Online Help

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Introduction

Nendo is an integrated Modeling and Painting tool for creating 3D objects. There are two modes in Nendo, Model and Paint.

Model

In Model, you create and modify objects. You can start with one of the primitives supplied with Nendo or import objects in a variety of file formats. Once you've loaded an object, you manipulate points, edges, or faces to add detail where you need it. As you model, you can change how the object is displayed, for example, choosing between shaded and wireframe mode. Plus, you can view your object from any angle by rotating the camera.

Paint

After you create an object, simply click on the Paint button and you are ready to paint directly onto the surface of your object in 3D. Once in Paint, a toolbox containing a wide variety of configurable, easy-to-use brushes and tools appears. You use these tools to color and paint your objects. You can paint on the object with imported images or colors created in the Color Mixer. As in Model, you can rotate the camera to view your object from any angle.

Creating a Penguin

This tutorial shows you how to model and paint a character. It also introduces you to many of Nendo's Model commands and Paint tools while explaining the buttons, menus, and toolbars.

You can see the ground plane when you open Nendo. For this tutorial, we'll turn the ground plane off and turn the global axes on so you can follow along when we make reference to moving in the X, Y, or Z directions.

- **(CLICK-L)** on **View>Axes** to make the global axes visible, then **(CLICK-L)** on **View>Ground Plane** to turn the ground plane off.

  (CLICK-L) means to click on the appropriate command using the left mouse button. Other conventions used in this tutorial:

(CLICK-M) **(CLICK-R)**	Click with the middle or right mouse button.
(CTRL-L)	Hold down the CTRL key on your keyboard when you click with the appropriate mouse button.
(DRAG-L)	Move the mouse while holding down the appropriate mouse button
"x" hot key	Press the x key on your keyboard.
CTRL-o	Hold down the **CTRL** key when you press the o key on your keyboard.

■ To create a penguin:

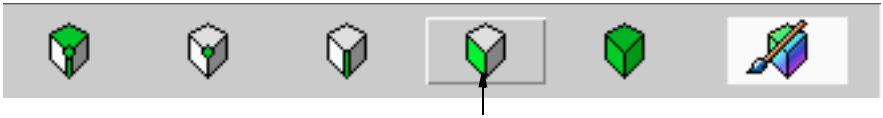
1. Create a cube.

   (CLICK-L) on **File>Add>Cube**.

NOTE...

You can also create a cube if you **(CLICK-R)** *in the Model window and then* **(CLICK-L)** *on* ***Cube*** *in the list that appears.*

2. **(CLICK-L)** on the **Faces** button, shown below.



Faces button

The buttons let you pick what kind of element you want to work with. The buttons are, from left to right, as follows:

	Free	Lets you select any element type. Once you have begun a collection of one type of element, you can collect only that element type.
	Vertices	Lets you select vertices.
	Edges	Lets you select edges.
	Faces	Lets you select faces.
	Objects	Lets you select one or more objects.

As you pass the mouse cursor over any of the buttons, the Status Bar at the bottom of the Nendo window shows the selected element type. This is true for all of the screen elements, commands, and tools in Nendo.

3. Select the cube's top and bottom faces.

   To select the top face:

   - Highlight the face (it turns green) and then click on it (the face turns yellow).
   - When you move the mouse away from the face, the face turns red. It is still selected, but it is no longer highlighted.

   In order to select the bottom face, you have to move the camera. The camera is what you use to look at the window. To move the camera:

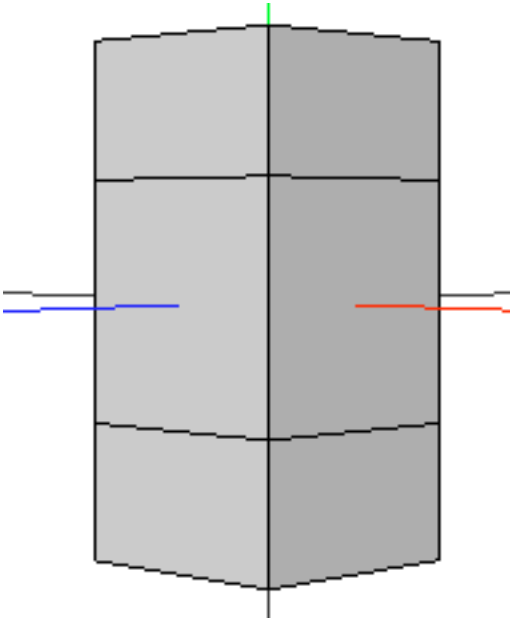
   - **(CLICK-M)** (or use **(CTRL-R)** if you have a two-button mouse) on the window to start the camera
   - After you start the camera, moving the mouse moves the camera.
   - If you need to zoom the camera in or out, **(CLICK-R)** and drag or **(DRAG-M)**.
   - To spin the camera around an object, **(DRAG-M)** or **(CLICK-R)** and drag the mouse left or right after starting the camera, then release the mouse button while still moving the mouse.
   - When you can see the bottom face, **(CLICK-L)** in the window to stop the camera. Then, select the bottom face.

4. After you've selected both faces, **(CLICK-R)** in the Model window to bring up the Faces Operations menu.

The Faces Operations menu lists all of the operations that can be performed on faces. Whenever an element is highlighted in the Model window, you can **(CLICK-R)** in the Model window, to see the Operations menu for that element type.

5. **(CLICK-L)** on **Extrude>Normal**.

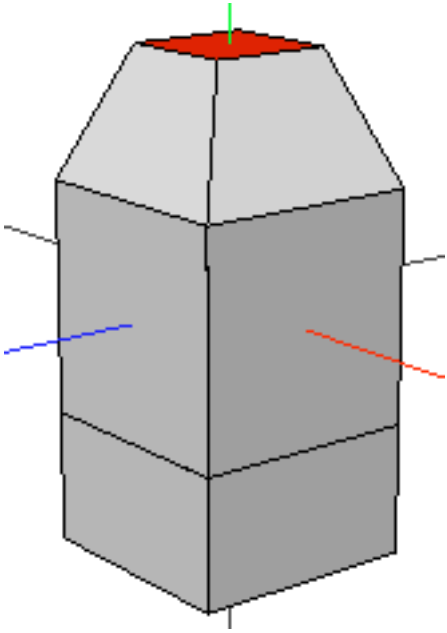
   Extrude the faces until you have three cubes stacked on top of each other. In order to see the cube with the new extrusions, you may need to move the camera back a bit.



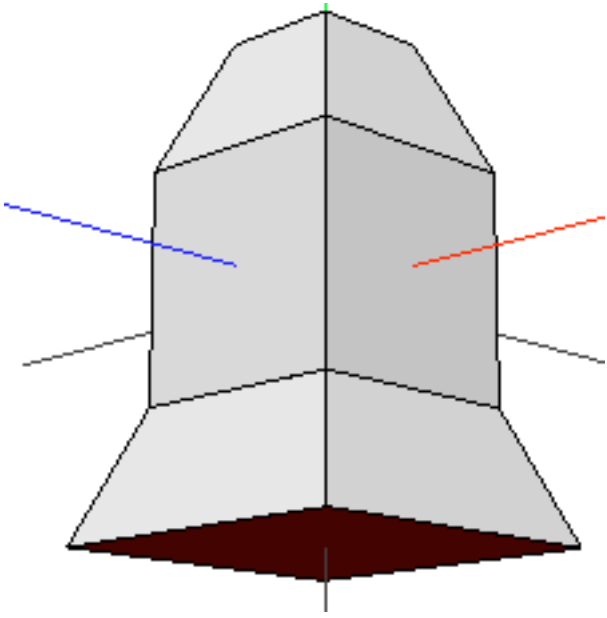
6. Deselect the faces using the one of the following:

   - Press the space bar to deselect any elements
   - **(CLICK-L)** on **Select>Clear Selection**
   - **(CLICK-L)** on each of the faces that you have selected
   - **(CLICK-L)** on one of the buttons

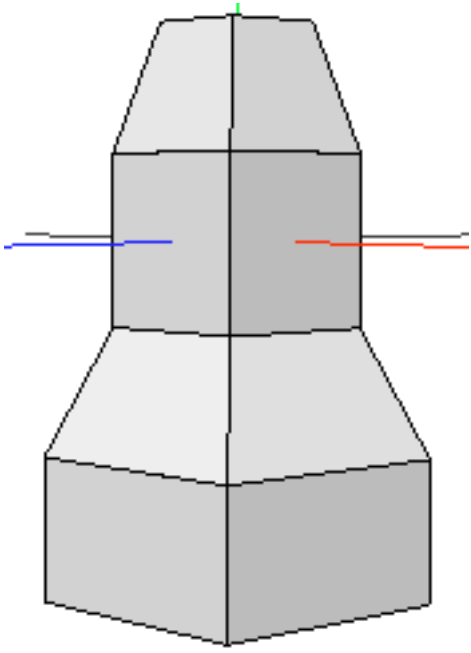
7. Select the top face, then **(CLICK-R)**. **(CLICK-L)** on **Scale>Uniform** and shrink the face.



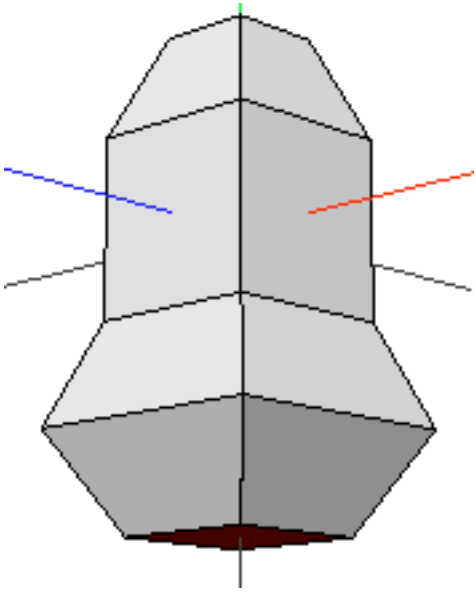
8. Do the same thing with the bottom face, this time making the face bigger. Your object should now look something like this:



9. With the bottom face still selected, **(CLICK-L)** on **Extrude>Normal** and pull the face down.

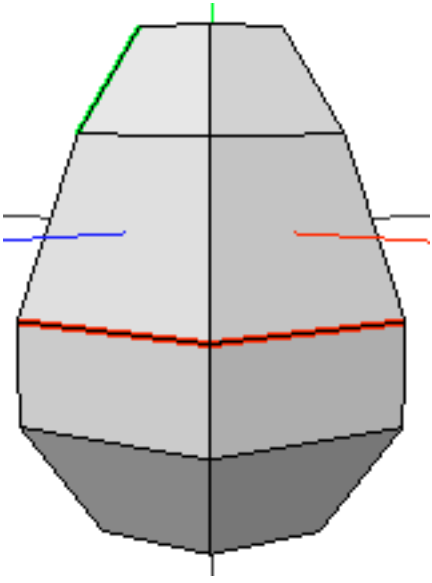


10. Use **Scale>Uniform** to shrink the bottom face.



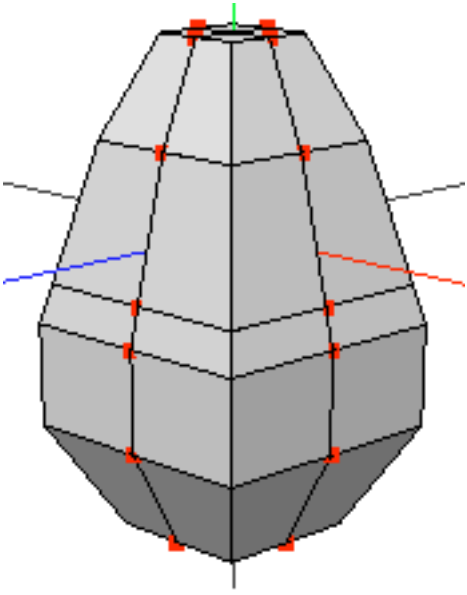
11. **(CLICK-L)** on the **Edges** button and select the horizontal edges that form the bottom of the original cube.

12. **(CLICK-R)** in the Model window to bring up the Edges Operations menu, then **(CLICK-L)** on **Scale>Uniform**. Scale the edges out until your model is pear shaped.



13. Select the **Object** button and then **(CLICK-L)** on your character.
14. In the Objects Operations menu, **(CLICK-L)** on **Cut2>X** to add edges along the X axis. Then, **(CLICK-L)** on **Cut2>Y** and **(CLICK-L)** on **Cut2>Z** to add edges along each of those axes.

15. Select all of the new vertical edges on your character (shown below). Then, **(CLICK-L)** on **Select>Select Adjacent>Vertices** to select all of the vertices adjacent to these edges.

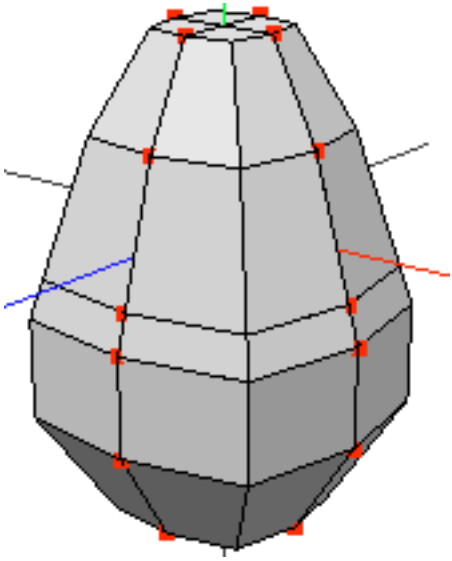


NOTE...

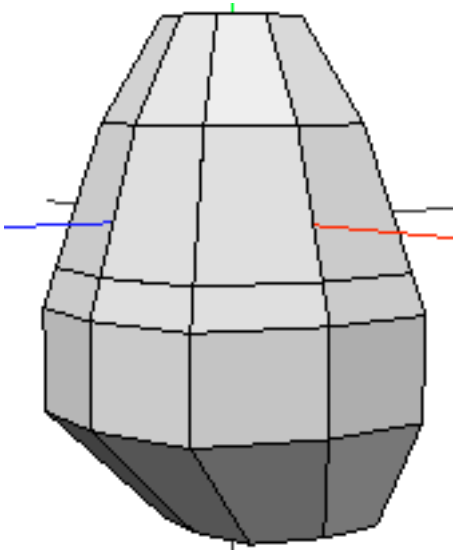
You can also use the "v" hot key to select the vertices of the currently selected elements.

16. In the Vertices Operations menu, **(CLICK-L)** on **Scale>X** and pull those sides out slightly.

17. **(CLICK-L)** on **Scale>Z** to round out the character.



18. Select the four faces on the bottom of the Penguin, then **(CLICK-L)** on **Move>Z** to move them back a bit.



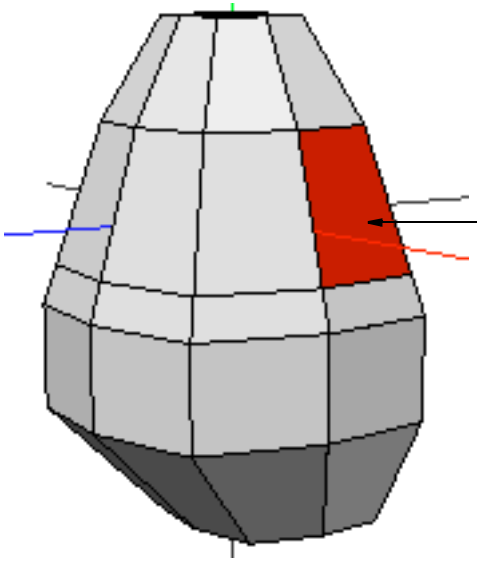
Building the Penguin's Wings

19. Press the "x" hot key to align the camera with the X axis.

> **NOTE...**
>
> *You can use the SHIFT key with the "x", "y", or "z" hot key to align the camera with the -X, -Y, or -Z axes.*

20. Press the space bar hot key to deselect the faces on the bottom of the penguin.

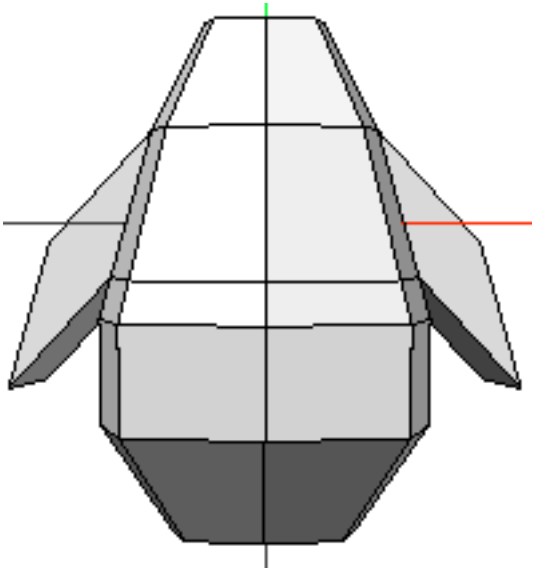
21. Next select the face shown below and the corresponding face on the other side of the penguin. These will become the penguin's wings.



22. Once the faces are selected, press the "z" hot key to align the camera with the Z axis.

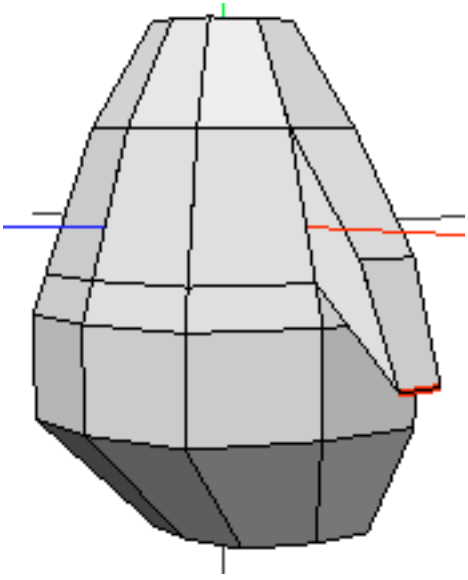
23. In the Faces Operations menu, **(CLICK-L)** on **Extrude>Normal** and pull the wings out from the body.

24. With the faces still selected, **(CLICK-L)** on **Move>Y** in the Faces Operations menu to move the wings down.



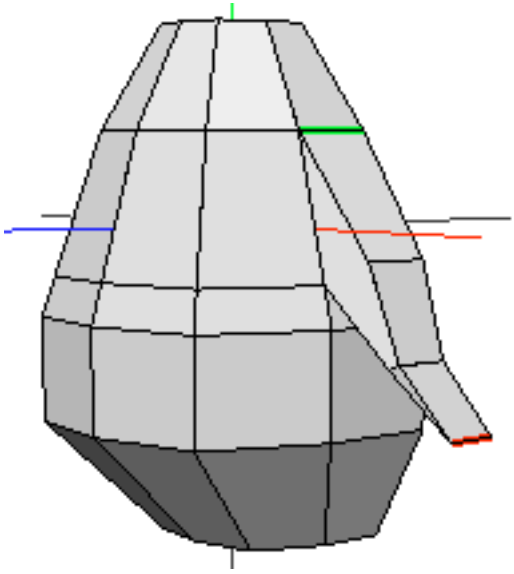
25. Press the "v" hot key to select the vertices of the selected faces, then **(CLICK-L)** on **Scale>Uniform** to bring the wings towards the body as you scale the vertices around the midpoint of the collection.

26. Select the bottom edges of the wings and **(CLICK-L)** on **Scale>Uniform** to taper the wings.



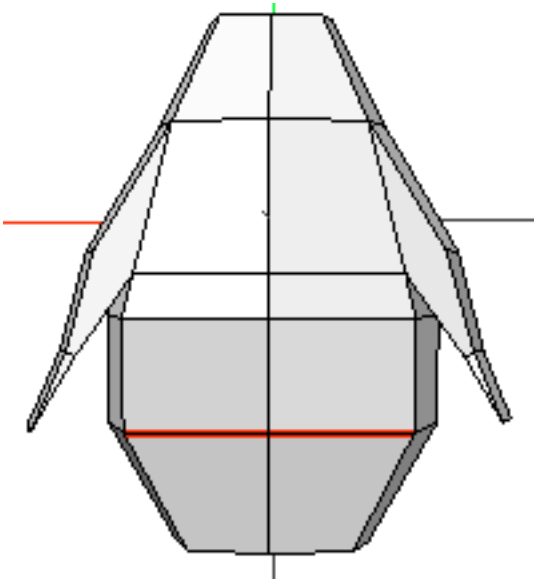
27. **(CLICK-L)** on **Extrude>Normal** and pull the edges down.

28. **(CLICK-L)** on **Move>Z** to move the edges of the wing back.

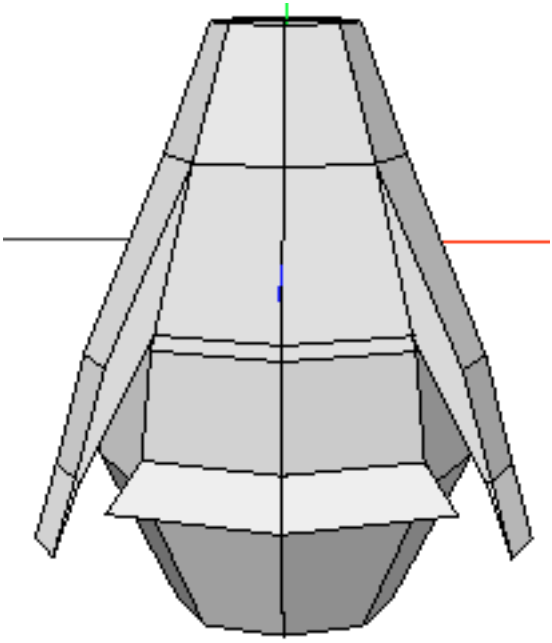


Creating the Tail

29. Press the "z" hot key to aim the camera at the penguin’s back.
30. Select the two edges shown below to start the tail.

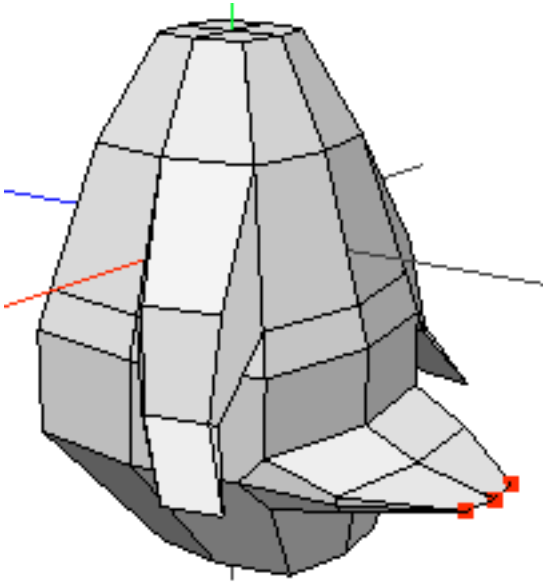


31. **(CLICK-L)** on **Extrude>Normal** and pull the edges out.



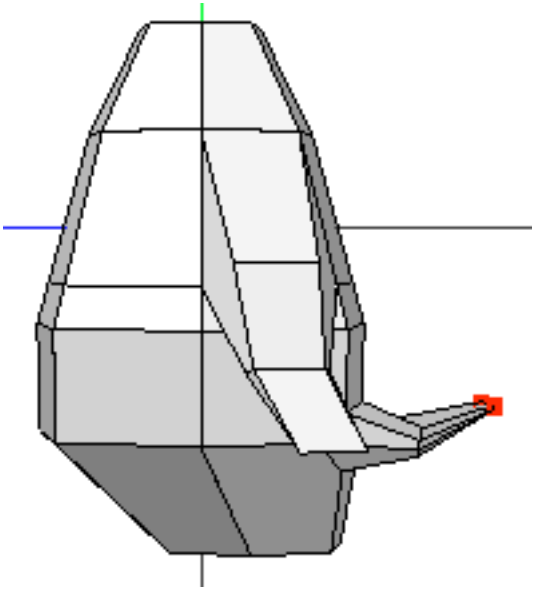
32. With the edges still selected, **(CLICK-L)** on **Extrude>Normal** and pull the edges out again to add a second section to the tail.

33. Press the "v" hot key to select the vertices of the selected to the edges, then **(CLICK-L)** on **Scale>Uniform** to shape the tail's edge.



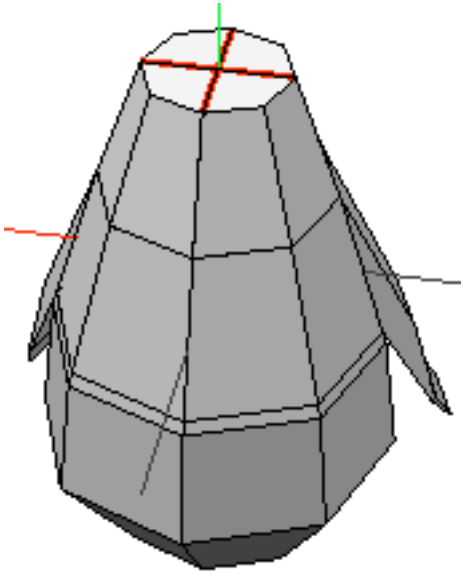
34. Press the "x" hot key to align the camera with the X axis.

