

# *Microspot Modeler*

## *USER GUIDE*

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# *Chapter 1*

## *Introduction*

Basic information regarding Microspot Modeler and technical support details.

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## v Introduction

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Thank you for choosing Microspot Modeler, the affordable, easy to use 3D modeling application for the Apple Macintosh® computer. Designed for novices as well as professionals, Microspot Modeler provides the tools you need to create realistic 3D models and animations.

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## v Entering serial number

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The first time you run Microspot Modeler you will be asked to enter your serial number

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## v Welcome screen

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The welcome screen allows new users to register Microspot Modeler. Registering the product allows you to receive technical support, as well as upgrade and new product information.

- **Never register:** Allows you to skip registration and starting using the Microspot Modeler. The welcome screen will not appear again.
- **Register later:** Allows you to skip registration and starting using the Microspot Modeler. The welcome screen will appear the next time Interior is started.
- **Register now:** Opens your default browser to the Microspot Modeler registration page. The welcome screen will not appear again.

**Note:** If you would like to register but press the Never register button, please use the help menu item Registration Information. (*see Registration Information on page 3-36 for more information*).

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## u **Technical Support**

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You must register your product in order to receive technical support, as well as upgrade and new product information. Registration information is provided in the help menu or please use the contact information below:

Address: Microspot Limited  
Concorde House  
10-12 London Road  
Maidstone Kent ME16 8QA  
England

Phone: 01622-687771; International: + 44-1622-687771  
FAX: 01622-690801; International: + 44-1622-690801

Email: [support@microspot.co.uk](mailto:support@microspot.co.uk)  
Web: [www.microspot.co.uk](http://www.microspot.co.uk)

# Chapter 2

## Tutorial

A brief introduction to some of Modeler's features and tools.

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# TUTORIAL ONE

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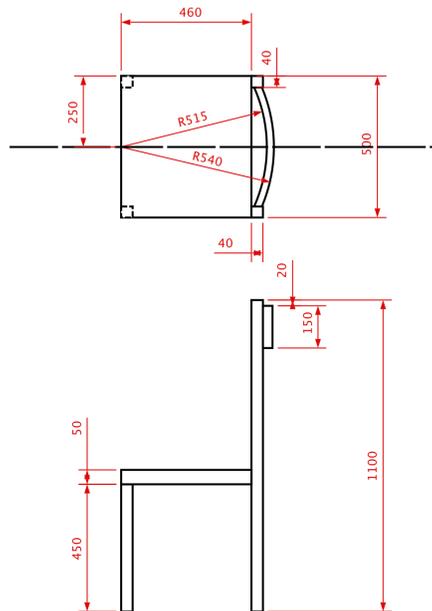
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## Introduction

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Welcome to Microspot Modeler. This is the first of 4 tutorials that will take you through the range of tools and features that will enable you to model quickly and easily. The first tutorial will introduce the working environment as well as helping you get to know the terminology involved with modeling. From there we will introduce more tools and options for modeling enabling you, the user, to specify how your model looks. This process will take you right through from starting a new model, editing and shaping, modeling to scale and set dimensions, to finally rendering the model or scene for presentation purposes. Tutorial one focuses on getting used to the modeling window and changing views to make modeling as easy as possible. To do this we will model a dining chair.



The second tutorial onwards will use this same chair as a base for us to edit further, and at the same time, this will introduce heightened complexity to the model and increase the amount of tools and techniques we will learn. At the end of the fourth tutorial we will have a library of 4 chairs, each more advanced than the last, to use and edit.

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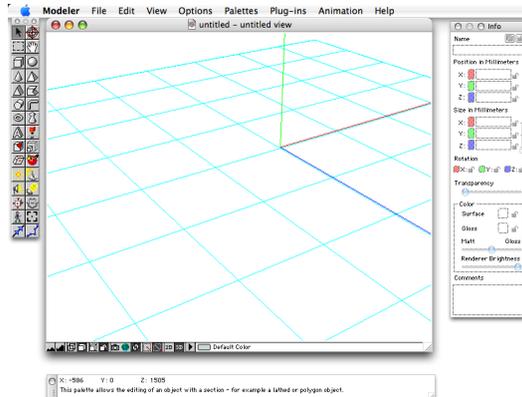
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## u Getting Started

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When Microspot Modeler is first opened the screen will appear as shown below. On the left is the Tools palette, this is used to select modeling and editing tools. On the far right is the Info palette, this palette displays all the information associated with any selected object including, position, size, rotation and color. This palette is particularly useful when modeling to specific dimensions. All the values and settings can be edited in the relevant fields of this palette, giving you full control over every object. At the bottom of the screen is the Help palette which gives a short description of every tool used and an exact coordinate position of the cursor in terms of X, Y and Z. *See Tools Palette on page 3-4, Info Palette on page 3-17 and The Help Palette on page 3-28 for more details.*



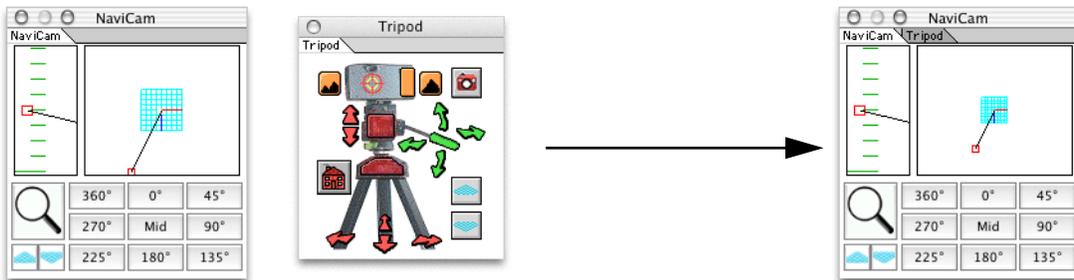
The modeling window can be resized to fill the entire screen or made smaller. The modeling window opens to this size for a good reason. The more involved and complex a model becomes, the more palettes you will need at hand to aid the modeling and orienting around the scene. For this reason the modeling window is set to this default size of 600 x 480 pixels enabling the user to position palettes around the outside of the modeling window for easy access.

### Stackable Palettes

If all the palettes are open on screen then space to model effectively can become cramped. This is why Microspot Modeler has been designed with what is called stackable palettes. This basi-

cally means that palettes can be grouped together and occupy the same area and so saving space.

When grouping palettes try to pick ones that are similar in terms of their usage and application to the model. Below are two of the palettes from the palettes menu. These are Navicam and Tripod respectively. Navicam is one of the primary tools used for altering our view (the camera as it will be referred to) around a scene or model. The Tripod is a very useful tool for looking at specific areas of a model or positioning the camera in an exact way or angle. We can say that both these palettes are used for navigating around a scene, and so it seems only logical to place them together. This is done by simply picking up one palette by its name tab and dragging it onto the name tag of the other one. *See Tabbed palettes on page D-4 for further details.*



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## u The Grid

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For this chair there are set dimensions, these will help determine the size and snapping of the working grid. The dimensions are given as follows in terms of X, Y, and Z.

- Overall size: 520 x 1100 x 500
- Rear legs: 40 x 1100 x 40
- Seat: 460 x 50 x 500
- Front legs: 40 x 450 x 40
- Back rest: 60 x 420 x 150 (60 mm includes the curvature of the rest).

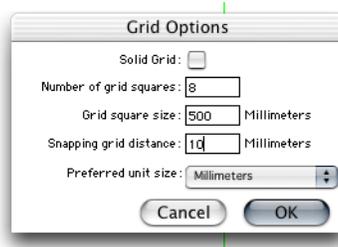
**Note:** All dimensions shown are in millimeters unless otherwise stated. Make sure you are in metric mode by selecting Metric in the Options menu.

Under the Options menu select Grid Options. This will open the Grid options palette which will enable the grid to be set up.

The real key to setting up a good grid is establishing a size that will make the modeling process quicker by making the grid work for the model without having to constantly change its properties. By default the size of each grid square is 1000mm with a snapping distance of 100mm. The snapping grid distance is the smallest increment that any object can be moved or resized by. By making this a convenient size it enables the easy and accurate moving and resizing of objects.

Now consider what the chair will look like from a birds eye view (along the Y axis). The piece that is most prominent is the seat. Its dimensions are given as 460 x 50 x 500. The Y value of 50mm is of no importance at this stage. It is important to keep the grid size close to the maximum values of the model. This way it will be easier to see what is being modeled. If the grid is too big then the model will appear far too small, the opposite being if the grid is too small it will not be of any use when trying to model accurately.

After considering all these factors the grid size for this chair will be 500mm/grid square, with a snap distance of 10mm. This grid size will enable the model to be easily seen and enable the grid to work for the model, and with a snap distance of 10mm it means the model can be drawn accurately and easily. This will offer 2500 precise snap positions per grid square or 50 snap increments to pass over 1 grid square. Enter the values as shown below. *See Grid Options on page 3-31 and Grid Snap on page 3-31 for more details.*



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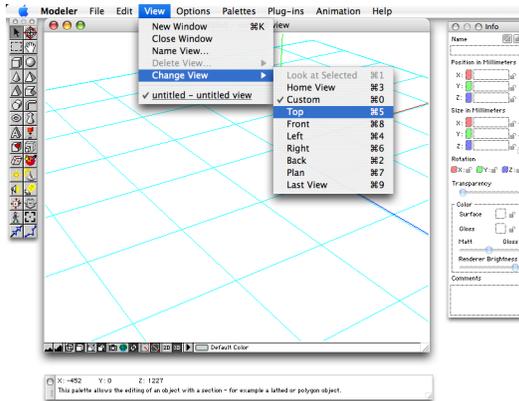
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## View

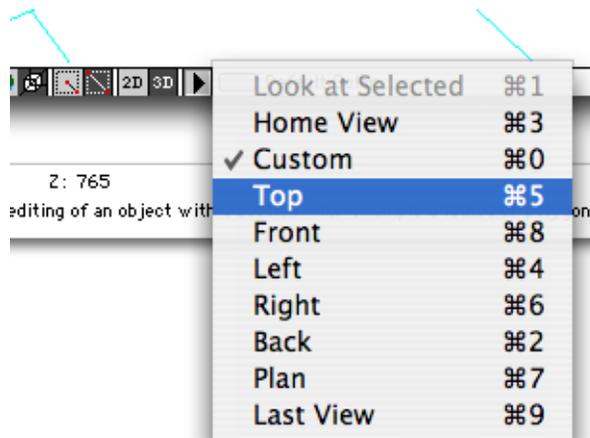
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With a new document open the view will be set to Home by default. This is a good overall view that can be used as a quick reference to check the model's progress. Now switch to the top view. Do this by clicking the View menu, select Change View and select Top View or by short-cut Command + 5.

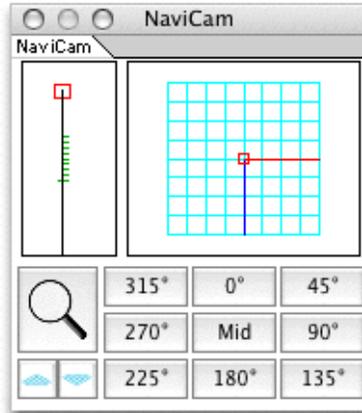


Alternatively you can change the view at the bottom of the screen, as shown below.



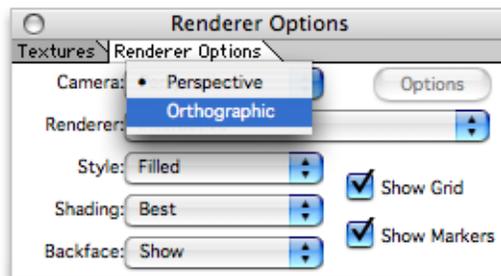
## Navicam

Now under the Palettes menu select the Navicam. Use the zoom function of this palette to zoom in slightly on the grid. This is the primary tool for orienting the camera around a scene. Over time this palette will become invaluable. *See NaviCam on page D-30 for further details.*



## Orthographic View

Now open the Renderer Options palette from the Palettes menu. Under the box labeled Camera select Orthographic. This will set the view in a flat mode so the model is viewed as a 2D plan. Start drawing anywhere on the grid, but drawing near the center is advisable as this will make it easier later to navigate around the scene and view the chair.



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## u Drawing The Legs

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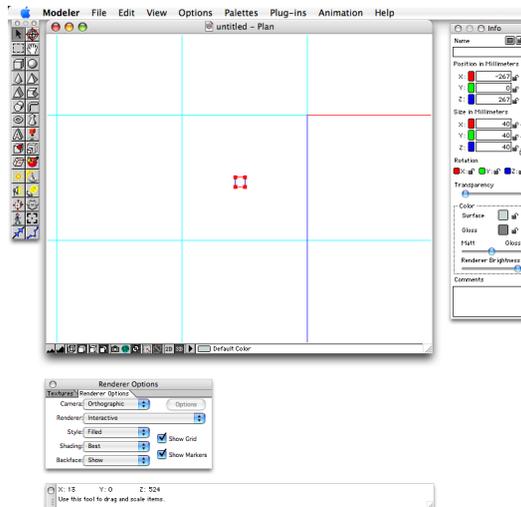
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### Cube

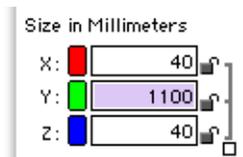


Now select the Cube tool from the Tools palette.

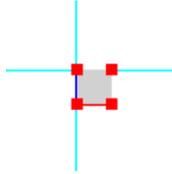
Hold down the shift key (holding down the shift key whilst drawing any object will constrain it's dimensions to be exactly proportional, i.e. a cube will be draw with all 3 dimensions being equal (whereas if the shift key is not held any size cuboid shape can be drawn)) and draw out a cube 40x40x40. *See Cube on page G-8 for further details.*



Use the info palette to check the dimensions. In the Y field of the size section enter the value 1100.



This is now the first leg of the chair. Notice that once the shape is drawn and selected each corner has a red square on it. This is an edit or control point and enables the shape to be changed by moving these points around. Within Microspot Modeler these edit points are called Handles and appear on any selected object.



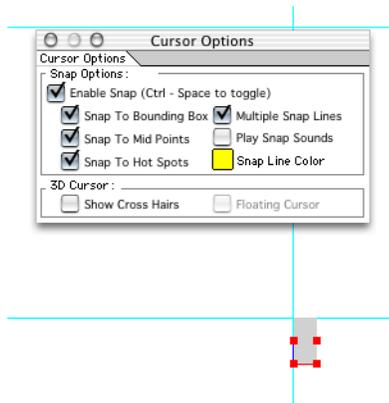
## Duplicate

Now hold down the Option key and Shift key at the same time. Click and drag (vertically) down the original leg that has been made. Holding the Option key makes a duplicate of any item that is dragged out, whilst holding the shift key constrains the movement to one axis.

Only drag this new leg out a small way with the Shift key held down.

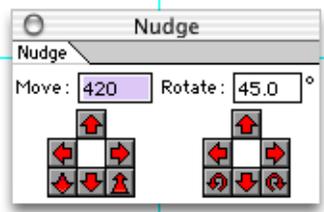
## Snapping

Now open the Cursor Options palette from the Palettes menu. Check the box that is labeled Enable Snap. Then check all the boxes within the Snap Options palette. Snapping enables objects to join together. When snapping is turned on then objects will jump together when they are close.

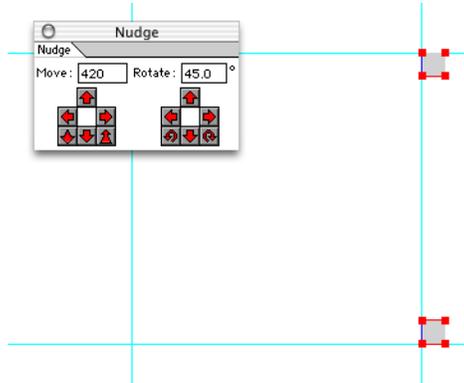


## Nudge

Select the new shape that has been made from the duplication and move it so snapping makes it join to the bottom edge of the original shape. Now go to the Palettes menu and open the Nudge palette. In the move field enter the value 420. *See Nudge on page D-33 for further details.*

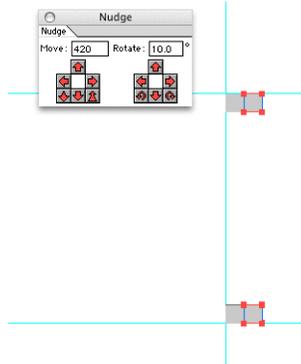


With the second shape selected click the down arrow on the move side of the Nudge palette. The leg will move 420mm into it's correct position. With the new leg selected hold down shift and select the original leg. By holding down the shift key multiple items can be selected.

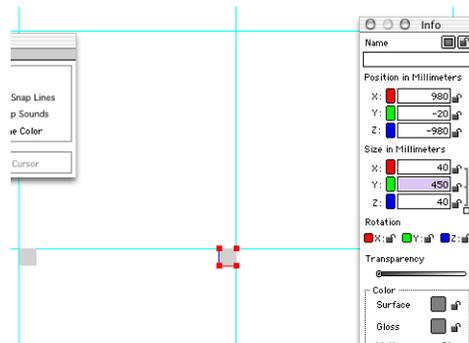


Now with both objects (soon to be legs) selected hold down the Option and Shift keys again and drag out two new legs to the right of the original two. Once again don't drag them too far as they both need to be positioned on the right hand edge of the original legs. Once they are posi-

tioned on the right hand side of each leg select the Nudge palette again and hit the right arrow key on the move keys (making sure the same value of 420 is input into the increment field).

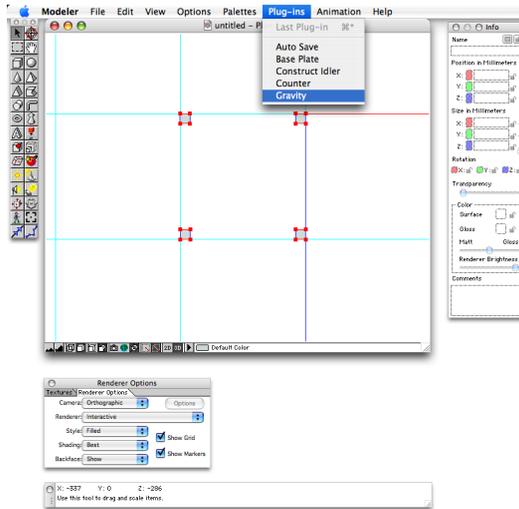


Click anywhere in the window to deselect the two legs just produced, these are the two on the right hand side. Select the top one and in the info palette under the size section enter the value 450 in the Y field. Do the same for the other leg also.



## Gravity

Change back to the Home view momentarily using the View menu or via the shortcut Command + 3. In the Home view it is possible to see the effects of the Gravity plug-in on objects. Now select all four legs and under the Plug-ins menu click Gravity. Whatever object is selected in a scene the Gravity plug-in will make it's base rest on the grid. Check that the gravity plug-in has worked. All the legs should be resting on the grid. Next, return to the Top view again either by the View menu or the shortcut Command + 5. Now there are four legs. The left hand two are the back legs (the longer ones) and the right hand two are the front legs (these are much shorter). *See Gravity on page C-5 for more details.*



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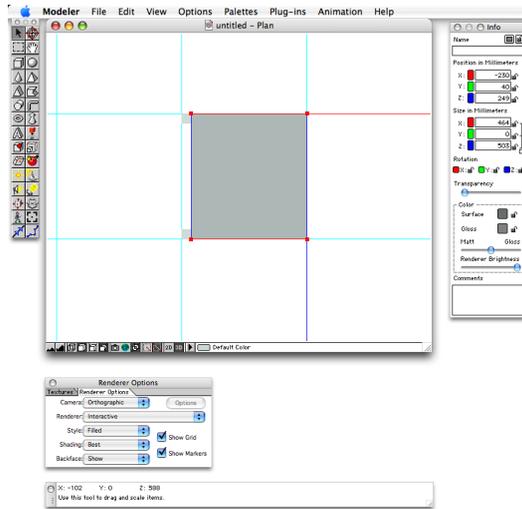
## u Drawing The Seat

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### Perspective

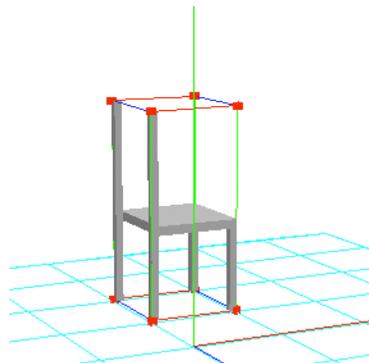
Select the Render Options palette and change back the camera menu from Orthographic back to Perspective. This will make the home view much more realistic and assisting in editing items and viewing objects clearly.

Select the Cube tool again from the Tools palette and hold the cursor over the far top right edge of the top right hand side leg. Snapping is still enabled and so cross-hairs will appear indicating that this specific corner is selected. Now click and drag out a cuboid across to the other left hand side legs until its edge snaps to the nearest edge of these legs and to the bottom edge of the bottom left hand leg. Once this is done the right hand legs will be covered by the shape drawn on top. The shape will be the seat of the chair.



Now change the view to the Home view. This is done by either the View menu and Change view then selecting Home or by the shortcut Command + 3.

Under the Palettes menu select the Navicam and zoom in on the chair to gain a closer view. Notice the seat that has been drawn too thin for a chair of this size. Select the seat. Note in the info palette it has a size value of 10 in the Y field. Now select one of the top handles, whilst holding down the shift key, and extend the seat vertically up until its Y size is 50. If this proves difficult, zoom in further to make it easier.



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## u Drawing The Backrest

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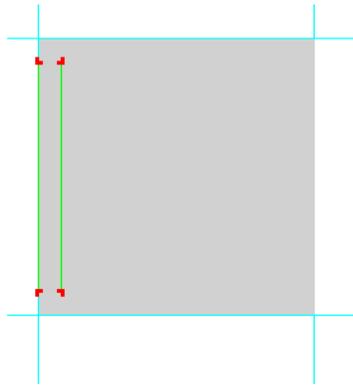
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### Irregular Polygon



Now go to the View menu and change to the Top view again, either by Change view then Top view, or by the shortcut Command + 5., and change back to the orthographic renderer. Once in the top view again (zooming in maybe required again via the navicam to get close) from the Tools palette select the Irregular Polygon tool.

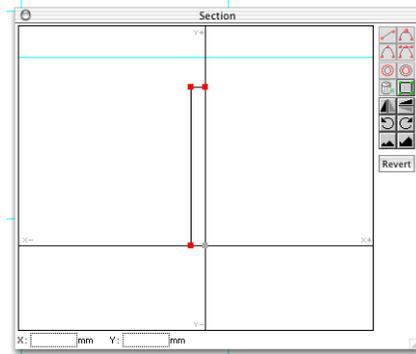
Position the cursor over the top back leg (left hand side) until cross-hairs appear on its bottom left corner. Click and move across to the bottom right corner of this leg, snapping should aid this. Now click and move the cursor down to the other back leg (also on the left). The cursor should now snap to the top right hand corner of this bottom leg. Click again and move across to the top left corner of this bottom leg. Once snapping has found this corner double click to finish the shape. A rectangle will appear positioned exactly between the two back legs. *See Irregular Polygon on page G-11 for further details.*



### Section

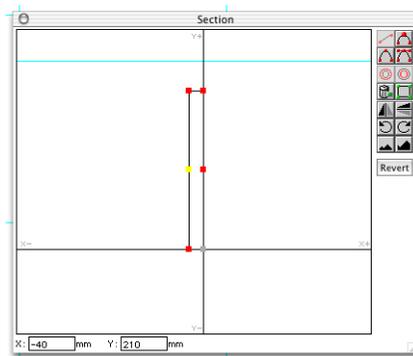
Now with this new shape selected, from the Palettes menu open the Section palette. The section palette will display a cross sectional view of the shape selected. In this case it is a long thin rectangular section. This section is a view along the Y axis and so the dimensions of X and Y are shown. Notice this section has four handles. These handles are on the four corners of the

rectangle. The back rest is actually curved and you will need to add two more handles at the centre of the back rest and convert the straight lines to curves. If necessary move the section palette to one side slightly so the top view can still be seen in conjunction with the section palette. The model will also dynamically update whatever is altered in the section palette, so it is a good idea to keep an eye on this to maintain accuracy.



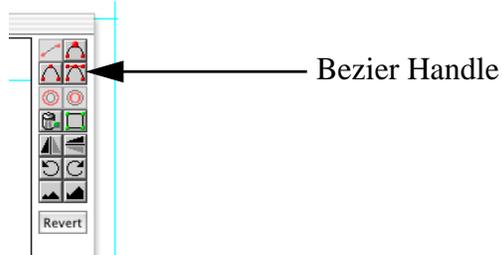
Hold down the Option key with the cursor over the top right hand handle, just as in the modeling window holding the Option key will duplicate something when dragged out. In this case it is a handle, in the modeling window it is shapes. When a handle is selected in the section palette as with the modeling window it will turn yellow. Click and drag down a new handle until it is exactly half way between top and bottom and exactly in line.

The dimensions of the back rest are given as 60x420x150. Therefore with a length of 420mm the middle handles will rest at 210mm. If this is slightly hard to achieve by dragging the handles, select the handle and enter the value of 210 in the right hand field at the bottom of the section palette. Repeat this for the top left handle also. Now the rectangular section should be comprised of 6 handles as shown below. *See Section on page D-41 for further details.*

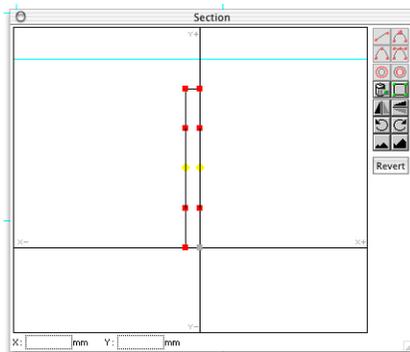


## Bezier Handles

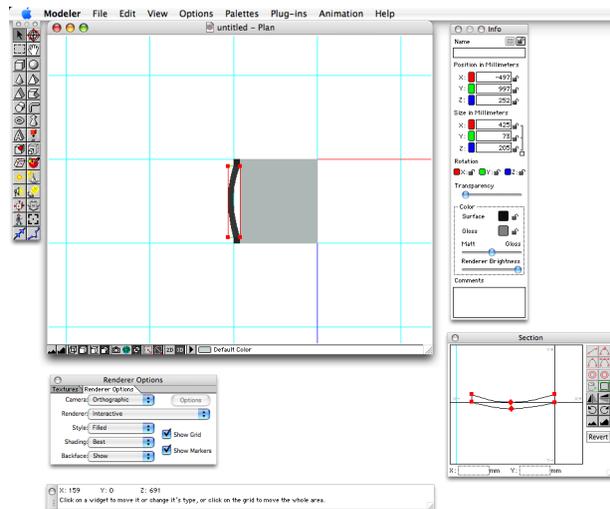
Now select one of the middle handles just created. Click on the bezier handle style on the right hand side of the section palette. This will now make this middle handle an editable curve, repeat this for the other middle handle.



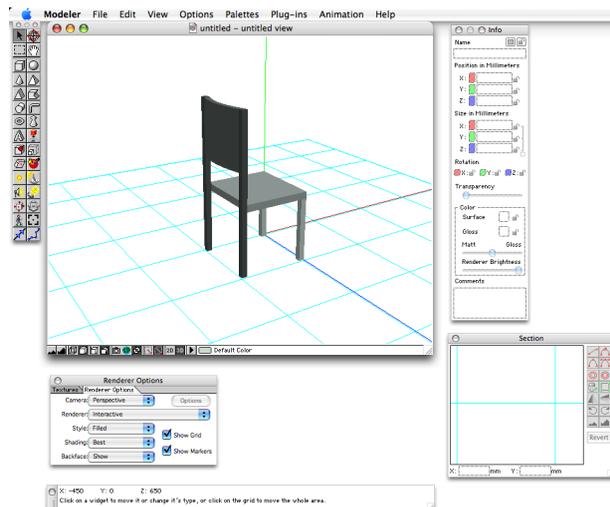
Notice now that both handles have two bezier handles either side of them which are control points to vary the angle and radius of the curve required.



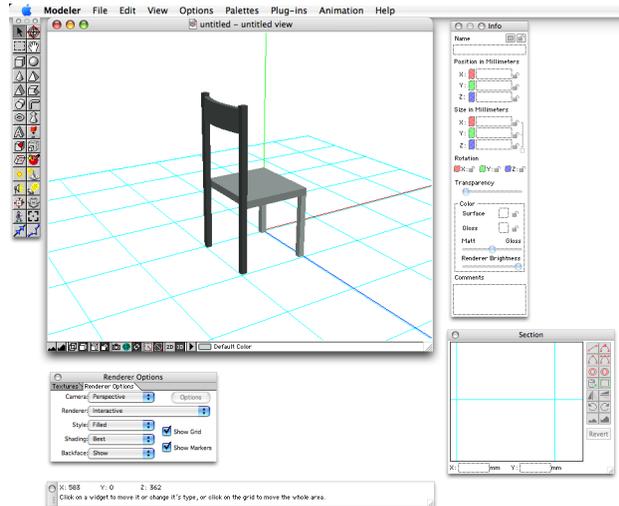
Select both the center handles by holding down the shift key and move both the handles to the right. Notice that the curve will form the opposite way to that of the direction in the section palette. If the object is rotated 180° in the section palette this will not occur. This is done by selecting the rotate (clockwise or counterclockwise) tool twice. Try and look at the modeling window whilst doing this and a curve should start to appear in the back rest. Adjust these handles in conjunction with the info palette, stop when the X value of the newly curved back rest is 60mm.



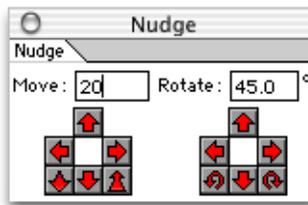
Now enter the home view again either by using the View menu and Change view then Home or by the shortcut Command + 3. Notice that the back rest is far too tall and needs to be adjusted. Use the Navicam again to orientate the camera around to the back of the chair so there is a clear view of the back rest.



Hold down the shift key and select a bottom handle of the back rest. Click and drag the handle up along the vertical axis until the back rest is 150mm in height. Do this whilst keeping an eye on the info palette.



Now with the back rest selected open the Nudge palette and enter the value of 20 in the move field. Move the rest down by one click, this will move it below the top of the back legs by 20mm.



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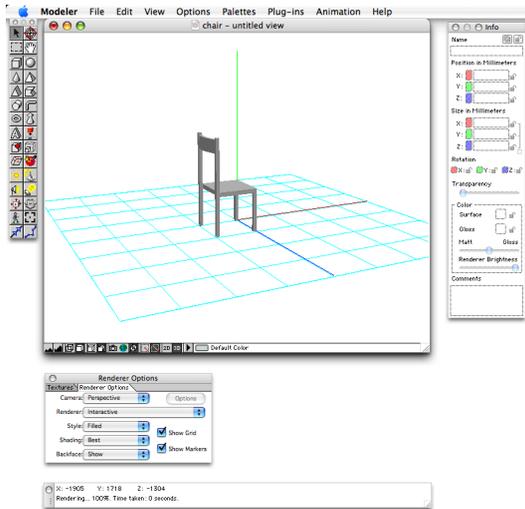
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## U Saving The Model

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Now the model is finished. At this point it is a good idea to save the model created. Under the File menu select Save and enter the name Chair 1. Save this file to your desktop or home directory, as long as the file is easily accessible for later tutorials. *See Save on page 3-12 for further details.*



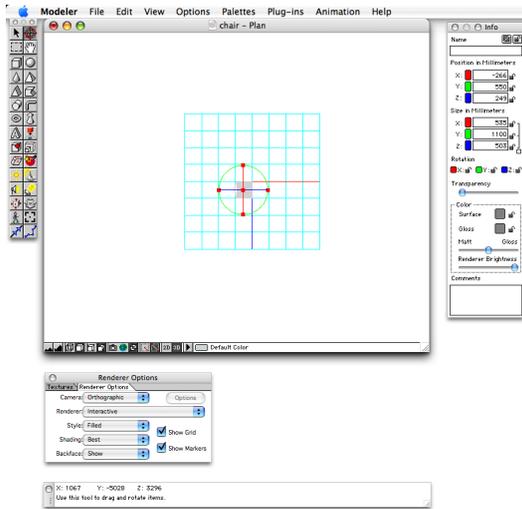
The model can now be positioned and rendered to give a presentation view of what has been created. Rendering will cast the correct shadows, adjust colors according to lighting conditions and make the model more photorealistic.

Select all of the parts of the model together. This can be done three ways: Firstly by clicking in open space and dragging a box over all of the components of the model. Secondly by using the Edit menu and using the Select All function, or finally by this function's shortcut which is Command + A. Once all the items are selected they can be grouped. Click the Edit menu and select Group, or use the shortcut, Command + G.

## Positioning The Spot Lights



Now change to the Top view, via the View menu or the shortcut Command + 5. Select the Rotate tool from the Tools palette and rotate the object 90° clockwise using the Shift key as a guide to enable movement in the axis planes only. Once this is done re-enter the Home view, either using the View menu or via the shortcut, Command + 3.

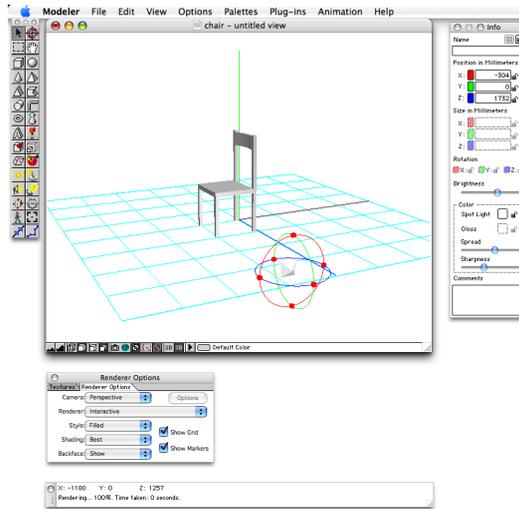


Now the model is ready for lighting and rendering. Under the Tools palette there is a Spotlight tool, click this as the scene must now be properly lit.



Once this tool is selected, wherever the cursor is clicked on the modeling window a spotlight will be placed.

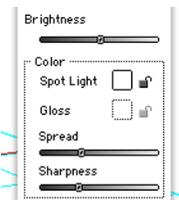
**Note:** By holding down the Control key and click/dragging a Spotlight out from a point the light will always aim at this point no matter where the final position is. We can now apply this method to the chair also. With the Spotlight tool selected hold down Control key. Now place the cursor over the chair seat and click/drag out a light towards the edge of the grid nearest the screen. A light will appear and will remain focused on the chair until the Control key is released.



By holding down Shift the light can be dragged out along the Z axis to a suitable distance. Select the Info palette with the light selected. In the Y field the value should be somewhere between 500 and 1000. Change this value to 2750mm. Once doing this the light is no longer directed at the chair. In the Tools palette choose the Light director tool.



With the light still selected aim the cursor, which should now be a cross hair at the chair seat and click. This will direct the light's focus exactly to this point. Again with the light still selected select the Info palette and adjust the light setting sliders to approximately these values: *See Spot Light on page G-28 for further details.*



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## u Setting The Sun Direction

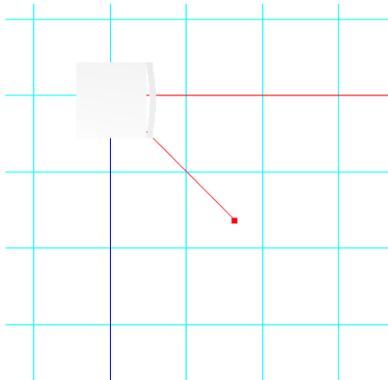
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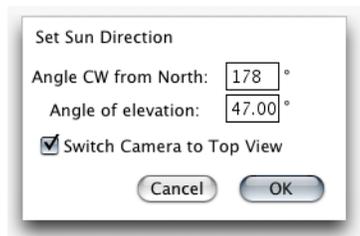
Once this is set the sun settings can be adjusted. Select the Tools palette and click on the Sun Direction tool.



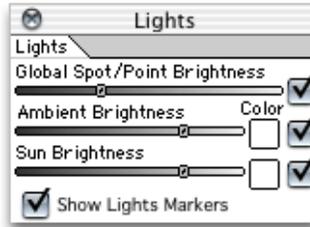
Once this is clicked the view will change to a top view of the scene. The direction of the sunlight is represented by a thin red line that is set by default to 45° between the X and Z global axis lines. The line has a handle on the end which can be dragged around to alter the sun direction and elevation. In this instance it will be easier to enter numeric values of angle and elevation for the sun rather than trying to make it shine exactly from the top view.



To do this hold down the Option key and re-click the Sunlight tool. This will bring up a dialogue box of sun setting. Enter these values in the fields and click OK. *See Sun Direction on page H-11 for further details.*



Open the Lights palette under the Palettes menu. This is the global controls settings for the Sunlight, Ambient light and Spotlights. Turn the Sun Brightness slider down to roughly 1/3 of its maximum value, with the addition of the spot light the sun does not have to be so intense. This will also avoid any overlapping shadows that might occur from two prominent light sources pointing in the same direction. *See Lights on page D-29 for further details.*



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## u Base Plate

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Go back to the Home view, via the View menu or by the shortcut Command + 3. The final piece of this model is a floor plane. This will enable shadows to be cast and give the seat more depth and realism. Select the Base Plate plug-in from the Plug-ins palette. Now you will notice a floor plane has been added to the document, at the same height as the grid.

With the chair selected select the Info palette and click the color block labeled surface color. The Apple default color wheel spectrum will appear. Pick a color that is as close to a mid to dark beige as you can get, click OK. Now select the floor plane and repeat this coloring process but this time make the floor plane white.

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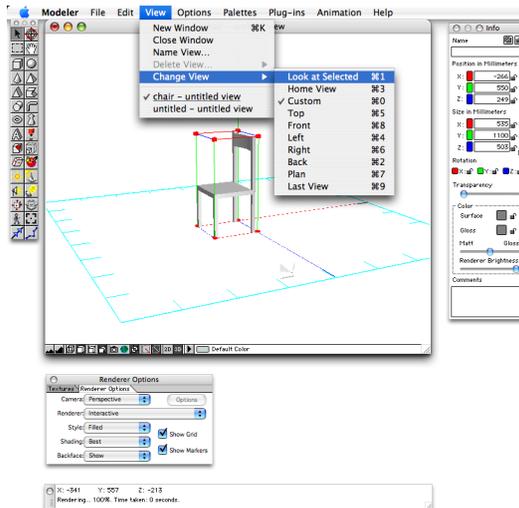
## u Final Render

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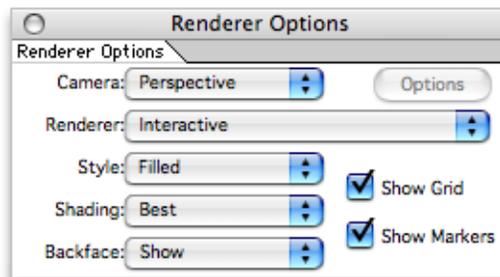
Go back to the Home view if you're not already there, via the View menu or by the shortcut Command + 3. Once the Home view is established the whole scene is visible, check that everything is in place, chair position, base plate, lighting, etc.

Select the chair and use the Look at selected function, the shortcut being Command + 1. Now zoom in on the chair to get a close up detailed view it the final model. This can be done by using the Navicam zoom tool.



## Renderer Options

Go to the Palettes menu and now open Renderer Options. This is the palette used to control the output of the final image and the quality of the scene when rendered. At present the view is set to Interactive, this is a plane shader view which offers a fast but low quality color filled appearance enabling the user to work quickly and easily with the model. The model can also be viewed in wire frame, which shows an outline mesh frame of each component. *See [Renderer Options](#) on page D-34 for further details.*

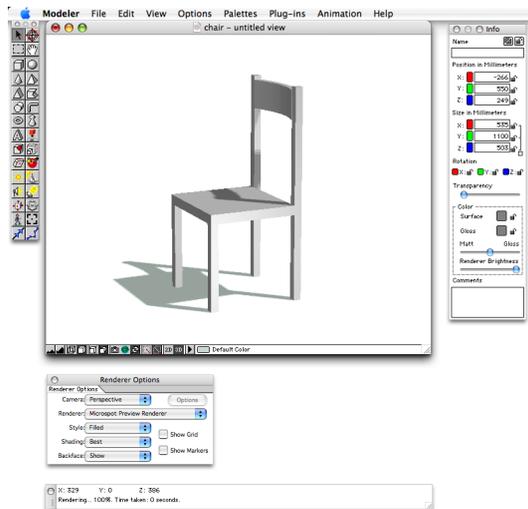


## Microspot Preview Renderer

Select the Renderer pop-up menu in Render Options and click Preview renderer. This will give a quick render with low quality settings to give the user a visual idea of colors and shadows under render conditions.

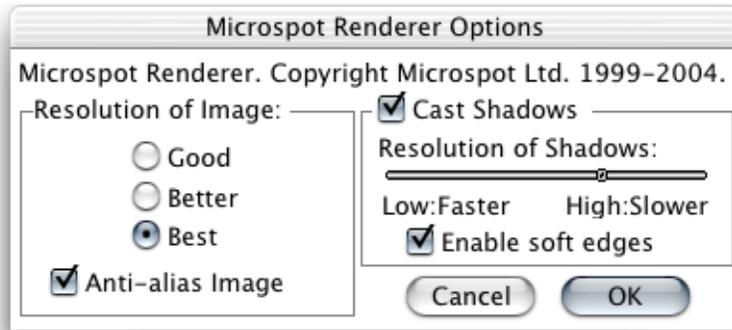


Now check over the Preview Render to make sure that the lighting is not too bright and there is no double shadowing and the model looks situated on the floor.



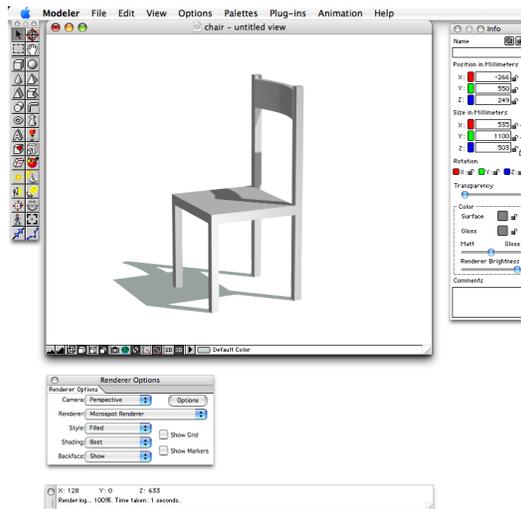
## Microspot Renderer

Now go back to the Render Options palette and from the Renderer box select the Microspot Renderer with the Option key held down. This will bring up the Render Options window. Within the Render Options screen there are several different areas of adjustment.

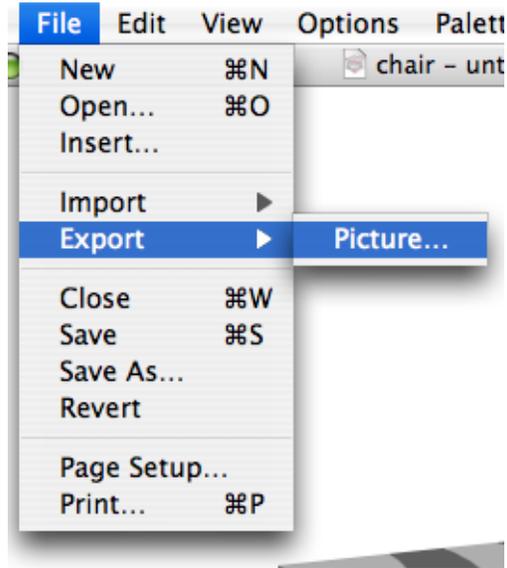


Note the above settings will output a good quality rendering with smooth anti-aliased edges and clean lines, accurate shadows and soft edges. However the higher the render quality specified the more data needs to be calculated, and so the render will take much longer. As this is a simple chair choose the settings as above in the Renderer Options palette and click OK.

The final render is now complete.



To export this image go to the File menu and Export, as Picture and this will export a PICT file to a specified (by the user) location. A dialogue box will appear with several settings on quality. The scene will now render for exporting. Once this is done a save dialog box will appear labeled export image as. Within here you can select the file type, which can be a JPEG, GIF, TIFF and other digital image formats.



Finally select the chair and under Options, select Primitive. This will mean the chair will not be able to be ungrouped by mistake, as it needs to be Dismantleable to be ungrouped. Now from the file menu select save, and save the file again, as we have altered the file with lights etc.

## TUTORIAL TWO

Please note that this tutorial should only be started upon completion of the first tutorial Modeling the basic chair. Alternatively open the file named Chair 1 from the samples files folder installed with this program. This will then form the base for which the second tutorial will take you through modifying the chair using more advanced and powerful editing tools.

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### 0 Getting Ready

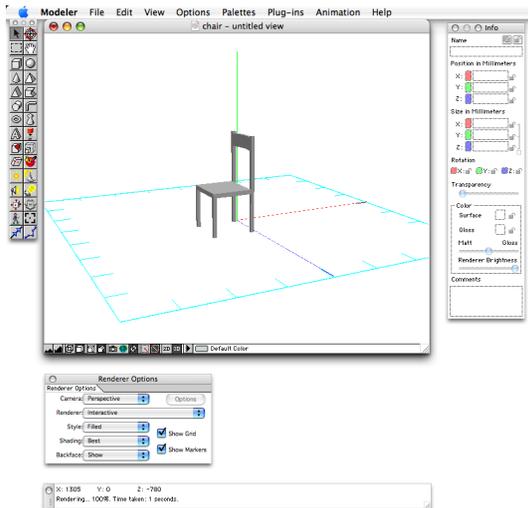
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Reopen the file named Chair 1 that was saved from the first tutorial. *See Open on page 3-8 for further details.*

Use the Navicam to change the camera position so that the chair can be easily seen. Select the chair and under the options menu select Dismantleable and then from the Edit menu select Ungroup. This will now make the model all of its component parts again which can be used to aid the positioning of the new parts, with regard to snapping and sizing.

**Note:** To avoid trouble later on in the tutorial, please ensure that the model is correctly dismantled and ungrouped.



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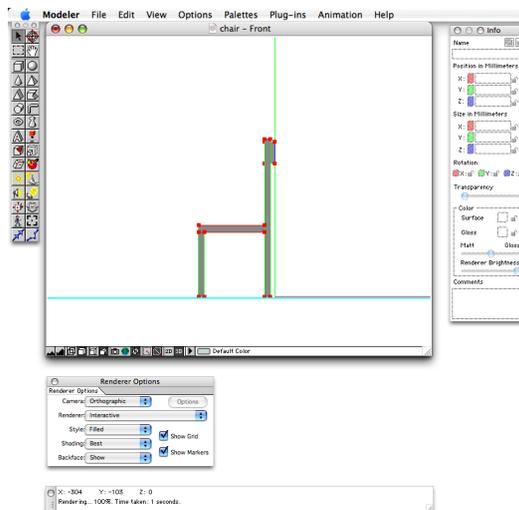
## u Drawing The Cushion Seat

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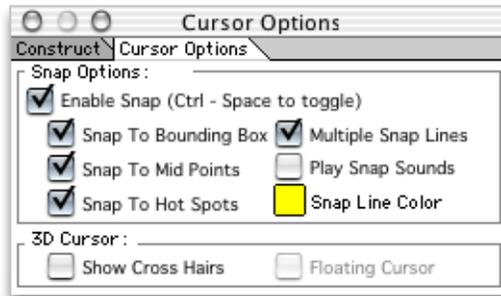
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Select the seat and note that its vertical size is 50 mm. Now the seat is going to be resized and to help with this, check the Cursor Options palette. Snapping will have to be disabled momentarily otherwise when resizing the seat the top edge that is being moved will snap to the bottom and will result in a seat that is of 0 mm thickness. Select one of the top handles whilst holding down Shift and move the handle vertically down until it becomes 30 mm in height.

Now the semi cushion style seat will be added. Change the view to the Front view. Do this by the View menu and Change view then selecting Front or by the shortcut Command + 8 Depending on the orientation of the chair it should be a side on view, but if the chair has been moved then use the Navicam so a side on view of the chair is achieved, as below.

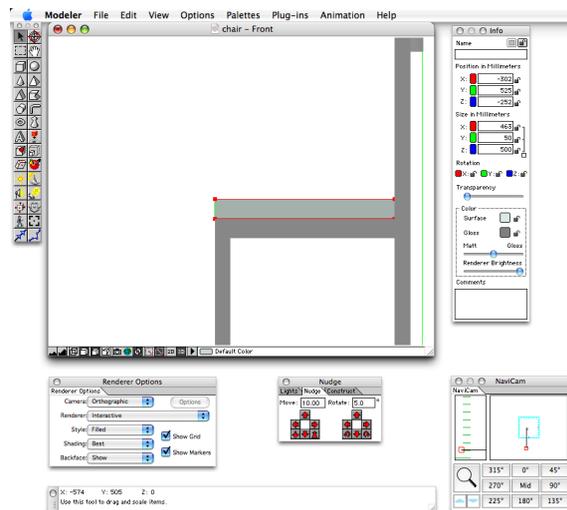


As well as this, enter the Renderer Options palette and change the drop down menu labeled Camera to Orthographic. This will give you a flat 2D side view of the chair. Open the Cursor Options palette and make sure that the Enable Snap check box is marked with a tick. For this method snapping is very important.



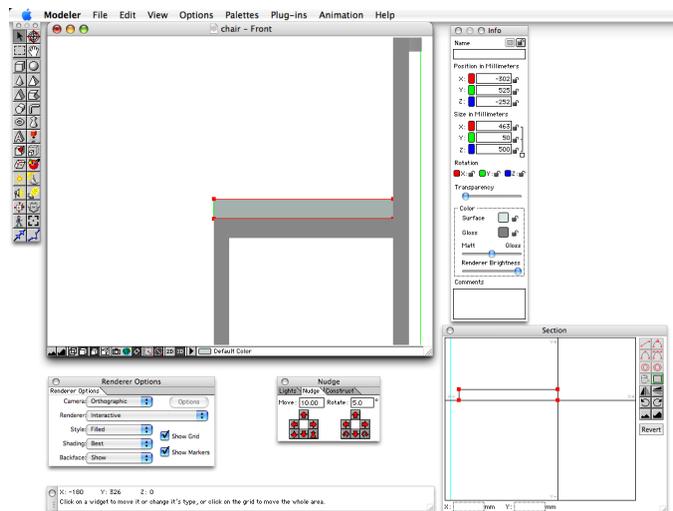
Now select the Irregular Polygon tool from the Tools palette.

Position the cursor on the top left corner of the now thinner seat that has just been resized. Cross-hairs will appear to indicate the cursor's position. Once in the correct position, click to start the polygon. Move the cursor to the right whilst holding down shift until it snaps to the corner section where the top right edge of the seat meets the chair leg coming down, click again. Now move the cursor up until it snaps again (if you feel the need to use the Shift function with this vertical movement to ensure a vertical line then fine, but snapping should be adequate) at the mid point of the back leg and click again. Now hold down shift and move back across the chair until it snaps in line and directly above the original start point of this polygon, once in position double click to finish the polygon.

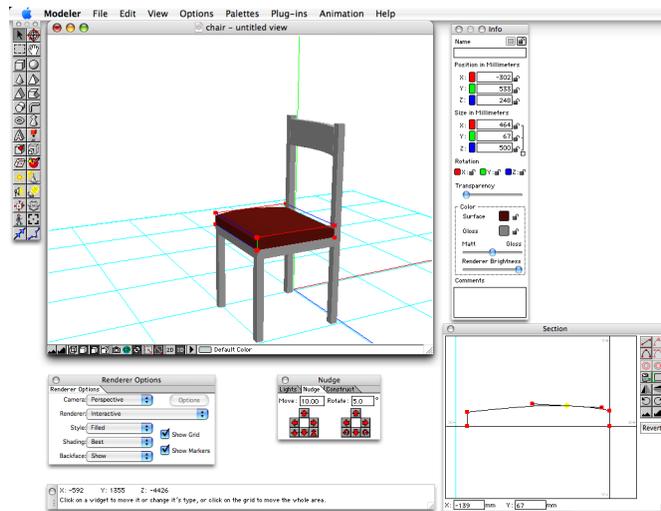


Now a cuboid will be sitting on top of the smaller seat. Open the Section palette with the newly formed rectangle still selected and, if necessary, move and resize the section palette so that the modeling window can be seen as well. A sectional outline of the new seat top will appear. Note that the object has 4 handles in the section palette and that one of these handles is grey. This is the origin handle and indicates the start point of the polygon.

Notice that the polygon was started on the bottom left hand side of the seat. Now in the section palette, the origin handle is on the bottom right hand side of the polygon. This is an important fact to note. It only means that the section palette is taking its sectional view from the other side of the chair. To keep things as intuitive as possible, and to avoid doing things backwards this object section should be flipped using the flip (along vertical plane) tool.

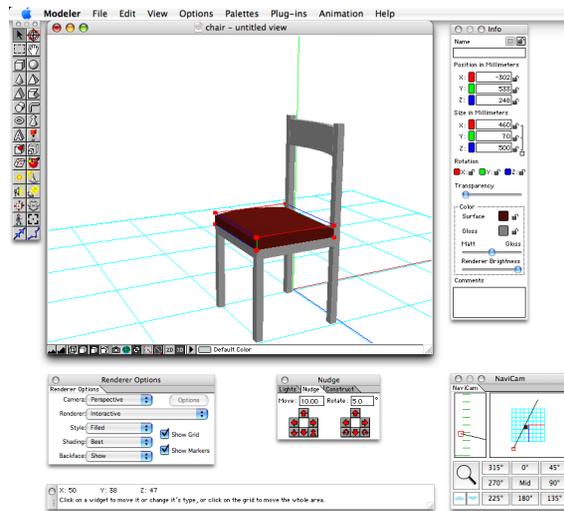


Place the cursor over the top left handle. Note with the Option key held down over the handle a small cross appears. This indicates that a duplication can be made. Just as with the modeling window, holding down the option key and dragging out from an object makes a duplicate of it, in the section palette holding down the option key and dragging or Option dragging makes a new handle. Now select this handle, and it will turn yellow to indicate its selection. Once selected Option drag out a new handle below the original until it rests at a Y value of 50 mm. Now select the top left handle, and move it until it has an X value of -130mm. With the handle still selected change its editing properties to a bezier curve. On the right hand side of the section palette are a range of tools for orientating the view of the section, zooming in on selected handles, and changing their editing properties. In this case a bezier will make the handle a curve with two in line editing points.



These two control points will control the size and radius of the curvature produced. Play with these control points to get an idea of the effect they have on a curve and a shape. Once you are happy with the effect. Select the top right handle and enter a Y value of 50 mm, or physically move it down. Move the left hand control handle (still maintaining parallel to the section) until it is vertically in line with the section's left edge handles. Now the seat top will have a gentle curve to it.

Close the section palette and return to the home view, zoom in again using the Navicam palette. The newly formed curve seat top will have the dimensions; 460 x 70 x 500, check this in the info palette.



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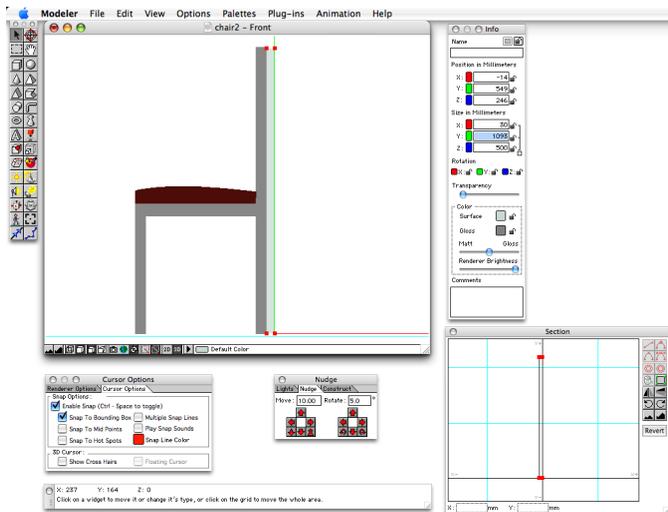
## u Changing The Back Legs

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Now the back legs will be changed. Utilizing the old legs from tutorial #1 for width and height new legs can be modeled quickly. Just as done previously orientate the view so that the side of the chair is shown, or by using the last view shortcut Command + 9.

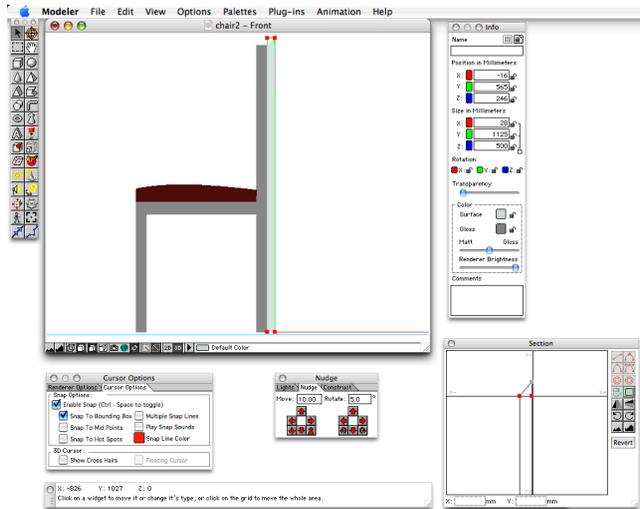
Select the Irregular polygon tool from the Tools palette. Place the cursor on the top back edge of the existing leg, with snapping still on this should be controlled easily by the cross-hairs that will mark the location. Now click and move the mouse down whilst holding down shift until the bottom corner is reached, now click again. Whilst holding down shift again move out to the right a short way, click again. Now hold down shift and move the cursor back up the length of the original leg until it snaps at the top, double click to finish this leg. There is now a second leg next to the original leg.

Select this newly created leg and enter the Section palette.



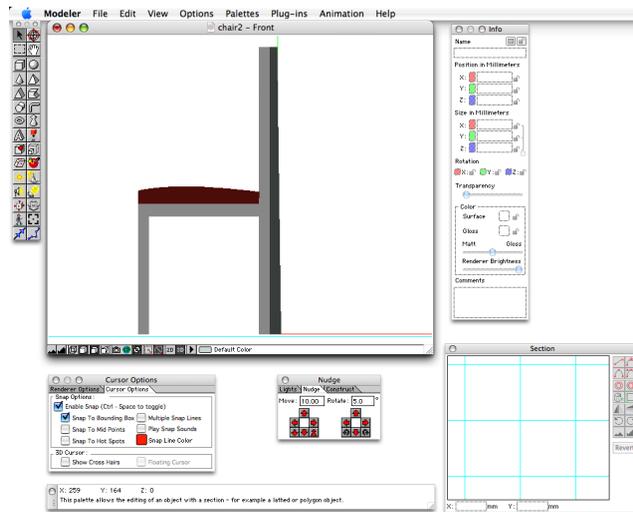
Above this is the vertical flip tool which will set the shape in exactly the same orientation as what is seen on screen. Click this once also, this will be useful as when editing in the section palette the modeling window will dynamically update and so the degree of adjustment of each piece can be suitably measured.

