Lighting Tutorials

Lights provide an important aspect to setting the environment and creating the appropriate atmosphere. In a stage setting, they can help define an indoor or outdoor environment and turn morning into night.

This tutorial will show you how to use the four types of lighting (light bulb, sun, spot, and projection). Using a playground scene, you will manipulate the sun (Parallel Light) to simulate different times of the day, turn on a street lamp (Point Light), have one of the character's eyes shine with light (Spot Light), and project a PICT file (Projector). The sun will be positioned at different points in space to simulate sunrise, noon, and sunset. The lamp and spot light will be turned on at sunrise and brightened for the midnight scene. The projector will be turned on at midnight.

General Information

Each of the four lights has its own Object Information dialogs. Each light's dialog can be accessed by double-clicking on the object. Numbers can be entered using the number key pad as well as the numbers above the letters on the keyboard. When entering numerical values in an Object Information dialog, the original values can be retrieved by clicking on the Revert button.

Any light source can be deleted by clicking on the light source and pressing the Delete key. Click OK in the dialog box that appears. As an alternative to deleting lights, they all can be turned off by selecting the Off button in their Object Information dialogs.

A default camera is automatically added when a demo is opened in Presenter. At least one camera needs to be present so that there is a picture in the Camera control Screen. The camera and its target point (focal point) may be in the way as you place and modify some of the lights. If this happens, drag the camera or the target point out of the way. Changing the position of either of these will result in the view changing in the Camera control Screen.

Tip: Depending on the size of your monitor, you will probably want to increase the size of the individual views. Clicking on the upper right size box will enlarge the screen to the size of the monitor which makes it easier to work in one specific view when the effects in the other views aren't needed. Use the zoom icons located at the bottom-right of each stage view to zoom the image in or out. Use the Hand tool to re-position the image in any view.

Scene I - Sunrise

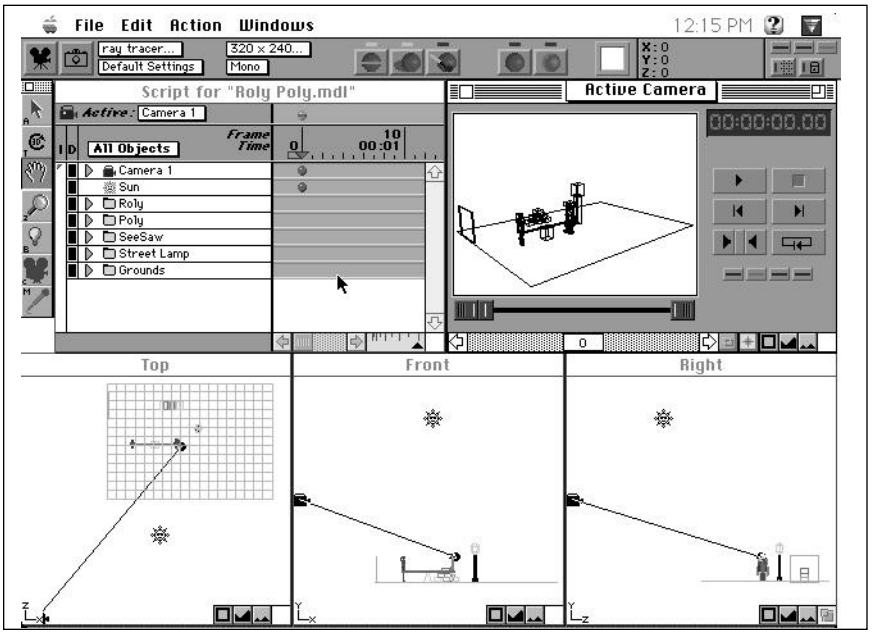
In this scene, you will place the sun, sign a color, and set a brightness level that that is consistent with the sun at sunrise.

To place the sun within a 3D scene, you will need to use two stage views. The sun will be placed in both the Front and the Top stage views so that it is placed correctly in 3D space.

Getting Started

If Presenter is not already open, open it now.

Click on File and drag to Open Model. Open the Roly Poly.mdl in the Tutorial Folder. Click on File and drag to Save Model As. Enter new name for model: Roly Poly1.mdl



Presenter Interface (Roly Poly.mdl)

For the purpose of this tutorial, when looking at the Front stage view, think of north as being up, east as being to the right, and west as being to the left.

A default sun is automatically added to any model when it is opened in Presenter. For this tutorial, the default sun will be used. Additional parallel light sources are added by selecting the second tool on the pop up light palette. Adding light sources will be discussed later in the tutorial.

Note: Save your work often!

Positioning the Sun and its Target Point

The sun will be placed in a position representing sunrise and will be set to pass directly over the characters. East on our stage is the right and the horizon is estimated to be at the stage level, so the sun will be positioned at the right slightly above the stage.

Click on the Front stage view to make it the active view

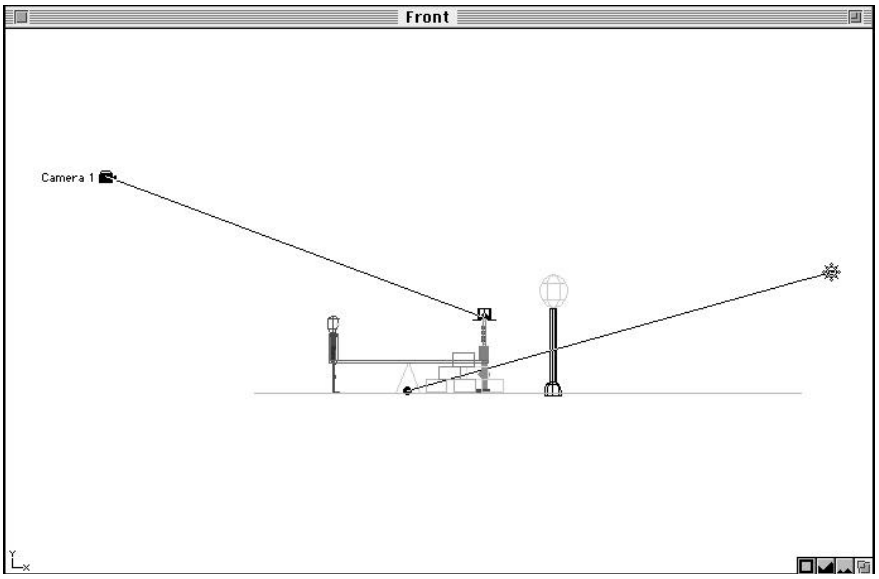
Click on the sun icon and drag it to the east so that it is just above the plane of the playground and beyond the edge of the playground.

Click on the target point (the control handle at the end of the line coming from the sun) and drag it to the point at which the seesaw intersects the playground.

If you enlarged the window, click in the upper right size box to return the view to its original size. Click in the Fit to Window box to make the scene fit on the stage.

Hint: This is an example where you may want to click on the upper right Zoom box to enlarge the view to the full screen.

You have now set the position of the sun and its target so that it is positioned in the east and shining on the playground set. It now needs to be positioned to pass directly over the scene. To accomplish this, we need to use another view. We'll use the Top view to position the sun.



Sun positioned in the Front stage view.

Click on the Top stage view to make it the active stage view. Click in the Fit to Window box to make the scene fit on the stage.

Click on the sun icon and drag it up or down, not sideways, until it is even with the seesaw

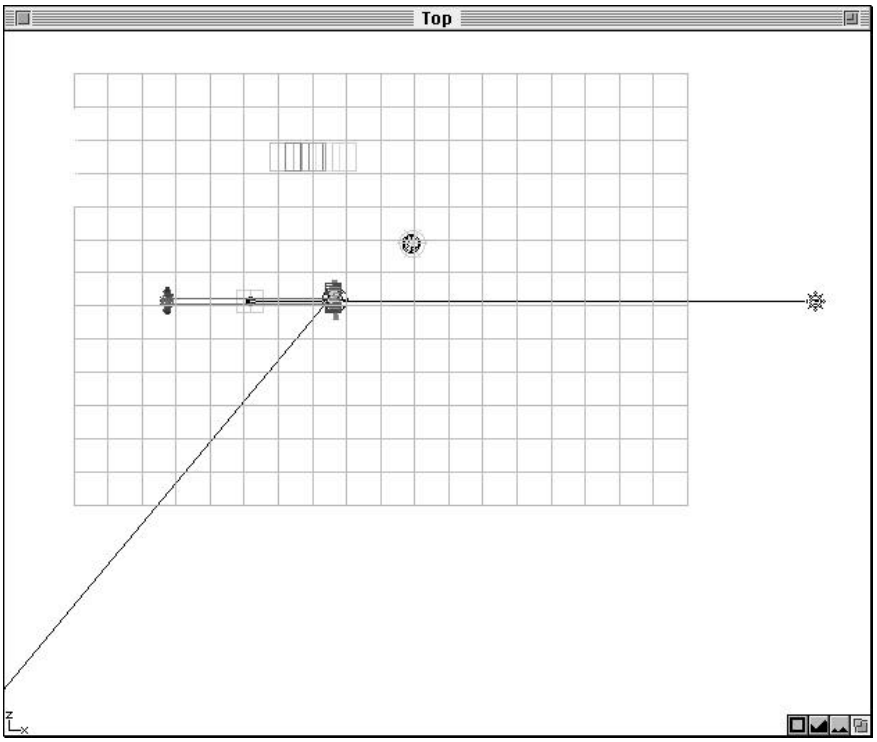
Click on the target point (the control handle at the end of the line coming from the sun) and drag it to the center of the seesaw

You have now set the sun and its target so that it is properly positioned with respect to the playground set. Look in all the stage views to verify the light position.