35. **(CLICK-L)** on **Move>Z** and **Move>Y** to position the tail.

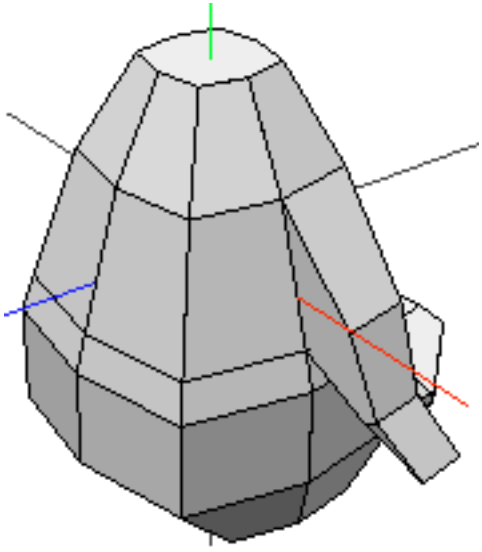


Building the Head

36. Rotate the camera so that you can see the top of the model.

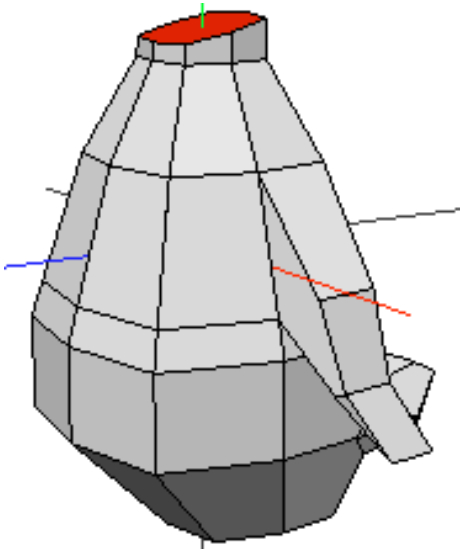


37. Select the edges that form a cross on the top of the model and **(CLICK-L)** on **Dissolve** to remove them.

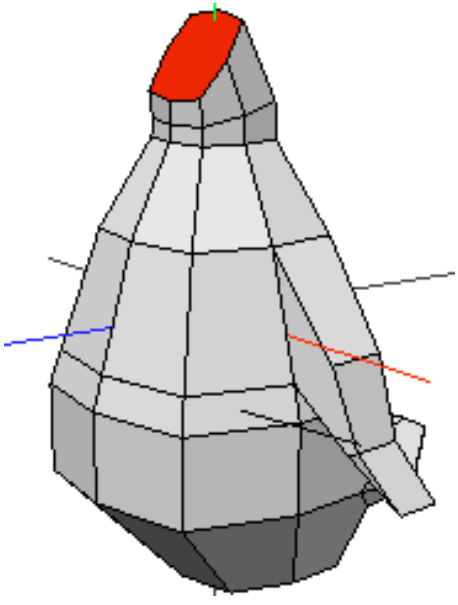


38. Select the top face and use **Extrude>Normal** to pull it up.

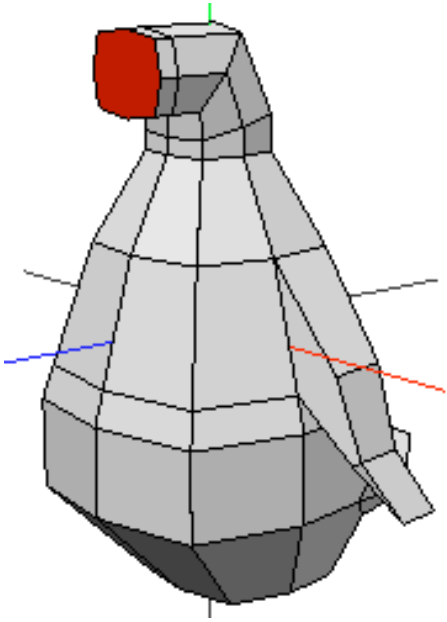
39. **(CLICK-L)** on **Rotate>X** and tilt the face towards the front.



40. Repeat steps 38 and 39 so that the penguin looks like this:

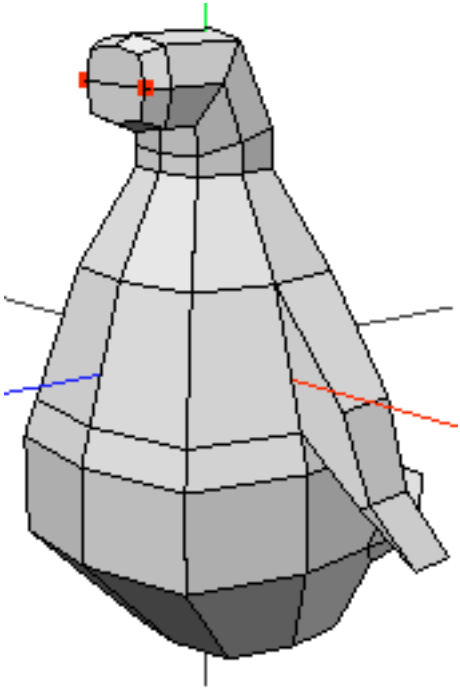


41. With the face still highlighted, **(CLICK-L)** on **Extrude>Z** and pull the face out again.
42. Then, **(CLICK-L)** on **Flatten>Z** to flatten the face.
43. **(CLICK-L)** on **Extrude>Normal** and pull the flattened face out a tiny bit.



44. Rotate the camera so that you can see the front of the penguin.
45. Next, **(CLICK-L)** on **Scale>Uniform** to shrink the face.

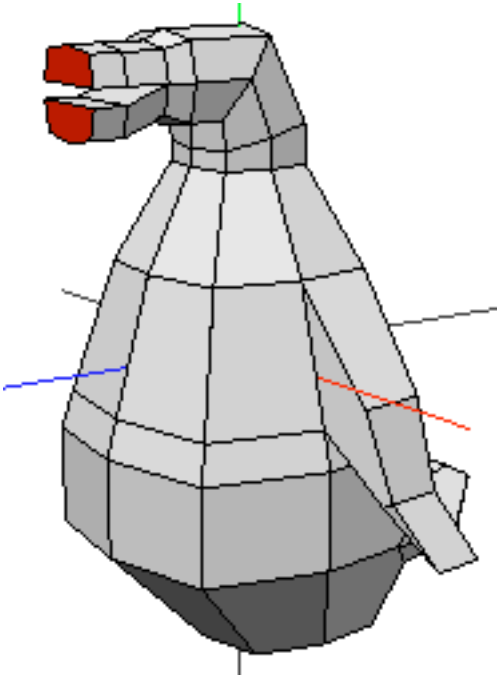
46. Select the two middle points on the scaled face and then **(CLICK-L)** on **Connect**.



47. Select the two faces formed after performing the Connect operation and **(CLICK-L)** on **Extrude>Z** to pull out the beak.

48. Select the front face on the lower half of the beak and **(CLICK-L)** on **Move>Y** to move it down.

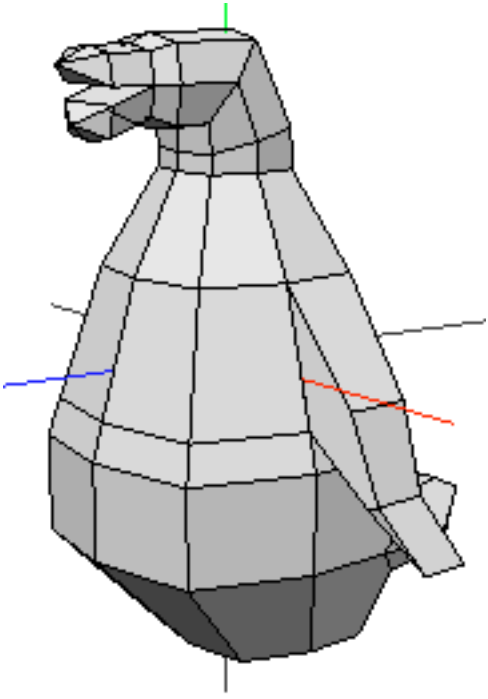
49. Select the front faces on the upper and lower half of the beak, then **(CLICK-L)** on **Extrude>Z** to pull them out a bit more.



50. Press the "space bar" hot key to clear your selection.

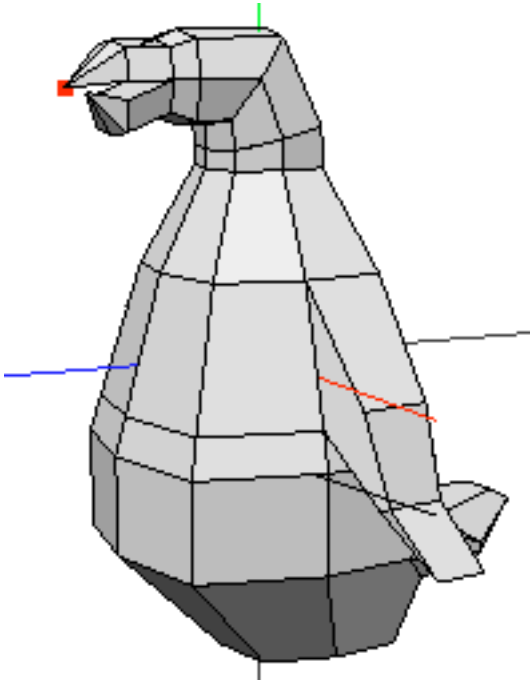
51. Select the front face on the bottom half of the beak and **(CLICK-L)** on **Move>Z** to move it back a bit.

52. Select the front faces of the upper and lower halves of the beak then **(CLICK-L)** on **Collapse**.



53. Select the point on the tip of the top half of the beak, then **(CLICK-L)** on **Move>Y**. Move the point down to give it a slightly downward curve.

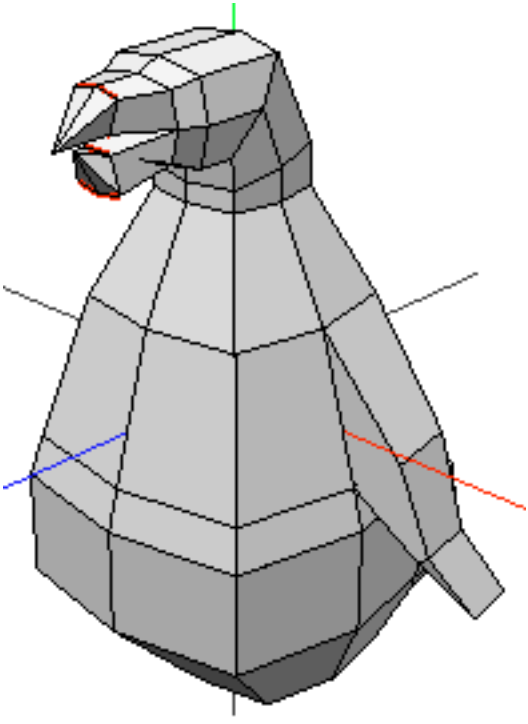
54. Now, select the point on the tip of the bottom half of the beak then **(CLICK-L)** on **Move>Y** to give it a slight upward curve.



55. Select the first loop of edges on both halves of the beak, then **(CLICK-L)** on **Scale>X** to shrink them.

NOTE...

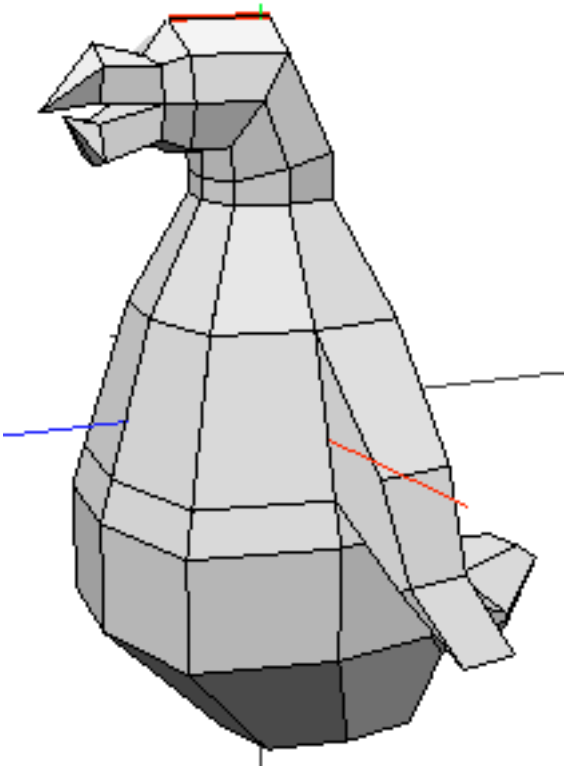
Don't forget to select the edges on the inside of the beak!



56. Move the camera so that you can see the top of the top beak.

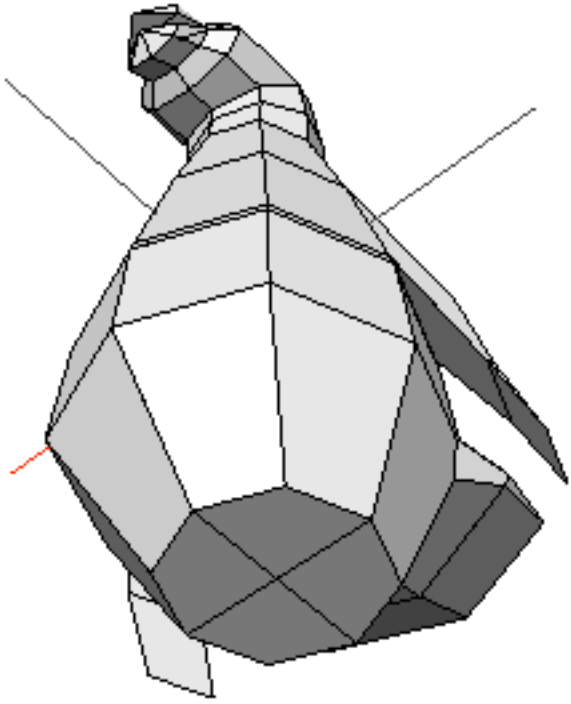
57. Select the middle vertex on the top beak and **(CLICK-L)** on **Move>Y** to give the beak a bump.

58. Select the middle edge on the top of the head and **(CLICK-L)** on **Move>Normal** to round out his head.

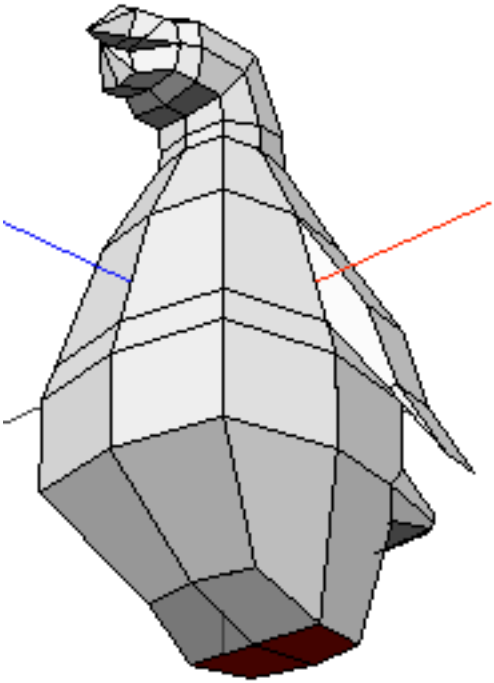


Creating the Legs and Feet

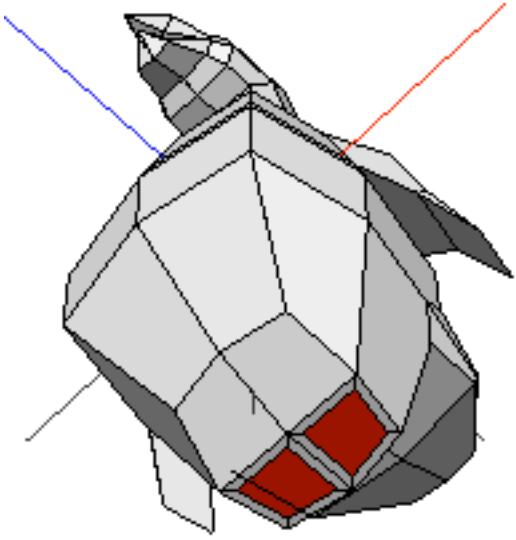
59. Rotate the camera so that you can see the bottom of the penguin.



60. Select the two faces that are closest to the rear of the penguin then **(CLICK-L)** on **Move>Normal** to round out the bottom of the penguin.

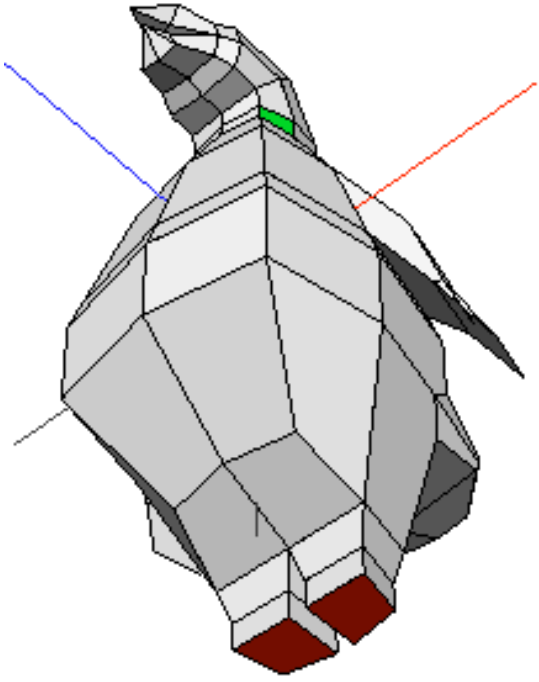


61. With these faces still selected, **(CLICK-L)** on **Inset** to inset faces that are slightly smaller than the currently selected ones. You control how far the faces are inset by moving the mouse left and right. When they are inset the correct amount, **(CLICK-L)** in the Model window.



62. The inset faces are now highlighted. **(CLICK-L)** on **Move>Normal** and pull the faces down to form the penguin's legs.

63. **(CLICK-L)** on **Extrude>Normal** and pull the faces down again. These extrusions will form the feet.

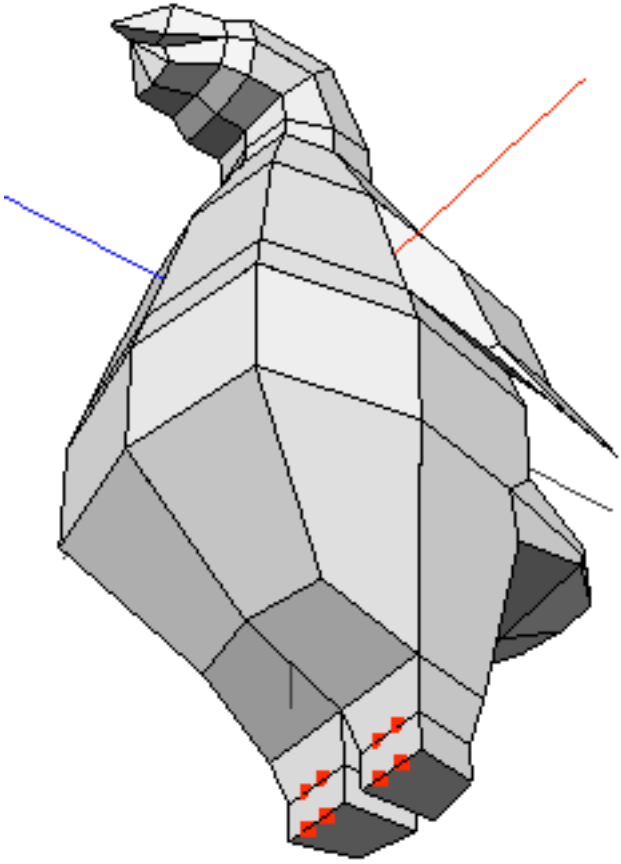


64. Select all four edges across the front of the penguin's feet and then **(CLICK-L)** on **Cut>3**.

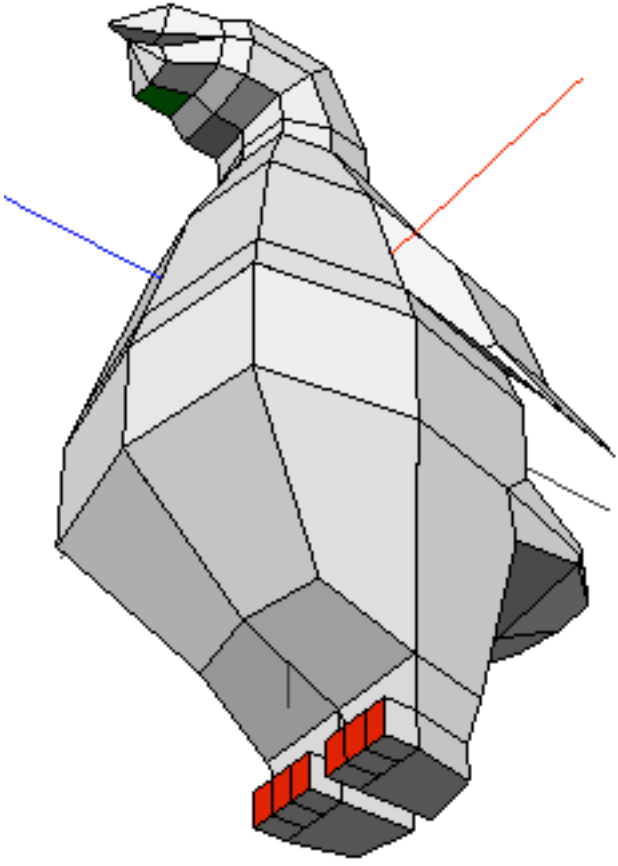
65. Press the space bar to clear your selection.

66. Select the new vertices on the penguin's feet formed by the Cut operation (shown below) and then **(CLICK-L)** on **Connect** to create edges between the vertical pairs of vertices.

    When you have multiple vertices selected, Connect creates edges between the closest pairs of vertices.



67. Pick the faces formed by the Connect operation on the front of the feet and **(CLICK-L)** on **Extrude>Z** to pull the faces out to make the toes.



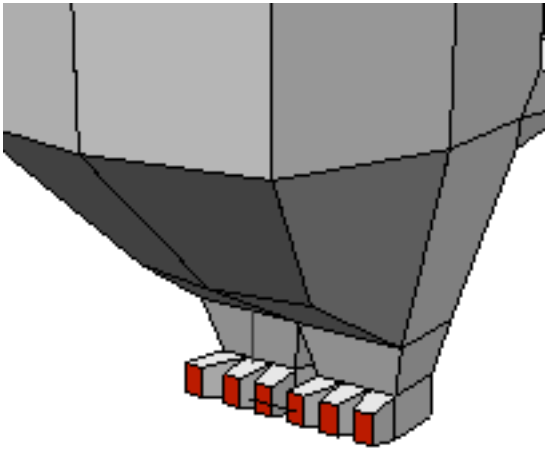
68. With the faces still selected, **(CLICK-L)** on **Scale>Uniform** to shrink the toes.

69. **(CLICK-L)** on **View>Aim** to aim the camera at the selected elements.

NOTE...

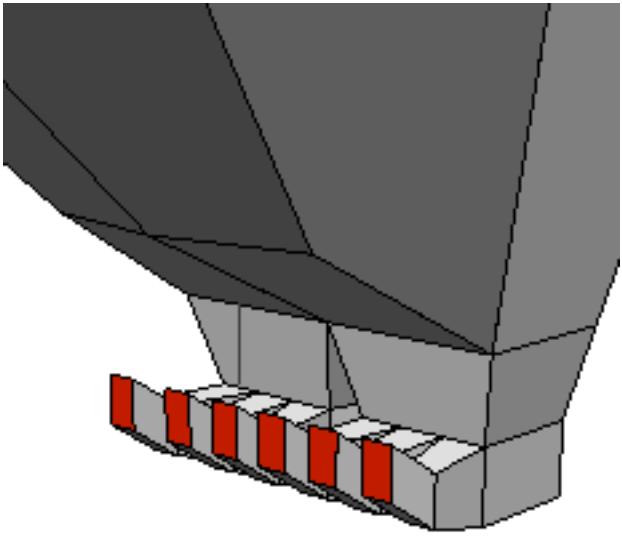
You can also use the "a" hot key to aim the camera.

70. Select the outside toe on the left foot and **(CLICK-L)** on **Move>Free** to move it away from the other toes. Repeat this operation on the inside toe on the left foot and the corresponding toes on the right foot.