Once this is done select the top right hand handle and using the Option drag method (hold down the option key, then click drag out) to produce a new handle directly above the existing one. Now select the original handle, make a note of its position with respect to X and Y and move it down, the newly formed handle will now take its place with the noted co-ordinates.



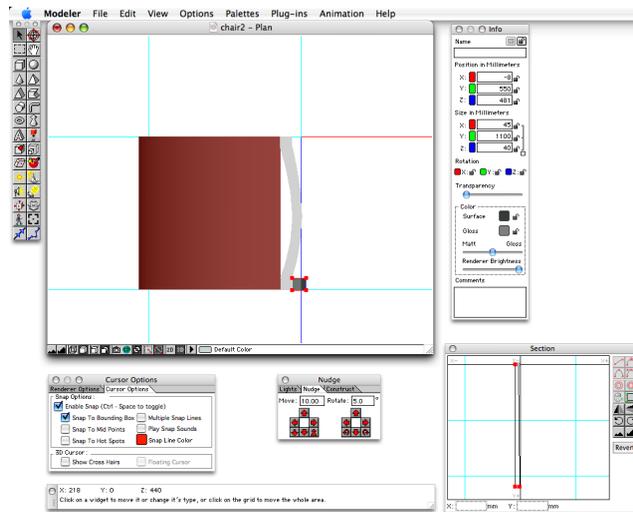
Now with this newly positioned handle move it sideways until the separation between itself and the top left handle is 40 mm, the co-ordinate fields will be needed to achieve this.

Now move to the bottom of the section and select the bottom right hand handle and move this handle until the separation between this and the bottom left handle is 70 mm. Select the handle that is sitting alone between the top and bottom sets of handles. Enter a value of -550 mm in the X field. Make this handle a bezier curve and adjust its control points to be vertical, again make this handle to be 70 mm away from the opposite side of the section. This now gives a new leg with a slight curve in the back.

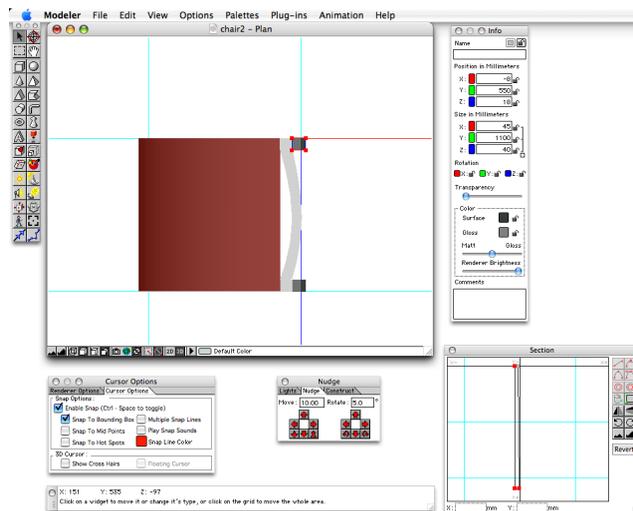


Close the section palette and change to the Home view in the modeling window, Command + 3 is the shortcut for this. Remember also to change back the Camera style under the Render Options palette back to Perspective. Notice that the leg produced is far too wide.

Switch to the top view via the short cut Command + 5 or the View drop down menu, check that the Camera style is in Orthographic under the Renderer options palette, and zoom in on the back legs. Select the top right hand handle whilst holding down shift and drag it down to resize the leg's width. In this instance it is the Z value that is being changed, so stop when the leg is 40 mm wide, this should easily be achieved using snapping.



Once this is done, the leg can be duplicated. Hold down the shift and option key and click drag a new leg up until it snaps in line with the original top leg. Again this is done by using the useful Option drag method. Alternatively the leg can be duplicated by the Edit menu and selecting Duplicate or by the shortcut Command + D. This however offsets the duplicated object by 500 mm in the X axis. This will then have to be repositioned to fit the model so in this case it is easier to use the Option drag method.



Now there are two new legs for the chair.

Hold down shift and select both the two original back legs and the back rest and then delete them. Reselect both of the new legs that have been made and move them to the left. Holding down the control key in this instance is really a personal preference, but it will allow the legs to be positioned on the seat without too many problems. By holding down the control key the Y axis movement is locked and so things can only move in the X and Z plane. Also Snapping will make moving much more accurate. Change to the Home view momentarily to check that this looks fine and come back to the Top view.

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## u Changing The Back Rest

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### Pipe Tool



Use the Navicam to zoom in on the back legs. Go to the Tools palette and select the Pipe tool. Now hold down the Option key and re-click the Pipe tool. This will bring up the Pipe Options dialogue box.

In the field labeled Pipe diameter enter the value 25 mm and check the box marked End Caps and click OK.

Pipe Tool Options:

Pipe Diameter: 25 mm

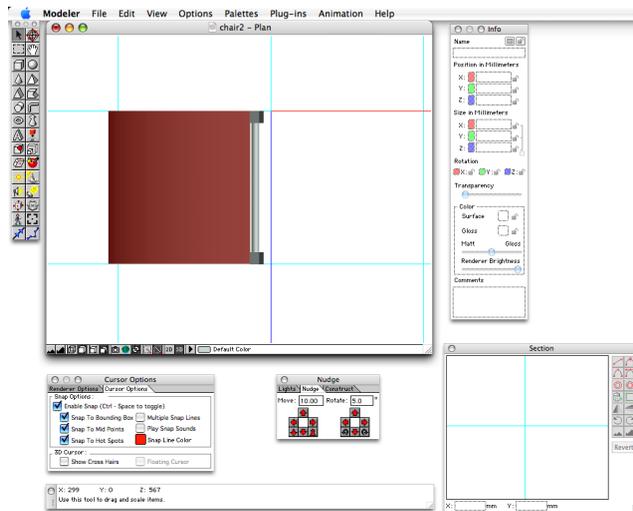
Outer Bend Radius: 200 mm

Sides to a 360° Bend: 24

End caps

Cancel OK

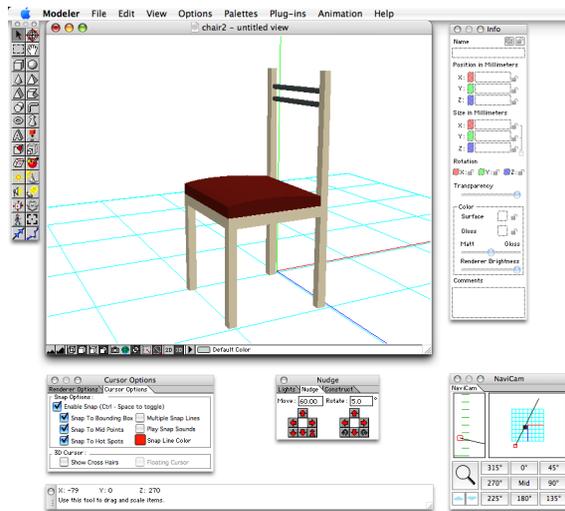
Now position the cursor until it snaps to the middle of the back legs on the inside edge. Click and move the mouse down until it snaps to the inside edge of the opposite leg and double click to finish the pipe. Select the newly formed pipe and move it slightly to the left, until the right edge snaps to the central snap line of the back legs. *See Animation Draw Path on page G-4 for further details.*



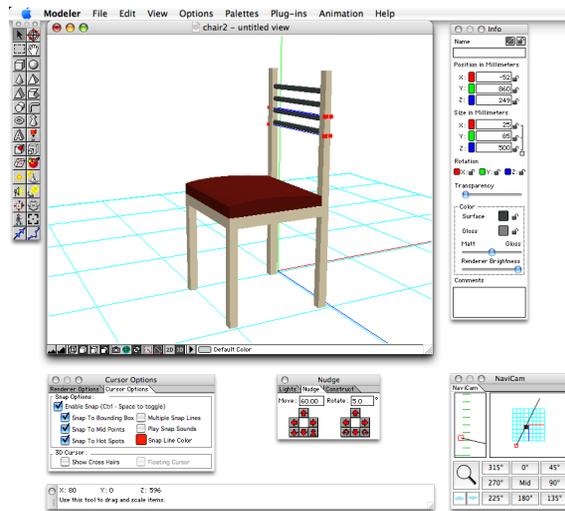
Once this is done enter the Info palette with the pipe still selected and change the Y position to 1088, this will place the pipe right at the top of the back legs.

Change to the Home view via the View menu or the shortcut Command + 3, and change back the Camera style under Render options to Perspective. Notice the position of the pipe. This will form part of a new back rest for this chair. With the pipe selected open the Nudge palette and enter a value of 40 in the Move field. Now nudge the pipe down 1 click or 40 mm.

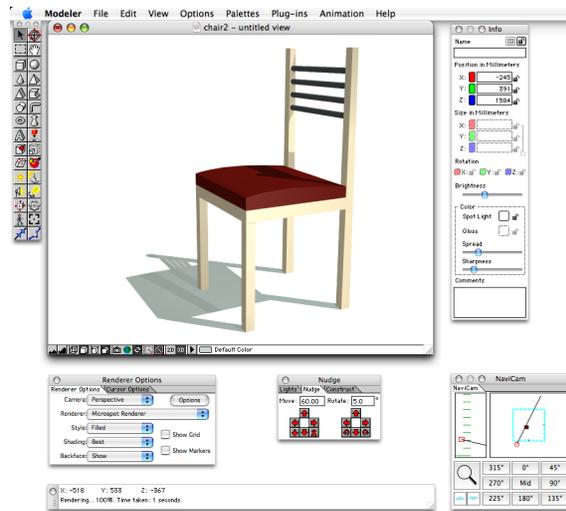
Now this pipe will be duplicated to produce a fully supporting back rest. Select the pipe and using the Option drag method produce a duplicate directly below the original one, stop when the top of the new pipe snaps to the bottom edge of the original pipe, shift may also be needed here. Now select the new pipe and nudge this down 40 mm.



Repeat this duplication and nudge, until there are 4 pipes in total.



The model is now finished. Color and render as in tutorial #1 to see a final presentation view.



## TUTORIAL THREE

Before this tutorial, it is advisable to have completed the first two tutorials.

Reopen the chair from the second tutorial. Alternatively open tutorial #2 from the samples documents folder installed with the program.

Select the chair and from the Options menu dismantle it. Now from the Edit menu select Ungroup. Now the chair is in individual parts again as they were modelled before.

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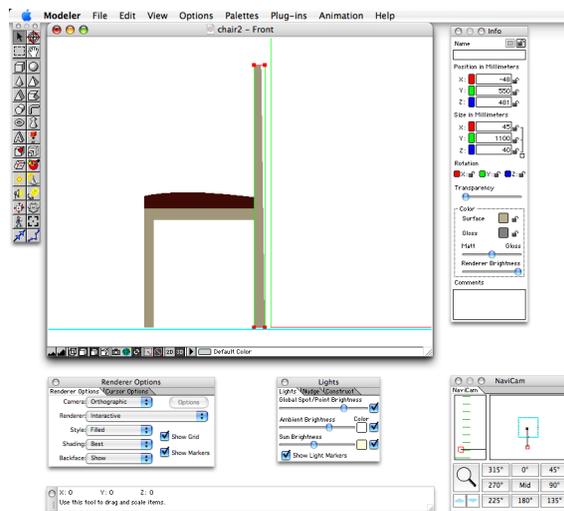
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### u Altering The Back Legs

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Change from the Home view to the Front view (Command + 8) and set the camera style to Orthographic, as below:

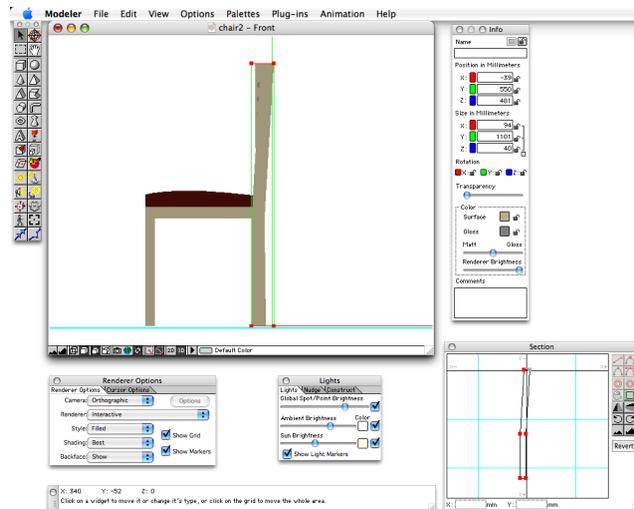


Select one of the back legs, preferably the one on the right of the model as it is now the one nearest to the camera view when in Front view. From the palettes menu select the Section palette. Make sure the Section palette is positioned so that the modelling window can be viewed at the same time. Remember that the model will dynamically update and so it is useful to see what effect the section palette is having.

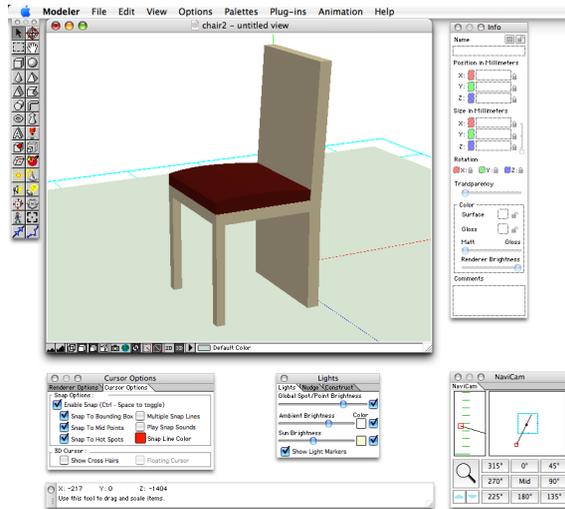
Select the handle in the middle of the leg that was made a bezier curve in the second tutorial, and make it a straight line. Now with this handle still selected make its X and Y values 0 and 500 respectively.

Using the Option drag method duplicate this handle directly below it and make its Y position 450. There are now 2 handles close together in the middle of the section on its right edge. Now replicate these handles and their positions on the left hand side of the section bearing in mind that there X value will be -40. Once this is done this 4 handles make a small square.

Now select the top right hand side handle and enter the values X = 60 and Y = 1100. For the left hand top handle enter the values X = 20 and Y = 1100. Now select the bottom right hand handle and change its X position to 20, now select the bottom left handle and make its X value -20.



Close the section palette and change to the Top view. The leg at the bottom is the leg that has just been altered. Select the top leg and delete it. Now reselect the altered new leg and duplicate it into the position of the deleted one. Change views back to the Home view and check that the new legs are correctly positioned at the back of the seat.

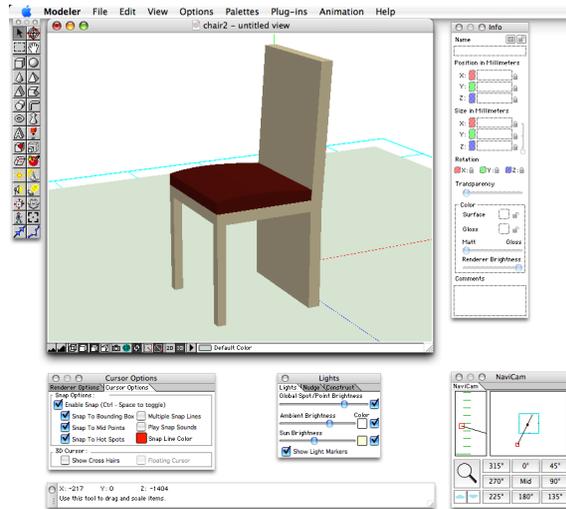



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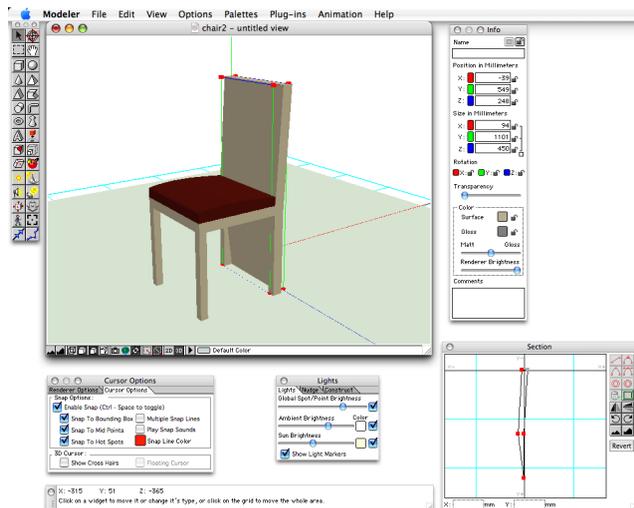
## Changing The Back Rest

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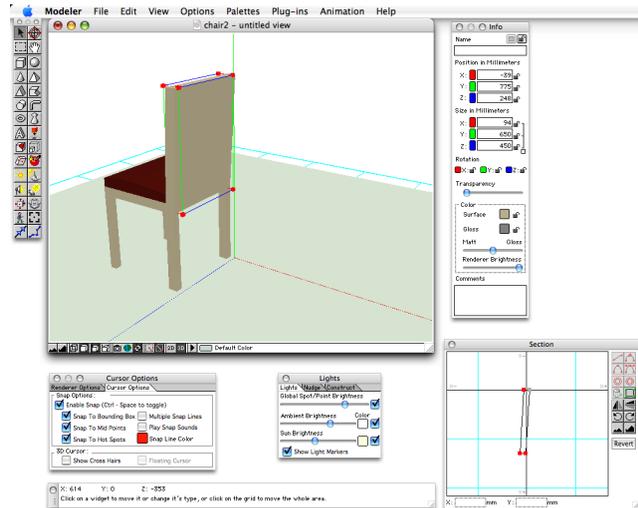
Select the 4 bars that made the back rest in the second tutorial, and delete them. Go back to the top view and using Navicam orientate the camera so it is focused on the back legs. Select one of the two legs and Option drag a new leg out between the other two. Allow Snapping to position this leg in the middle of the chair and change its Z size value to 420. This will then make it long enough to touch each outer leg. Change back to the Home view again and then use the shortcut Command + 1 to look at the selected leg directly.



Now orientate the camera around using Navicam to get a good look at this new leg that has been created. Select this new leg and open the Section palette. Just as before utilize the flip and rotate tools in the Section palette to make the selected leg of an orientation that is understandable to you. Select the bottom left handle that extends the leg to the floor. Once this is selected click the delete or Trash tool in the section palette and the handle will disappear. Now the object is left with a point.

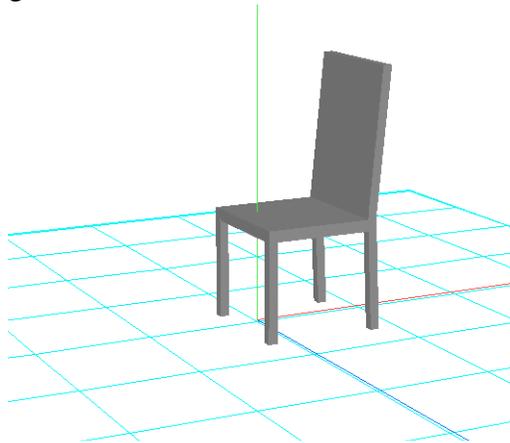


Notice that the bottom right handle is the origin handle, denoted by its grey color. This handle in most cases can not be deleted. Instead the handle above this one (the handle that makes up the bottom right handle of the handles in a square formation) can be deleted and the origin handle can take its place. Notice also that the object is now much smaller as the volume of the model has been quite radically altered due to this removal. The modelling window should express this change well as the object is no longer a leg but more like a back rest.

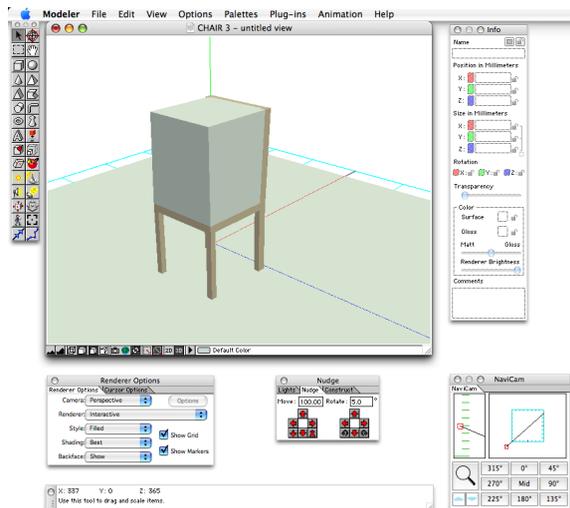


Now return to the Home view and select the curved seat top that was made in the second tutorial and delete it. Underneath is a much thinner seat top that is only 30 mm in height. Change to the Front view again using the shortcut Command + 8 and select this thinner seat top.

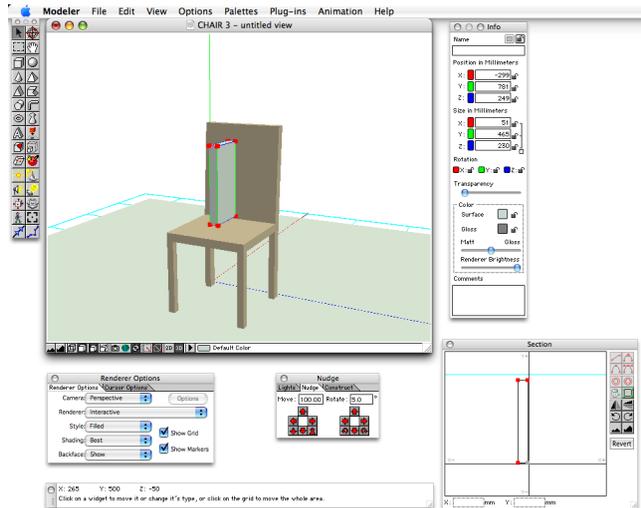
Without using shift select the top left handle and move it up until the Y value is 50 mm. Note that by not using shift in this operation snapping will control the size in both the X and Z directions by a single snapping line on the front left corner.



Now change the view again back to the Home view, zoom in on the seat a small amount and select the Irregular polygon tool from the Tools palette. Position the cursor on the nearest corner of the seat top and once snapping has given a suitable corner position click to start a new polygon. Hold down shift and move the cursor up until it snaps to be in line with the top of the back rest and click again. Now move across the seat face, still holding down shift until snapping takes the cursor to the far front edge of the seat size. Click again and move vertically down until the cursor snaps to this corner point of the seat, and double click to finish. Now a cuboid should appear that covers the seat.

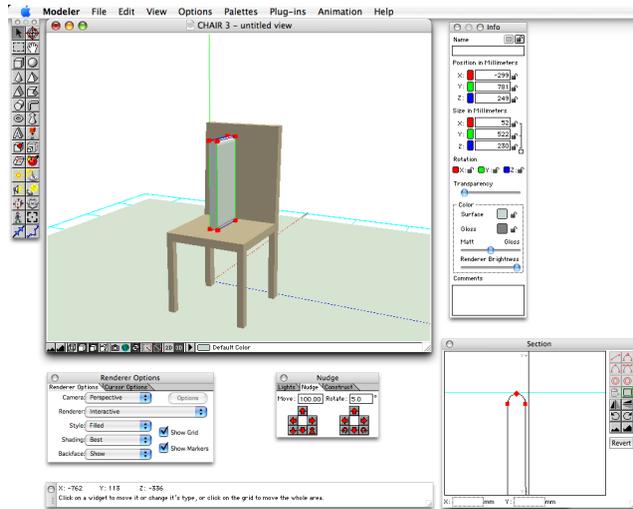


Notice that due to the orientation at which the model was started the X axis is in the Y axis' direction. This does not matter really for these purposes. With this object selected enter the value; 470, 60, 230 for the size of X, Y and Z respectively. Now with the object still selected open the Section palette. The object might open in the section palette with a slightly different orientation to that on screen. Use rotate tools in the section palette to alter this to look the same as the model's orientation.



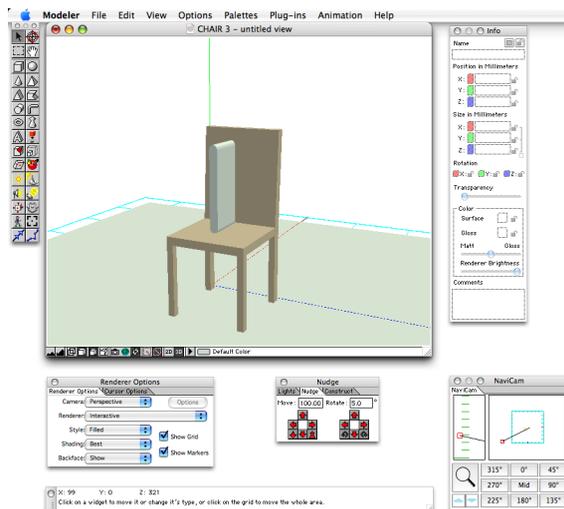
Now select the top right hand handle and make a duplication of this handle. Position the duplicated handle between the two original handles.

Now select these top 2 original handles (not the middle one) and move them both down 20 mm, this is easy to achieve as it is only 2 grid snap moves away and it is quicker to do this by feel, rather than typing in the increments by hand for each handle.

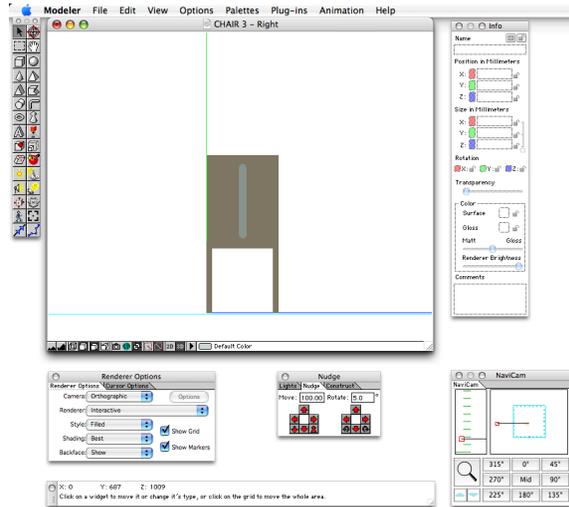


Now repeat this for the bottom handles also, so the final result is a long diamond shaped object that has a point at each end.

Select the middle handle at the top of the object and make it a bezier from the tools menu in the Section palette. Position its control handles so they are completely horizontal and are the same width as the original outer handles. Do the same for the bottom middle handle.

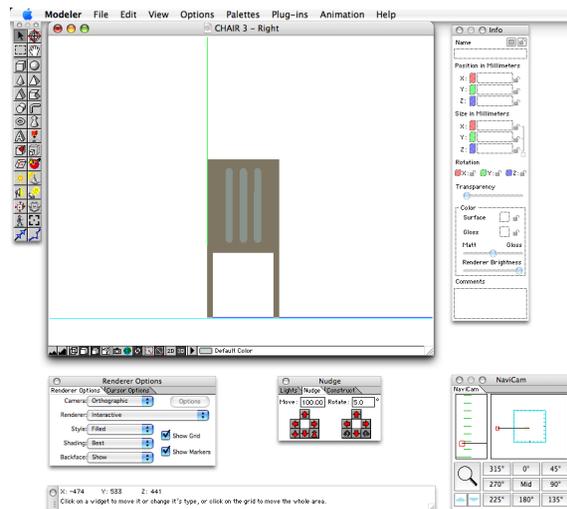


Now this object is ready, close the section palette. With the object selected enter the Info palette and click on the surface color square. Change its color to anything, so long as it contrasts with the default grey color. Now change view to the Right view, either by using the View menu or the shortcut for this is Command + 6.

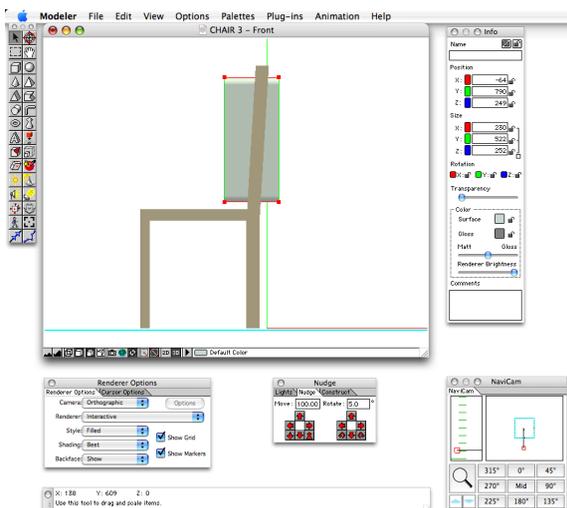


Set the camera style to orthographic. Select the object that will be used as a cut out and duplicate this to the left and right so there are 3 in total. When duplicating make sure that snapping positions the duplicated one edge to edge with the original, so they are all in line, and next to each other.

Once there are 3 cut outs open the Nudge palette and enter a value of 50 in the move field. Move the left hand side cut out 50 mm to the left, away from the central one. Now move the right hand cut out 50 mm away from the central one also.

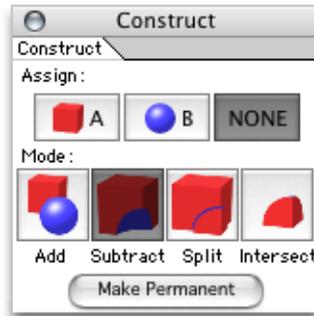


Once this is done change to the Front view and drag a box over the cut outs. This is just to make sure that all 3 are selected. Once all 3 are selected, hold down the Shift key and move them to the right into the back rest. Stop when they are roughly central, i.e. half is sticking out the back and half out of the front.

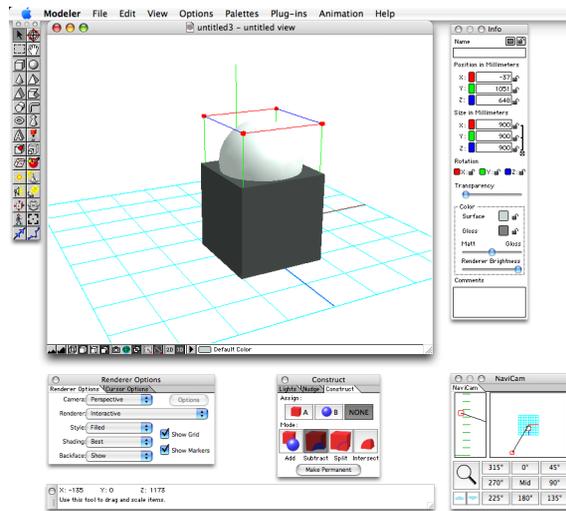


## Construct Tool

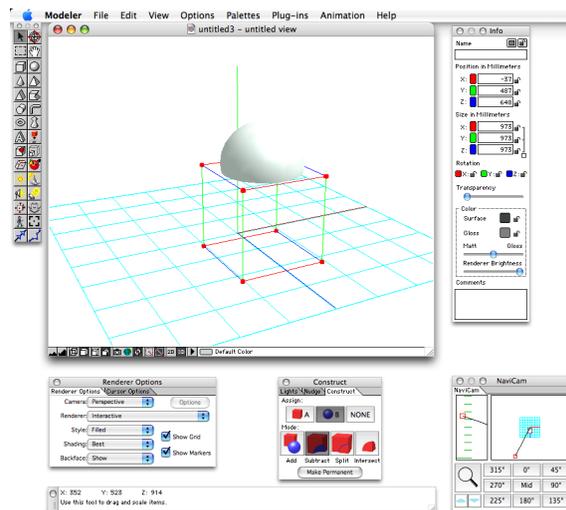
Change back to the Home view and orientate the camera to get a clear view of the seat back and cut outs. Now from the Palettes menu open the Construct palette. The construct tool allows objects to be used in conjunction with other objects to make complex shapes or complicated sections and profiles that are too complicated to create with one shape. Select the 3 cut outs if they are not already selected and in the Construct palette click the Subtraction button.



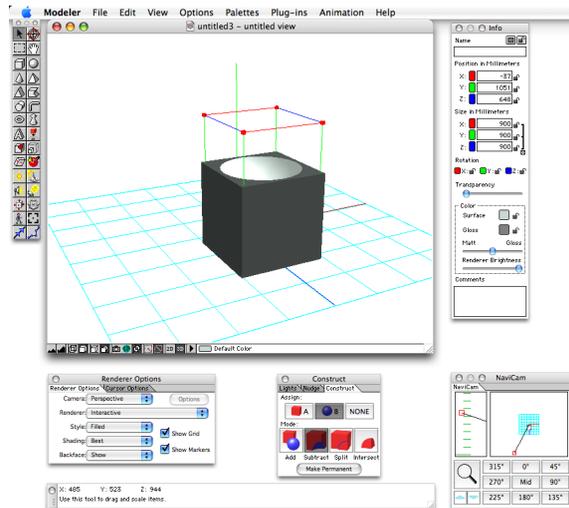
This will go dark as it indicates that this is the tool or action that will be applied when both intersected are assigned A or B. This idea is best explained by giving an example. If a simple sphere is placed on top of a cube and pushed inside so only half the sphere is showing out of the top of the cube then this is an Intersection. The options available now for this intersection are Add, Subtract, Split and Intersect. Each tool does very specific things but for now only the Subtract tool is needed. Assigning A or B to objects allows the program to calculate what must be done to an object or group of objects. An object can either be assigned A or B. Picture the example again or even try this on a new document the cube and sphere. If the cube and sphere are both assigned A or both assigned B then nothing will happen.



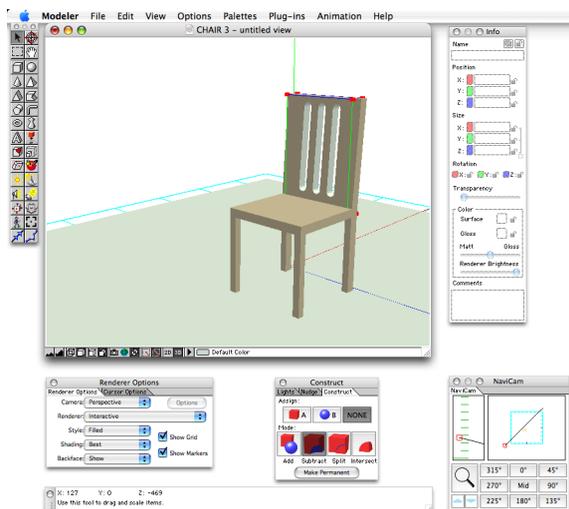
The tools are used to always express operations in terms of A and B, for example using the subtract operation: A subtracting B will result in a loss of area from A. So if the sphere is assigned A and the cube B then if; A subtracting B from it will result in half the sphere being cut away.



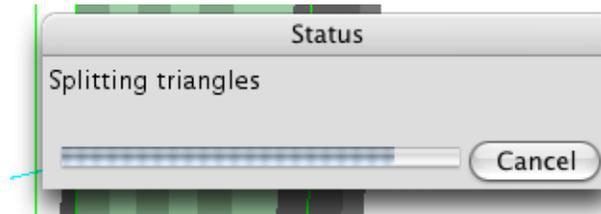
Now think if these were the other way around i.e. the sphere was B and the cube was A then the cube would end up with half a sphere shape cut out of its top. *See Construct on page D-17 for further details.*



Going back to the model, assign the 3 cut outs B. Now select the central back rest made earlier and assign this A. Depending on processor power available to the Construct Idler the modeling window should show a preview of this operation before it is made permanent. At present both A and B have individual bounding boxes and their own specific geometry. Once this is made permanent however the geometry of the bounding box will change. If the Construct Idler has performed the operation preview then 3 exact cut outs should appear in the back rest.



Now it is easier to see why the cut outs should be a different color as now it is much easier to see what the operation has actually done to the back rest. Once this looks fine click Make permanent, wait for a few seconds as this operation will now be implemented by the program. A status bar should appear explaining that triangles are being split. With the back rest now finished change to the Front view via the View menu or the shortcut Command + 8.



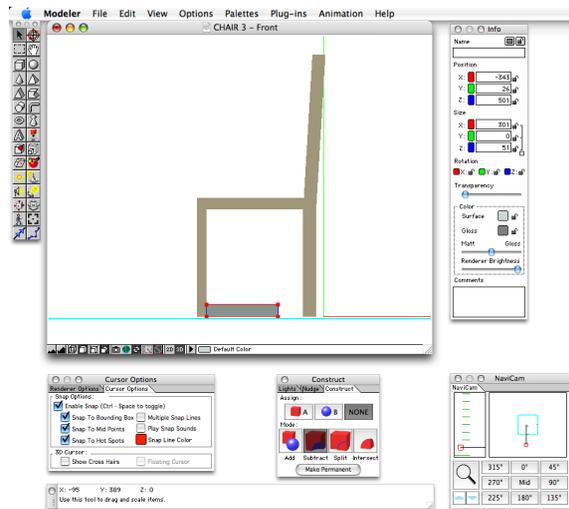
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## u Drawing The Chair Supports

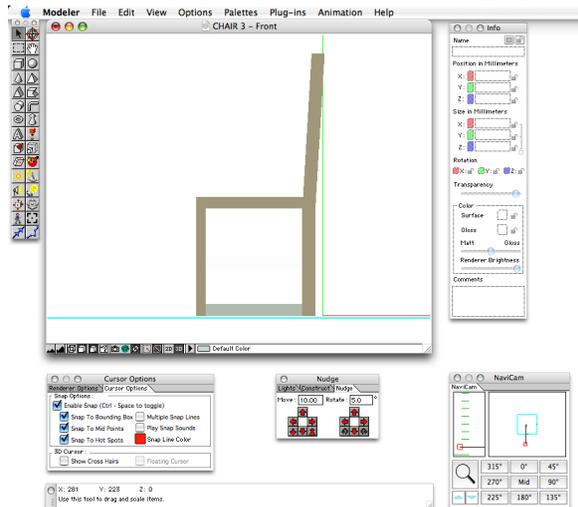
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Set the camera style to Orthographic and select the Cube tool from the Tools palette. Make sure that snapping is on in the Cursor options palette (to toggle snapping on and off quickly hold down Control and press the Spacebar once, doing this again will turn it back on) and position the cursor so snapping occurs on the bottom right hand corner of the front leg. When this is in position click and drag out a rectangle that is 60 mm in the Y direction and stop when it is roughly 300 mm in the X direction. Now switch off snapping and hold down Shift whilst selecting the same handle and drag the rectangle out longer until it is 450 mm in length, and 40 mm in height.

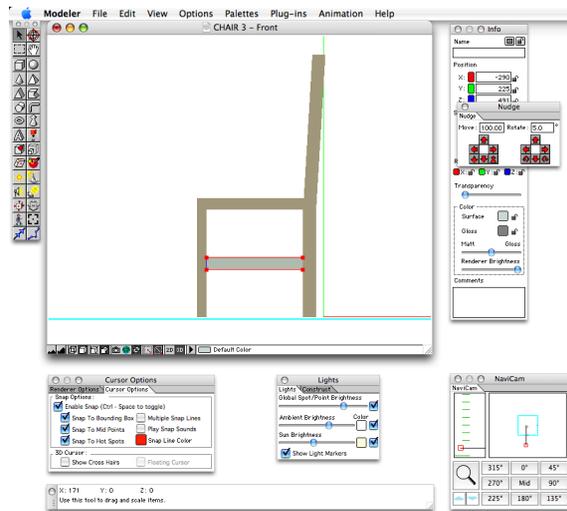
Finally turn snapping on again.



**Note:** that the Z size of the object is only 10 mm, change this to 40 mm. Now select the front leg and note its Z position. Reselect the object just drawn and change its Z position to be the same.

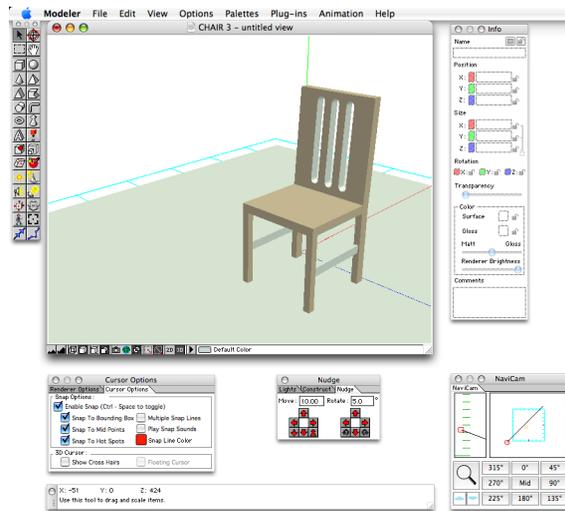


This object will form part of the foot rest/ chair supports. Now move it up using the Shift key to preserve its position between the front and back legs. Stop when the foot rest snaps to the middle of the front leg and is positioned centrally on it.

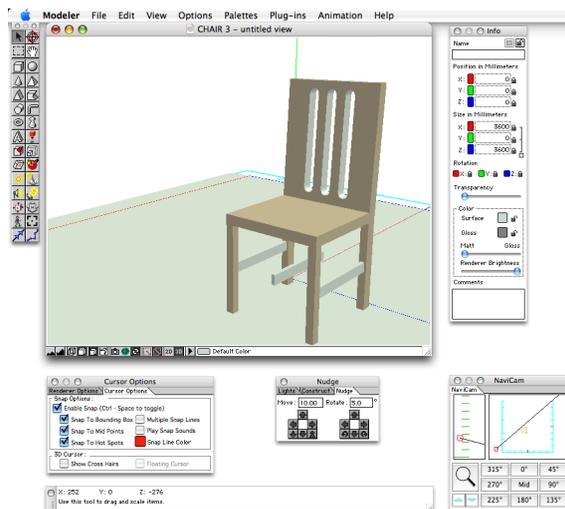


Now with this rest still selected enter the Info palette again and change the X value of size from 450 to 470 mm this will give the appearance that the foot rest is fixed as part of the chair structure. Once this has been finished return to the Home view to observe the results.

Now use the Navicam to orientate the scene around so that both sets of legs can be seen those with the foot rest and those without. Now select the foot rest just made and hold down the shift key. Option drag a duplication of this rest out across to the other legs. Stop when this new rest falls completely in line with the front and back legs. Snapping should aid a great deal with this operation. If for one reason or another the position can not exactly be obtained by moving with the Shift key then note the Z position of the front or back legs and make this new rest the same just as with the previous leg.

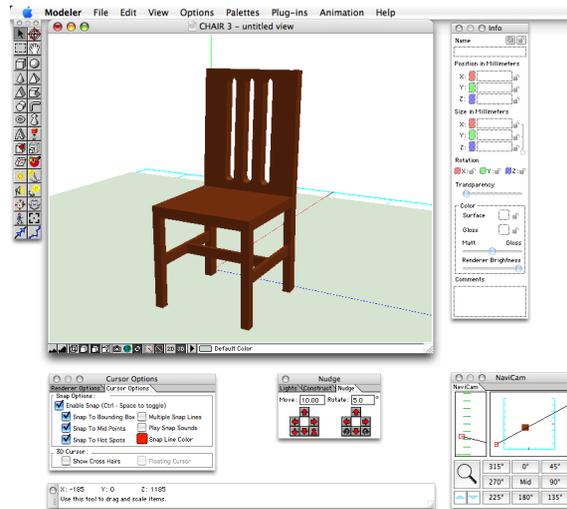


Now Option drag a third rest out again using the Shift key from one of these two new rests and and roughly position it in the middle of these two. Now select the two original rests that are in position and group them together, either by the Edit menu or the shortcut Command + G.



Once these are grouped reselect the middle rest that has just been made and using Shift to constrain it to the global axis move it until it snaps to the centre of this newly formed group of the two outer rests. Now open the Nudge palette. In the rotate field enter 90 and nudge this rest

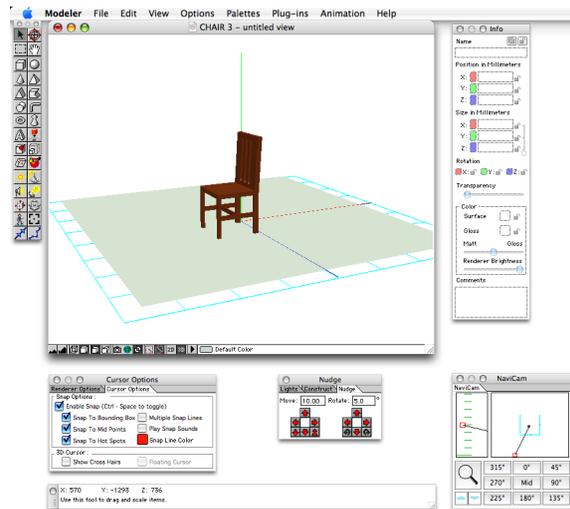
round until it is perpendicular to the group of two outer rests. Finally resize it so it is now only 460mm long.



Now the model is finished. Save the model to your home directory and call it Chair #3.

## TUTORIAL FOUR

Reopen the file saved as Chair 3. If the third tutorial has not been completed then open the file named Chair 3 from the sample files folder installed with the program.



Select the chair, Dismantle and Ungroup it so it can be edited by individual parts. Change to the Top view and orientate the camera to have a clear view of the seat top. Select the Irregular polygon tool from the Tools palette. Open Cursor Options under the palettes menu and check that Snapping is turned on, it will be needed extensively throughout this part of the model.

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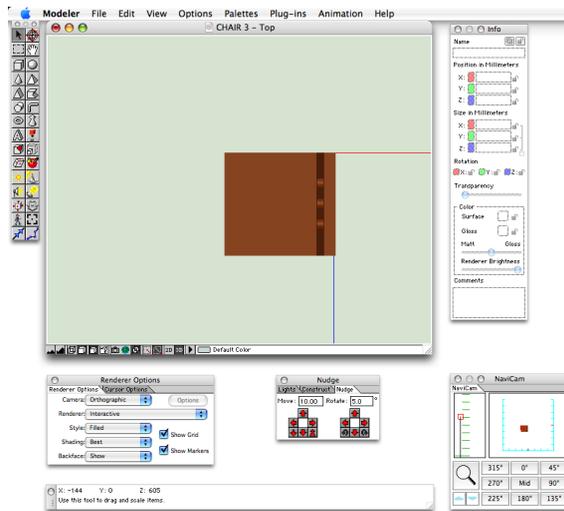
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### u The Final Seat

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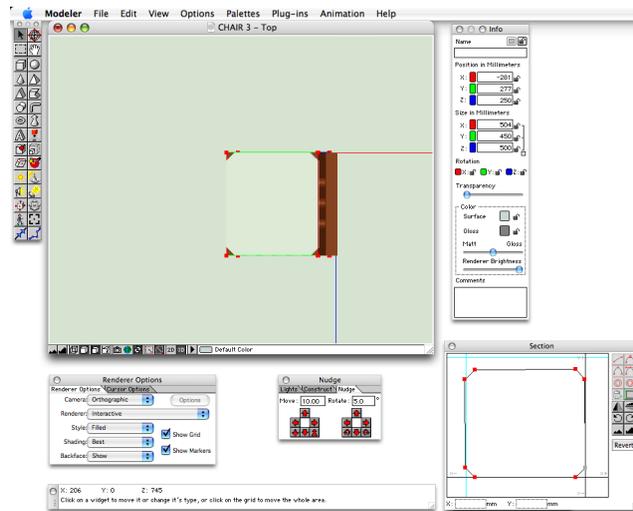
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Now position the cursor over the bottom left hand corner of the seat and click to start the polygon. Move the cursor to the right until snapping finds the bottom right hand corner and click again. Now move the cursor up either using the Shift function or by allowing snap to guide the cursor, locate the top right hand corner of the seat and click again. Now move back across to the top left hand corner of the seat and double click to finish the Irregular polygon.

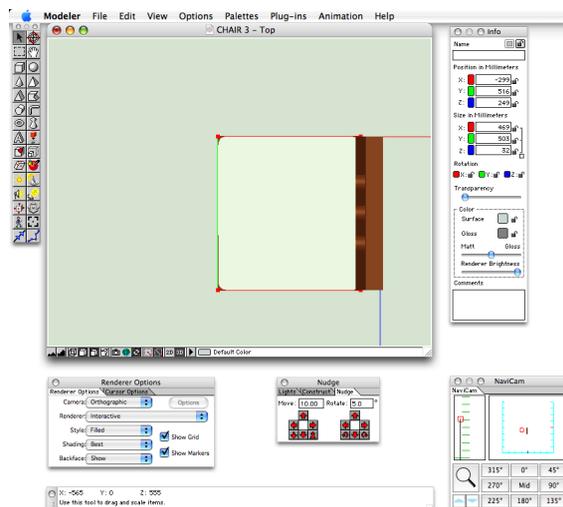


With the object still selected open the Section palette and select the top left hand handle. Option drag a new handle out from this 40 mm to the right. Do the same for the bottom left hand handle also.

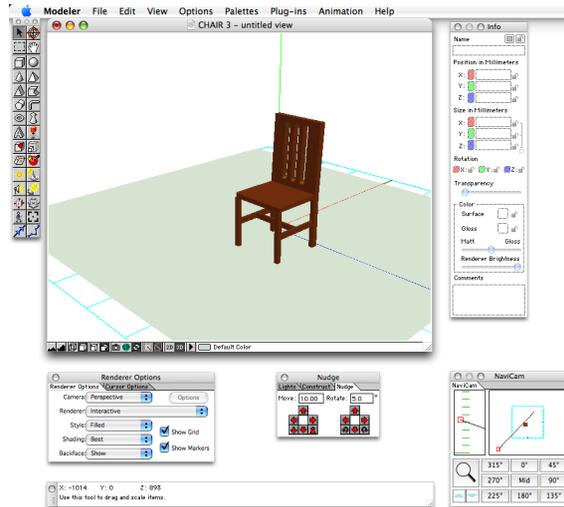
Now select the bottom right handle and duplicate a new handle directly 40 mm above this. Repeat this for the top right handle making the duplication 40 mm below this one. Return to the four handles on the left of the model now. Select the original top left handle and move it down 40 mm, this will make a clean 45° chamfer. Next select the bottom left handle and move this up to again make a 45° chamfer. With the right handles move the original 2 to the left by 40 mm to finish a new eight sided shape.



With these four original handles that have just been moved, use the Bezier curve tool from the tools on the right hand side of the Section palette. Once these beziers have been made it is important to note that on the left they act in a vertical direction and on the right in a horizontal direction however the result is just the same. For all four beziers make the control points rest in line with the handles they come from and the outer control point that extends past the curve should be shortened to rest in line with the other handle each corner section. The resulting effect is a rectangle (almost square) with four rounded edges. Close the Section palette and change back to the Home view (Command + 3).



Select the original seat block that rests on top of the legs and delete it. Depending on Snapping variations when the original section was drawn the new block could be sitting below the grid or on top of the original seat block. Either way relocate this so that its bottom edge rests on the top edge of the chair legs. This will now form a new seat. Once this is in position notice that it is still far too high to be a seat top. Using the Snapping shortcut, Control + Space to deactivate Snapping and resize the new seat top. Do this by selecting a top handle and whilst holding down Shift change the size of this seat to be 50 mm in height.



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## u The Final Legs

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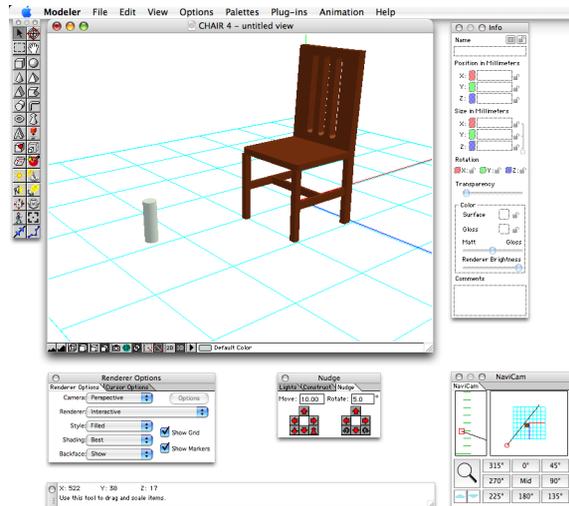
Select all of the inner foot rests that were drawn in the third tutorial and delete them. Now the legs will be drawn independently of the rest of the model as each leg is a more detailed and complex section than those previously made. Move the camera orientation away from the model and into an area of the grid where work can be done clear of other objects. Using the Control + Space shortcut or by checking the Cursor Options palette deactivate Snapping.

## Lathe Tool

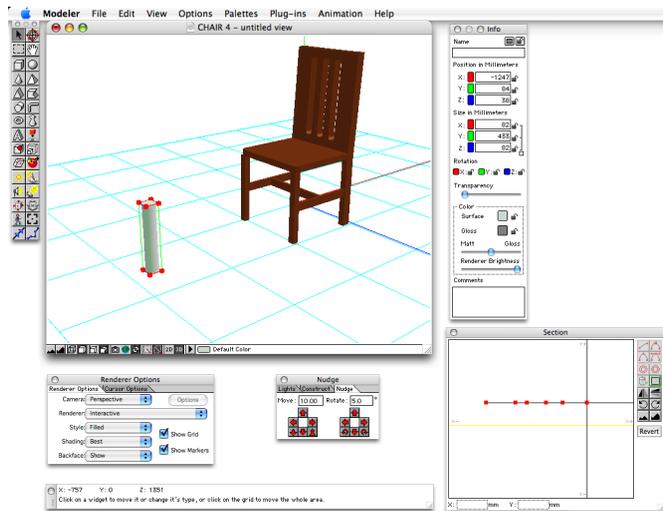


Select the lathe tool from the Tools menu. Click on the grid and follow the guide line vertically up a reasonable way and click. Now hold down the Shift key and move the cursor out to the left or right a short distance (remember this is going to be a long thin chair leg) and click again. Still with the Shift key held down move down vertically until the cursor roughly meets the floor and double click to finish.

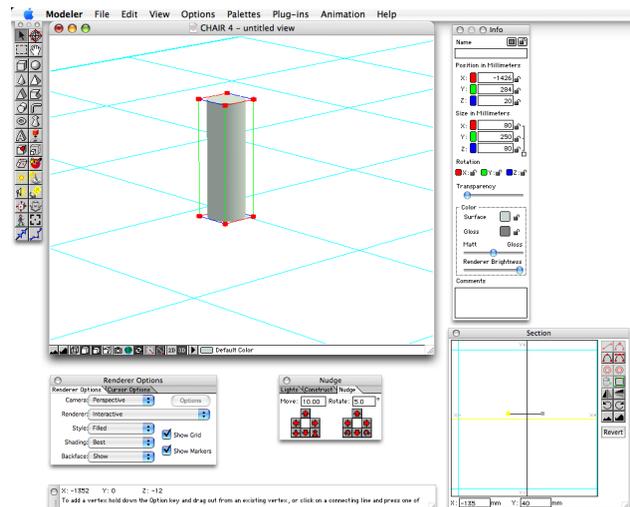
At the stage a cylinder should appear. It is still rough in terms of shape and dimensions at this stage as all of the sectional adjustments will be added in the Section Palette. With the cylinder still selected enter the values 80, 250, and 80 in the size fields of X, Y and Z respectively.



Now open the Section palette. Notice that the cylinder is represented by a single line with 2 handles, one of these being the origin handle. Use the horizontal flip tool from the tools on the right hand side of the section palette to make the line sit above the X axis. The far left handle is editable and so from this Option drag out 6 more handles to the left so that there are 8 in total. These handles will be used now to make a chair leg that appears to be lathed.



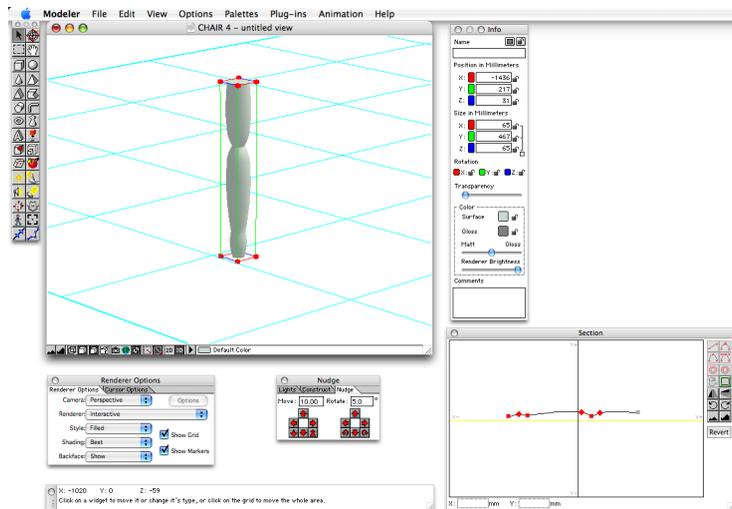
Drag a box over all of the handles including the origin and (hold Shift down after a handle is selected to control axial direction. Note if Shift is held down before a handle is selected then one will be deselected when clicked on) select and hold a handle. Now using the Shift key drag the cylinder to the right until the left most handle rests on the Y=0 line. Notice the dynamic update in the modeling window as the cylinder moves up to sit on the grid. This is done to make dimensioning easier from now on for this complex curved section.



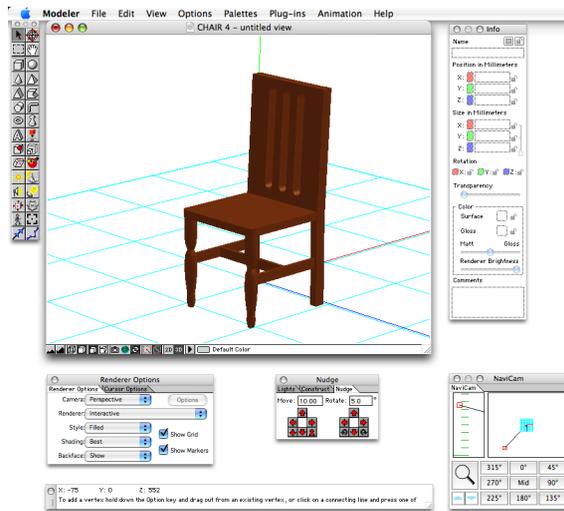
Working left to right select the first handle, its value should be 0, -40 in terms of X and Y respectively. Change these to 0, 18. Select the second handle and change the values to 20, 20. Change handle three's values to 50, 20 and handle 4 will sit directly below this at 50, 17.

The fifth handle is a bezier curve with coordinate value of 246, 35. For this handle make the control handles horizontal and extend them to be almost vertically in line with handle 6. The position of handle 6 is 330, 25. The handles of handle 5 should extend roughly half the distance between handle 6 and 3-4.