Placing the Sun Using the Object Information Dialog

The position of the sun can also be set numerically in the Object Information dialog.

Double-click on the sun icon in any of the 3 stage views



Sun positioned in the Top stage view.

Hint: Once the cursor is positioned in the x field, pressing the tab key will move it to the y field. Pressing the cursor again will move it to the z field.

The sun's position at sunrise is defined numerically by the x, y, z coordinates in the Location boxes. In our example, the sun is located at the following coordinates: (x = -0.854947, y = 1.28257, z = -1.67607). By changing any of these numbers, you can change the position of the sun. Do not be concerned if your numbers vary slightly from ours.

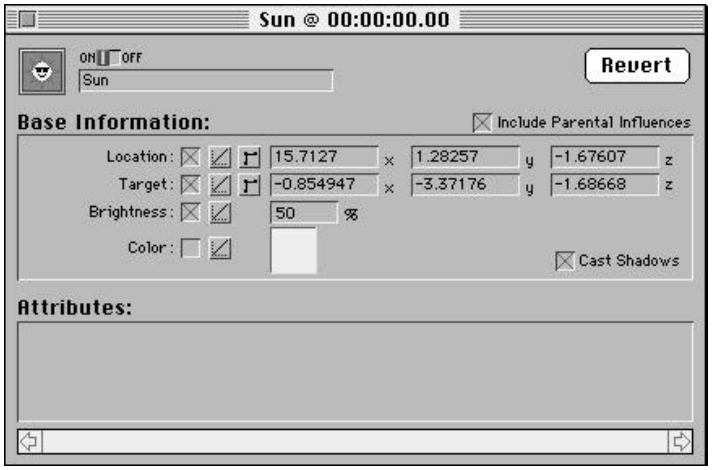
The sun's target position is defined numerically by the x, y, z coordinates in the Target boxes. In our example, the sun is located at the following coordinates:(x = 15.7127, y = -3.37176, z = -1.688668). By changing any of these numbers, you can change the target position of the sun. In this case, you might want to make the z values of both numbers the same since they should line up. To do this you would type -1.67607 for the z value of the target position.

Setting the Brightness and Color of the Sun

Now we'll customize the sun to fit its characteristics at sunrise. For the color, a light yellow is appropriate. Since the intensity of the light changes depending on the position of the sun, a brightness of 50% will be chosen to represent the intensity of the sun at sunrise.

Brightness is entered and color is selected in the Object Information dialog. Enter 50% in the Brightness box. There should be an X in the Brightness check box. If not, click in the box.

Click on the Color box (currently, it should be white). The standard color picker appears. Select a light yellow color. There should be a red X in the Brightness check box. If not, click in the box. Click OK. Close the Object Information dialog by clicking in the upper left close box.



Sun Object Information dialog for sunrise.

Save the Scene

Click on File and drag to Save Model to save the stage set up. Close the model unless you wish to continue with the tutorial.

Rendering the Scene

You've set the sun, so let's take a look at what the sunrise scene will look like rendered. You will ray trace an anti-aliased image with shadows.

The red balls at the top of the screen represent your render quality features. To select anti-aliasing, click on the left-most ball. To select shadows, click on the next ball to the right.

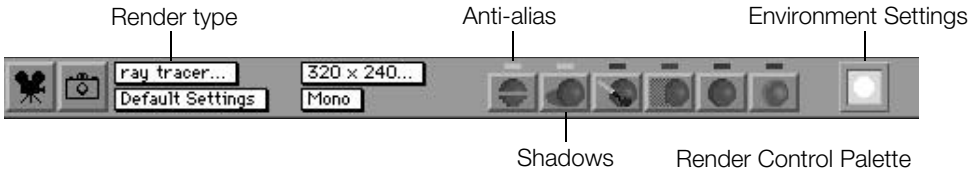
You might want to assign a background color to your rendering. Click on the white button to the right of the red balls to bring up the Environmental Settings dialog. Click on Render Background to display color dialog. Select a light blue and click OK. Click OK in the Environmental Settings dialog.

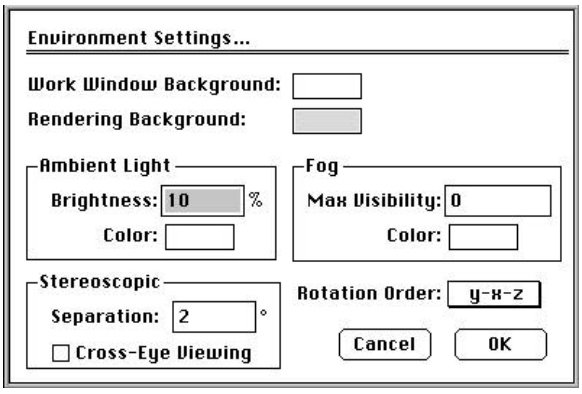
Click on the Render Type pull-down and select RayTrace.

To start rendering, click on the Camera icon, Enter a name for the rendered image and click on the Save button. To replay the rendered scene, select Open Image/Movie from the File menu and open your rendered image.

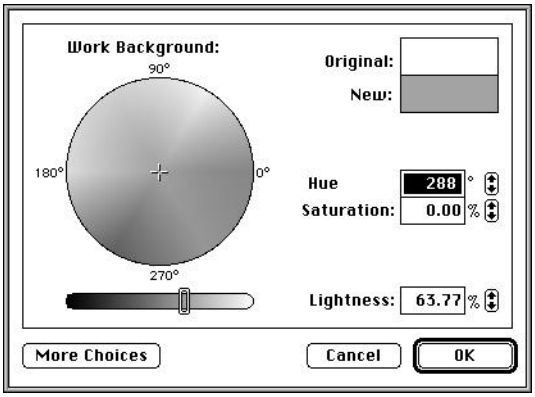
Note: The sun can be moved within any of the 3 stage views by clicking on the vector line (the line between the sun icon and the target) and dragging. This method allows you to change the position of the light source and the target while maintaining the distance and the angle between the source and the target.

Note: Make sure that the green light bar above each of the first two red balls is lit; it means that this rendering option is selected and will render. Unless these options are selected, the light won't cast shadows and the edges will be jagged even though these features were assigned to the objects themselves. The benefit of globally turning off some rendering options is to speed up test rendering.





Environmental Settings dialog



Color dialog

End of Scene I

If you left the camera in the original position you will notice that the scene is quite dark. Observe the long shadows cast by the sun at sunrise. This is because the sun is shining on the other side of the objects in the scene. Move the camera to the right of the scene and render again.

Summary

In this scene, the playground set in your digital studio is lit and shadows are cast by the sun rising in the east. The sun, a parallel light source, was positioned using two different methods: freehand (click and drag) and numerical (Object Information dialog). Also, the brightness was set and a color for the light was selected.

Tip: Since this is a digital studio, you can lighten the scene by adding another sun and placing it above and slightly to the left of the scene. Be sure to turn shadows off and set a low brightness level in its Object Information dialog. This will lighten up the dark side of the scene, but won't cast a new set of shadows.

Scene II - Noon

In this scene, the sun will be re-positioned straight overhead to simulate high noon. The brightness will be increased since it is later in the day.

Getting Started

If Presenter is not already open, open it now.

Click on File and drag to Open Model. Open the Roly Poly1.mdl in the Tutorial Folder. Click on File and drag to Save Model As. Enter new name for model: Roly Poly2.mdl

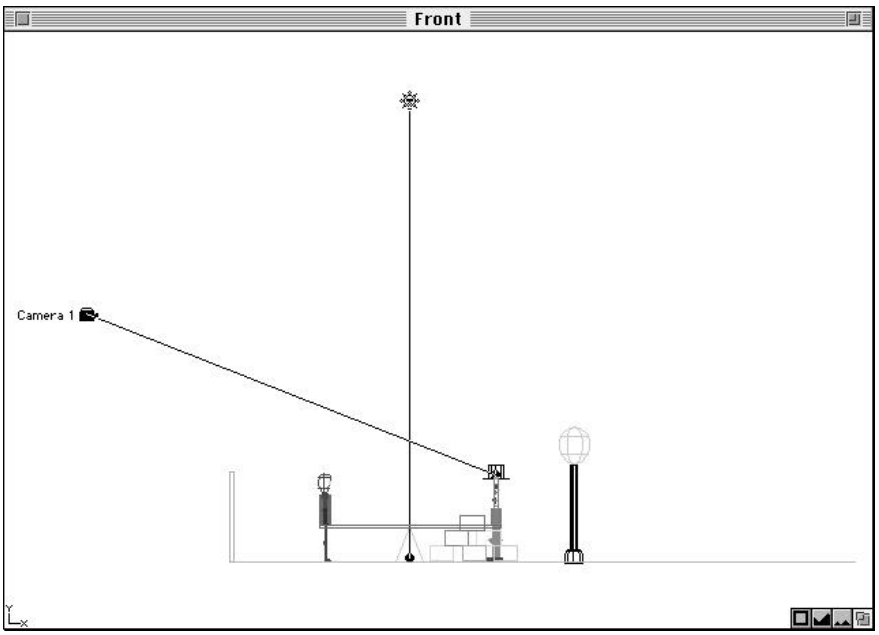
Re-positioning the Sun and the Target Point

To simulate high noon, the sun will be positioned directly overhead, the target will remain in the same place, and the intensity will be increased to 100%.

