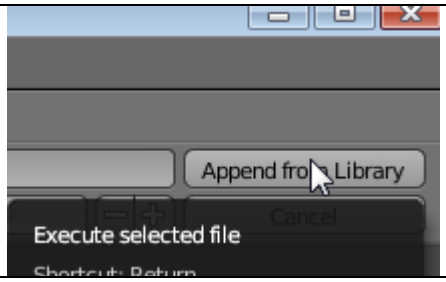
Complete these steps to add a hubcap to the tire.

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

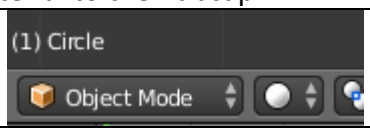
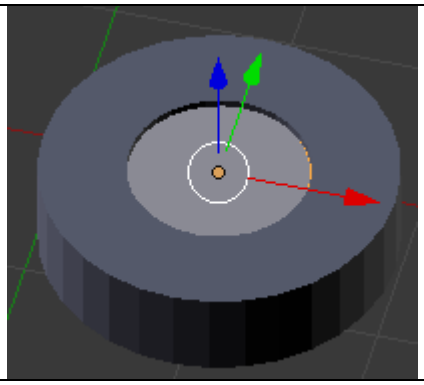
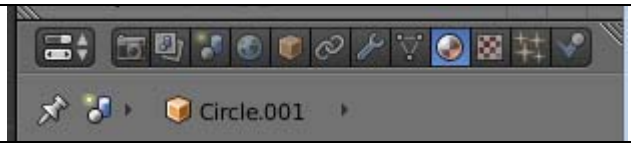
Complete these steps to make the hills smoother.

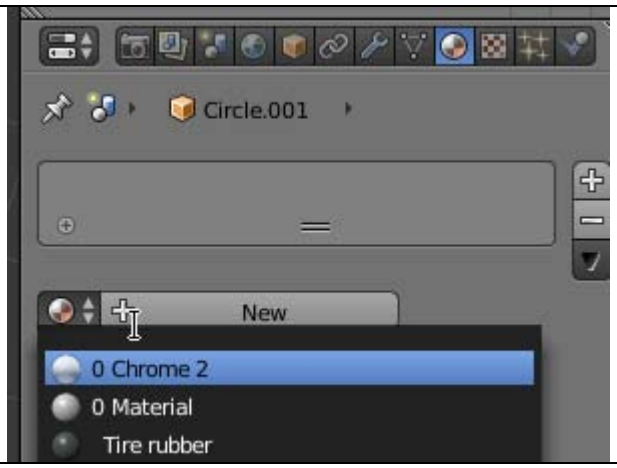
1.At the top of the 3D View window, left-click File and left-click Append.	
2.Left-click SonixCarMaterialLibrary.blend.	
3.Left-click Material.	

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

Add the Chrome Material

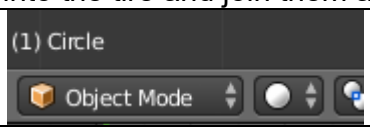
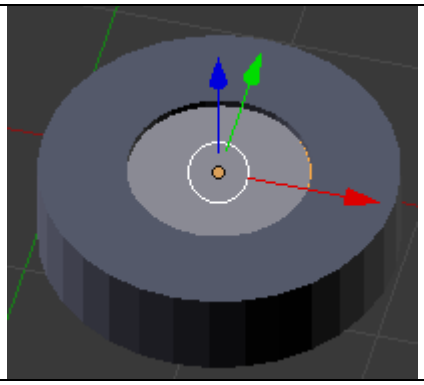
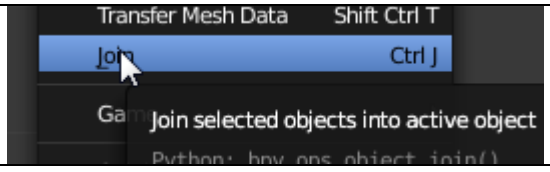
Complete these steps to add the chrome material to the hubcap.

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.

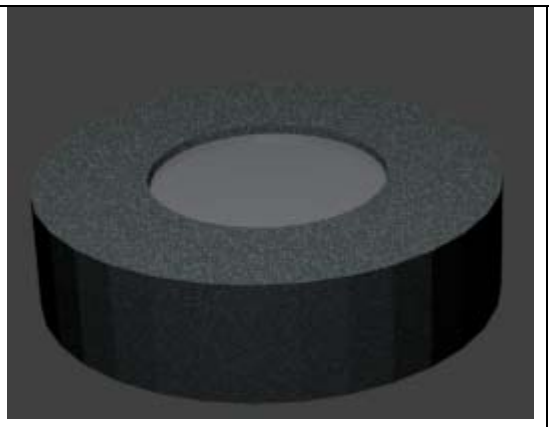
1.Make sure you're in Object Mode. If not, press TAB.	
2.Make sure that the hubcap is still selected. If not, right-click it.	
3.Use the Translate Manipulator Mode to move the hubcap to the center of the tire.	
4.Press and hold SHIFT and right-click the tire.	
5.At the bottom of the 3D View window, left-click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

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Lab 2 Introduction

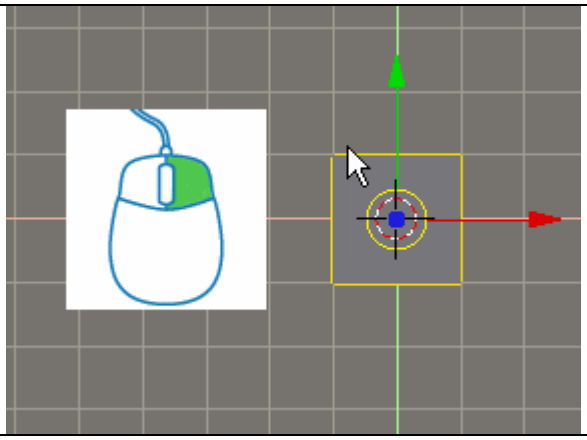
In this lab, you'll build the basic car shape.

Set Up Your Workspace

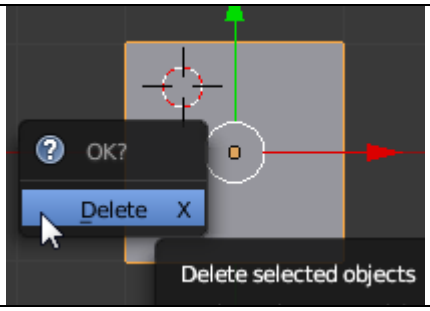
Complete these steps to set up your workspace with a background image. You'll use this background image as a guide to help you build a car.

1.Open a new Blender project.

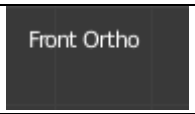
2.Right-click the cube to select it.

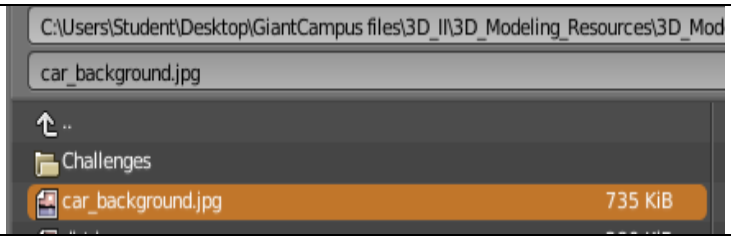


3.Press the X key and left-click Erase Selected Object(s) to delete the cube.