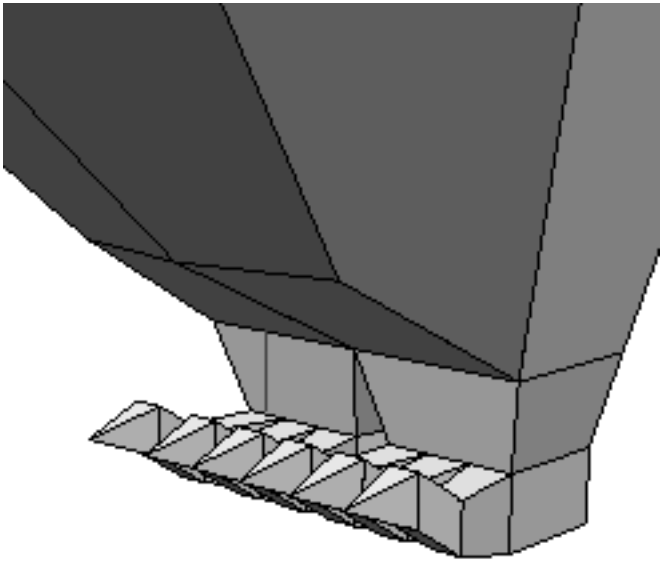
71. Select the front face on each toe, then **(CLICK-L)** on **Extrude>Z** and extrude the faces out a small amount.

72. **(CLICK-L)** on **Move>Y** to curl the toes up.



73. With the faces still highlighted, **(CLICK-L)** on **Extrude>Z** again.

74. **(CLICK-L)** on **Collapse** to collapse the faces.



75. **(CLICK-L)** on **File>Save** to save the penguin. In the dialog box that appears, navigate to the directory in which you want to save your penguin. Then, enter a name for the penguin (for example, Penguin) and **(CLICK-L)** on **Save**.

    Your penguin model is now complete! In the next sections, we'll show you how to add color to your penguin and create a higher-resolution version.

Coloring the Penguin

You can color your penguin by painting or using the Apply Color command. In this section, we will use the Apply Color command to color the penguin. Apply Color assigns colors to vertices, edges, faces, and objects.

76. **(CLICK-L)** on **Window>Show Object Info**.

    You use the Object Info window, to set the display options for individual objects. You can set any of the following options:

    - Visibility
    - Wireframe
    - Sensitivity
    - Decorations
    - Name

77. Make sure that the Decorations icon next to **Penguin** is toggled on. If it isn't, then **(CLICK-L)** on the Decorations icon.

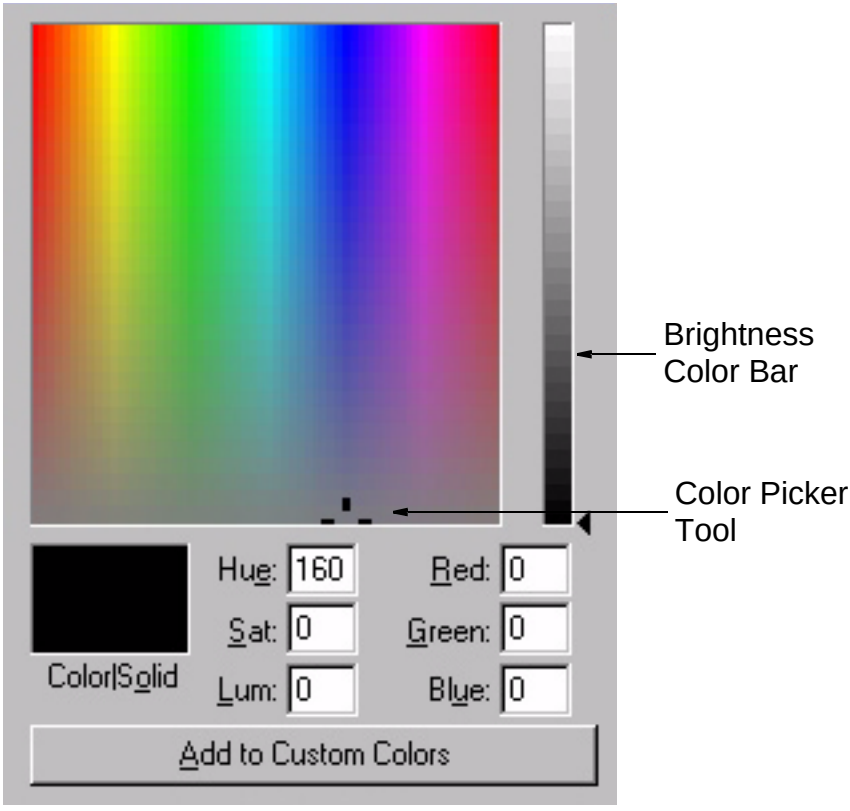
78. Select a dark gray with which to color the penguin. You do this with the Color Bar or with the Color Mixer:

To use the Color Bar:

- **(CLICK-L)** on a dark gray spot on the Color Bar. That color appears in the Current Color box next to the Color Bar.

To use the Color Mixer:

- **(CLICK-L)** on **Window>Show Color Mixer**, then **(DRAG-L)** the Color Picker Tool and the Brightness slider until the correct color appears in the Color/Solid Box in the Color Mixer window.



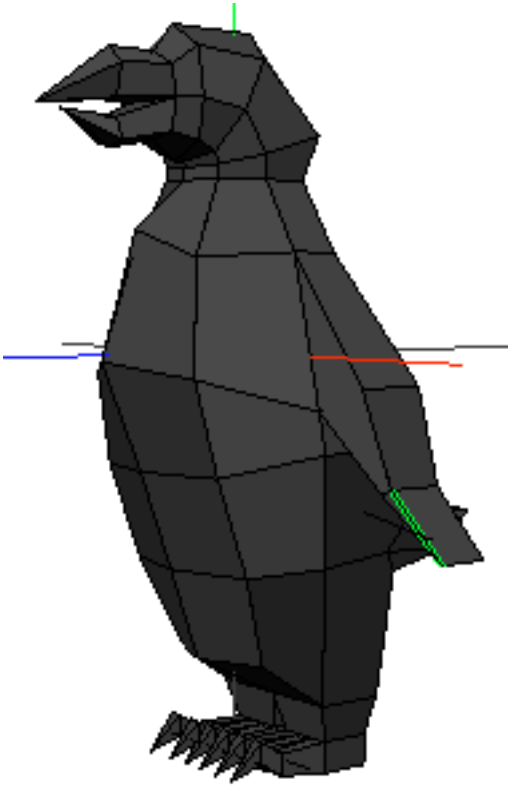
- When the correct color is shown in the Current Color Box, **(CLICK-L)** on **Add to Custom Colors** to add the color. The new color will appear in the Custom Color Box.
- **(CLICK-L)** on **OK**. The color appears in the Current Color Box next to the Color Bar.

NOTE...

If you **(DOUBLE-CLICK)** *on the Color Bar, the Color Mixer window opens.*

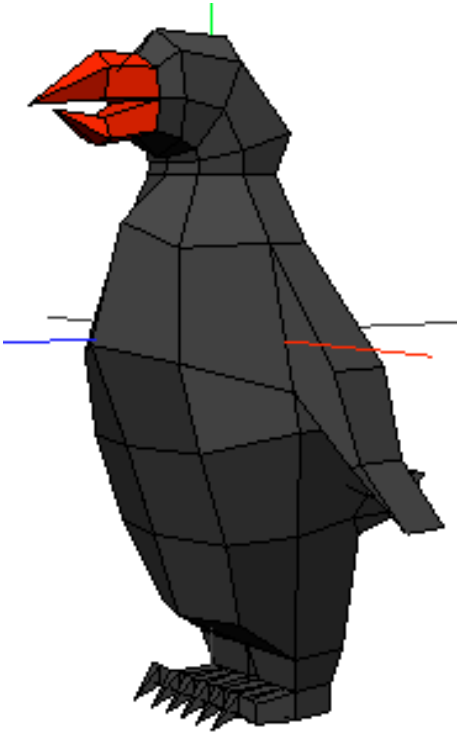
79. Now that dark gray is the current color, select the penguin object and **(CLICK-L)** on **Apply Color**.

80. Press the space bar to clear your selection. The penguin is now dark gray.



81. Move the camera so that you have a good view of the beak.

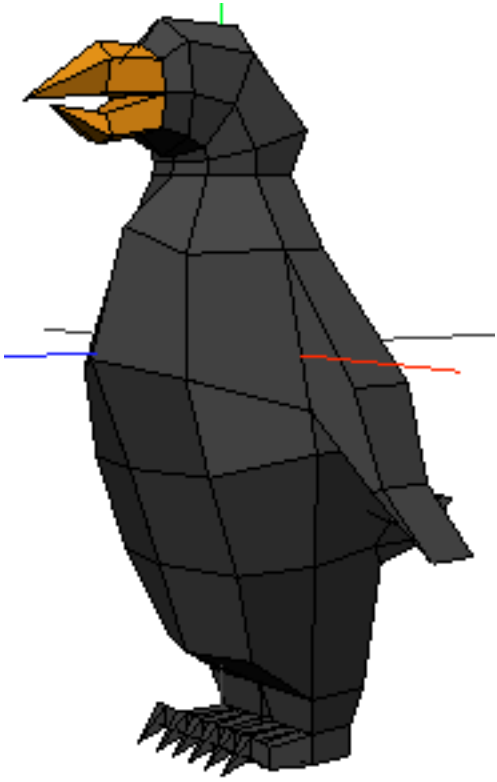
82. Select the vertex on the end of both halves of the beak and then use the "f" hot key twice to select all of the faces on the beak.



83. With the faces selected, select an orange shade for the beak.

84. **(CLICK-L)** on **Apply Color**. The beak turns orange.

    Notice that when you use Apply Color with faces, the color is contained within the selected faces and is applied evenly throughout.



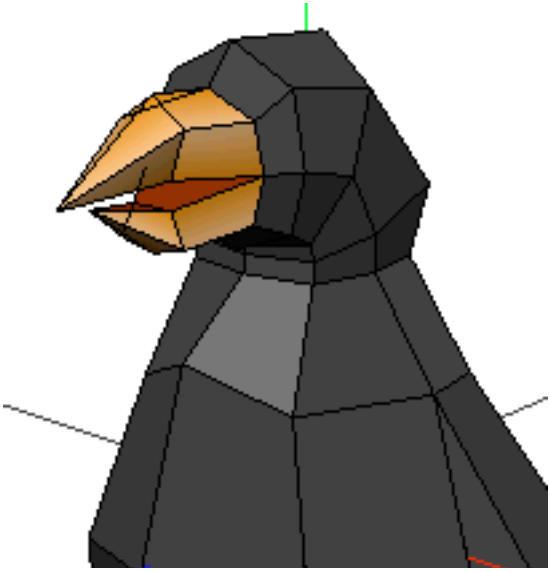
85. Select a lighter orange on the Color Bar.

86. Select a few edges on the top and bottom halves of the beak and then **(CLICK-L)** on **Apply Color** to apply the lighter orange. This creates highlights on the beaks.

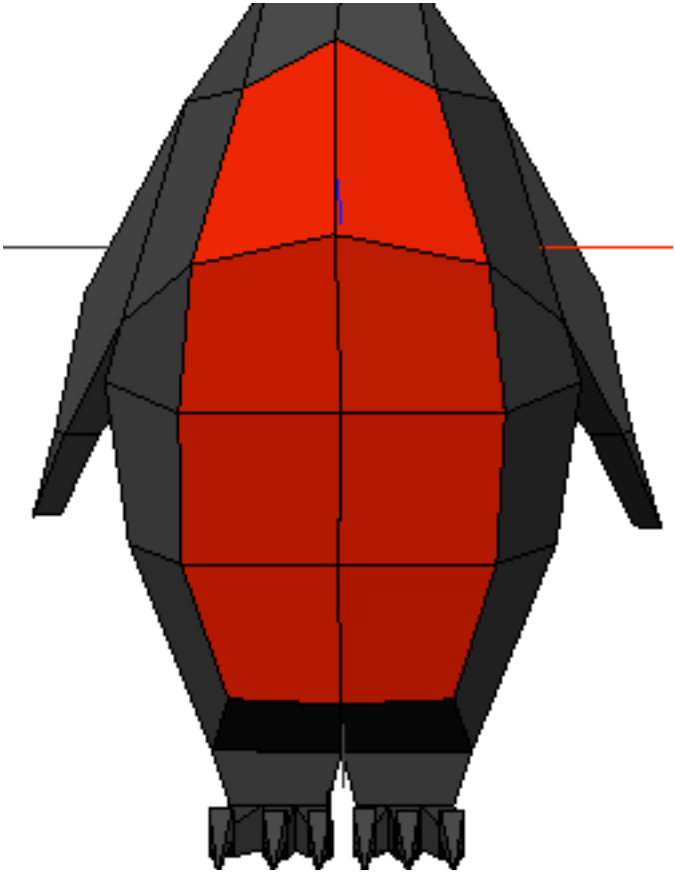
    Color applied to edges, or edge color, is concentrated at the selected edges and fades out as you move away from that edge. The color is actually applied to the vertices on each end of the selected segments but only in the faces adjacent to the selected edges.

87. Select a red for the mouth's interior.

88. Select all of the faces on the inside of the mouth, then **(CLICK-L)** on **Apply Color** to apply the red.



89. Move the camera so that you can easily select the faces on the penguin's chest shown below.



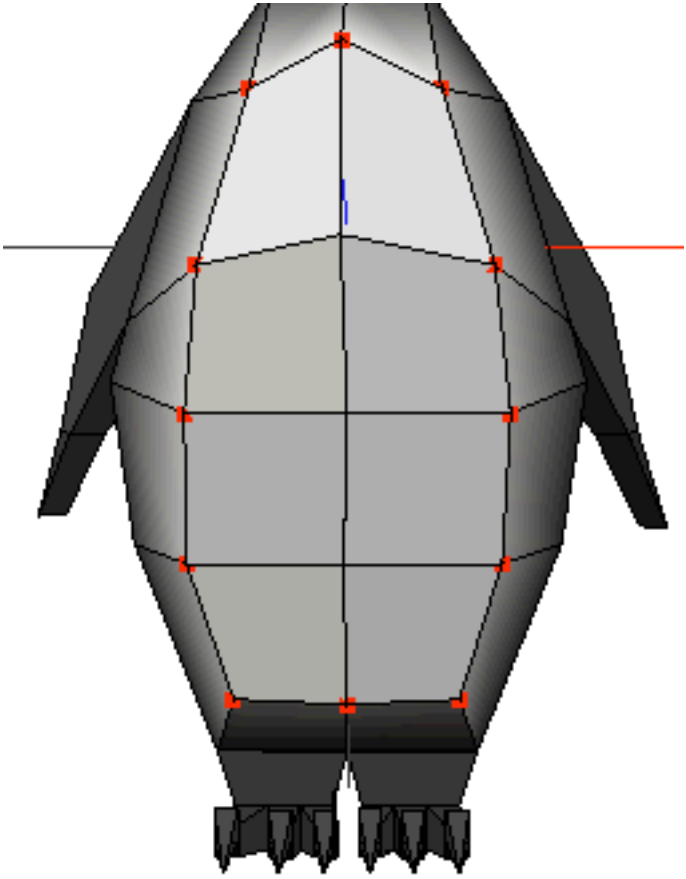
90. Make white the current color and then **(CLICK-L)** on **Apply Color** to apply it to the penguin's chest.

    To make the color look a bit more natural, we can use the Apply Color command on the vertices at the edge of the faces to blend the color into the rest of the body. Since the color is assigned to vertices, this is known as vertex color. When you use vertex color, the color is applied to the vertices and the sur-

rounding faces. As you move away from the vertices, the color dissipates.

91. Select the vertices that border both the white and gray areas.

92. **(CLICK-L)** on **Apply Color**. The color is blended between the two areas.



Now we'll add some detail to the penguin's wings, tail, back, and neck.

93. Select the vertices on the tips of both wings.

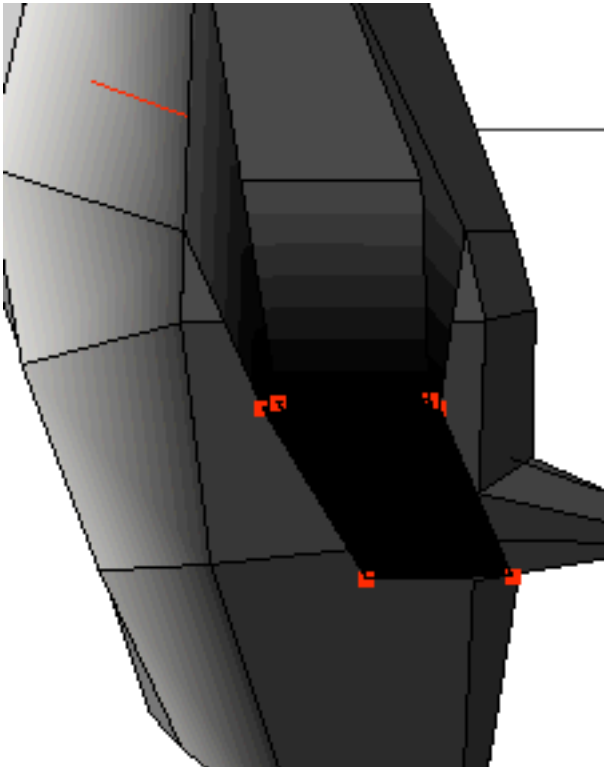
94. **(CLICK-L)** on **Select>Grow Selection** to select the adjacent vertices.

NOTE...

You can also use the "+" hot key to select adjacent elements of the same type.

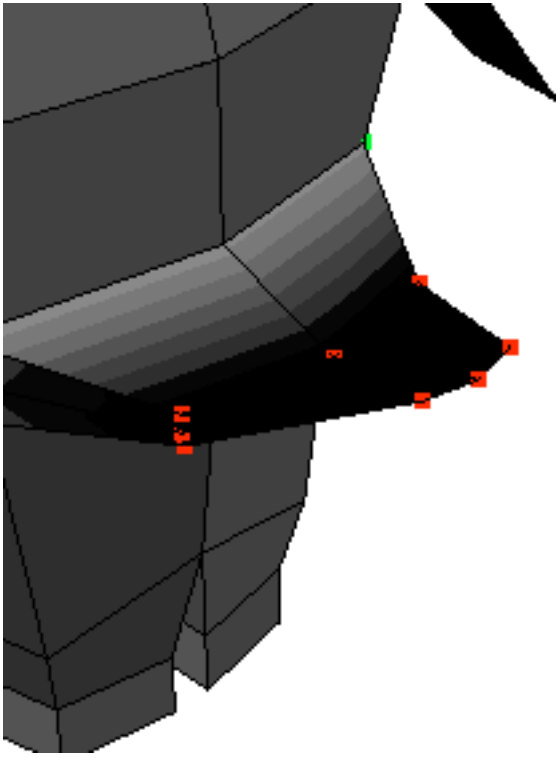
95. Select black from the Color Bar for the wings.

96. **(CLICK-L)** on **Apply Color**.



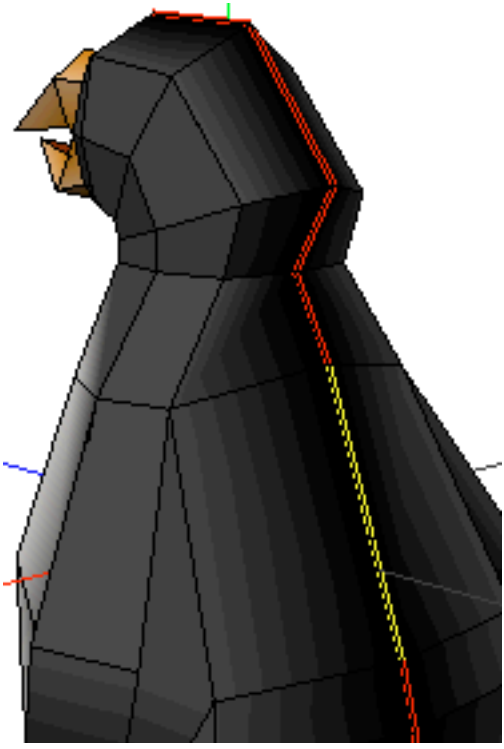
97. Push the space bar to clear your selection.

98. Use the same technique to make the tip of the tail black.



99. Select the edges down the middle of the penguin’s back.

100. **(CLICK-L)** on **Apply Color**. A black stripe appears down the penguin's back.



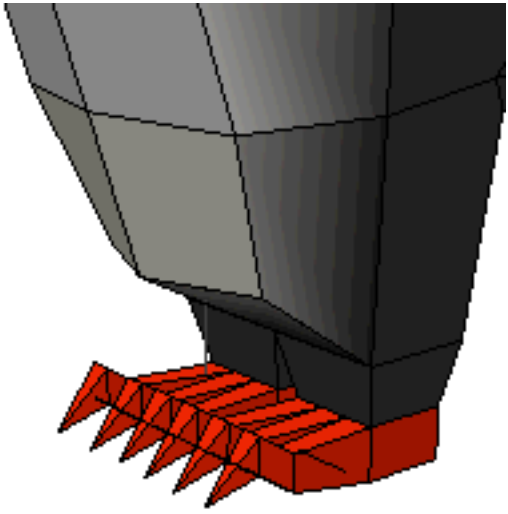
101. Select a single row of edges around the penguin's neck to form a ring.

102. **(CLICK-L)** on **Apply Color**. A black stripe appears around the penguin's neck.

103. Select the vertices at the end of each of the penguin's toes.

104. Use the "a" hot key to aim the camera at its toes.

105. Now, grow your selection using the "f" hot key until you have selected all of the faces on the feet.



106. Select an orange about the same as the orange on the beak and then **(CLICK-L)** on **Apply Color**. The feet are now colored orange.

107. Reselect the vertices on the ends of the penguin's toes.

108. Select a black color.

109. **(CLICK-L)** on **Apply Color** to make the tips of the penguin's toes black.

110. Now, your penguin has its basic color scheme.

111. Select the entire penguin and then **(CLICK-L)** on **Smooth**.

    Smoothing creates a subdivided surface, giving the entire body a smoother appearance. Because smoothing is done by creating subdivided surfaces, the colors assigned to the penguin's edges and vertices are transferred to the new faces.

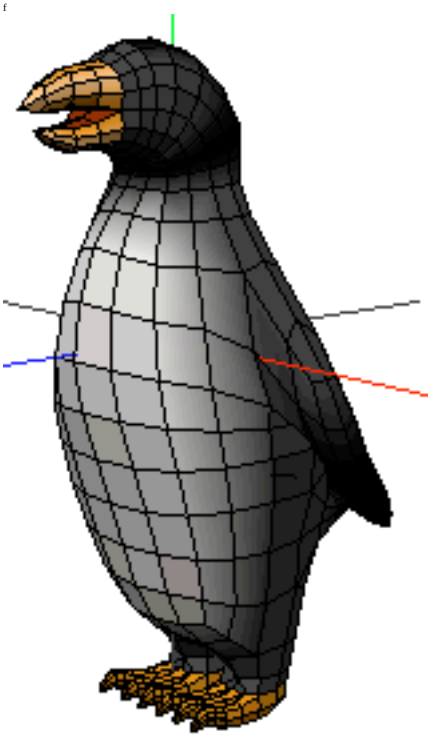
NOTE...

You can't perform topological modeling operations, like smoothing, on a painted object.

112. Save your penguin.

NOTE...

*You can also use the "**CTRL**-s" hot key to save your penguin.*



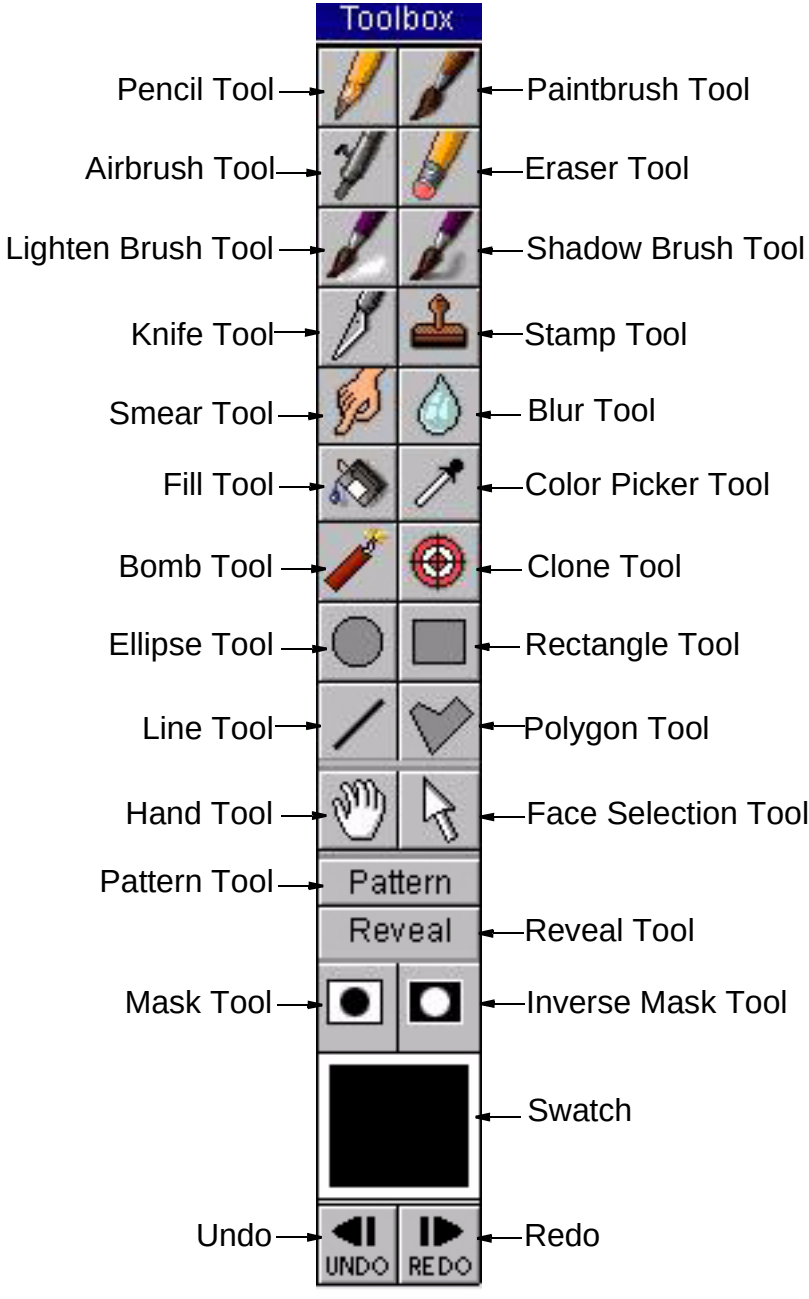
Painting the Penguin

When you paint in Nendo, you apply colors and images onto your object using the Paint tools. Unlike the Apply Color command, which applies colors to points, edges, and faces, paint tools let you add detail wherever you want.