Click on the Front stage view to make it the active window.

Click on the sun icon and drag it straight up so that it is far above the plane of the playground and the vector line is unbroken.

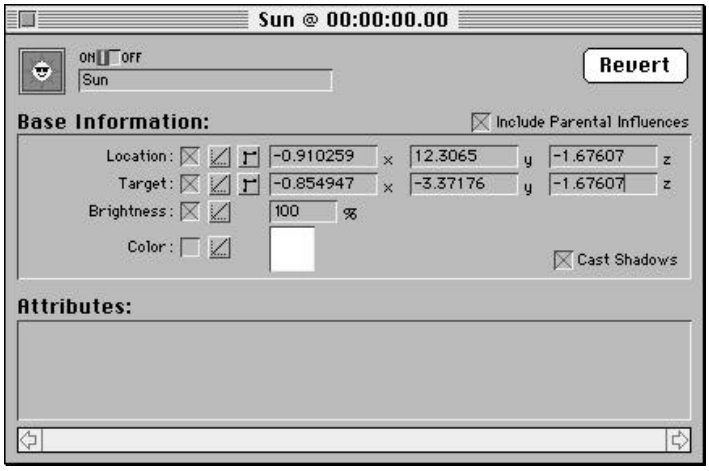
Since the sun was previously lined up with the seesaw, it is not necessary to go to another view to line it up. Check the other stage views to verify that the sun is now directly overhead in all views.



Sun positioned at noon in Front stage view.

Placing the Sun Using the Object Information Dialog

The position of the sun can also be set numerically in the Object Information dialog.



Sun Object Information dialog for noon

The sun's position is defined numerically by the x, y, z coordinates in the Location boxes. In our example, the sun at noon is located at the following coordinates: (x = -0.910259, y = 12.3065, z = -1.67607). By changing any of these numbers, you can change the position of the sun. As before, don't be concerned if your numbers vary slightly from ours.

Notice that the z value is the same as the value at sunrise. This means that the sun is moving directly west. This is exactly what we want.

Resetting the Brightness of the Sun

The brightness of the sun will increase since it is now later in the day, so the color will be changed to white.

Enter 100% in the Brightness box.

Click on the Color box (currently, it should be light yellow). The standard color picker appears. Select a white color. Click OK. There should be an X in the Brightness check box. If not, click in the box. Close the Object Information dialog by clicking in the upper-left close box.

Close the Object Information dialog by clicking in the upper-left close box.

Save the Scene

Click on File menu and drag to Save As to save the stage set up as outlined above.

Rendering the Scene

You've set the sun, so let's take a look at what the noon scene will look like rendered. You will ray trace an anti-aliased image with shadows.

The red balls at the top of the screen represent your render quality features. To select anti-aliasing, click on the left-most ball. Select shadows, click on the next ball to the right.

Click on the Render Type pull-down and select Ray Trace.

To start rendering, click on the Camera icon, Enter a name for the rendered image and click on the Save button. To replay the rendered scene, select Open Image/Movie from the File menu and open your rendered image.

Note: Make sure that the green light bar above each of the first two red-ball buttons is lit. If any bar is dark, it means that this rendering option is not selected and you need to click on the ball again. Unless these options are selected, the light won't cast shadows and the edges will be jagged even though these features were assigned to the objects themselves. The benefit of globally turning off some rendering options is to speed up test rendering.

End of Scene II

You will notice that the long shadows are gone and the scene looks like what you would expect with a noon sun shining overhead. Close the model unless you wish to continue with the tutorial.

Summary

In this scene, the playground set in your digital studio took on the look and feel of noontime. The sun is directly above the scene. The sun, a parallel light source, was re-positioned using two different methods: freehand (click and drag) and numerical (Object Information dialog). Also, the brightness was set.

Notes

Scene III - Sunset

In this scene, the sun will be re-positioned to a low angle in the west. The brightness and the color of the sun will be changed to simulate sunset. The set lamp (point light) will come on with a low level of brightness. Roly (the character with the top hat) will have an eye beam (spot light) that will focus on Poly (the red and blue character).

Getting Started

If Presenter is not already open, open it now

Click on File and drag to Open Model. Open the Roly Poly2.mdl in the Tutorial Folder Click on File and drag to Save Model As. Enter new name for model: Roly Poly3.mdl.

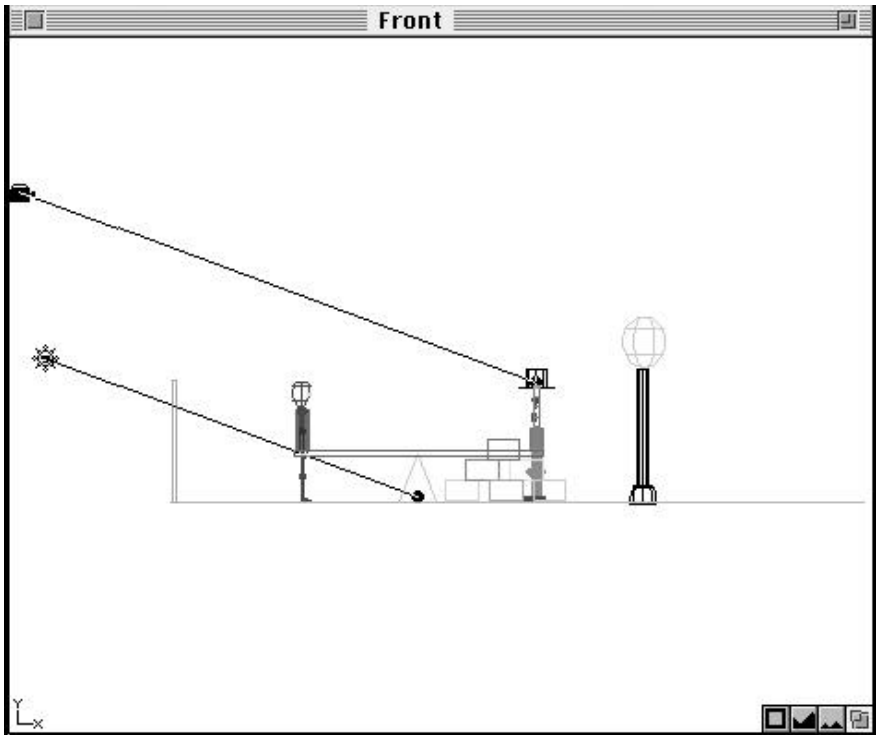
Part 1– The Setting Sun

The sun will be placed in a position representing sunset. West on our digital set is at the left and the horizon is estimated to be at the stage level, so the sun will be positioned at the left slightly above the stage.

Re-positioning the Sun

Click on the Front stage view to make it the active view. Click on the sun icon and drag it to a low angle in the west.

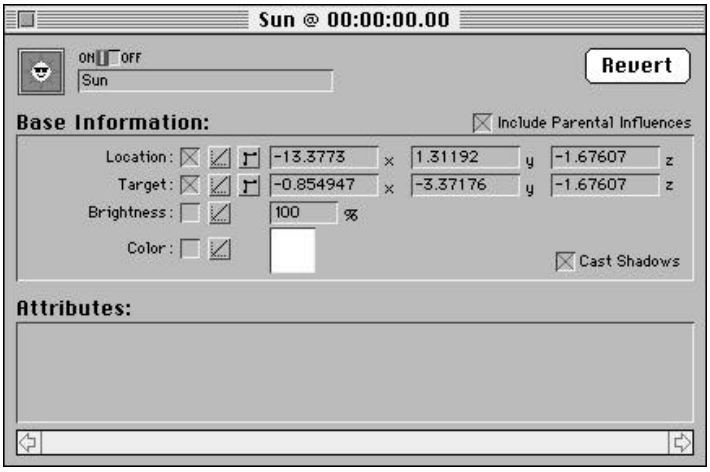
Since the sun was previously lined up with the seesaw, it is not necessary to go to another view to line it up. Check the other stage views to verify that the sun is correctly positioned in all views.