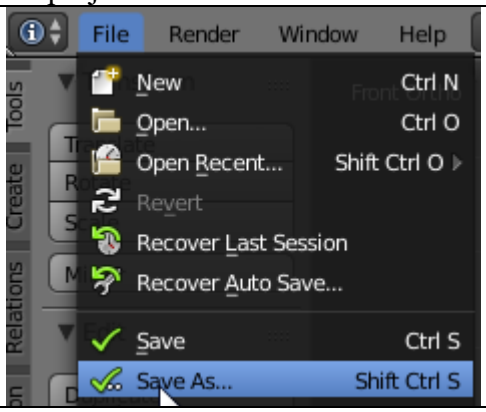
4. Set your view to Front Ortho, Number 1. We will use this view to add a Background image of the side of a car

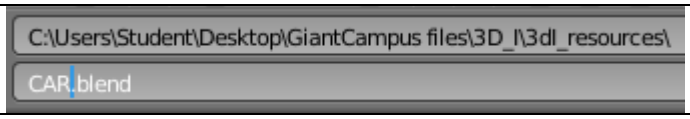
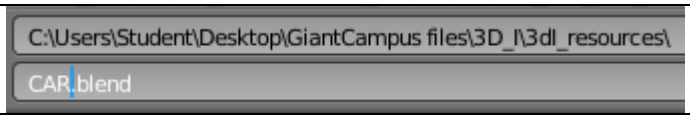
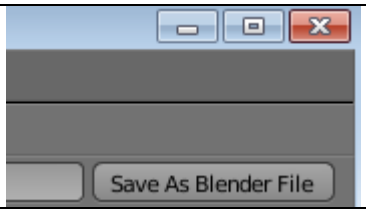


4.To add a Background image press the 'N' Key on your keyboard and a panel will appear on the right of your window. Left-click the arrow to the left of Background and Select it with the check mark.	
5.Left-click the Open button.	
6.Left-click car_background.jpg from the Modeling Resources folder and 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.

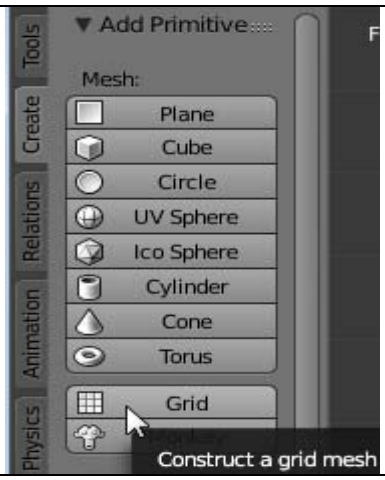
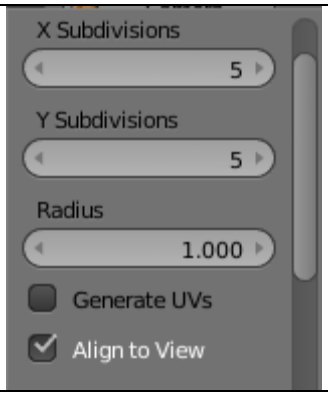
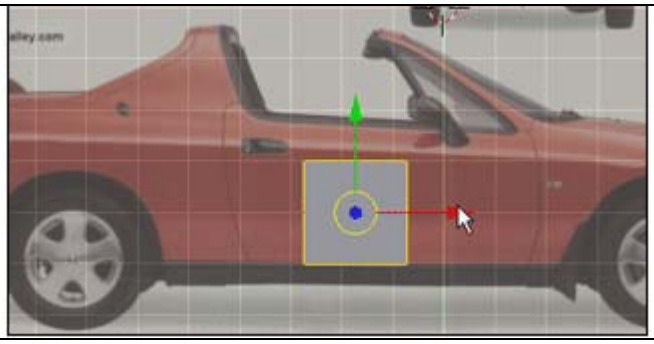
1.At the top of the 3D View window, left-click File and left-click Save As.	

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.

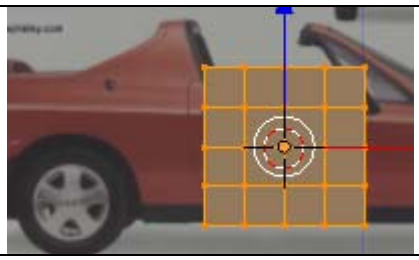
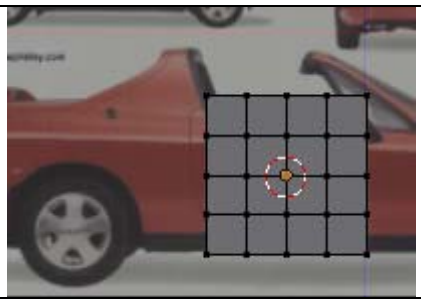
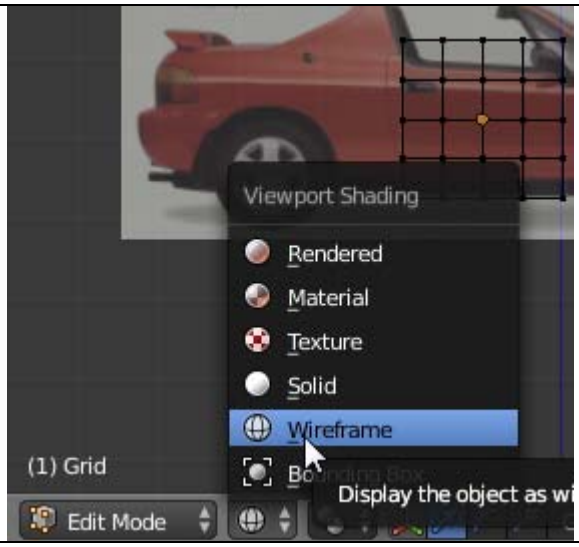
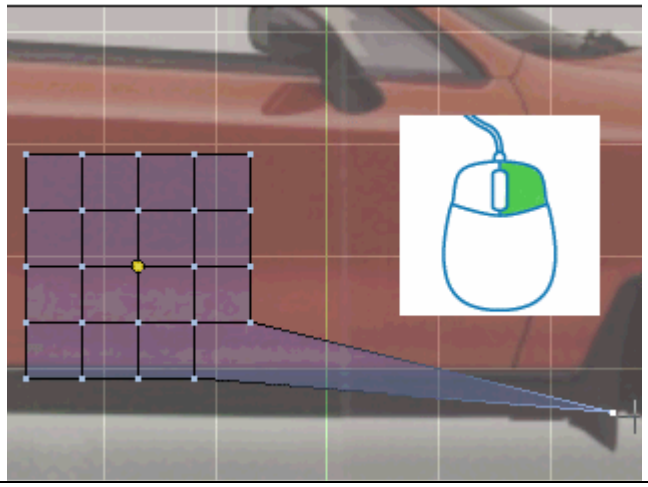
1.You should still be in the Front Ortho View.	
2. Place the mouse marker in the center of the door of the car image.	