113. To enter Paint, **(CLICK-L)** on the Paint button.

When you open Paint, several changes occur in Nendo:

- Objects become flat shaded
- Outlining is turned off
- Neither the global axes or the ground plane are displayed
- Colors applied using the Apply Color command are copied into paint that is automatically applied to the object
- The Paint Toolbox appears:


Toolbox
Pencil Tool
Paintbrush Tool
Airbrush Tool
Eraser Tool
Lighten Brush Tool
Shadow Brush Tool
Knife Tool
Stamp Tool
Smear Tool
Blur Tool
Fill Tool
Color Picker Tool
Bomb Tool
Clone Tool
Ellipse Tool
Rectangle Tool
Line Tool
Polygon Tool
Hand Tool
Face Selection Tool
Pattern Tool
Pattern
Reveal
Reveal Tool
Mask Tool
Inverse Mask Tool
Swatch
Undo
Redo
UNDO
REDO

When using any of the tools in the toolbox, the angle at which you are painting and how close the camera is to your object affect how the paint is applied. It's like working with a spray can, when you move close to or further from the object, or change the angle at which the paint hits.

114. **(CLICK-L)** on the **Blur Tool** in the Paint Toolbox.

We are going to blur the colors where the beak meets the penguin's face and where its feet meet its legs.

115. **(CLICK-R)** in the Paint window to bring up the Brush Options menu.

You modify the size, softness, and opacity of brushes and tools in the Paint Toolbox with these options.

116. **(CLICK-L)** on **Size>Small** to modify the size of the Blur Tool.

117. Move the camera so that you have a good view of the area on the penguin where the beak meets the rest of the face.

118. **(DRAG-L)** the Blur Tool where the beak meets the face to brush out the line between the orange beak and black head.

119. Move the camera so that you can see the area where the penguin's feet and legs meet.

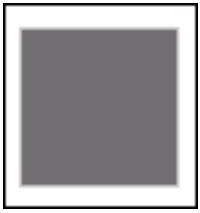
120. **(DRAG-L)** the Blur Tool across the edges where the feet and legs meet.

121. **(CLICK-L)** on the **Paintbrush Tool** in the Paint Toolbox.

122. **(CLICK-R)** in the Paint window to bring up the Brush Options menu.

123. Then, **(CLICK-L)** on **Size>Small** to modify the size of the Paint-brush Tool.

124. Select a gray that is lighter than the gray used to color the penguin's body. The color will appear in the Swatch in the Paint Toolbox.



125. On the white area of the penguin's chest, paint small gray lines.

126. **(CLICK-L)** on the **Smear Tool** in the Paint Toolbox.

127. Use the **Smear Tool** to blend the gray lines with the white chest.

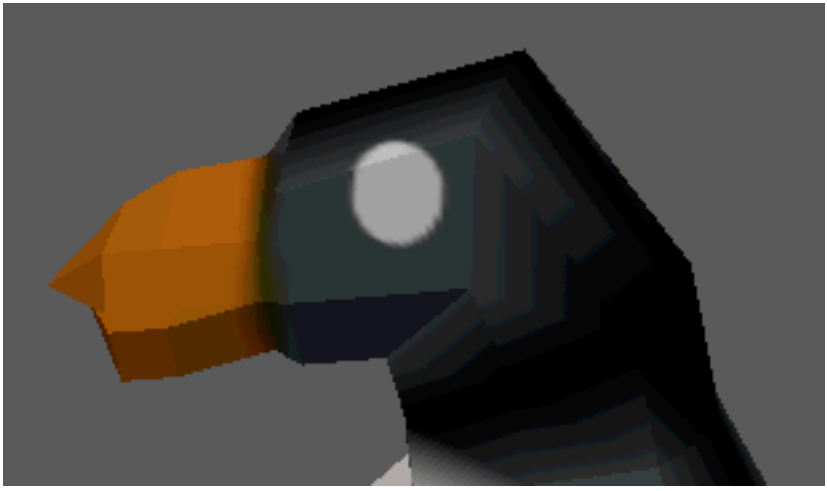
128. Move the camera so that you can see the side of the penguin's head. We are going to paint eyes onto the penguin's head.

129. **(CLICK-L)** on the **Ellipse Tool** in the Paint Toolbox.

130. Make white the current color.

131. Place the Ellipse Tool cursor in the middle of the area where you want the eye to be.

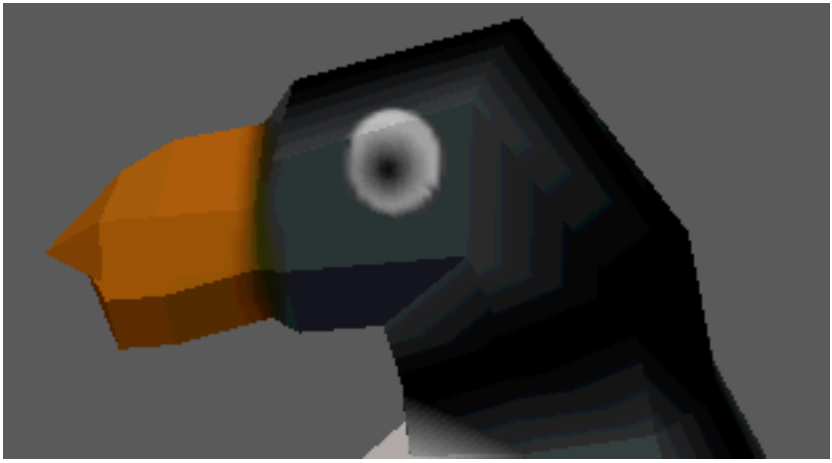
132. **(DRAG-L)** the cursor until the outline of the eye is the right size and shape, then release the mouse.



133. **(CLICK-L)** on the **Paintbrush Tool** in the Paint Toolbox.

134. Make black the current color.

135. **(CLICK-L)** inside the white oval to place the penguin's pupil.



136. **(CLICK-L)** on the **Lighten Brush Tool** in the Paint Toolbox.

137. **(CLICK-L)** in the middle of the pupil.

138. Save your penguin. There are several ways to save him:

    - Save
    - Save As
    - Save Selected
    - Export

    Congratulations! Your penguin is now fully painted and modeled.

Menus

This section describes the commands in the menus located on the menubar:

The File Menu

The Edit Menu

The View Menu

The Select Menu

The Window Menu

The Help Menu

Most of the commands on these menus also have keyboard short-cuts called hot keys. A summary of all hot keys is in:

Hot Keys

The File Menu

The File menu commands let you:

- Create new primitives
- Open previously saved objects
- Save objects to disk
- Reload the object in its previously saved state
- Export objects to a different external file format
- Exit Nendo

Each of the options on the File menu are discussed in the following sections:

New	Save	Revert
Add	Save As	Import
Open	Save Selected	Export
		Quit

New

Removes all objects from your workspace and starts a new file. Use New if you want to clear your workspace and start a new project.

■ **To remove all objects from your workspace:**

- **(CLICK-L)** on **File>New**.

Add

Adds a new primitive or a previously saved object to your work-space. Primitives are standard geometric shapes from which you can build more complex material.

■ **To add a primitive:**

- **(CLICK-L)** on **File>Add**, then select a primitive from the menu

NOTE...

You can also add a primitive if you **(CLICK-R)** *in the Model window, then select a primitive from the menu that appears.*

■ **To load a previously saved object into the Model window:**

- **(CLICK-L)** on **File>Add>From File**, then navigate to the file you wish to open. **(CLICK-L)** on **OK** to add the file.

Open

Removes all objects currently in your workspace and loads the selected files.

■ **To open a file:**

- **(CLICK-L)** on **File>Open**

Save

Saves all of the objects in your workspace as a single file in Nendo's native NDO format.

■ **To save all objects in your workspace:**

- **(CLICK-L)** on **File>Save**

NOTE...

The following characters cannot be used in filenames:
*~ ' ! & * ( ) { } [ ] \ | ; : ' " ? < > @ # $ % ^*

Save As

Saves all of the objects in your workspace as a single file with a new name and location in Nendo's native NDO format.

■ **To save objects with a new name and location:**

- **(CLICK-L)** on **File>Save As**

NOTE...

The following characters cannot be used in filenames:
*~ ' ! & * ( ) { } [ ] \ | ; : ' " ? < > @ # $ % ^*

Save Selected

Saves the selected object or objects with a new name and location.

■ **To save the selected objects with a new name and location:**

- **(CLICK-L)** on **File>Save selected**

NOTE...

The following characters cannot be used in filenames:
*~ ‘ ! & * ( ) { } [ ] \ | ; : ’ " ? < > @ # $ % ^*

Revert

Reloads the previously saved version of the file.

■ **To revert an object to its last saved state:**

- **(CLICK-L)** on **File>Revert**

NOTE...

You cannot undo the Revert command.

Import

Adds objects in the following file formats to the current workspace:

- VRML 2.0 (.wrl)
- 3D Studio (.3ds)
- Wavefront (.obj)
- Game Exchange (.gof)

■ **To import an object:**

1. **(CLICK-L)** on **File>Import**
2. In the window that opens, navigate to the file you want to import.
3. Select the file and then **(CLICK-L)** on **Open**.

NOTE...

When importing files, Nendo first parses the file and then fixes the topology of the object. Depending upon the file, this process may be lengthy.

Export

Saves objects in one of the following formats:

- VRML 2.0 (.wrl)
- Wavefront (.obj)
- 3D Studio (.3ds)
- DirectX (.x)
- Game Exchange (.gof)

■ **To export all objects as a single file:**

1. **(CLICK-L)** on **File>Export>All**
2. In the window that opens, navigate to where you would like to save the file, enter a file name, and select a file format, then **(CLICK-L)** on **Save**.

■ **To export selected objects as a single file:**

1. Select the objects you want to save
2. **(CLICK-L)** on **File>Export>Selected**
3. In the window that opens, navigate to where you would like to save the file, enter a file name, and select a file format, then **(CLICK-L)** on **Save**.

NOTE...

Not all formats support all of the functionality of Nendo. For example, if your object has colors assigned to vertices and you export to 3D Studio (.3ds), Wavefront (.obj), or DirectX (.x), the vertex color information will not be exported.

nendo

VRML 2.0 (.wrl)

Import

Imports the following data from VRML 2.0 (.wrl) files:

- Vertex coordinates
- Vertex Color
- Textures
- UV coordinates

Export

Exports the following data to VRML 2.0 (.wrl) files:

- Vertex coordinates
- Vertex Color
- Object Material
- Textures
- UV coordinates

3D Studio (.3ds)

Import

Imports the following data from 3D Studio (.3ds) files:

- Vertex coordinates
- Textures
- Base object color
- UV coordinates

Export

When you export to 3D Studio (.3ds), your objects will be triangulated. Nendo exports the following data to 3D Studio (.3ds) files:

- Vertex coordinates
- Textures
- Base object color
- UV coordinates

Wavefront (.obj)

Import

Imports the following data from Wavefront (.obj) files:

- Vertex coordinates

Export

Exports the following data to Wavefront (.obj) files:

- Vertex coordinates

Game Exchange (.gof)

Import

Imports the following data from Nichimen Graphics' Game Exchange (.gof) files:

- Vertex coordinates
- Vertex color
- Object material
- UV coordinates
- Texture

Export

Exports the following data to Nichimen Graphics' Game Exchange (.gof) files:

- Vertex coordinates
- Vertex color
- Texture
- UV coordinates

DirectX (.x)

Export

Exports the following data to DirectX (.x) files:

- Vertex coordinates

Quit

Exits Nendo.

■ **To quit Nendo:**

- **(CLICK-L)** on **File>Quit**

The Edit Menu

The Edit menu commands let you:

- Undo the last action
- Delete objects
- Paint the object the current color

Each of the options on the Edit menu are discussed in the following sections:

Undo

Delete

Delete All

Paint All

Undo

Reverses the last action performed in Nendo. In Model, if the last action was an undo, then Undo reverses the undo. In Paint, you can undo back to the last camera move.

■ **To undo the last action:**

- **(CLICK-L)** on **Edit>Undo**

Delete

Deletes the selected object or objects from your workspace.

■ **To delete an object:**

- Select the object you want to delete, then **(CLICK-L)** on **Edit>Delete**.

NOTE...

You can only delete objects when in Model, not in Paint.

Delete All

Deletes all objects from your workspace.

■ **To delete all of the objects from your workspace:**

- **(CLICK-L)** on **Edit>Delete All**.

NOTE...

You can only delete objects when in Model, not in Paint.

Paint All

In Paint, paints the object the current color.

■ **To paint the object the current color:**

- **(CLICK-L)** on **Edit>Paint All**

The View Menu

The View menu commands let you:

- Aim the camera at selected elements
- Reset the camera to its initial position
- Toggle display of the global axes or the ground plane in the Model window
- Turn smooth shading on and off
- Turn outline mode on and off

Each of the options on the View menu are discussed in the following sections:

Aim

Reset View

Ground Plane

Axes

Smooth Shaded

Outlines

Aim

Aims the camera at the selected element (or elements) in the Model window. If multiple elements are selected, the camera is aimed at the center of the collection.

■ **To aim the camera:**

- Select an element, then **(CLICK-L)** on **View>Aim**.

Reset View

Resets the camera to the initial camera view.

■ **To reset the camera:**

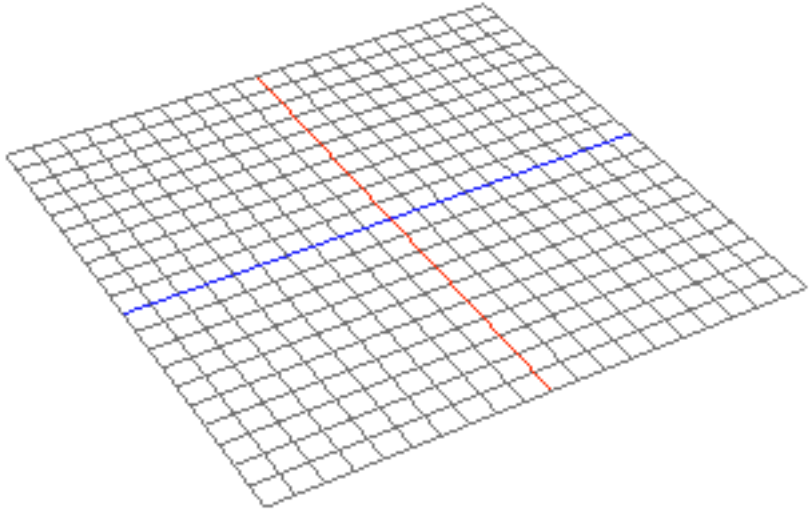
- **(CLICK-L)** on **View>Reset View**

Ground Plane

Displays a ground plane in the Model window. The ground plane intersects the Y axis where Y=0. It is a useful reference point when modeling.

■ **To toggle display of the ground plane:**

- **(CLICK-L)** on **View>Ground Plane**

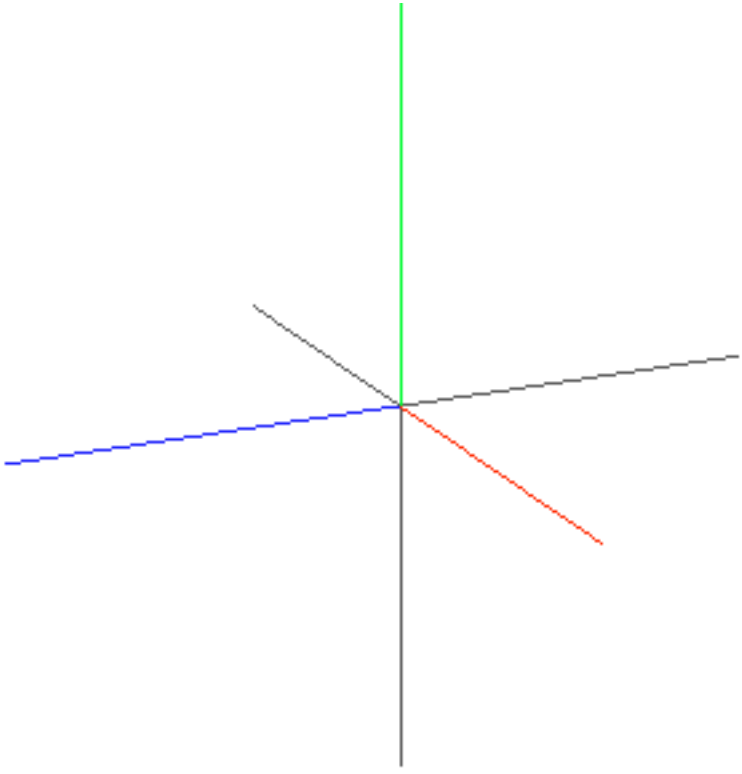


Axes

Displays the global axes. In order to make it easier for you to tell "which way is up," Nendo uses a Cartesian coordinate system represented by a set of global axes. Positive Y (the green axis) represents "up," positive X (the red axis) is "right," and positive Z (the blue axis) is "forward."

■ **To display the global axes:**

- **(CLICK-L)** on **View>Axes**

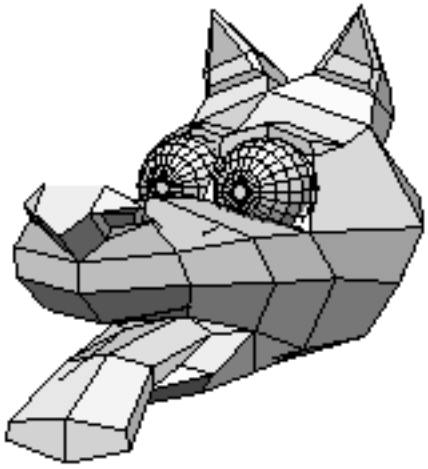


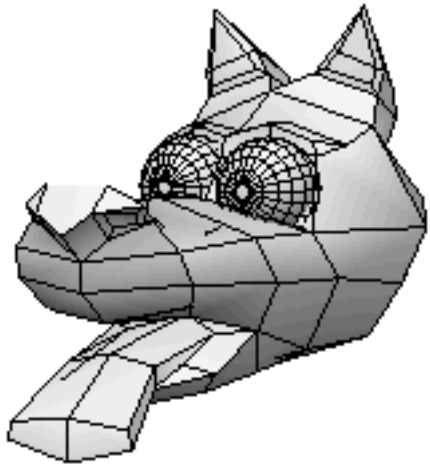
Smooth Shaded

When Smooth Shaded is on, all objects in the Model window are displayed with smooth lighting transitions between neighboring faces.

■ **To show objects with smooth shading:**

- **(CLICK-L)** on **View>Smooth Shaded**



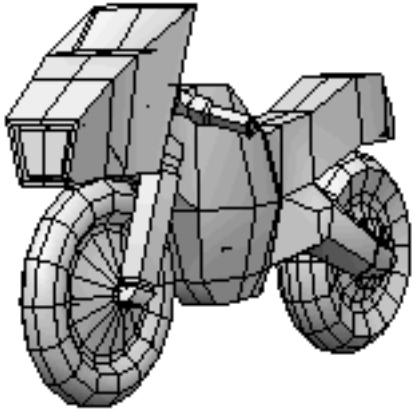


Outlines

When Outlines is toggled on, thin, black lines are displayed on the edges of every face on objects in the Model window.

■ **To toggle between outlined and non-outlined faces:**

- **(CLICK-L)** on **View>Outlines**



The Select Menu

The Select menu commands let you:

- Select collections of elements
- Deselect elements

Each of the options on the Select menu are discussed in the following sections:

Grow Selection

Shrink Selection

Select Adjacent

Select All

Clear Selection

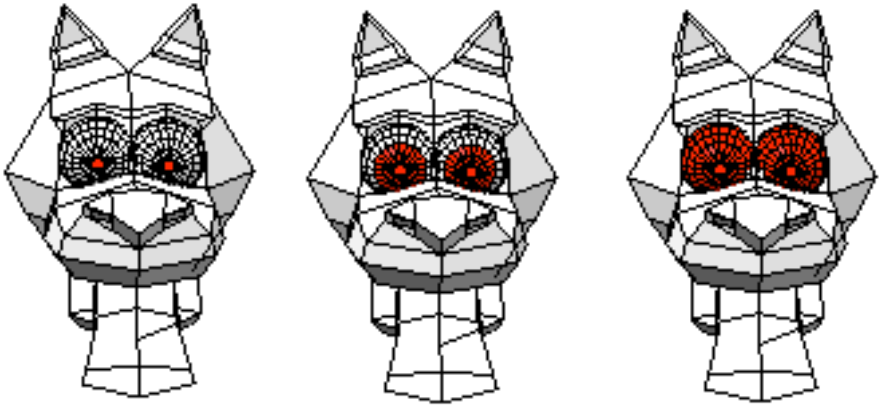
Grow Selection

For the currently selected elements, selects neighboring elements of the same type.

■ **To select adjacent elements of the same element type:**

- Select an element, then **(CLICK-L)** on **Select>Grow Selection**.

  Each of the adjacent elements of the same type is selected.



NOTE...

You can also use the "+" hot key to grow a selection.

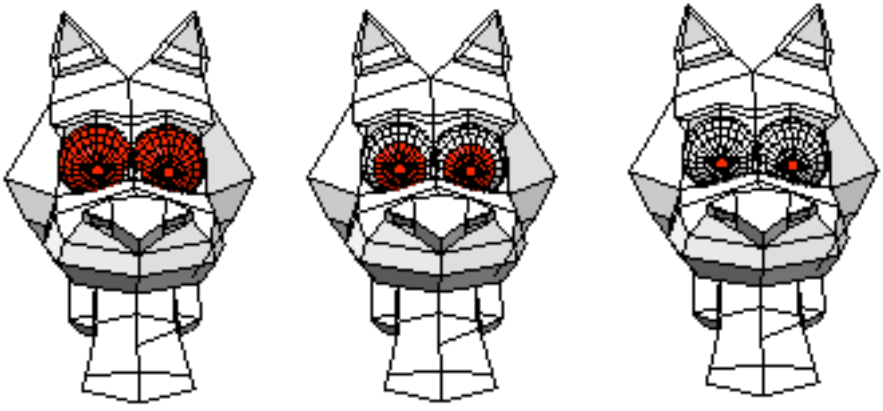
Shrink Selection

Deselects the outermost elements in a collection.

■ **To deselect elements:**

- **(CLICK-L)** on **Select>Shrink Selection**

  The outermost elements in the collection are deselected.



NOTE...

You can also use the "-" hot key to shrink a selection.

Select Adjacent

Selects the vertices, edges, or faces adjacent to the selected elements. The selected and adjacent elements do not have to be the same element type.

■ **To select adjacent elements of a certain type:**

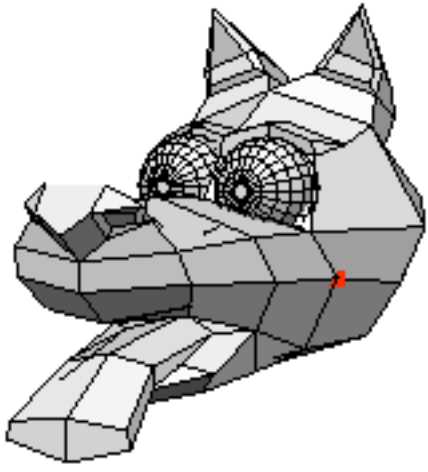
- Select an element, then **(CLICK-L)** on one of the following:

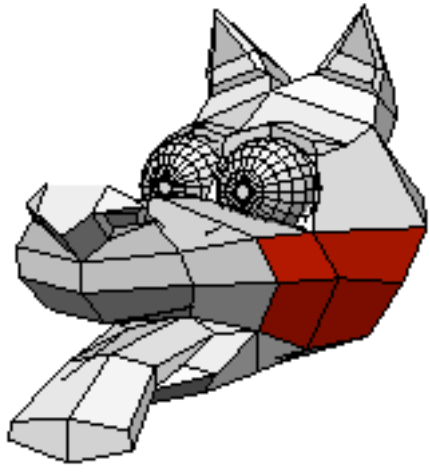
  Select>Select Adjacent>Vertices

  Select>Select Adjacent>Edges

  Select>Select Adjacent>Faces

  All of the vertices, edges, or faces adjacent to the selected element are now selected. The originally selected element is deselected.