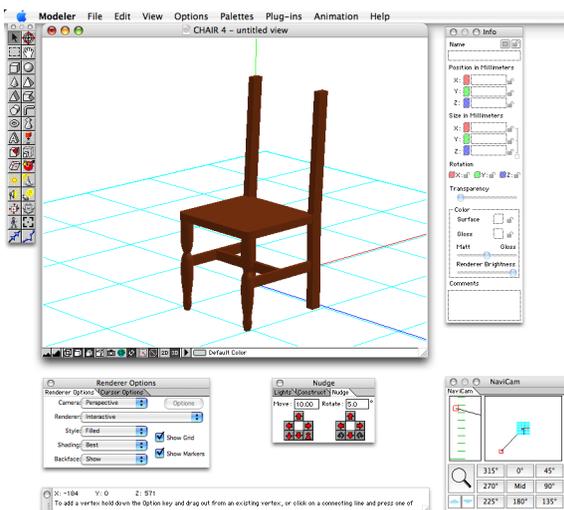
Handle 7 has coordinate values of 360,33 and is also a bezier. With handle 7 make the control handles horizontal and extend them until the left handle is directly over handle 6. The final handle is the origin handle and should rest at 450, 33.



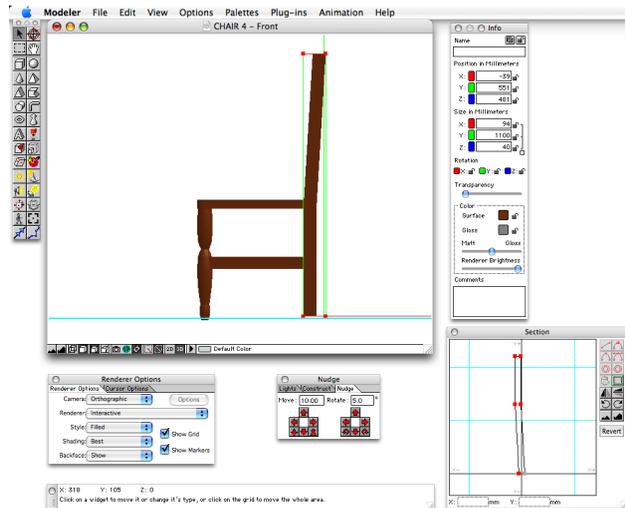
Close the section palette and select the original front legs. Delete these two legs and change to the Top view (Command + 5). Select the new leg and make a duplication of it. Open the Cursor Options palette and enable Snapping. Now select the duplicated leg and move it into position so that its top left hand corner snaps to the top left hand corner of the rounded seat top. Now move the original leg into position below this one to snap in place on the bottom left hand corner. Change back to the Home view (Command + 3) and check the position of the legs.



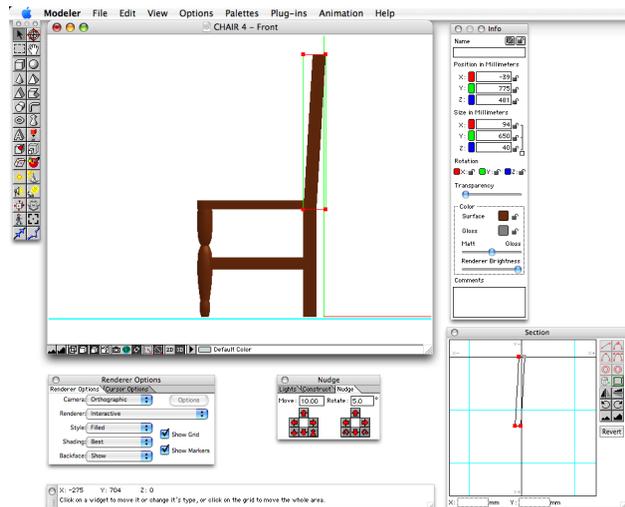
Make sure that both of them are resting with their top edge on the bottom edge of the seat. Check that the back is ungrouped, and that there are 2 legs and one back rest. Select the back rest and delete it as a new one will now be modeled using several of the techniques used in the third tutorial.



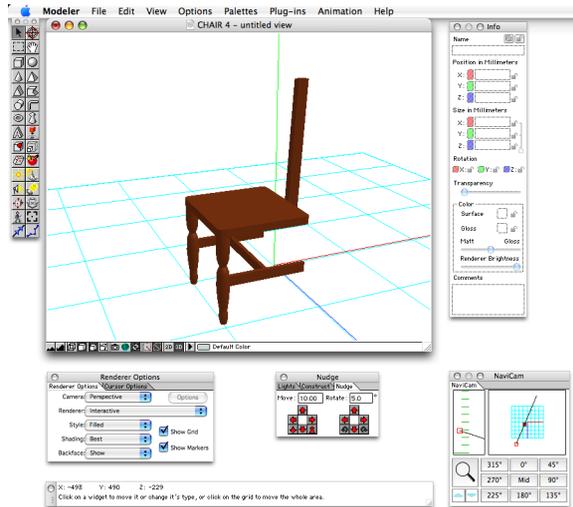
Orientate the camera so the view of the chair is side on or change to the Front view (Command + 8) and select the back leg nearest the camera. Now with this leg selected open the Section palette.



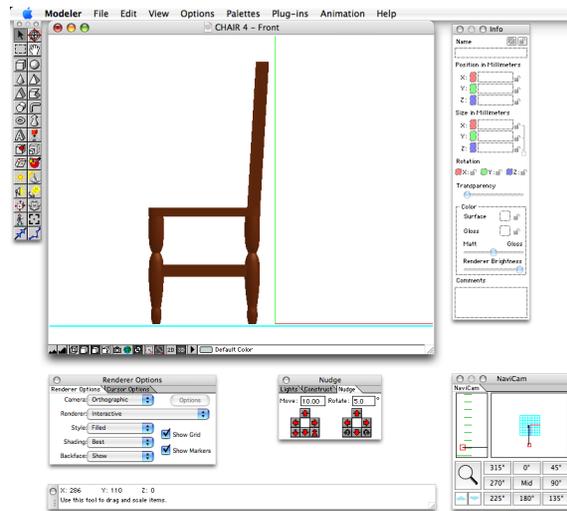
Select the bottom left hand handle and delete it using the delete/trash tool in the section palette's tool area. The leg is left with a spike which forms at the origin handle. Above this is the small group of 4 handles in a square shape. Delete the bottom right hand handle of these four. Now select the origin handle and move it into position to reform this small group.



Close the Section palette and if not already change the camera view to the Front view (Command + 8) and select this now shortened leg. As with the third tutorial this leg will become the back rest of the chair. Open the Nudge palette and in the Move field enter the value of 50 mm. Now nudge the back rest 50 mm to the left. This will push it into the seat top and make it appear more secure and stable. Now change back to the Home view and select this soon to be back rest. Hold down shift and move this to the left until it snaps to the centre of the seat. Select the other leg that has not been altered and delete it also.



Reselect the rest that is positioned in the middle of the seat and change its Z size in the Info palette from 40 to 460 mm. Revert back to the Front view again and drag a box over the front 2 legs. Use the Option drag method in conjunction with Shift to duplicate these 2 front legs to the back. Position them at the furthest rear edge of the seat.

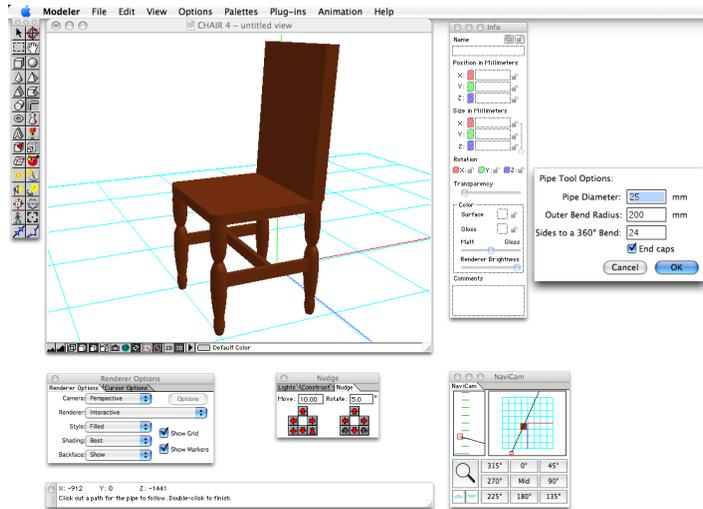



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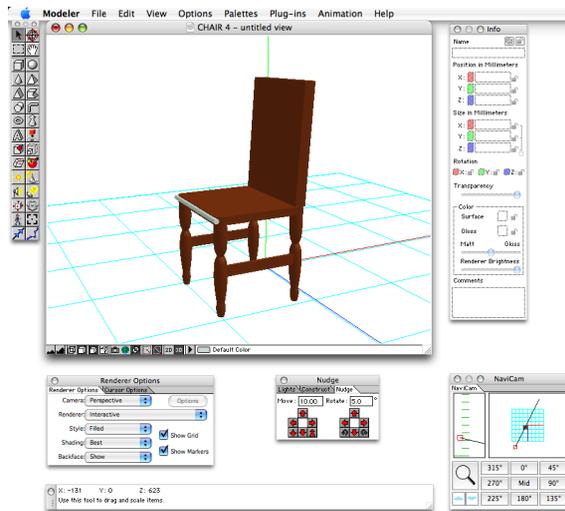
## U The Final Supports

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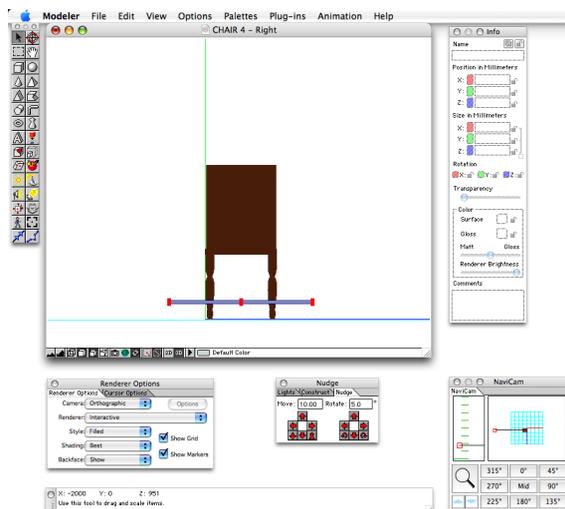
Now with these 2 back legs still selected (if they have accidentally become unselected, drag another box over them) open the Nudge palette and enter a value of 5 in the move field and move the legs to left 5 mm. Now drag a box over the front 2 legs and nudge these to also, but this time to the right 5 mm. This next stage will concentrate on modelling solely in a 3D view so the use of axis guides including Shift function, and Snapping will be very important. Change to the Home view (Command + 3) and select the Pipe tool from the Tools palette with the Option key held down. Holding down the Option key will bring up the Pipe Options dialogue box where the diameter and attributes of each pipe can be set. Enter a value of 20 mm in the Pipe diameter field and click OK.



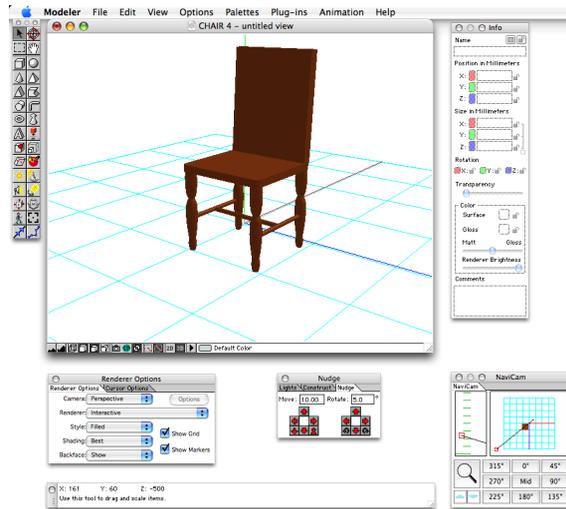
Now position the cursor over the top left (furthest away) corner of the seat. Snapping should position the cursor accurately on the corner and when it does click to start the pipe. Move the cursor around and note that a cord is attached to it. This represents the direction of the pipe and the cursor being its finish point. Note also that if after the first click the mouse is clicked and held down, dragging the mouse out now in any given direction will result in a curve being produced. This is particularly useful for making bends in pipes, etc. Experimentation with this tool is the best way to learn its parameters. Now hold down the shift key and move the cursor along the Z axis to the right until it snaps to the corner of the seat that is nearest the camera. Once snapping has found this corner double click to finish and a pipe the length of the seat will be produced.



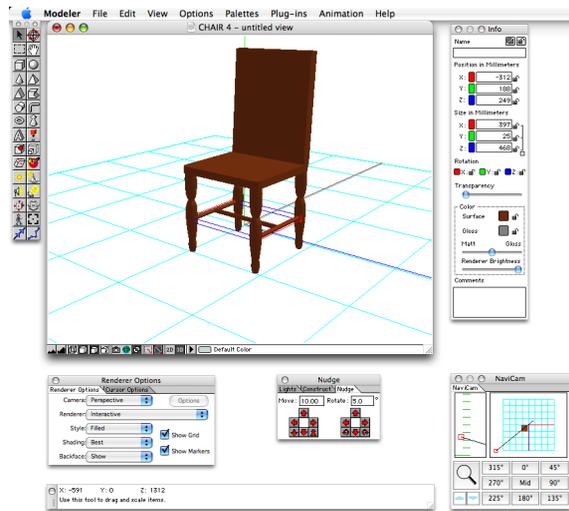
With this new pipe still selected open the Info palette and change the value of Y in the position area to 120. This will put this pipe at exactly the right height as it will make up part of a new foot rest. Now change to the Right view (Command + 6) and zoom in slightly on the foot rest that has just been produced. Select the foot rest and in the Info palette enter the value of 440 in the Z field of the Size area. Now make 2 duplications of this rest, one directly to the left that snaps to the middle of the original with its right hand end, and one to the right that also snaps in this way but with its left hand edge. It is important that these new rests are snapped in the right place in relation to the original otherwise they will not align.



Now select both of the new foot rests that have just been duplicated. Open the Nudge palette and in the Rotate field enter the value of 90°. Now rotate both of these rests 90°, either to the left or right it does not matter. In this present view all that should be seen now of the rests is the original one, still length ways and now 2 circular sections. Switch back to the Home view and zoom in a short way to see more of the foot rests. The rests will form a H shape. Select all 3 rests and whilst holding down Shift move all 3 along the X axis back under the seat. Move these back until the middle of the original rest (the rest in line with the Z axis) snaps to the centre of the seat. This should be easy to achieve but may not work exactly first time.



Move the 3 back and forth along this axis until snapping finds the position. Notice that the two duplicated rests are too long for the size of the chair. Select both of these rests. This can be done in two ways; at present all 3 rests are selected so click onto the grid and they will be deselected. Now hold down Shift and select them both. Alternatively when all 3 are still selected, hold down shift and click on the original rest and it will be deselected from the group of selected objects. Sometimes this is a much quicker method of gathering groups of objects, by selecting them all with the shortcut Command + A and then Shift deselecting the ones that are not needed. Once the two rests are selected group them together, by either the Edit menu or the shortcut Command + G.



In the Info palette change the X value of Size from 440 to 400. This will put them inside the chair legs and thus making it a more solid looking chair. At present the back rest of the seat is solid since one of the old legs was extended to fill the width of the seat top. This next stage will produce an irregular curved shape that will be used to produce a cut out section in the back rest.

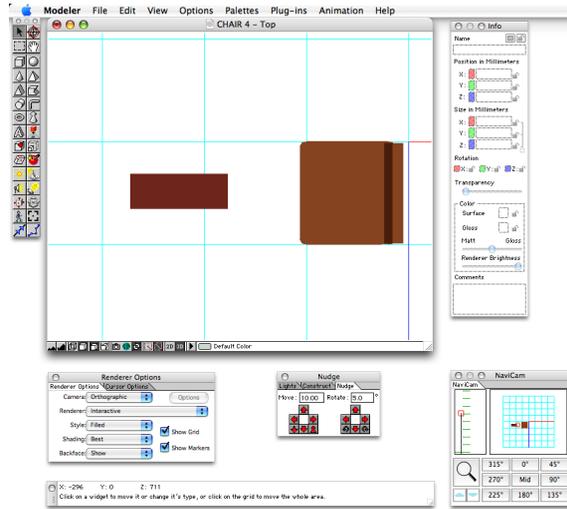
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## u The Final Backrest

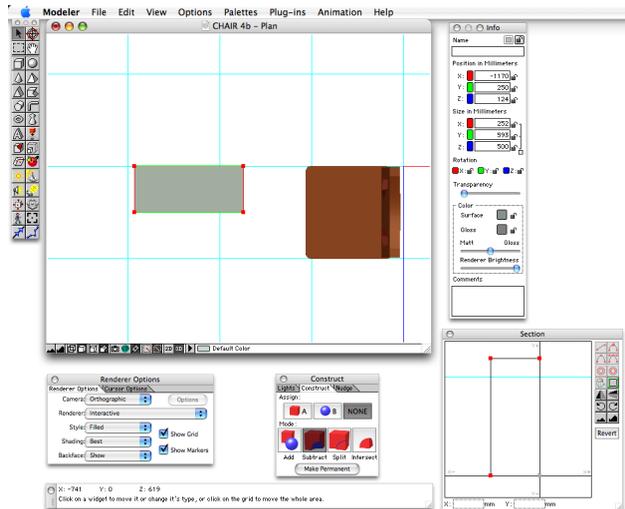
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Zoom out a small way until there is sufficient room on the grid to draw a separate object. Switch to the Top view (Command + 5) as it is much easier to draw in this view and then rotate the item later rather than draw in the Home view and have to navigate the modelling window around the object just to understand what is being made. This way when it is edited in the Section palette the dynamic update will show exactly what the final object will look like. Open the Cursor options palette and turn off Snapping as it is not needed in this instance and could cause problems whilst trying to draw if the cursor is near the chair at all. This next piece will be an object used as a cut out, just as with the third tutorial. A section will be produced and inserted to the back rest to make an intersection using the Construct palette. Draw out a long thin rectangle. Make sure to use Shift and only draw 3 handles with the third being a double click to finish the object. Otherwise the rectangle will have one to many handles at its origin point and

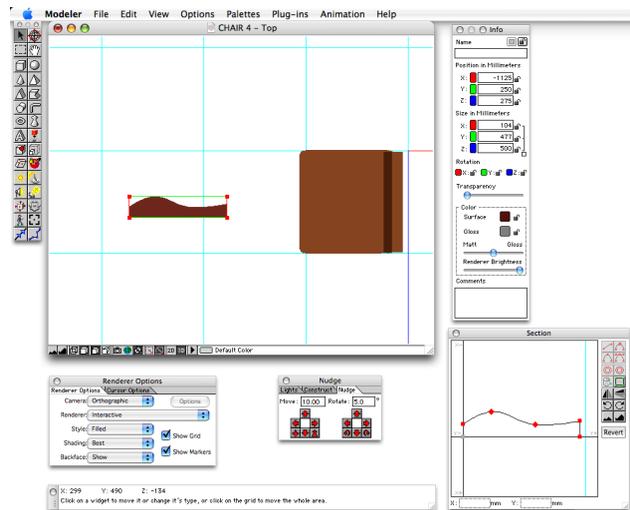
will not be exact. Once this is drawn enter the Info palette and make the shape 600 mm long, 160 mm wide and 200 mm deep.



Now open the Section palette (check that the 4 handles are in line and make a perfect rectangle). On the top long edge of this new object create 2 new handles, one on the left and one on the right. On the far right, the origin handle should be at co-ordinates 0,0. If this is correct then all the other handles can be positioned using their X and Y values (adjust the model by dragging a box over all the handles and moving the object until the origin handle rests on the 0, 0 coordinate).

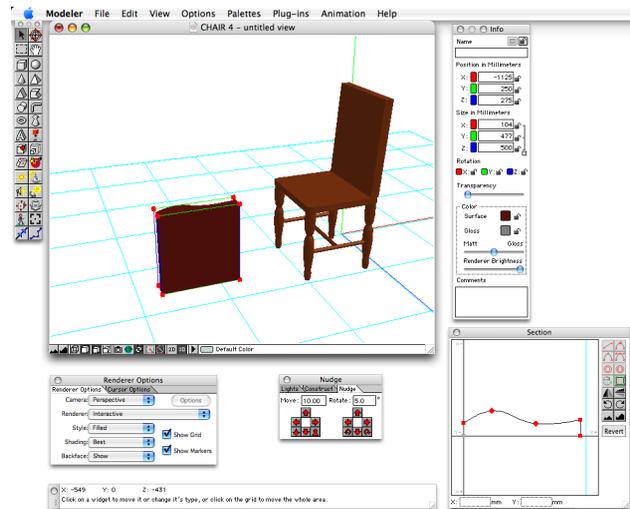


Working clockwise from the origin handle select the bottom left hand handle and enter the values -550, 0 for X and Y respectively. For the top left hand handle enter the values -550, 40. The handle to the right of this which is a duplicated handle should have the co-ordinates -440, 90. Make this handle a bezier curve and adjust its control handles to sit horizontal, the expansion of these handles will have to be referenced from the picture below as there is no real definition of size for this. The next handle is a duplicated one and should have the coordinates; -200, 30, this is also a bezier curve with horizontal handles. The original right hand (top) widget has the coordinates 0, 60 and the origin handle just below this has the coordinates 0, 0 as previously discussed. Now close the Section palette.

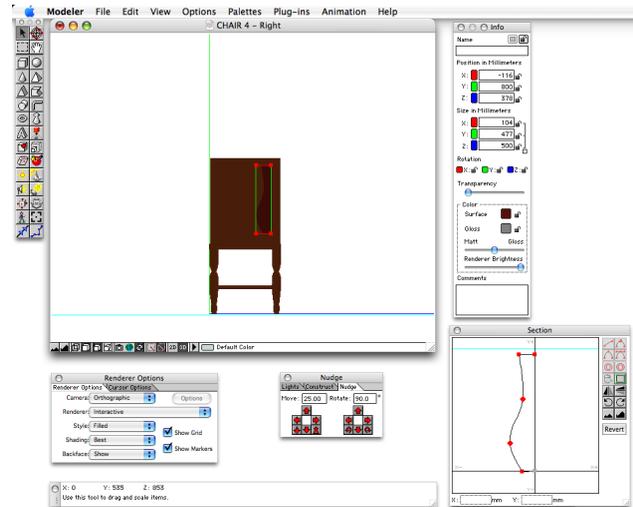


Once the shape looks right then switch back to the Home view (Command + 3). Open the Nudge palette and in the rotate field enter 90 (if it is not already entered). Using the Navicam orientate the camera around to be facing the curved edge of the cut out.

Now use the rotate left arrow tool (the tool that is a curled arrow on the left of the cluster) to rotate the cut out through 270°. This will place the cut out with the larger curve end on the bottom. Now using the Nudge palette again rotate the cut out 180° to the left or right (in this instance it does not matter as the cut out is just being flipped around) about the Y axis so that the flat edge faces the camera and the curved edge points away. Return to the Home view, and now the cut out is in the correct orientation to be placed in the back rest.

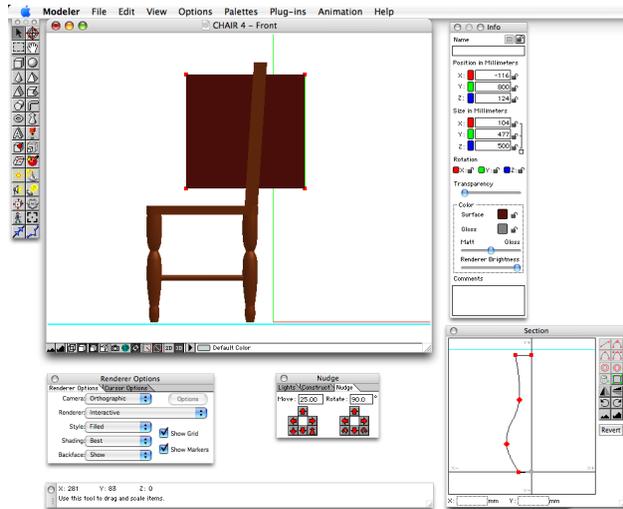


With the cut out still selected enter the Info palette and in the Y position field change the value to 825. Open the Cursor options palette and re-enable Snapping as this will be useful again for the cut out positioning. Now change the view to the Top view (Command + 5) and move the cut out until it snaps to the bottom edge of the back rest with its own bottom edge (ensure that its Y position is still 825 mm). Change view again to the Right view (Command + 6) and with the cut out selected use the Command + 1 function to look at the selected object. Open the Nudge palette and enter a value of 25 in the move field. Nudge the cut out (who's curved edge should be facing inwards, if not then use the nudge palette to rotate this 180 degrees around) 25 mm down and 75 mm in towards the centre.



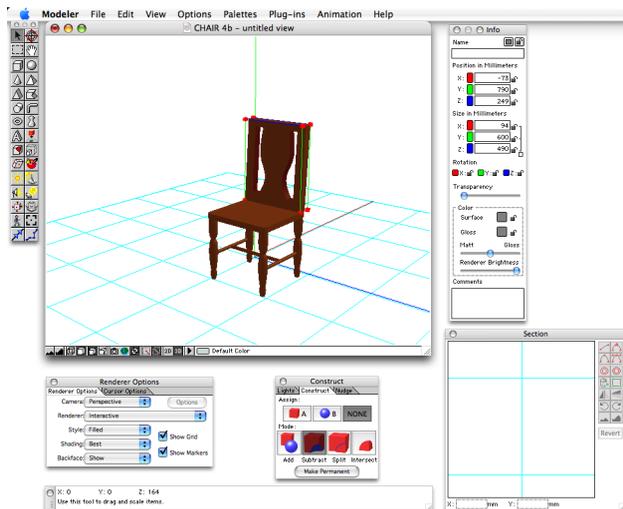
Now holding down Shift, Option drag a new cut out to the left and position this one edge to edge with the back rest. This cut out will need to be rotated 180° to mirror the cut out on the right. Now use the Nudge palette again to nudge this in 75 mm. It might be easier to reposition this duplicated cut out on the corner of the back rest at 825 mm above the grid (Y position) and then nudge it down 25 mm.

Change to the Front view (Command + 8) and drag a box over the cut outs to select both of them. Now with the shift key held down move them to the right so they rest half in and half out of the back rest. This does not have to be accurate, as long as the cut outs are clean through to ensure a precise and full cut is produced. Change back to the Home view and orientate the camera around into a position that will give a clear view of the back rest when the construction is applied.

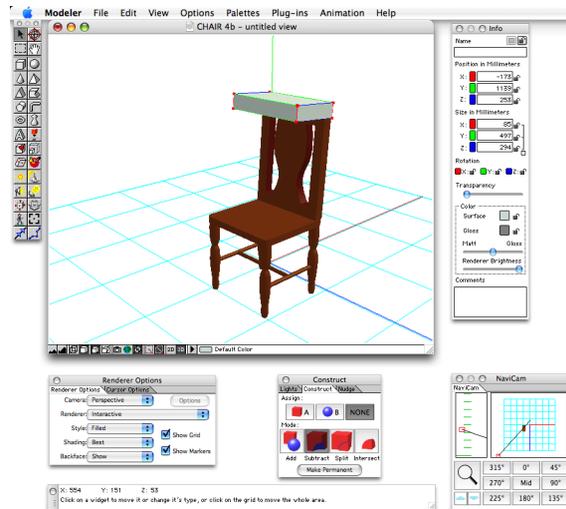


Open the Construct palette from the Palettes menu and select the Subtract tool (this will grey out to indicate this is the process that will be performed). Now select both the cut out objects and in the Construct palette assign both of these B. Now select the back rest and assign it A.

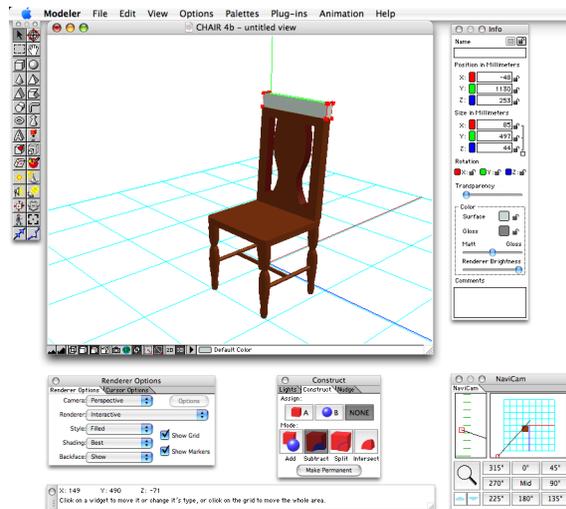
**Note:** Depending on processor power the Construct Idler should update this operation and give a preview of the intersection that has been made by the two assignments. A slower processor will take longer to update this preview but it will occur.



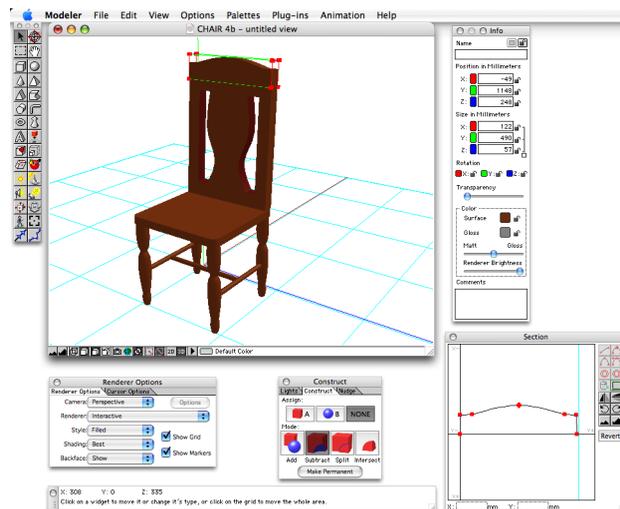
If this looks fine, click Make Permanent. Move the camera into a position where the top of the seat is easily seen and both ends are visible. Do not use an Orthographic view like the Right view (Command + 6) for this final operation as all 4 handles at the top of the back rest need to be seen. Select the Irregular polygon tool from the Tools palette and position the cursor on the nearest back corner of the back rest. Now the last part of this final chair is to produce a grander top or crown to the back rest making the chair more detailed and slightly taller than the others. Click to begin and whilst holding down shift move the cursor across the back rest to the opposite back corner and click again. Now move vertically up a short way (say 1/3 the distance across the back rest) and click again. Move back across the back rest until the cursor snaps to the centre of the back rest and click, then move on to the end of the back rest above the original start point and double click to finish. This produces a block that rests with its back edge on the back edge of the back rest and the front extending out 500 mm in the Z direction.



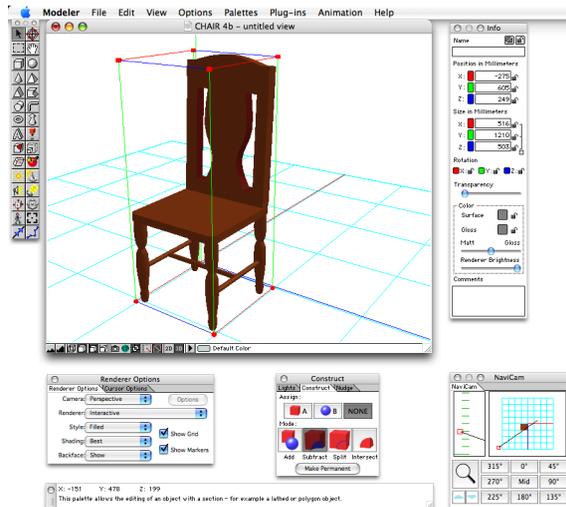
Turn off Snapping using the shortcut Control + Space (this may need to be checked in the Cursor Options palette) and select one of the handles at the end of the new back rest crown. Hold down shift and drag this back towards the back rest along the Z axis. Stop when the back rest is 40 mm thick. With the crown still selected open the Section palette and duplicate the 2 top handles. Make the duplications rest 60 mm in towards the centre from their originals.



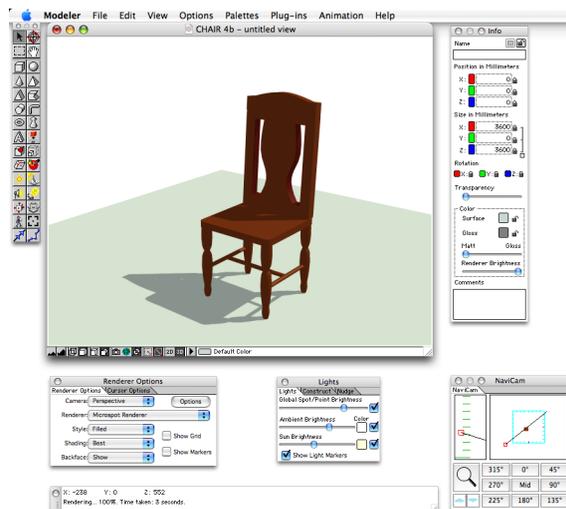
The top left and right corner originals and the duplicates must have a height of 40 mm. Select the middle handle and change it to a bezier and change its height to 80 mm. Now make the two duplication handles both beziers and make their handle handles horizontal and extend them out to stop just before the outer handles, as long as they are both equal this can be left to personal choice. Apply the same to the middle handle, extending its handles out to give a gentle natural looking curve. Close the Section palette and return to the Home view.



Select all the components using the shortcut Command + A and group them together by the shortcut Command + G.



Now the model can be colored, textured and rendered. Save the file as chair 4.



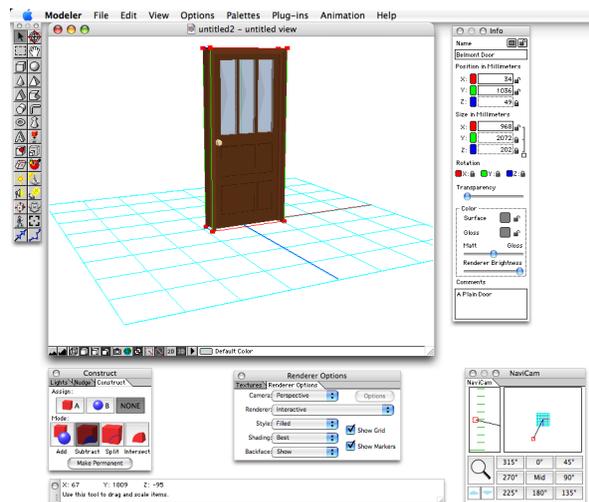
## WINDOWS AND DOORS TUTORIAL

This short tutorial will outline the basic operation to produce a door and a window that can be used in conjunction with Microspot Interiors.

Modeling a window or door is just like modeling anything else in Microspot Modeler, however there are a few steps that must then be taken in order to turn a simple model into a door or window. Once this is achieved, the item can be successfully positioned on a wall and can then be manipulated to satisfy individual criteria.

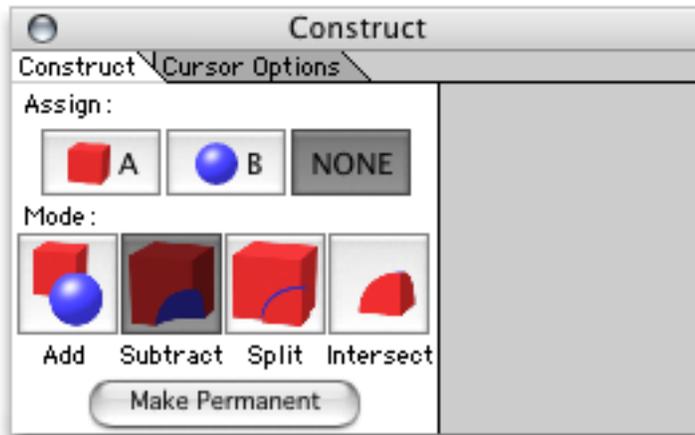
Understanding why a door or window is different from just any other model is easy. When moving the model from Modeler to Interiors, Interiors needs to know that the supplied model is a door or window. It needs to know this as it will need it to position the model correctly, when it is put into a wall. For example, a door needs to be placed at the base of a wall and resized to the wall's thickness. However a window needs to be placed a certain height from the ground, and will be resized to the wall's thickness. Interiors also needs to be told not to draw the wall over the top of the model. All this information is supplied within Modeler, allowing Interiors to easily add the model from a library or file.

Firstly start by completing or opening a model of a window or a door. Change view to the Home view (Command + 3) to have a clear view of the model.

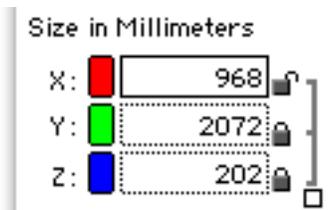


For the purpose of visual aid a door will be used to highlight the process, but equally a window can be used. For the model that has been produced make sure that everything is present and in the right position, i.e. window panes, door handles, etc.

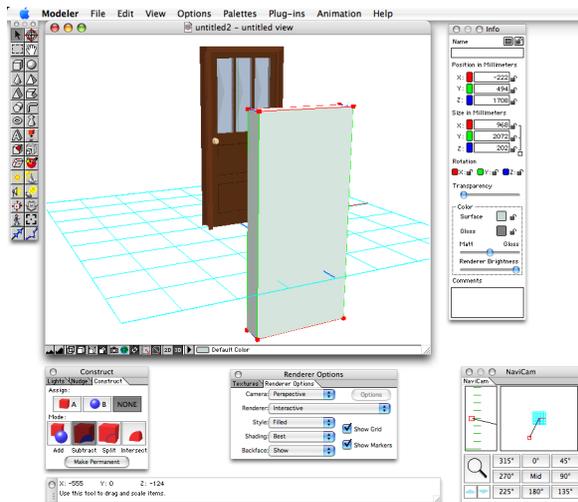
Now group the door and make it a primitive if not already. Now open the Construct palette from the Palettes menu and with the new door selected, check that it has no assignment. During the modeling of the door if some construction or intersections have been performed then a loose assign A or B may still be attached. When objects are grouped the assignments are lost, but if one object has an assigned value and the other does not, an A or B can still be assigned. It is always a good idea to check.



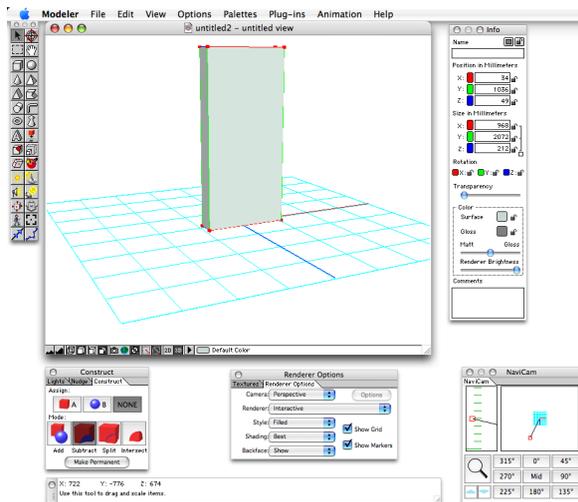
At this point open the Info palette and with the door still selected make a note of the dimensions of the door, these will be needed shortly.



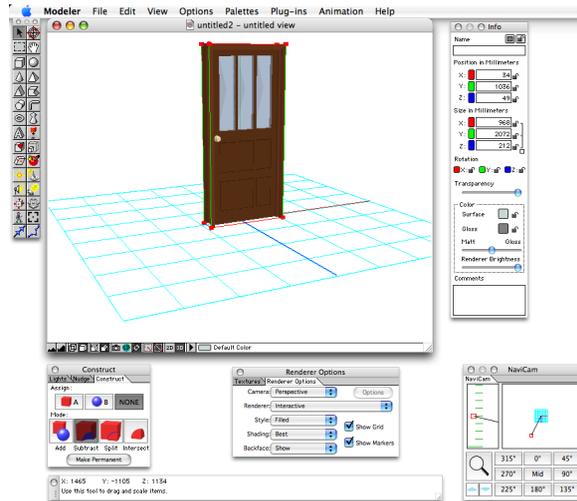
Select the Cube tool from the Tools menu and draw out a simple rectangle on the grid a short distance from the door. Once this is drawn re-enter the Info palette and change its dimension to be that of the door (which were noted down earlier). This new block will be used to make a precise cut out of the door into which it can fit and be placed in the wall. Check the width of the original door and in the Info palette make the new block just 10 mm thicker.



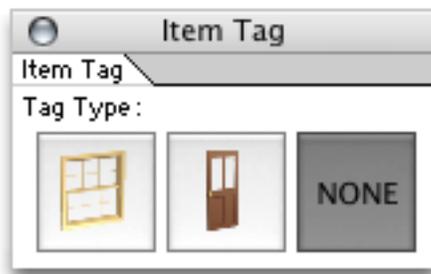
This will ensure that the handles and everything are caught by the cut out block. It is important to note at this stage that no matter how wide the walls are made this new block (the cut out block) will always resize itself (in terms of width) to accommodate this. This is due to two physical properties that will be changed to let the program understand that this is a door, as previously discussed. Now go back and select the original door and note down its position in terms of X, Y and Z. Now select the block that has just been made and in the Info palette enter the previously noted positions for the door.



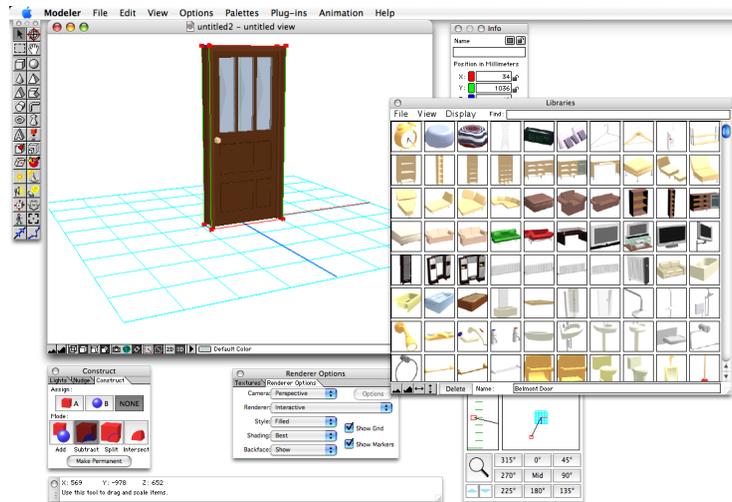
This is just a quick method of getting both the door and cut out block in exactly the same position. The block could easily be moved and position with the aid of Snapping but this way is much quicker. Once this new block is in position the door should no longer be visible. Select the block (if not already selected) and open the Construct palette. Assign this new block B and in the Info palette move the Transparency slider all the way to the right so it is only visible by its bounding box.



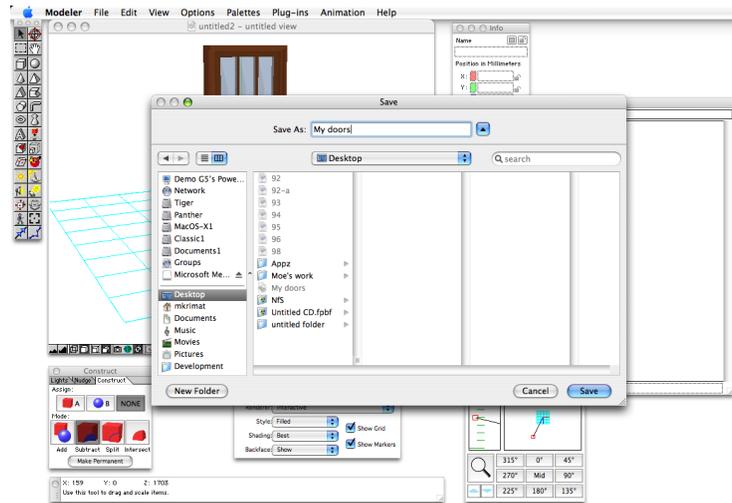
Now the door will be visible again. Note that if no door was present then only a cut out box would exist as an object. Even though it is colorless if saved in a library and then reopened in Microspot Interiors it could be used as an open door way. Now drag a box over the door to select both the cut out and the door. Once both are selected group them together using Group under the Edit menu or via the shortcut Command + G. With the new group still selected from the Options menu select Primitive. Note that the entire group is now classified as an assign B. Now from the Palettes menu open the Item tag palette.



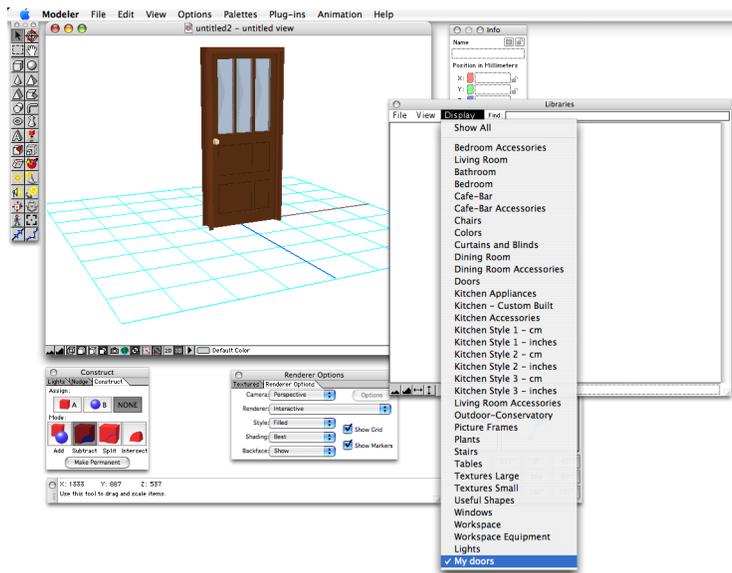
This palette simply assigns a value for either a door or a window so that the program knows what to do when one is placed in a wall. Just as with the Construct palette this works by having an object or group highlighted and then selecting either one, or it can be unassigned by selecting None. With the door selected click the Door button on the palette. Similarly if it is a window then assign it Window. Now the door is tagged. It has had a value assigned to it so that no matter what wall it is dragged on to, it will act accordingly. Cutting out the wall placing the door equally in the space or frame and allowing only movement along the floor and proportional resizing. As with a window once this tag is placed then the window can be placed onto any wall and will be able to move around on that wall and can be resized also. For this new door to be used in Interiors it must be transferred from Modeler. This is easily done using Libraries that can be filled with any number of models. Open the Libraries plug-in from the Palettes menu.



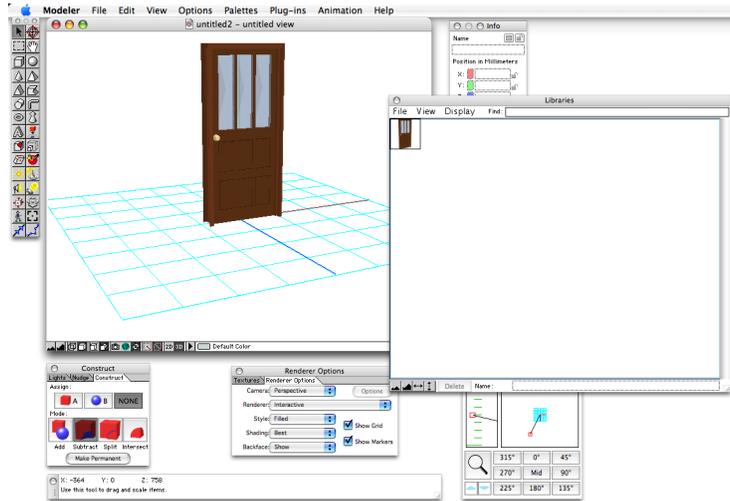
Select File and New. This will bring up a dialogue screen asking for a destination for this new library. Select a suitable place to save this to, like the Home directory or Desktop, and name it something appropriate.



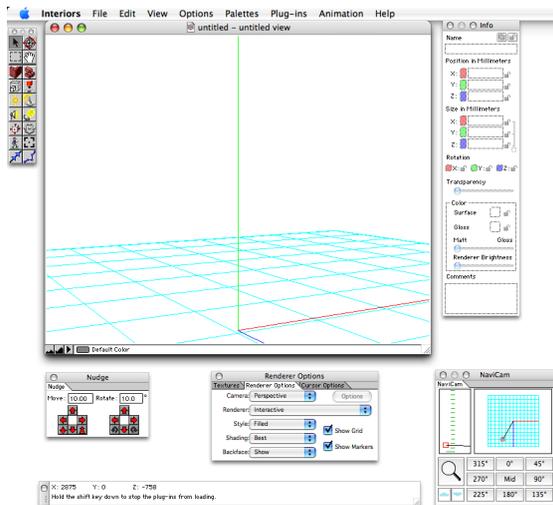
Click OK and this will bring you back to the Libraries palette with a blank library open. Click the display menu and note that the new library just created is at the bottom of this list.



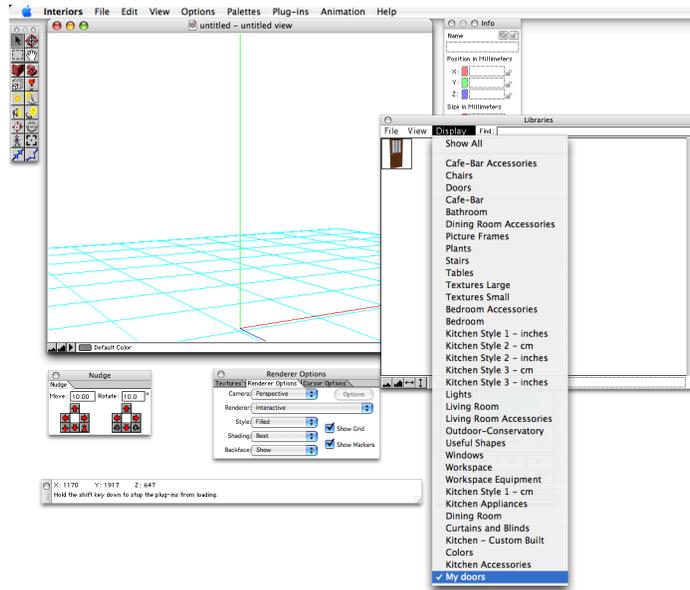
Position the Libraries palette so the modeling window can also be seen. Select the new door and physically drag it into the library. A small icon will appear of this door. This can then be dragged out to make as many doors in the scene as desired. This can be done for any window or door that is produced.



Once the door is in the new library under the file menu in the Libraries palette select Close. This can be opened again at any time but the same library can not be shared by two applications. Meaning that if Microspot Modeler and Microspot Interiors are open at the same time they can not both access newly created libraries simultaneously. Either close Modeler (making sure the new door is saved before doing so or hide the application by either the Modeler menu and selecting Hide or by the shortcut Command + H). Now open Microspot Interiors.

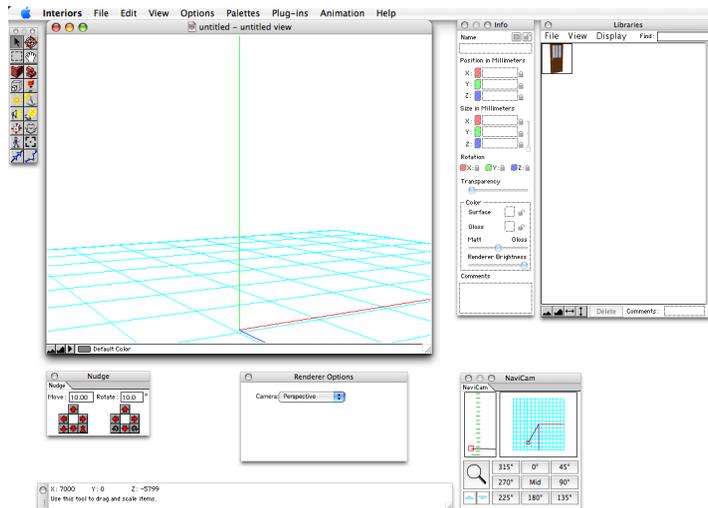


Either open a previously modeled room to place the door into or simply use the new document created to test this door. For this tutorial two walls will be drawn to test the door. Firstly the newly created library must be opened. From the Palettes menu select the Libraries palette. In the Libraries palette select Open from the File menu. Now select the library from the location it was saved in and click OK. Now the library is open, from the Display menu select this new library containing the door from the bottom of the list.

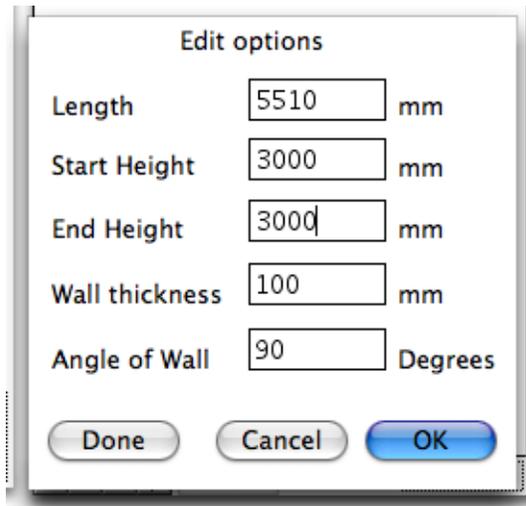


Now go back to the modeling window and from the Tools menu select the Wall tool.

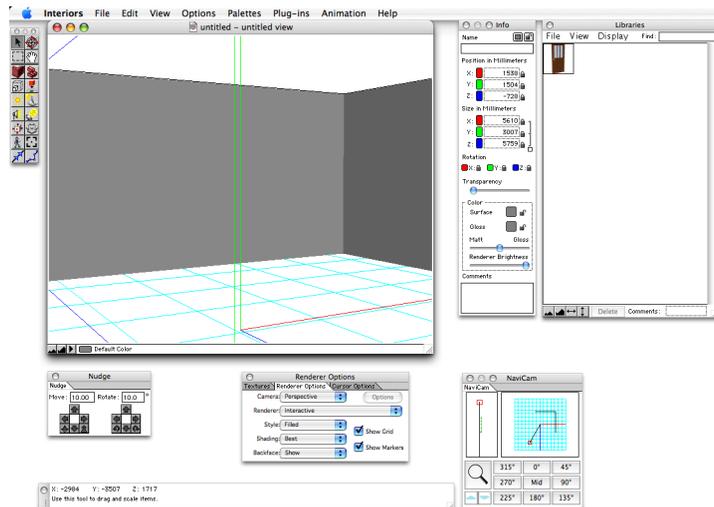
This will instantly change to the top view. Position the cursor on the bottom right hand side of the grid and click to start a wall. Move the cursor up and click.



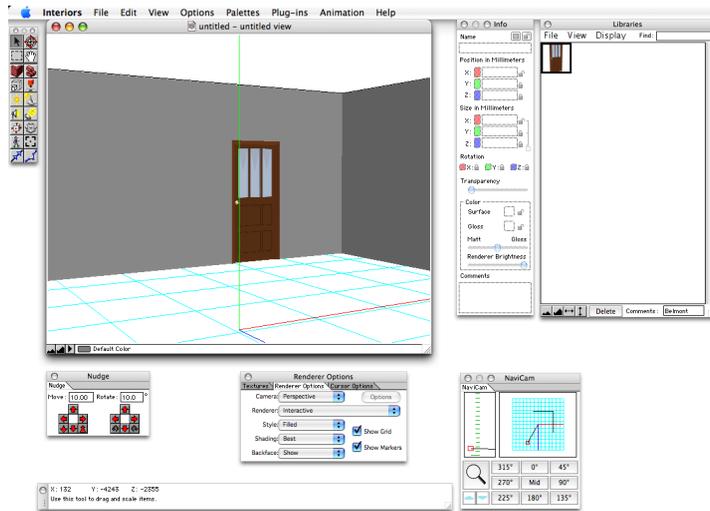
This will bring up the wall options screen, the length of the walls is not important but make the width 100 mm and the wall height 3000 mm.



Click OK and move to the left and click again, this will bring up the options window for the last time. Click Done to finish the wall as the setting will be preserved from the previous instance. The view will now change back to the Home view with a corner wall in-front of the camera. Use the Navicam to zoom out and gain a suitable viewing position.



Drag the new door from the library onto either wall surface and the door will appear positioned on the grid in the wall.



# ANIMATION TUTORIAL

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## Introduction

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The following tutorial will show you how to operate the basic functions in Microsoft Modeler to create Animations. In this tutorial you will learn how to animate movement of objects, camera angles and lights. You will also learn how to export your animation into a QuickTime movie to view or share. We will create an animation of a barbeque opening to reveal a glowing heat underneath the grill as the sun sets over the scenery.

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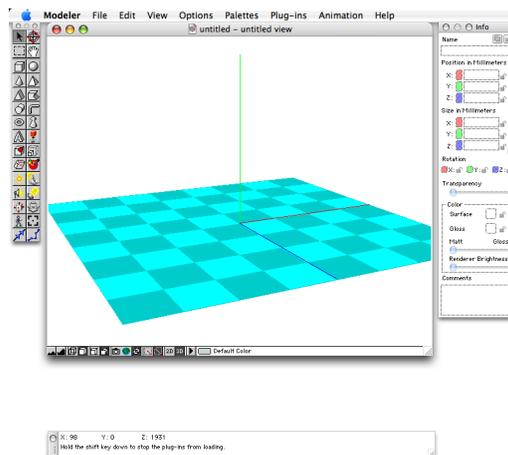
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## Creating the Scenery

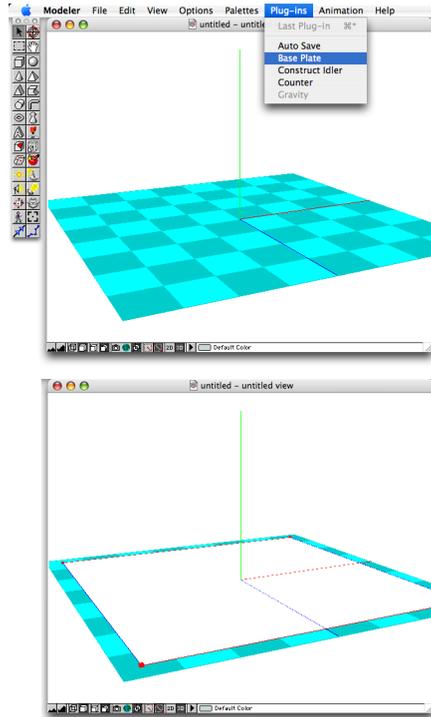
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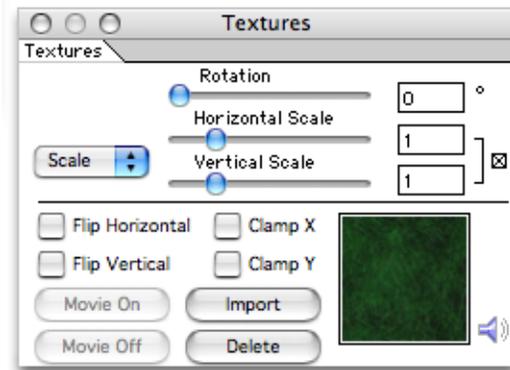
Double-click on the Modeler icon to launch this application. A new untitled document will appear along with the Tools, Help and Info palette:



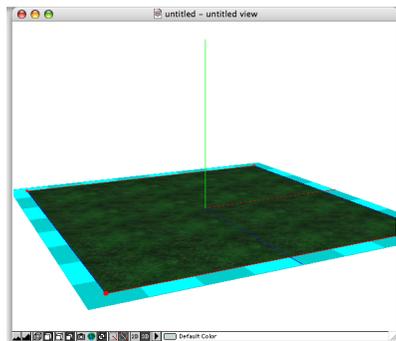
Begin by changing the grid size to 8 grid squares at 500mm each. We will first create the scene where the barbecue animation will take place. Select Base Plate from the Plug-ins menu on the Menu Bar:



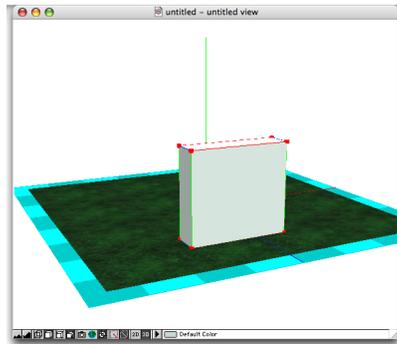
You have now inserted a solid floor for the scene which we can add a texture or colour to from the Libraries palette. From the Libraries palette, open the Tutorial library. Drag the Grass texture and drop it on the Base Plate you have recently added. The texture will appear to be distorted as it is stretched across the plate, we can adjust texture by opening the Texture palette from the Palettes menu, on the Menu bar.