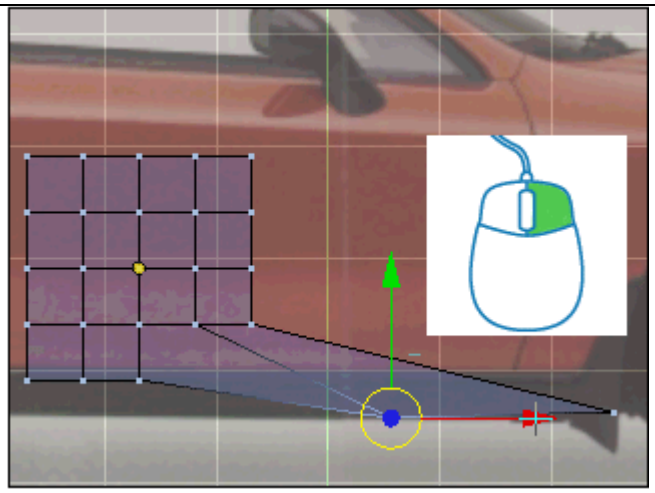
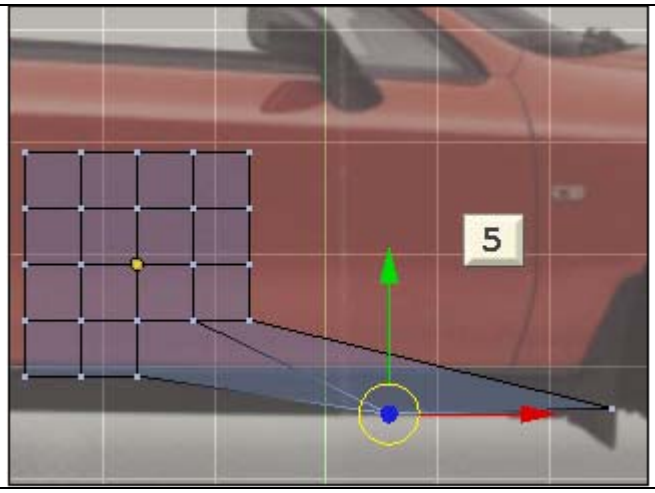
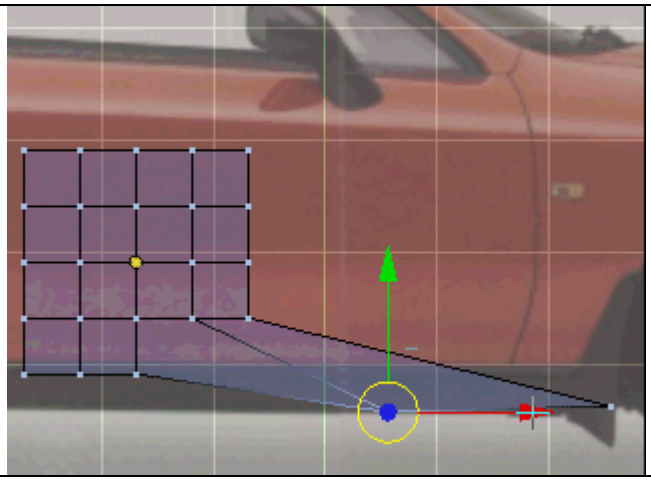
3.From the Create Tab and Add Primitive select Grid.	
4.In the Add Grid box, left-click X res and type 5. Press ENTER. In the Add Grid box, left-click Y res and type 5. Press ENTER. Left-click OK. Check the Align view option.	
The entire grid should be on the side view of the background car image. TIP: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

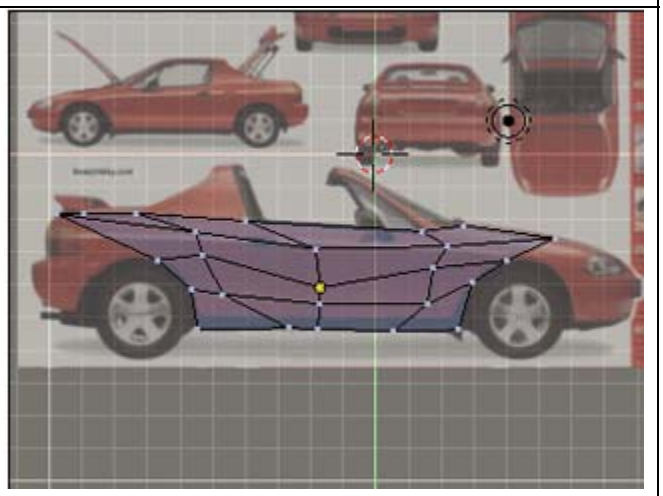
2.Now change the mode to Edit Mode or press TAB to see the grid.	
3.Make sure all of the vertices are unselected. If not, press the A key.	
4.Press the Z key to switch to the Wireframe Draw Type. This will make it easier to see the background image as you stretch out the grid.	
5.Right-click and drag 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.

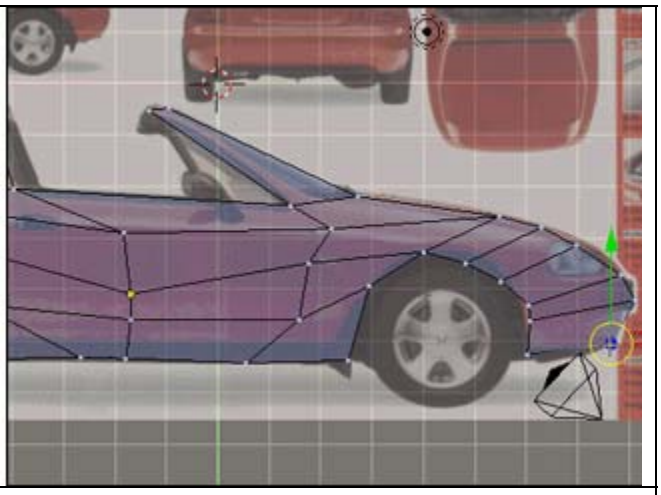
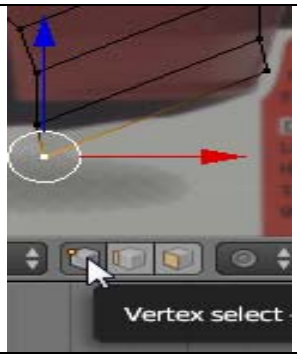
1.Continue stretching vertices to get the grid to match the background image. TIP: Watch the demonstration movie for one example of how to do this. You won't have to do the top or the nose or back end of the car yet.



Finish the Grid

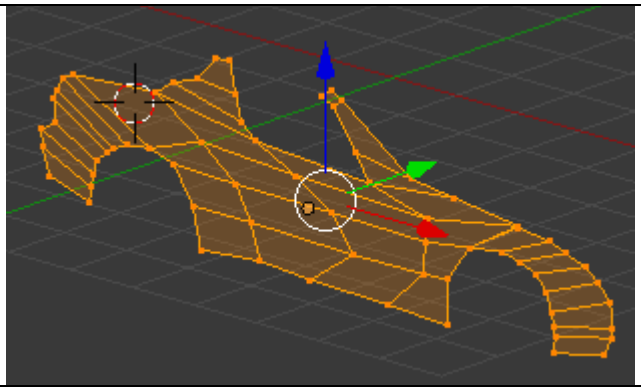
Complete the steps below to extrude the grid's lines into the rest of the car's shape.