Re-positioning the sun

Placing the Sun Using the Object Information Dialog

Double-click on the sun icon in any of the 3 stage views to bring up the sun's Object Information dialog.



Sun Object Information dialog

The sun's position is defined numerically by the x, y, z coordinates in the Location boxes. In our example, the sun at sunset is located at the following coordinates: (x = -13.3773, y = 1.31192, z = -1.67607). By changing any of these numbers, you can change the position of the sun.

Notice that the z value is the same as the value at noon and sunrise. This means that the sun is still moving directly west.

Resetting the Brightness and Color of the Sun

The brightness of the sun will decrease and the color will change to simulate sunset.

Enter 50% in the Brightness box.

Click on the Color Box. The Color Picker appears. Chose an orange color for sunset.

Click OK. Close the Object Information dialog by clicking in the upper left close box.

Part 2 - Lighting the Lamp

A light bulb will be placed inside the globe of the street lamp and set with a low intensity. You should consider expanding the Front stage view and using the zoom icons at the bottom of the view and the Hand tool to enlarge and position the street lamp so its easier to work with.

This is an example where you may want to click on the upper-right Zoom box to enlarge the view to the full screen.

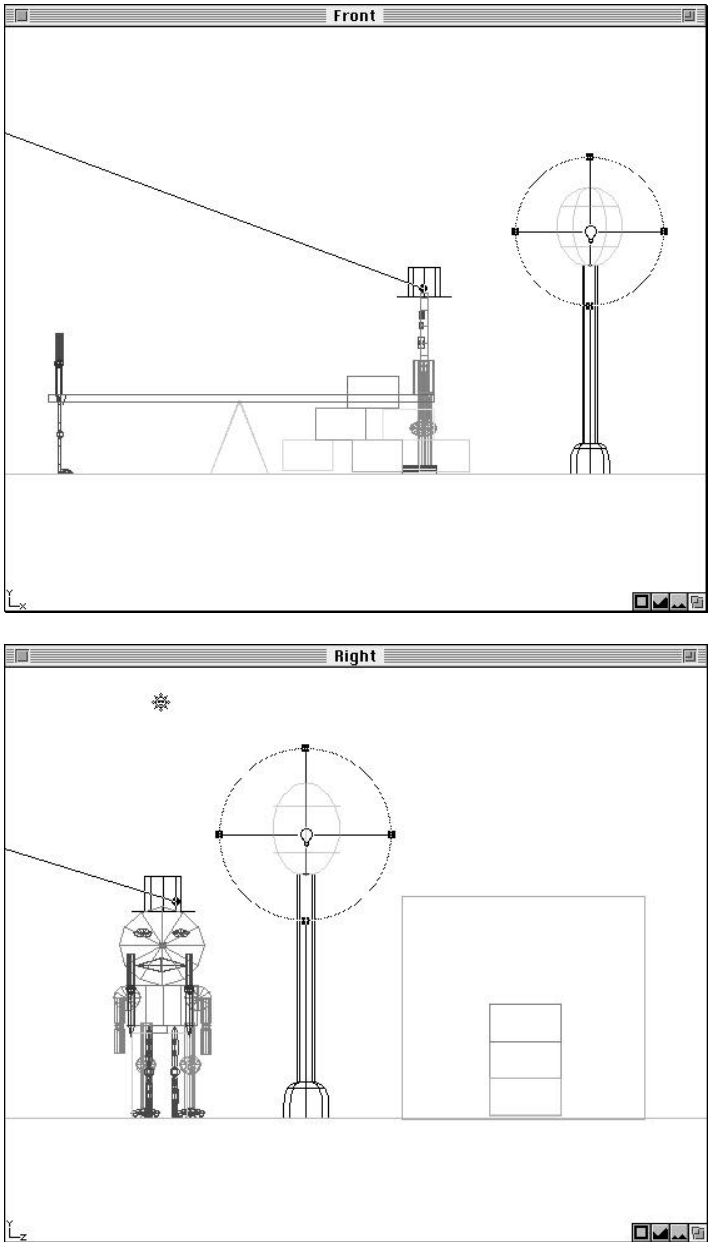
Click on the Front stage view to make it the active view. In the tools palette, click on the light bulb, the first icon in the pop up lights tool palette. Click in the middle of the globe of the street lamp.

Click on the Arrow tool in the tools palette. By selecting the arrow tool, the light bulb can now be positioned by clicking and dragging the light bulb icon in the 3 stage views. If the light bulb tool remains selected, every time there is a mouse click a new point light source will be added.

You have now set the position of the light bulb relative to the Front view. Looking at the other stage views, you can see that it is even with the lamp, but not inside it yet. It needs to be re-positioned in another view

Click on the Right stage view to make it the active view. Click on the light bulb icon and drag it to the middle of the globe of the street lamp.

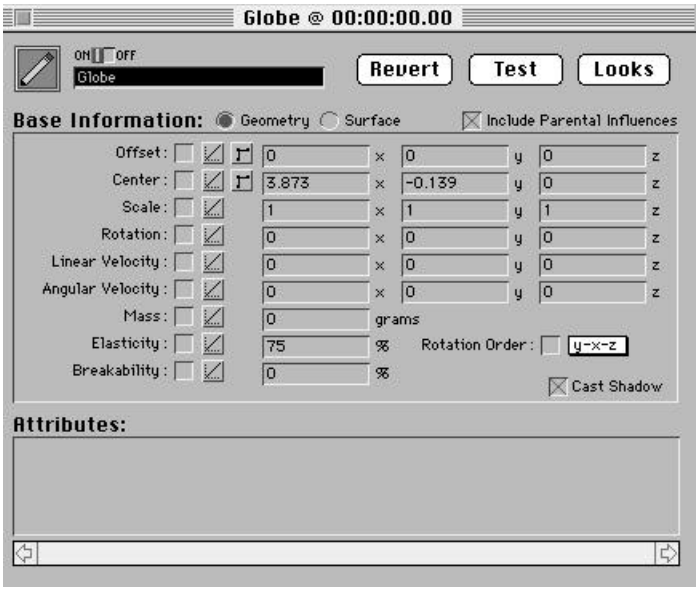
You have now placed the light bulb in the lamp. Verify this in all the stage views.



Positioning the light bulb

Placing the Light Bulb Using the Object Information Dialog

For this step, you will access the Globe in the Script window's Object List. To get at the Globe in the Object List, you will need to open the lamp folder. Click on the arrow pointing to Street Lamp in the Groups palette. The folder opens to display the objects.

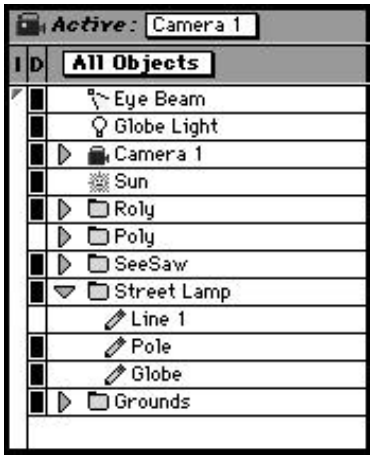


Object Information dialog

To place the light bulb accurately in the middle of the globe, double-click the Globe object in the Object List to bring up its Object Information dialog. The coordinates for the center of the globe are listed. Make a note of these coordinates (x = 3.873, y = -0.139, z = 0) and close the Object Information dialog.

Double-click on the light bulb icon in any of the 3 stage views to bring up the point light source's Object Information dialog.

Set the point light source's position as x, y, z coordinates by entering numbers in the appropriate boxes. Enter the values that reflect the center of the globe:
(x = 3.873, y = -0.139, z = 0).



The Object List with open Street Lamp folder

While in the Object Information dialog, the name of the light can be changed. The default name is in the upper left of the dialog and is the name of the light source (i.e. point light). Select the name and type in the new name (i.e. Globe Light).

Close the Object Information dialog by clicking in the upper left close box.

Setting the Brightness and Color of the Street Lamp

The brightness of the street lamp will be low since it is just coming on at sunset. The color will be white. Since white is the default color, the color will not be changed.

The brightness is controlled by the sphere of influence. The sphere can be increased or decreased by dragging one of the four control handles.

Click on any of the 3 stage views to make it the active view. Click on the light bulb icon (Globe Light) to make it the selected object.

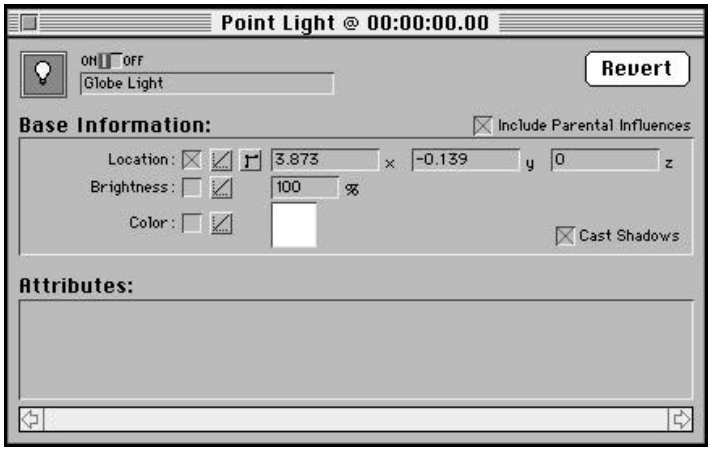
Click on any one of the four control handles and drag till the sphere touches Roly. The diameter of the point light source's sphere of influence increases as the control handle is dragged away from the light bulb icon and decreases as it is dragged towards the light bulb icon.