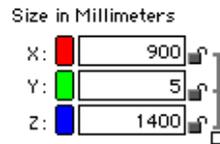
Making sure the Horizontal and Vertical sliders are both locked (symbolised by a cross on the right), drag one of the sliders up to approximately 4. For a more accurate method, you can type 4 inside either of the Horizontal or Vertical value field, or hold the shift key while dragging the slider.



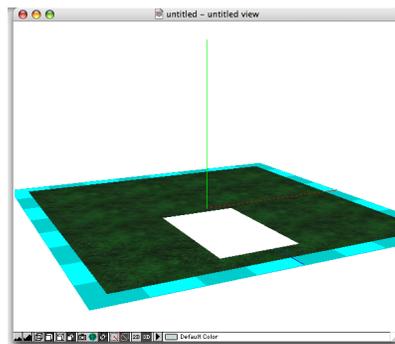
Once you are satisfied with the size of the texture on the base plate, we can now create a small path where the barbeque will sit. By selecting the Cube Tool from the Tools palette, create a rectangular object by initially clicking (and holding) on top of the base plate and drag upwards.



Edit the dimensions of the object using the Info palette to the following sizes:



Click on the Gravity tool and then on the object to ensure it is directly on top of the base plate:



We can now lock the Y-position of the cube, to be able to reposition it without accidentally lifting it off the ground. Click on the Y-position padlock on the Info palette so that the padlock symbol becomes locked:

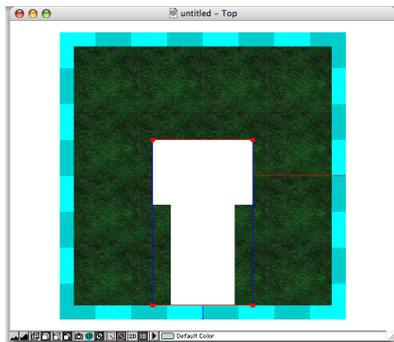
### Position in Millimeters

X:  

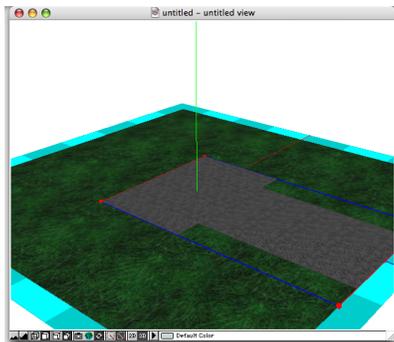
Y:  

Z:  

Select Top in Change View in the View menu. Click on the shape then select duplicate from the Edit menu. Using the nudge tool rotate the duplicated shape 90° and position the two objects to create a 'T' shaped area similar to the screen shot below.



When you are satisfied with the positions of the objects, select both and chose group from the Edit menu. You can now drag and drop the Outdoor Tarmac texture from the Tutorial library onto the group. And set a scale value of 4.0 on the texture palette to make the texture look more realistic.



Before we continue any further with the tutorial, it's a good idea to save the document with the title 'BBQ animation'.

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## Animation Palettes

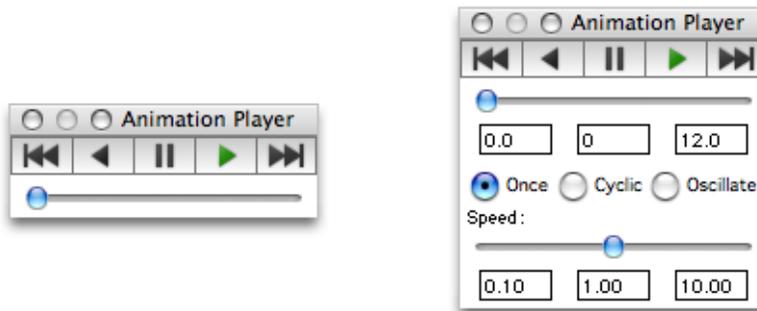
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Open the following palettes from the Palettes menu:

### Animation Player palette

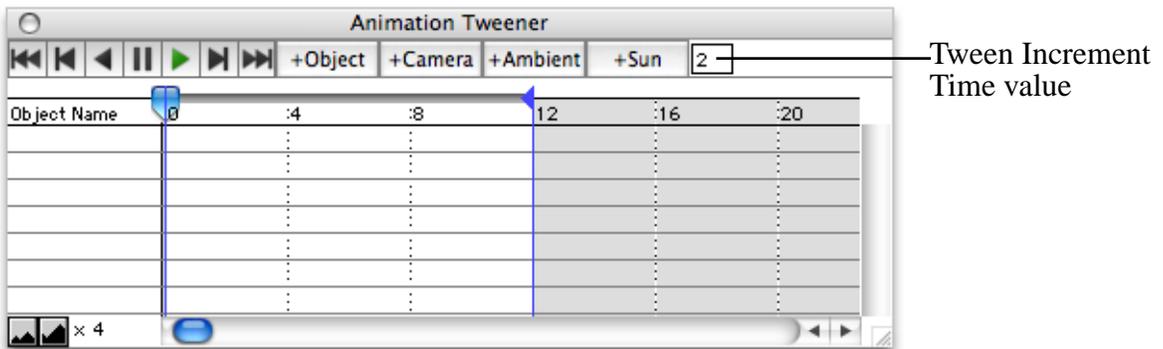
This palette enables you to control the animation playing speed as well as set the animation playtime. You can also choose to set the animation to play in cyclic mode or in oscillate mode.



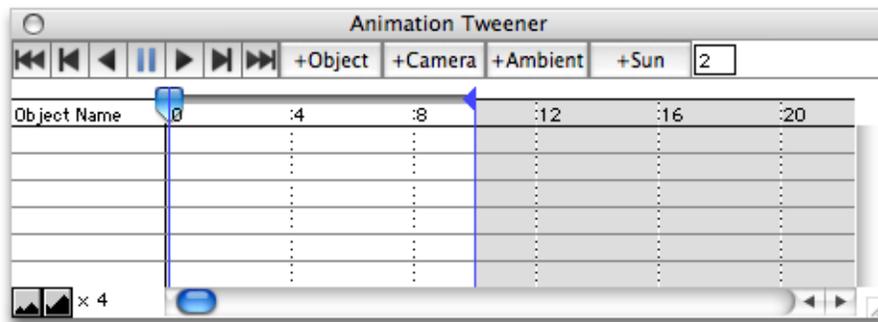
Note: To fully open all the options on this palette, you need to click on the green button to maximise the palette.

### Animation Tweener palette

The Animation Tweener palette displays all added objects, the camera, and light animations that have been added to a document. The Tween Increment Time value determines the time difference between each tween added, this may be varied for each animation.



The Animation Tweener palette displays a time line signified by starting and ending arrowheads. Click and drag the End arrowhead to the 10 seconds time mark. This has set the animation time to run for 10 seconds:

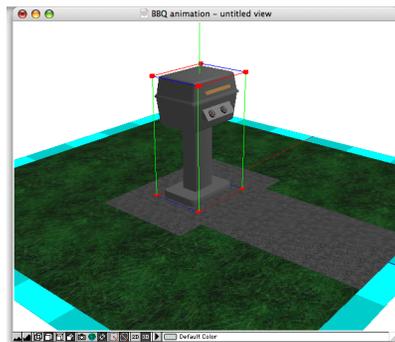


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## u Animating Objects

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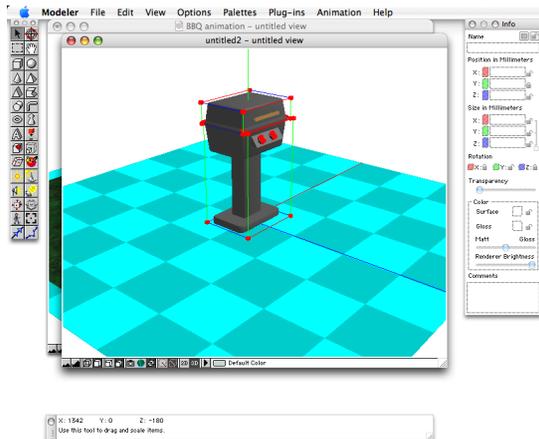
With the Library palette open, bring up the Tutorial library and select the Barbeque. Drag and drop the Barbeque onto the pavement created in the previous chapter.



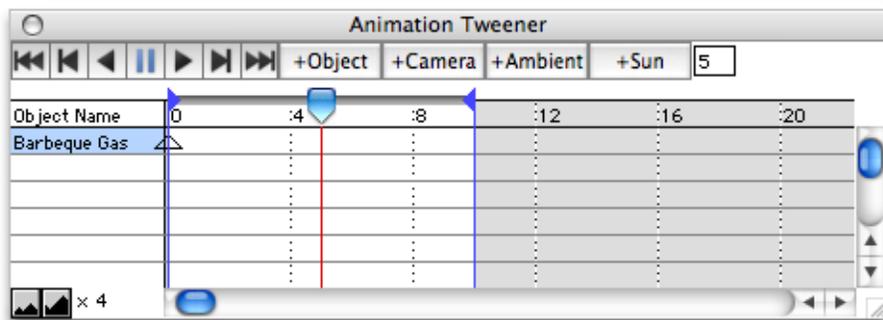
Our aim is to animate the lid of the barbeque opening, and have point lights animated to glow a brighter red, as the control knobs of the barbeque turn higher. In order to animate several different parts of an object separately we need to break down the barbeque into its components.

## Animating the Barbeque Lid

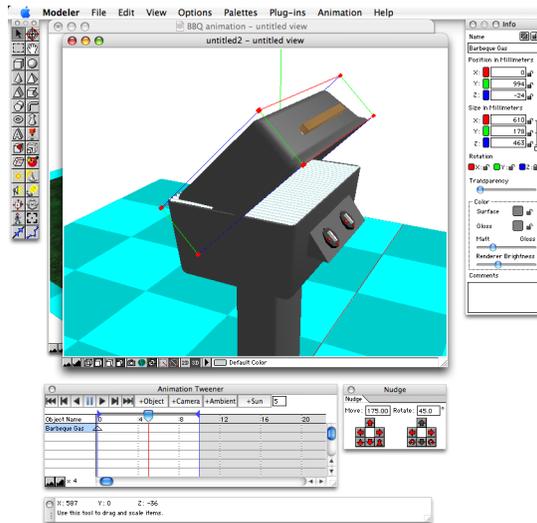
By Option double clicking on the Barbeque or by using the Menu commands (Options - Dismantleable and then Edit Group), a new sub document window will open with the barbeque broken down into its components.



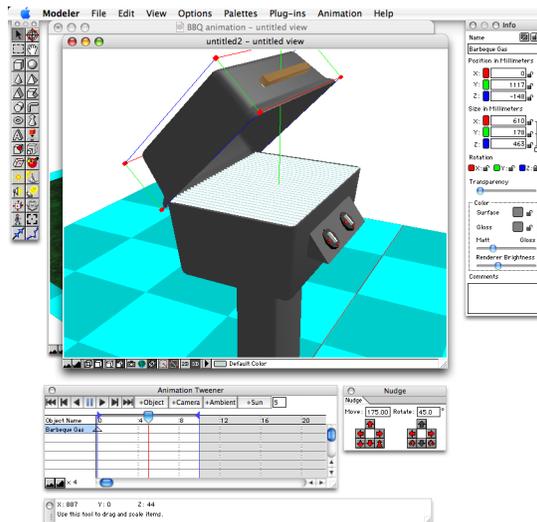
Click anywhere on the grid to be able to select the Barbeque lid and go to the Animation Tweener palette and type 5 into the Tween Increment Time field. Now click once on +object button on the Animation Tweener palette, you will notice the lid's original position has now been recorded into the timeline:



We must now record the position of the lid at its final open position. Change to the Right View, and using the Nudge palette, rotate the lid 45° counter clockwise.

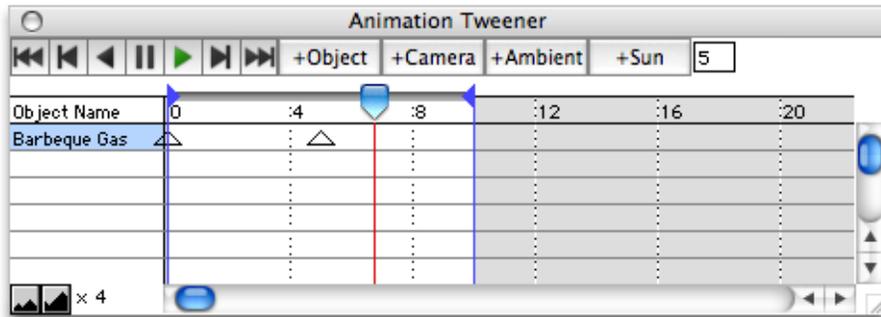


Now using the Nudge Palette again, nudge the lid upward 175, the lid should now look as though it is on a hinge attached to the body of the barbecue:



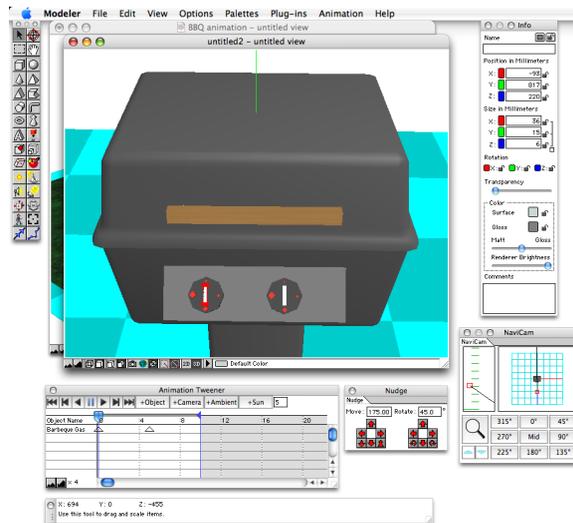
Click once again on the +object button, you will notice its final position is now recorded at the 5 seconds mark. This means that from the first until the second tween points, the lid will be animated opening.

To see the animation created so far click the Rewind button and then the Play Forward button on the Animation Tweener or the Animation Player palette:



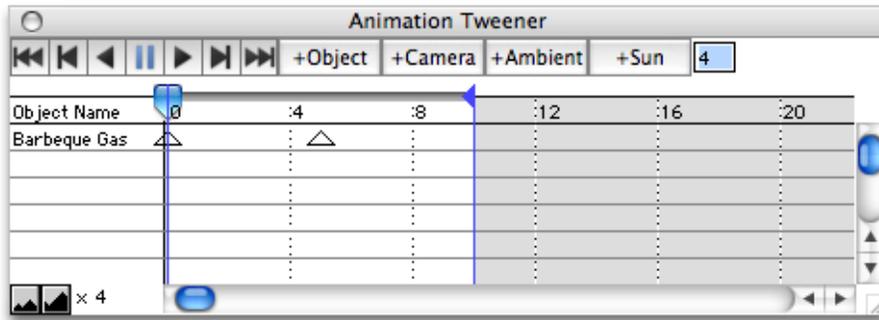
### Animating the Barbeque Control Knobs

We can now animate the turning of the control knobs in the same time frame as the first animation. After returning to Home View, adjust the NaviCam so you have a close up of the control knobs on the front of the barbeque:

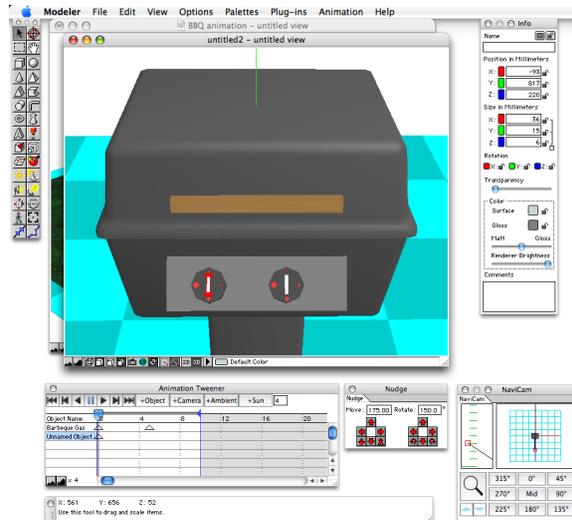


Before we begin adding the objects positions into the Animation Tweener, reset the animation to the start. We will have the control knobs start to turn at the beginning of the animation, you can however have the animation of a particular object start and end at any specific time with the use of the Animation Tweener.

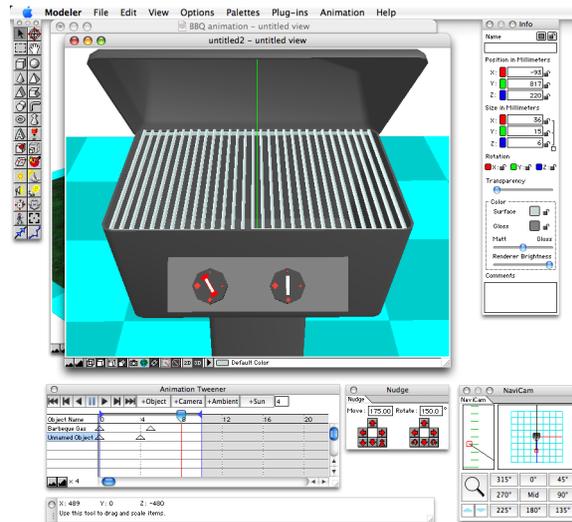
This time we will have the animation of the control knobs run for the first 4 seconds:



Select one of the control knobs and click once on the +object button. This will record the first position of the knob at 0 seconds, and the timeline should now be at the 4 second mark:



We can now indicate the final position we want the knob to turn to at the 4 second mark. With the same knob selected use the nudge tool to rotate it 150° clockwise. Once the knob appears to be turned towards a higher temperature mark, click once again on the +object button.



Repeat the same process to create an animation for the second knob, remember to rewind the animation back to 0 seconds before recording the first position of the second knob.

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## u Animating Lights

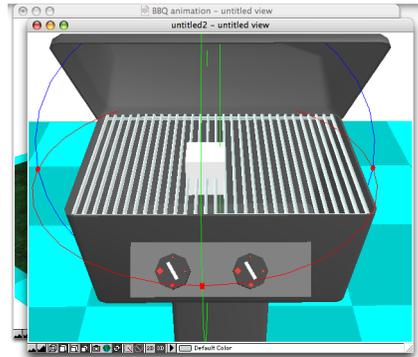
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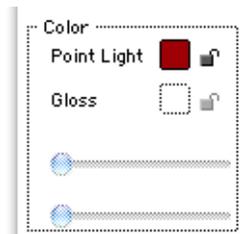
### Animating Point Lights

To create a glowing effect of the heat underneath the grill we need to insert point lights and position them under the grill of the barbecue.

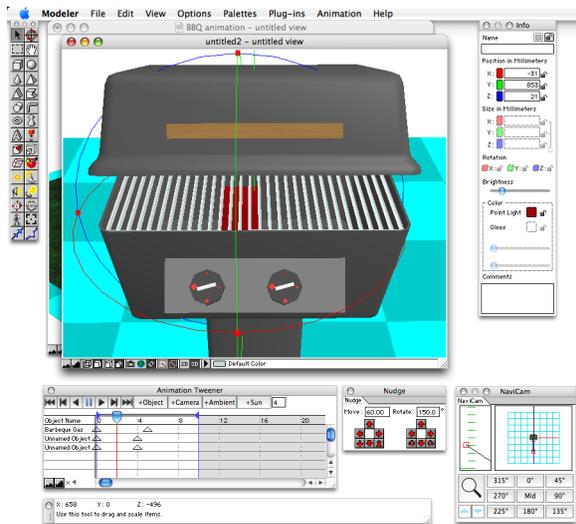
Select the Point light tool from the Tools palette and forward the animation time on the Animation Tweener or Animation Player palette until the barbeque lid is open and click on top of the grill to place the point light:



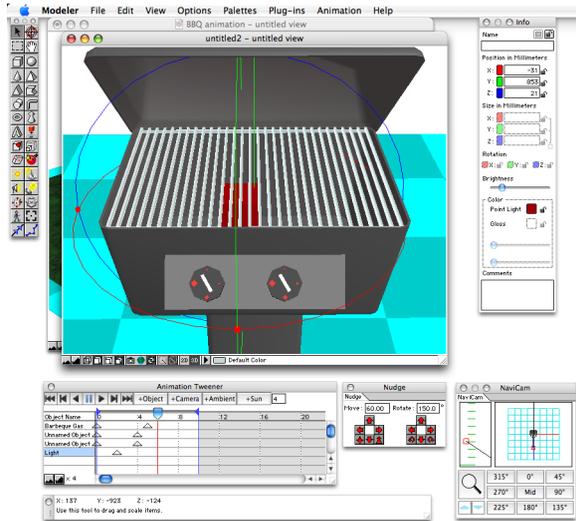
Before we correctly position the point light, change the colour of the light, using the Info palette, to a red:



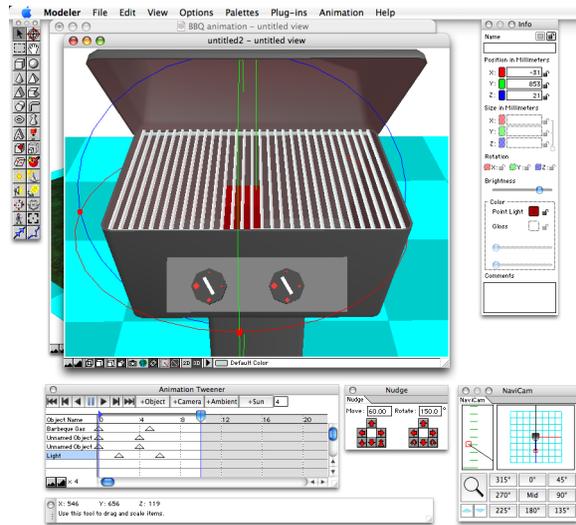
Reset the Animation timer to 2 seconds and nudge the point light, downwards 60mm, so that it is hidden underneath the grill of the barbeque. In this case, rather than animating the position of the light, we will animate the brightness of the light, as the control knobs on the barbeque turn. To begin with we will have the light with minimum brightness:



With the point light still selected, click on +object button to record its initial brightness.



The time line should now be at 6 seconds, increase the brightness of the point light and click once again on the +object button.



You have now created all three animations involving the barbeque. Now close the sub document window to return to the original window where the barbeque should be standing on the scenery created earlier.

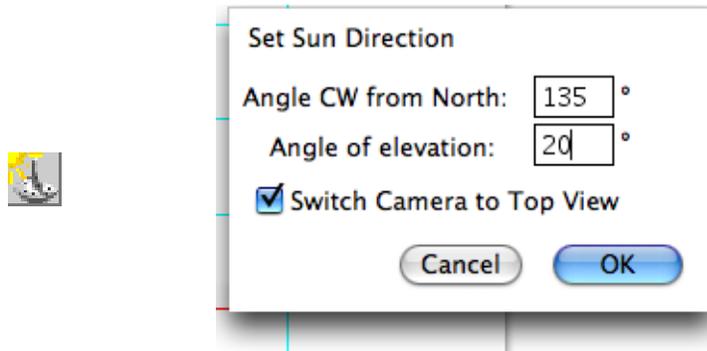
You can view the animation so far by clicking on the Rewind and then the Play Forward button on the Animation Tweener, or Animation Player palette.

Save the document.

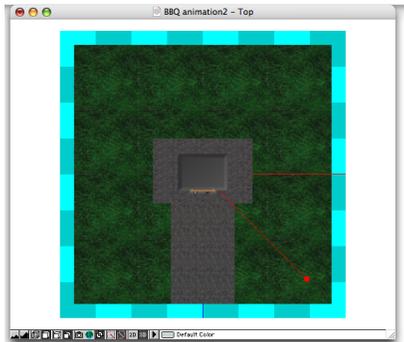
### Animating Sun Light

To create the effect of the sun setting, we can animate the movement of the sun by recording several positions across the grid to move in. The sunlight is always set to point towards the centre of the grid.

Holding the Option key down, click on the Sun Direction tool in the Tools menu:

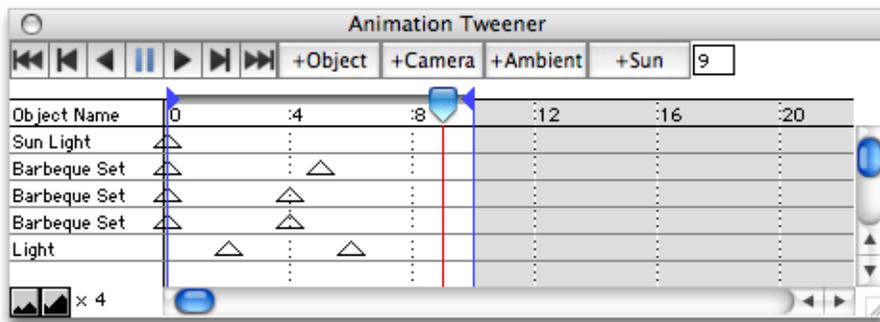
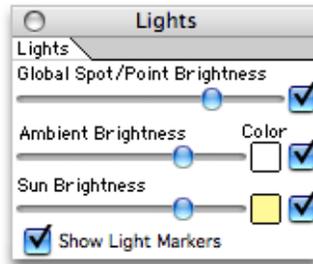


Keep the angle clockwise from North at  $135^\circ$  and change the elevation angle to  $20^\circ$  and press OK. The top view of the grid will now illustrate the position of the sun and its direction.

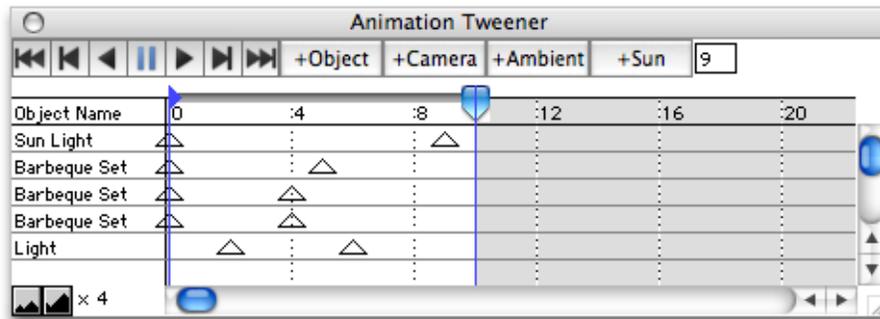


Go back to Home View.

Before clicking on +sun button to record the suns initial position at time 0 seconds, change the Tweener Increment Time value to 9 seconds and change the colour of the sun in the Lights palette to a pale yellow.



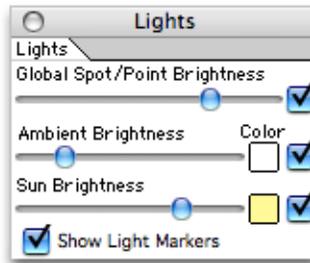
The timeline should now be at 9 seconds, where we can record the final position and angle of the sun that it will move to. Using the Sun Direction tool again, enter 315 for the angle clockwise from North, and an elevation angle of 10°. Change the colour of the sunlight to a dark red before recording the new position of the sun in the Animation Tweener palette at 9 seconds. Now click on +sun button once again:



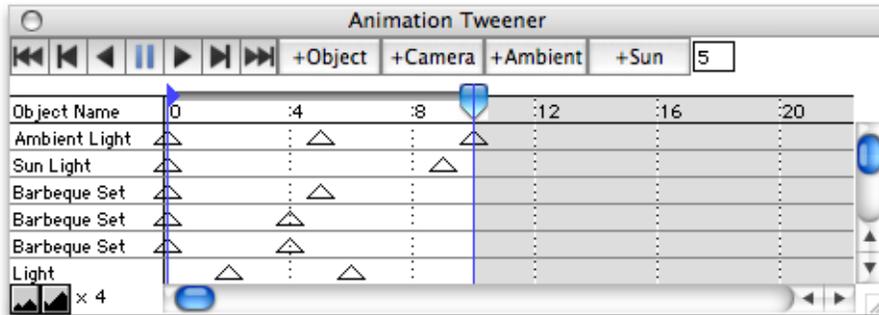
## Animating Ambient Light

To add a more realistic effect to the sunrise and sunset, we can animate the ambient light to start out dark. When the sun is at a 90° elevation the ambient light will increase and then dim again as the angle of the sun drops.

To do this we need to record three different levels ambient brightness using the Lights palette. Rewind the timeline back to 0 seconds and set the Tween Increment Time value to 5, set the ambient light to a low level of brightness:



Click on the +ambient button, once the timeline moves to 5 seconds; increase the ambience brightness and click on +ambient button again. Finally as the timeline moves to 10 seconds, decrease the brightness back to a minimum and click on +ambient button once again. The tweener should now have three tweens for the ambient light animation:



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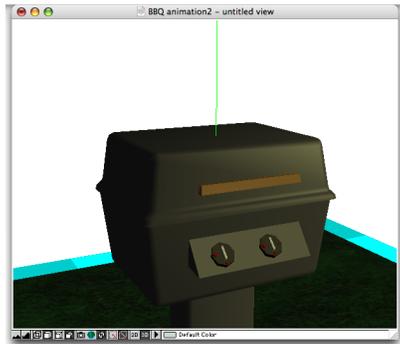
---

## u Animating Camera

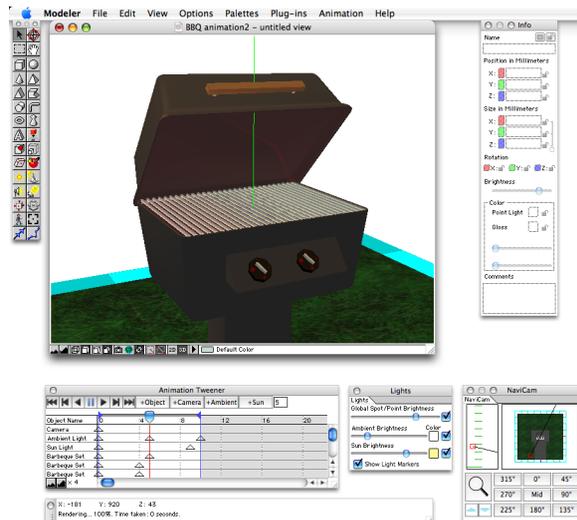
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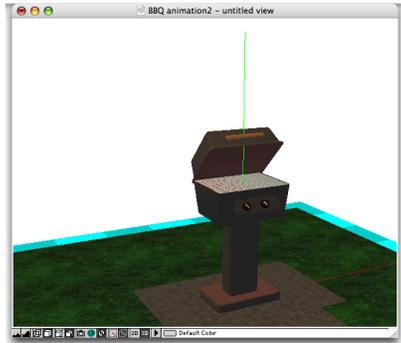
We can now create an animation individually for the camera movement. Rewind the animation to time 0 seconds and adjust the NaviCam so you have a close up of the barbeque grill:



Change the Tween Increment Time to 5, and then click on the +camera button. This will record the first position of the camera view into a tween at time 0 seconds.:



We can now adjust the final position of the camera view using the NaviCam once again:



Click on the +camera button once again. We have now finished creating this barbeque animation scene. You can view the full animation by rewinding the animation back to time 0 seconds and clicking on the Play Forward button.

Save the document.

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## u Exporting a Movie

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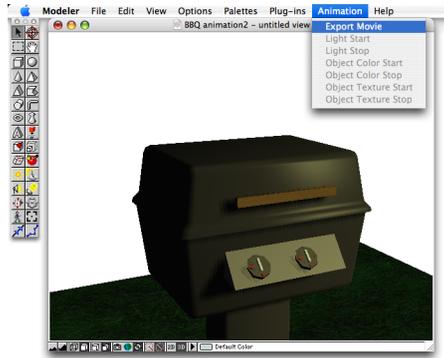
Once you are satisfied with the animation, you can export the animation as a QuickTime movie. The movie will be exported with the current renderer options settings. For higher quality graphics use the Microspot Renderer. The higher the Microspot Renderer settings are set the longer the movie will take to export, in this case we will export using Microspot Preview Renderer.

Note: A large Document window size will affect the size of the movie and time to export. We recommend editing the Window Size in the Options menu to 600x480.

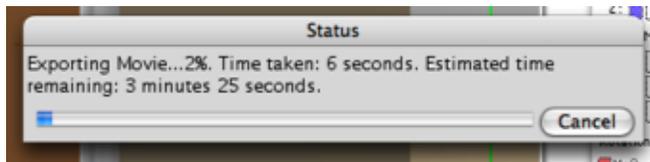
You can now select the Microspot Preview Renderer from the Renderer pop-up menu in the Renderer Options palette:



As the scene begins to render, select Export Movie from the Animation menu:



The standard save dialog will then open for you to allocate where you want the file to be saved and what name it should have. Once you have clicked Save a status window will appear after a few moments to inform you on the expected time remaining to export the movie to file.



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## ∪ **Summary**

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This tutorial has shown you how to use the basic tools to create an animation. A QuickTime video of this animation is available, in the Microspot Modeler package, to compare with your animation. There are many more options and combinations of animations you can use once you have become familiar with the essential animation functions as shown above.

# Chapter 3

## Menus

Details of the application's File, Edit, View, Options, Palettes, Plug-in, Animation and Help menus. Command key shortcuts can be used to perform many menu commands. *See Appendix L — Command Key Table on page L-1 for details.*

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## MODELER MENU

Click on the word Modeler at the top left of the screen to display the Modeler menu. The top three items relate to Modeler:

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### u About Modeler

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Select About Modeler to display the About Modeler dialog. This provides information about the version of the application you are running, registration and serial number details.

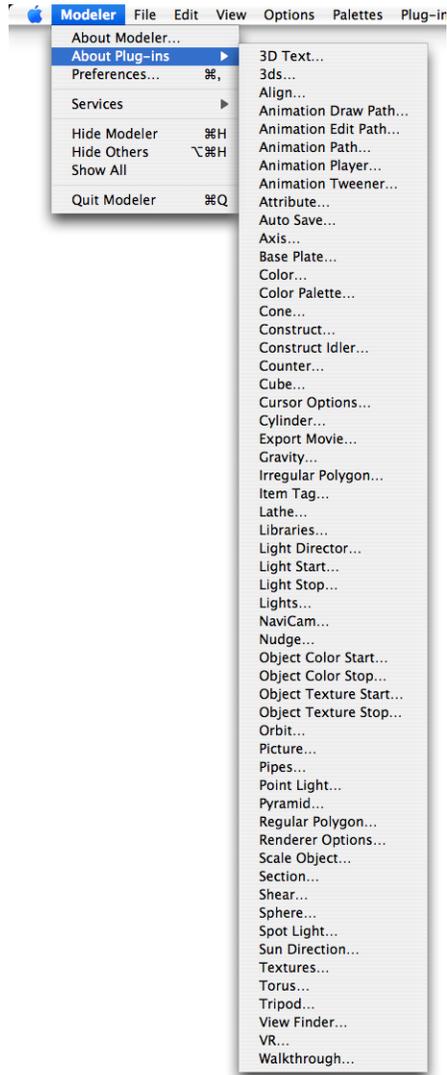


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## u About Plug-ins

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Select About Plug-ins and hold down the mouse button to display the list of the plug-ins that are currently running:



Select a plug-in name from the list to display a dialog containing brief details about the plug-in.

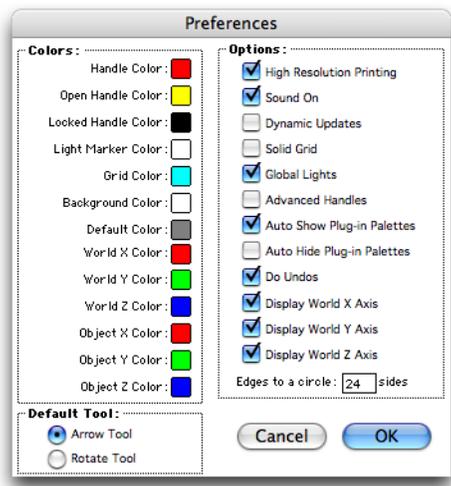


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## Preferences

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Select Preferences to display the Preferences dialog:



## Colors

To change color preferences, click on a color square to display the Color Picker. Select a new color and close the Color Picker.

- **Handle Color:** The color of the handles on the bounding frame of a selected object.
- **Open Handle Color:** The color of the handles on the bounding frame of a group of objects when an Editing or Group window is open, and the color of the active handle when an object is being resized.
- **Locked Handle Color:** The color of the handles on the bounding frame of a locked object.
- **Light Marker Color:** The color of the cone or point marking the position of a Spot/Point Light. If this color is set to white, the color of each light marker will be the same as the color of the light.
- **Grid Color:** The color of the grid.
- **Background Color:** The color displayed in the background of a new file.
- **Default Color:** This is the color that displays in the color block in the window toolbar and is used to draw new objects.
- **World X, Y, Z Color:** The colors that are used to draw the respective axis.
- **Object X,Y,Z Color:** The colors that are used to draw the lines of the bounding frame of an object.

## Default Tool

Choose either the Arrow or Rotate Tool as the default tool.

## Options

- **High Resolution Printing:** Click to print at printer resolution rather than screen resolution.
- **Sound On:** Click to play sounds within the application.
- **Dynamic Updates:** If this option is enabled, all open windows for a particular document will automatically be updated as objects are created or manipulated in the active window and as slider bar controls in palettes are changed. If this option is not enabled, only the active window will be updated as actions are performed. Other open windows will not be updated until the action is complete and when moving slider controls, views will not be updated until the mouse is released.

- **Solid Grid:** Click to specify that the document grid should appear as a solid floor rather than a wire frame grid.
- **Global Lights:** When this check box is enabled, the controls in the Lights palette relate to the document. When it is not enabled, the controls in the Lights palette relate to the active window only.
- **Advanced Handles:** When this option is checked on, the lines of the bounding frame of an object can be clicked on and dragged to resize the object.
- **Auto Show Plug-in Palettes:** When this option is checked on, whenever a plug-in tool is selected in the Tools palette, any plug-in palettes that are associated are opened.
- **Auto Hide Plug-in Palettes:** When this option is checked on, whenever a plug-in tool is selected in the Tools palette, any plug-in palettes currently open are closed. This helps to prevent your work space from becoming too cluttered.
- **Do Undos:** The Do Undos checkbox is used to specify whether or not you wish to be able to use the Undo command. It is checked on by default.
- **Display X, Y, Z World Axis:** These options enable the display of the world axis that are drawn with the origin in the center of the grid.
- **Edges to a Circle:** Enter a value for the number of sides a circle should have. This will affect the appearance of circles, spheres, cylinders, etc. The lower the value, the coarser the curve. The higher the value, the more memory and disk space you will need to display and store the images. The default value is 24.

**Note:** In version 3.6 Dynamic Tessellation has been added so that objects viewed in the foreground will have the full number of edges but items in the background will have progressively less. This enables faster rendering of objects as they become less obvious in the scene.

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## U Quit

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Quits the application and closes all open files and their associated windows. If any open files have been changed without being saved, a dialog will display asking if you wish to save the changes.

## FILE MENU



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### ↳ **New**

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Creates a new, untitled document.

If there is a document called Default Stationery Pad located in the same folder as the application, a copy of this document will be opened as an untitled document (a document is tagged as a stationery pad via the Get Info dialog). This allows you to use the same customized settings for each document.

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### ↳ **Open**

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Opens an existing Modeler file, or any other file created by a 3DMF-compatible application (Such as Microsoft Interiors or Microsoft Modeler).

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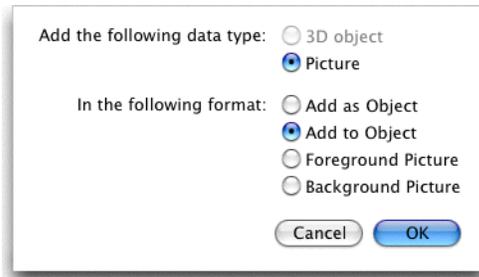
## u Insert

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Select Insert to input 3DMF or picture files into the documents.

When the standard dialog displays, select a file to insert. The Insert Dialog will display:

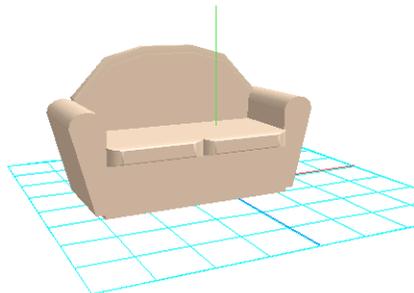


The options available will depend upon the type of file selected, and whether an object was selected when Insert was chosen. The type of file selected will be indicated on the right side of the dialog.

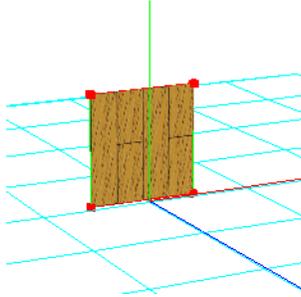
### Add as Object

The selected file appears either in the center of the grid or at the last place the mouse was clicked.

- **3DMF file:** Appears as a 3D object, the orientation of which will depend on the information contained in the 3DMF file.

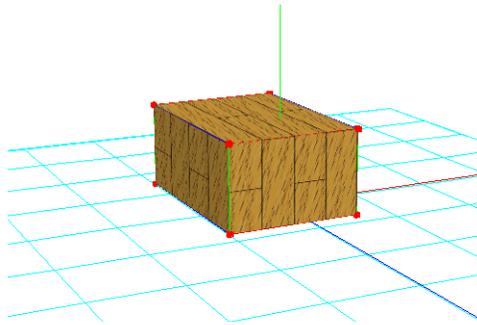


- **Picture file:** The image displays as a rectangle with the same proportions as the original picture. The longest side of the rectangle is equivalent to the length of one side of one grid square and its orientation relates to the grid.



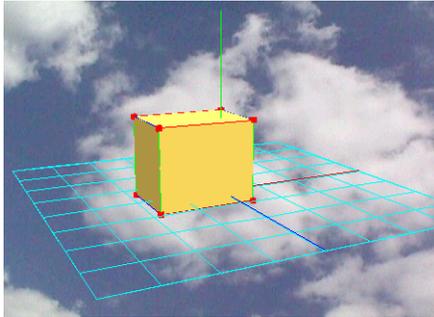
### **Add to Object**

This option is only available if an object was selected in the document before Insert was chosen. The file is converted to a picture (if necessary) and applied to the selected object as a texture. The properties of the selected object will determine how it is applied.



### **Fore/Background Picture**

The file is converted to a picture (if necessary) and placed in the foreground/background where it remains even if the view changes. If the proportions of the image are not the same as the proportions of the window, the image is distorted to fit the window. Its size remains constant relative to the window size.



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## ↳ **Import**

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The Import submenu allows you to access Import options. *See Appendix A — Appendix A on page A-1 for more details.*

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## ↳ **Export**

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The Export submenu allows you to access Export options. *See Appendix B — Appendix B on page B-1 for more details.*

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## ↳ **Close**

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Closes the current document and its associated windows. If the document has not been saved, or if changes have been made to it since it was last saved, an alert will display asking if you want to save the document before closing.

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## ∪ **Save**

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The Save option is only available if a document has never been saved, or if changes have been made to it since it was last saved. Using the Save option saves the document in 3D metafile format. If the document has not been saved before, a dialog will display for you to specify the document name and a location to save it.

To save a document as a stationery pad, give it the name Default Stationery Pad. The document will be automatically tagged as a stationery pad.

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## ∪ **Save As**

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Choose to save a document (in 3D metafile format) under a different name or in a different location. If you try to save a document in the same location as a document of the same name, an alert will ask if you wish to replace the existing file.

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## ∪ **Revert**

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Returns to the last saved version of a document. (This option will only be available if the document has been previously saved.) An alert will display to ask if you are sure you wish to revert.

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## ∪ **Page Setup**

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Select to display the Page Setup dialog. The options available in the Page Setup dialog will depend on the printer driver you have selected in the Printer Setup Utility.

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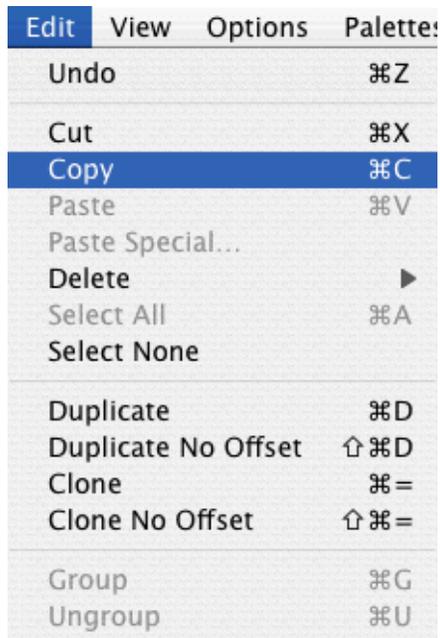
## Print

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Select to display the Print dialog. The options available in the Print dialog will depend on the printer driver you have selected in the Printer Setup Utility.

## EDIT MENU



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## Undo

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Allows you to undo your last object manipulation. Selections, de-selections, mode changes and view changes are not object manipulations, and therefore cannot be undone.

This option will be disabled if no document is open, if an open document has not been changed since it was last saved, or if Do Undos has been turned off in the Preferences dialog. *See Options on page 3-6 for further details.*

After an object manipulation has been undone, the Undo option will change to Redo. Select Redo to perform the action again.

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↳ **Cut**

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Removes a selected item from the current document and places it on the clipboard where it remains until replaced by another item cut or copied from the document.

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↳ **Copy**

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Copies a selected item from the current document and places it on the clipboard where it remains until replaced by another item cut or copied from the document.

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↳ **Paste**

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---

Pastes items into the current file either in the center of the grid or at the last place the mouse was clicked. 3DMF or PIC files can be pasted into Modeler documents. 3DMF data are pasted in as 3D objects and PICT files are pasted in as rectangles.

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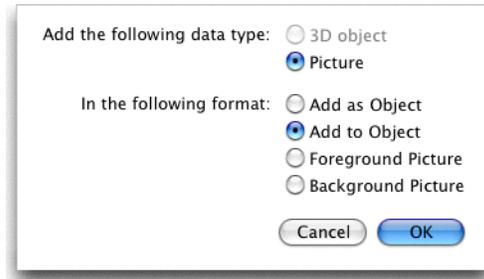
---

## u Paste Special

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Paste Special is only available if you have cut or copied items from an application other than Modeler. When you select Paste Special, the following dialog displays:



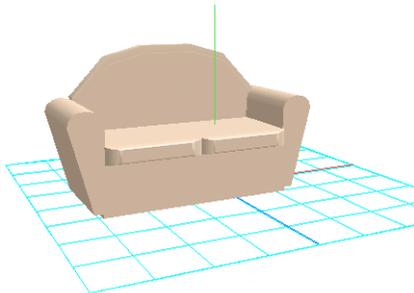
Items cut or copied from other applications can be placed in Modeler documents in a variety of ways, depending on their formats.

The Paste Special options available to you will depend on the type of file selected, and whether an object was selected prior to choosing Paste Special.

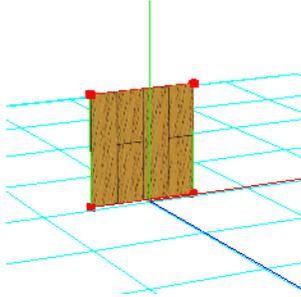
### Add as Object

The file will appear either in the center of the grid or at the last place the mouse was clicked.

- **3D Object:** Appears as a 3DMF, the orientation of which depends on the information contained in the 3D object file.



- **Picture:** The image displays as a rectangle with the same proportions as the original picture. The longest side of the rectangle is equivalent to the length of one side of one grid square, and its orientation relates to the grid.

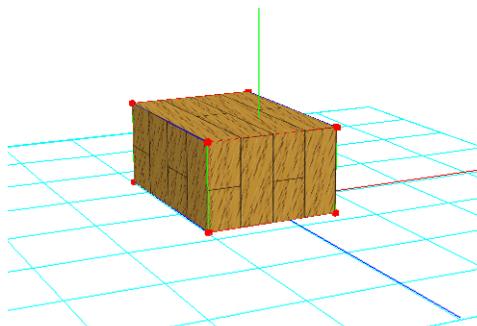


### **Add to Object**

This option is only available if an object was selected in the document prior to choosing Paste Special.

Available for:

- **3D object:** The file is converted to a picture and applied to the selected object as a texture. The properties of the selected object will determine how it is applied.
- **Picture:** The file is applied to the selected object as a texture. The properties of the selected object will determine how it is applied.



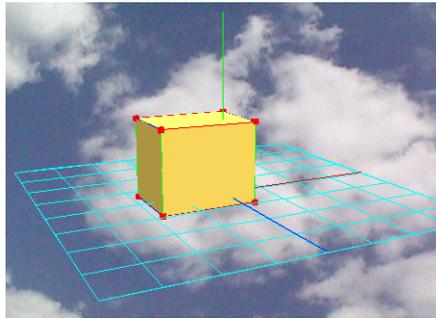
### **Fore/Background Picture**

The file is converted to a picture (if necessary) and displayed in the document foreground/background where it remains even if the view changes. If the proportions of the image are not

the same as the proportions of the window, the image is distorted to fit the window. Its size remains constant, relative to the window size.

Available for:

- 3D object
- Picture



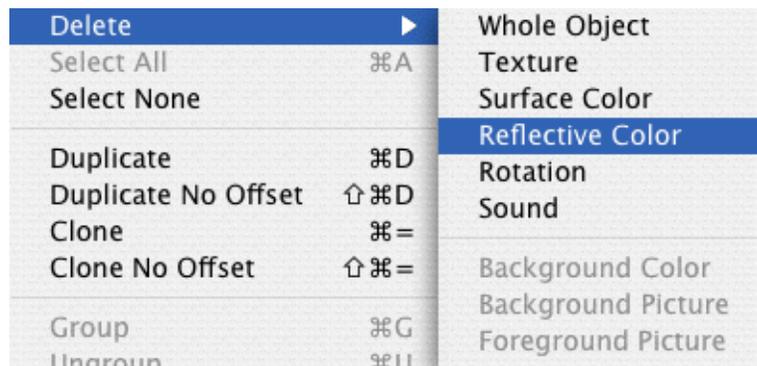
---

---

## Delete

---

---



Use the Delete command to remove items or attributes. The six options in the top part of the popup menu are only available if an item is selected within the document before Delete is chosen.

An entire object can also be deleted from a file by dragging and dropping it into the trash can. The last three options in the Delete menu allow you to remove the document's background color, background picture and foreground picture.

---

---

↳ **Select All**

---

---

Selects all of the objects in the current window.

---

---

↳ **Select None**

---

---

Deselects all of the selected items in the current window.

---

---

↳ **Duplicate and Clone**

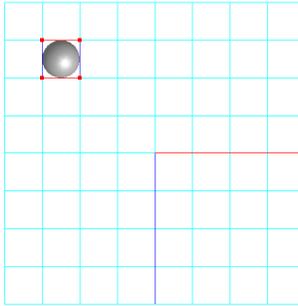
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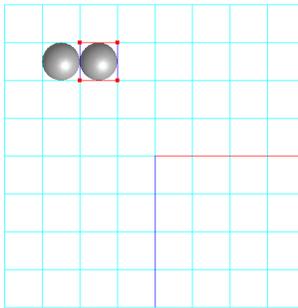
The Duplicate and Clone operations appear identical, however, when an object is duplicated, the duplicate is created as an entirely separate item and is unrelated to the original. When an object is cloned, the clones share the same basic geometry and surface attributes as the original. This means that if the geometry, color, transparency etc. of the original is changed, any clones will also be changed, and if a clone is changed, other clones and the original will be changed. The link relates to the basic geometry and surface attributes only. Changes in size, position and rotation will not be reflected by the clones.

The Clone command can be very useful in certain situations as due to their shared attributes, clones use less memory than duplicates, and changes can be made quickly to several cloned objects at once.

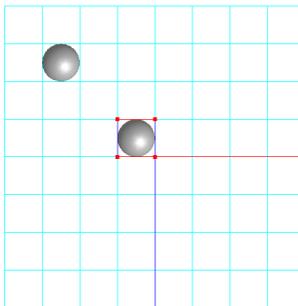
1. Select an item or group of items and choose Duplicate/Clone.



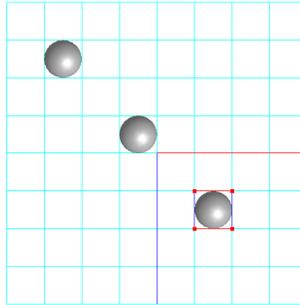
2. A duplicate/clone of the selected item or group of items is placed one grid square to the right of the original:



3. Move the duplicate/clone and choose Duplicate/Clone again.



4. The second duplicate/clone will be positioned in the same position relative to the first duplicate/clone, as the first duplicate/clone was to the original:



Any rotations that are applied after the first duplication are also applied to subsequent duplicated items. This is useful for drawing items like spiral staircases.

Hold down the Shift key when using the Duplicate/Clone option to avoid applying any offset.

---

---

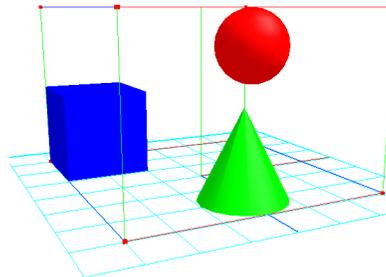
## U Group

---

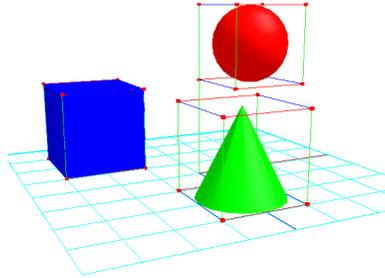
---

Groups two or more objects and allows them to be manipulated as a single object.

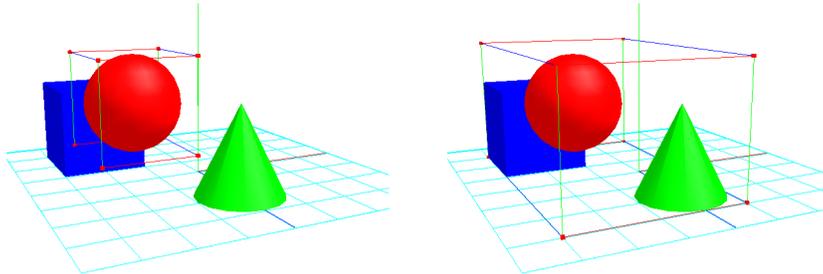
1. Select the desired items, then choose Group. Grouped items will be surrounded by a bounding rectangle or sphere depending on whether the arrow or rotate tool was used to select them:



2. Double-click on the group or choose Edit Group from the Options menu to open a new window containing only the items within the group:



3. Manipulate these items individually, then close the window to view your changes in the original document:



While a Group window is open, the handles of the bounding rectangle or sphere around the original grouped items will change color. This indicates that the objects are selected, and the Group window is open. The color of the handles is set in the Preferences dialog. *See Colors on page 3-6 for further details.*

If the grouped objects have been placed in further groups, the Group window will contain grouped objects. Double-clicking on these groups will open additional windows showing the contents of their respective groups.

If a group of objects is flagged as Primitive, it is not possible to edit the items within the group by double-clicking on the group or choosing Edit Item from the Options menu. The group must be flagged as Dismantleable before the individual items can be edited.

---

---

## U **Ungroup**

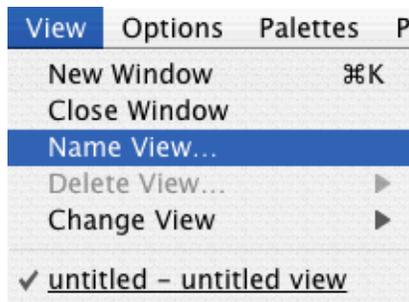
---

---

Un-groups selected items so that members of a group can be selected individually. Note that this option only un-groups one level at a time.

If a group is flagged as Primitive, the Ungroup option will be grayed out in the Edit menu, and will not be selectable. The group must be flagged as Dismantleable before it can be ungrouped.

## VIEW MENU



---

---

## U **New Window**

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---

Opens a new window for the current document. The new window displays the same view as the original window, and is offset from it.

---

---

## ⌘ **Close Window**

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---

Closes the current window. If this is the last open window for a document, the document will also be closed.

---

---

## ⌘ **Name View**

---

---

Saves the current view. Enter a name for the view in the dialog that displays:



You cannot use the names of the standard views included in the program. If you specify a name that has already been used to save a nonstandard view, an alert displays asking if you want to name your view.

---

---

## ⌘ **Delete View**

---

---

Deletes a saved view. This option is only available when new views have been created and saved (standard program views cannot be deleted).

1. Select Delete View and a submenu lists the views that may be deleted:



2. Select the name of the view to delete from the submenu and the view will be deleted.
3. If you do not select a view from the submenu, the delete view dialog displays showing the views that can be deleted
4. Select the view to delete and click OK.

**Note:** If a document window was displaying a view that has now been deleted, the window will remain open as an untitled view.