Select All

Selects all of the vertices, edges, or faces on an object or all of the objects in the Model window.

■ **To select all of an element type on an object:**

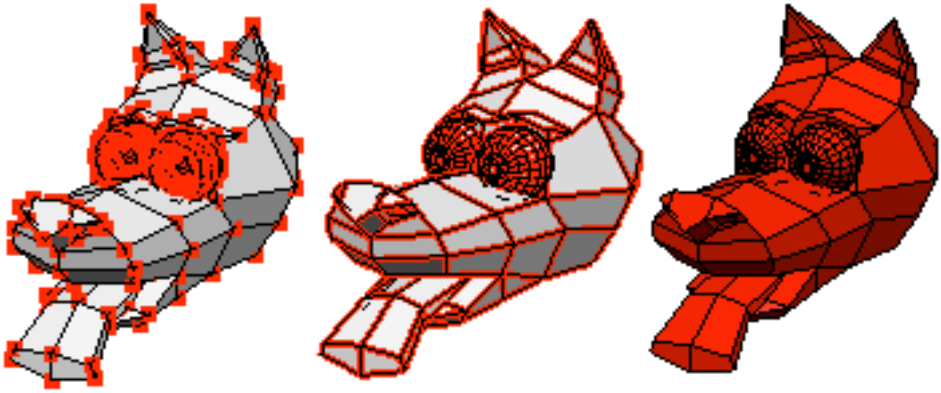
- Select a vertex, edge, face, or object, then **(CLICK-L)** on one of the following:

  Select>Select All>Vertices

  Select>Select All>Edges

  Select>Select All>Faces

  Select>Select All>Objects



Clear Selection

Deselects any selected elements.

■ **To deselect all elements:**

- **(CLICK-L)** on **Select>Clear Selection**

NOTE...

You can also press the space bar to deselect selected elements.

The Window Menu

The Window menu commands bring up palettes that let you:

- Set and view display parameters for individual objects
- Choose the color for paint and the Apply Color command

Each of the options on the Window menu are discussed in the following sections:

Show Object Info

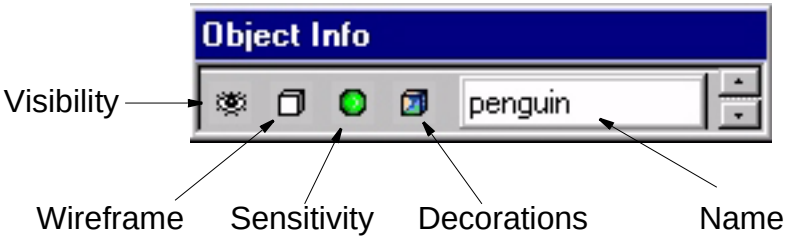
Show Color Mixer

nendo

Show Object Info

In the Object Info window, you set the following parameters:

- Visibility
- Wireframe
- Sensitivity
- Decorations
- Name



-More-

■ **To change an object's parameters:**

1. **(CLICK-L)** on **Window>Show Object Info**.
2. **(CLICK-L)** on the icon of the parameter you want to change.

   For example, to change the visibility of an object, **(CLICK-L)** on the Visibility Icon.

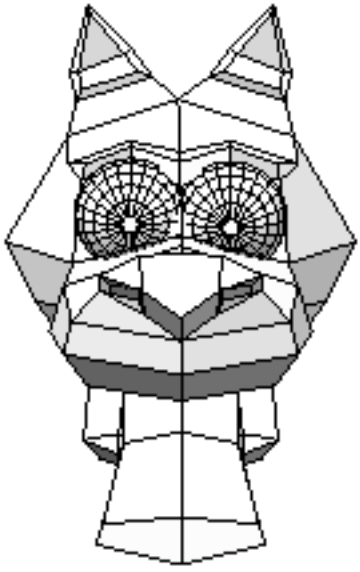
   If you want to change the object's name, **(DOUBLE-CLICK)** in the field and then enter a new name for the object.

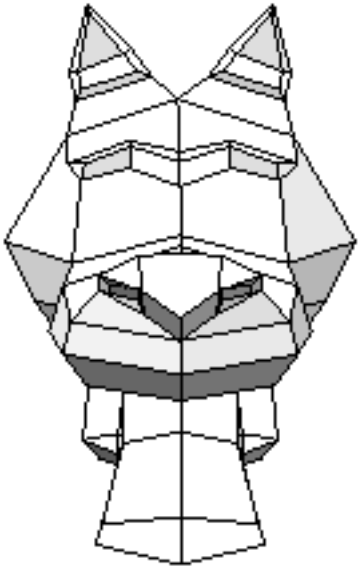
Visibility

Toggles an object's visibility.

■ **To toggle an object's visibility:**

- **(CLICK-L)** on **Window>Show Object Info**, then **(CLICK-L)** on the Visibility icon.





NOTE...

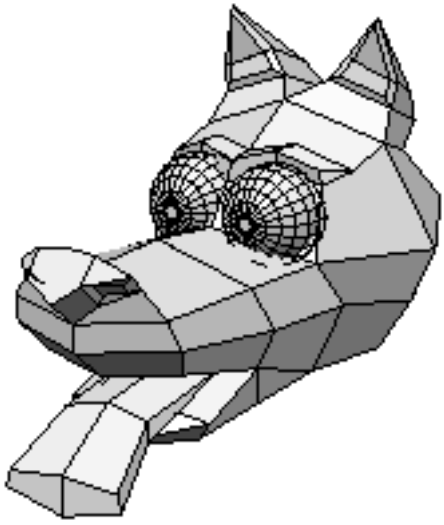
Invisible objects can't be selected.

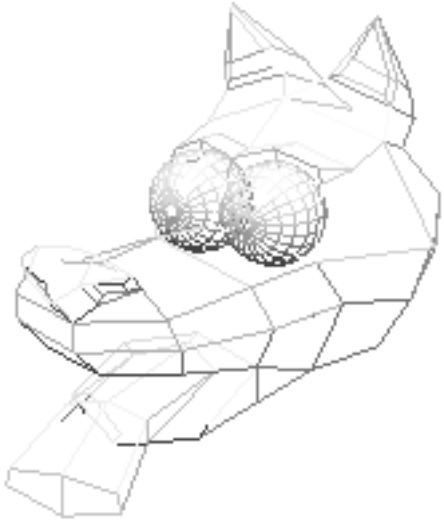
Wireframe

In wireframe mode, only the object's edges are visible (faces are not shaded).

■ **To show an object in wireframe mode:**

- **(CLICK-L)** on **Window>Show Object Info**, then **(CLICK-L)** on the Wireframe icon.





NOTE...

When an object is displayed in wireframe mode, shading, colors, and paint assigned to the object are invisible.

Sensitivity

Insensitive objects are visible, but cannot be modified. This command is useful if you have several objects close to each other, and want to modify one, but not another.

■ **To toggle an object's sensitivity:**

- **(CLICK-L)** on **Window>Show Object Info**, then **(CLICK-L)** on the Sensitivity icon.

Decorations

When Decorations is toggled on, the color, paint, and images assigned to an object are visible.

■ **To toggle the display of decorations:**

- **(CLICK-L)** on **Window>Show Object Info**, then **(CLICK-L)** on the Colors/Textures icon

NOTE...

Once an object is brought into Paint, colors assigned to the object using the Apply Color command are converted into paint.

Name

Changes the name of an object.

■ **To change an object's name:**

- **(CLICK-L)** on **Window>Show Object Info**, then **(DOUBLE-CLICK)** in the Name field and enter the object's new name

NOTE...

Changing the object's name does not change the name of the file.

See also:

Combine

nendo

Show Color Mixer

In the Color Mixer window, you choose colors for the Apply Color command or with which to paint. The color can be either a basic or custom color.

■ **To select a basic color:**

1. **(CLICK-L)** on **Window>Show Color Mixer**.
2. **(CLICK-L)** on one of the Basic Colors. The color appears in the Color/Solid Box.
3. **(CLICK-L)** on **Add to custom colors**. The color appears in a Custom Colors Box. **(CLICK-L)** on **OK** to return to Nendo.

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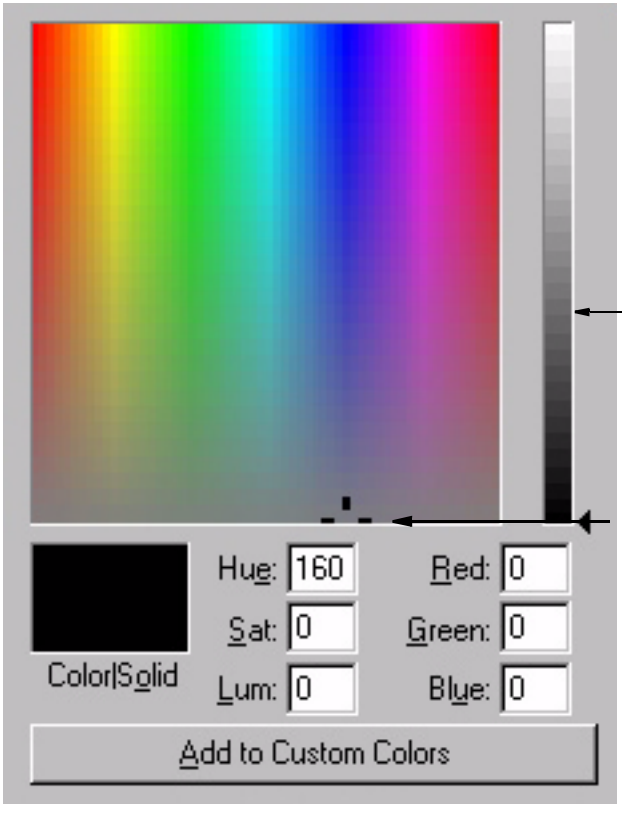
Creating a Custom Color

■ **To create a custom color:**

1. **(CLICK-L)** on **Window>Show Color Mixer**.
2. **(DRAG-L)** the Color Picker Tool and the Brightness Color Bar slider until the color you want appears in the Color/Solid Box. You can also input numeric values for the color.
3. **(CLICK-L)** on **Add to Custom Colors**. The color appears in a Custom Color Box. **(CLICK-L)** on **OK**.



The Help Menu

The Help menu commands let you:

- Bring up the online help system
- Open the tutorial viewer
- Show the about screen

Each of the options on the Help menu are discussed in the following sections:

Help

How to

About

Help

Opens Nendo's online help system.

■ **To open the help system:**

- **(CLICK-L)** on **Help>Help...**

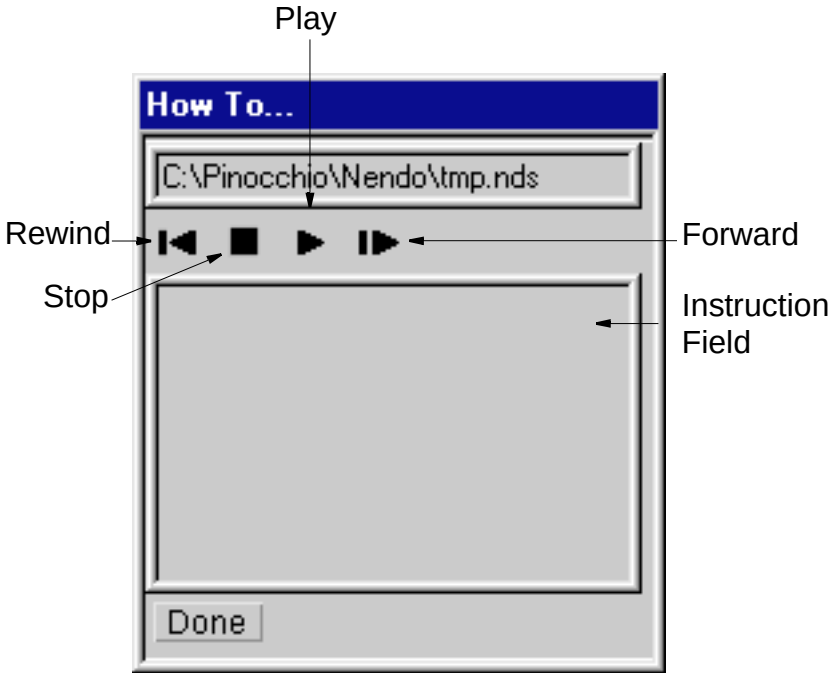
How to

Opens the Tutorial Viewer.

■ **To view the tutorials:**

1. **(CLICK-L)** on **Help>How to...**
2. Use the file browser to find the image you want to import, then **(CLICK-L)** on **Open**.

   The Tutorial Viewer opens:



-More-

3. Push the **Play** button to start the tutorial.

   The object you selected is built in the Model window. A description of each step in the modeling process appears in the Instruction Field.

   While the tutorial is playing, you can also:

   - **(CLICK-L)** on the **Stop** button to stop the tutorial.
   - **(CLICK-L)** on the **Rewind** button to rewind the tutorial to the beginning
   - **(CLICK-L)** on the **Forward** button to advance the tutorial to the next step

4. When you're done, **(CLICK-L)** on the **Done** button to exit the Tutorial Viewer.

About

Brings up Nendo's About window, which contains Nendo's copyright information.

■ **To open Nendo's about window:**

- **(CLICK-L)** on **Help>About...**

Camera

The camera is what you use to look at the window. To move the camera:

- **(CLICK-M)** (or use **(CTRL-R)** if you have a two-button mouse) on the window to start the camera
- After you start the camera, moving the mouse moves the camera.
- If you need to zoom the camera in or out, **(CLICK-R)** and drag or **(DRAG-M)**.
- To spin the camera around an object, **(DRAG-M)** or **(CLICK-R)** and drag the mouse left or right after starting the camera, then release the mouse button while still moving the mouse.
- **(CLICK-L)** in the window to stop the camera.

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Modeling

Modeling commands enable you to modify objects in Nendo. For more information on a particular command, **(CLICK-L)** on a link below:

Apply Color
Bevel
Bridge
Collapse
Combine
Connect
Copy
Cut
Cut 2/Cut 3
Delete
Dissolve
Extrude
Extrude Region
Flatten
Flip
Inset
Invert
Mirror
Move
Clear Paint
Plane Cut
Rotate
Scale
Separate
Smooth
Tighten

Apply Color

Vertices, edges, faces, objects, and collections of these elements

Assigns color to the selected element.

■ **To assign a color:**

1. Select a color.
2. Select one or more elements, then **(CLICK-R)**.
3. **(CLICK-L)** on **Apply Color**.

   The current color is applied to the selected element.

NOTE...

For color to be visible, objects must be shaded and Color toggled on.

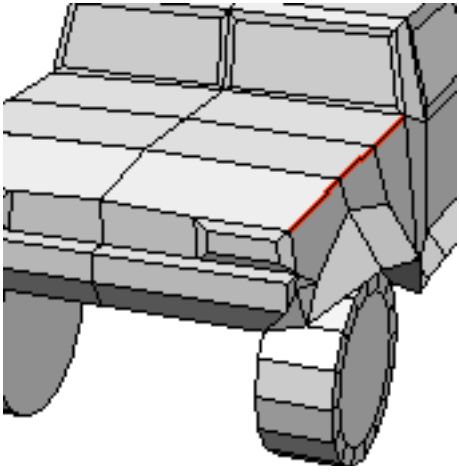
Bevel

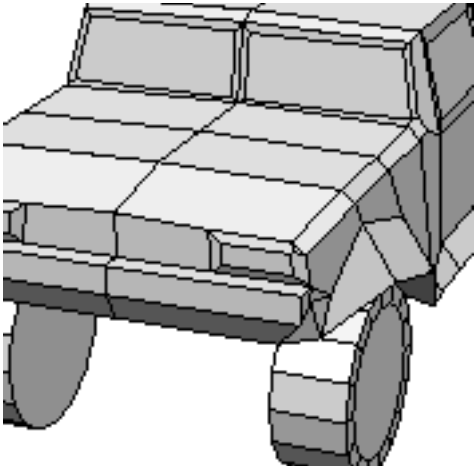
Vertices, edges, faces, and collections of these elements

Beveling an edge or vertex removes that element and replaces it with a face perpendicular to the normal of that element, "rounding" the corner. Beveling a face bevels each of its edges.

■ **To bevel an element:**

1. Select an element, then **(CLICK-R)**.
2. **(CLICK-L)** on **Bevel**.
3. Move the mouse left and right to bevel the element interactively. **(CLICK-L)** when the element is beveled correctly.





Bridge

Collection of two faces

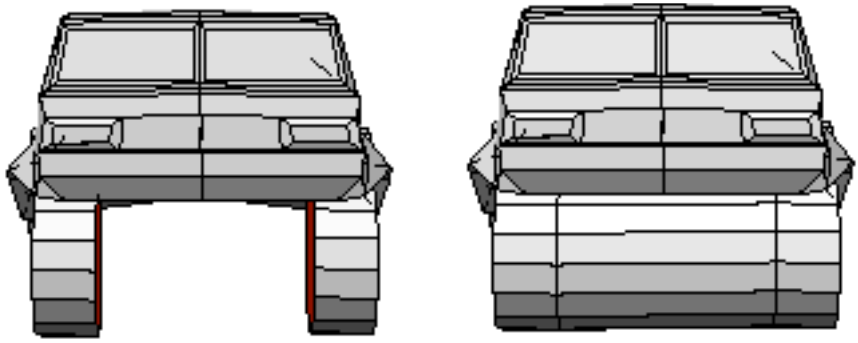
Creates a tunnel or a bridge between two non-contiguous faces with the same number of vertices.

■ **To bridge between two faces on the same object:**

1. Select two faces with the same number of vertices, then **(CLICK-R).**
2. **(CLICK-L)** on **Bridge**. Either a tunnel or a bridge is created.

■ **To bridge between two faces on different objects:**

1. Select two faces whose normals are less than 180 degrees apart and that have the same number of vertices, then **(CLICK-R).**
2. (**CLICK-L)** on **Bridge**. A bridge is created.



Bridging between the two inside faces of the wheels

NOTE...

Once you bridge between two objects, the objects become a single object and cannot be separated.

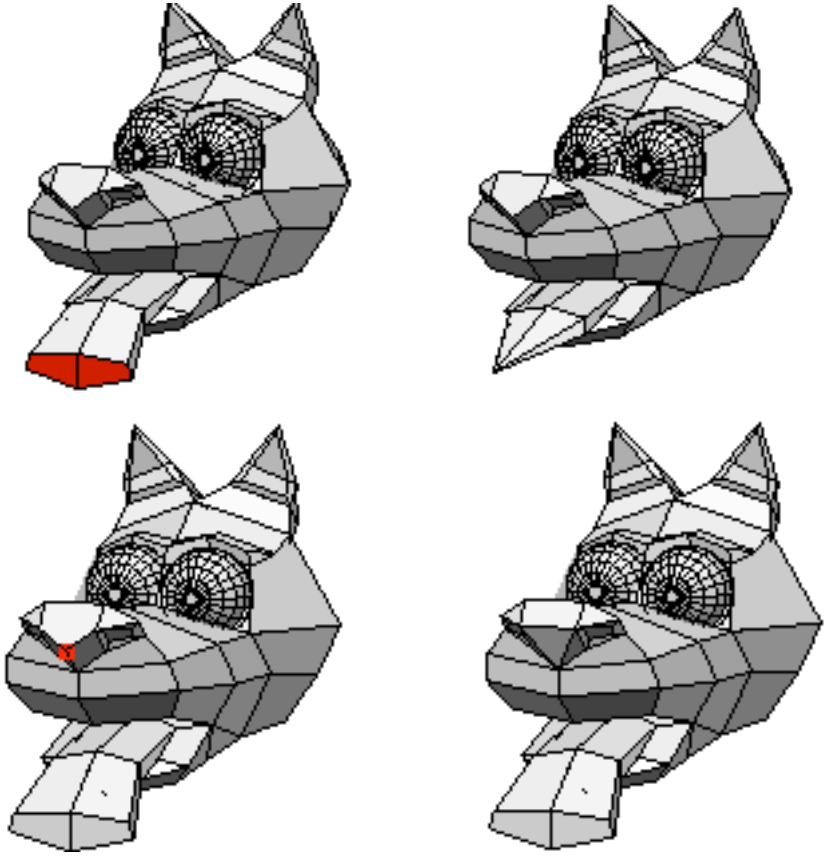
Collapse

Vertices, edges, faces, and collections of these elements

Deletes the selected element while maintaining the closed surface of the object. Faces and edges collapse to a point; points collapse to a face.

■ **To collapse an element:**

1. Select an element, then **(CLICK-R)**.
2. **(CLICK-L)** on **Collapse**.



Combine

Collections of objects

Combines multiple separate objects into a single object. Once combined, that object can then be manipulated as any other object.

■ **To combine multiple objects:**

1. Select the objects, then **(CLICK-R)**.
2. **(CLICK-L)** on **Combine**.

   The objects are combined into a single object.

NOTE...

Combined objects assume the name of the last object added to Nendo.

Connect

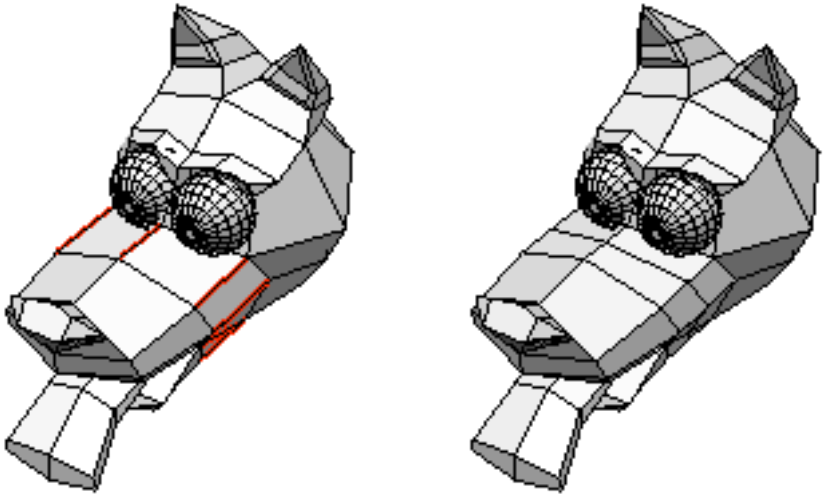
Collection of vertices or edges

Creates a new edge that connects two vertices or the midpoints of two edges. If you have multiple vertices or edges selected, Connect creates edges between the closest pairs of vertices or edges.

■ **To connect two elements:**

1. Select a collection of vertices or edges, then **(CLICK-R)**.
2. **(CLICK-L)** on **Connect**.

   The vertices or the midpoint of the edges are connected by a new edge.



Copy

Objects and collections of objects

Duplicates the selected object.

■ **To copy an object:**

1. Select an object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Copy**.
3. Use the mouse to position the new object, then **(CLICK-L)** to place the object.

Cut

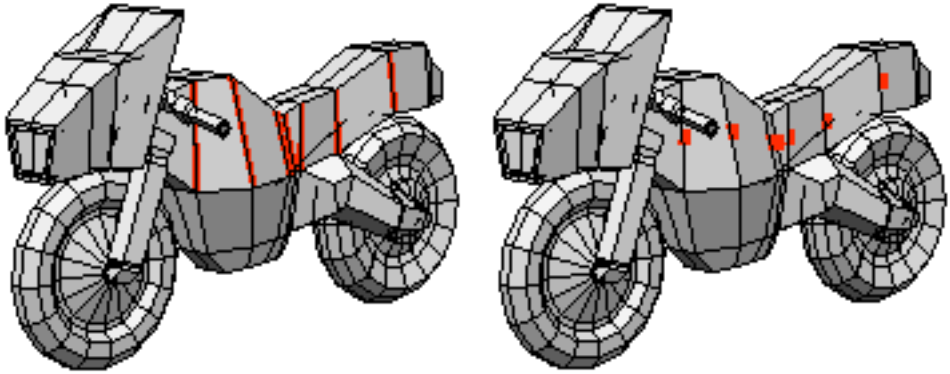
Edges and collections of edges

Cuts edges into a specified number of segments of equal length.

- **2**, **3**, **4**, and **5** specify the number of segments

■ **To cut one or more edges:**

1. Select one or more edges, then **(CLICK-R)**.
2. **(CLICK-L)** on **Cut** and then select the number of segments into which to cut the edges.



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Cut 2/Cut 3

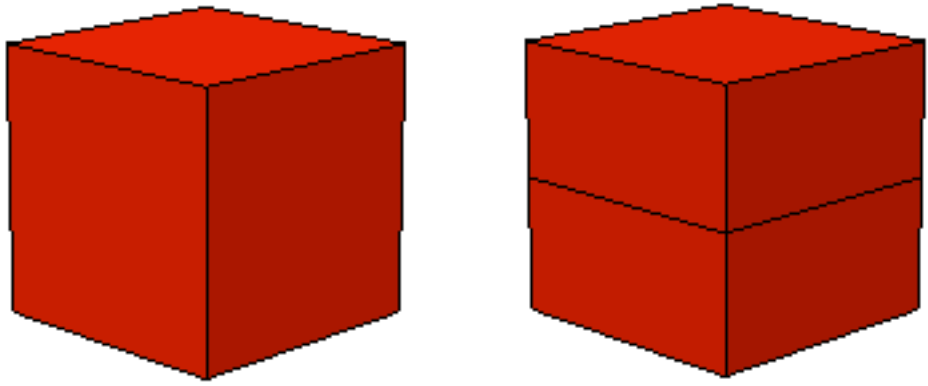
Objects and collections of objects

Makes two or three cuts into an object, along the specified plane. The object is not physically cut into different objects, the cuts are only made on the surface.