Setting the Brightness Using the Object Information Dialog

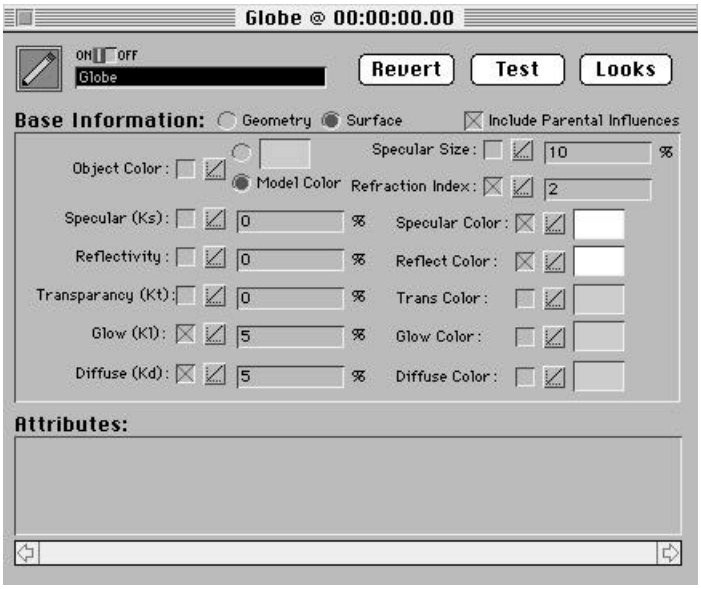
Open the point light's dialog by double-clicking on the light bulb icon in any of the 3 stage views.

As indicated, the brightness is entered as a percentage which is tied to the diameter of the sphere of influence in inches. Enter 5 in the Brightness box.

Close the Object Information dialog by clicking in the upper left close box.



Point Light Info dialog box



Object Info dialog

Making the Globe Transparent

To light the stage with the lamp, you need a transparent glass globe. The current globe is opaque because any 3D objects created by ModelPro defaults to opaque and assumes the color used in creating it. In this example, the globe will be transformed from an opaque object to a transparent object by assigning the properties of a glass lamp to it.

To create properties of a glass lamp, click on the Globe in the Object List in the Script window The Globe's Object Information dialog displays the object's Geometry information. Click on the Surface button near the top-middle of the dialog to display its Surface information.

To turn the globe into a glass lamp, enter 2 for the Refraction Index, 50 for Glow and 5 for Diffuse. Make sure that the check boxes for each of the three previous properties has a red X in it. If not checked they are not selected so you need to click in the unchecked boxes.

To make the globe transparent, click on the white box for Opacity. In the color picker, drag the slider nearly all the way down to assign a black color. Close the Object Information dialog by clicking in the upper left close box.

Part 3 - Putting a Gleam in the Eye

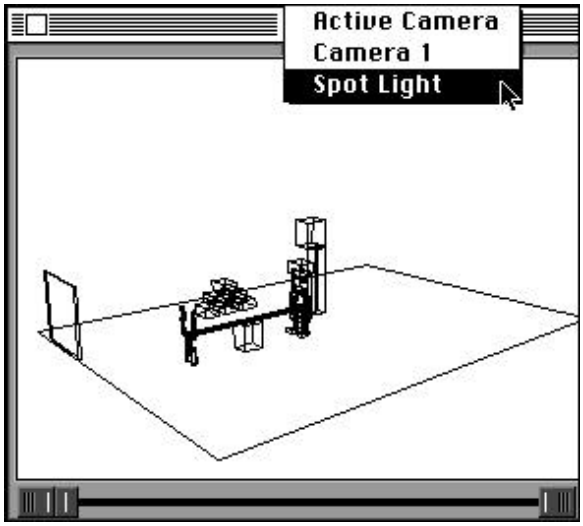
A spot light will be positioned at eye level in front of Roly's head (the character with the top hat) and will target a point just in front of Poly's head (the red and blue character). You can position the spotlight using the 3 stage views, in the Camera Control Screen, or the Object Information dialog. All three methods will be explored in this part.

Note: The target point is at the same coordinates as the spot light, so it is not currently visible.

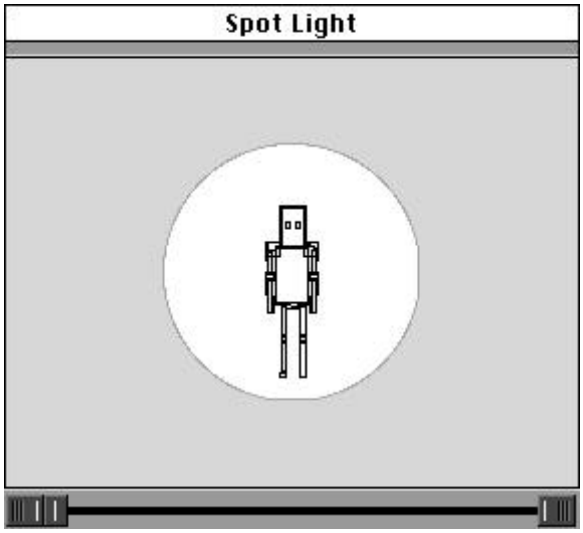
After inserting a spot light into the scene, the Camera Control Screen will be set to show the effect of the spot light.

Positioning the Spot Light

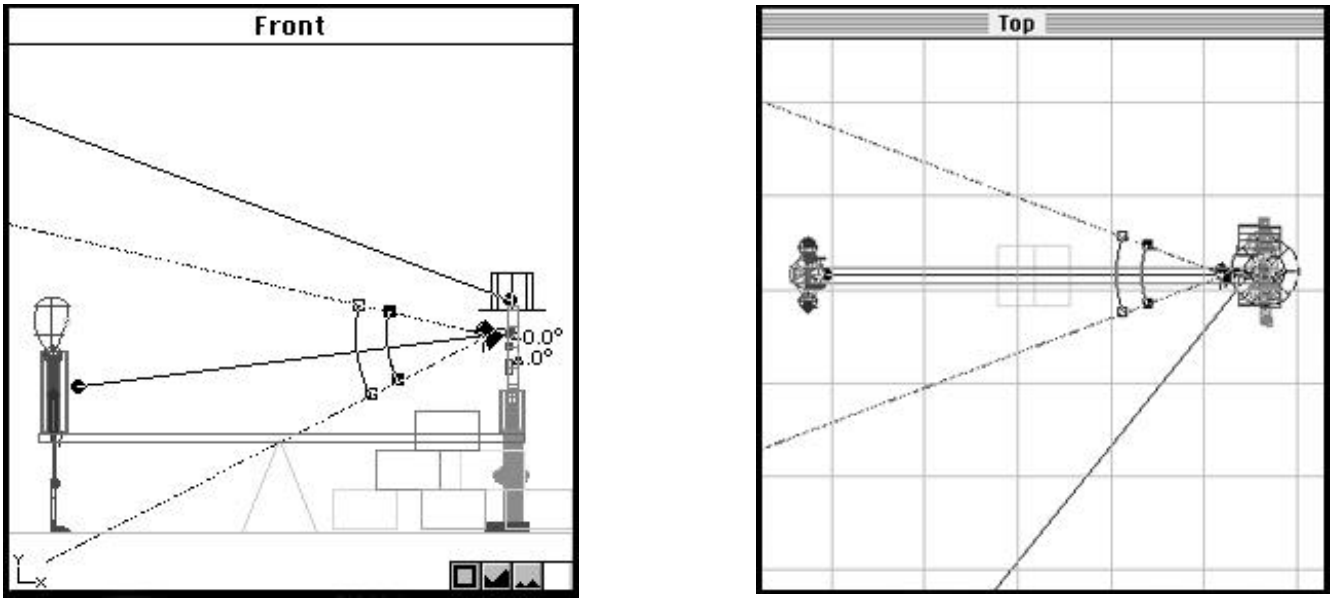
Click on the Front stage view to make it the active view. Use the Zoom In icon at the bottom of the window to enlarge the view and the Hand tool to position it so that Roly and Poly just fit inside the window.



Selecting spot light to view in the Camera Control Screen



Camera Control Screen view of the spot light.



Positioning the spot light.

In the tools palette, click on the spot light, the third icon in the pop up lights tool palette.

Click on a point in front of Poly's chest. The spot light and its target will be placed at this point.