---

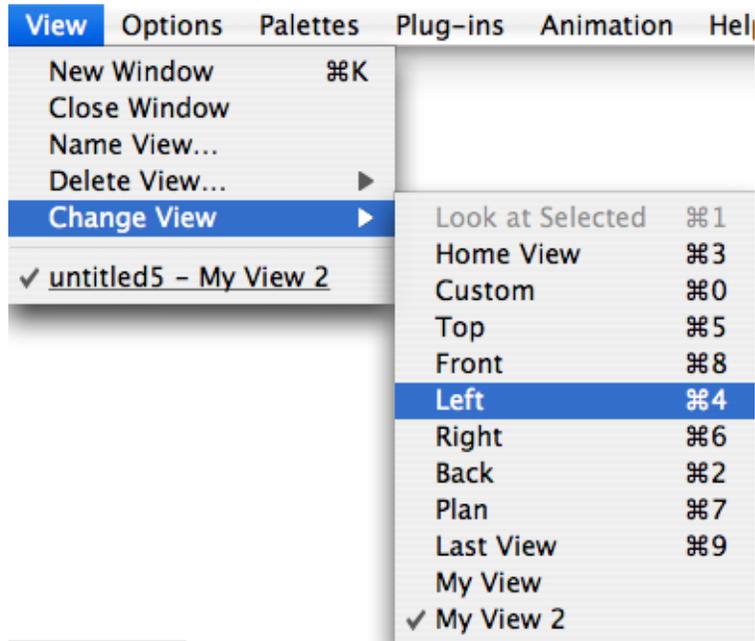
---

## u Change View

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Click on Change View to display a popup menu which lists the available views (including any that you have saved). The view in the current window will be indicated by a check mark. Move the cursor down the list to select the desired view:

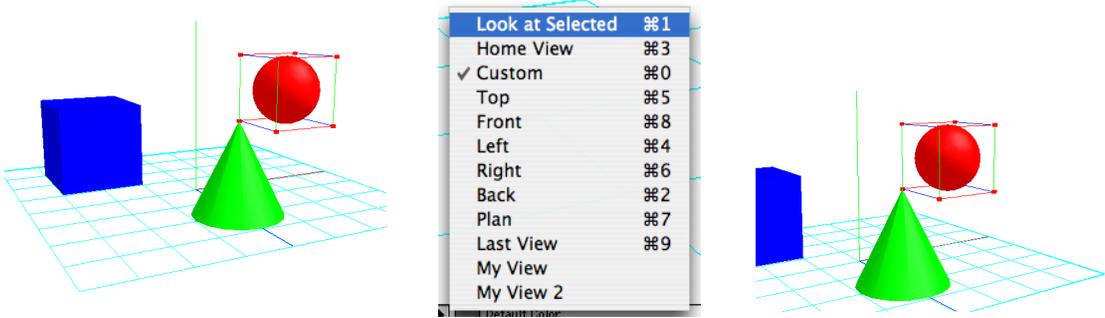


The current window will change to reflect your choice. If a standard view has been changed, hold down the Option key and select the name of the standard view to reset it to the default standard view.

The view displayed can also be changed via the Command key shortcuts shown in the Change View popup menu above, or through the popup menu in the Window controls. *See View on page 4-33 for further details..*

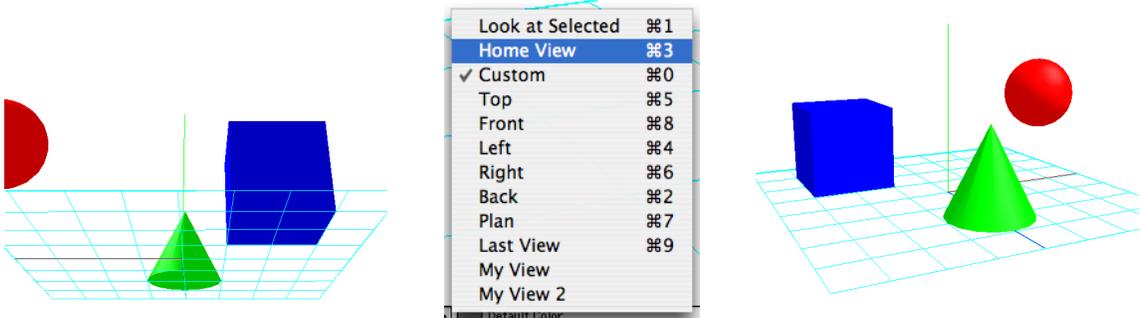
### Look at Selected

Displays a selected object in the center of the window:



### Home View

Returns the camera to its initial position (the view displayed when a new file is opened):

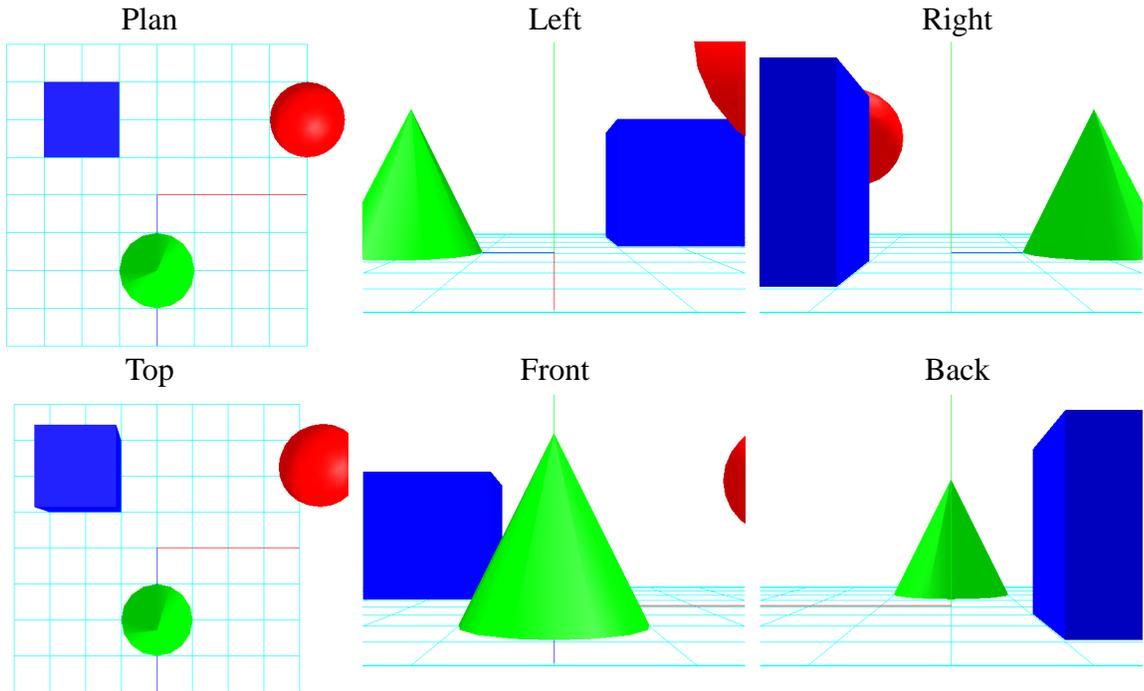


### Custom

Any nonstandard view, or any view that has not been saved is a Custom view.

## Plan, Top, Front, Left, Right and Back

The six standard views that allow you to display the file from the sides, top and a plan view:



## Last View

The view that was displayed in the window immediately prior to the current view.

---

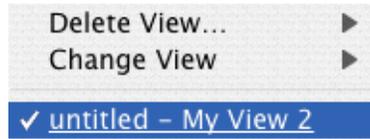
---

## u Open Documents

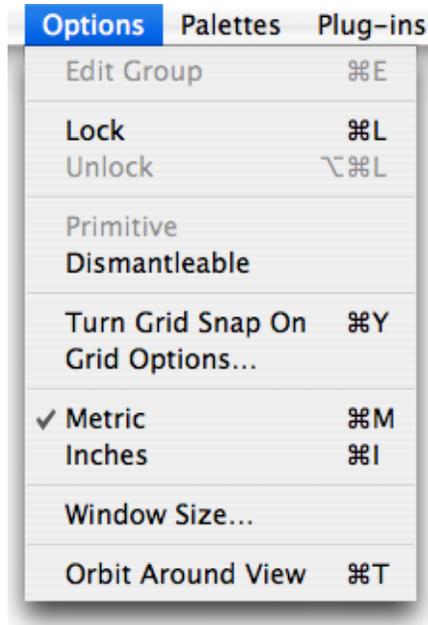
---

---

At the bottom of the view menu is a list of the documents and views that are currently open. The active window has a check mark to the left of its name. Documents that have been changed since they were saved are underlined. Select a document/window name from the list to make it the active window:



## OPTIONS MENU



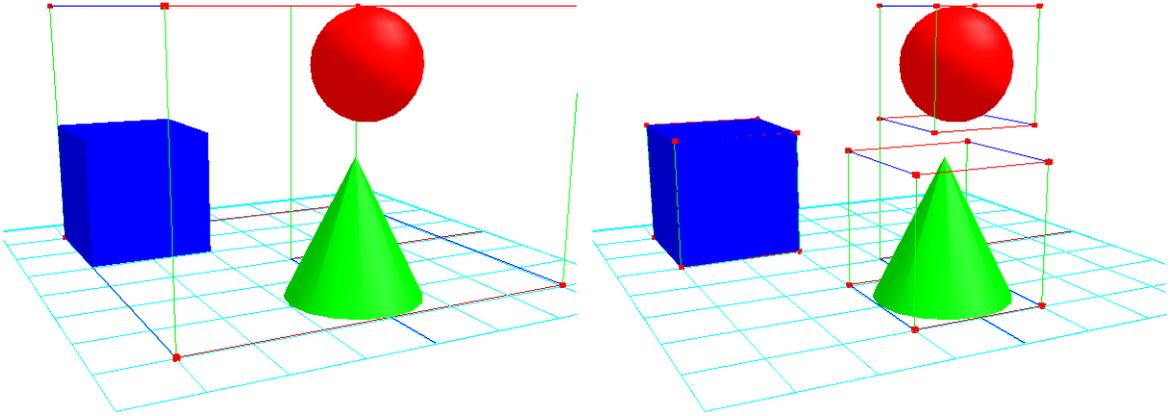
---

### u **Edit Group**

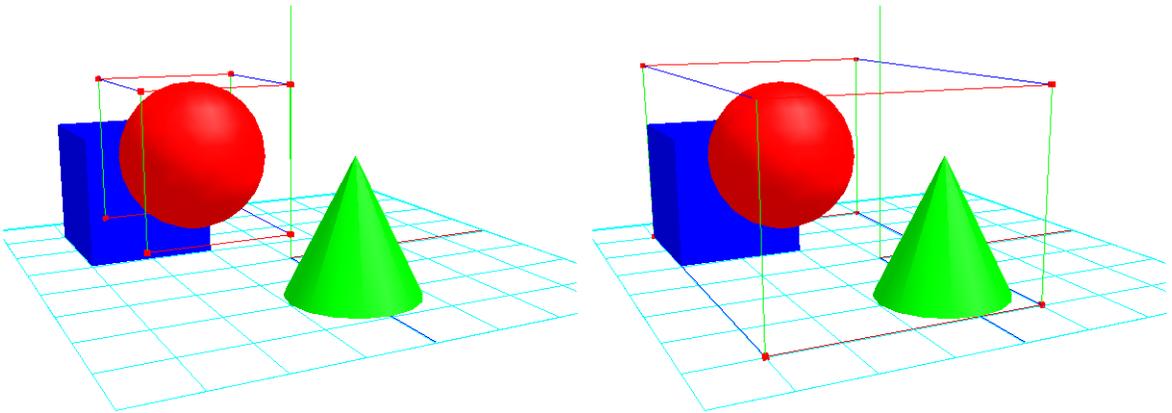
---

Select to edit individual objects within a group.

Double-click on the group, or select the group and choose Edit Group from the Options menu, to display a new window which contains only the items in the group.



The items can now be edited individually. As you edit the individual items, the group remains locked in the original file window, although it will be updated to reflect any changes you make.



Hold down the Option key when closing an editing window, and all editing windows for that file will be closed.

Items and groups can be flagged as Primitive or Dismantleable. If the selected group has been flagged as Primitive, Edit Group will be grayed out and will not be selectable. Flag the group as Dismantleable to edit it.

---

---

## ↳ **Lock**

---

---

Protects a selected object or group from being changed. A locked object can be grouped with other objects, but cannot be moved, resized or changed. If you group a locked object with other objects, the entire group will be locked.

If you place the cursor over a locked object, a padlock displays next to it.

An object or group can also be locked by selecting it and clicking on the large open padlock icon in the top right corner of the Info Palette. *See Lock on page 4-18 for further details.*

---

---

## ↳ **Unlock**

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Select a locked object or group and choose Unlock to remove the protection against changes. An object or group can also be unlocked by selecting it and clicking on the large closed padlock icon in the top right corner of the Info Palette. *See Lock on page 4-18 for further details.*

---

---

## ↳ **Primitive**

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Specifies that an item or group should be treated as a basic geometry. A basic geometry cannot be un-grouped, so individual surfaces or items cannot be edited.

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---

## ↳ **Dismantleable**

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Specify that an item or group can be broken down into its component parts. This will allow you to ungroup an item or items and edit individual components as separate items.

---

---

## u Grid Snap

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Grid Snap applies an invisible grid to the document to which object points can snap. It is enabled by default to make it easier to align objects. The distances between the nodes on this grid are determined by the value entered for the Snapping Grid Distance in the Grid Options dialog.

When Grid Snap is enabled and a new item is drawn, the cursor is positioned on the closest snapping grid intersection. As the object is drawn, the object's handles snap to the snapping grid's intersection points. As an object is resized, the object's handles are positioned on snapping grid intersection points. When an item is moved, its center point will snap to the snapping grid intersection points.

If Grid Snap was disabled when an object was randomly positioned in the file, the item will be moved or resized in increments of the snapping grid distance when Grid Snap is enabled.

Reselect the Grid Snap option in the Options menu to turn this option off.

---

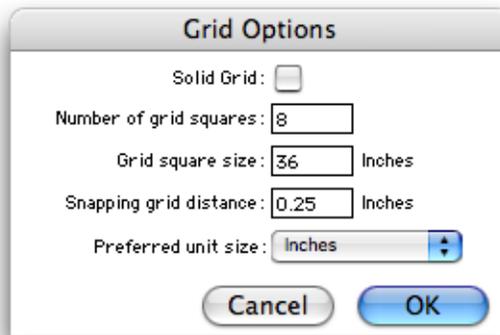
---

## u Grid Options

---

---

Choose Grid Options to display the Grid Options dialog:



- **Solid grid:** When this check box is enabled the documents grid will appear as a solid floor rather than a wire frame.
- **Number of grid squares:** This value relates to the visible grid. Enter a value to specify the number of grid squares that should make up one side of the grid.
- **Grid square size:** This value relates to the visible grid. Enter a value to specify the length of one side of one grid square.
- **Snapping grid distance:** This value defines the invisible snapping grid. Enter a value for the length of one side of one snapping grid square. Typically, you will want to give the snapping grid distance a value that is a fraction or multiple of one document grid square.
- **Preferred unit size:** This option allows you to select a unit size.



The entries in the popup menu are determined by whether metric or inches has been selected in the Options menu as discussed below.

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## u **Metric**

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Select this option to use metric units of measurement. The grid size, position coordinates and dimensions will all be calculated using metric units.

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---

## u **Inches**

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---

Select this option to use inches, feet or yards as the units of measurement. The grid size, position coordinates and dimensions will all be calculated using inches, feet or yards.

---

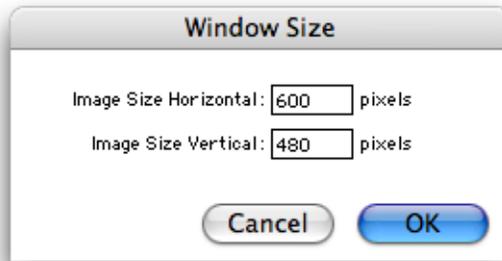
---

## ∪ Window Size

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---

Set the size of the current drawing window in screen dimensions.



**Note:** Pixels are a measure of dot on screen, with a pixel representing a single dot.

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## ∪ Orbit Around View

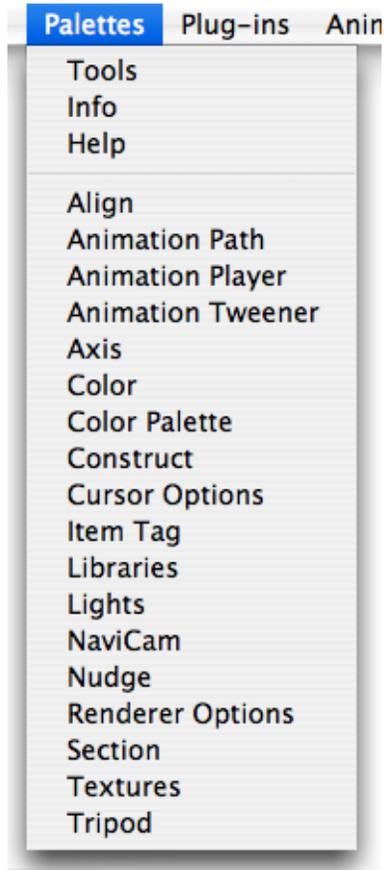
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Select Orbit Around View to rotate the camera around the point at the center of the current view. Click anywhere in the window to stop the rotation.

## PALETTES MENU

Click on Palettes in the application menu bar to display a list of available palettes. Select the palette name from the list to open it.

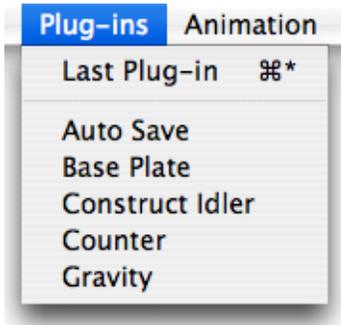


When a palette is currently open, a tick will appear next to it in the palette menu. If it has been docked with another tab, but is currently not visible, a diamond will appear next to it in the menu.

*See Chapter 4 — Tools Palette on page 4-4 for details of the Tools, Info and Help palettes, and Appendix D — Plug-in Palettes on page D-1 for details of plug-in palettes.*

## PLUG-IN MENU

Click on Plug-ins in the application menu bar to display a list of available plug-ins.

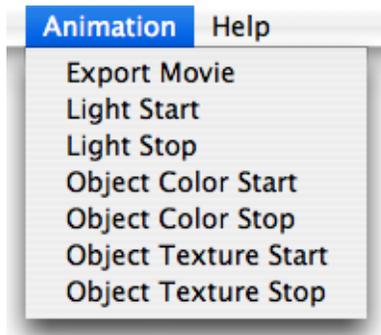


Select the plug-in name from the list to open it.

*See Appendix C — for details of the plug-ins accessed from the Plug-ins menu.*

## ANIMATION MENU

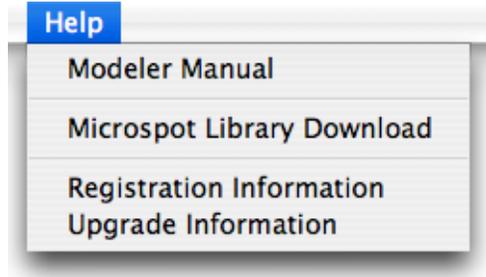
Click on Animation in the application menu bar to display a list of animation plug-ins.



Select the animation plug-in name from the list to open it.

*See Appendix C — for details of the plug-ins accessed from the Plug-ins menu.*

## HELP MENU



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### ↳ **Modeler Manual**

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---

Select this option to launch and display the Microspot Modeler User Guide.

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---

### ↳ **Microspot Library Download**

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---

Select Microspot Library Download to go to the Microspot Download web page to download the latest libraries and updates.

---

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### ↳ **Registration Information**

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Select Registration Information to register your product via the Microspot web page. The Register Information dialog displays:

Click on the Connect button in the dialog to go to the web page.

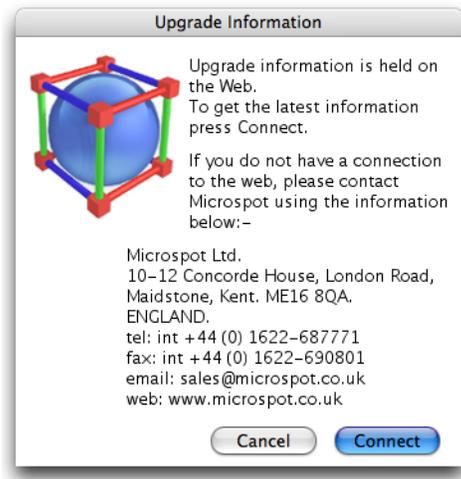


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## Upgrade Information

---

Select Upgrade Information to obtain product upgrade information (if any) from the Microspot web page. The Upgrade Information dialog displays:



Click on the Connect button in the dialog to go to the web page or alternatively, contact Microspot via telephone, fax or email for upgrade information.

# Chapter 4

## Palettes

The Tools, Info and Help palettes are the standard palettes included in the application. All other palettes are plug-in palettes that are loaded when the application is launched.

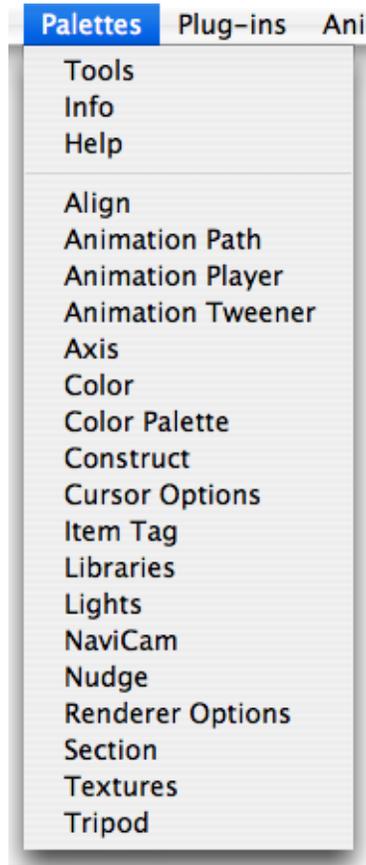
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## INTRODUCTION

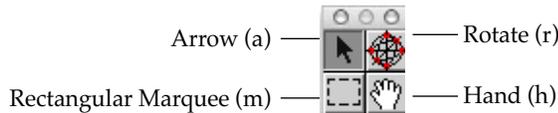
To open a palette, select its name from the Palettes menu. The Palettes menu lists of all the available palettes.



The status and position of palettes is remembered each time the application is closed. Close a palette by clicking on the top left corner of the palette window.

## Tools Palette

The tools built-in to the application Tools palette are the Arrow, Rotate, Rectangular Marquee and Hand tools.



The rest of the tools are plug-ins that are loaded when the application is launched

Select the tool to use by clicking on its icon in the Tools palette. After a tool has been used, the currently selected tool reverts to being the Arrow tool, unless the default tool is changed in the Preferences dialog. *See Preferences on page 3-5 for further details.* You can, however, double-click on any tool to lock it in so that it will not change after you use it, but will remain selected.

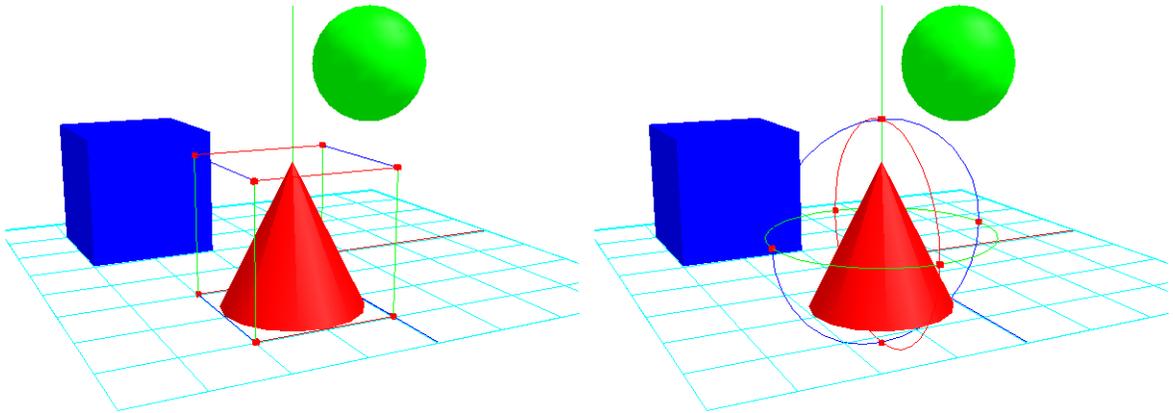


Both the Arrow and Rotation tools can be used for selecting and moving objects. You can also click and drag on the grid with either tool to move the entire scene in the window.

**Note:** Objects may be locked to prevent them being moved or rotated in one or more directions, or to prevent them being resized.

### Select

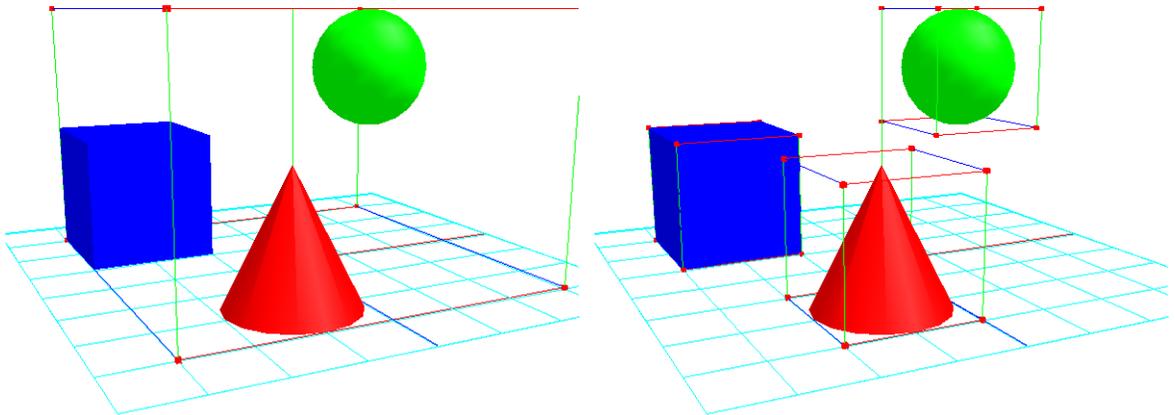
When an object is selected, it is surrounded by a bounding frame with handles at the points where the bounding lines intersect:



To temporarily hide an object's bounding frame, hold down the Option key and click on the arrow or rotate tool. The item is still selected, but the bounding frame and handles do not display. To re-display, click on the arrow or rotate tool again.

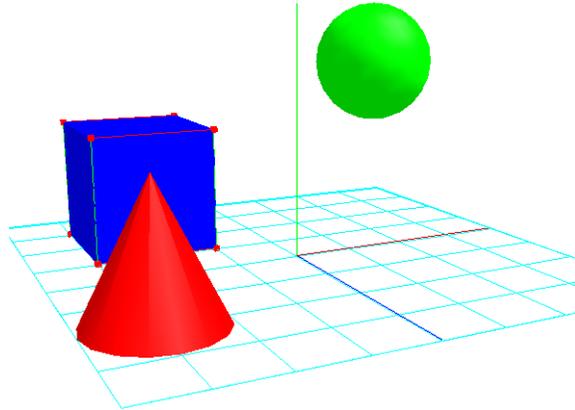
To add objects to a selection, hold down the Shift key and click on the additional objects. To deselect one object in a selection, hold down the Shift key and click on the object. If you click on an object that is part of a group, the entire group will be selected and the bounding frame will surround all of the items in the group.

Double-click on a group of objects to open a new window in which the grouped items can be edited:



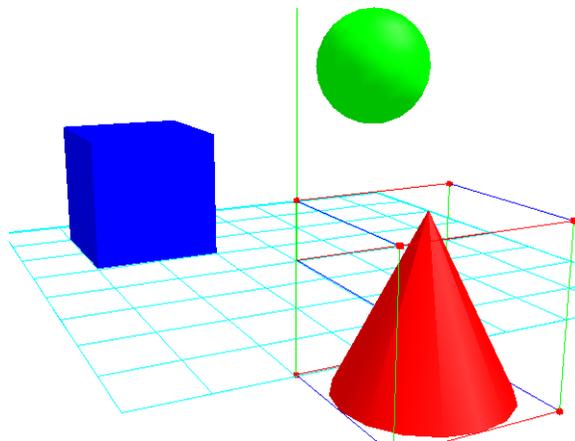
When you close this editing window, any changes you have made will be reflected in the original document window. You can also edit a group by selecting it and choosing Edit Item from the Options menu. *See Edit Group on page 3-28 for further details.*

Hold down the Command key and click the mouse to select an object that is behind another object. Initially, the foremost object will be selected. The second time you click the mouse, the next object back will be selected, and so on:



## Move

To move an object, click on it, hold down the mouse button, and drag. Release the mouse button to place the object in its new location. Hold down the Control key and drag up or down to move the object closer or further away. If you hold down the Shift key, lines will display showing the X, Y and Z axes, and movement will be constrained to these axes:



Objects can also be moved by entering coordinate values in the Info Palette.

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---

u  **Select/Move/Scale**

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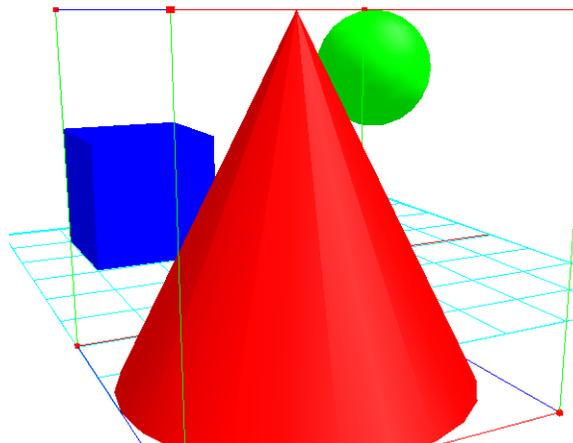
---

**Note:** Objects may be locked to prevent them being moved or rotated in one or more directions, or to prevent them being resized.

Select an object with the Arrow tool, it will display surrounded by a bounding frame with handles at the corners.

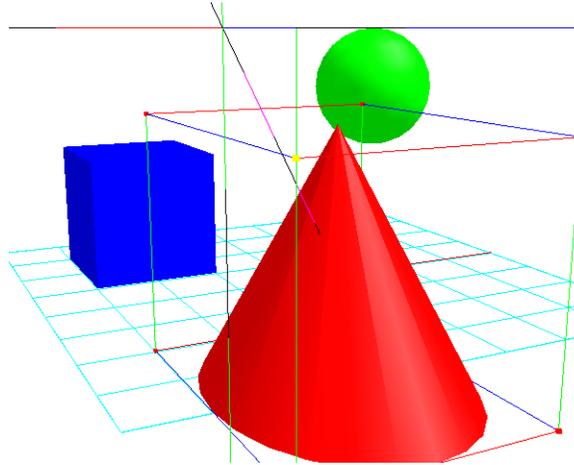
As an alternative to clicking and dragging, you can move an object using the arrow keys by selecting the object and pressing the desired arrow key to move it one pixel. If you hold down the arrow key, the object will move one pixel at a time until it has moved six pixels. It will then begin to move at an accelerated rate. To move objects closer or further away, hold down the Control key while using the up and down arrow keys.

To change the size of an object, move the cursor over one of the handles of the bounding frame. When the cursor changes to a white arrow, click the mouse and drag. The shape or size of the object will change to reflect your actions:

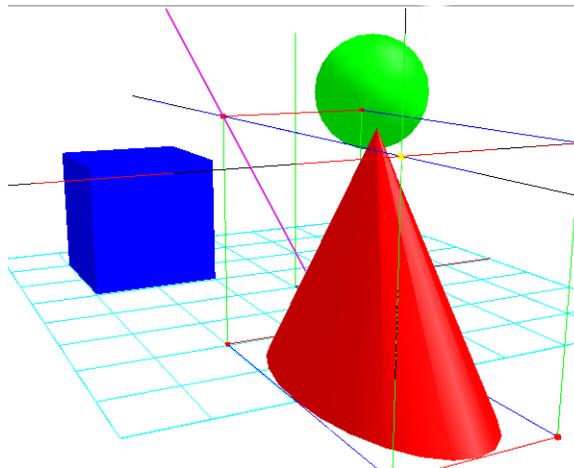


**Note:** If the Advanced Handles preference is checked on in the Preferences dialog, the lines of the bounding frame of an object can also be clicked on and dragged to resize the object.

Hold down the Shift key when resizing an object to constrain movement to the X, Y, or Z axes or to maintain the objects proportions. Four constraining lines are displayed. The red line represents the X-axis; the green line the Y-axis; and the blue line the Z-axis. The pink line represents the line along which the object will retain its current proportions:



If, after resizing the object, you hold down the Option and Shift keys and resize the object a second time, the pink line will move to a position which allows you to constrain the object to the proportions it was originally drawn with:



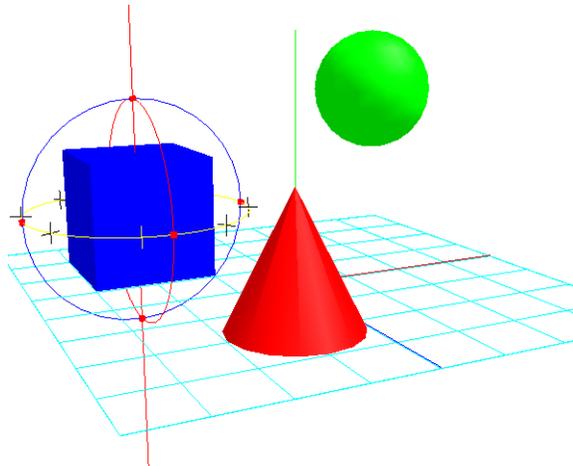
Objects can also be resized via the controls in the Info Palette.



**Note:** Objects may be locked to prevent them being moved or rotated in one or more directions, or to prevent them being resized.

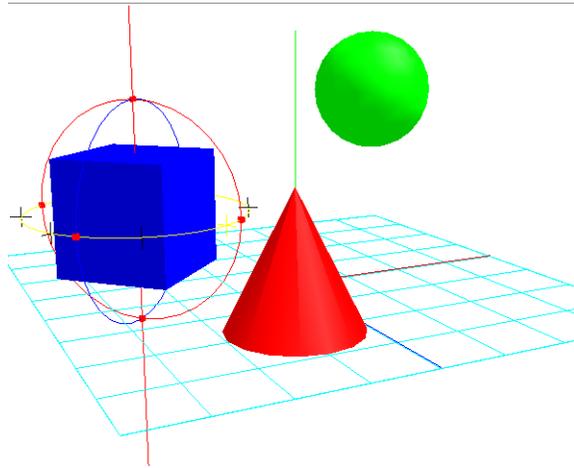
When an object is selected with the Rotate tool, it displays surrounded by a bounding sphere with six handles.

To rotate the object, move the cursor over one of the widgets of the bounding frame. When the cursor changes to a white arrow, click the mouse and drag. The object will rotate to reflect your actions:



**Note:** holding down the Shift key while rotating an object using the handles, constrains the rotation to 90°.

To rotate the object, in one axis only, move the cursor over one of the lines of the bounding frame. When the cursor changes to a white arrow, pointing right, click the mouse and drag. The object will rotate to reflect your actions in one axis only:



**Note:** holding down the Shift key while rotating an object using the rotation rings, constrains the rotation to 45°.

You can also use the arrow keys to rotate objects. If you hold down the arrow key, the object will rotate in 1° increments for 6°, then accelerate to 10° steps. If you hold down the Shift key while using the arrow keys, you can rotate objects in 45° increments. To tilt an object, hold down the Control key and use the left and right arrow keys.

The arrow keys can also be used to move and rotate the camera when nothing is selected in the document window. The camera will either move or rotate depending on which tool is currently selected. Use the control key to move the camera in the Z dimension.

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## u **Manipulating The Grid**

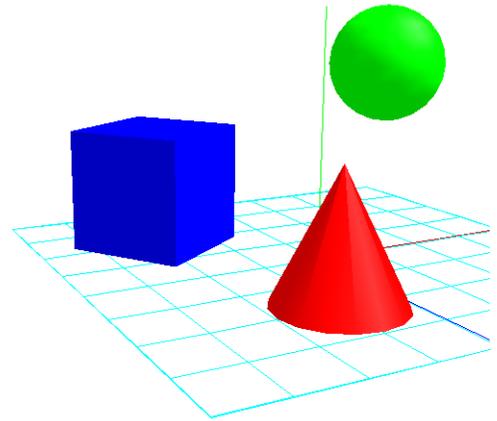
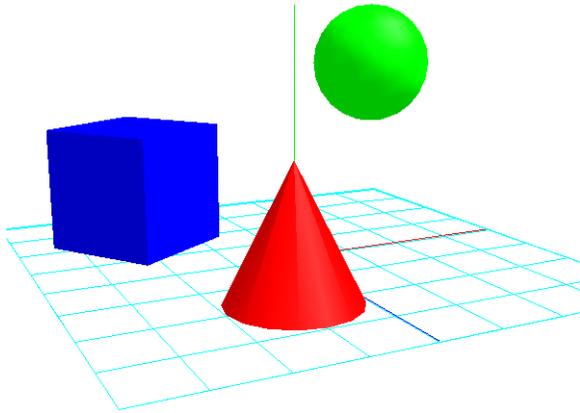
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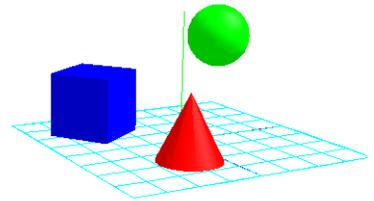
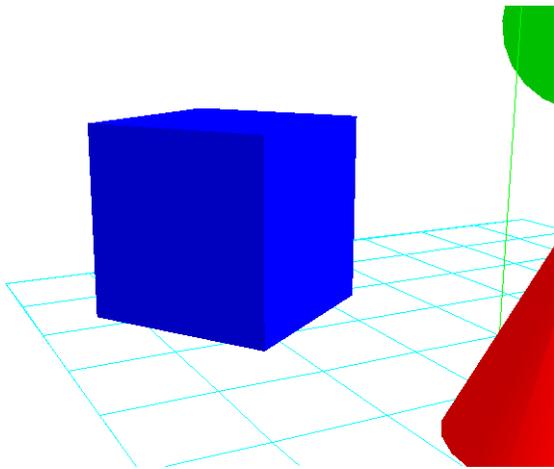
The Arrow and Rotate tools can be used to move and rotate the grid, as well as objects, to easily manipulate your view of a document.

### **Moving The Grid**

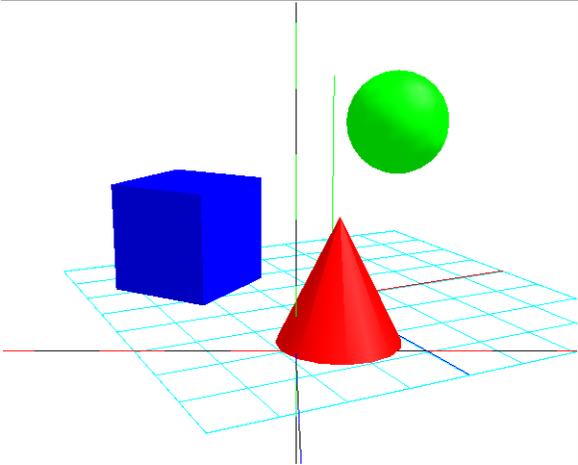
Select the Arrow tool and move the cursor over the grid. Hold down the mouse button, the cursor changes to an open hand. Move the cursor up, down, left or right. The grid will move to reflect your actions:



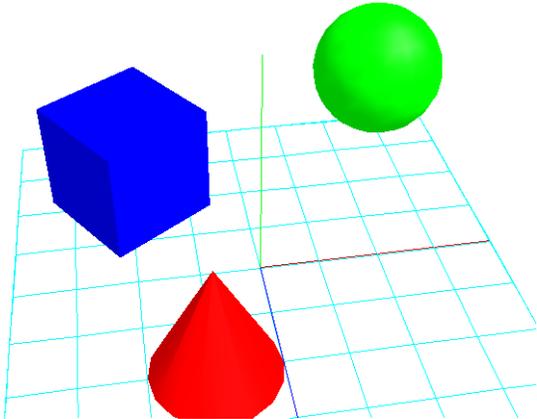
Hold down the Control key and move the mouse up and down to move the grid closer and further away:



Hold down the Shift key when moving the grid to display, and constrain movement to, the X, Y and Z axes:

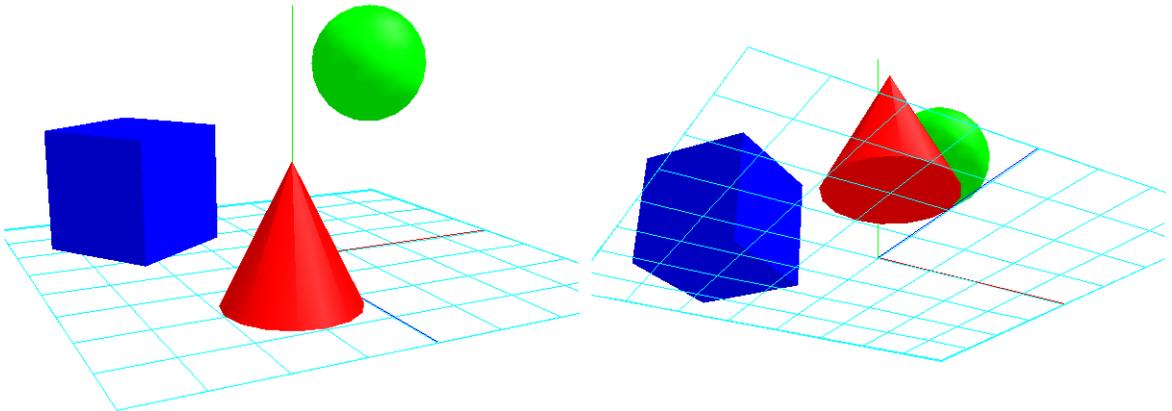


Additionally, you can hold down the command key to rotate the grid, whilst the arrow tool is selected:

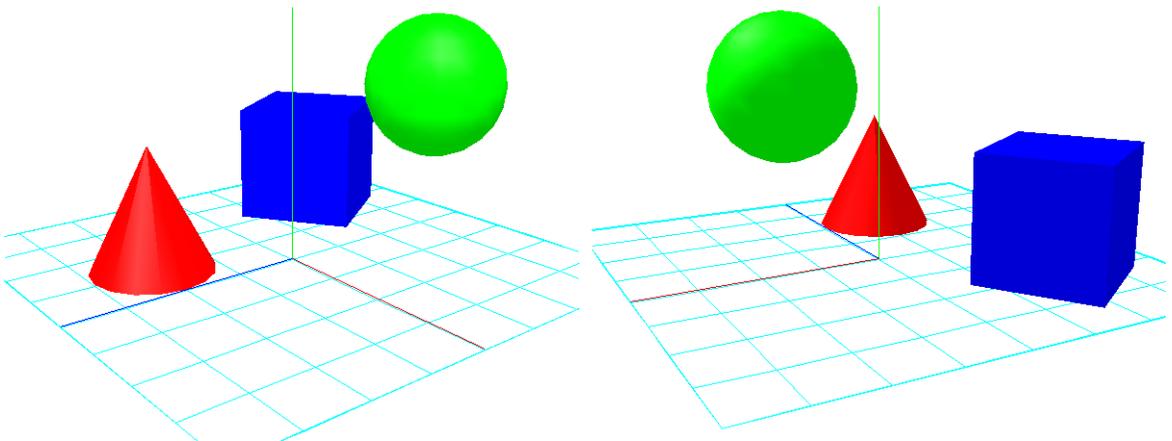


## Rotating The Grid

Select the Rotate tool and move the cursor over the grid. Hold down the mouse button, the cursor changes to an open hand. Move the mouse up, down, left or right. The grid moves to reflect your actions:



Hold down the Shift key while rotating the grid to constrain it to its initial plane. It can then only be rotated in that plane:



Holding the command key down before grabbing the grid will allow you to switch between rotating or moving the grid.

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U

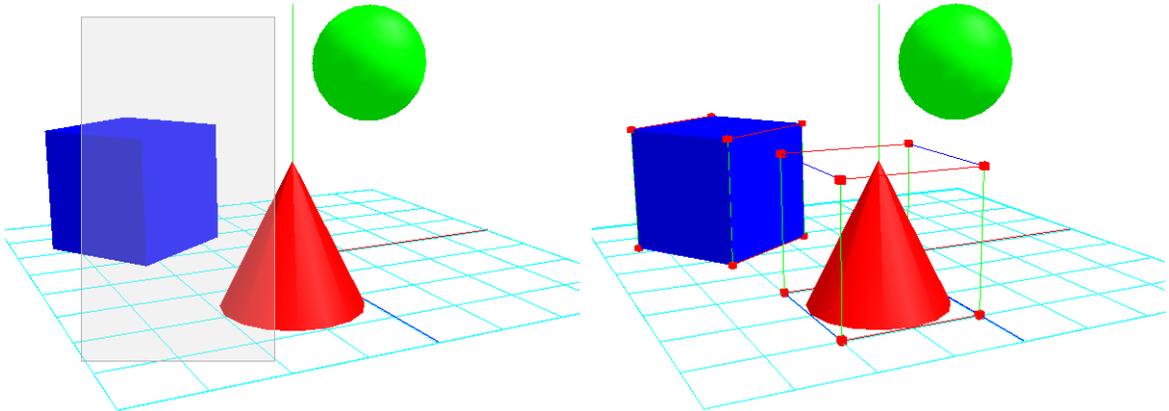


## Rectangular Marquee

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Select the Rectangular Marquee tool, hold down the mouse and drag out a rectangle to select one or several objects:



**Note:** that if any part of an object is inside the marquee, that object will also be selected.

To add objects to a selection, hold down the Shift key and drag a rectangle around the desired objects. To deselect items, hold down the Shift key and drag a rectangle around selected items. You can also add or remove items from a selection by clicking on them with a Selection tool while holding down the Shift key.

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U

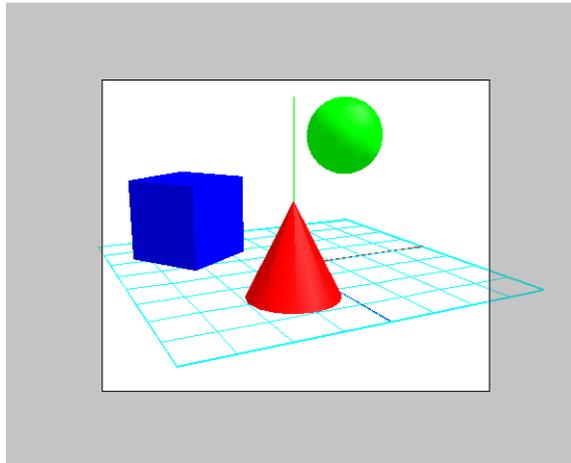


## Hand

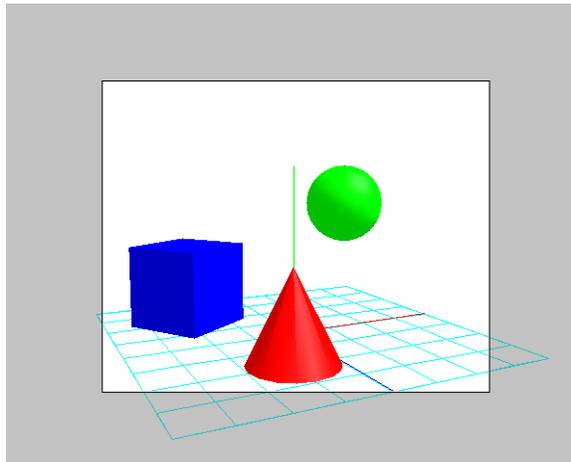
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Use the Hand tool to change the view of the document by altering the position of the camera. When you select the Hand tool, a frame will appear around the contents of the window. The cursor will change type near the corners of the frame:



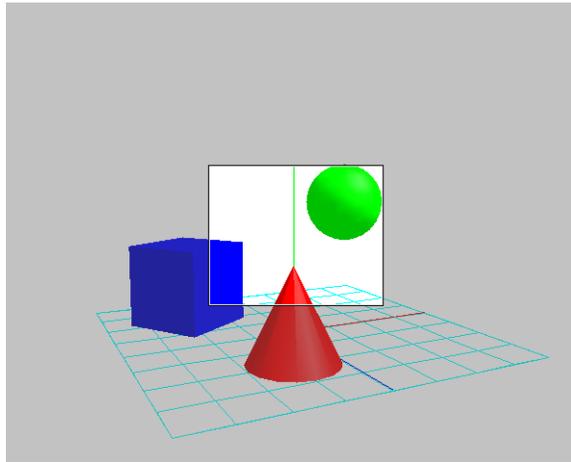
You can either position the view within the frame, or position the frame around the view. To position the view, click outside the frame and drag the mouse. To position the frame, click inside the frame and drag the mouse:



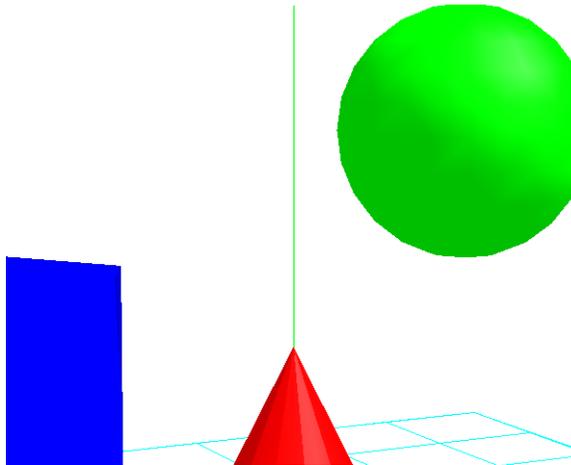
If you are in an elevation or orthogonal view, move the mouse left and right to crab, or up and down to change the camera height.

If you are in a perspective or user defined view, move the mouse left and right to pan the camera, or up and down to tilt the camera. Hold down the Option key and move left and right to crab, up and down to change the height.

To zoom in on an object (note that you are not actually moving the camera, but rather narrowing the focus), click on one of the frame corners and drag it in towards the center of the window:



When you select another tool, the window changes to show the view you have chosen:

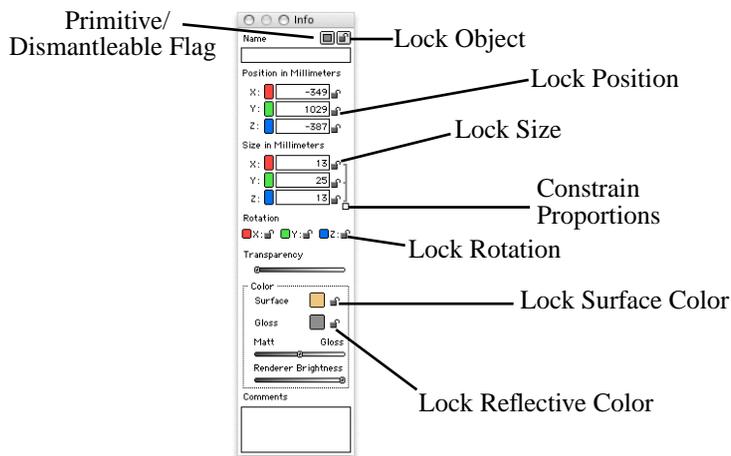


## INFO PALETTE

The Info palette displays information about, and provides controls for you to adjust, the characteristics of a selected object or light.

Select Info from the Palettes menu to display the Info Palette. When it is first opened, all of the Info palette will be visible. To reduce the palette click on the button on the right in the top left corner of the palette. To extend the window, click again.

**Note:** The controls in the Info Palette will vary depending on whether you have selected a 3D object or a spot/point light in the document window:



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### u Name

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The Name box provides a space to enter a name for an object or group of objects. This name will be displayed whenever the object or group is selected.

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∪   **Primitive/Dismantleable**

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This option is only available when an item or group is selected. A Primitive item cannot be ungrouped into component items. Click on the button to toggle between Primitive and Dismantleable. The solid square button represents the Primitive state and the split button the Dismantleable state. An object can also be specified to be Primitive or Dismantleable by selecting Primitive or Dismantleable from the Options menu. *See Primitive on page 3-30 and Dismantleable on page 3-30 for further details.*

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∪   **Lock**

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To lock a selected object or group of objects, click on the padlock icon in the top right corner of the Info palette, or select Lock from the Options menu. *See Lock on page 3-30 for further details.* This will prevent the object or group from being moved or changed. To unlock an object, click on the Padlock icon a second time, or select Unlock from the Options menu. *See Unlock on page 3-30 for further details.*

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∪ **Position**

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The figures displayed in the X,Y and Z Position boxes are the grid coordinates of the center of the selected object's bounding rectangle. If you select items that are grouped together, the coordinates displayed will relate to the group. If you select more than one item and the items are not grouped, no coordinates will display.

To precisely position an object, type in values for the X, Y and Z coordinates, then press Enter. The object will move to reflect your entries.

## Lock Position

The padlocks next to the position boxes are used to lock the position of an object. The lock options work the same for groups of objects as for single objects.

Click on the padlock next to the X position coordinate. It will close, which means the object is in a fixed position on the X axis (in relation to the grid), but can still be moved in the Y and Z axes. Any or all coordinates can be constrained. If an object's position is constrained on all three axes, it cannot be moved. However, you can still change the object's size (unless it has also been constrained).

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## Size

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The size boxes display the X, Y and Z dimensions of an object's bounding rectangle. If you select items that are grouped together, the dimensions displayed will relate to the group's bounding rectangle. If you select more than one item and the items are not grouped, no dimensions will display. To precisely resize an object, type in values for the X, Y and Z dimensions, then press Enter. The object will be resized to reflect your entries.

**Note:** Information about the object's size will be grayed out if you have selected a light as light objects have a constant size which cannot be changed.

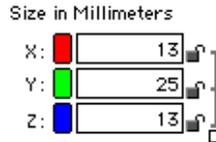
## Lock Size

The padlocks next to the size boxes are used to lock the size of an object. The lock options work the same for groups of objects as for single objects.

Click on the padlocks by the size dimensions to constrain an object's size. Click on a closed padlock to open it and un-constrain an object's size. Any or all size dimensions can be constrained. If all are constrained, the size cannot be changed. If just one dimension is constrained, you can change the other dimensions.

## Constrain Proportions

The Proportional Constrain checkbox to the bottom right of the dimension fields allows you to constrain the proportions of an object. Select an item and click on the checkbox to turn on Proportional Constrain.



The item can now be resized or moved, but will always maintain its current proportions.

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## Rotation

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### Lock Rotation

Below the size controls are additional padlocks for the X, Y, and Z axes that are used to constrain the rotation of an object.

Click on the padlock relating to the X axis. It will close, indicating that the object cannot be rotated around the X axis (in relation to the grid), although it can still be rotated in the Y and Z axes. The rotation of the object can be constrained in any or all of the axes. The X Y and Z axes are determined by the orientation of the object.

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## Transparency/Brightness

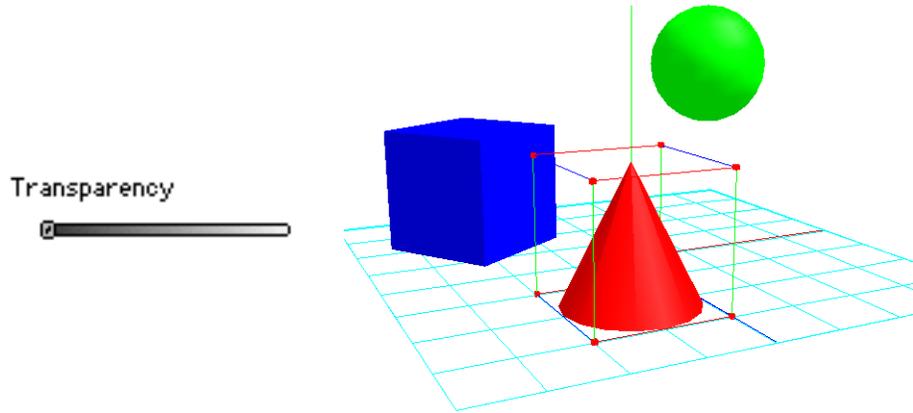
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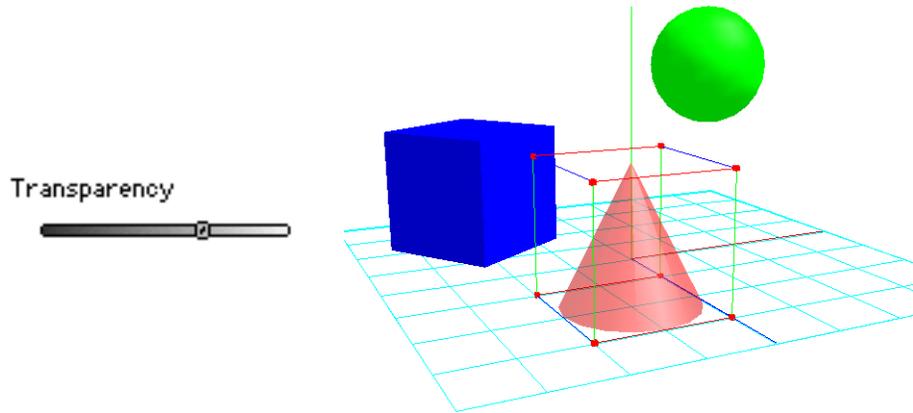
### Transparency

Select an object and use the Transparency slider control to adjust its transparency.

- When the transparency slider is to the left of the bar, the selected object is opaque:

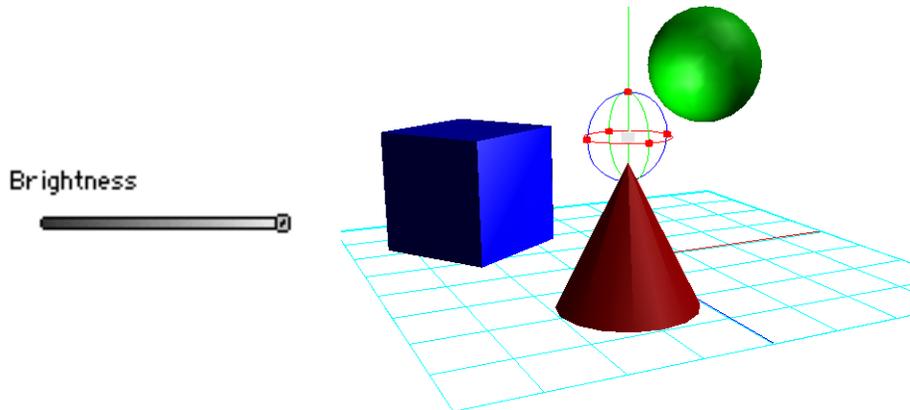
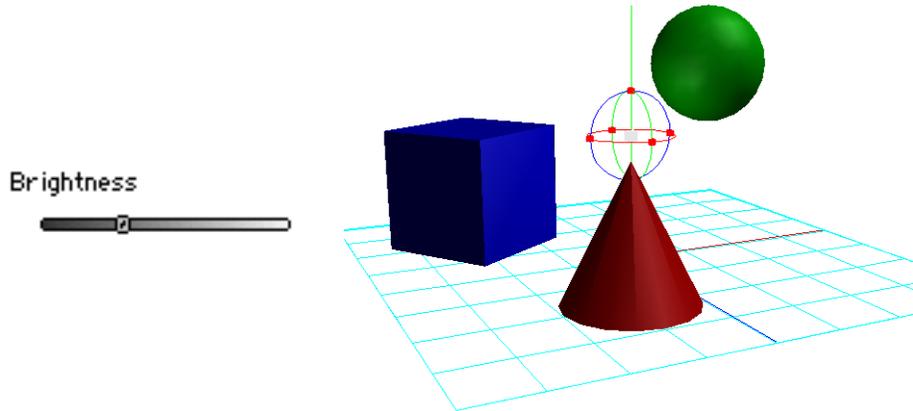


As the slider is moved along the bar, the object becomes more transparent:



## Brightness

If a light is selected, the first slider control relates to the brightness of the light it emits:



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## Color

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### Surface

The Surface color box shows the color of the selected object.