- **X**, **Y**, and **Z** specify the plane in which the object is cut

■ To cut an object into halves or thirds:

1. Select an object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Cut 2** to cut it in half, **Cut 3** to cut it in thirds, then select the plane in which the object will be cut.



Delete

Objects and collections of objects

Deletes the selected object.

■ **To delete an objects:**

1. Select the objects, then **(CLICK-R)**.
2. **(CLICK-L)** on **Delete**.

   The objects are deleted.

NOTE...

You can only delete objects from Model, you cannot delete objects from Paint.

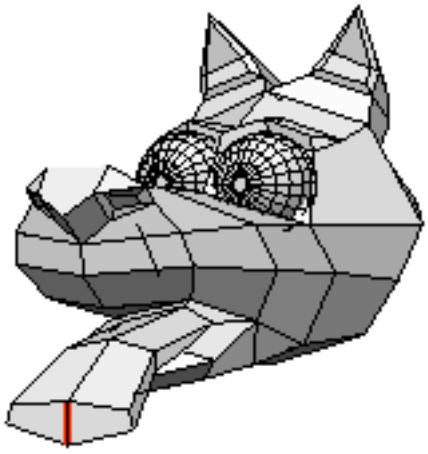
Dissolve

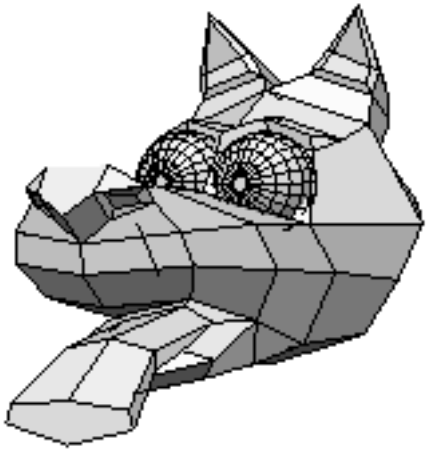
Edges and collections of edges

Eliminates the selected edge and turns the adjoining faces into one face.

■ **To dissolve an edge:**

1. Select an edge, then **(CLICK-R)**.
2. **(CLICK-L)** on **Dissolve**.





Extrude

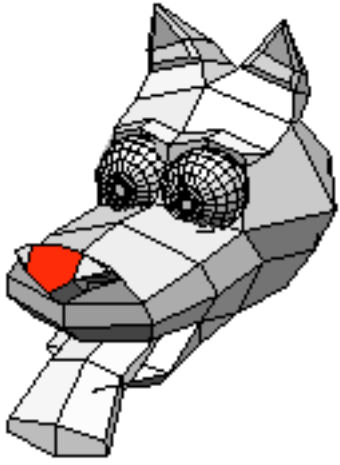
Vertices, faces, edges, and collections of these elements

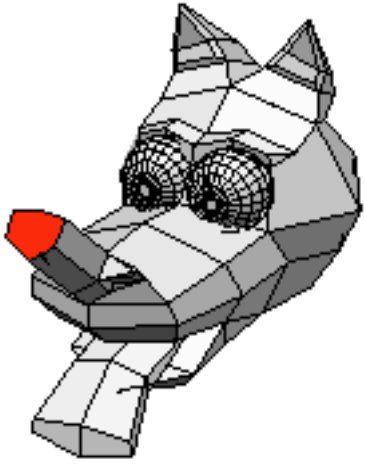
Moves the element in the selected direction. Vertices and edges are beveled before moving.

- **Normal** extrudes the element and moves it along its normal
- **Free** extrudes the element and moves it freely in any direction
- **X**, **Y**, and **Z** extrude the element and move it along the specified axis

■ To extrude an element:

1. Select an element, then **(CLICK-R)**.
2. **(CLICK-L)** on **Extrude** and select a direction to extrude.
3. Move the mouse to extrude the element. **(CLICK-L)** when done.





See also: Extrude Region

Extrude Region

Collections of faces

Extrudes the selected faces as a region in the selected direction:

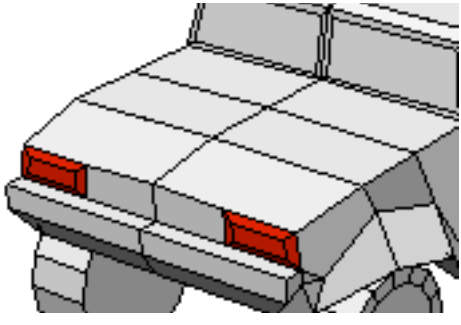
- **Normal** extrudes the faces as a region and moves them along the group's normals
- **Free** extrudes the faces as a region and moves them freely
- **X**, **Y**, and **Z** extrude the selected faces as a region and moves them along the specified axis

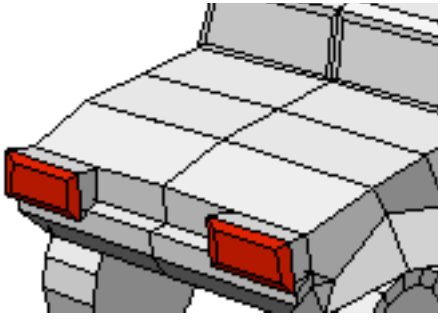
NOTE...

Extrude Region behaves like Extrude on non-contiguous faces in the collection.

■ **To extrude a collection of faces as a region:**

1. Select a group of contiguous faces, then **(CLICK-R)**.
2. **(CLICK-L)** on **Extrude Region** and select a direction.
3. Move the mouse to extrude the region. **(CLICK-L)** when done.





See also: Extrude

Flatten

Faces and collections of vertices and faces

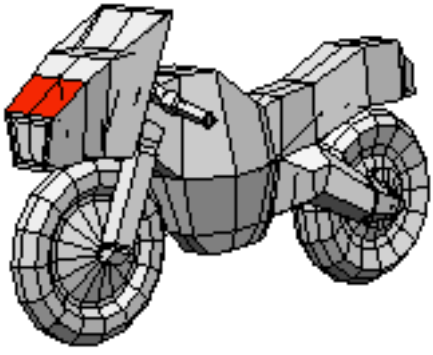
For faces, the faces are reoriented to the selected plane, then moved along the axis to the average position for all selected faces. For vertices, the vertices are moved along the axis to the average position for all selected points.

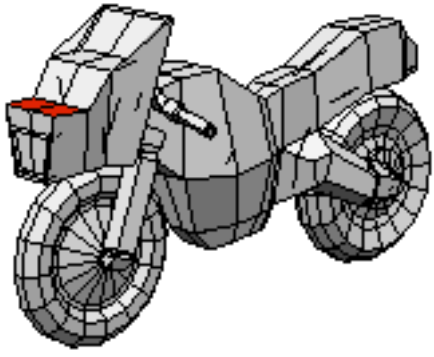
- **X**, **Y**, and **Z** specify the plane on which the element will lie

■ To flatten a collection of elements:

1. Select the elements, then **(CLICK-R)**.
2. **(CLICK-L)** on **Flatten** and then select a plane along which to flatten the collection of elements.

   The collection is flattened along that plane.





Flip

Objects and collections of objects

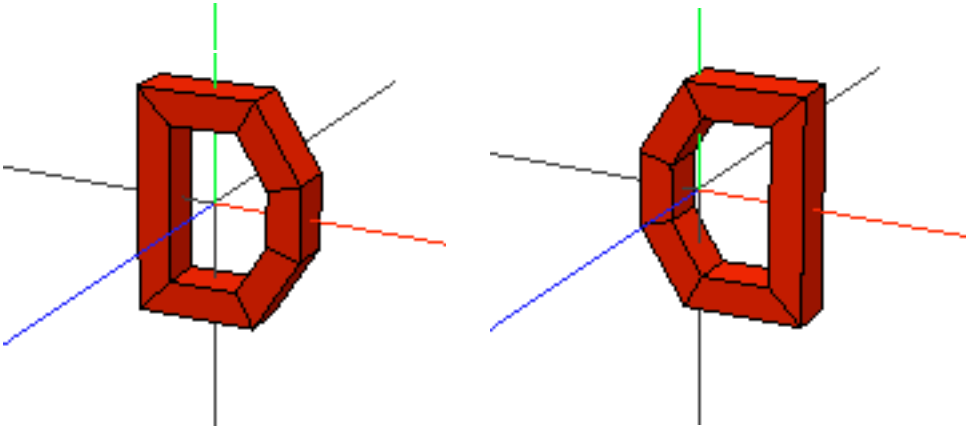
Mirrors the topology of the object across a specified axis.

- **X**, **Y**, and **Z** specify the axis around which to flip the object.

■ To flip an object:

1. Select an object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Flip** and select an axis around which to flip the object.

   The object flips around the selected axis.



Flipping an object around the X axis

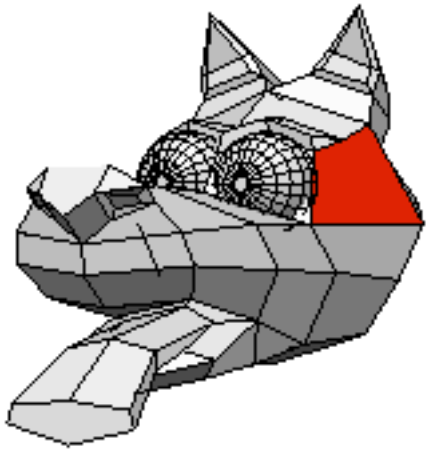
Inset

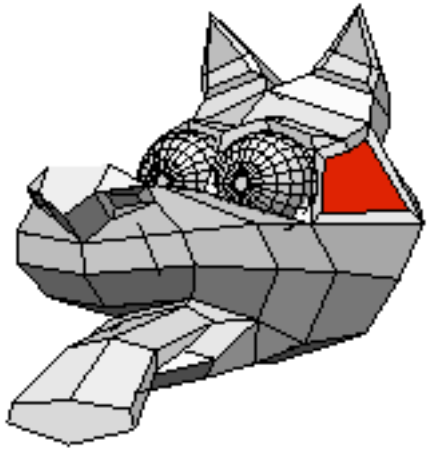
Faces and collections of faces

Interactively insets a face inside the selected faces.

■ **To create insets in one or more faces:**

1. Select the faces, then **(CLICK-R)**.
2. **(CLICK-L)** on **Inset**.
3. Move the mouse left and right to interactively size the inset. When the inset is the correct size, **(CLICK-L)**.





Invert

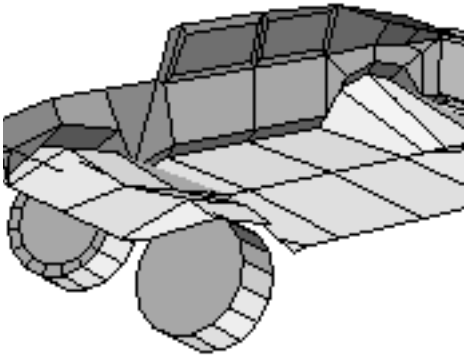
Objects and collections of objects

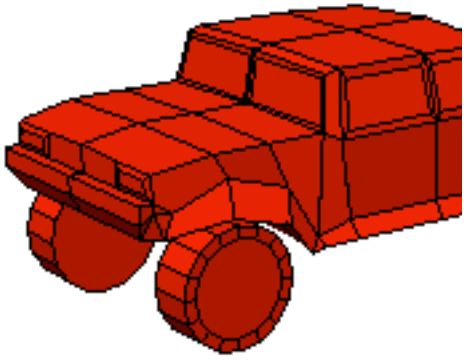
Turns an object inside out, flipping its normals.

■ To invert an object:

1. Select an object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Invert**.

   The object turns inside out.





NOTE...

This is useful when importing objects in other formats whose normals are flipped.

Mirror

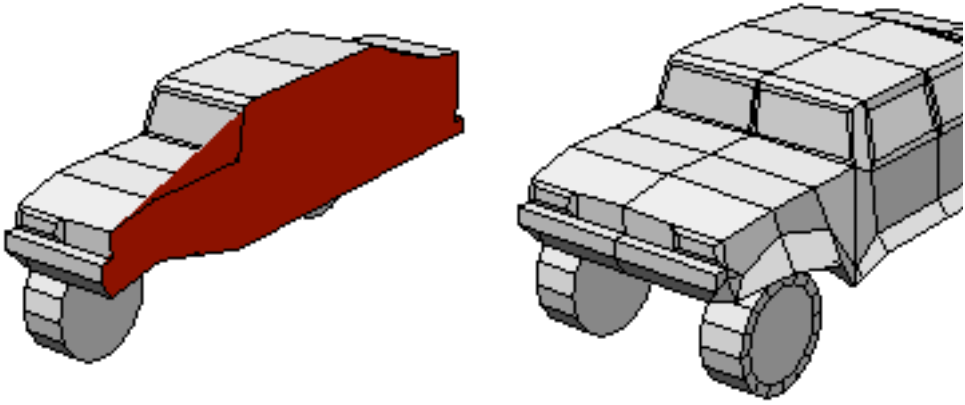
Faces and collections of faces

Mirrors the topology of an object around one or more faces. The newly added geometry is added to the original object (not as a separate object).

■ **To mirror an object around a face:**

1. Select a face on the object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Mirror**.

   The object is mirrored around the selected face.



Move

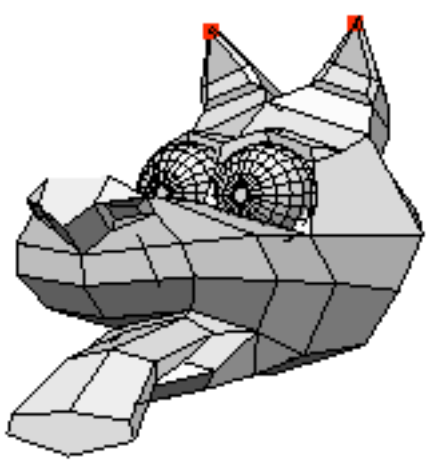
Vertices, edges, faces, objects, and collections of these elements

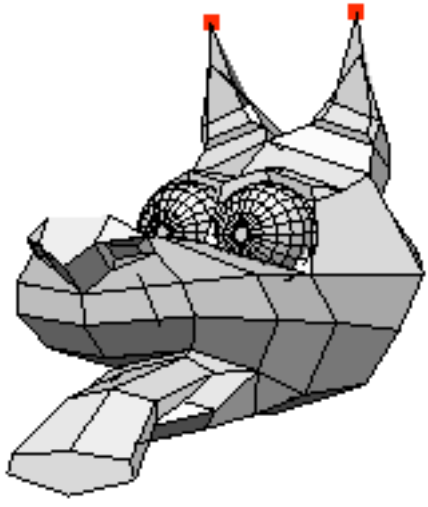
Moves the selected elements in the selected direction:

- **Normal** moves the element along its individual normals
- **Free** moves the element freely
- **X**, **Y**, and **Z** move the selected elements along the specified axis

■ **To move one or more elements:**

1. Select the elements, then **(CLICK-R)**.
2. **(CLICK-L)** on **Move** and select a direction.
3. Use the mouse to move the elements, then **(CLICK-L)**.





Clear Paint

Objects and collections of objects

Removes paint from an object so that you can perform topological modeling operations.

- **Delete Paint Layer** removes all paint from the object
- **Paint Layer to Color** converts all of the paint on the object into color and assigns it to the object's vertices, edges, and faces.

To remove paint from an object:

1. Select an object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Paint** and select a method.

NOTE...

Color applied to an object using the Apply Color command is converted into paint and applied to the object when you enter Paint. This paint must be converted back into color or removed from the object before you can perform any topological operations.

Plane Cut

Objects and collections of objects

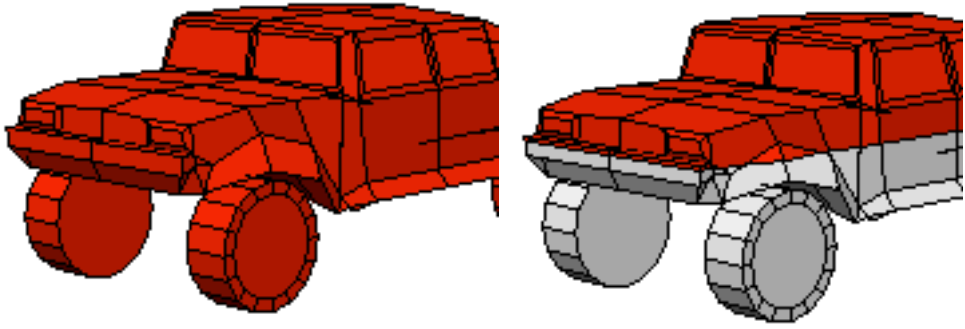
Makes a cut through the object where it intersects the selected plane. If the object does not intersect the selected plane, then it will not be cut.

- **X**, **Y**, and **Z** specify the plane by which the object is cut

■ To chop an object:

1. Select an object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Chop** and select a plane to cut the object.

   The faces that lie on the selected plane are cut.



Rotate

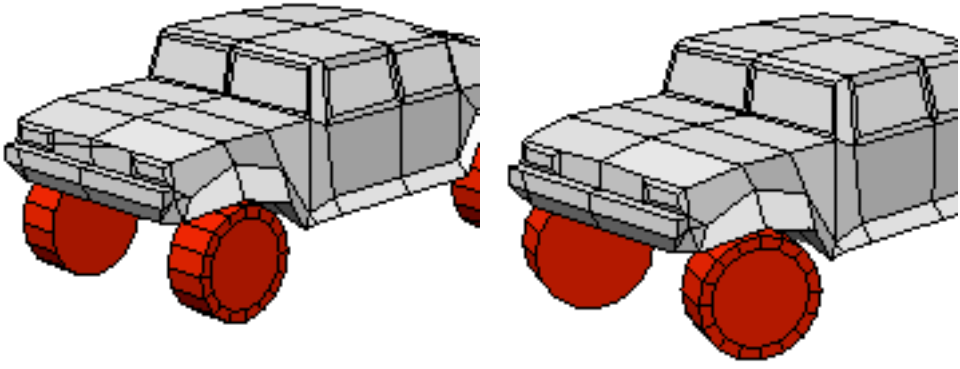
Vertices, edges, faces, objects, and collections of these elements

Rotates the element around a selected axis:

- **Normal** rotates the element around its individual normal
- **Free** rotates the element freely
- **X**, **Y**, and **Z** rotate the element around the specified axis; the center of collections rotate around the specified axis

■ **To rotate one or more elements:**

1. Select an element, then **(CLICK-R)**.
2. **(CLICK-L)** on **Rotate** and select an axis of rotation.
3. Move the mouse to rotate the element, then **(CLICK-L)**.



Scale

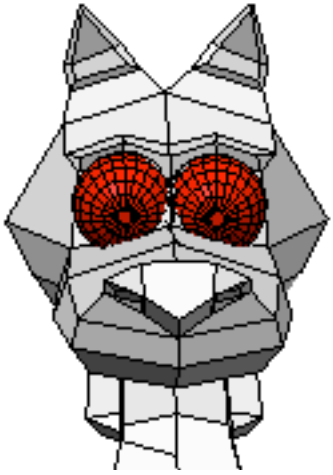
Vertices, edges, faces, objects, and collections of these elements

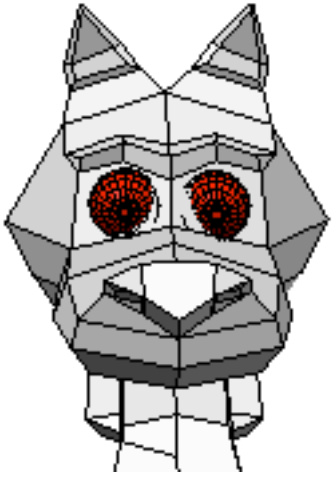
Scales the element relative to its midpoint around a scaling center along a specified direction. Collections are scaled around the midpoint of the collection along a specified direction:

- **Uniform** scales the element equally in all directions
- **X**, **Y**, and **Z** scale the element along the specified axis
- **X Radial**, **Y Radial**, and **Z Radial** scale the element uniformly around the specified axis

■ **To scale an element:**

1. Select an element, then **(CLICK-R)**.
2. **(CLICK-L)** on **Scale,** then select the direction in which the element will be scaled.
3. Move the mouse to scale the element, then **(CLICK-L)**.





Separate

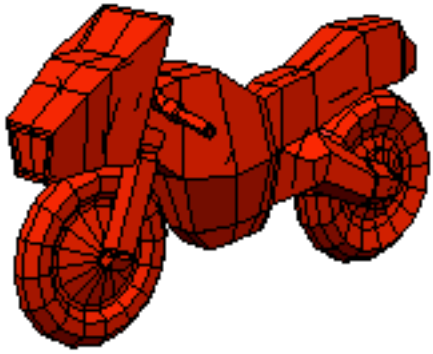
Objects and collections of objects

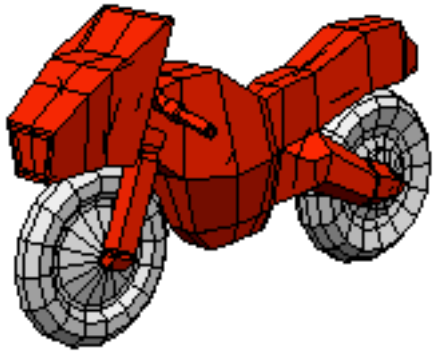
Separates a combined object into its original components.

■ **To separate a combined object:**

1. Select a combined object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Separate**.

   The combined object becomes separate objects.





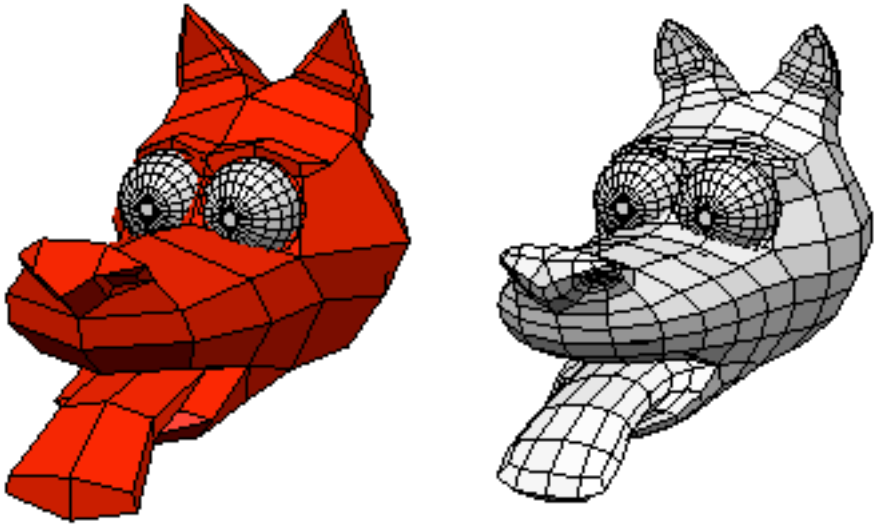
Smooth

Objects and collections of objects

Gives an object a smoother appearance by cutting each face into many faces. The faces are subdivided by creating new vertices at the midpoints of each edge and at the geometric center of the face.

■ **To smooth an object:**

1. Select an object, then **(CLICK-R)**.
2. **(CLICK-L)** on **Smooth**.



NOTE...

You cannot smooth objects that have been painted.