Click on the arrow tool in the tools palette. By selecting the arrow tool, the spot light can now be positioned by clicking and dragging the spot light icon in the 3 stage views. If the spot light tool remains selected, every time there is a mouse click a new spot light source will be added.

Click in the Camera Control Screen to make it the active view and click on Active Camera to select it. Click on Active Camera and drag to Spot Light.

The Camera Control Screen now shows where the spot light is shining.

Click on the Front stage view to make it the active view

Click on the spot light and drag it to the eye level in front of Roly's head. Notice how the view in the Camera Control Screen changes.

Note: As with a parallel light source, a spot light source can be moved within any of the 3 stage views by clicking on the vector line (the line between the source, the spot light icon, and the target) and dragging. This method allows you to change the position of the light source and the target while maintaining the distance and the angle between the source and the target.

The target point can stay where it is in front of Poly's chest. If you want to move it, click on it and drag. As the target point is moved, notice how the view in the Camera Control Screen changes.

You have now set the position of the spot light relative to the Front view. Looking at the other stage views, you can see that it is even with the head, but not inside it yet. It needs to be repositioned in another view.

Click on the Top stage view to make it the active view. Click on the spot light icon and drag it to the eye level in front of Roly's head. Once again, notice how the view changes in the Camera Control Screen.

The target point should be dragged so it is in front of Poly's chest. As the target point is moved, notice how the view in the Camera Control Screen changes.

You have now positioned and targeted the spot light. Verify this in all the stage views.

Using the Camera Control Screen to Set the Spot Light

The Camera Control Screen can be used to position the spot light intuitively

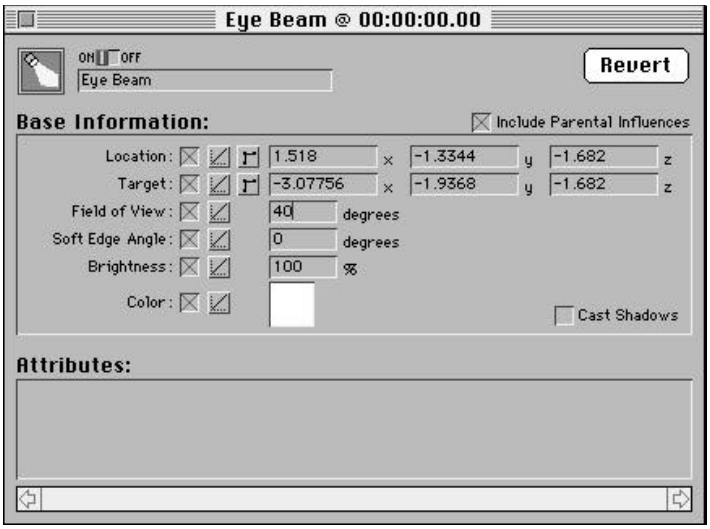
Click on the Camera Control Screen to make it the active view. When the cursor is placed inside the Camera Control Screen, it becomes a cross hair cursor with arrows.

Click anywhere in the screen and drag. Notice how the spot light icon moves in the 3 stage views.

You may have found it difficult to drag to exactly 8 degrees.
To be able to set the field of view accurately, click on a black control point and drag along the angle line moving away from the spot light. The farther away you are from the spot light as you drag the angle line the slower the angle changes and the more accurately you can set the angle. Try dragging the black control point close to the spotlight and then far from it to see the difference.

Placing the Spot Light Using the Object Information Dialog

The position of the spot light can also be set numerically in the Object Information dialog.



Spot Light Info dialog box

Note: The spot light provides an option to define a soft edge. The white control handles that are slightly further along on the angled lines are used to define a soft edge angle. Dragging a white handle in sets the number of degrees in the soft edge angle. The upper number next to the spot light represents the angle of the field of view. The lower number represents the soft edge angle. If the white handle is dragged in one degree in this example, there would be an intensity fall-off of one degree at the edge of the spot. You can also set the soft edge in the spot light's Object Information dialog.

Double-click on the spot light icon in any of the 3 stage views to bring up its Object Information dialog.

The spot light's position is defined numerically by the x, y, z coordinates in the Location boxes. In our example, the spot light is located at the following coordinates:(x = 1.21862, y = -1.3344, z = -1.682). By changing any of these numbers, you can change the position of the spot light. Don't be concerned if your numbers vary slightly from ours.

The spot light's target position is defined numerically by the x, y, z coordinates in the Target boxes. In our example, the spot light is located at the following coordinates:(x = -3.0776, y = -1.9368, z = -1.682). By changing any of these numbers, you can change the target position of the sun.

While in the Object Information dialog, the name of the light can be changed. The default name is in the upper left of the dialog and is the name of the light source (i.e. spot light). Select the name and type in the new name (i.e. Eye Beam). If you have the Camera Control Screen set to Spot Light, the name will change to Eye Beam. So the beam won't cast any shadows, click in the Cast Shadows check box in the lower right part of the dialog.

Close the Object Information dialog by clicking the close box in the upper left corner.

Setting the Field of View of the Eye Beam

The field of view of the spot can be set using the control handles on the angled lines extending out from the spot light or through the Object Information dialog. The smaller the angle, the narrower the field of view. The larger the angle, the wider the field of view.

First we'll set the field of view using the control handles

Click on any of the 3 stage views to make it the active view. Click on the spot light to make it the active object.

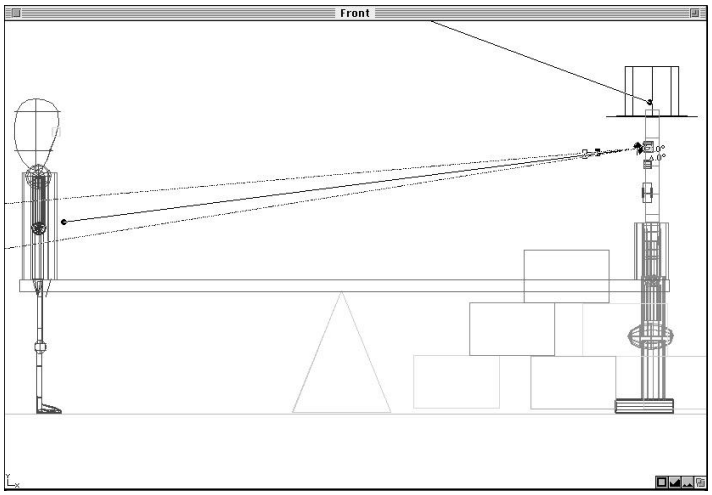
Click on one of the black control handles on the angled lines and drag. The target point is always in the middle of the angle. As a control handle is dragged away from the target point, the field of view gets wider. As a control handle is dragged towards the target point, the field of view gets narrower. Watch the results in the Camera Control Screen.

The angle appears as degrees to the right of the spot light. Set the angle close to 4.

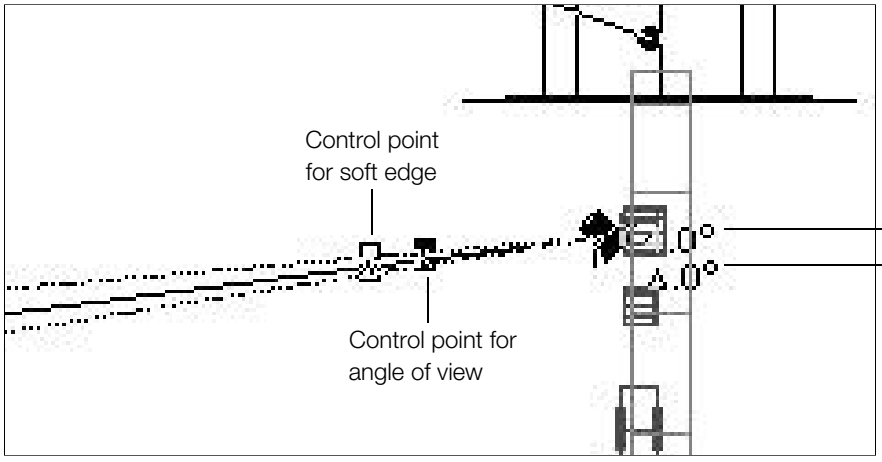
Next we'll set the field of view using the Object Information Dialog.

Double-click on spot light in any of the 3 stage views to bring up the spot light's Object Information dialog.

Enter 4 the Field of View box.



Roly and Poly Front View
(see detail below)



Detail from diagram above

Setting the Brightness and Color of the Eye Beam

The brightness of the eye beam will be low since it is just coming on at sunset. The color will be blue since Rody's eyes are blue.

As with point light, the brightness is a percentage. Enter 50 in the brightness field.

Click on the Color box (currently, it is white). The standard Color Picker appears. Select a light blue color. Click OK.

Close the Object Information dialog by clicking in the upper-left close box.

Change the Camera Control Screen from Eye Beam to Active Camera by clicking in the Camera Control Screen and clicking on Eye Beam to select it. Then, click on Eye Beam and drag to Active Camera.

Save the Scene

Click on the File menu and drag to Save As to save the stage set up you just completed.