To change the color of the object, click on the Surface color box to display the Color Picker. Select a color and close the dialog. The color you have chosen will be displayed as the Surface color and applied to the selected object.

If a light is selected the Spot Light color box or Point Light color box is the color of the light emitted by the light object. The light marker color will also change to this color. If the light marker color was changed by use of the Preferences dialog the light marker will stay the preference color value. *See Colors on page 3-6 for further details.* Colors can also be dragged and dropped onto the spot or point light color box.

### **Gloss**

The Gloss color box shows the reflective color of the selected object. If light is shining on an object (sun light or spot/point lights), the part of the object that shines displays the gloss color. This will only be visible if you have selected the Best Shading option for the interactive renderer, or the Microspot Renderer via the Renderer Options palette. *See Renderer Options on page D-34 for more details.* This option is not available for lights.

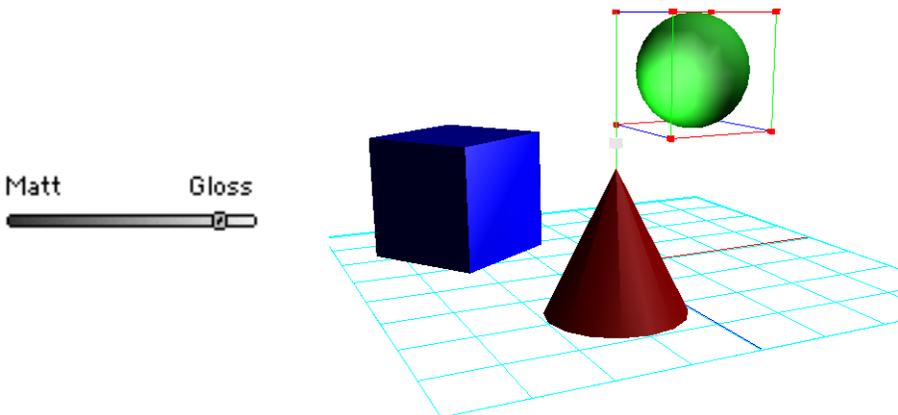
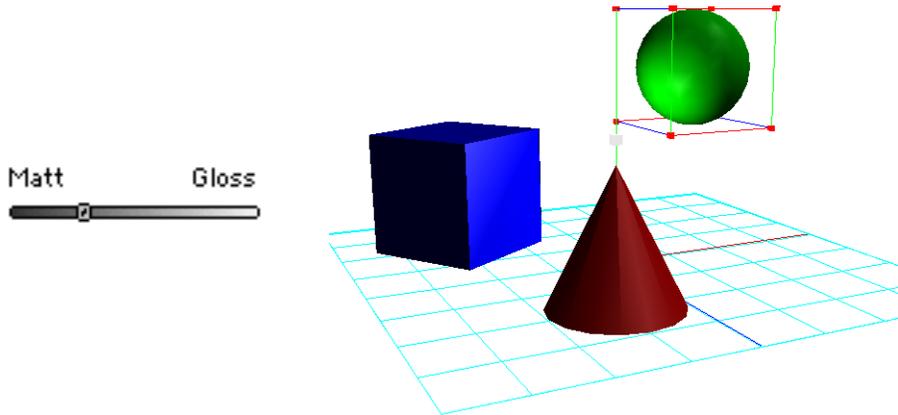
To change the reflective color of the object, click on the Gloss color box to display the Color Picker. Select a color and close the dialog. The color you have chosen will be displayed in the Gloss color box. Colors can also be dragged and dropped onto the Gloss color box.

### **Lock Color**

The padlock next to the color boxes is used to protect the color values of an object.

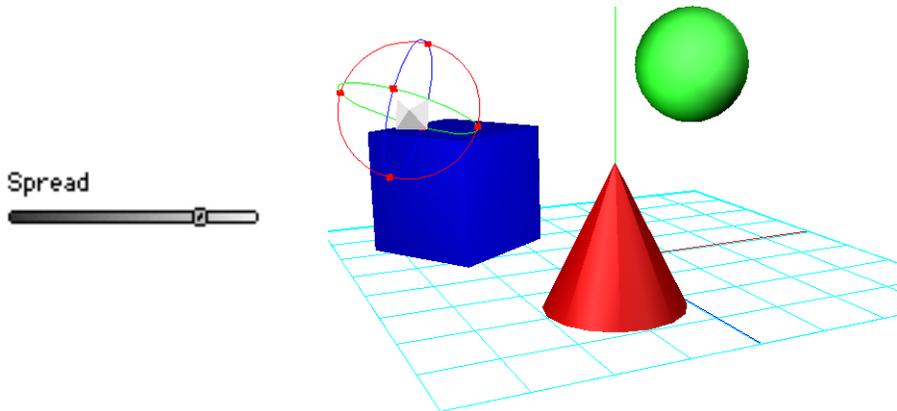
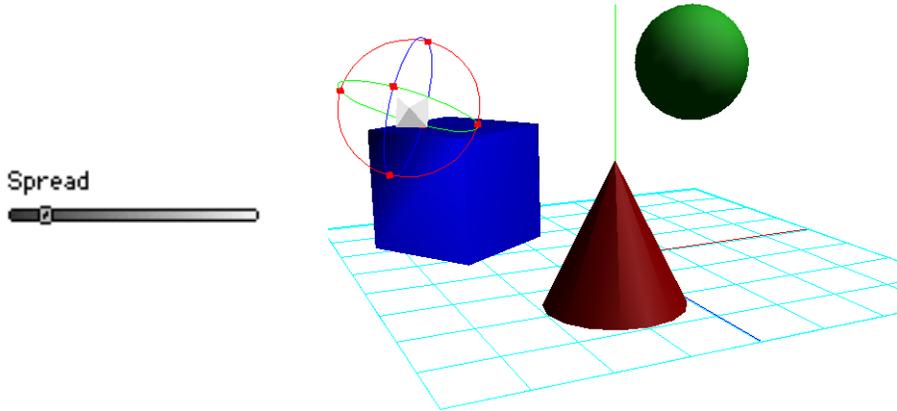
## Matt - Gloss

If an object is selected, the second slider control relates to its amount of gloss or shininess an object has. Use the slider control to adjust the degree of gloss or shine you place on an object. The Matt- Gloss value is affected by the amount of directional light on an object:



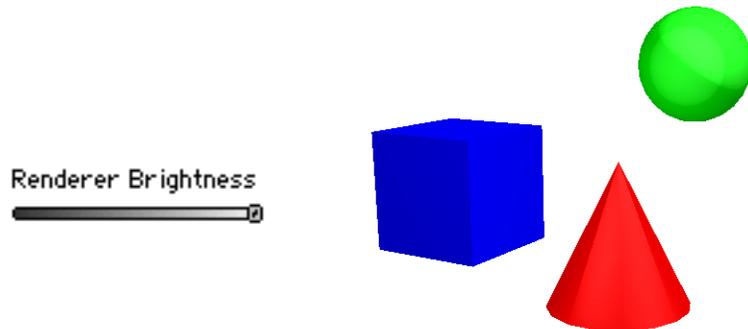
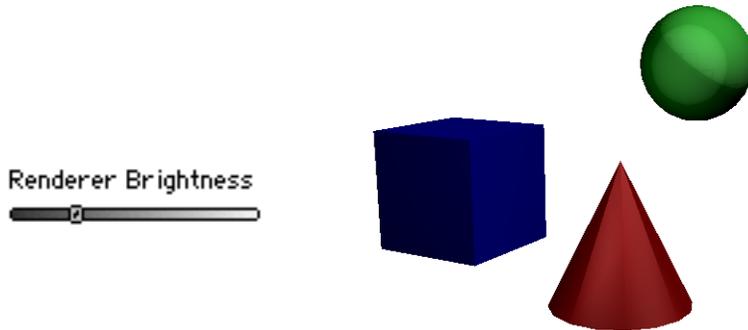
## Spread

If a spot light is selected, the second slider control allows you to adjust the lens angle of the light and narrow or widen the beam. Note that this option is not available for point lights:



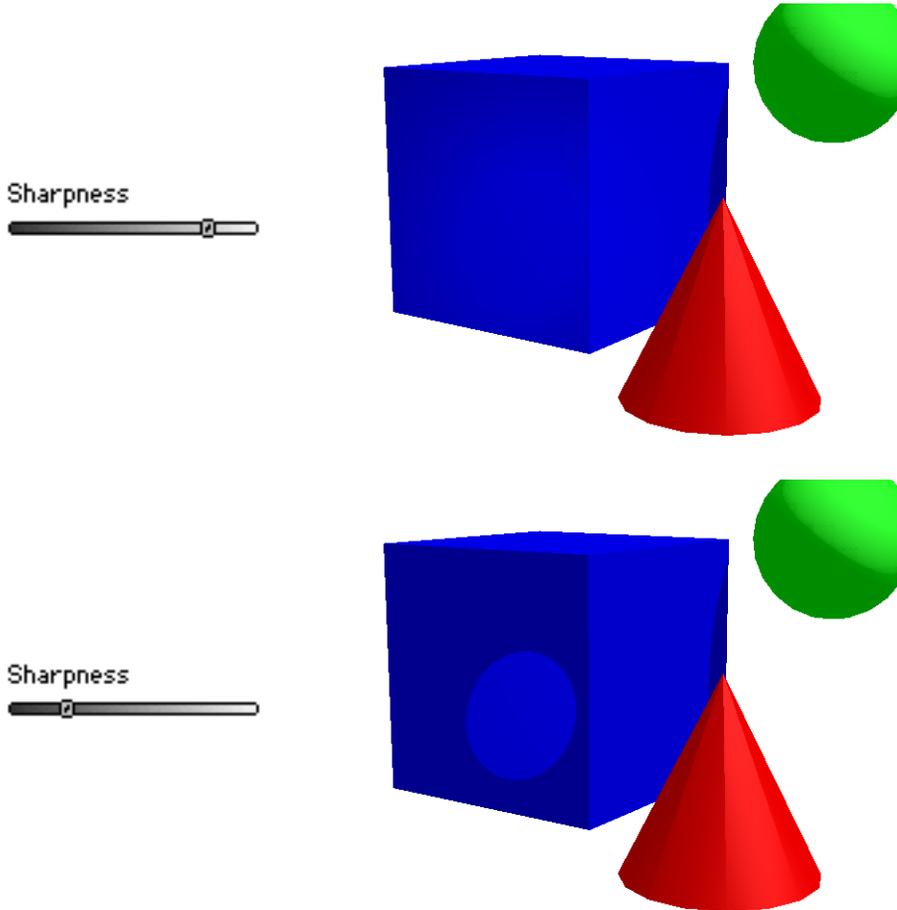
## Renderer Brightness

If an object is selected, the Renderer Brightness slider control allows you to adjust its reflectivity, which is the amount of ambient light the object reflects. This will only be visible if you have selected the Microspot Renderer via the Renderer Options palette. *See [Renderer Options](#) on page D-34 for more details.:*



## Sharpness

If a spot light is selected, the third slider control allows you to adjust the sharpness of the light. Move the slider control to sharpen or un-sharpen the focus of the light. Note that this option is not available for point lights:



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### u Comments

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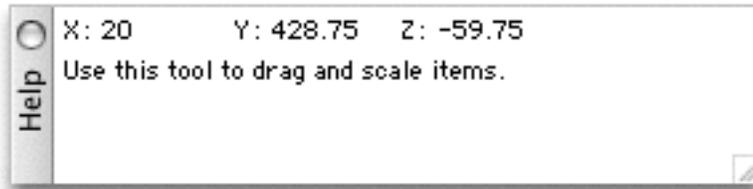
---

The Comments box provides a space to enter details about an object or group of objects (such as a description). These comments will be displayed whenever the object or group is selected.

## THE HELP PALETTE

The Help palette displays coordinate values that show the position of the cursor and help messages or information relevant to the tool selected, cursor position or rendering status (if a non-interactive renderer is being used).

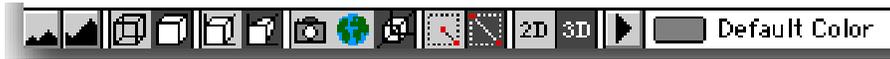
Select Help from the Palettes menu to display the Help palette:



To resize the Help palette, click on the resize box in the bottom right corner of the palette and, holding down the mouse button, drag to resize the palette. Release the mouse button when the palette reaches the desired size.

## WINDOW CONTROLS

The Window controls are displayed at the bottom of each window:



Selecting an option affects only that window, regardless of how many other views are open.

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### **Zoom Out**

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Use the Zoom Out button to widen the focus of the camera's view and make objects appear to be farther away. Position the cursor over the Zoom Out icon and click once to zoom out slightly. Click and hold the mouse button down to continue zooming out.

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### **Zoom In**

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Use the Zoom In button to narrow the focus of the camera's view and make objects appear to be closer. Position the cursor over the icon and click once to zoom in slightly. Click and hold the mouse button down to continue zooming in.

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### **Wire Frame**

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Select this option to view objects in wire frame mode. Working in this mode is usually faster than working in solid fill mode as there is less information to be updated after each change.

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↳  **Solid Fill**

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When the Solid Fill option is selected, objects are displayed with filled surfaces. Although working in this mode may be slower than working in wire frame mode, it offers a better representation of your 3D models.

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↳  **Orthographic**

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Select the Orthographic option to see an orthogonal view of the document rather than a perspective view. In an orthogonal view, all parallel lines display as parallel.

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↳  **Perspective**

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Select the Perspective option to see a perspective view of the document rather than an orthogonal view. In a perspective view, parallel lines converge.

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↳ **Coordinate Systems**

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Select the Camera, World or Object icon to specify a coordinate system. The system you choose will affect the way new objects are drawn and existing objects are manipulated. Since the bounding rectangle of a shape is drawn according to the coordinate system, changing the shape or size of the bounding rectangle will have different effects on the object when using the different coordinate systems.

The grid is drawn according to the World Coordinate System. Holding down the Shift key constrains movement to the X, Y or Z axes. When moving or resizing an object, holding down the Shift key makes the axes visible. The X-axis is red and runs left to right; the Y-axis is green and runs top to bottom; and the Z-axis is blue and runs in/out. These constraining lines will be in different positions depending upon which coordinate system is being used.



### **Camera Coordinates**

When this option is selected, the X, Y and Z axes relate to the direction and angle of the camera. New objects will be drawn perpendicular to the camera. Object manipulations can be constrained to the axes that relate to the camera.



### **World Coordinates**

When this option is chosen, the X, Y and Z axes relate to the World Coordinates and are the same as the grid axes. New objects will be drawn in relation to the World Coordinate X, Y and Z axes. Manipulated objects can be constrained to these axes.



### **Object Coordinates**

This is the default option. When the Object Coordinates option is chosen, the X, Y and Z axes relate to the orientation of a selected object.

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### **Radius**

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If Radius mode is selected, objects are drawn from a central point. This is the point at which you first placed the cursor to start drawing an object. When resizing an object, the center of the object will remain in a fixed position:

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u  **Diameter**

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This is the default mode. When selected, objects are drawn from the point where you initially placed the cursor and began to draw. When resizing an object, the corner opposite the one you are dragging will remain in a fixed position:

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u  **2D**

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If 2D Mode is selected, objects can only be drawn in 2D. An object will normally be drawn in the X,Y plane, however if you begin drawing while holding down the Control key, the object will be drawn in the X,Z plane. If you release the Control key while continuing to hold down the mouse button, the object can be flipped into the Y,Z plane. Once drawn, the object will be constrained from resizing in the smallest axis until the constrain locked flag is turned off in the Info Palette.

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u  **3D**

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This is the default mode which allows you to draw objects in 3D. Hold down the Control key and move the mouse up and down to move in and out in the document space.

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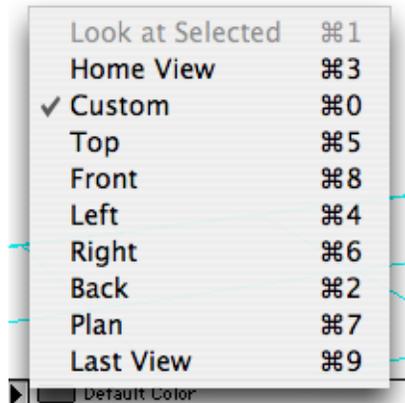
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## View

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Use the View popup menu to select a different view, including any view that you have saved. When you select a view option, the window will change to display your selection:



The Command key options and View menu can also be used to choose a view. *See Change View on page 3-25 for further details.*

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## Default Color

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The color displayed in the color block at the bottom right of the window toolbar is the currently selected color. Any new items created (except lights and markers) will automatically be this color, even if you are working in wire frame mode.

To change the default color, click on the color block and select a new color from the Color Picker:



To change an object's color, click on the color block and drag the color over the object. It will be highlighted by a bounding frame to show that it is selected. Release the mouse button to apply the color to the object. You can also select an object, then go to the Color Picker and select a new color to automatically apply that color.

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## Window Resize

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To change the size of the window you are working in, click on the Resize Window icon. Hold down the mouse and drag to resize the window.

# *Appendix A*

## *Import Plug-ins*

Import plug-ins are accessed via the Import submenu in the File menu.

### *Table of Contents*

Introduction	A-2
3ds	A-2

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## u Introduction

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Open the File menu and select Import. A submenu lists the installed Import options:



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## u 3ds

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The 3ds plug-in imports 3ds formatted files into an Modeler document.

1. Select 3ds from the Import submenu in the File menu.
2. Select the file to import from the dialog that displays.
3. The selected file will then be imported into the current Modeler document as a 3DMF object.
4. The size of the object will depend on your current grid size.

# *Appendix B*

## *Export Plug-ins*

Export plug-ins are accessed via the Export option in the File menu.

### *Table of Contents*

Introduction	B-2
Picture	B-2

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## Introduction

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Open the file menu and select Export. A submenu lists the installed Export options:



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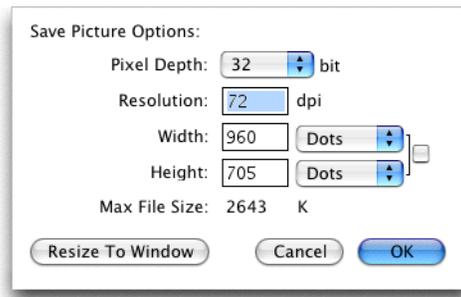
## Picture

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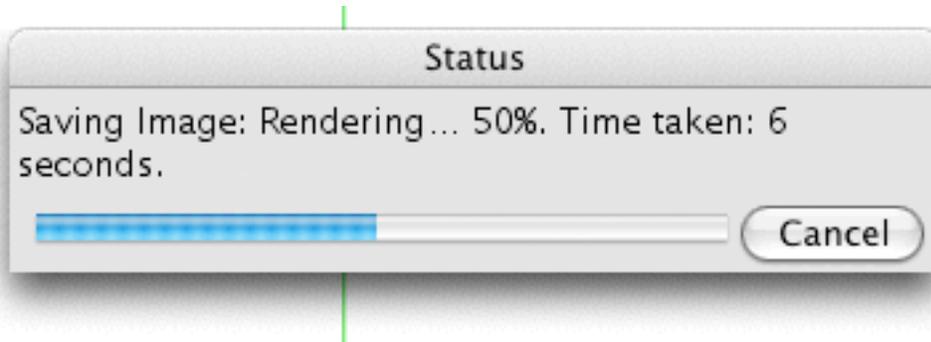
The Picture plug-in provides several format options for saving your document view.

1. Select Picture from the Export submenu. The Save Picture Options dialog displays:



2. Choose the desired pixel depth from the Pixel popup menu.
3. Enter a value in dots per inch to specify the resolution at which the picture is to be saved.
4. Select Dots, Millimeters or Inches from the units popup menus (constraining the proportions of the image by checking the checkbox if necessary), then enter values for the width and height required.

5. Click on the Resize to Window button to change the resolution back to 72 dpi and the width and height to the width and height of the contents of the document window.
  6. Click OK to accept the options as set.
  7. The standard save dialog then displays, enter a name and select a location to save the file.
  8. At this stage you can choose the type of image file you want from the list displayed in the save dialog.
  9. Click Save to save the image.
  10. A small dialog will show, displaying the current progress of the render to file.
- Note:** You may stop the export at any time by clicking on the cancel button in the dialog.



# Appendix C

## Menu Command Plug-ins

Menu command plug-ins are accessed via the Plug-in menu or Animation menu.

### *Table of Contents*

Introduction	C-2	Object Color Stop	C-8
PLUG-INS MENU	C-3	Object Texture Start	C-9
Auto Save	C-3	Object Texture Stop	C-10
Base Plate	C-4		
Construct Idler	C-4		
Counter	C-4		
Gravity	C-5		
ANIMATION MENU	C-6		
Export Movie	C-6		
Light Start	C-6		
Light Stop	C-7		
Object Color Start	C-7		

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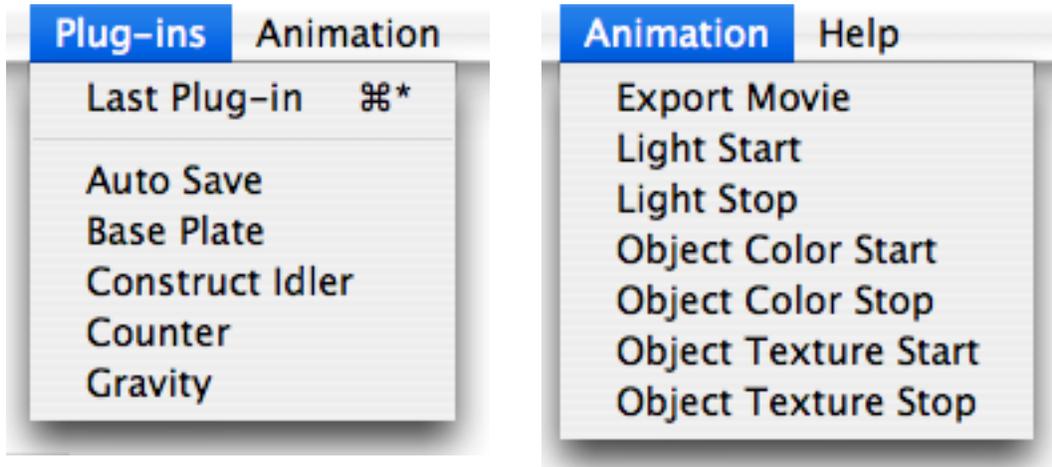
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## ∪ Introduction

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Select Plug-ins or Animation from the menu bar.



A list of available menu command will displays. Select the name from the list to use that feature. Hold down the Option key and select the name to display any options that are available.

The first time the Plug-in menu is selected, the top item in the menu, Last Plug-in, will be grayed out. After selecting a menu command, the top item will then be the name of the menu command selected. This can be chosen by selecting the top item or typing Command - \*.

# PLUG-INS MENU

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## Auto Save

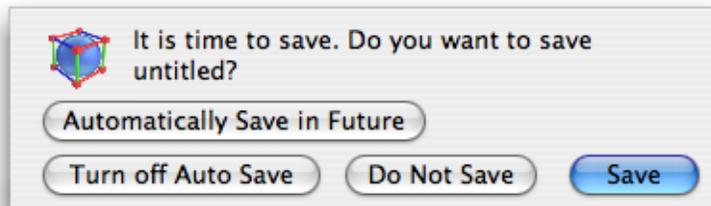
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Select Auto Save to turn on the Auto Save feature. A dialog displays for you to enter a value for the Auto Save period.



Enter a value in minutes and click OK. A check mark will display next to the plug-in name to show that Auto Save is on.

After the specified period, a dialog displays warning that it is time to save. The dialog offers the opportunity to turn Auto Save off, to close the dialog without saving, to automatically save in future, or to save the document. To make this dialog disappear, but still save, just click on Automatically Save in Future.



To turn Auto Save off, select the plug-in name again from the plug-in menu.

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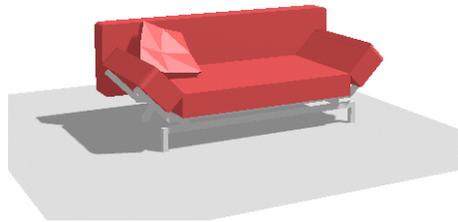
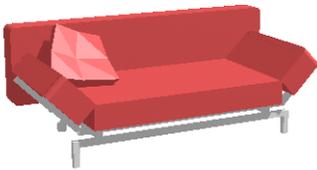
## ∪ **Base Plate**

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The Base Plate plug-in allows the user to add a plate onto the grid. The purpose of this plate is to allow the model to cast shadows whilst being rendered, thus giving more depth and realism to the model created. To enable the base plate, simply click on it in the plug-in menu. Then you will observe that a plate has been added to the grid, at roughly 90% of its size.

The plate itself is locked, and so cannot be moved, although you can unlock it to move it around and change its color as you see fit.



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## ∪ **Construct Idler**

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The Construct Idler plug-in is available as both a menu command plug-in and as an idler plug-in. *See Construct Idler on page E-2 for details.*

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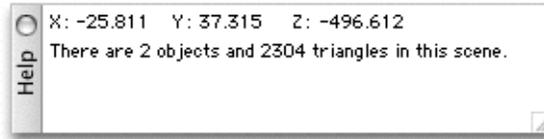
## ∪ **Counter**

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The Counter plug-in counts the number of objects and triangles in the selection or scene.

1. Make a selection to count only the number of objects and triangles in the selected objects, or select nothing to count the number of objects and triangles in the entire scene.
2. Choose Counter from the Plug-in menu.
3. The number of objects and triangles is counted, and the result displayed in the Help palette. (Select Help from the Palette menu to display the Help palette.)



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## u Gravity

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The Gravity plug-in is available as both a menu command plug-in and as a plug-in modifier. *See Gravity on page H-8 for details.*

# ANIMATION MENU

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## ↳ **Export Movie**

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The Export Movie plug-in saves the current animation as a Quicktime movie.

1. Select Export Movie plug-in from the Animation menu
2. A standard Save dialog displays.
3. Enter a name and select a location to save the movie.
4. The animation will then be recorded frame by frame by the current renderer.

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## ↳ **Light Start**

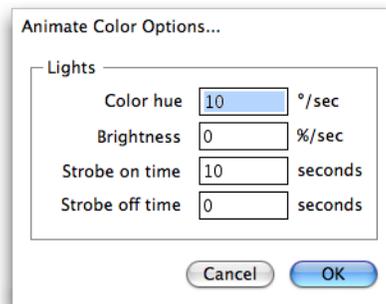
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The Light Start plug-in is used to animate the color and brightness of a light or group of lights.

To animate the color or brightness of a light, first select the light. The Light Start menu command will then highlight if a light is selected. By selecting the menu command the light is now tagged to allow the lights color and brightness to animate when the current scene is animating.

To set the Animate Color options, hold down the Option key and select the Light Start menu command. The Animate Color Options dialog will display:



- **Color Hue:** Enter a value in the hue field to specify the number of degrees around the color wheel to move each second to select the colors to apply. The default is 10.
- **Brightness:** Enter a value between 0 and 360 to specify the percentage change in brightness of the color per second. Each second the brightness of the color will change by that set percentage value, cycling around to get darker, brighter and darker again. The default is 0.
- **Strobe on time:** Enter a value in seconds for the length of time the light should stay on.
- **Strobe off time:** Enter a value in seconds for the length of time the light should stay off.

Click OK to enter the options. They will remain as set until changed.

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## ∪ **Light Stop**

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The Light Stop plug-in is used to stop the animation of a light or group of lights.

To stop an animating light, first select the light. The Light Stop menu command will then highlight if the light selected has a light animation. By selecting the menu command the light is then untagged causing the light to stop animating when the current scene is animating.

Light Stop has no options or options dialog.

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## ∪ **Object Color Start**

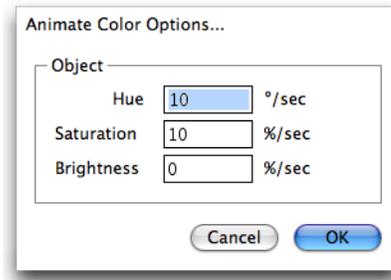
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The Object Color Start plug-in is used to animate the color applied to an object or group of objects.

To animate the color of an object, first select the object. The Object Color Start menu command will then highlight, selecting the menu command will tag the object to allow the color to animate when the current scene is animating.

To set the Animate Color options, hold down the Options key and select the Object Color Start menu command. The Animate Color Options dialog will display:



- **Hue:** Enter a figure in the hue field to specify the number of degrees around the color wheel to move each second to select the colors to apply. The default is 10.
- **Saturation:** Enter a value between 0 and 360 to specify the percentage change in saturation of the color per second. Each second the saturation of the color will change by the percentage value set. The default is 10 but to stop this effect set the value to 0.
- **Brightness:** Enter a value between 0 and 360 to specify the percentage change in brightness of the color per second. Each second the brightness of the color will change by the percentage value set. Cycling around getting darker, brighter and darker again. The default is 0 which has no effect on the color brightness.

Click OK to enter the options. They will remain as set until changed.

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## u Object Color Stop

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The object Color Stop plug-in is used to stop the animation of the color applied to an object.

To stop a color animating on an object, first select the object. The object Color Stop menu command will then highlight if the object or object in a group selected has an animated color. By selecting the menu command the object is then untagged causing the color to stop animating when the current scene is animating.

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## u Object Texture Start

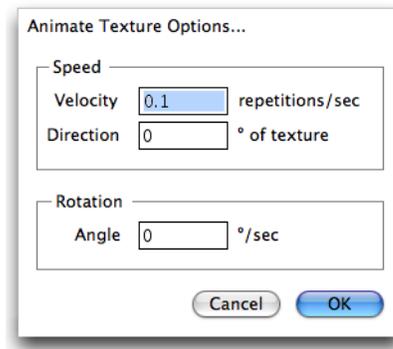
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The Object Texture Start plug-in is used to animate a texture applied to an object.

To animate a texture on an object, first select the object. The Object Texture Start menu command will then highlight if an object is selected and has a texture to animate. By selecting the menu command the object is now tagged to allow the object's texture to animate when the current scene is animating.

To set the Animate Texture options, hold down the Option key and select the Object Texture Start menu command. The Animate Texture Options dialog will display:



- **Velocity:** Enter a figure in the Velocity field to specify how many times the applied texture should move around the object per second. The default is 0.1
- **Direction:** To change the direction in which the texture moves, enter a value between 0 and 360 in the Direction field. If set at 90 degrees the texture will move from top to bottom, 180 degrees from left to right, 270 degrees from bottom to top, and so on. The default is 0 degrees.
- **Rotation:** Enter a value between 0 and 360 in this field to start the texture rotating. Each second the texture will rotate by the amount specified. The default value is 0 degrees.

Click OK to enter the options. They will then remain as set until changed.

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## u **Object Texture Stop**

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The Object Texture Stop plug-in is used to stop the animation of a texture applied to an object.

To stop a texture animating on an object, first select the object. The Object Texture Stop menu command will then highlight if the object selected has an animated texture. By selecting the menu command the object is then untagged causing the texture to stop animating when the current scene is animating.

Object Texture Stop has no options or options dialog.

# Appendix D

## Plug-in Palettes

Plug-in palettes are accessed via the Palettes menu. Select the palette name from the list to open it.

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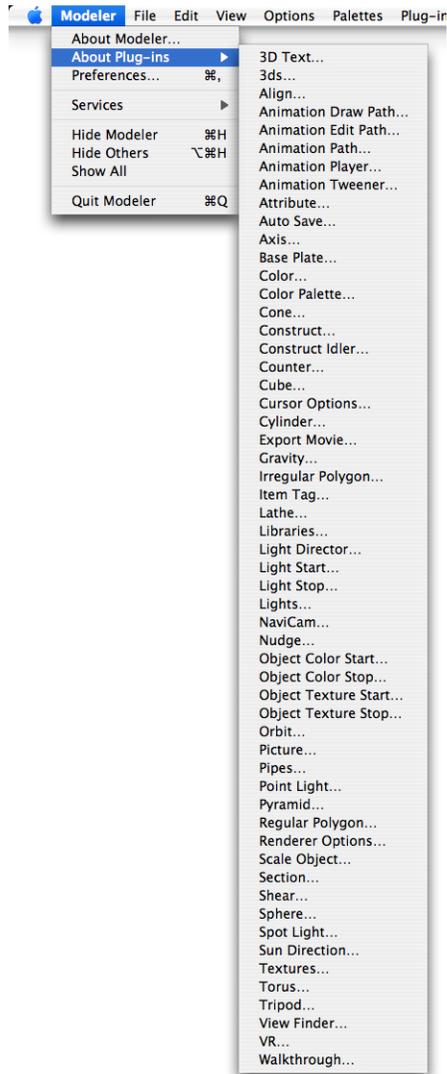
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## Introduction

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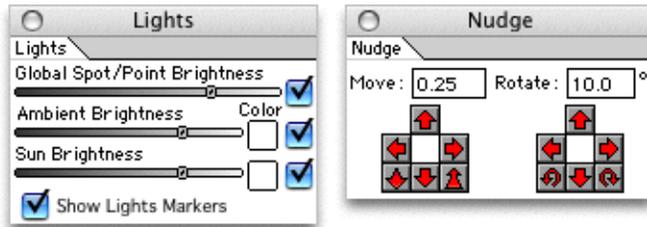
Click on Palettes in the application menu bar to display a list of available palettes. Select the palette name from the list to open it.



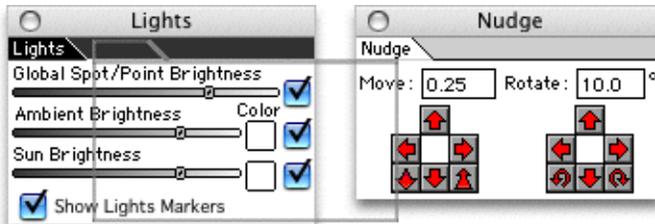
The Tools, Info and Help palettes are not plug-in palettes but are part of the core application. See *Chapter 4 — Palettes* on page 4-1 for details.

## Tabbed palettes

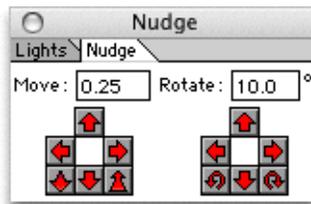
When a palette is opened it displays in a window with the palette name on a tab at the top of the palette.



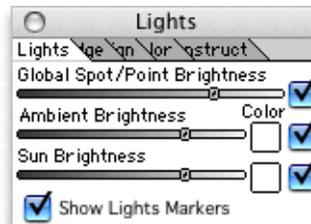
Tabbed palettes can be stacked together by simply clicking on the palette tab and dragging the palette onto the tab area of another tab palette:



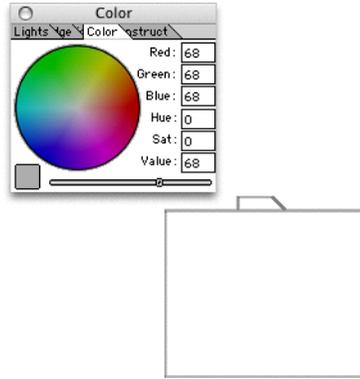
Both palettes then appear in the same palette. To access a palette click on its tab.



Any number of tabbed palettes can be stacked together, although in practice you may wish to limit this to the number of tabs that are visible in a palette.



To remove a tabbed palette from a stack, click on the palette tab and drag the palette onto the desktop.



The palette will appear on its own, while the other palettes remain stacked together.



Click on a palette tab and hold down the mouse button to display the tab menu. This provides an alternate method of selecting other palettes or of disconnecting a palette from the stack.



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## u Align

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The Align palette is used to align objects in any or all of the X, Y and Z axes.

1. Select Align from the Palettes menu to display the Align palette:



2. Select two or more objects in the document window then click on the buttons in the Align palette to specify how the objects should be aligned in the X, Y and Z axes.

If one or more of the selected items are locked, they will not be moved, but other selected items will be aligned with the locked items. Locked items are treated as a single object for alignment purposes.

The line of alignment relates to the object that is in the most extreme position in the relevant direction. For example, when choosing align right in the X-axis, the line of alignment is defined as the right edge of the bounding frame of the object furthest to the right.

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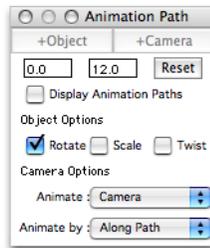
## Animation Path

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The Animation Path palette is used to move an object or the camera along a specified path, over a set time. To use the Animation Path palette you will first need to create an Animation Path with the Animation Draw Path Tool.

Select Animation Path from the Palettes menu to display the Animation Path palette:



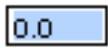
### Animation Path Controls

 +Object

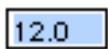
The +Object button will enable when both an object and an animation path are selected. Clicking this button will cause the object have tween points added in the Animation Tweener palette. These points will correspond to the Animation Path selected.

 +Camera

The +Camera button will enable when an animation path is selected. Clicking this button will cause the camera to have tween points added in the Animation Tweener palette. These points will correspond to the Animation Path selected.

 Start Time

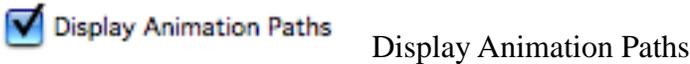
The value displayed in the Start Time field is the Animation Path initial value in seconds. Enter a value and press the Return, Enter or Tab key to change the Start Time value.

 End Time

The value displayed in the End Time Field is the Animation Path final value in seconds. Enter a value and press the Return, Enter or Tab key to change the End Time value.



The reset button when clicked will change the start and end time value to the current documents animation values.



Controls the visibility of an Animation Paths in the current document.

### Object Options



The object is rotated as it moves along the path so that it maintains its original orientation in relation to the path.



If the Animation Path has been scaled at any point using the Animation Edit Path tool, the object will also be scaled at that point.



If the Animation Path section has been rotated at any point using the Animation Edit path tool, the object will also be rotated around the path at that point.

### Camera Options

**Note:** To view the effect of the following different camera options open the NaviCam palette the animation is running.

### Animate Camera



The camera is moved along the path.



### Fixed Point

The camera is moved along the path with a fixed view point.



### Fixed Direction

The camera is moved along the path with its view point in a fixed direction.

## Animate View Point



### Along Path

The camera's view point is moved along the path with the camera following behind.



### Fixed Point

The view point is moved along the path while the camera is in a fixed position.



### Fixed Direction

The view point is moved along the path while the camera follows behind at a fixed distance and fixed to a set direction.

**Note:** The object or camera is not linked to the path in any way. If the Animation Path is edited, the animation for the camera will not be changed. To update an animation of an object or camera along a new path just click the appropriate button and the new animation will replace the old animation.

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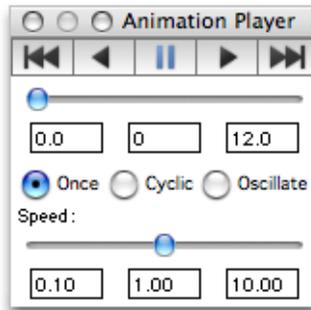
## u Animation Player

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The Animation Player palette is used to control the display of animation in the document.

Select Animation Player from the Palettes menu to display the Animation Player palette:



## AnimationPlayerControls



Move To Start

Click on the Move to Start button to move to the beginning of the timeline. 0/0 will be displayed in the Time field, and slider on the timeline bar will display at the left end of the bar.



Play Backward

Click on the Play Backward button to play an animation in reverse direction.



Pause

Click on the Pause button to pause an animation playing.



Play Forward

Click on the Play Forward button to play an animation.



Move to End

Clicking on the Move to End button to move to the end of the timeline. The value set in the Duration field will be displayed in the Time field, and the slider on the timeline bar will display at the right end of the bar.



Timeline Bar

The slider bar represents the timeline for the animation. Click on the slider, hold down the mouse button and drag the slider right or left to move to a different position on the timeline.

Start Time

The value displayed in the Start Time field is the animation's start position in seconds. Enter a value and press the Return, Enter or Tab key to change the Start Time value.

Current Time

The value displayed in the Current Time field is the animation's current position in seconds. Enter a value and press the Return, Enter or Tab key to change the Current Time value.

End Time

The value displayed in the End Time field is the animation's current position in seconds. Enter a value and press the Return, Enter or Tab key to change the EndTime value.

Once  Cyclic  Oscillate Once

Click on the Once radio button to specify that an animation should run once through to the end then stop.

Once  Cyclic  Oscillate Cyclic

Click on the Cyclic radio button to specify that an animation should play constantly, running through to the end then returning to the start to play again.

Once  Cyclic  Oscillate Oscillate

Click on the Oscillate radio button to specify that an animation should play constantly, running through to the end, playing backward from the end to the start, and playing again.

 Speed Bar

The slider bar represents the speed for the animation. Click on the slider, hold down the mouse button and drag the slider left or right to move to a different speed of animation. The center point always represents normal speed.

0.10 1.00 10.00

### Minimum Speed

The value displayed in the Minimum Speed field is the animation's slowest possible frame progression in seconds. Enter a value and press the Return, Enter or Tab key to change the minimum speed value.

0.10 1.00 10.00

### Current Speed

The value displayed in the Current Speed field is the animation's current frame progression in seconds. Enter a value and press the Return, Enter or Tab key to change the minimum speed value.

0.10 1.00 10.00

### Maximum Speed

The value displayed in the Maximum Speed field is the animation's fastest possible frame progression in seconds. Enter a value and press the Return, Enter or Tab key to change the minimum speed value.

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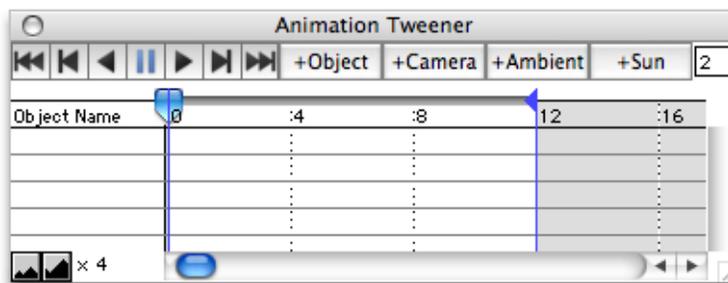
## Animation Tweener

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The Animation Tweener palette is used to specify the position, size and rotation of the object or the position, direction, zoom factor and view type of the camera at a specific time. The specified position is called a tween point, the positions between the set tween points are calculated by the computer.

Select Animation Tweener from the Palettes menu to display the Animation Tweener palette:



## Animation Tweener Controls



Move To Start

Clicked on the Move to Start button to move to the beginning of the timeline. 0.0 will be displayed in the Time field, and the slider on the timeline bar will display at the left end of the bar.



Move to Previous Tween

Click on the Move to Previous Tween button to move the timeline to the previous tween time point in the current animation.



Play Backward

Click on the Play Backward button to play the current animation in reverse direction.



Pause

Click on the Pause button to pause the current animation.



Play Forward

Click on the Play Forward button to play the current animation.



Move to Next Tween

Click on the Move to Next Tween button to move the timeline to the next tween time point in the current animation.



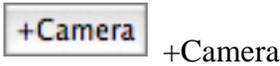
Move to End

Click on the Move to End button to move to the end of the timeline. The value set in the Duration field will be displayed in the Time field, the slider on the timeline bar will display at the right end of the bar.

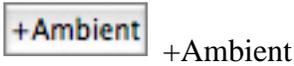


+Object

Use the +Object button to add a tweenpoint for an object. This specifies the position, size and rotation of the selected object at a particular time.



Use the +Camera button to add a tween point for the current camera. This specifies the position, direction, zoom factor and camera type at a particular time.



Use the +Ambient button to add a tween point for the current ambient light levels. This specifies the brightness, color and if it is on or off at a particular time.



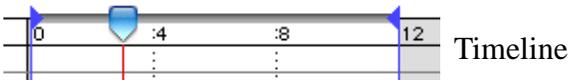
Use the +Sun button to add a tween point for the sunlight. This specifies the position, brightness, color and if it is on or off at a particular time.

**Note:** To delete a tween point, select the desired triangle marker and press the Delete key.



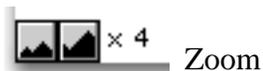
The Tween increment time value specifies the time in seconds the timeline will move forward after a tween point has been added.

**Note:** Holding down the Option key stops the timeline moving forward.



In the lower part of the Animation Tweener palette a table displays the list of objects with tween points which are displayed in the Object Name column. Objects can be selected in the document window by selecting an Object name in the list and vice versa.

The time in seconds is displayed in the first line of the table, and the current animation time is marked with a blue thumb at the top of the table and a vertical red line. To move the current animation time



Using the zoom controls at the bottom left of the palette to zoom in and out on the table, displaying a longer or shorter section of the timeline.

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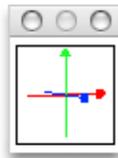
## u **Axis**

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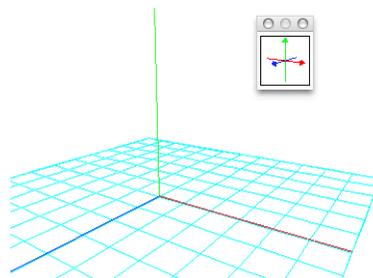
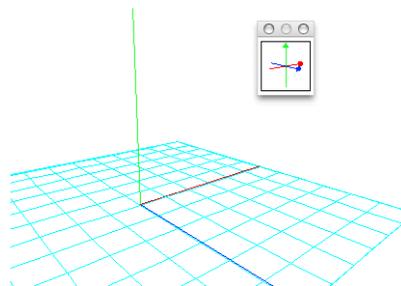
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The Axis palette is used to display the current orientation of the front window's camera.

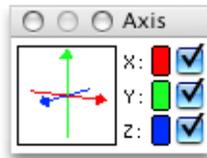
Select Axis from the Palettes menu to display the Axis palette:



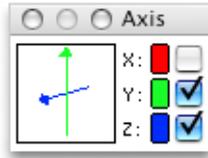
Select the Rotate tool in the Tool palette, click on the document grid and, holding down the mouse button, drag to rotate the grid. Notice that the positions of the axes in the Axis palette are updated to reflect the new orientation of the grid.



Click on the palette's zoom button to extend the Axis palette:



The axes are listed and the color of each axis shown. Next to the axis name is a checkbox that is used to display or hide the axis. Checking the check boxes on or off to specify which axes should be displayed in the palette.



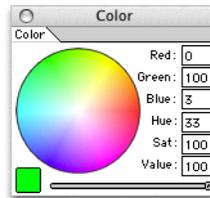
---

## u Color

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The Color plug-in displays a color picker, so that an object's color or the default color can be changed easily.

1. Select Color from the Palette menu to display the Color palette:



2. To change the color of an object, several objects, or a group, make a selection in the document window. If nothing is selected, the default color will be changed.
3. Choose a color from the Color palette by clicking on the color wheel and/or adjusting the brightness slider bar and values for Red, Green, Blue, Hue, Saturation and Value.
4. Click on the current color button to display the system color picker(s) if necessary.

**Note:** Colors can be dragged to and from the current color button.

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## u Color Palette

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The Color Palette plug-in provides a repository for 12 colors.

1. Select Color Palette from the Palette menu to display the Color Palette:



2. To use a color in the Color Palette, drag and drop it onto an object, the background, grid or color box in the Info Palette, or select an object in the document window and click on a color in the Color Palette.
3. To change a color in the Color Palette, drag and drop a new color over an existing one, or, when nothing is selected in the document, click on a color to open the color picker and choose a new color.

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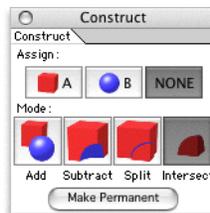
## u Construct

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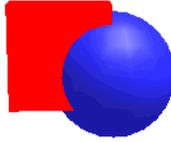
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The Construct palette is used to perform CSG (Constructive Solid Geometry) Boolean operations by cutting into one geometry with another.

Select Construct from the Palettes menu to display the Construct palette:



1. In the document window, position two objects so that they intersect:



2. Select one of the objects (in this example, the cube) and click on the A button to specify that this should be a type A object.
3. Select the other object (in this example, the sphere) and click on the B button to specify that this should be a type B object.
4. Clicking on the Mode buttons selects the type of construction that will be performed:
  - **A Add B:** Creates a geometry that has only the outer surfaces of A and B. Choosing this option will have no visible effect.
  - **A Subtract B:** Display only the portion of object A not intersected by object B:



- **A Split B:** Creates two geometries that has surface of object A and the intersected surfaces of object B. The object part that was not intersected by object B is assigned A, the other object part is assigned B. Choosing this option will have no visible effect, until Make Permanent is clicked.
- **A Intersect B:** Display only the portion of object A that is intersected by object B:



5. The geometry displayed will be updated interactively to reflect the new position of an object as it is moved.

6. If you have the Construct Idler plug-in loaded, one of the objects may be invisible, but it can still be selected and moved. The geometry displayed will be updated to reflect the new position of the object.
7. Click on the Make Permanent button to create a permanent geometry. This may take a few seconds to calculate. The Make Permanent action can be undone if the desired effect is not achieved, and the objects repositioned.

The Mode button controls described are global controls and will affect all CSG objects in the document that have not been made permanent. As many objects as you wish may be specified as type A and type B type CSG objects and will all interact with each other according to type.

### The Construct Plug-in Tool

The Construct plug-in is a plug-in modifier tool. *See Construct on page H-7 for more details.*

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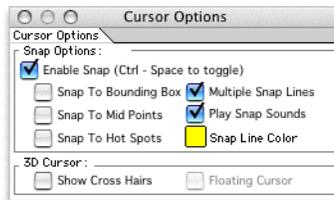
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## v Cursor Options

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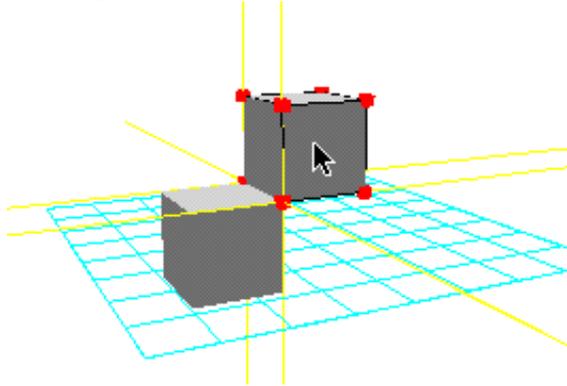
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The Cursor Options palette allows you to control the alignment and positioning of objects with other objects, and the display and positioning of the cursor. Select Cursor Options from the Palettes menu to display the palette. Click on the shrink/expand button at the top right of the palette to show or hide the lower section.



## Snapping Options

Snapping is the alignment of points with other points. When positioning objects, snap lines will display and a sound will play when the snap points of the selected objects are aligned to the snap points of unselected objects.



- **Enable Snap:** Click on this check box to turn the Snapping features on or off. Alternatively hold down the Control key and press the space bar to switch Snapping on or off.
- **Snap to Bounding Box:** Click on this check box to activate the eight corners of each object's bounding box as Snapping points.
- **Snap to Mid Points:** Click on this check box to activate the mid points of each object's bounding box as Snapping points, i.e. The points half way between the eight corner points of the bounding box.
- **Snap to Hot Spots:** Click on this checkbox to specify that an object's Hot Spots should be activated as Snapping points. Hot Spots are points in addition to the corners and mid points of an object's bounding box. These are automatically added to wall objects and can be added to door and window objects. Hot Spots are added to wall objects at the top and bottom of the wall at each corner. When placing doors and windows in a document, the Windows and Doors palette includes a check box allowing you to choose whether to add Hot Spots or not. If added, Hot Spots are positioned at the points where the window or door intersects with the wall.
- **Multiple Snap Lines:** If this option is checked on, snap lines will display for all current alignments. If checked off, snap lines will display only for the first alignment found in each axis.
- **Play Snap Sounds:** Check this option on to play sounds according to the snapping status of objects being positioned. Three different sounds play in the following circumstances:

If a point is aligned with, but not snapped to, another point.

If a point is snapped to another point.

If a point is no longer aligned with or snapped to another point.

- **Snap Line Color:** Click on this box to display the Color Picker and select the color used to display the snapping lines.

### 3D Cursor

- **Show Cross Hairs:** Check this option to display cross hairs showing the position of the cursor in the document in 3D space.
- **Floating Cursor:** The cursor defines a position and an orientation for entering new objects, and usually snaps to the surface of any object below the cursor arrow. Check this option to specify that the cursor should not snap to the surface of any object below it, and should not orientate itself in relation to that surface.

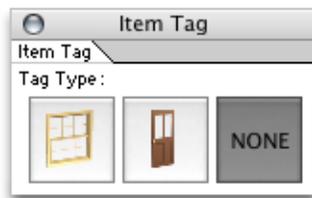
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## u Item Tag

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The Item Tag palette is a palette that is designed to allow the easy design of doors and windows in Microspot Modeler for Microspot Interiors. Essentially to tag a model as a door in Interiors, select the item and click on the door button in the item tag palette. Similarly for windows. Then when one of the tagged models is imported into Interiors from Modeler, Interiors will know to treat the model as a door or window, depending on the tag used. *See the Windows And Doors Tutorial on page 2-84 for more details.*

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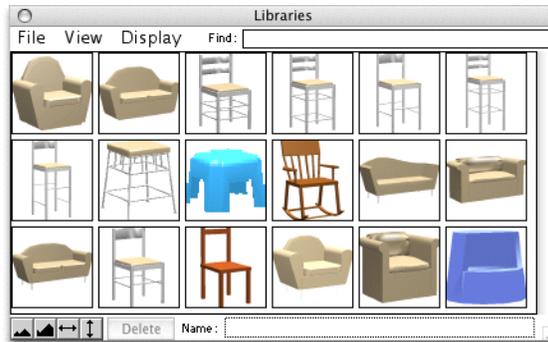
## u Libraries

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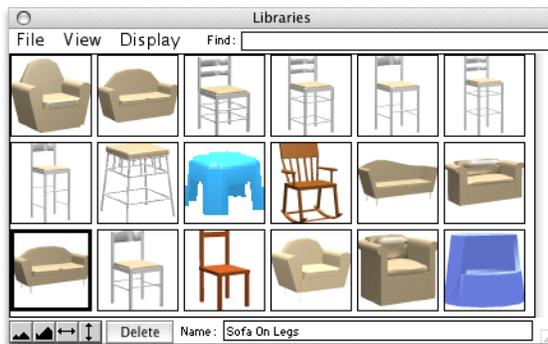
The Libraries palette displays libraries of furniture items, doors, windows, textures, colors etc. that can be used in your 3D scene.

Select Libraries from the Palette menu. The first time the Libraries palette opens, it opens all the default libraries of the program. Every time after this the Library palette retains the list of the libraries selected:



### Selecting Library Items

When you click on an item that is stored in a library it will be outlined with a black rectangle to show it is selected:



## Storing Data

3DMF, PICT, and data in various other image formats can be stored in libraries. Modeler includes several libraries of furniture and accessory items, doors and windows, colors and textures, but you can also use the Libraries palette to store your own items. To do this drag and drop objects/groups of objects from Modeler into a library. You can also visit the Microspot website to download more libraries, *See Microspot Library Download on page 3-36.*

## Naming Items

Items are displayed in a library in the order in which they were entered.

If an item has a name attached to it, this name is displayed in the Name field at the bottom of the palette when the item is selected. Unnamed items will display as untitled.

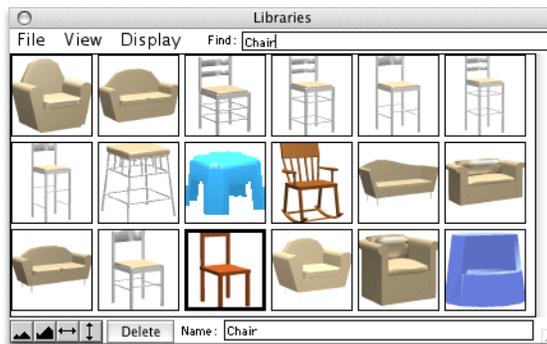
To name or rename an item, select its icon and enter a name in the Name field. Press the Enter or Return key, select another object or click on an empty space in the library and the item will be updated with its new name.

## Retrieving Data

To retrieve data from a library, drag and drop an item directly into your Modeler document.