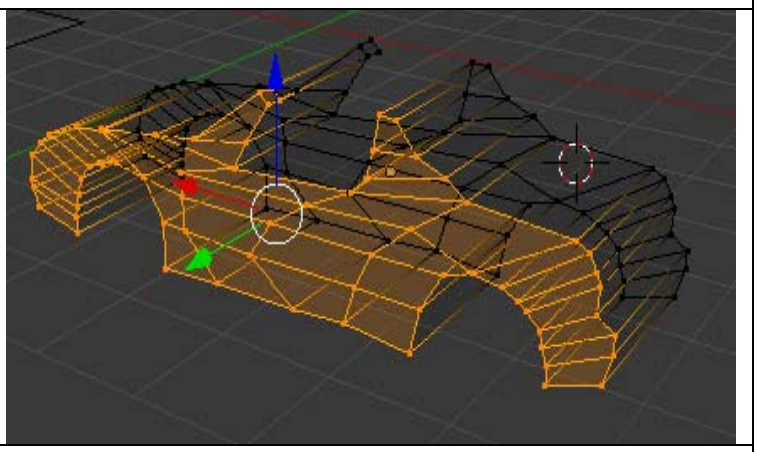
1.Extrude the grid's lines to sketch out the rest of the car's basic shape by using the Edge Select. This change from selecting a point to and edge.
After you select and edge press eht 'E' the move your mouse to extrude that edge.

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.	

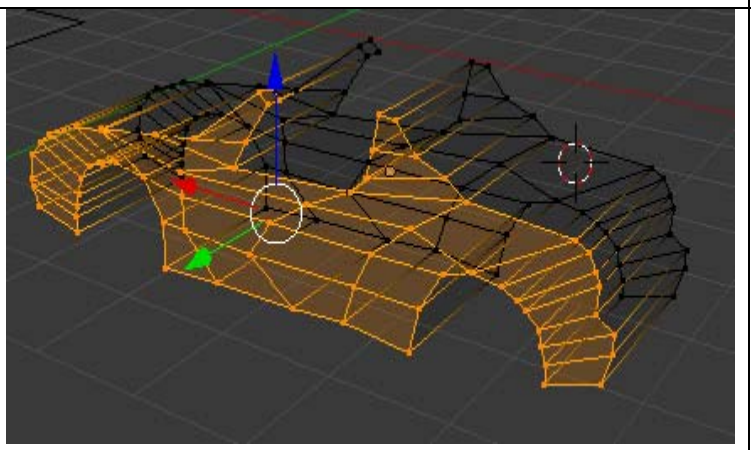
3.Press the E key to extrude and left-click Region.	
4.Extrude the plane up along the Z-axis about 4 boxes. You don't need to get this exactly right.	
5.Save the car as a new file name CAR_3D.	

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.



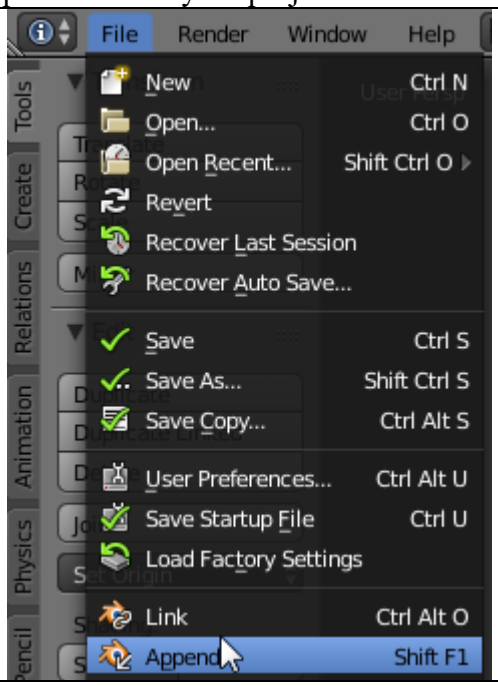
SUMMARY	In this lab, you: • Added a background image guide and a subdivided grid. • Stretched the vertices of the grid to create a 2D model of the side view of a convertible. • Extruded the 2D model along the Z- axis to make it 3D.

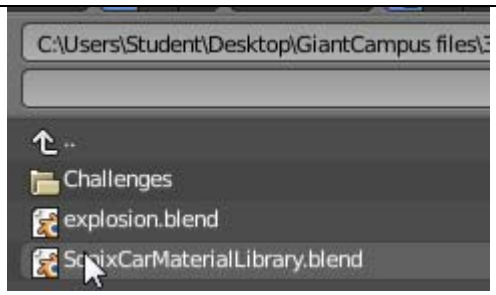
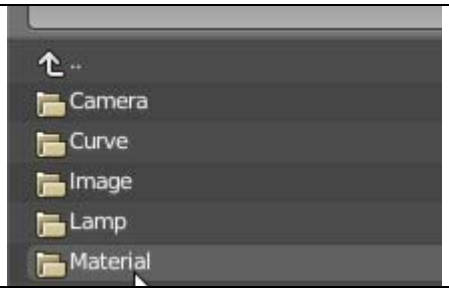
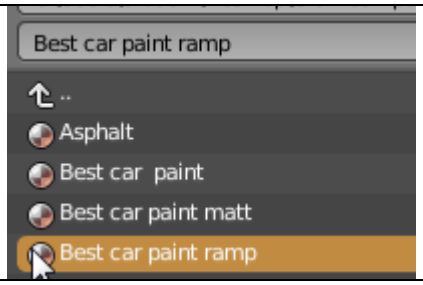
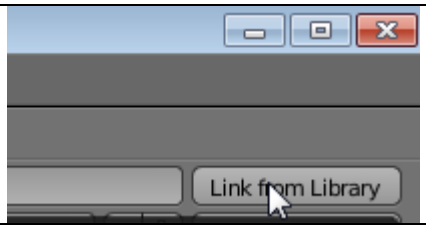
Lab 3 Introduction