Rendering the Scene

You've set the sun, light bulb, and spot light, so let's take a look at what the sunset scene will look like rendered. You will ray trace an anti-aliased image with shadows.

Note: Make sure that the green light bar above each of the first two and the last red balls is lit. If any bar is dark, it means that this rendering option is not selected and you need to click on the ball again. Unless these options are selected, the light won't cast shadows, the edges will be jagged, and the glass won't be transparent even though these features were assigned to the objects themselves. The benefit of globally turning off some rendering options is to speed up test rendering.

The red balls at the top of the screen represent your render quality features. To select anti-aliasing, click on the left-most ball. To select shadows, click on the next ball to the right. To select transparency, click on the last red ball at the right.

Click on the Render Type pull-down and select RayTrace.

To start rendering, click on the camera icon. Enter a name for the rendered image and click on the Save button. To replay the rendered scene, select Open Image/Movie from the File menu and open your rendered image.

End of Scene III

Notice that the shadows now extend to the right, the scene has an orange tinge to it. The lamp creates a small circle of light and casts its own shadows. To see the spot light shining on Polly's chest, you will need to move the camera to the right and render again.

In this part, you rendered with a sun, light bulb, and spot light. To see the effect of soft edges on the spot light, type 1 in the Soft Edge Angle box in the Eye Beam Object Information dialog and render again. As an alternative, try placing a spotlight for each eye and render with two spots. Remember, if you place the spots inside the eyes, you have to make the eyes transparent as you did for the lamp's globe. This would result in an interesting effect; the eyes would glow as well as your spot light.

Close the model unless you wish to continue with the tutorial.

Summary

In this scene, the playground set in your digital studio took on the look and feel of dusk. The sun is setting and the lights are coming on.

The sun was re-positioned using two different methods: freehand (click and drag) and numerical (Object Information dialog). The brightness and color of the sun were reset to simulate sunset.

A light bulb was added as a street lamp. A low intensity was set. The freehand and numerical methods were demonstrated for both the placement and the brightness of the point light.

A spot light was also added as an eye beam. The spot light and target were positioned using both the freehand, control screen, and the numerical method. The Camera Control Screen was changed to Spot Light so that the effects of the placement and modification of the spot light and its target could be seen.

To allow the light to shine through, the globe was transformed into a transparent object by assigning the properties of glass.

Tip: Since this is a digital studio, you can add more lights without shadows to lighten the dark side of the scene. They should have the same orange color as the first one, but should cast no shadows.

In addition to showing what was in the camera's field of view the Camera Control Screen was used to see where the spot light was focused.

Scene IV - Midnight

In this scene, the sun will be turned off since it is now midnight. The street lamp will become brighter as will the eye beam. A projector will be added to display an image on the playground wall.

Getting Started

If Presenter is not already open, open it now.

Click on File and drag to Open Model. Open the model from scene three, Roly Poly3.mdl. Click on File and drag to Save As. Rename the model Roly Poly4.mdl.

Note: An alternative to turning the sun off is to delete it. You can do this by clicking on the sun and pressing the Delete key.

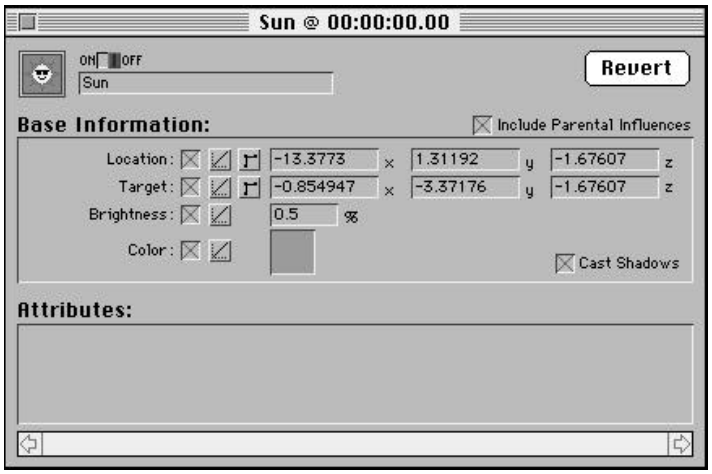
Part 1 - The Sun has Set

The first step to simulate midnight is to turn off the sun light.

Turning the Sun Off

Click in any of the 3 stage views. Click the Zoom In box in the lower right corner if the sun icon is not visible.

Double-click the sun icon to access the sun's Object Information dialog. In the upper left, there is an on/off slider bar. Click OFF. Close the Object Information dialog by clicking in the upper left close box.



Sun turned off

Part 2 - The Street Lamp Brightens

In this part we'll make the street lamp brighter.

Click on any one of the 3 stage views to make it the active window. Double-click the light bulb icon, Globe Light, to access the point light's Object Information dialog.

Type 100% in the Brightness field. Close the Object Information dialog by clicking in the upper left close box.

Note: A light that is turned off is still visible on stage, but it has no effect.

Note: If you stretched the sphere of influence to the left edge of the playground, that would be about 100% Brightness.

Part 3 - The Eye Beam Brightens

In this part we'll make the spot light brighter.

Double-click the spot light icon in any of the 3 stage views to access the spot light's Object Information dialog.

Select the brightness and type 100%. Close the Object Information dialog by clicking in the upper left close box.

Part 4 - Projecting a New Image

Now that night has fallen, we can have an outdoor slideshow or play a movie. To be able to do this, you will set up a projector on the blocks in the playground and project a slide against the wall.

A projector works like a spot light with one major difference. A projector transmits a rectangular image in the same way a movie or slide projector does in the real world. This image can be either a single still frame or a series of frames such as QuickTime movie or PICS file. It is the fourth lighting tool on the right of the light pop-up icon.

A projector will be positioned on top of the blocks and will target a small wall at the left of the playground. You can position the projector using the 3 stage views, in the Camera Control Screen, or the Object Information dialog. All three methods will be explored in this part. PICT or QuickTime images are selected for projection by adding them as attributes of the projection light.

Positioning the Projector

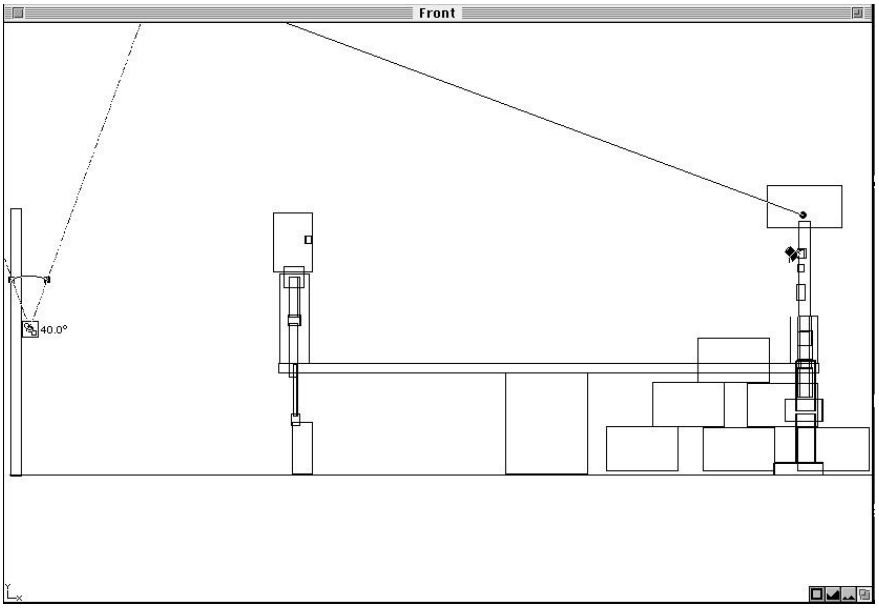
Click on the Front stage view to make it the active view. Click in the Zoom box at the top-right part of the view to enlarge the view. Use the Zoom In icon at the bottom of the window to zoom the view and the Hand tool to position it so that the wall and the blocks fill a major portion of the view.

In the tools palette, click on the projector, the fourth icon in the pop up lights tool palette.

Place the Projector icon up against and centered on the right side of the wall. The projector and its target will be placed at this point.

Note: The target point is at the same coordinates as the projector, so it is not currently visible.

Click on the arrow tool in the tools palette. By selecting the arrow tool, the projector can now be positioned by clicking and dragging the projector icon in the 3 stage views. If the pjector tool remains selected, everytime there is a mouse click a new projector source will be added.



Positioning the projector.