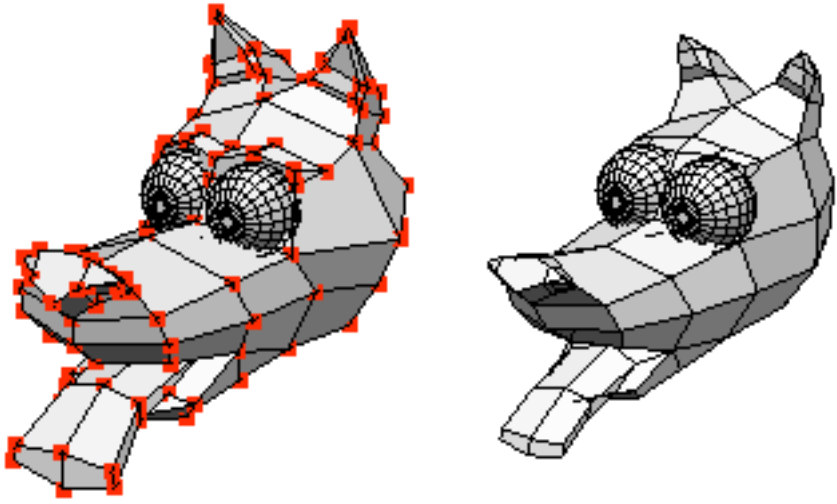
Tighten

Vertices, objects, and collections of these elements

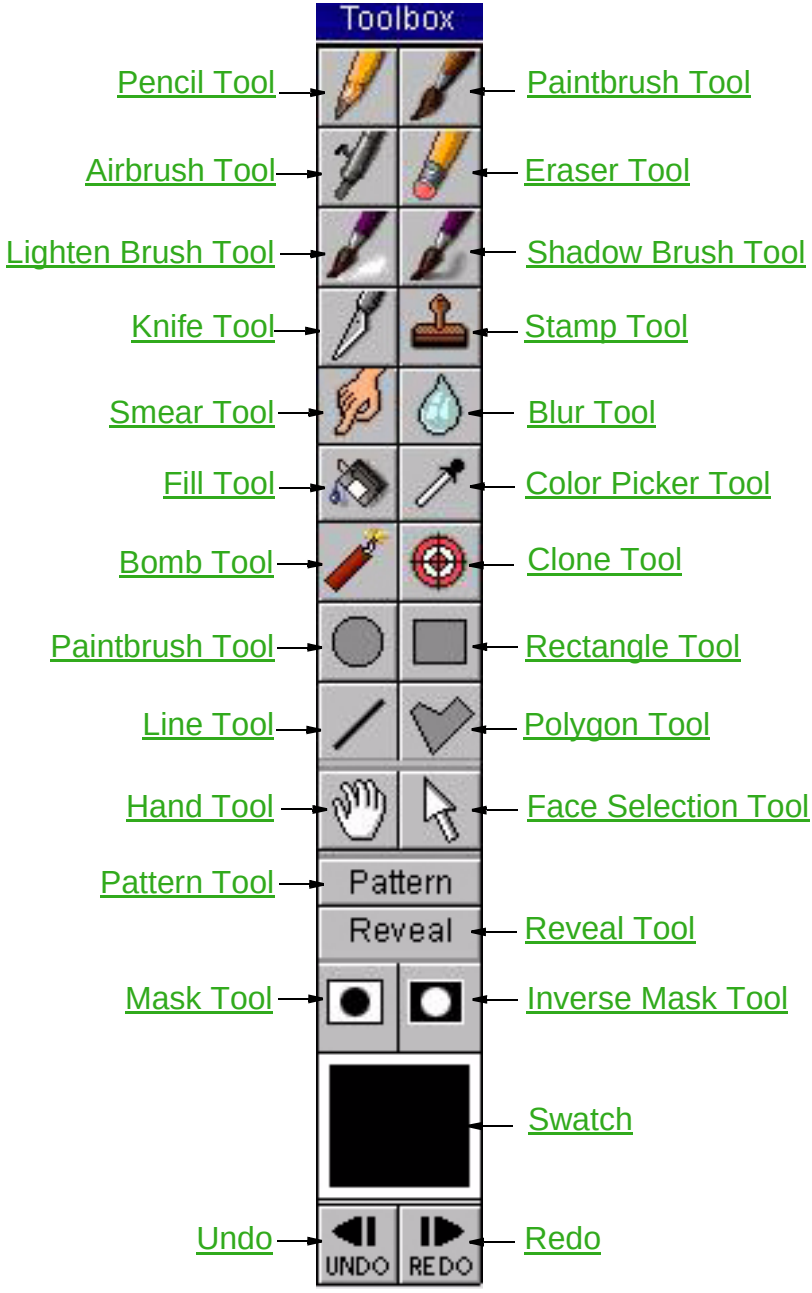
Moves the selected elements to a point midway between its neighbors. The effect is to "pull in" points that stick out from the contour of the body. Once the element is at the midpoint of all its neighbors, no more tightening can occur. It may be helpful to think of this as a "smooth" of sorts which does not affect the topology of your object.

■ **To tighten a set of vertices:**

1. Select one or more vertices, then **(CLICK-R)**.
2. **(CLICK-L)** on **Tighten**.
3. Move the mouse to tighten (or loosen) the vertices, then **(CLICK-L)**.



Painting


Toolbox
Pencil Tool
Paintbrush Tool
Airbrush Tool
Eraser Tool
Lighten Brush Tool
Shadow Brush Tool
Knife Tool
Stamp Tool
Smear Tool
Blur Tool
Fill Tool
Color Picker Tool
Bomb Tool
Clone Tool
Paintbrush Tool
Rectangle Tool
Line Tool
Polygon Tool
Hand Tool
Face Selection Tool
Pattern Tool
Pattern
Reveal
Reveal Tool
Mask Tool
Inverse Mask Tool
Swatch
Undo
UNDO
REDO
Redo

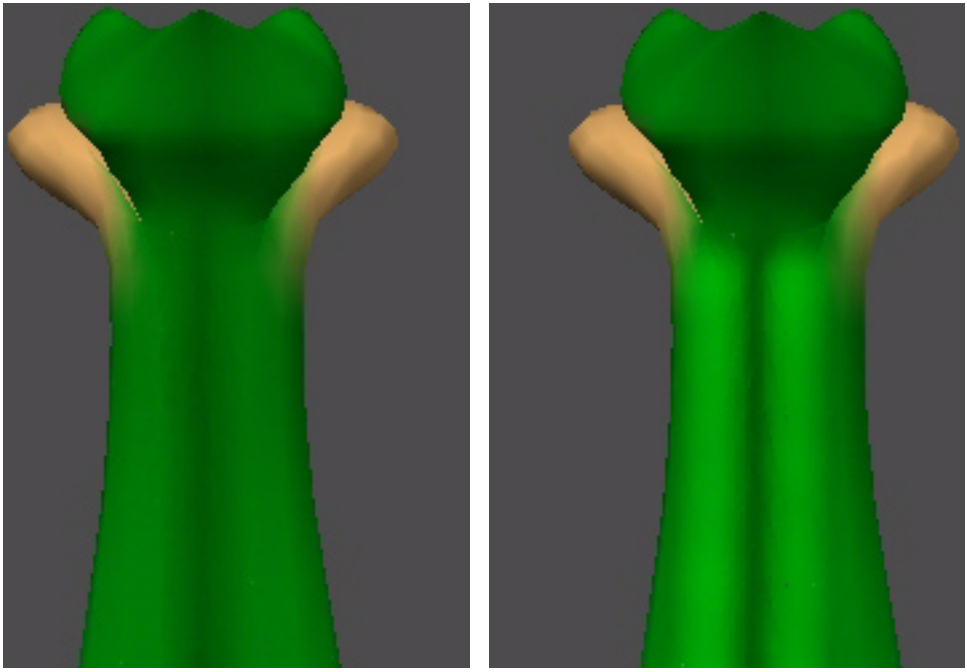
nendo

Airbrush Tool

Applies paint to the object using an Airbrush Tool.

■ **To use the Airbrush Tool:**

1. Select the color with which to paint.
2. **(CLICK-L)** on the Airbrush Tool icon, then **(DRAG-L)** to paint on the object.



Right, using the Airbrush Tool to add highlights to the Snake's back

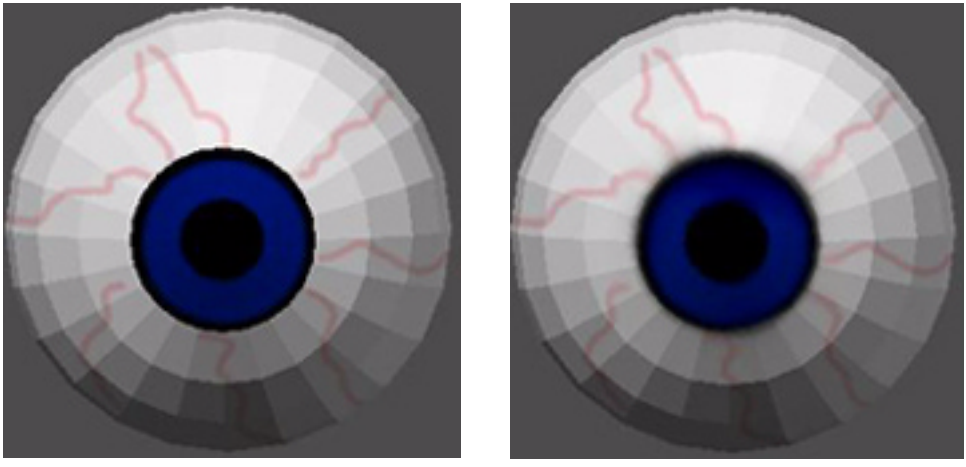
See also: Brush Options

Blur Tool

Blurs the paint on the object.

■ **To use Blur Tool:**

1. **(CLICK-L)** on the Blur Tool icon.
2. **(DRAG-L)** the mouse over the area you want to blur.



Right, using the Blur Tool to blur the paint around the perimeter of the eye

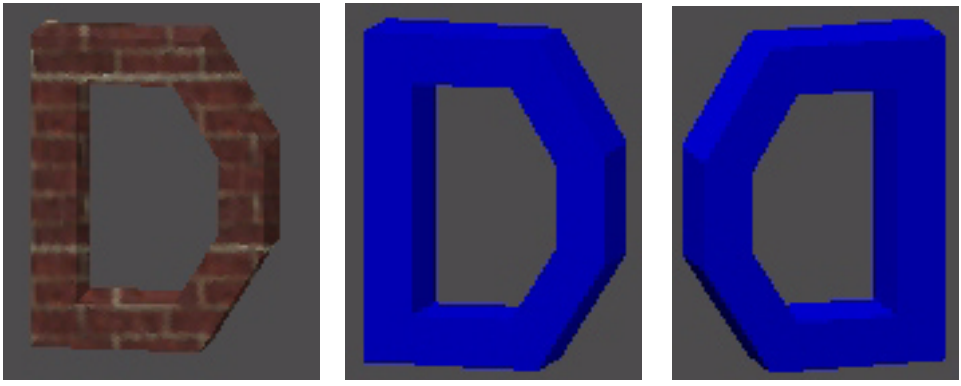
See also: Brush Options

Bomb Tool

The Bomb tool fills the entire object with a selected color. The default color is white.

■ **To use the Bomb Tool:**

1. **(CLICK-L)** on the Bomb Tool icon.
2. Select the Bomb color.
3. **(CLICK-L)** on the object you want to fill.



Using the Bomb Tool to color an entire object

Clone Tool

Creates a copy of an area on the object.

■ **To clone an area:**

1. **(CLICK-L)** on the Clone Tool icon (shown above) on the Paint Toolbox.
2. **(CLICK-L)** in the area you want to copy.
3. Place the mouse where you want to copy the captured area.

   The distance between the first click and the second click defines the offset distance for the cloning operation.
4. **(DRAG-L)** the mouse over the object.

   As you drag the mouse over the object, the captured area is cloned in the new area.

Using the Clone Tool to reproduce a pattern

See also: Brush Options

Color Picker Tool

Selects the current color from the workspace.

■ **To use the Color Picker Tool:**

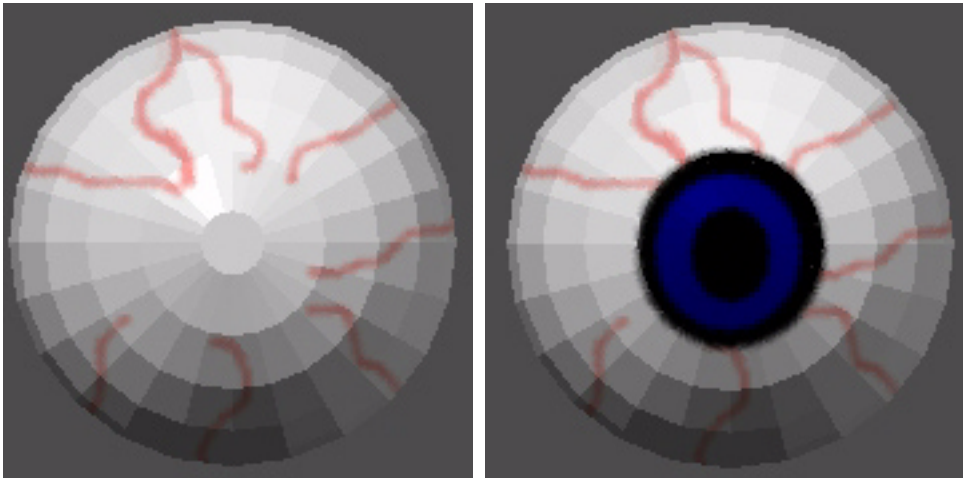
1. **(CLICK-L)** on the Color Picker Tool icon.
2. **(CLICK-L)** on a part of the object that has the color you want to use. That color becomes the current color and appears in the Swatch.

Ellipse Tool

Draws a filled oval on the object.

■ **To use the Ellipse Tool:**

1. Select the color with which to draw and fill the oval.
2. **(CLICK-L)** on the Ellipse Tool icon.
3. **(DRAG-L)** the mouse until the oval is the right size, then release the mouse.



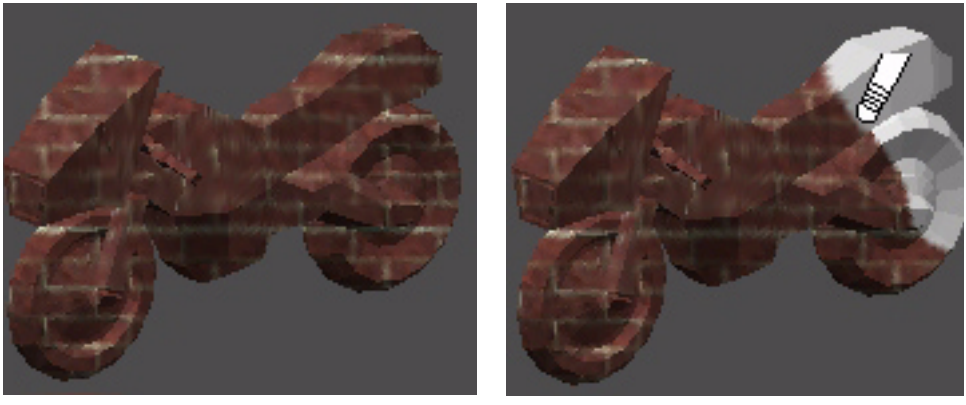
Using the Ellipse Tool to draw the pupil and the iris

Eraser Tool

Removes all paint from an area and paints it a selected color. The default color is white.

To use the Eraser Tool:

1. **(CLICK-L)** on the Eraser Tool icon.
2. Select the Eraser color.
3. **(DRAG-L)** the mouse over the area of the object you want to erase.



Using the Eraser Tool to remove paint

See also: Brush Options

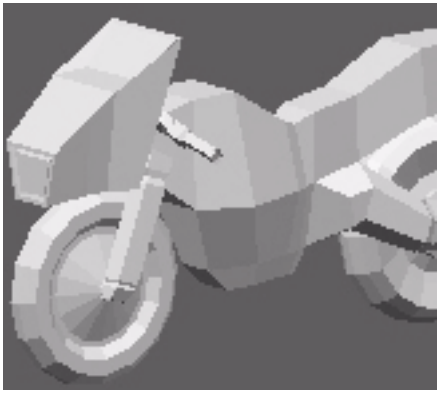
Face Selection Tool

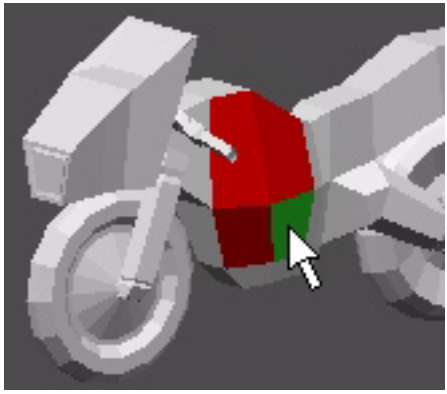
Selects faces on objects.

■ **To use the Face Selection Tool:**

1. **(CLICK-L)** on the Face Selection Tool icon.
2. **(CLICK-L)** on a face to select it.

   You can then use the Mask Tool to mask the faces you selected or the Inverse Mask Tool to mask the faces you didn't.





Fill Tool

The Fill Tool colors neighboring pixels that have the same color value as the area you click. Note that only the visible area of an object is filled; an area of the same color that is facing away from the camera is not filled.

To use the Fill Tool:

1. Select the fill color.
2. **(CLICK-L)** on the Fill Tool icon.
3. **(CLICK-L)** in the area you want to fill.

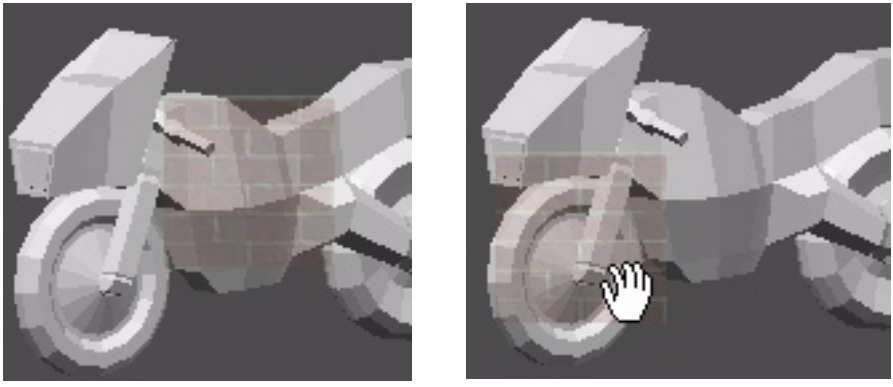
Using the Fill Tool to fill a wheel

Hand Tool

After importing an image with the Reveal Tool, the Hand Tool positions the image on the screen.

■ **To use the Hand Tool:**

1. Import an image using the Reveal Tool. The image appears in the lower left hand corner of your workspace.
2. **(CLICK-L)** on the Hand Tool icon.
3. **(DRAG-L)** the image to its new position. **(CLICK-L)** on the Reveal Tool icon when done.



Positioning an image with the Hand Tool

Inverse Mask Tool

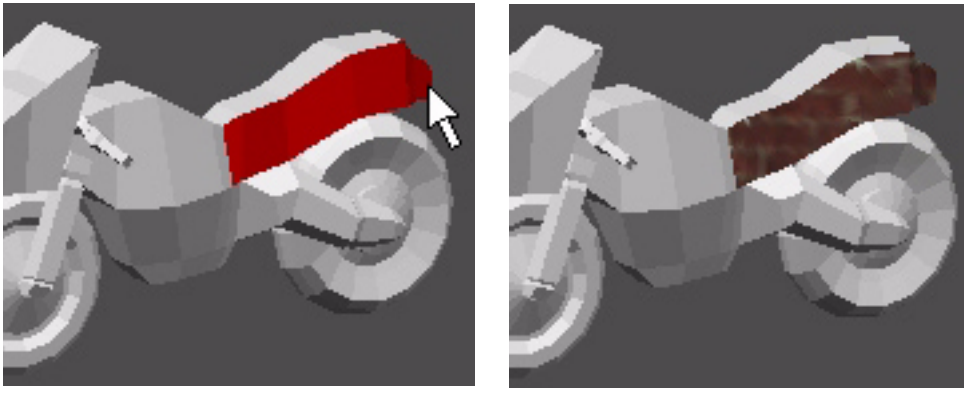
Creates a mask over non-selected areas of the object. A mask prevents painting in those areas.

■ **To use the Inverse Mask Tool:**

1. **(CLICK-L)** on the Face Selection Tool icon.
2. **(CLICK-L)** on each face on which you want to paint.
3. **(CLICK-L)** on the Mask Tool icon.

   A mask is created over the faces you selected. You cannot paint on these faces.
4. **(CLICK-L)** on the Inverse Mask Tool icon (shown above) on the Paint Toolbar.

   A mask is created over the faces you did not select. You can now paint on the faces you selected.
5. When you are done with the mask, **(CLICK-L)** on the Inverse Mask Tool Icon to toggle it off.



Using the Inverse Mask Tool to prevent painting on non-selected areas of the motorcycle

Knife Tool

Copies a rectangular region on the object.

To use the Knife Tool:

1. **(CLICK-L)** on the Knife Tool icon.
2. **(DRAG-L)** the mouse to capture a rectangular area on the object. When you release the mouse, the cursor changes from the Knife Tool to the Stamp Tool.
3. Place the mouse in the area to which you want to transfer the rectangular area and **(CLICK-L)**. The captured area is reproduced in the new area.

Copying a rectangular region

NOTE...

You can **(DRAG-L)** *the mouse or* **(CLICK-L)** *again to reproduce the captured area multiple times.*

nendo

Lighten Brush Tool

Lightens the area under the brush.

■ **To use the Lighten Brush Tool:**

1. **(CLICK-L)** on the Lighten Brush Tool icon.
2. **(DRAG-L)** the mouse over an area to lighten it.

Enhancing the snake's markings using the Lighten Brush Tool

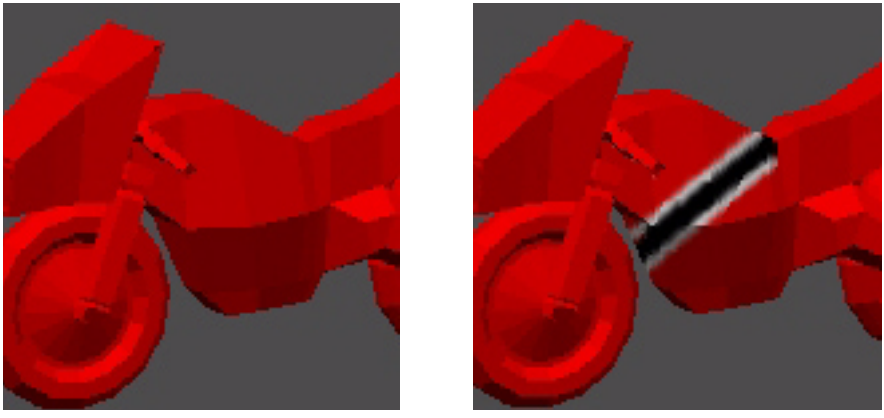
See also: Brush Options

Line Tool

Draws a line on the object.

■ **To use the Line Tool:**

1. Select the color with which to draw.
2. **(CLICK-L)** on the Line Tool icon.
3. **(DRAG-L)** the mouse to draw the line.



Using the Line Tool to draw racing stripes

See also: Brush Options

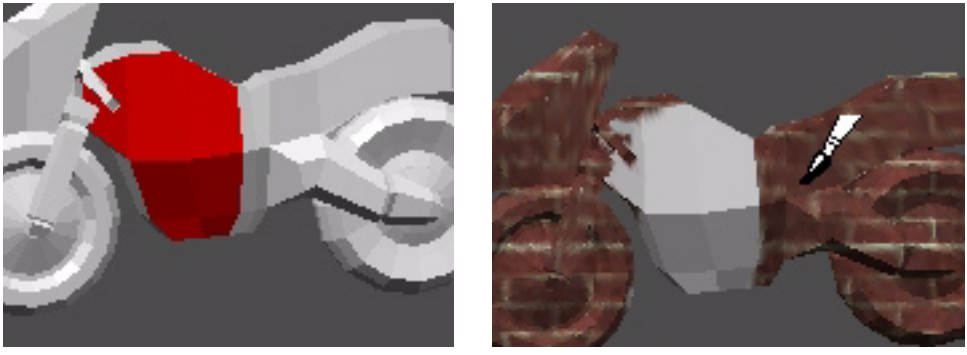
Mask Tool

Creates a mask over selected areas. A mask prevents painting in those areas.

■ **To use the Mask Tool:**

1. **(CLICK-L)** on the Face Selection Tool icon.
2. **(CLICK-L)** on each face you want to mask.
3. **(CLICK-L)** on the Mask Tool icon (shown above) on the Paint Toolbox.

   A mask is created over the faces you selected. You cannot paint on these faces.
4. When you are done with the mask, **(CLICK-L)** on the Mask Tool Icon to toggle it off.



Using the Mask Tool to prevent painting on selected areas of the motorcycle

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Paintbrush Tool

Paints with brush strokes. This is the default brush in the toolbox.

■ **To use the Paintbrush Tool:**

1. Select a color with which to paint.
2. **(CLICK-L)** on the Paintbrush Tool icon.
3. **(DRAG-L)** the mouse over the area of the object you want to paint.

Using the Paintbrush Tool to paint the snake

See also: Brush Options

Pattern Tool

Imports images in one of the following formats: TIFF (.tif), PNG (.png), JPEG (.jpg or .jpeg), or PPM (.ppm). You can then paint with the imported image. The image will repeat endlessly, so images with seams (see below, right) appear tiled.

To use the Pattern Tool:

1. **(CLICK-L)** on the Pattern Tool icon.
2. Use the file browser to find the image you want to import, then **(CLICK-L)** on **Open**. The image appears in the Swatch.
3. **(DRAG-L)** the Paintbrush Tool, Pencil Tool, Airbrush Tool, or Stamp Tool to paint the imported image.

Left, painting with a seamless image; right, painting with a non-seamless image

NOTE...

In order to use the other Paint tools, you have to toggle the Pattern Tool off.