## Find

Library items can be searched by name. Enter text into the Find field at the top right of the Libraries palette. The first item found that matches the entered text will be selected:

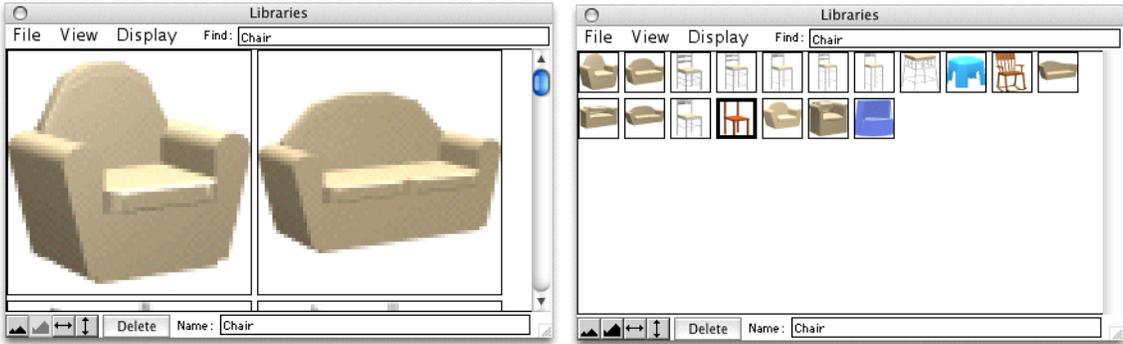


**Note:** The Libraries palette searches for names that match or start with the name you enter.

## Window Controls

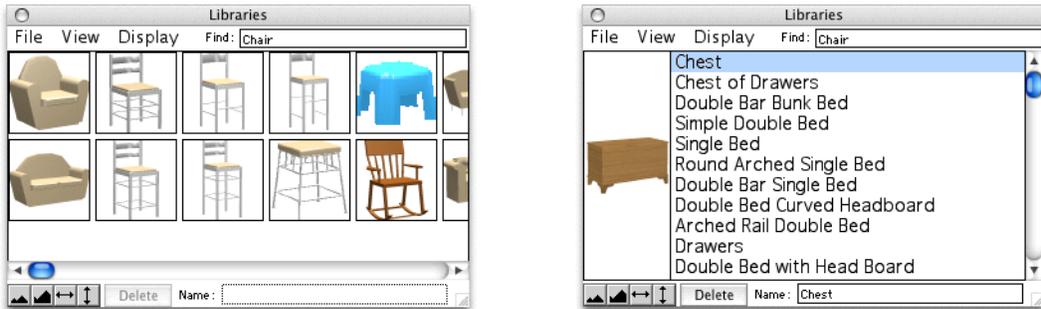
### Zoom In/Out

The Zoom controls at the bottom left of the palette can be used to increase/decrease the size of the palettes contents:

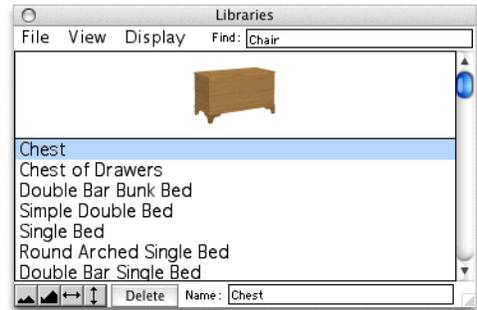
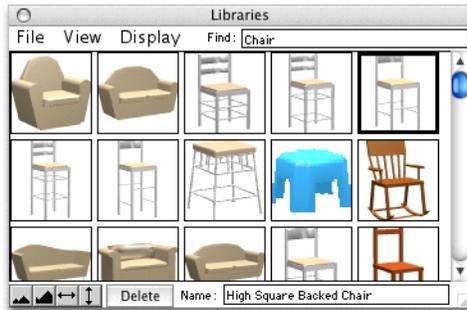


### Horizontal/Vertical Arrows

- **Horizontal Arrow:** In the By Icon view, click on this button to display the Libraries palette with a horizontal scroll bar. In the By List view, click on this button to display the preview to the left of the item list:



- **Vertical Arrow:** In the By Icon view, click on this button to display the Libraries palette with a vertical scroll bar. In the By List view, click on this button to display the preview above the item list:

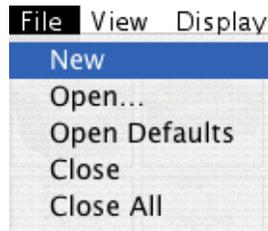


### Delete Button

- **Delete:** The Delete button removes the current selected library item:

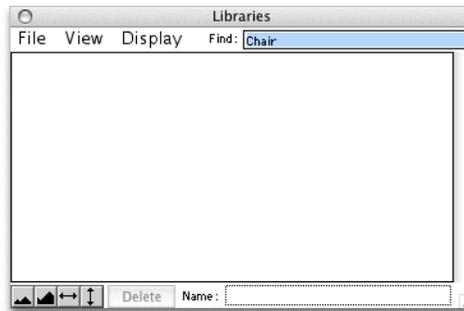
## Menus

### File Menu



### New

Select New to open a new library. The standard dialog will display, allowing you to enter a name for the new library and specify a location to save it. A new, empty library will display in the Libraries palette:



### Open

Select Open to open an existing library. A standard Open dialog will display for you to select the library to open. The selected library will display in the Libraries palette.

### Open Defaults

On selecting Open Defaults all the programs existing default libraries will be displayed in the Libraries palette.

## Close

Choose to close the current library. The Libraries palette save the library file whenever you add data, so you do not need to save any changes. The Libraries palette will remain open and will display the contents of any other open libraries.

## Close All

Choose to close all open libraries. The Libraries palette will remain open but will be empty.

## View Menu



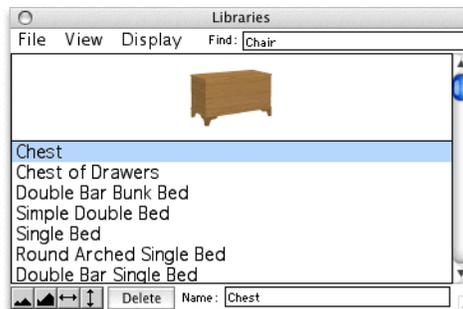
## By Icon

Select By Icon from the View menu to display picture previews of a library's contents. Although the items' names will not be displayed, you may still search for items by name using the Find field at the top right of the Libraries palette.

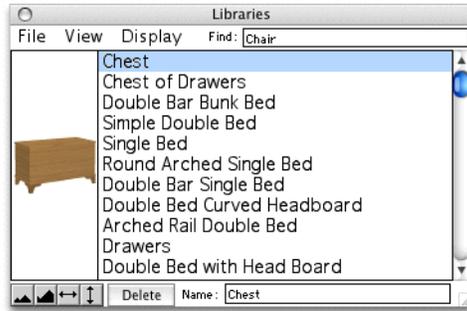
## By List

Select By List from the View menu to list a library's contents by name. When By List is selected you can also choose whether to see a preview of an item when it is selected in the list.

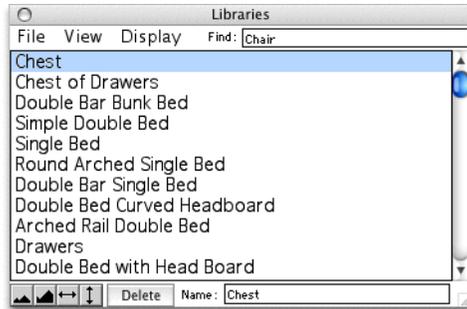
- Preview above: The preview is displayed above the list:



- Preview to left: The preview is displayed to the left of the list:



- No preview: No preview of selected items is displayed:



## Display Menu

The display menu lists all the libraries currently open. Select a library's name from the list to display it or choose Show All to display the contents of all the open libraries in the order in which they were opened.

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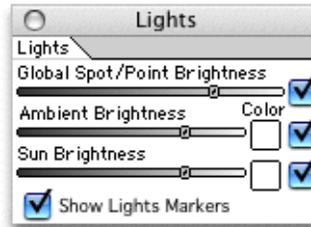
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## u Lights

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The Lights Palette is used to control the various lighting features available in the application. Select Lights from the Palettes menu to display the palette:



**Note:** The Preferences dialog, accessed from the Edit Menu, contains a check box for Global Lights. If the Global Lights control is turned on, any changes made via the Lights palette will affect the whole document. If the Global Lights control is turned off, making changes in the Lights palette will affect only the current window. *See Preferences on page 3-5 for further details.*

### Spot/Point Brightness

Lights are placed in documents by dragging and dropping light objects or furniture items including lights into the document. When a light is placed in a document, its color, brightness, spread and sharpness can be adjusted via controls in the Info Palette. *See Info Palette on page 4-17 for further details.*

- To manipulate all point or spot lights at once, use the Spot/Point Brightness slider control in the Lights Palette.
- Use the checkbox to the right of the slider bar to turn all the point or spot lights on or off.

### Ambient Brightness

Ambient light is the equivalent of daylight. It is a diffused light that has no specific point of origin and casts no shadows.

- Use the Ambient Brightness slider bar to adjust the brightness of the ambient light.
- Click on the color box to display the Color Picker and select a color for the ambient light, or drag a color onto the color box.

- Use the checkbox to the right of the color box to turn ambient light on or off.

### Sun Brightness

By default, sunlight shines from the South East at an angle of 45°. The direction of the sunlight can be adjusted using the Sun Direction plug-in. *See Sun Direction on page H-11 for further details.* Sunlight will affect your view of an object, and some surfaces will reflect more light than others.

- Use the Sun Brightness slider bar to adjust the brightness of the sunlight
- Click on the color box to display the Color Picker and select a color for the sunlight, or drag a color onto the color box.
- Use the checkbox to the right of the color box to turn sunlight on or off.

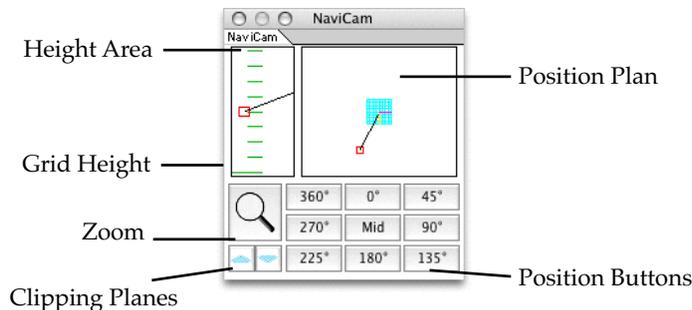
### Show Lights Markers

Use this checkbox to specify whether Point and Spot Light Markers should be hidden or displayed. The effects of the lights will be apparent regardless. Non-interactive renderers (such as the Microspot Renderer) will not display light objects whether they are hidden or not. *See Appendix I — Microspot Plug-in Renderers on page I-1 for more details.*

## u NaviCam

The NaviCam palette provides a way of controlling the camera position and view.

Select NaviCam from the Palette menu to display the NaviCam palette.



The red square displayed in the palette, both in the height area and in the position plan, represents the camera. The line from this square shows the camera view direction and at the end of this line is the look at point or point of interest.

## **Height**

Use the controls in the Height Area to adjust the position of the camera, or point of interest, in the Y dimension.

The long green line in the Height Area represents the grid height. The lines above it represent height as determined by the size of the grid and each grid square.

- Click on the camera square and move it up or down to change the camera height while maintaining the point of interest.
- Click on the view direction line (or anywhere in the Height Area except the camera square) and drag up or down to change the height of the point of interest without changing the camera height. This is the same as tilting the camera.
- Hold down the Option key, click anywhere in the Height Area and drag up or down to adjust the height of the camera and move the point of interest relative to the camera height.

If the camera is moved out of the height range shown, the display will be rescaled so that the camera square can still be seen. When the camera is moved back into range, the display will be rescaled again.

## **Position**

Use the controls in the Position Plan to adjust the position of the camera or the point of interest in the X and Z dimensions.

The Position Plan displays an image of the 3D scene in plan view.

- Click on the camera square and drag to change the position of the camera while maintaining the point of interest.
- Click on the view direction line (or anywhere in the Position Plan except the camera square) and drag to change the position of the point of interest without moving the camera position. This is the same as turning the camera.
- Hold down the Option key, click anywhere in the Position Plan and drag to move the camera and move the point of interest relative to the camera position. This is the same as the step and crab movements of the camera.

If the camera is moved out of the plan shown, the display will be rescaled so that the camera square can still be seen. When the camera is moved back into range, the display will be rescaled again.

## **Zoom**

Click on the Zoom button and drag up or down to zoom in or out on the scene.

## **Clipping Planes**

The Clipping Plane controls are used to adjust the camera's front (Hither) and back (Yon) clipping planes.

Although the clipping planes themselves are invisible, the effect they have on objects in the document can be seen. The front (Hither) and back (Yon) clipping planes can be set so that you view only a section of the document. Any objects or parts of the objects closer to the camera than the front (Hither) clipping plane, or further from the camera than the back (Yon) clipping plane, will not be visible.

### **Hither Clipping**

Click on the Hither Clipping button and drag up to move the front (Hither) clipping plane further away from the camera or down to move the front (Hither) clipping plane towards the camera.

### **Yon Clipping**

Click on the Yon Clipping button and drag up to move the back (Yon) clipping plane further away from the camera or down to move the back (Yon) clipping plane towards the camera.

## **Position Buttons**

Use the position buttons to move either the camera or the point of interest to predefined positions.

- Click on the position buttons to move the camera while maintaining the point of interest. 0° moves the camera to directly behind the point of interest, 90° to the right, 180° directly in front of, 270° to the left, and so on.

- Hold down the Option key and click on the position buttons to move the point of interest while maintaining the camera position. 0° moves the point of interest to directly behind the camera, 90° to the right, 180° directly in front of, 270° to the left, and so on.
- Click on the 'Mid' button to move both the camera and the point of interest to predetermined locations. The point of interest is positioned at the centre of the grid. The camera is placed half way between the centre and the side of the grid, directly in front of the point of interest. The camera will be at approximately eye height and tilted down slightly.

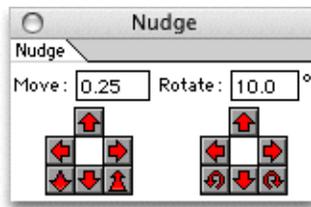
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## U Nudge

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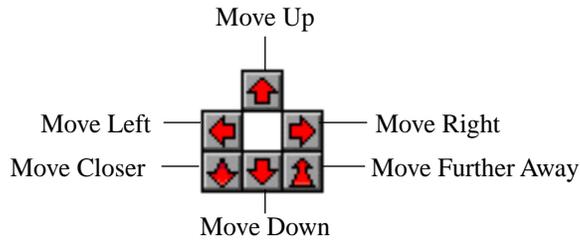
Use the Nudge palette to move or rotate an object by a specified amount.

Select Nudge from the Palettes menu to display the Nudge palette:



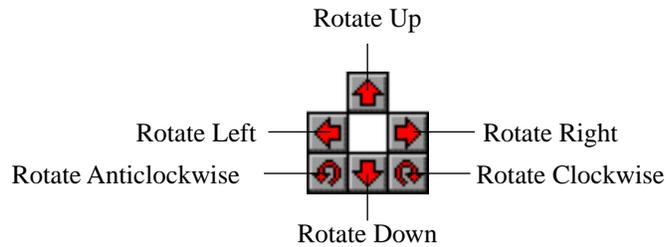
### Move

1. Select an object in the document window.
2. Enter a value in the Move box in the Nudge palette. The units used will depend on those set for the document in the Options menu.
3. Click on the control buttons to choose the direction in which to move the selected object. The direction relates to the current view.



## Rotate

1. Select an object in the document window.
2. Enter a value in degrees in the Rotate box in the Nudge palette.
3. Click on the control buttons to choose the direction in which to rotate the selected object. The direction relates to the current view.

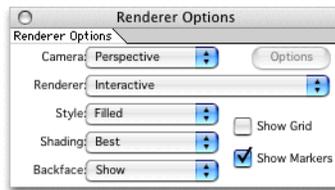


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## Render Options

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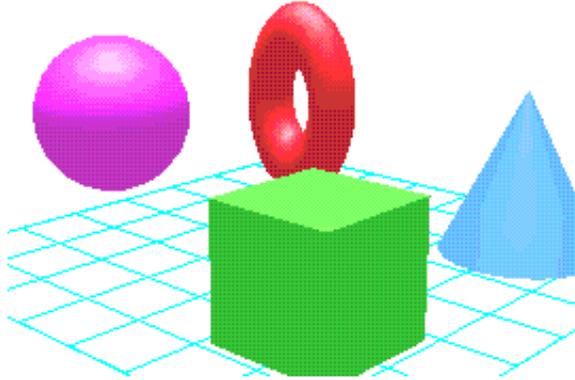
The Renderer Options plug-in palette is used to control the way that the document is displayed. Choose Render Options from the Palettes menu to open the palette:



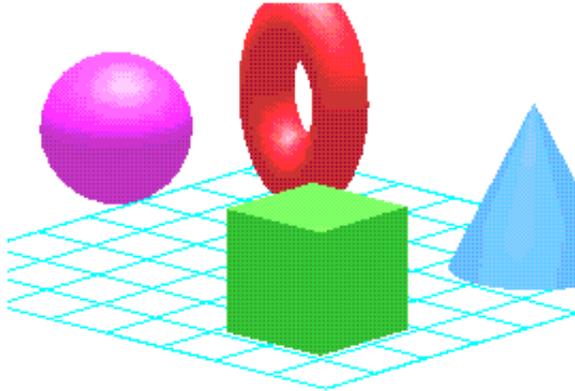
## Camera

Select Perspective or Orthographic from the Camera pop-up menu.

- **Perspective:** Objects are displayed in perspective mode to give the illusion of depth. Parallel lines are drawn so that if extended, they would converge at a given point:



- **Orthographic:** Objects are displayed in Orthographic mode. Parallel lines remain parallel, regardless of the distance they are supposed to be from the camera:

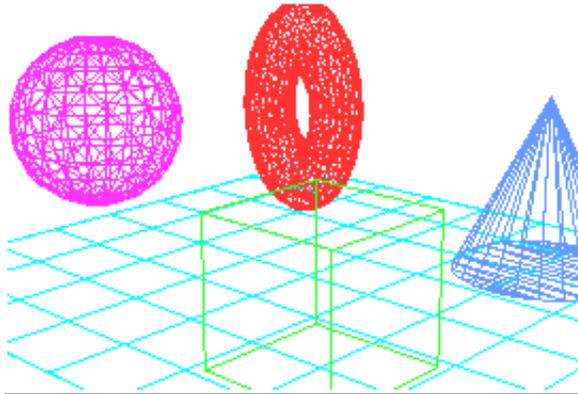


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## Renderer

Click on the Renderer popup menu to display any available renderers.

- **Wire Frame:** The surfaces of objects are not filled; only the edges of the surfaces are displayed:



- **Interactive:** Objects in the document are rendered using the programs interactive renderer.
- **Microspot Preview Renderer:** The scene is rendered using the Microspot non-interactive renderer to produce a fast preview render of the scene with lighting and shadows. *See Appendix I — Microspot Plug-in Renderers on page I-1 for more details.*
- **Microspot Renderer:** The scene is rendered using the Microspot non-interactive renderer to produce a high quality final render. *See Appendix I — Microspot Plug-in Renderers on page I-1 for more details.*

### Renderer Options

To the right of the Renderer popup menu is a button for Renderer Options. This is only active if a non-interactive renderer is installed and selected. Click on the button to display any available options for the currently selected non-interactive renderer.

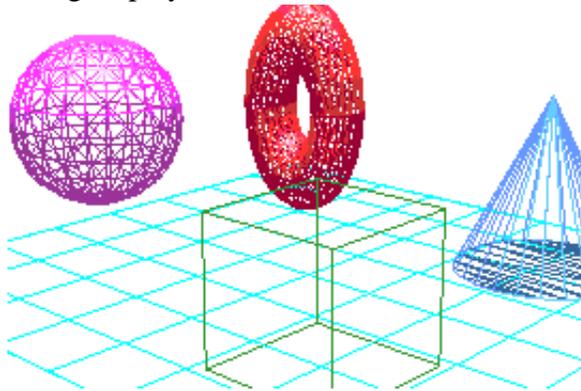
**Note:** Holding the Option key down while selecting the renderer will also display any options available.

### Style

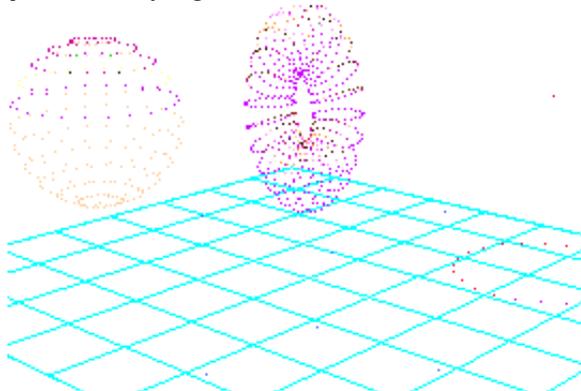
The Style pop-up menu is not available when the Wire Frame renderer is selected. Select one of the following options from the menu:

- **Filled:** All surfaces are filled and rendered. Objects appear to be solid.

- **Edges:** Only the edges of objects are rendered. This is different from Wire Frame mode in that lines are rendered according to the orientation of the object and any light sources, rather than the lines being displayed as one solid color:



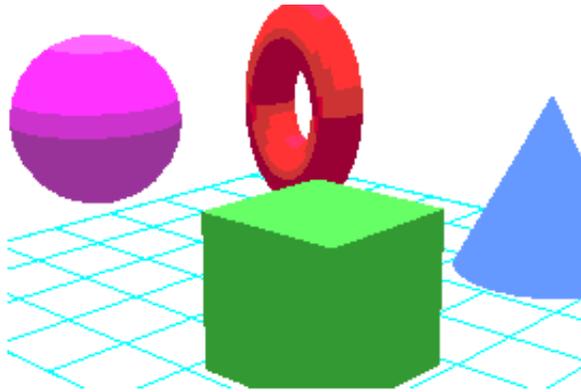
- **Points:** Only the vertex points of objects are rendered. Points are rendered according to the orientation of the object and any light sources:



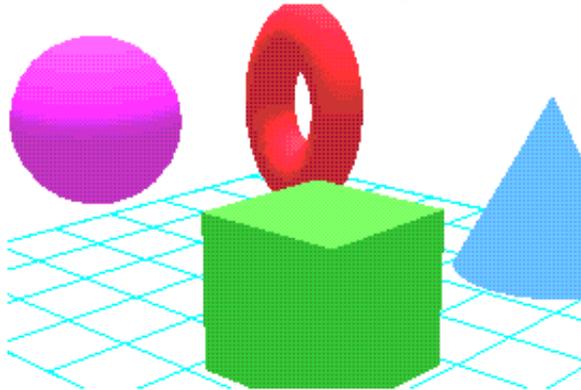
## Shading

Select Plain, Smooth or Best from the Shading pop-up menu.

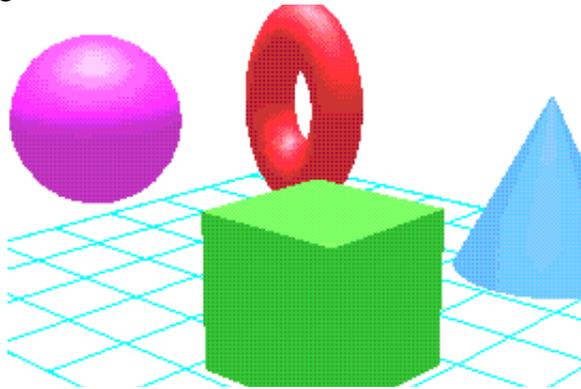
- **Plain:** Surfaces are filled but not smoothed and steps of color can be seen within some objects. Shading is applied according to the angle of the surface and any light sources that will affect the object:



- **Smooth:** Surfaces are filled and smoothed. Shading is applied according to the angle of the surface and any light sources that will affect the object:



- **Best:** Surfaces are filled and smoothed. Shading is applied according to the angle of the surface and any light sources that will affect the object. This option also displays the reflections of any lights:

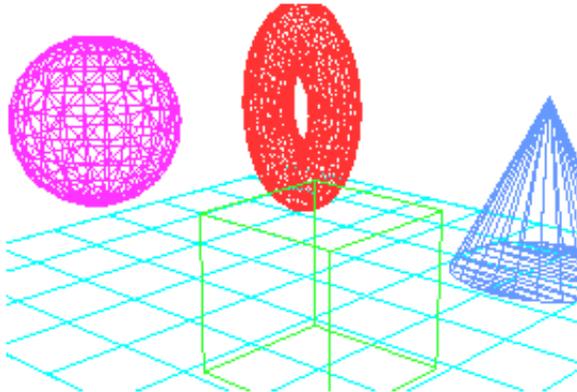


### **Backface**

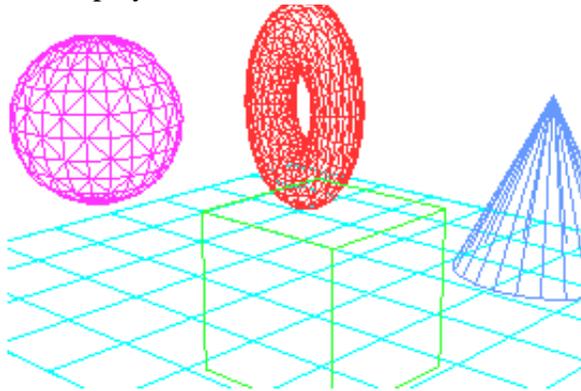
The backface of an object is the side that faces away from the camera.

Select Show, Remove or Flip from the pop-up menu.

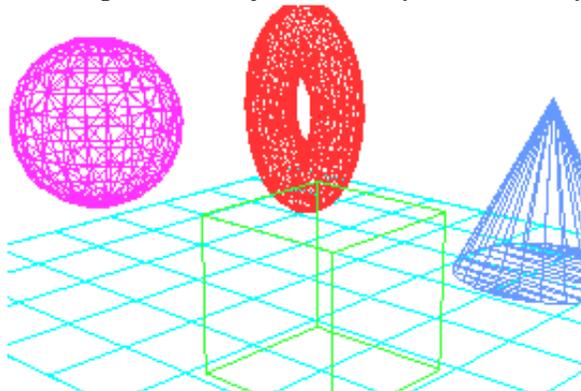
- **Show:** Select this option to show the backface of an object. This will not make any visible difference if the object surfaces are filled, but if you are viewing the objects in wire frame mode, you will be able to see the wire frame on the backface of the object:



- **Remove:** Select this option to hide the backface of an object. This will not make any difference if the object surfaces are filled, but if you are viewing an object in wire frame mode, its backface will not be displayed:



- **Flip:** The Flip option flips the backface so that the outside surface is now on the inside. This does not affect the shape of the object, but may alter the way it is rendered:



### Show Grid

Documents are automatically displayed with a grid to help you design and position objects in 3D. When this option is enabled, the grid will be displayed. Uncheck this option to hide the grid.

### Show Markers

When text and sound markers are placed in a document, you can choose whether or not to display them. Check the Show Markers option to display markers, or leave it unchecked to hide markers. There is no marker tool in Modeler.

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## Section

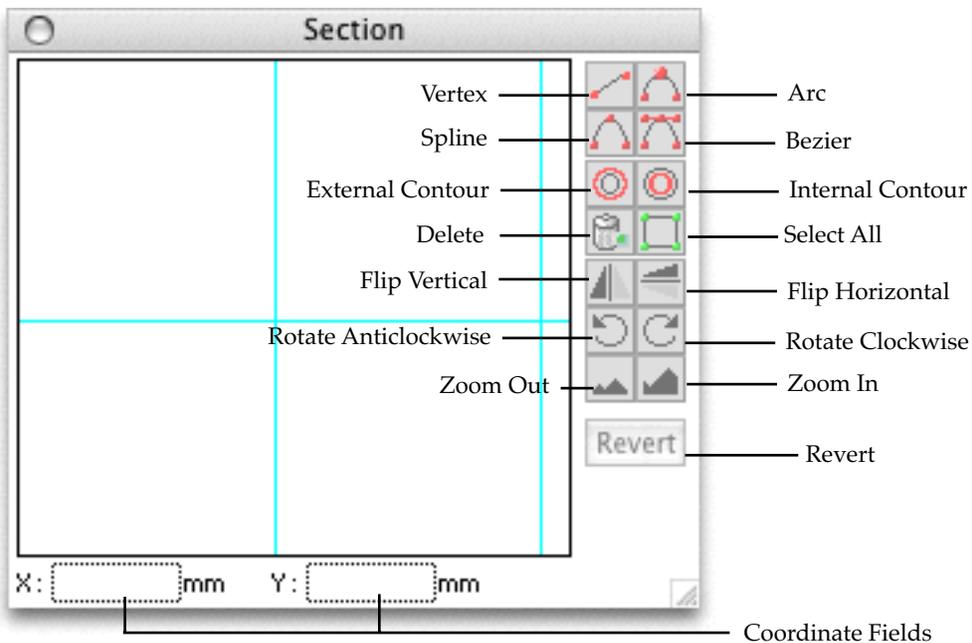
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The Section palette is used to edit the section of geometries that are made up of paths and sections. These are: 3D Text; cones; cylinders; irregular polygons; lathed objects; pipes; pyramids; and regular polygons.

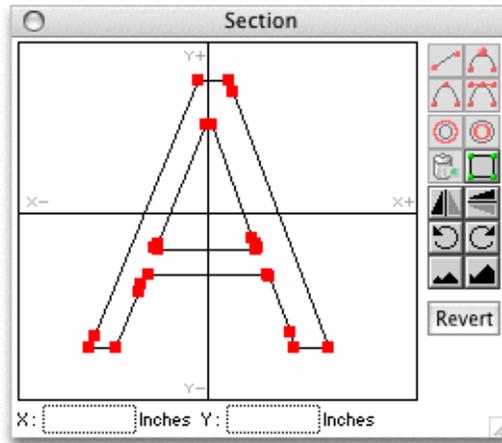
If the Dynamic Updates application preference is checked on, as the section is edited the geometry in the document window is updated to reflect the changes made and the results of any actions can be seen instantly. If the Dynamic Updates preference is checked off, the geometry in the document window is updated only when the mouse button is released as an editing action is completed. *See Preferences on page 3-5 for further details.*

To display the Section palette, select Section from the Palette menu:



## Displaying An Object Section

Select a geometry in the document window and its section will display in the Section palette. The section is drawn in black with handles showing the various points on the section. Black lines show the x and y axes, and the object origin is at the point these two axes intersect.



## Types Of Point

-  **Vertex:** A standard point used to define the beginning or end of a straight section of a path or line.
-  **Arc:** A point on a section of a circle defined as the center point on the arc between two vertex points.
-  **Spline:** A point on a curve. The curve is defined automatically and cannot be edited except by adjusting the points at either side of the spline point.
-  **Bezier:** A point on a curve. Two Bezier handles allow the curve to be adjusted.

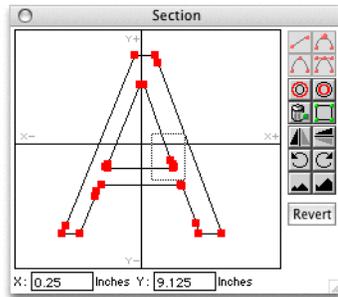
Vertex point handles display as squares, Bezier and spline point handles as diamonds, and arc point handles as circles.

## Selecting Points

Click on a handle to select it.

**Note:** When selected, a Bezier point has two additional handles that allow you to adjust the Bezier curve.

- **To select additional points:** Hold down the Shift key and click on another point.
- **To deselect points:** Hold down the Shift key and click on a selected point.
- **To select several points at the same time:** Hold down the Shift key and click and drag in the Section palette to drag out a marquee selection:

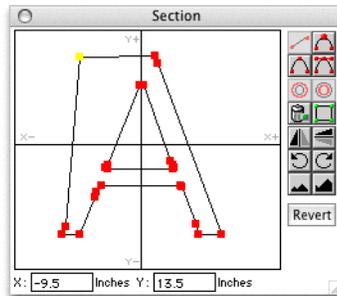


- **To select all the points in the section:** Click on the Select All button in the Section palette.

## Moving Points

There are three methods of moving points of any type:

- Click on a handle and drag to reposition it.



- Enter coordinate values in the x and y fields at the bottom of the Section palette to move a point by precise values. The coordinates entered here relate to the section origin rather than the grid origin.
- Use the arrow keys to move a point by two screen pixels at a time, or by the grid snapping distance if one is set.

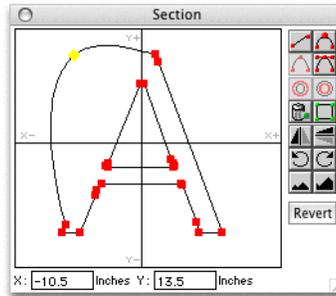
When moving points by clicking and dragging or using the arrow keys, the section window will auto scroll so that you can see the new position of the point(s).

## Manipulating Points

- **Arc:** Other adjustments can be performed by manipulating the vertex points at either end of the arc.
- **Bezier:** Click and drag on the Bezier handles to adjust the curve. Hold down the Control key and click and drag on the Bezier point or Bezier handles to break the Bezier curve.

## Changing Points

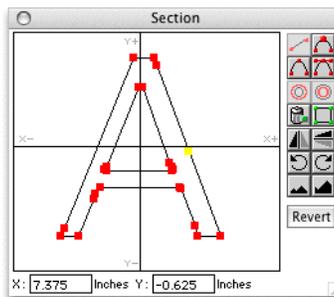
To change a point to a point of a different type, select the point then click on the Vertex, Arc, Spline or Bezier button in the Section palette. The point will change to the type selected.



**Note:** An arc point can only be added between two vertex points.

## Adding Points To A Section

To add a point to a section, select two contiguous points on the section, then click on the Vertex, Arc, Spline or Bezier button in the Section palette. A point of the appropriate type will be added between the two points originally selected.



**Note:** An arc point can only be added between two vertex points.

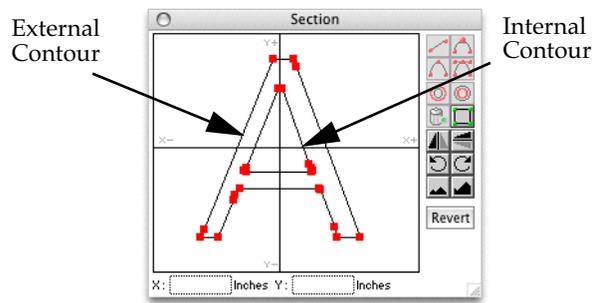
An alternative way of adding vertex or spline points is to hold down the Option key, click on an existing vertex or spline point and drag to place a copy of the point.

**Note:** Arc and Bezier points cannot be added in this way.

 External/  Internal Contour

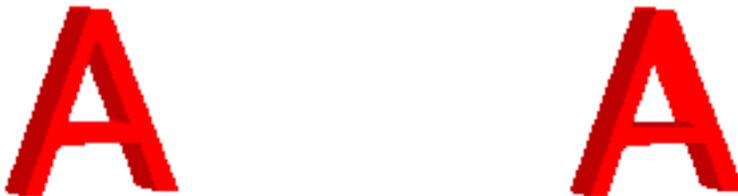
The way light shines on a surface will be affected by whether a contour is defined as being an internal or an external contour. A contour is part of a section made up of a closed line.

For example, the cross section of the letter A contains two contours. By default they are an external contour and an internal contour. As the window cut out of the letter A is defined as an internal contour, the light is shown shining down on the bridge of the letter A and the other inside surfaces are in shadow.



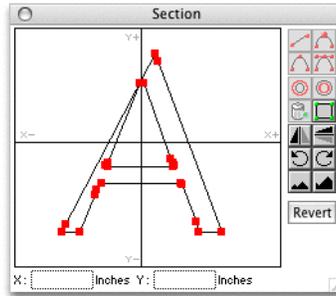
To change the definition of a contour, select a point on the contour line and click on the External Contour or Internal Contour button in the Section palette.

In the figure below, the internal contour of the letter A is selected and changed to an external contour. It is now treated as an external contour as far as the lighting effects are concerned, so the bridge of the letter A is now in shadow and the other inside surfaces have light shining on them.





Select a point or points in the Section palette and click on the Delete button to remove them from the section.



To select all the points in the section, click on the Select All button in the Section palette.

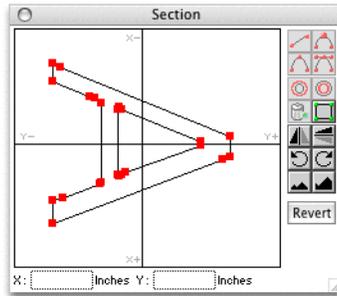


The orientation of the object's section when it initially appears in the Section palette is determined by the way the original object was drawn and how the object's internal data structure is held by Modeler. To view the section in the same orientation as the object as it now is displayed in the document window, it may be necessary to use the Flip Vertical or Flip Horizontal button to flip the section around the x or y axis. This affects only the view of the section in the Section palette, it does not affect the 3D geometry in the Modeler document window.



The orientation of the object's section when it initially appears in the Section palette is determined by the way the original object was drawn and how the object's internal data structure is held by Modeler. To view the section in the same orientation as the object as it now is displayed in the Modeler document, it may be necessary to rotate the section in the Section palette

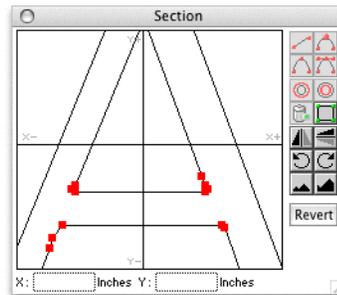
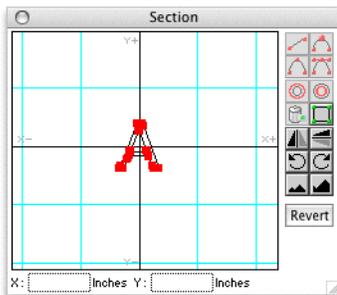
by clicking on the Rotate Anticlockwise or the Rotate Clockwise button. The section will be rotated by 90° in the relevant direction.



This affects only the view of the section in the Section palette, it does not affect the 3D geometry in the Modeler document window.



Click on the Zoom In or Zoom Out button to zoom in or out of your view of the section in the Section palette. The view is centered on any selected points or on the center of the section if no points are selected.

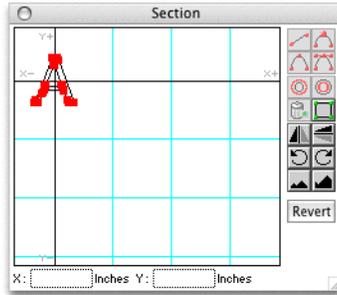


## Revert

Click on the Revert button to return to the section as it was when the object was first selected. This relates to the points on the section only, not to any view options you have used in the Section palette.

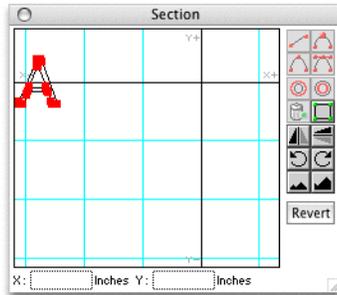
### Moving the Section Window Contents

Click on the section window and drag to reposition window contents. The section window will autoscroll.



### Changing the Object's Origin

Click on X or Y axis and drag to reposition the location of the axis relative to the section.



When the X or Y axis is moved the origin will change, so the origin of the object's path is changed relative to the object's section.

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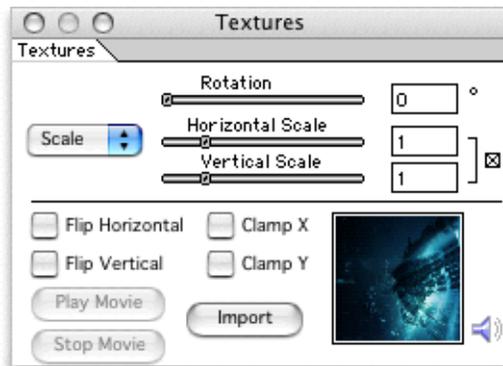
## u Textures

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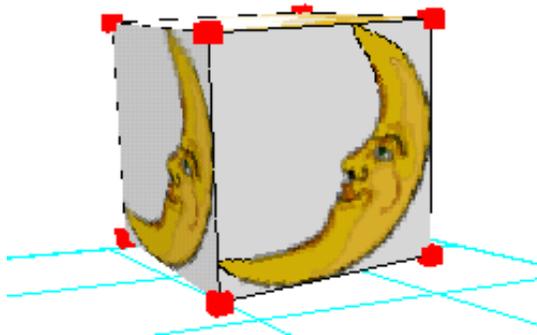
Use the Textures Palette to manipulate a texture applied to an object.

Select Textures from the Palettes menu to display the Textures palette:



The contents of the palette will be grayed out unless an object with a texture applied to it is selected.

When a texture is applied to an object it is scaled/stretched to fit once on each surface. The texture can then be manipulated using the controls in the Textures palette.



### Textures Palette Options

- **Rotation:** Enter a value between 0 and 359.9 in the rotation field and press the Return, Enter or Tab key or use the rotation slider to adjust the degree of rotation of the texture applied to the object.
- **Offset:** Select Offset from the pop-up menu and the two slider bars to the right of the pop-up menu will relate to horizontal and vertical offset. The values for horizontal and vertical offset can be linked by clicking on the constrain box to the right of the slider bars.

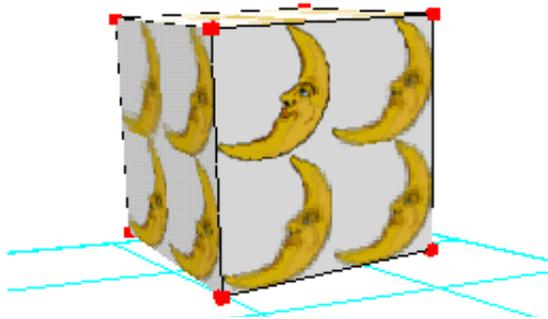
**Horizontal Offset:** Enter a value between 0 and 1 in the Horizontal Offset field and press the Return, Enter or Tab key or use the slider bar to move the texture across the object in a horizontal direction.

**Vertical Offset:** Enter a value between 0 and 1 in the Vertical Offset field and press the Return, Enter or Tab key or use the slider bar to move the texture across the object in a vertical direction.

- **Scale:** Select Scale from the pop-up menu and the two slider bars to the right of the pop-up menu relate to horizontal and vertical scale. The values for horizontal and vertical scale can be linked by clicking on the constrain box at the right of the slider bars.

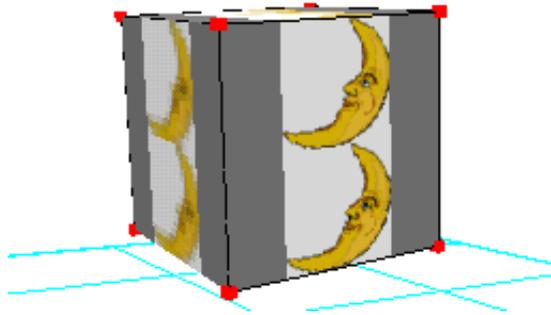
**Horizontal Scale:** Enter a value between 0 and 25 in the Horizontal Scale field and press the Return, Enter or Tab key, or use the slider bar to change the horizontal scale of the texture on the object.

**Vertical Scale:** Enter a value between 0 and 25 in the Vertical Scale field and press the Return, Enter or Tab key or use the slider bar to change the vertical scale of the texture on the object.

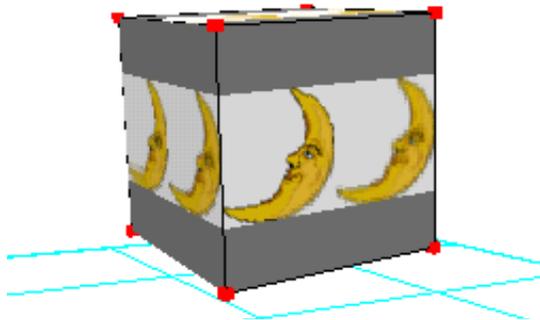


- **Flip Horizontal:** Check the Flip Horizontal check box to flip the texture applied to the object around the horizontal axis.
- **Flip Vertical:** Check the Flip Vertical check box to flip the texture applied to the object around the vertical axis.

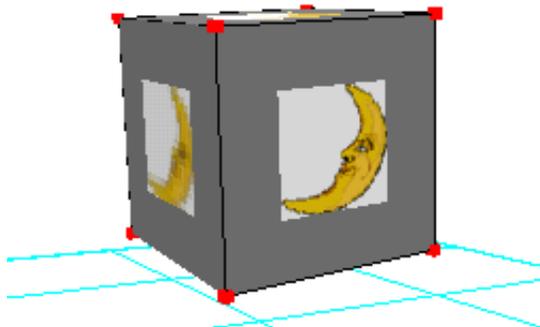
- **Clamp X:** Check the Clamp X check box to prevent the texture being repeated in the X-axis. The texture offset can then be adjusted to position the strip of texture on the surface.



- **Clamp Y:** Check the Clamp Y check box to prevent the texture being repeated in the Y-axis. The texture offset can then be adjusted to position the strip of texture on the surface.



- If the texture is clamped in both the X and Y axes it is not repeated in either direction. The texture can then be scaled and positioned on the surface as desired.



- **Play Movie:** This option is only available if a movie has been applied to an object as a texture. Click on the Play Movie button to start the movie playing. Note: the movie will only play if animation is turned on and is not paused. If animation has been turned off or paused via the Animation Player palette (*see Animation Path on page D-7*) the movie will not play until animation is turned on again.
- **Stop Movie:** This option is only available if a movie has been applied to an object as a texture. Click on the Stop Movie button to stop the movie playing.
- **Import:** Click on the Import button to display a standard dialog that allows you to select a PICT, TIFF, JPEG, GIF, PICT clipping or movie file to import as a texture or else just drag and drop directly onto objects in the document window, as long as the Textures palette plug-in is loaded.
- **Sound:** Use the Sound control to change the volume of the sound of any movie applied as a texture on a selected object. Click on the sound icon and a pop-up menu displays. Select the level of sound required.

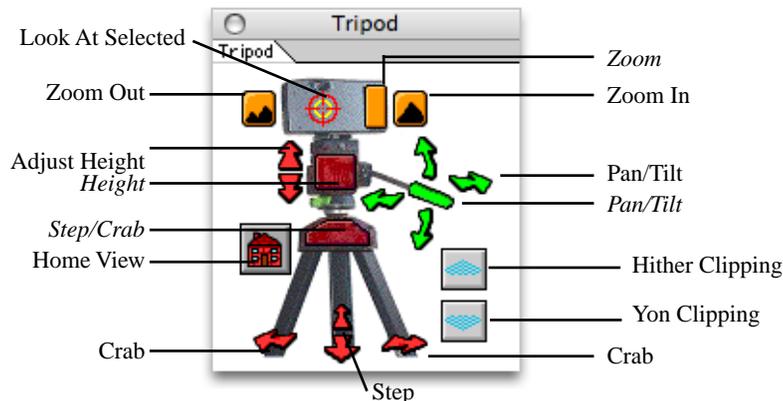
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## v Tripod

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The Tripod palette provides an alternate method to the NaviCam palette for a way of changing the view in the current document window.

Select Tripod from the Palettes menu to display the palette:



The Tripod palette displays a graphic of a camera on a tripod. A variety of buttons provide controls for manipulating the camera, the above dialog shows how those controls are used. In most cases click on the button to perform the relevant action. When using those buttons marked with *italic text*, click on the button and drag to perform the desired action.

- **Look At Selected:** Select an object in the document and click on the Look At Selected button to position the camera to centre the selected object in its view.
- **Zoom:** is used to narrow or widen the focus of the camera lens
- **Height:** The Height controls are used to change the height of the camera.
- **Pan/Tilt:** The Pan/Tilt controls are used to change the camera's angle by turning it left and right or tilting it up and down.
- **Step/Crab:** The Step/Crab controls are used to move the camera closer, further away, left, and right.
- **Home View:** Click on the Home View button to return the camera to its initial position (the view displayed when a new file is opened).
- **Hither Clipping:** Click on the Hither Clipping button and drag up to move the front (Hither) clipping plane further away from the camera or down to move the front (Hither) clipping plane towards the camera.
- **Yon Clipping:** Click on the Yon Clipping button and drag up to move the back (Yon) clipping plane further away from the camera or down to move the back (Yon) clipping plane towards the camera.

**Note:** Although the clipping planes themselves are invisible, the effect they have on objects in the document can be seen. The front (Hither) and back (Yon) clipping planes can be set so that you view only a section of the document. Any objects or parts of the objects closer to the camera than the front (Hither) clipping plane, or further from the camera than the back (Yon) clipping plane, will not be visible.

# *Appendix E*

## *Idler Plug-ins*

Idler plug-ins have no interface and run constantly in the background when loaded.

### *Table of Contents*

Construct Idler                      D-2

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## u Construct Idler

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The Construct Idler has two functions:

- **Performing CSG (Constructive Solid Geometry) Boolean calculations.** CSG operations allow one geometry to cut into another — enabling you to see into a room through a window for example. The calculation is performed each time an object with a CSG attribute is changed, and may take a few seconds depending on the complexity of the document. The objects must have the appropriate CSG attributes applied to them, by using a plug-in that allows CSG attributes to be applied to objects, or by using library items that already have CSG attributes applied. Door and window library items supplied with the application, and walls drawn with the wall drawing tools, include the correct CSG attributes.
- **Automatically simplifying objects as rendering speed decreases.** When the Construct Idler is checked on in the Plug-in menu and rendering speed falls below 4 renders per second, the plug-in starts to simplify the objects in the scene that contain the most triangles, by turning them into cubes. This allows you to continue to edit a complex document in real time, even on one of the slower computers. Any selected items, windows and doors are not affected by this process. Items are re-drawn in full once the editing action is complete.

# *Appendix F*

## *Plug-in Tools*

Individual plug-in tools are discussed in *Appendix G — Plug-in Geometries* and *Appendix H — Plug-in Modifiers*. This appendix provides information relevant to both types of plug-in tool.

### *Table of Contents*

Introduction	F-2
Configuring The Tools Palette	F-2
Tool Options	F-3

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## ∪ Introduction

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Plug-in tools are either plug-in geometries or plug-in modifiers. *See Appendix G — Plug-in Geometries on page G-1 and Appendix H — Plug-in Modifiers on page H-1 for details of individual plug-ins.* When loaded, plug-in tools appear in the Tools palette and can be positioned in the palette by the user as discussed below.

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## ∪ Configuring The Tools Palette

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When Modeler is launched with all the plug-ins loaded, the plug-ins are placed in the Tools palette in a default order.



The Tools palette is configurable, so you can move tools around to position them in the location or group that is most convenient or logical for you.

Configure the Tools palette in the following way:

- Click on a tool and hold down the mouse button to display a pop-up menu showing the other tools in the stack (if any). Select the name of a tool in the pop-up menu to select the tool and bring it to the top of the stack.
- To move a tool, hold down the Command key, click on the tool and drag it to a new location.
- Drop a tool onto another tool to stack them together.
- Drop a tool onto the four selection tools at the top of the palette to separate it from a group of stacked tools and add it to the top of the tool palette as an individual tool.

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## u Tool Options

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To open a dialog showing any options available for a tool, use either of the following methods:

- Hold down the Option key and select the tool in the Tools Palette.
- Click on the tool in the Tools palette and hold down the mouse button. Select the same tool from the pop-up menu that displays.

**Note:** There are no options available for the Arrow, Rotate, Rectangular Marquee and Hand tools.

# Appendix G

## Plug-in Geometries

Plug-in Geometries are plug-in tools that are used to create objects. When installed they are located in the Tools palette.

### *Table of Contents*

		Sphere	G-27
		Spot Light	G-28
		Torus	G-29
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3D Text	G-2		
Animation Draw Path	G-4		
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Cube	G-8		
Cylinder	G-9		
Irregular Polygon	G-11		
Lathe	G-13		
Pipes	G-17		
Point Light	G-22		
Pyramid	G-23		
Regular Polygon	G-24		

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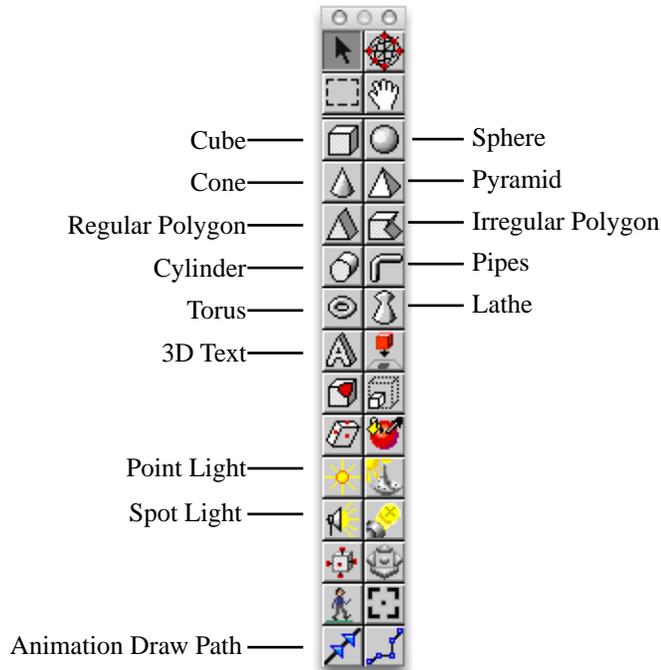
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## Introduction

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When loaded, Plug-in Geometries appear in the Tools palette. The position of each plug-in within the Tools palette will depend on how the user has configured the palette. *See Configuring The Tools Palette on page F-2 for more details.* The default arrangement is shown below.



Select the plug-in tool to use by clicking on the icon of that tool in the Tools palette.

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## 3D Text

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The 3D Text plug-in is used to create three dimensional text. Once created, the text can be manipulated like any other 3D object.

Select the 3D Text plug-in from the Tools palette and move the cursor over the document window. The cursor will change to a text insertion icon.

Click on the place you wish the text to appear. The Enter text dialog will display. Note: If you have a lot of fonts installed on your Mac, it may take a few seconds for this dialog to appear.



Enter the text in the top field and choose a font, style and text quality from the popup menus below. The higher the quality selected, the smoother the curves on the text will be drawn, but more memory will be required to display the text and it will be slower to display.

Leave the Invert Text check box unchecked to display your text as 3D letters. Click OK. The text will be placed in the document window:



Check the Invert Text check box and click OK. The text will be 'punched out' of a solid rectangle.



The text can be moved, resized and rotated, have colors, textures, images and sounds applied to it and the geometry path can be edited. You will not be able to ungroup a word to edit individual characters, although you can ungroup the front and back faces and extruded outlines. To do this you must flag the text as Dismantleable. *See Dismantleable on page 3-35 and Primitive/Dismantleable on page 4-18 for further details.* If you need to manipulate individual characters, they must be entered separately.

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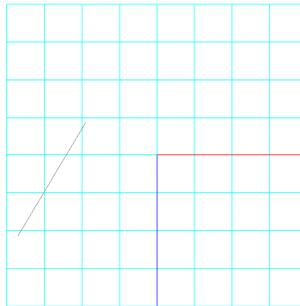
U  **Animation Draw Path**

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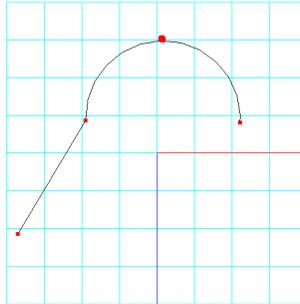
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The Animation Draw Path plug-in is used to draw animation path geometries.

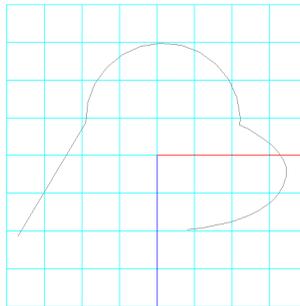
Select the Animation Draw Path tool, position the cursor where you want to begin drawing, click the mouse button to place a vertex point, move the cursor to a new point and click again. To finish the line, double click.



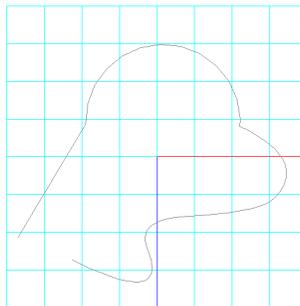
To draw an arc, hold down the Option key and click at the point that will represent the center of a circle. Release the Option key and mouse button and move the cursor ready to place the next point. The arc will display. Click to place the next point at the end of the arc:



To draw a Bezier curve, click and drag the cursor:



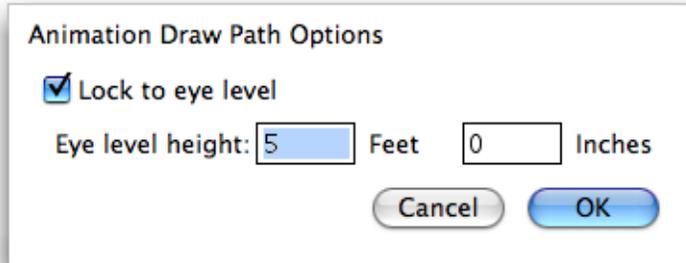
To draw a spline curve, hold down the Option key and click and drag the cursor:



- To delete the last point placed use the Delete key.
- To complete an Animation Path double click.
- To constrain the path to the X, Y, or Z axis hold down the Shift key.
- To move in the Z dimension, hold down the Control key.

To change the default settings for eye level height and locking for the Animation Draw Path plug-in:

1. Hold down the Option key and select the Animation Draw Path tool to display the Animation Draw Path Options.



2. Select the Lock to eye level checkbox to control if an Animation Path geometry will be locked to the X-Z dimension at the value of eye level height.
3. Enter a value in the Eye level height field(s) to specify the position in Y coordinates at which the Animation Path geometries will be drawn.

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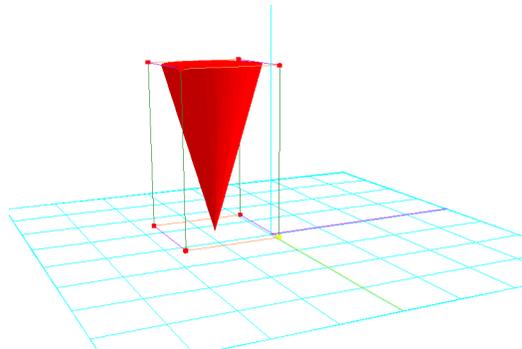
v  **Cone**

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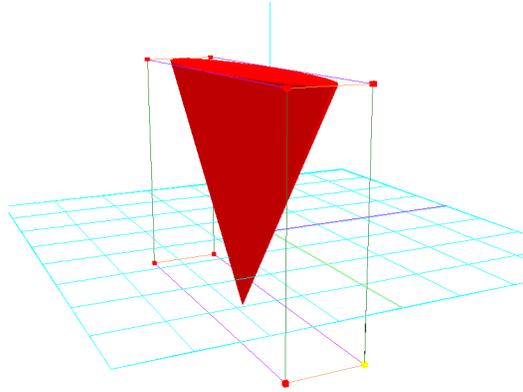
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The Cone plug-in is used to draw cone geometries.

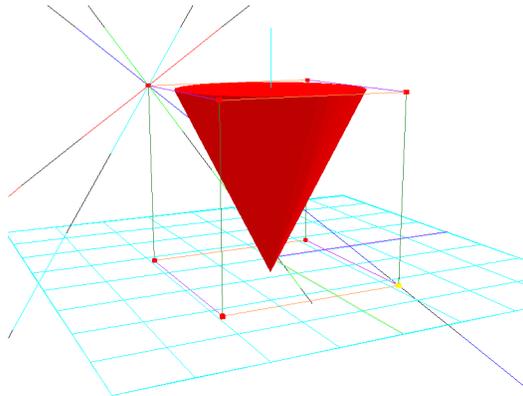
Place the cursor at the point you want to begin drawing, hold down the mouse button and drag to create a cone:



Hold down the Control key and move the mouse up or down to change the depth of the cone.



Holding down the Shift key to constrain the cross section of the cone to a circle, and the height of the cone to the diameter of the base:



In 2D mode, you will not be able to create a 3D object and holding down the Shift key will constrain the object shape to a triangle with equal sides, or a circle, depending upon which plane you are drawing in. Using the Control key in 2D mode will not add depth to an object, but you can use it to draw your 2D shape in the Z dimension.