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

Append Car Paint

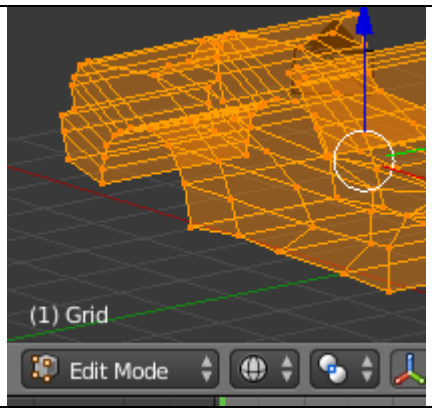
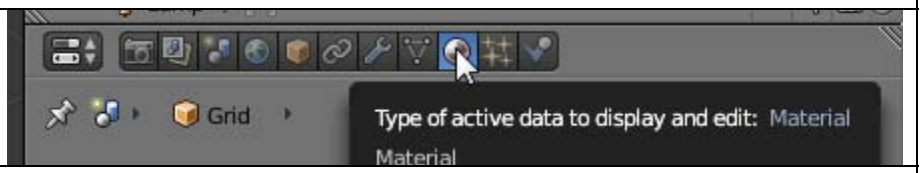
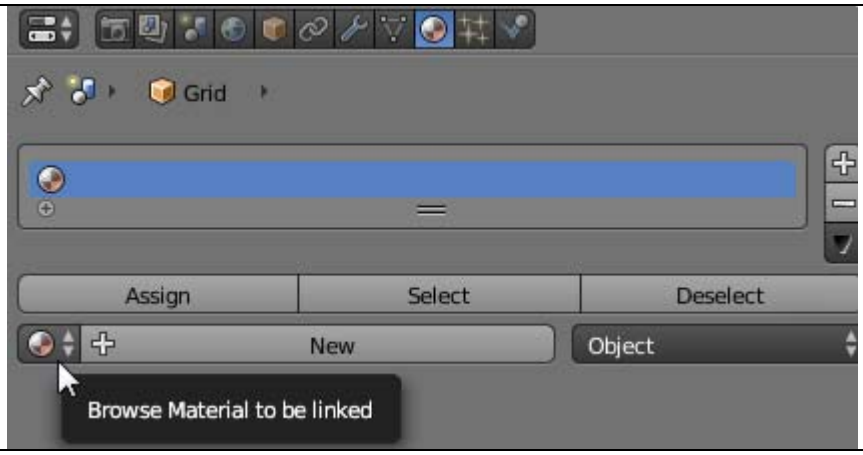
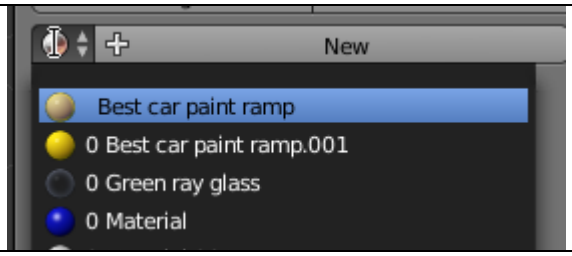
Complete these steps to append a premade car paint color to your project.

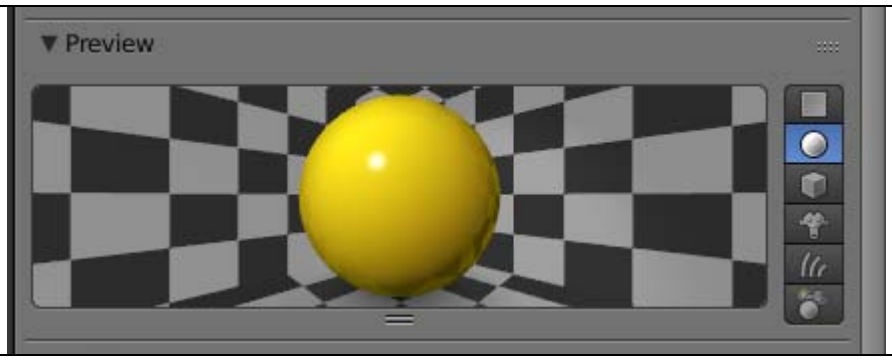
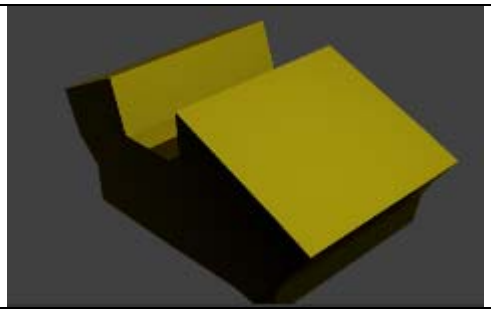
1.At the top of the 3D View window, left-click File and left-click Append or Link. TIP Append or Link is not accessible in Edit Mode so change to Object Mode.	
2.Make sure you're in the C:\profiles\username\3D_Modeling_Resources\ directory. If not, navigate to it.	

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

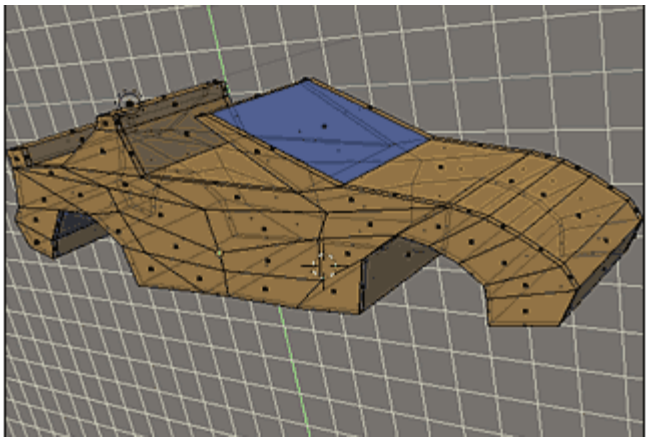
Paint the Car

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:

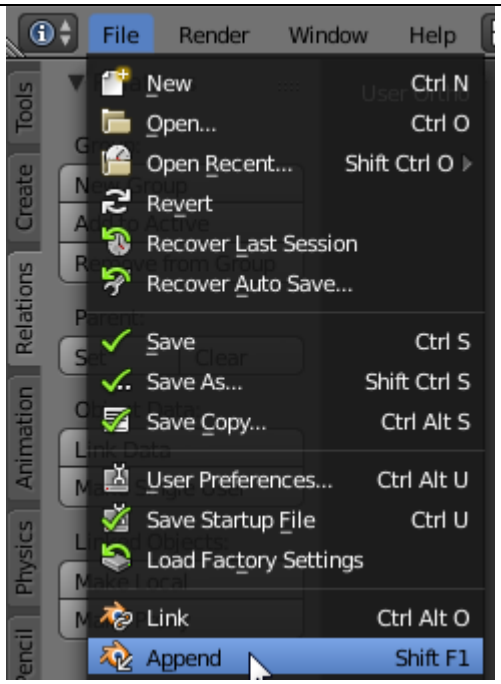
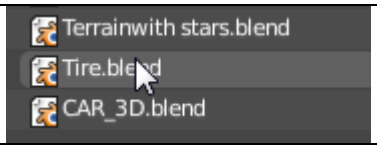
- Created a windshield for the car.
- Added color to the car.

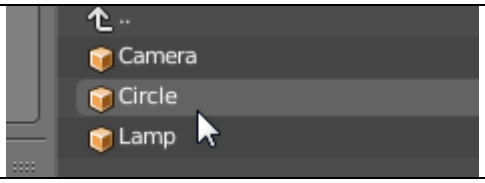
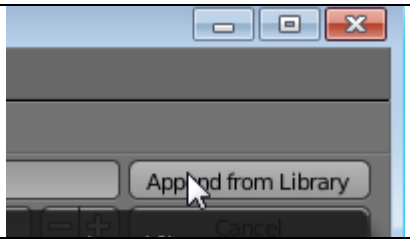
Lab 4 Introduction

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

Append the Tire

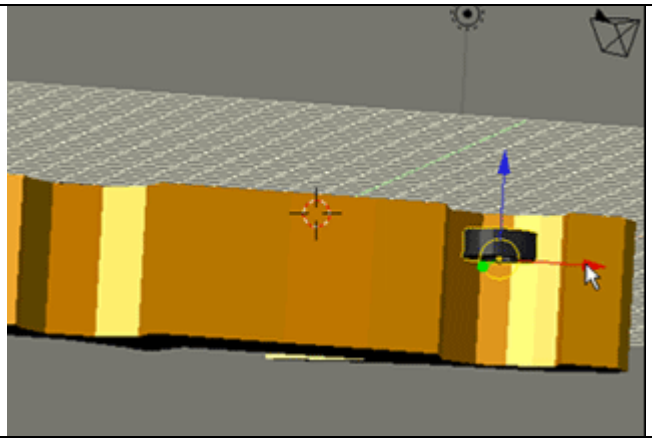
Complete these steps to append the tire you made earlier into the vehicle project.