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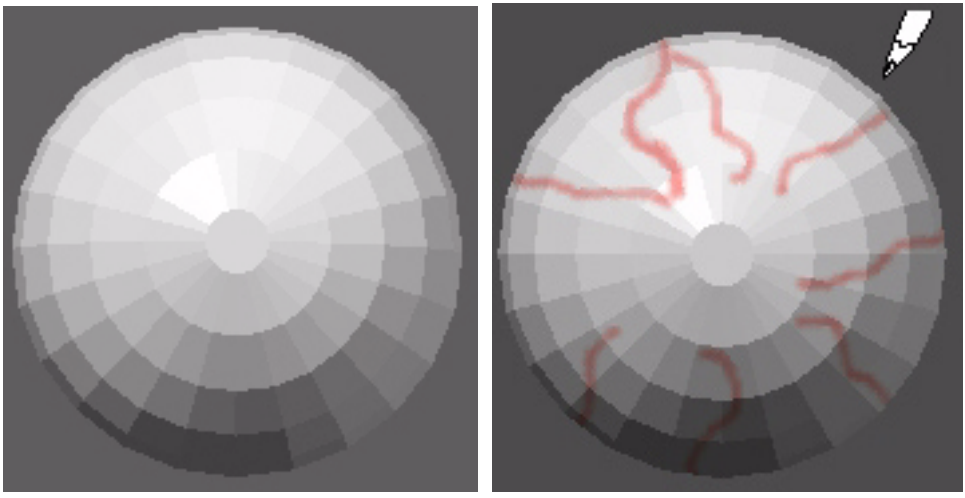
Pencil Tool

Draws a thin, hard-edged line on the object.

■ **To use the Pencil Tool:**

1. Select the color with which to draw.
2. **(CLICK-L)** on the Pencil Tool icon.
3. **(DRAG-L)** the mouse over the area of the object you want to paint.



Using the Pencil Tool

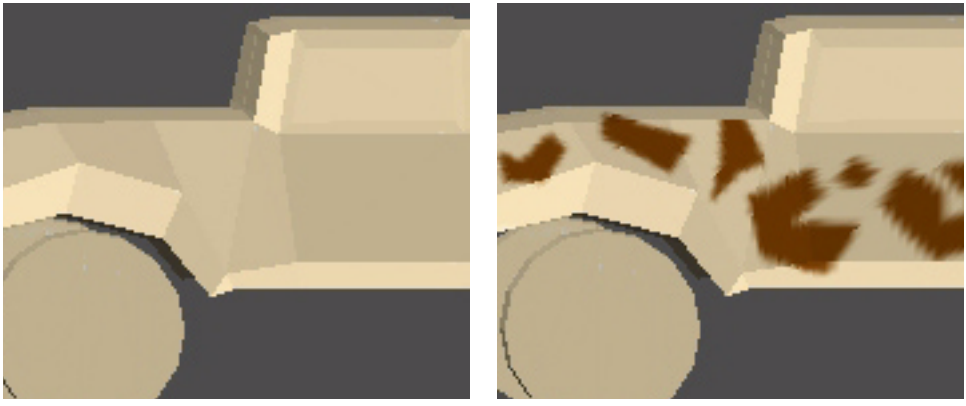
See also: Brush Options

Polygon Tool

Draws a filled polygon on the object.

■ **To use the Polygon Tool:**

1. Select the color with which to draw and fill the polygon.
2. **(CLICK-L)** on the Polygon Tool icon.
3. **(CLICK-L)** on successive points to form the perimeter of the polygon. Click on the same point twice to close the polygon.



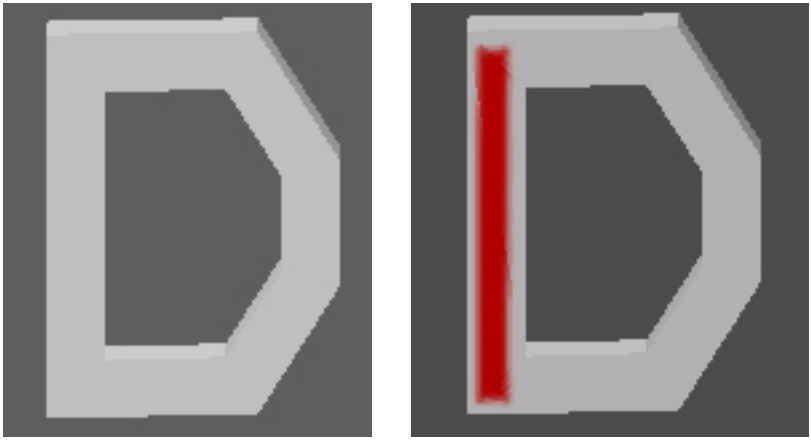
Using the Polygon Tool to create camouflage

Rectangle Tool

Draws a filled rectangle on the object.

■ **To use the Rectangle Tool:**

1. Select the color with which to draw and fill the rectangle.
2. **(CLICK-L)** on the Rectangle Tool icon.
3. **(DRAG-L)** the mouse until the rectangle is the right size, then release the mouse.



Using the Rectangle Tool

Redo

In Paint, Redo undoes the last undo. You can use the Redo icon repeatedly to reverse multiple undos. For example, if you undo the last five paint operations in Nendo, then you can redo all five or just the last three.

■ **To undo the last undo:**

- **(CLICK-L)** on the Redo icon

See also:

Undo

Reveal Tool

Imports images in one of the following formats: TIFF (.tif), PNG (.png), JPEG (.jpg or .jpeg), or PPM (.ppm). You then position the image on the screen and use the other Paint tools to reveal all or part of the image.

■ To use the Reveal Tool:

1. **(CLICK-L)** on the Reveal Tool icon.
2. Use the file browser to find the image you want to import, then **(CLICK-L)** on **Open**.
3. The image appears in the Paint window and in the Swatch. You can use the Hand Tool to position the image. You can also zoom the camera in or out to change its relative size.
4. **(DRAG-L)** any of the tools in the Paint Toolbox over an area to paint the imported image in that area.

Left, a sphere; middle, positioning the image; right, revealing the image

NOTE...

In order to use the other Paint tools, you must toggle the Reveal Tool off.

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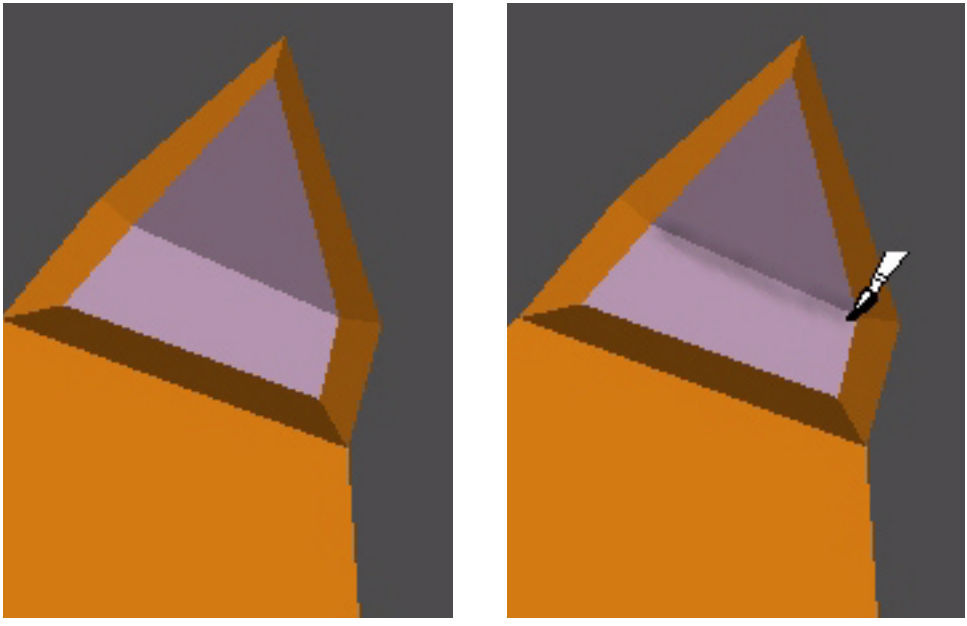
Shadow Brush Tool

Adds a nearly transparent black layer to the object. Use it to draw shadows on the object.

■ **To use the Shadow Brush Tool:**

1. **(CLICK-L)** on the Shadow Brush Tool icon, then **(DRAG-L)** to paint on the object.



Adding a shadow to the dog's ear

See also: Brush Options

Smear Tool

Smears paint on the object, much as if you were fingerpainting.

■ **To use the Smear Tool:**

1. **(CLICK-L)** on the Smear Tool icon.
2. **(DRAG-L)** on the areas you want to smear.

Using the Smear Tool to blend

See also: Brush Options

Stamp Tool

Stamps an image onto the object.

To stamp an image:

1. **(CLICK-L)** on the Stamp Tool icon.
2. If an image is already loaded, it will appear in the Swatch. **(CLICK-L)** on the object where you want to stamp the image.

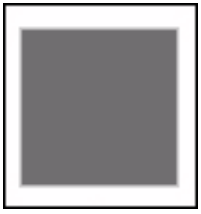
   If an image isn't loaded, use the file browser to find the image you want to open, then **(CLICK-L)** on **Open**. An outline appears around the Stamp Tool icon.

3. **(CLICK-L)** on the object where you want to stamp the image.

   The image is stamped onto the object. You can also **(DRAG-L)** the mouse to stamp the image multiple times.

Left, original sphere; middle, positioning the Stamp Tool; right, after using the Stamp Tool

Swatch



Shows the current image or color, depending upon which tool you are using.

■ **To change the current image or color:**

1. **(CLICK-L)** on the Swatch.
2. If a color is currently loaded, the Color Mixer opens. Select a new color from it.

   If an image is currently loaded, use the file browser to find the image you want to import, then **(CLICK-L)** on **Open**.

Undo

Undo reverses the last Paint operation in Nendo.You can use the Undo icon repeatedly to reverse multiple actions.

■ **To undo the last action:**

- **(CLICK-L)** on the Undo icon.

NOTE...

Once you move the camera, you cannot undo any painting that was done prior to the camera move.

Brush Options

You can modify the parameters of the following tools and brushes:

Airbrush Tool	Line Tool
Blur Tool	Paintbrush Tool
Bomb Tool	Pencil Tool
Clone Tool	Polygon Tool
Ellipse Tool	Rectangle Tool
Eraser Tool	Shadow Brush Tool
Lighten Brush Tool	Smear Tool

■ **To modify the tools and brushes in Paint:**

- Select a tool, then **(CLICK-R)** and select the parameter you would like to modify:

  Size

  Softness

  Opacity

NOTE...

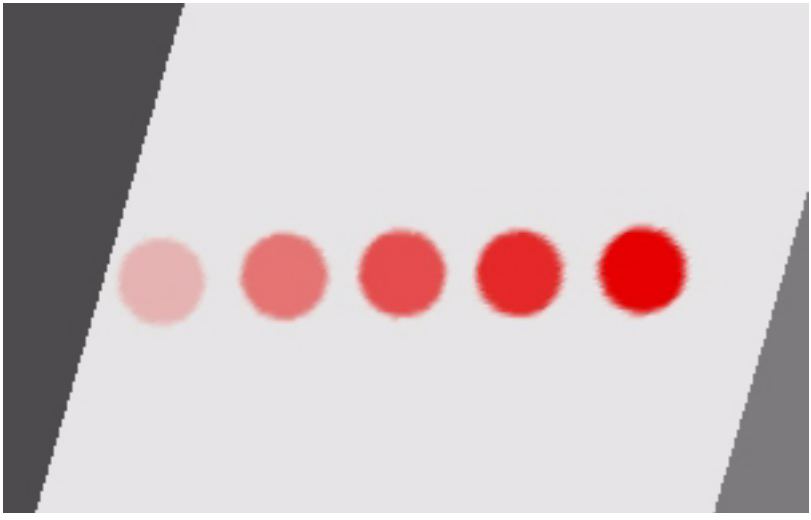
Nendo remembers the settings that you make for each tool.

Opacity

Specifies the relative opacity (**Most Transparent, Transparent, Medium, Opaque,** or **Most Opaque**) of paint applied to the object.

■ **To change the paint's opacity:**

1. Select a tool, then **(CLICK-R)**.
2. **(CLICK-L)** on **Opacity** and select a setting.



From left: Most Transparent, Transparent, Medium, Opaque, and Most Opaque

Size

Specifies the relative thickness of the tool (**Tiny, Small**, **Medium**, **Large** or **Huge**).

■ **To change tool size:**

1. Select a tool, then **(CLICK-R)**.
2. **(CLICK-L)** on **Size** and select a setting.

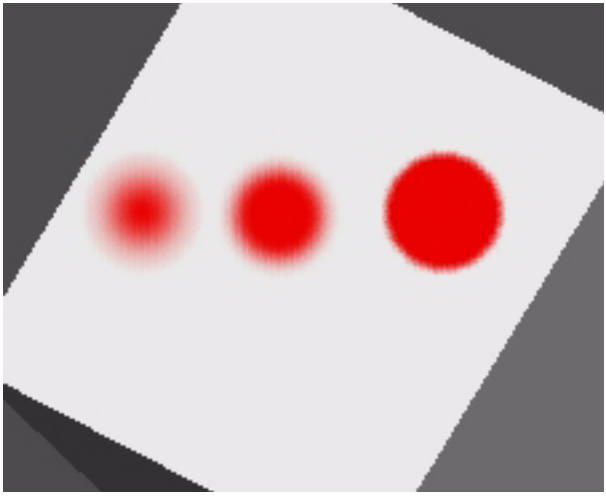
From left: Tiny, Small, Medium, Large, and Huge

Softness

Sets the relative hardness or softness of the tool's edge (**Soft**, **Medium**, or **Hard**).

■ **To change a tool's softness:**

1. Select a tool, then **(CLICK-R)**.
2. **(CLICK-L)** on **Softness** and select a setting.



From left: Soft, Medium, and Hard

Tips

The following links contain information which you may find useful:

- Using the Interactive Collection Tool to Model Organic Shapes
- Painting Objects with Lots of Faces
- Aiming the Camera When Painting

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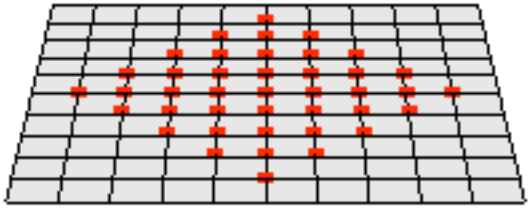
Using the Interactive Collection Tool to Model Organic Shapes

You generate a curved surface by shrinking a collection of vertices while they move. For example:

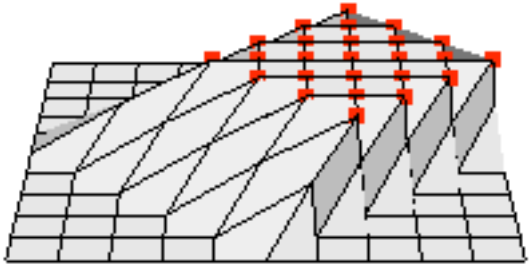
1. Create a grid.
2. Select the center point on the grid, then press the "+" key four times. This selects most of the points on the interior of the grid.



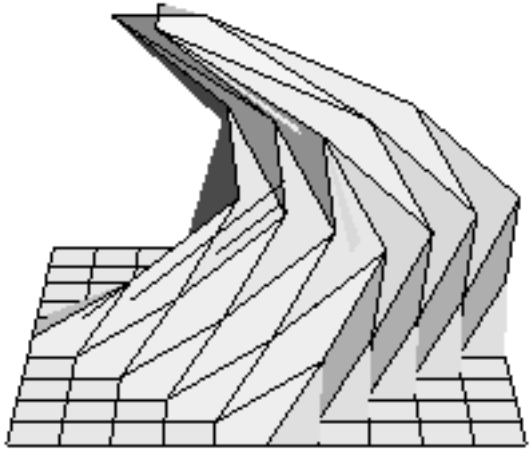
3. **(CLICK-L)** on **Move>Free**.
4. Move the points up and to one side.

-More-

5. While you're moving the vertices, press the "-" key to shrink the collection.

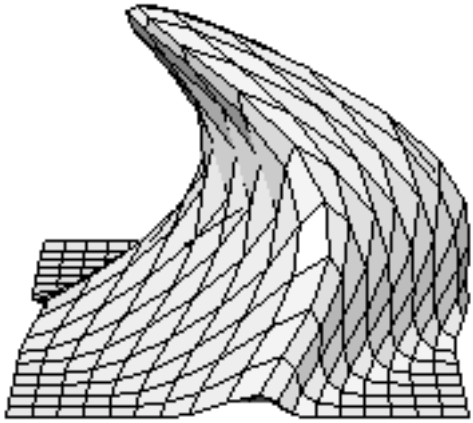


6. Continue to move the vertices up and over until you've generated a relatively smooth surface:



-More-

7. You can use the Smooth command on the object to smooth the object even further:



Painting Objects with Lots of Faces

If you're painting an object with a high number of faces, you may see spots or smearing when you paint. This is because all of the painting changes you make on an object are saved in one image.

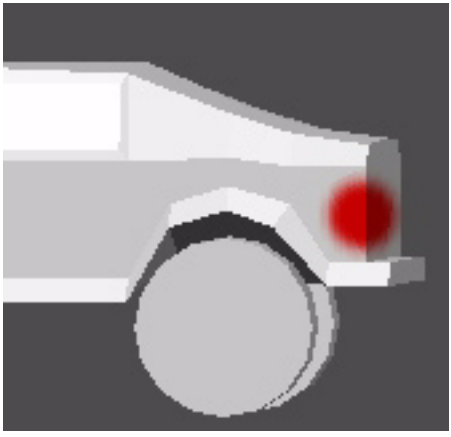
If you know you are working on a complex model, try breaking it into smaller, separate objects (if possible) before you begin painting.

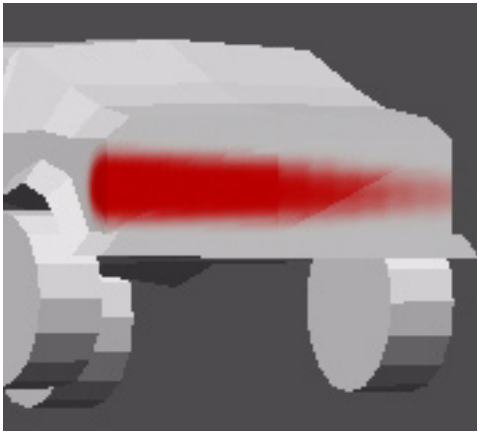
NOTE...

Breaking an object into separate objects uses more memory.

Aiming the Camera When Painting

When painting, try to aim the camera directly at the faces you're painting on. If the camera is not aimed directly at a face, the paint, which looks good from one angle, may, in fact, have streaked along other faces, as shown below.





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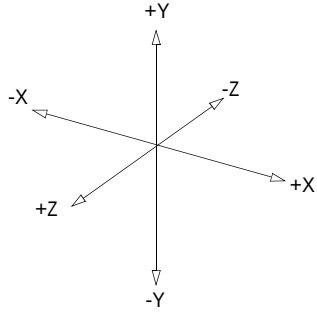
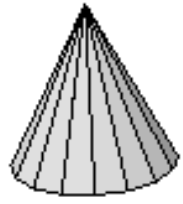
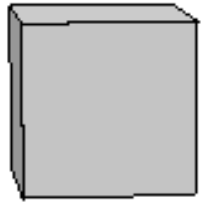
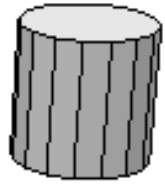
Glossary

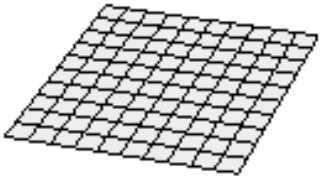
The glossary defines terms in Nendo with which you may not be familiar. **(CLICK-L)** on a letter to jump to that section of the glossary.

Numerics A C D E F G H I N O S T V W X

Term	Definition
Numerics	
.3DS file	3D Studio file format. Nendo imports and exports .3DS files.
A	
Axis	A straight line defining some direction in 3D space. See Axes.

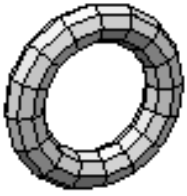
Term	Definition
C	
Camera	The viewport through which you look at objects in Nendo.
Cartesian Coordinate System	A system of defining 3D space using a set of three global axes wherein X represents "right and left," Y represents "up and down," and Z represents "forward and backward." The orientation and position of any element can be expressed in relationship to the global center, where these three axes meet. 
Cone	A cone is a geometric primitive with a circular base that tapers to a vertex. 
Contiguous	Touching or connected in an unbroken sequence.

Term	Definition
Cube	A cube is a six-sided geometric primitive. 
Cylinder	A cylinder is a geometric primitive formed by rotating a parallel line around a fixed line. 
D	
Dodecahedron	A dodecahedron is a twelve-sided polyhedron.
E	
Edge	An edge is one side of a face. Each edge is bound by two vertices.
Element	There are four kinds of elements in Nendo: vertices, edges, faces and objects. You specify which type of element you want to modify by selecting the corresponding element button.

Term	Definition
F	
Face	A face is one side of a polygonal object. Every face is bound by three or more edges.
G	
Global Axes	The three axes formed by the intersection of the X, Y, and Z planes.
.GOF files	Nichimen Graphics file format. Nendo imports and exports .GOF files.
Grid	A grid is a primitive formed by a network of uniformly spaced horizontal and perpendicular lines. 
Ground Plane	The ground plane, which intersects the Y axis where Y=0 is represented by a grid. It can be turned on and off using the **Ground Plane** command under the **View** menu.

Term	Definition
I	
Icosahedron	A geometric primitive with twenty sides.
Image	Imported two dimensional image in TIFF, PNG, JPEG, or PPM format.
M	
Mask	A mask prevents painting in an area.
N	
NDO files	Nendo’s native file format.
Normals	Vectors which describe the orientation of the selected element.

Term	Definition
O	
.OBJ files	Wavefront file format. Nendo imports and exports .OBJ files.
Object	Each model in Nendo is an object. An object is the smallest unit that can be saved from Nendo.
Octahedron	An octahedron is an eight-sided polyhedron.
S	
Sphere	A sphere is a geometric primitive where every point on the surface is equidistant from the center.
Status Bar	The Status Bar describes the screen element currently under the mouse. For example, if you move the mouse over a command, you can see what the command does.

Term	Definition
T	
Tetrahedron	A tetrahedron is a four-sided polyhedron.
Topology	An object's surface is described by its topology. Adding faces, edges, or vertices to an object changes its topology.
Torus	Primitive in the shape of a torus. 
Triangulated	A triangulated object is one in which all faces have been subdivided into triangles. Triangulization occurs when exporting objects from Nendo to 3D Studio (.3ds) format.

Term	Definition
V	
Vertex or Vertices	A point where two or more edges intersect.
W	
.WRL file	VRML file format. Nendo imports and exports .WRL files.
X	
.X file	DirectX file format. Nendo exports .X files.

Hot Keys

A hot key is a key command that performs an action.

Command	Hot Key	Description
Grow Selection	+	Selects adjacent elements of the same element type.
Shrink Selection	-	Deselects the outermost elements in a collection.
Clear Selection	space bar	Deselects all elements. If all elements are deselected, reselects the last selection.
Aim	a	Aims the camera at the selected element.
Makes objects sensitive	b	Selects the Objects button.
Select Adjacent	e	Selects all edges adjacent to the selected element. If no elements are selected, "e" selects the Edges button.
Select Adjacent	f	Selects all faces adjacent to the selected element. If no elements are selected, "f" selects the Faces button.
Outlines	o	Toggles outlines on and off.
Open	**CTRL**-o	Loads a file after deleting other objects in Nendo.
Quit	**CTRL**-q	Exits Nendo.

Command	Hot Key	Description
Reset View	r	Resets the camera to the initial camera view.
Smooth Shaded	s	Displays object in Smooth Shaded mode.
Save	**CTRL**-s	Saves all of the currently loaded objects together in one file, using the .NDO format.
Select Adjacent	v	Selects all vertices adjacent to the selected element. If no elements are selected, "v" selects the Vertices button.
Wireframe	w	Changes to Wireframe mode.
Align Camera +X	x	Aligns the camera with the X axis.
Align Camera -X	**SHIFT**+x	Aligns the camera with the -X axis.
Align Camera +Y	y	Aligns the camera with the Y axis.
Align Camera -Y	**SHIFT**+y	Aligns the camera with the -Y axis.
Align Camera Z	z	Aligns the camera with the Z axis.
Align Camera -Z	**SHIFT**+z	Aligns the camera with the -Z axis.
Undo	**CTRL**-z	Undoes the last action in Nendo.

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About Help

Nendo's online help system is delivered in PDF format. This section gives details on how to access information in the online help system. **(CLICK-L)** on a link below for more information:

Navigating Nendo's Help

Printing Out Help

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Navigating Nendo's Help

Nendo's online help is delivered in PDF format. You can navigate through it using:

- Links
- Bookmarks
- Toolbar buttons

. For example:

- **(CLICK-L)** on a green link or a bookmark topic to jump to that location.
- **(CLICK-L)** on the **Previous View** button to return to the previous page.

- **(CLICK-L)** on the **First Page** button or on **Home** in the bookmarks to return to the home page.

You can also **(CLICK-R)** on the help screen to display a handy navigation menu.

For more information on using Acrobat Reader:

- **(CLICK-L)** on **Help>Reader Online Guide** inside the Help window.

Printing Out Help

If you want to print out any part of Nendo's help:

1. **(CLICK-L)** on **File>Print**.

   A dialog box appears.

2. Choose to print all the pages, or only a certain range of pages, then **(CLICK-L)** on **Print**.

   The selected pages print.

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