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v



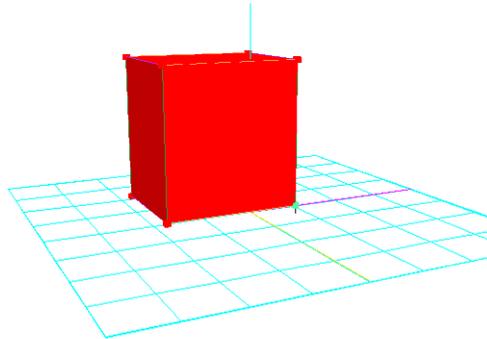
## Cube

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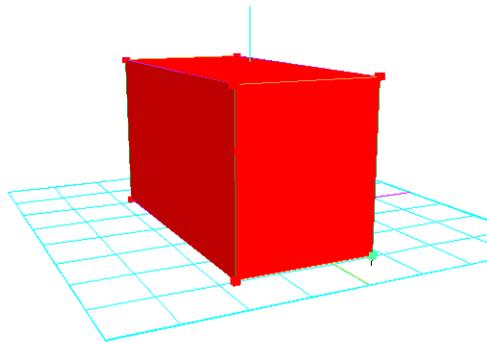
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The Cube plug-in is used to draw cube geometries.

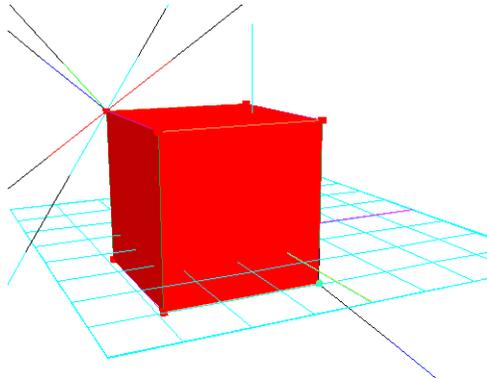
Select the Cube plug-in from the Tools palette. Position the cursor at the point you want to begin drawing and, holding down the mouse button, drag to create the cube geometry:



Hold down the Control key and move the cursor up or down to change the depth of the cube:



Hold down the Shift key while drawing to constrain the geometry to a cube:



In 2D mode you will not be able to create a 3D object, and holding down the Shift key will constrain the object shape to a square. Using the Control key in 2D mode will not add depth to an object, but you can use it to draw your 2D shape in the Z dimension.

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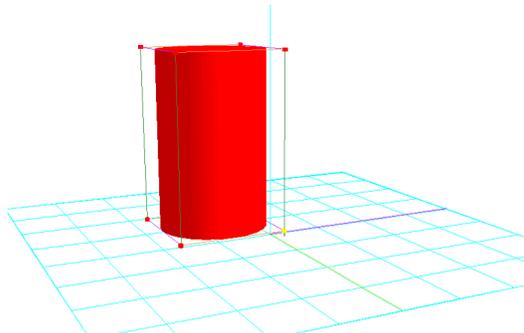
v  **Cylinder**

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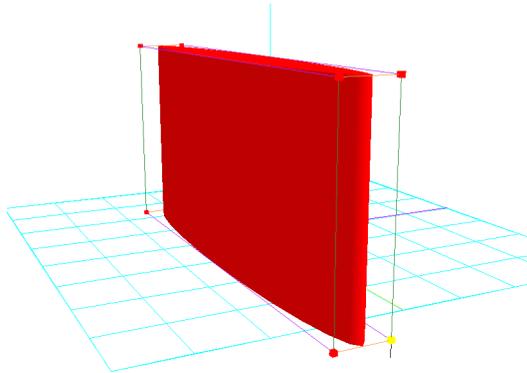
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The Cylinder plug-in is used to draw cylinder geometries.

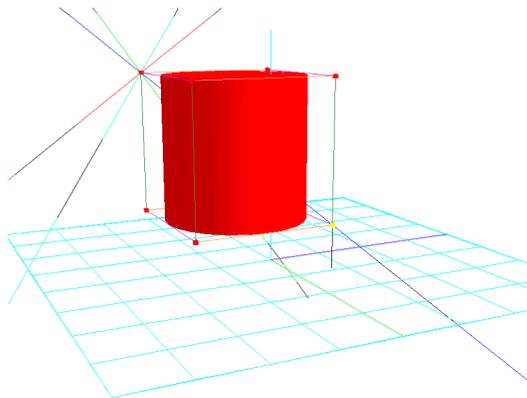
Select the Cylinder plug-in from the Tools palette. Place the cursor at the point you want to begin drawing and, holding down the mouse button, drag to create the cylinder geometry:



Hold down the Control key and move the mouse up or down to change the depth of the cylinder:



Hold down the Shift key while drawing the object to constrain the cross section of the cylinder to a circle, and the length of the cylinder to the diameter of the circle:

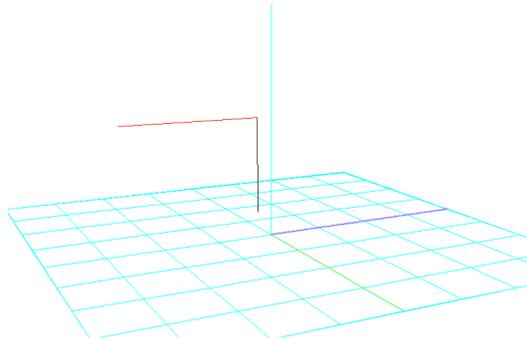


In 2D mode, you will not be able to create a 3D object, and holding down the Shift key will constrain the object shape to a square or circle depending on the plane you are drawing in. Using the Control key in 2D mode will not add depth to an object, but you can use it to draw your 2D shape in the Z dimension.

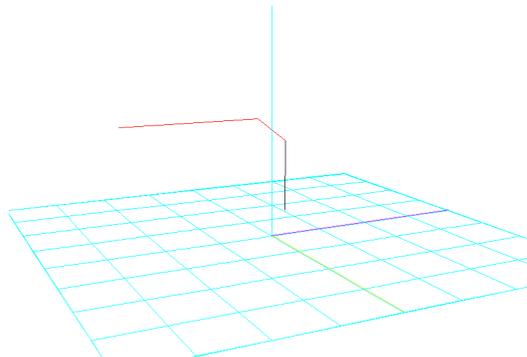


The Irregular Polygon plug-in is used to define a cross section, which is then extruded to create an irregular polygon geometry.

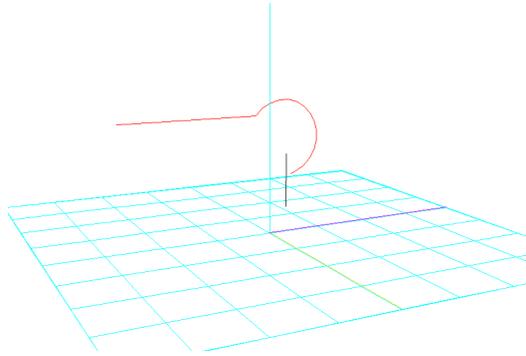
1. Position the cursor where you want to begin drawing, click the mouse button to place a vertex point, move the cursor and click again:



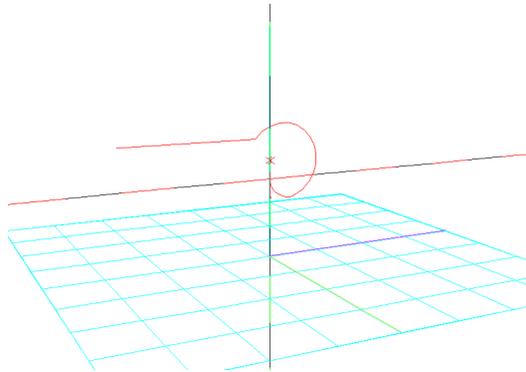
2. To draw an arc, hold down the Option key and click at the point that will represent the center of a circle.



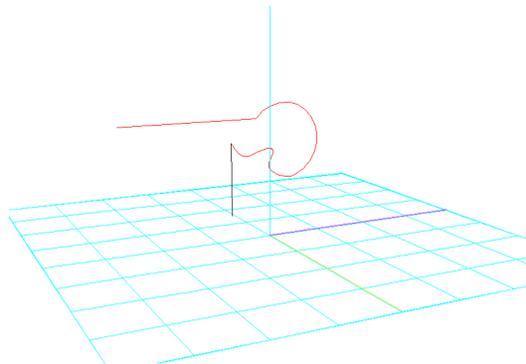
3. Release the Option key and mouse button and move the cursor ready to place the next point. The arc will display:



4. Click to place the next point at the end of the arc.
5. To draw a Bezier curve, click and drag the cursor.

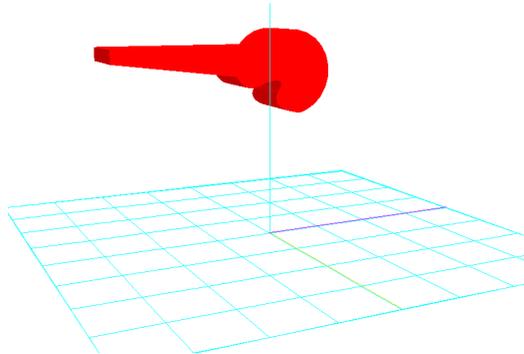


6. To draw a spline curve, hold down the Option key and click and drag the cursor.



7. Use the Delete key at any time to delete the last point placed.

8. Double-click at any time to complete the shape.



The following modifier keys can be used when drawing the irregular polygon cross section:

- **The Control key:** Use the Control key to adjust the position of the cursor in the third dimension when placing the first three points. This will define the plane in which the polygon is drawn.
- **The Shift key:** Hold down the Shift key to constrain lines to the two axes of the plane in which you are drawing. Constraining lines will display.
- **The Command key:** Hold down the Command key to draw a line tangent or perpendicular to the previous line or curve. Constraining lines will display.

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**Lathe**

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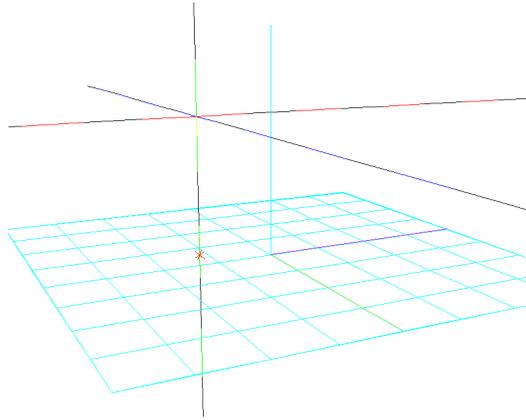
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The Lathe plug-in is used to define a lathe template and produce a lathed geometry from it.

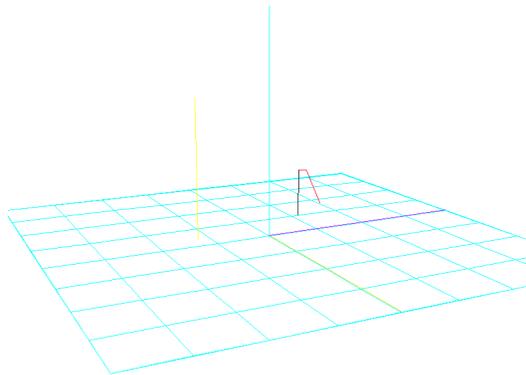
### Drawing a Lathe Template

1. Select the Lathe plug-in from the Tools palette.

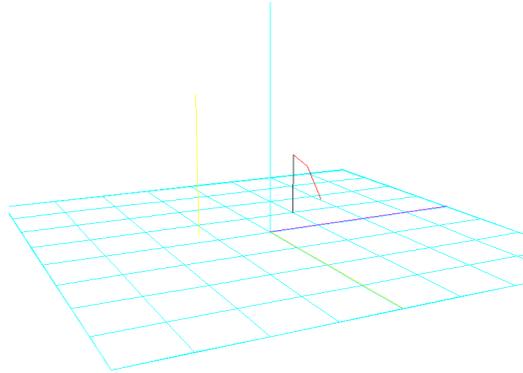
2. Determine the lathe axis by clicking once, moving the cursor, and clicking a second time. Note: The lathe axis is constrained to either the X, Y or Z axis. A yellow line representing the axis your object will be lathed around displays:



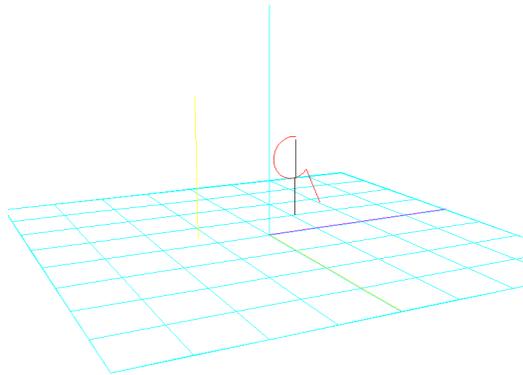
3. Position the cursor at the point to start drawing the lathe template. Click the mouse button to place a vertex point, move the cursor the desired distance and click again:



4. To draw an arc, hold down the Option key and click on the point that will represent the center of a circle:

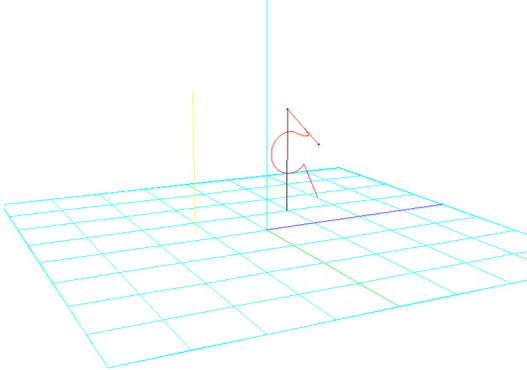


5. Release the Option key and the mouse button and move the cursor ready to place the next point. The arc will appear:

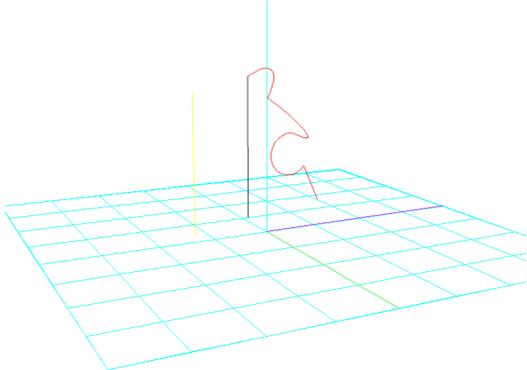


6. Click to place the next point at the end of the arc.

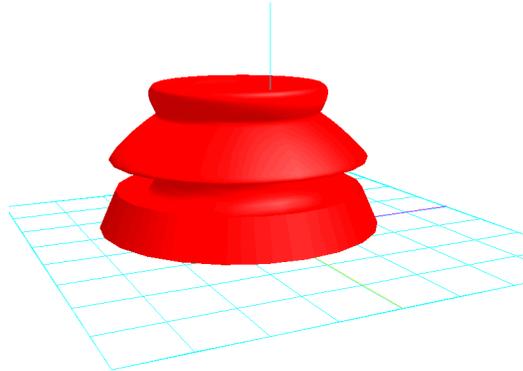
7. To draw a Bezier curve, click and drag the cursor:



8. To draw a spline curve, hold down the Option key and click and drag the cursor:



9. Double-click to lathe a geometry from the template:



At any time while drawing the lathe template:

- Hold down the Shift key to constrain lines to one of the two axes of the plane you are drawing in.
- Hold down the Command key to draw a line tangent or perpendicular to the previous line or curve. Constraining lines will display.
- Use the Delete key to delete the last point placed.

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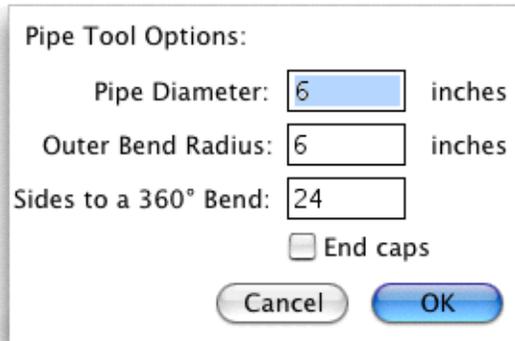
**Pipes**

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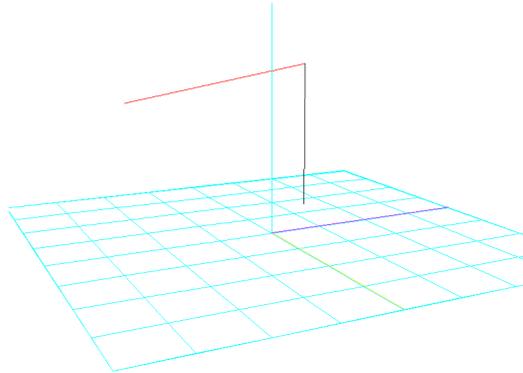
The Pipes plug-in is used to draw pipe geometries.

1. Hold down the Option key and select the Pipes tool from the Tools palette to display the Pipe Tool Options dialog:

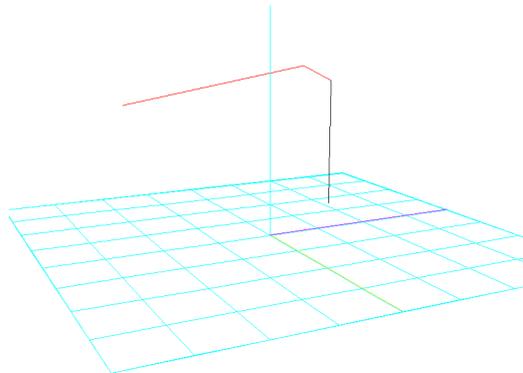


2. Enter a value in the Pipe Diameter field to specify the width of the pipe.
  - **Enter zero:** A polyline will be drawn. This will be drawn as one pixel thick, regardless of the view.
3. Enter a value in the Outer Bend Radius field to specify how the bends in the pipe should be drawn.
  - **Enter zero:** Mitred joints will be generated.
  - **Enter half the pipe's diameter:** The outer half of the joint will be rounded with the radius value and the inner half mitred — just like a pipe elbow.
  - **Enter a value more than the pipe's diameter:** Gradual bends will be generated (if there is not enough straight pipe on each side of the bend to generate gradual bends, the length of the curve will be reduced).
4. Enter a value in the Sides to a 360° Bend field to determine the accuracy with which bends in the pipe are formed. (The Edges to a circle preference controls the number of vertices used to form each cross section of pipe. *See Preferences on page 3-5 for further details.*)
5. Check the End caps checkbox if you wish the pipe to be sealed at both ends.
6. Click OK, the options will remain as set until changed.

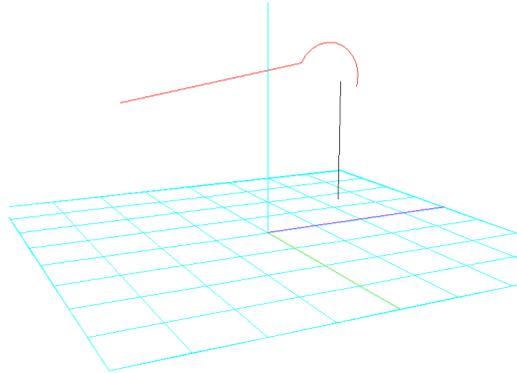
7. With the Pipes tool still selected, position the cursor where you want to begin drawing, click the mouse button to place a vertex point, move the cursor and click again:



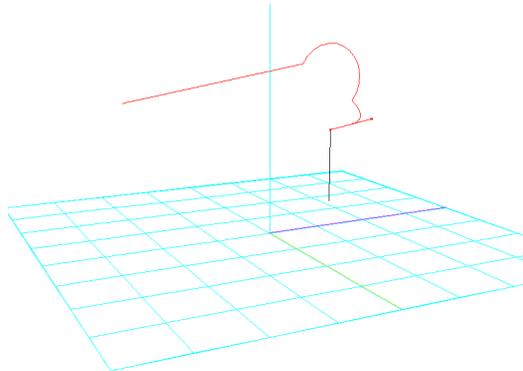
8. To draw an arc, hold down the Option key and click at the point that will represent the center of a circle:



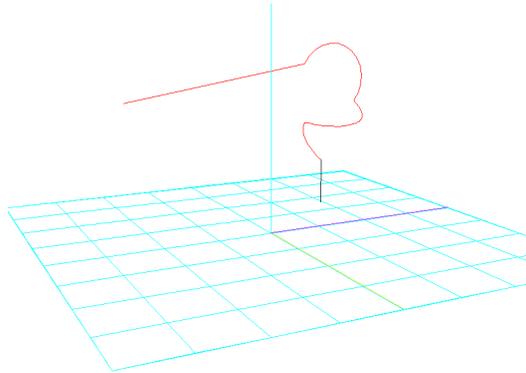
9. Release the Option key and mouse button and move the cursor ready to place the next point. The arc will display:



10. Click to place the next point at the end of the arc.
11. To draw a Bezier curve, click and drag the cursor:

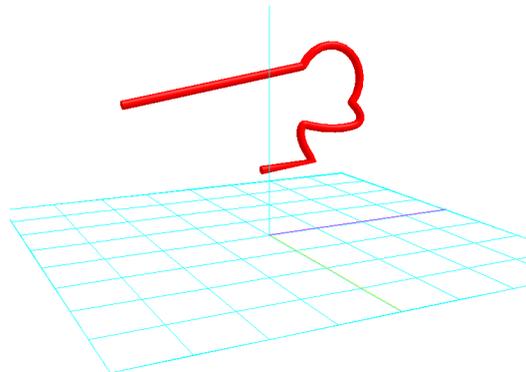


**12.** To draw a spline curve, hold down the Option key and click and drag the cursor:



**13.** Use the Delete key at any time to delete the last point placed.

**14.** Double-click at any time to complete the shape:



Hold down the Shift key while drawing the pipe path to constrain the path to the X, Y, or Z axis. To move in the Z dimension, hold down the Control key.



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Use the Point Light plug-in to place point lights in your Modeler document. Point lights radiate light in all directions.

**Note:** Light objects are visible by default. If you have turned off the Show Light Markers option in the Lights palette, the light objects will not be displayed. *See Lights on page D-20 for more details.*

Select the Point Light tool in the Tools palette and click in the document window. The light is placed at the point clicked.

A point light is displayed as a small cube and when selected has a bounding sphere. Point lights cannot be resized, but can be moved and rotated like other objects. Note that rotating a point light will not have any affect on the lighting in the document.

Hold down the Command key when placing a point light and, if the scene is rendered using a Microspot renderer that draws shadows, that particular light will not cast any shadows.

Hold down the Option key when placing a point light and a light with a negative brightness value will be placed in the document. The negative brightness value can be adjusted using the Brightness slider in the Info palette as usual. To adjust a light with a negative brightness value so that it has a positive brightness value, set the brightness to 0 in the Info palette, then adjust brightness as for an ordinary point light.

The Info Palette is used to specify the color and brightness of a selected point light. *See Info Palette on page 4-17 for further details.*

The color of the point light sphere is set in the Preferences dialog. If the color chosen is white (default) light markers take on the color of light they represent. *See Preferences on page 3-5 for further details.*

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u  **Pyramid**

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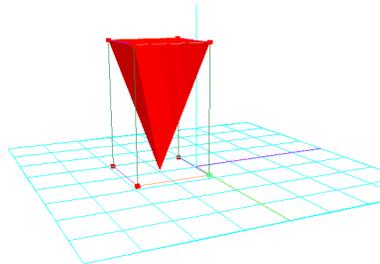
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The Pyramid plug-in is used to draw pyramid geometries with a specified number of sides.

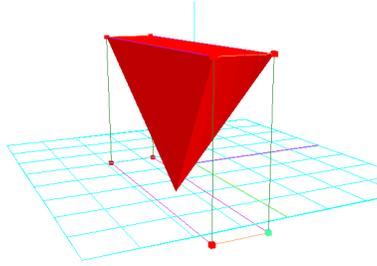
1. Hold down the Option key and select the Pyramid plug-in from the Tools palette to display the Pyramid Options dialog:



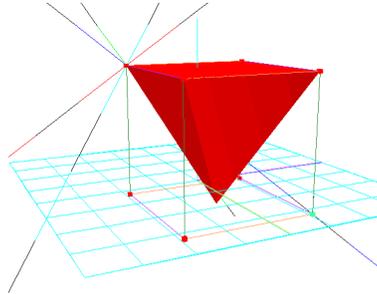
2. Enter a value in the Number of sides field to specify the number of sides the pyramid should have.
3. Place the cursor at the point to begin drawing, hold down the mouse button and drag to create the pyramid geometry:



4. Hold down the Control key and move the mouse up or down to change the depth of the pyramid. Release the mouse button when the pyramid reaches the desired size:



5. Hold down the Shift key while drawing the object to constrain the base of the pyramid so that each side is the same length, and constrain the height of the pyramid to the diameter of an imaginary circle that touches all the points of the base:



In 2D mode, you will not be able to create a 3D object, and holding down the Shift key will constrain the object shape to a polygon with equal sides, or to a triangle, depending upon which plane you are drawing in. Using the Control key in 2D mode will not add depth to an object, but you can use it to draw your 2D shape in the Z dimension.

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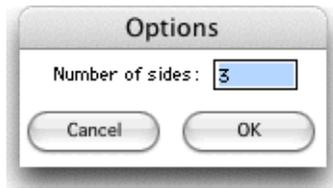
## Regular Polygon

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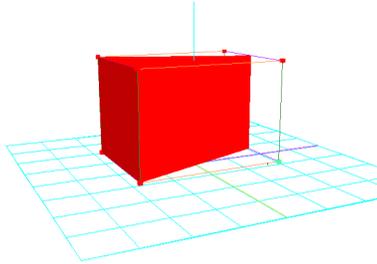
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The Regular Polygon plug-in is used to draw regular polygons with a specified number of sides.

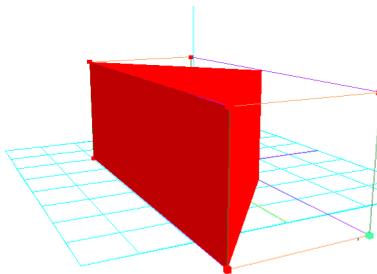
1. Hold down the Option key and select the Regular Polygon plug-in in the Tools palette to display the Regular Polygon Options dialog:



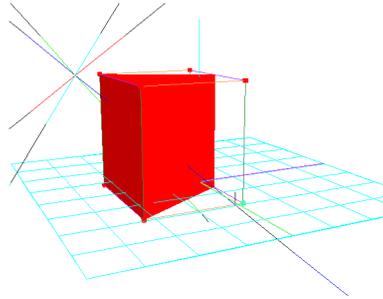
2. Enter a value in the Number of sides field to specify the number of sides the regular polygon should have. The number of sides will remain as specified until you change it.
3. Place the cursor at the point to begin drawing, hold down the mouse button and drag to create the regular polygon:



4. Hold down the Control key and move the mouse up or down to change the depth of the regular polygon. Release the mouse button when the polygon reaches the desired size:



5. Hold down the Shift key while drawing the object to constrain the cross section of the polygon so each side is the same length, and constrain the height of the shape to the diameter of an imaginary circle that touches each point of the base of the polygon:



In 2D mode, you will not be able to create a 3D object and holding down the Shift key will constrain the object shape to a polygon with equal sides, or a square, depending upon which plane you are drawing in. Using the Control key in 2D mode will not add depth to an object, but you can use it to draw your 2D shape in the Z dimension.

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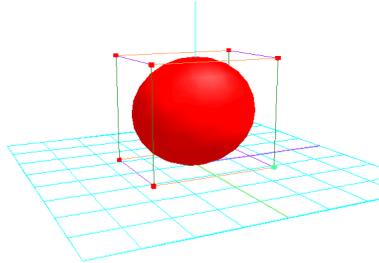
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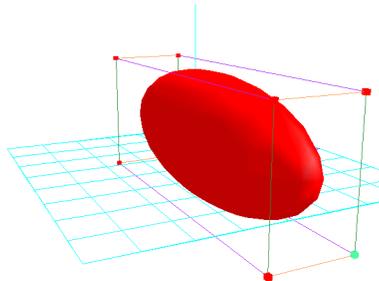


Use the Sphere plug-in to draw ellipses and spheres.

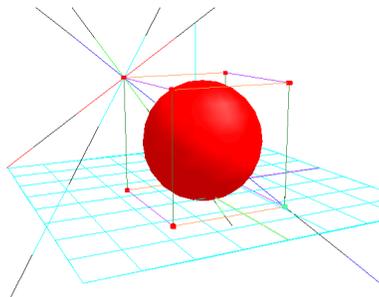
1. Place the cursor at the point you want to begin drawing, hold down the mouse button and drag to create an object:



2. Hold down the Control key and move the mouse up or down to change the object's depth. Release the mouse button when the ellipse/sphere reaches the desired size:



3. To constrain the shape of the object to a sphere, hold down the Shift key while drawing:



In 2D mode, you will not be able to create a 3D object, and holding down the Shift key will constrain the object shape to a circle. Using the Control key in 2D mode will not add depth to an object, but you can use it to draw your 2D shape in the Z dimension. *See Primitive/Dismantleable on page 4-18 for further details.*

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u  **Spot Light**

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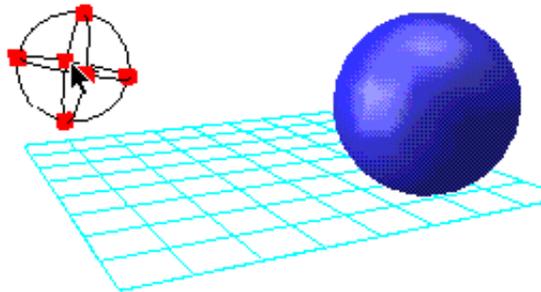
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Use the Spot Light plug-in to place spot lights in your Modeler document. Spot lights have a directional shade around them which can be rotated to direct light in a specific direction.

**Note:** Light objects are visible by default. If you have turned off the Show Lights option in the Lights palette, the light objects will not be displayed. *See Lights on page D-20 for more details.*

Select the Spot Light tool in the Tools palette.

- **To place a spot light at a specific position in the document:** move the cursor to that point, click and release the mouse button.
- **To direct the light as you place it in the document:** click on the point you wish the spot light to shine and drag the light into position before releasing the mouse button. Hold down the Shift key when dragging the light to constrain it to an axis perpendicular to the surface clicked on.



A spot light is displayed as an open, four sided pyramid with a line coming out of it. The line indicates the direction the light is pointing. When a light is selected it displays with a bounding sphere. Spot lights cannot be resized, but can be moved and rotated like other objects.

Hold down the Command key when placing a spot light and, if the scene is rendered using a Microspot renderer that draws shadows, that particular light will not cast any shadows.

Hold down the Option key when placing a spot light and a light with a negative brightness value will be placed in the document. The negative brightness value can be adjusted using the Brightness slider in the Info palette as usual. To adjust a light with a negative brightness value so that it has a positive brightness value, set the brightness to 0 in the Info palette, then adjust brightness as for an ordinary point light.

The Info Palette is used to specify the color, brightness, spread and sharpness of a selected spot light. The Spread control adjusts the lens angle, while the Sharpness control adjusts the focus. *See Info Palette on page 4-17 for further details.*

The color of the spot light pyramid is set in the Preferences dialog. If the color chosen is white (default) light markers take on the color of light they represent. *See Preferences on page 3-5 for further details.*

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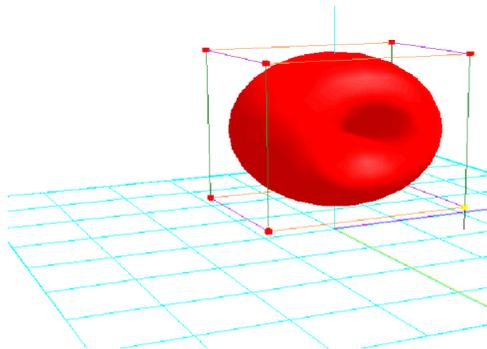
v  **Torus**

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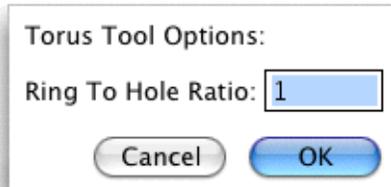
Use the Torus plug-in to draw a torus geometry which is a shape like a doughnut.

Select the Torus tool from the Tools palette. Click on the grid and drag out a torus shape.



The torus is drawn with reference to the preference value, Edges to a Circle. *See Preferences on page 3-5 for further details.*

To change the Torus options, hold down the Option key and select the Torus tool from the Tools palette again. The Torus Tool Options dialog displays:



Enter a value in the Ring To Hole Ratio field to specify how thick the outer ring of the torus should be in relation to the diameter of the central hole.

- The default value of 1 will produce a torus where the thickness of the outer ring is the same as the diameter of the central hole.
- A value less than 1 will produce a torus where the thickness of the outer ring is less than the diameter of the central hole.
- A value greater than 1 will produce a torus where the thickness of the outer ring is more than the diameter of the central hole.

# Appendix H

## Plug-in Modifiers

Plug-in Modifiers are plug-in tools that are used to modify objects or the scene in some way. When installed they are located in the Tools palette.

### *Table of Contents*

Walkthrough

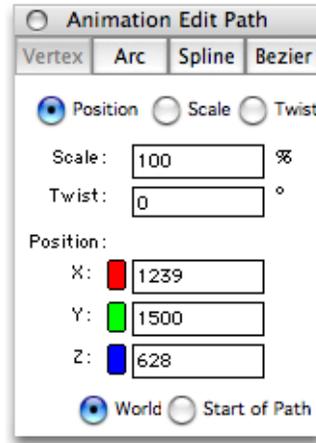
H-14

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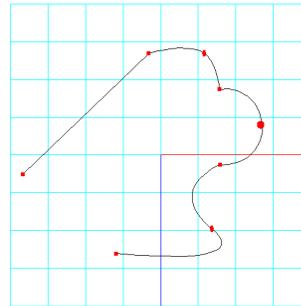
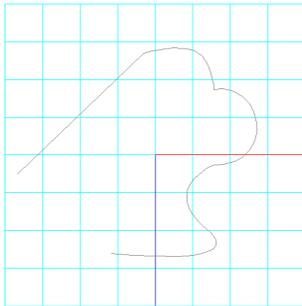
## The Animation Edit Path Dialog

To display the Animation Edit Path dialog, click on the Animation Edit Path tool in the Tool palette.



## Selecting an Animation Path to edit

With the Animation Edit Path tool selected, click on an animation path in the document window. The selected path will display as a black line with handles at the ends and on the curves.



## Types Of Point

- **Vertex:** A standard point used to define the beginning or end of a straight section of a path or line.
- **Arc:** A point on a section of a circle defined as the center point on the arc between two vertex points.

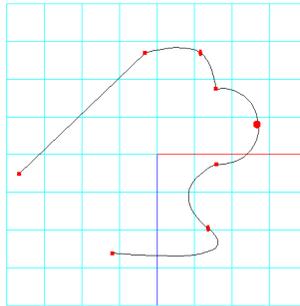
- **Spline:** A point on a curve. The curve is defined automatically and cannot be edited except by adjusting the points at either side of the spline point.
- **Bezier:** A point on a curve. Two Bezier handles allow the curve to be adjusted.

Vertex point handles display as squares, Bezier and spline point handles as diamonds, and arc point handles as spheres.

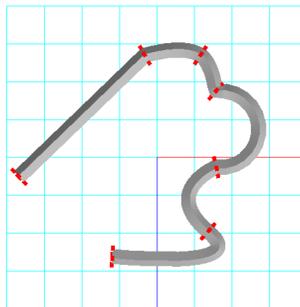
### Viewing Manipulations

The Position, Scale or Twist radio buttons allow you to determine how the path will be manipulated when selected with the Animation Edit Path tool.

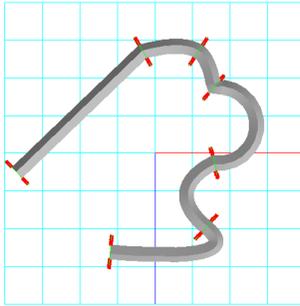
- **Position:** If this option is chosen, path points manipulated.



- **Scale:** If this option is chosen, the amount of scale per point is manipulated.



- **Twist:** If this option is chosen, the amount of twist per point is manipulated.



### Selecting Points

Click on a handle to select it.

- A Vertex, Arc or Spline point will change color.
- A Bezier point will change color but has two additional handles to adjust the Bezier curve.

To select additional points, hold down the Shift key and click on another point. To deselect points, hold down the Shift key and click on a selected point.

### Manipulating Points

- **Vertex, Arc, Spline:** Click and drag on the point to move it. Adjust the scale or twist of the section at that point by selecting the scale or twist radio button on the Animation Edit Path dialog.
- **Bezier:** Click and drag on the point to move it. Adjust the scale or twist of the section at that point by selecting the scale or twist radio button on the Animation Edit path dialog. Click and drag on the Bezier handles to adjust the curve. Hold down the Option key and click and drag on the Bezier point or Bezier handles to break the Bezier curve.

### Moving Points On The Path

To move a path handle of any type, click on it and drag.

- Select the Position radio button in the Animation Edit Path dialog.
- Click on the handle of the point on the animation path you wish to move.
- Drag the path handle to the new position.
- Use the Control key to change the axis used.

To move a point by precise values, click on the Relative to Path or Relative to World radio button in the Edit Path dialog and enter values in the x, y and z fields.

- **Relative to Path:** The selected point is moved to the values entered relative to the point of the start of the path.
- **Relative to World:** The selected point is moved to the values entered relative to the grid.

### Adding Points To A Path

To add a point to a path, select two contiguous points on the path by clicking on the line between them, or by holding down the Shift key and clicking on a second point. Click on the Vertex, Arc, Spline or Bezier button in the Animation Edit Path dialog. A point of the specified type will be added between the two points originally selected.

Alternatively, hold down the Option key, click on the path or an existing handle and drag to place a new Vertex point.

**Note:** An arc point can only be added between two vertex points.

### Changing Points

To change a point to a different type, select the point then click on the Vertex, Arc, Spline or Bezier button in the Animation Edit Path dialog. The point will change to the type selected.

**Note:** An arc point can only be added between two vertex points.

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**Attribute**

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The Attribute plug-in is used to change an object's transparency, surface color, reflective color, gloss and renderer brightness, simply by clicking on the object. Random values or values copied from another object can be applied.

- **To apply random values to an objects:** Select the Attribute tool from the Tool palette. Hold down the Shift key and move the cursor over an object in the document window, the cursor will change to a die. Click on the object to apply random values.

- **To apply the same random values to another objects:** Click on the Attribute tool again. Move the cursor over an objects and it will change to a paint bucket. Click on the object.
- **To copy an object's values:** Click on the Attribute tool and hold down the Option key. The cursor will change to an eye dropper. Click on an item to copy its values.
- **To apply copied values:** Click on the Attribute tool again and the cursor will change to a paint bucket. Click on the object to which you want to apply the copies.

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v  **Construct**

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The Construct plug-in is also available as a plug-in modifier tool. *See Construct on page D-17 for more details.*

To use the Construct tool in the Tool palette:

1. Select the Construct tool from the Tool palette:



2. In the document window, select the object to perform the Boolean operation on (object A).
3. Depending on the Boolean option radio button currently selected in the Construct palette, the cursor will display as one of the following:
  - A plus sign for A add B.
  - A minus sign for A minus B.
  - A division sign for A split B.
  - An ampersand (&) for A intersect B.
4. Click on the object you want to perform the operation with (object B). The Boolean operation will be applied permanently to the two objects.

To change the options set in the Construct palette, hold down the Option key and click on the Construct tool in the Tool palette. The Construct palette will open.

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## Gravity

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The Gravity plug-in is used to place objects on the grid.

Select the Gravity tool from the Tools palette. As the cursor is moved over the document window it will change to a downward arrow. The active point is at the tip of the arrow. Click on an object and it will be moved so that its lowest point is placed on the grid.

If an object has been locked by clicking on the padlock icon in the top right corner of the Info palette, or by selecting Lock from the Options menu, you will not be able to use the Gravity tool to drop the object to the grid.

If the object position is locked only in the Y-axis, the Gravity tool will over-ride this restraint and can be used to drop the object to the grid. If you have several objects selected, some of which may be locked in the Y-axis, hold down the Shift key when using the Gravity tool to prevent these locked objects from being dropped to the grid.

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## Light Director

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The Light Director plug-in is used to direct one or more spot lights in a particular direction.

Select the light(s) to direct, then select the Light Director tool in the Tools palette. In the document window, click at the place you want the lights to point. The light(s) will be rotated to point at the place specified.

Lights can also be selected using the Light Director tool by selecting the tool and clicking on a light. Hold down the Shift key and click on additional lights to increase the selection. Hold down the Shift key and click on a selected light to remove it from the selection.

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u  **Orbit**

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The orbit plug-in is used to move the camera around a selected object.

Select the Orbit tool from the Tool palette. Move the cursor over the document window and it will change to a black diamond.

- **Click on an object:** drag the mouse left, right, up, or down and the view will orbit around the center of the object's bounding frame.
- **Click on the grid:** drag the mouse left, right, up, or down, and the view will orbit around the center of the grid.
- **Click in an empty area of the document window:** drag the mouse left, right, up, or down, and the camera will orbit around the center of the grid.

In all cases, the further you move the mouse from the point where you first clicked, the faster the view will move. Use of the option key will slow this rate of movement.

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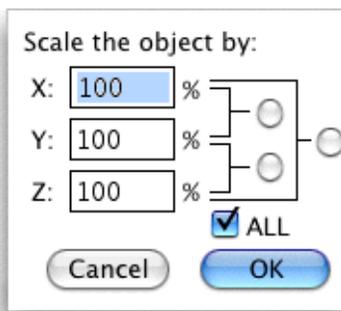
u  **Scale Object**

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The Scale plug-in is used to easily scale selected objects by percentage values.

1. Select the Scale Object tool from the Tool palette. The Scale Object dialog displays:



2. To maintain an object's proportions, ensure that the ALL checkbox remains checked on.
3. To scale an object without maintaining its proportions, uncheck the All checkbox. Enter a value in percentage to scale the object in each of the x, y and z dimensions.
4. Click OK, and the object selected will be scaled by the specified value(s).

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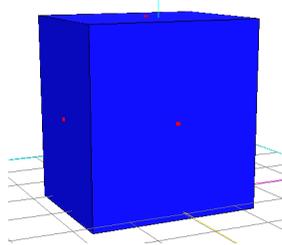
v  **Shear**

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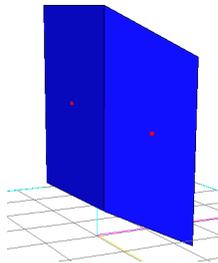
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The Shear plug-in is used to distort shapes.

Select the Shear tool from the Tool palette then select an object in the document window. The object's normal bounding frame and handles will not display, instead the object will display in a bounding frame with handles in the center of each surface.



Click on a handle and drag to shear the object. When you move the handle, the surface of the bounding frame opposite the handle you are moving will remain stationary, but the other surfaces of the bounding box will move as you drag the handle. The object will be distorted to continue to fit in the bounding frame.

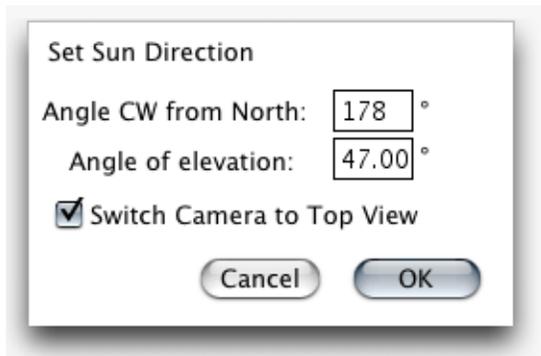


To move a handle in the Z dimension, hold down the control key as you drag. To constrain the movement of the handle to the X, Y, or Z axis, hold down the shift key as you drag.



The Sun Direction plug-in is used to adjust the direction the sun light shines in.

The Sun Direction plug-in has the following options, displayed by selecting the Sun Direction plug-in with the Option key pressed.



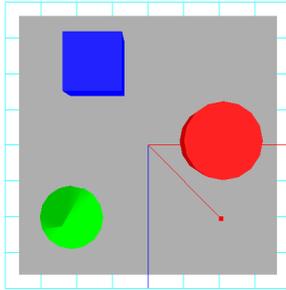
The Option dialog box allows you to enter values for both the angle of elevation of the sun, and its position angle referenced from the clockwise direction, relative to the north.

When the Sun Direction plug-in is selected, and the Auto Show Plug-in Palettes preference is enabled, the Lights palette is automatically opened so that you can make any necessary changes to the way the scene is lit. *See Lights on page D-29 for more details.*

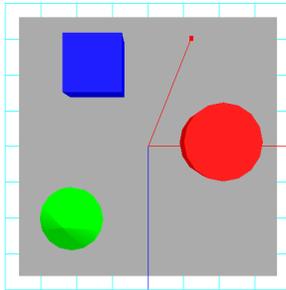
**To adjust the position of the sun manually**

1. Select the Sun Direction tool from the Tools palette.
2. The document window changes to Top view.

3. The current direction the sunlight is shining in is depicted as a red line with a handle at the end:



4. Click on the handle and holding down the mouse button drag to change the position of the source of the sun light.



5. Hold down the Control key as you drag to move the position of the source of the sun light closer or further away.
6. Movement of the sun direction line can be constrained to the X, Y and Z axes by holding down the Shift key.
7. Release the mouse button to drop the handle at its new location.

**Note:** The red direction line will not be visible with either the Microspot Preview Renderer or the Microspot Renderer.

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u  **View Finder**

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The View Finder tool allows you to click anywhere in the document to change the camera orientation to have that point at the center of the view.

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u  **VR**

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The VR plug-in is used to pan and tilt the camera using control mechanisms similar to those found in QuickTime™ VR.

When the VR plug-in is selected, the NaviCam palette is automatically opened so that you can use it to make changes to the camera position and view. *See NaviCam on page D-30 for more details.*

Select the VR tool from the Tools palette and click in your document window.

- To pan the camera (turn it left and right): hold down the mouse button and drag the mouse left and right.
- To tilt the camera: hold down the mouse button and drag the mouse up and down. The tilt is limited to +/- 90°.
- To crab the camera (move it to the left or right): hold down the mouse button and the Command key and drag the mouse left and right.
- To move the camera forwards and backwards: hold down the mouse button and the Command key and drag the mouse up and down.
- To zoom in: hold down the Shift key.
- To zoom out: hold down the Control key.

As you move, the cursor changes to an arrow head pointing in the direction you are moving. In all cases, the further you move the mouse from the point first clicked on, the faster the camera will move. Use of the option key will slow this rate of movement.

Alternatively, select the VR tool and use the arrow keys to move the camera:

- To pan the camera (turn it left and right): use the left and right arrow keys.
- To tilt the camera: use the up and down arrow keys. The tilt is limited to +/- 90°.
- To crab the camera (move it to the left or right): hold down the Command key and use the left and right arrow keys.
- To move the camera forwards and backwards: hold down the Command key and use the up and down arrow keys.

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## Walkthrough

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The Walkthrough plug-in is used to walk the camera through a scene.

Select the Walkthrough tool from the Tool palette. Click in your Modeler document window and the cursor will change to a black diamond. Drag the mouse to the left and right to move in those directions, or up to move forwards and down to move backwards. Use the left and right arrow keys to crab (move side to side), and the up and down arrow keys to tilt the camera.

As you move, the cursor changes to a black arrow head pointing in the direction you are moving. In all cases, the further you move the mouse from the point first clicked on, the faster the camera will move.

Use of the option key will slow the rate of movement.

# *Appendix I*

## *Microspot Plug-in Renderers*

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Resolution	I-3
Soft Edges	I-3
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Anti-alias Image is Off	I-4
Anti-alias Image is On	I-4

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## u Introduction

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The Microspot Renderer provides the following features in addition to those provided by Interactive renderer: transparency; shadows; pixel level lighting calculations; image anti-aliasing. These features allow you to render a high quality, more realistic 3D scene — in particular the pixel level lighting calculations give more accurate representations of how lighting affects surfaces.

The Microspot Preview Renderer is a limited version of the Microspot Renderer. The Microspot Preview Renderer allows a fast display of a scene rendered with Shadows and Soft edges.

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## u Selecting Microspot Renderers

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The Microspot Renderer is accessed via the Renderer Options palette. Select Renderer Options from the Palettes menu to display this palette. Click on the Renderers pop-up menu, the Microspot Renderer and the Microspot Preview Renderer.



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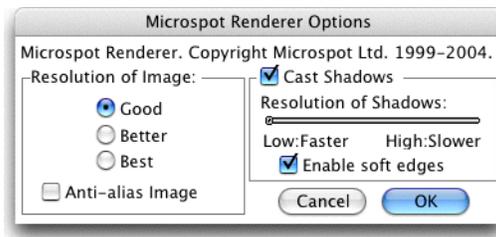
## u **Renderer Options**

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To change the Microspot Renderer options in Modeler select the Options button in the upper right corner of the palette or hold down the Option key when selecting the Microspot Renderer.

### **Renderer Options Dialog**



The dialog provides controls to turn shadows on or off, adjust the resolution of the shadows, soften the edges of the shadows and choose how much an image is anti-aliased. Click OK when you have set the rendering options you want to render the scene.

### **Shadows**

#### **On/Off**

The Microspot Renderer and the Microspot Preview Renderer both create realistic shadows. The Microspot Render has the option of not creating shadows when rendering.

#### **Resolution**

Increasing the sharpness of the shadows that are created

#### **Soft Edges**

Turning on soft edges will soften the edges of the shadows, creating a more realistic shadow effect.

## Anti-alias Image

Use the anti-alias image checkbox to turn anti-aliasing on or off for the image. If image anti-aliasing is turned off, the whole image is rendered at the same resolution. If image anti-aliasing is turned on, the edges of objects in the image are softened. Select the quality of render via the Good, Better and Best radio buttons.

### Anti-alias Image is Off

- **Good:** The image will be rendered at 72 dpi. A typical 640 x 480 render will require 2.5 Mb of RAM as an image buffer.
- **Better:** The image will be rendered at 144 dpi. A typical 640 x 480 render will require 10 Mb of RAM as an image buffer.
- **Best:** The image will be rendered at 288 dpi. A typical 640 x 480 render will require 40 Mb of RAM as an image buffer.

### Anti-alias Image is On

- **Good:** The image will be rendered at 72 dpi, with soft edges at 288 dpi. A typical 640 x 480 render will require 2.5 Mb of RAM as an image buffer.
- **Better:** The image will be rendered at 72 dpi, with soft edges at 1152 dpi. A typical 640 x 480 render will require 2.5 Mb of RAM as an image buffer.
- **Best:** The image will be rendered at 144 dpi, with soft edges at 1152 dpi. A typical 640 x 480 render will require 10 Mb of RAM as an image buffer.

# *Appendix J*

## *Drag and Drop*

This section discusses dragging and dropping colors, 3D objects, text, TIFF, JPEG, GIF and Movie files to and from Modeler documents.

### *Table of Contents*

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Drag Input	J-3
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## DRAG OUTPUT

You can drag a color from the Window control panel, Lights Palette or Info Palette to:

- A 3D object in Modeler
- Another Lights Palette or Info Palette color or any other palette that includes color buttons.
- The Finder Desktop or a Folder window
- The Finder Trash Can
- An Modeler Library file
- A PICT-compatible, Drag & Drop aware application

You can drag a 3D object or an entire scene (by holding down the Option key and clicking on the background) to:

- Another view of the same file in Modeler
- The window of a different file in Modeler
- A 3DMF-compatible, Drag & Drop aware application
- A PICT-compatible, Drag & Drop aware application
- The Finder Desktop or a Folder window
- The Finder Trash Can (to delete the object)
- A Modeler Library file

## COPY

When you copy selected items from a 3D Modeler document, the following types of data are put on the Clipboard:

- A PICT of the selected items which is the same size as the front window
- A 3DMF as a single grouped item.

## DRAG INPUT

Drag a PICT file from the Finder to:

- A 3D object to create a texture of the picture wrapped around the object
- The document window to make a background picture
- The document window to make a foreground picture (hold down the Control key when dropping the file)
- The grid to make a rectangle with a texture of the picture

Drag a text file from the Finder to:

- A 3D object to create a texture of the text wrapped around the object
- The background to make a background picture of the text

Drag a TIFF, JPEG GIF or Movie file from the Finder to:

- A 3D object to create a texture of the picture wrapped around the object.

Drag a 3DMF file from the Finder to:

- A 3D Modeler document (to import it)

Drag a clippings file of the following type from the Finder:

- A PICT clipping (See Drag a PICT file from the Finder)
- 3DMF clipping (See Drag a 3DMF file from the Finder)

Drag an Modeler color clipping file (created by dragging a color from a color button into the Finder) from the Finder to:

- A 3D object to change its color
- The background to change its color
- The Default Color button, to change the default color, as well as any selected items
- The Lights Palette to change the color of the appropriate light
- The Info Palette to change the color of the selected object/light
- Any other palette that includes color button.

## NOTES

- To drag and drop locked items out of an Modeler document window, hold down the Option key.
- Holding down the Control key as you drag and drop an item onto an object or group ungroups the object or group and places the item on just one surface of the object, or on one item in the group.
- Hold down the Option key as you drag a 3D object to leave a duplicate in the same place as the original.

# *Appendix K*

## *Plug-in Directory*

Lists the application's plug-ins by name, provides details of the plug-in's type and status, and offers a brief description of its use.

[Return to main table of contents](#)

#	Name	Type	Use the plug-in to...
1	3D Text	Geometry	Create three dimensional text.
2	3ds	Import	Open 3ds formatted files into 3DMF files.
3	Align	Palette	Align objects in any or all of the X, Y, and Z axes.
4	Animation Draw Path	Geometry	Create animation paths.
5	Animation Edit Path	Modifier	Edit the position, scale or rotation of an animation path.
6	Animation Path	Palette	Animate an object, a light or the camera along a predefined path.
7	Animation Player	Palette	Control the animation of the current document.
8	Animation Tweener	Palette	Set and edit tween points for objects, the camera, the ambient light or the sun light.
9	Attribute	Modifier	Changes an object's surface attributes.
10	Autosave	Menu Command	Display an alert to save document at specified intervals.
11	Axis	Palette	Display the current orientation of the front window.
12	Base Plate	Menu Command	Create a plate on the grid, 90% of the grid's size.
13	Color	Palette	Display a color picker to dynamically change an objects color.
14	Color Palette	Palette	A repository for 12 colors.
15	Cone	Geometry	Draws cones.

#	Name	Type	Use the plug-in to...
16	Construct	Modifier & Palette	Performs boolean operations
17	Construct Idler	Idler	Perform boolean calculations and automatically simplifies objects.
18	Counter	Menu Command	Count the number of objects and triangles in the selection or scene.
19	Cube	Geometry	Draw rectangles and cubes.
20	Cursor Options	Palette	Align, snap and cursor display controls.
21	Cylinder	Geometry	Draw ovals and cylinders.
22	Export Movie	Menu Command	Export a QuickTime movie of the current animation.
23	Gravity	Menu Command & Modifier	Moves objects onto the grid.
24	Irregular Polygon	Geometry	Draw the cross section of an irregular shape which is extruded to produce a 3D geometry..
25	Item Tag	Palette	Allows Microspot Interiors to know what objects are Windows or Doors.
26	Lathe	Geometry	Draw the lathe template which is revolved around an axis to produce a 3D geometry.
27	Libraries	Palette	Store and retrieve hundreds of furniture and accessories items.
28	Light Director	Modifier	Direct one or more spot lights to point at one place.

#	Name	Type	Use the plug-in to...
29	Light Start	Menu Command	Animate a light object color and brightness.
30	Light Stop	Menu Command	Stops a light object animating.
31	Lights	Palette	Control the documents lighting values.
32	NaviCam	Palette	Control the camera position and view.
33	Nudge	Palette	Move or rotate an object by a specified amount.
34	Object Color Start	Menu Command	Animate the color of an object.
35	Object Color Stop	Menu Command	Stop an objects color animating.
36	Object Texture Start	Menu Command	Animate the texture applied to an object.
37	Object Texture Stop	Menu Command	Stop an objects texture animating.
38	Orbit	Modifier	Orbit the camera around a selected object or point.
39	Picture	Export	Save the document view as an image.
40	Pipes	Geometry	Draw pipes of a specified diameter.
41	Point Lights	Geometry	Place a point light.
42	Pyramid	Geometry	Draw pyramid geometries with a specified number of sides.
43	Regular Polygon	Geometry	Draw regular polygons with a specified number of sides.
44	Renderer Options	Palette	Change the way the document is displayed.
45	Scale Object	Modifier	Scale selected objects by percentage values.
46	Section	Palette	Edit the section of the geometries with sections.

#	Name	Type	Use the plug-in to...
47	Shear	Modifier	Distort geometries.
48	Sphere	Geometry	Draw ellipsoids and spheres.
49	Spot Light	Geometry	Place a spot lights in the document.
50	Sun Direction	Modifier	Adjust the direction the sunlight shines.
51	Textures	Palette	Import and manipulate a texture or movie texture applied to an object.
52	Torus	Geometry	Draw torus geometries.
53	Tripod	Palette	Control the camera view based on a real tripod.
54	View Finder	Modifier	Point the camera at an object or point clicked.
55	VR	Modifier	Pan and tilt the camera.
56	Walkthrough	Modifier	Walks the camera through a scene.

# *Appendix L*

## *Command Key Table*

Command key shortcuts can be used to perform many actions. The following table lists those key combinations.

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## COMMAND KEY TABLE

Action	Command Key
<b>File Menu</b>	
New	Command N
Open	Command O
Close	Command W
Save	Command S
Print	Command P
Quit	Command Q
<b>Edit Menu</b>	
Undo/Redo	Command Z / F1
Cut	Command X / F2
Copy	Command C / F3
Paste	Command V / F4
Delete Whole Object	Backspace / Delete
Select All	Command A
Duplicate	Command D
Duplicate No Offset	Command Shift D
Clone	Command =
Clone No Offset	Command Shift =
Group	Command G
Ungroup	Command U
<b>View Menu</b>	
New Window	Command K
Look At Selected	Command 1

<b>Action</b>	<b>Command Key</b>
Home View	Command 3 / Home
Custom (View)	Command 0
Top (View)	Command 5
Front (View)	Command 8
Left (View)	Command 4
Right (View)	Command 6
Back (View)	Command 2
Plan (View)	Command 7
Last View	Command 9 / End
<b>Options Menu</b>	
Edit Item	Command E
Lock	Command L
Unlock	Command Shift L
Grid Snap	Command Y
Metric	Command M
Inches	Command I
Orbit Around View	Command T
<b>Plug-in Menu</b>	
Last Plug-in	Command *
<b>Help Menu</b>	
Online Manual	Help