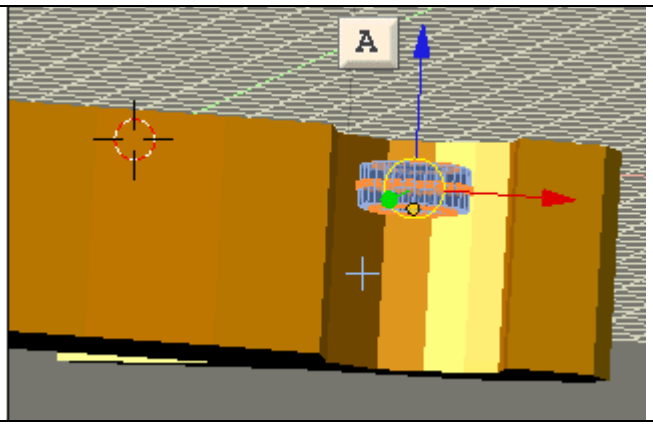
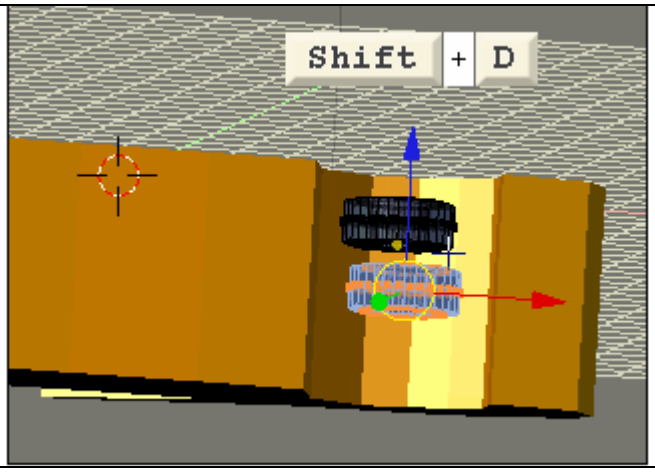
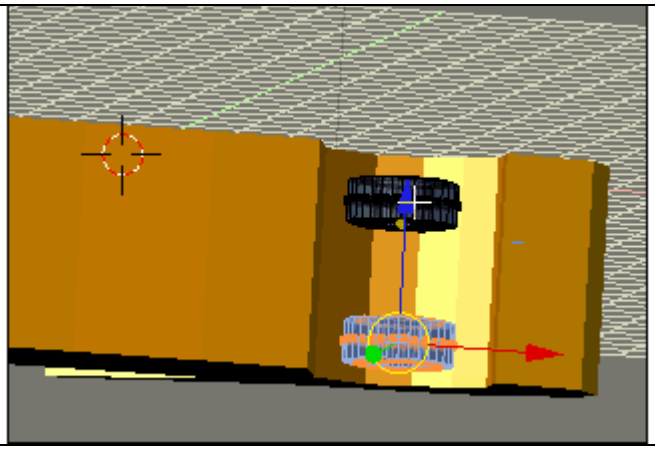
1.Make sure you are in Object Mode. If not, press TAB to switch to Object Mode.	
2.At the top of the 3D View window, left-click File and left-click Append or Link.	
3.Make sure you're in the C:\profiles\username\3D_Modeling_Resources directory. If not, navigate to it.	
4.Left-click tire.blend.	

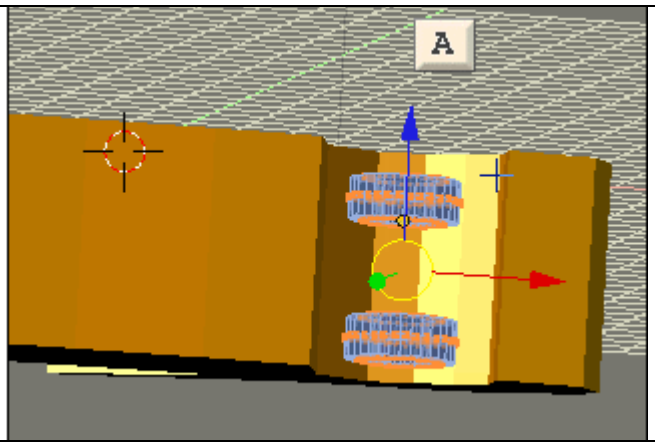
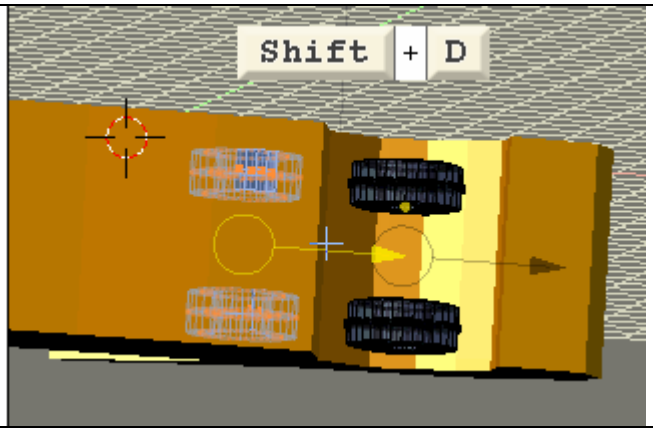
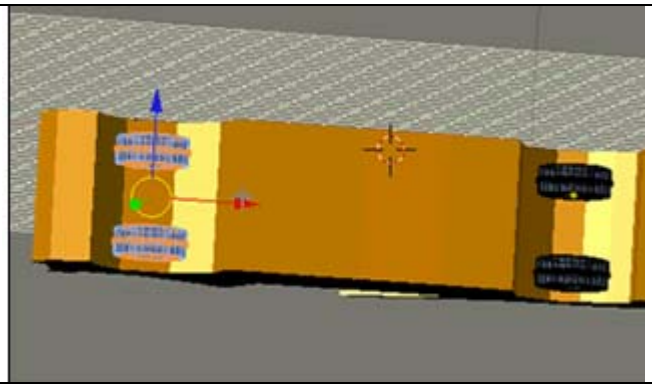
5.Left-click Object.	
6.Left-click Circle. TIP: It's possible that Circle may have some other number at the end of it, but that doesn't matter.	
7.Left-click Load Library. You should see the tire you made in the 3D View window.	

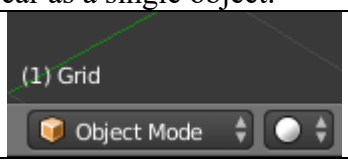
Arrange the Tires

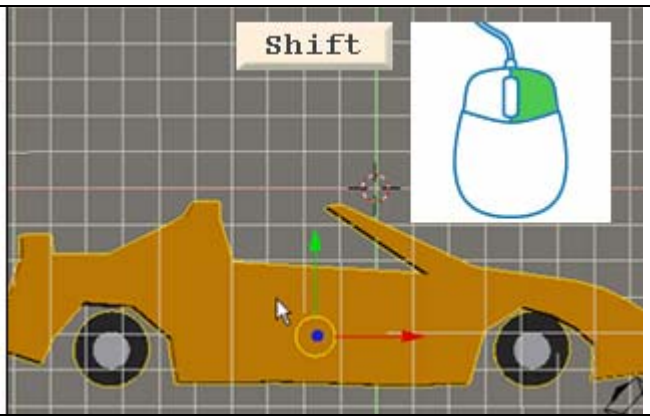
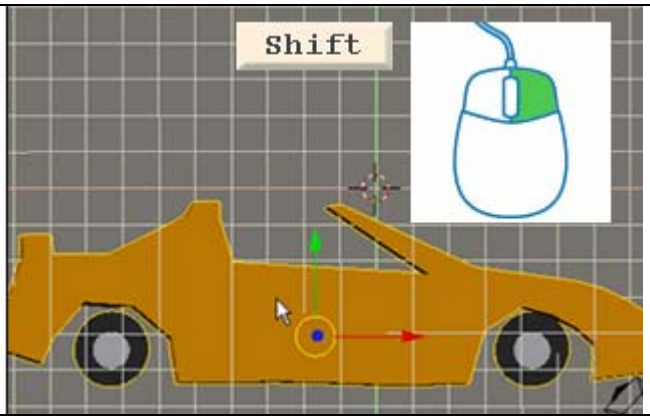
Complete these steps to copy the tires and move them into place at the bottom of the car.

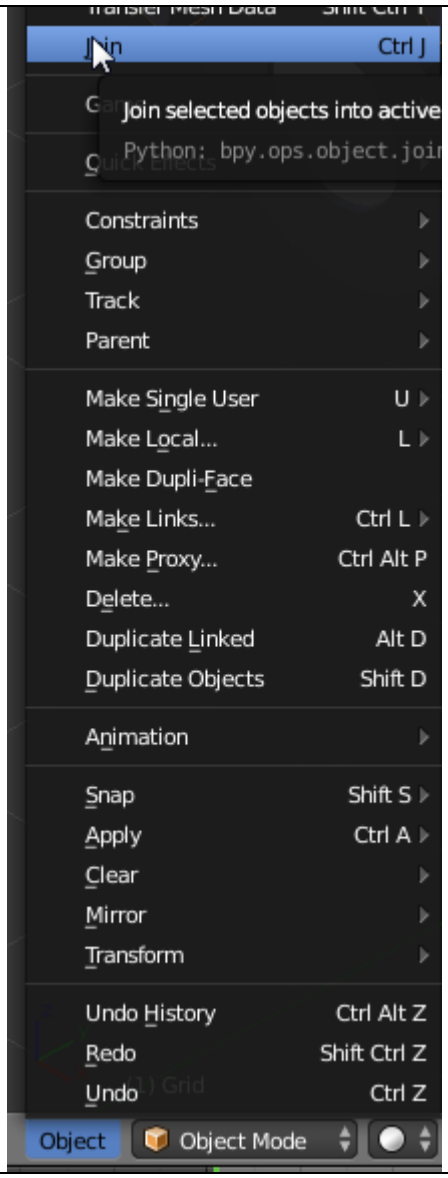
1.Using the Translate Manipulator Mode, move the tire to the bottom of the car in the spot where it should go. TIP: Look at the example if you get stuck.	
2.Press TAB to switch to Edit Mode. This will make sure that all of your tires are grouped together as one object.	

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.	

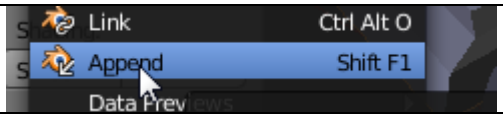
Join the Tires to the Car	
Complete these steps to join the tires to the car as a single object.	
1.Press TAB to switch to Object Mode.	

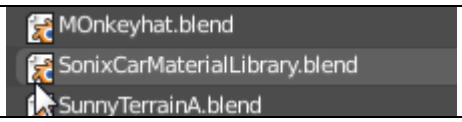
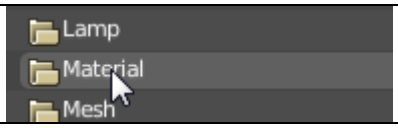
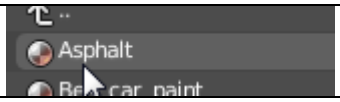
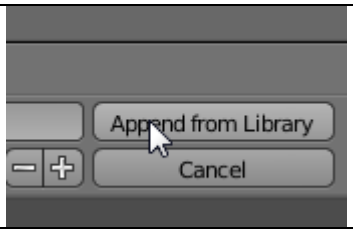
2.Press and hold SHIFT and right-click the tires and the car to select them. TIP: The tires are a single object. Clicking one tire will select them all.	
3.Make sure that all four tires and the car are selected. If not, press and hold SHIFT and right-click the unselected car or tire.	

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

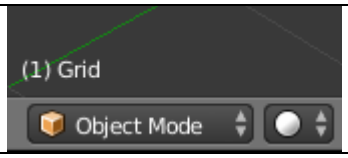
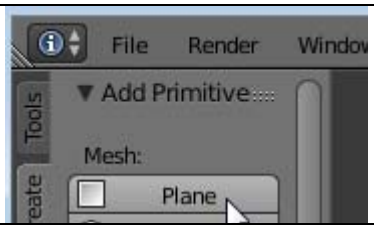
Complete these steps to append an asphalt texture for the car to drive on.

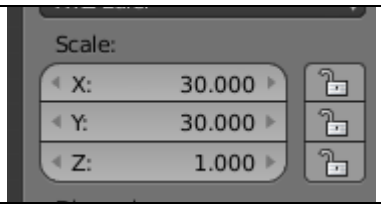
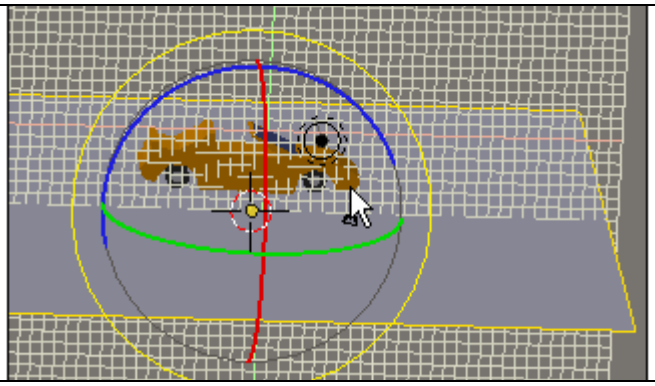
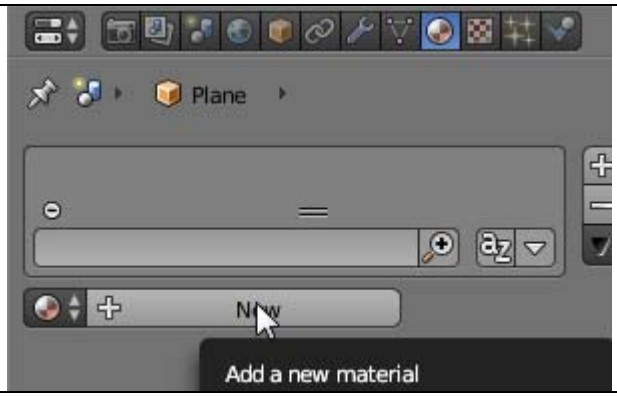
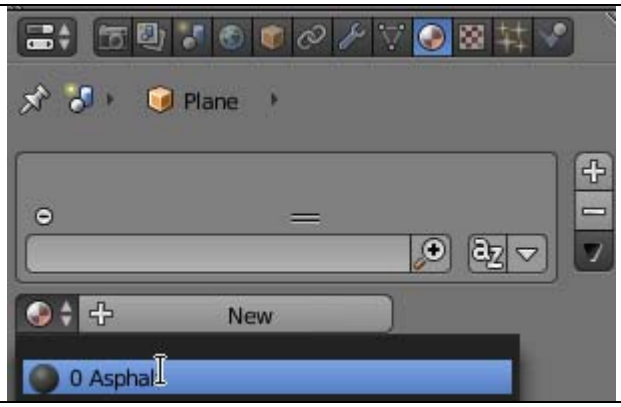
1.At the top of the 3D View window, left-click File and left-click Append or Link.	
2.Make sure you're in the C:\profiles\username\3D_Modeling_Resources directory. If not, navigate to it.	

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.

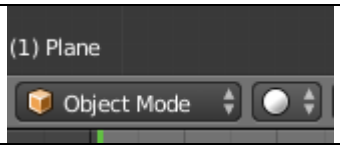
1.Make sure you're in Object Mode. If not, press TAB.	
2.From the Create Tab and Add Primitive left-click Plane.	
3.Press the N key to bring up the Transform Properties panel.	

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.

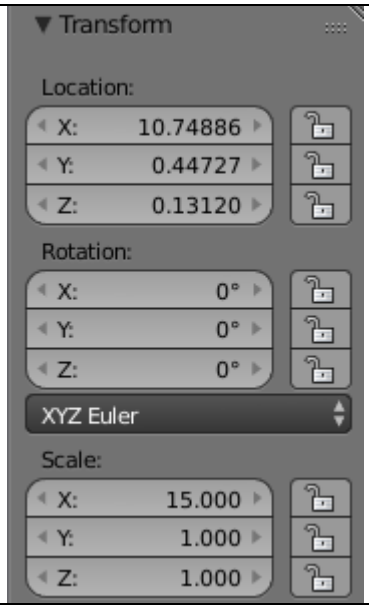


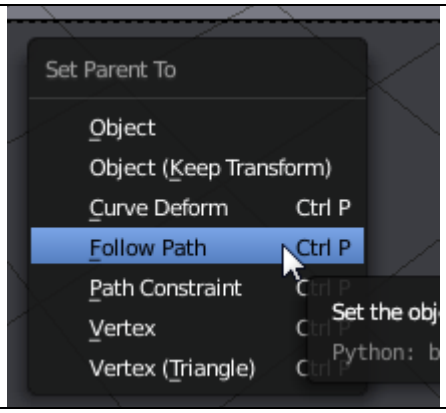
2.From the Create Tab and Add Primitive left-click Path. TIP: You may need to move the path above the plane so that you can see it.

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

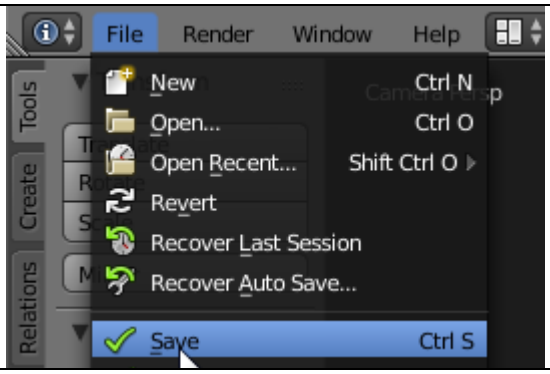
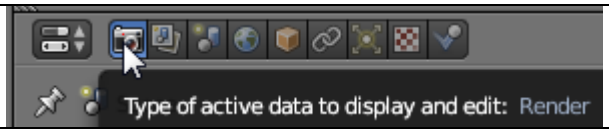
4.Left-click the Link Scale button. This will scale the path to the correct size, regardless of which direction it's pointed.

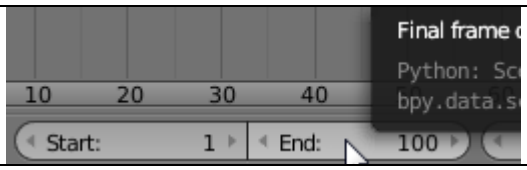
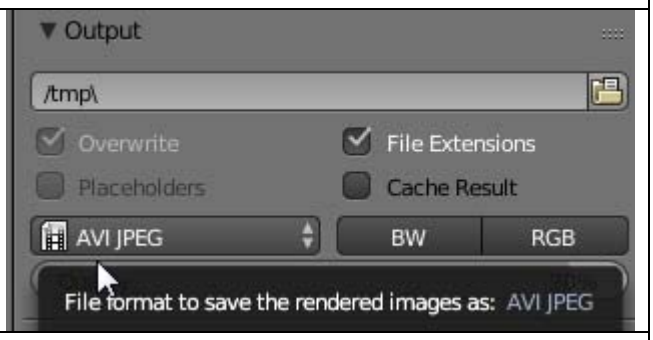
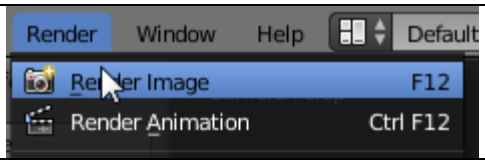
5.Left-click ScaleX and type 15. Press ENTER.



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.

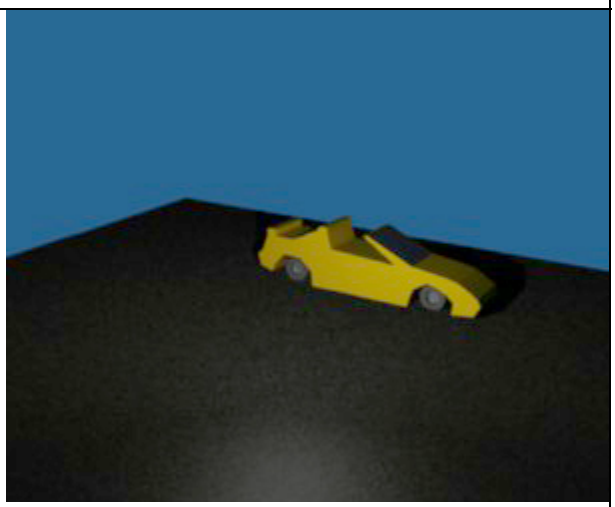
1. Is the car in the movie window? If not, you may need to move the camera.

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.