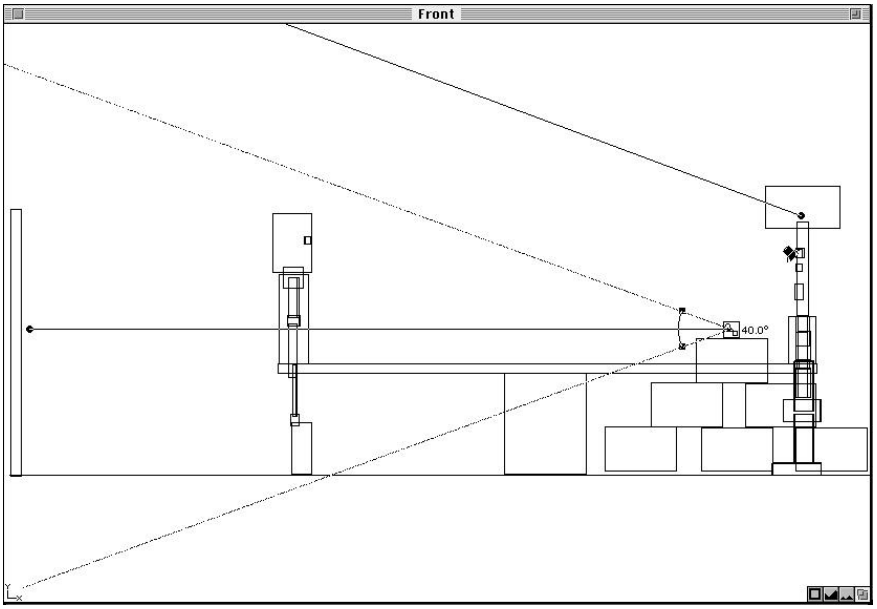
Click in the Camera Control Screen to make it the active view and click on Active Camera to select it. Click on Active Camera and drag to Projector.

The Camera Control Screen now shows where the projector is shining.

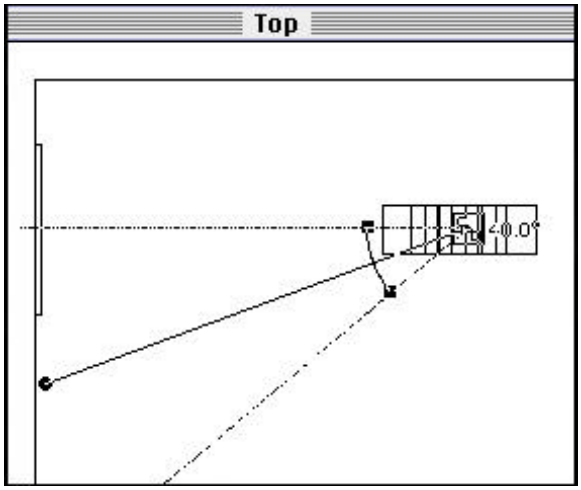
Click on the Front stage view to make it the active view

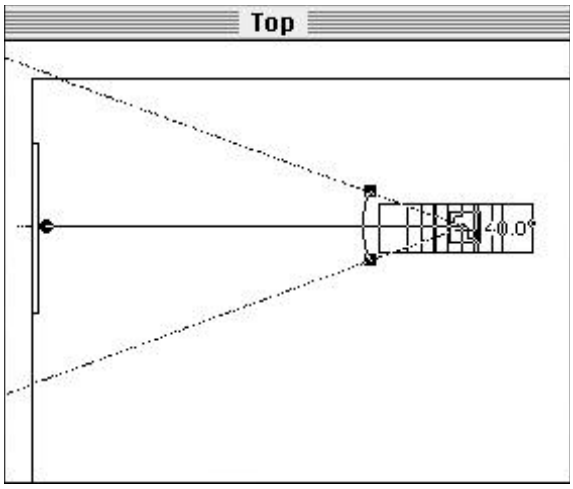
Click on the projector and drag it so it is centered on the the top of the blocks. Notice how the view in the Camera Control Screen changes.

The target point can stay where it is in front of the screen. If you want to move it, click on it and drag. As the target point is moved, notice how the view in the Camera Control Screen changes.



You have now set the position of the projector relative to the Front view. Looking at the other views, you can see that it is even with the blocks, but is not set on top of it yet. It needs to be repositioned in another view.





Projector in the Top stage view

Note: Move a Projector in the stage views by dragging the vector line of the tool icon (the line between the icon and its target). This changes the position of the light source and its target, maintaining the Field of View.

Click on the Top stage view to make it the active view. Click on the projector icon and drag it so it is centered on top of the blocks. Once again, notice how the view changes in the Camera Control Screen.

The target point should be dragged so it is centered on the wall. As the target point is moved, notice how the view in the Camera Control Screen changes.

You have now positioned and targeted the projector. Verify this in all the stage views.

Using the Camera Control Screen to Set the Projector

The Camera Control Screen can be used to position the projector intuitively.

Click on the Camera Control Screen to make it the active view. When the cursor is placed inside the Camera Control Screen, it becomes a cross hair cursor with arrows.

Click anywhere in the screen and drag. Notice how the projector icon moves in the 3 stage views.

Placing the Projector Using the Object Information Dialog

Double-click on the light bulb icon in any of the 3 stage views to bring up the projector's Object Information dialog.

Set the projector's position as x, y, z coordinates by entering numbers in the appropriate boxes.

Close the Object Information dialog by clicking the close box in the upper left corner.

Setting the Field of View of the Projector

The field of view of the projector can be set using the control handles on the angled lines extending out from the projector or through the Object Information dialog. The smaller the angle, the narrower the field of view. The larger the angle, the wider the field of view.

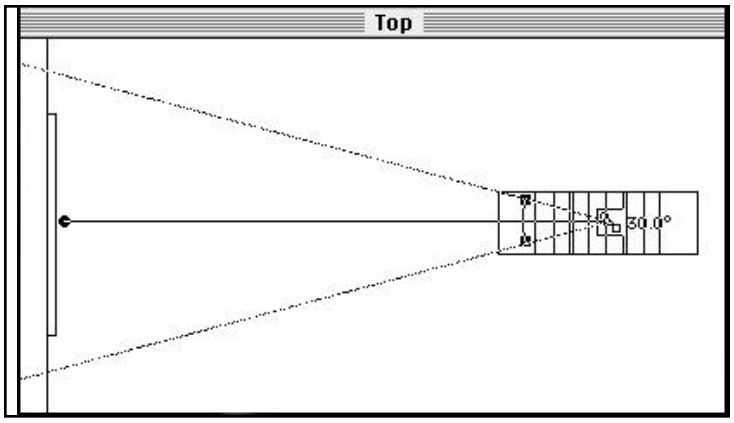
First we'll set the field of view using the control handles

Click on any of the 3 stage views to make it the active view. Click on the projector to make it the active object.

Click on one of the control handles on the angled lines and drag. The target point is always in the middle of the angle. As a control handle is dragged away from the target point, the field of view gets wider. As a control handle is dragged toward the target point, the field of view gets narrower. Watch the results in the Camera Control Screen.

The angle appears as degrees to the right of the projector. Set the angle close to 30

Double-click on projector in any of the 3 stage views to bring up the projector's Object Information dialog. Enter 20 the Field of View box.



Setting the Field of View

Setting the Brightness of the Projector

The brightness of the projector will be set at 100%.

Double-click on the projector icon in any of the 3 stage views to open the Object Information dialog.

As with point light, the brightness is a percentage. Enter 100 in the brightness field.

So the beam won't cast any shadows, click in the Cast Shadows check box in the lower-right part of the dialog.

Change the Camera Control Screen from Projector to Active Camera by clicking in the Camera Control Screen and clicking on Projector to select it. Then, click on Projector and drag to Active Camera.

Projecting an Image

You are going to project a PICT image selected from the Texture Attributes dialog.

Double-click on the projector icon in any of the 3 stage views to open the Object Information dialog.

Click on Windows and drag to Attributes. Select Textures from the pull-down menu.

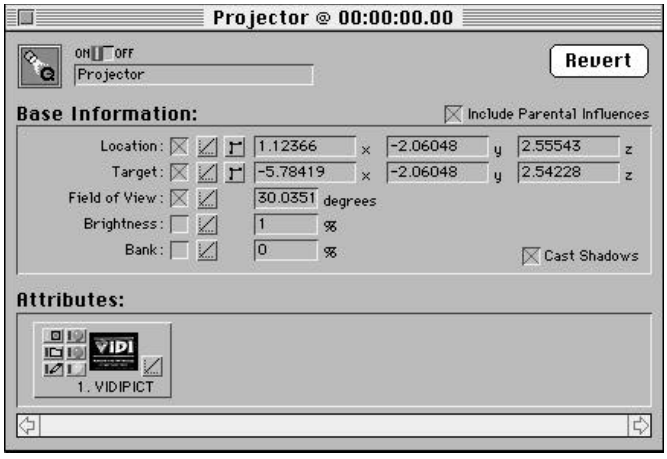
Select a PICT image to project and drag the icon into the Attributes portion of the Projector Information dialog.

Rendering the Scene

You've set the light bulb, spot light, and projector, so let's take a look at what the midnight scene will look like rendered. You will ray trace an anti-aliased image with shadows and projected image.

The red balls at the top of the screen represent your render quality features. To select anti-aliasing, click on the left-most ball. To select shadows, click on the next ball to the right. To select projection, click on the next ball to the right. To select transparency, click on the red ball at the far right.

Windows Menu, Attributes pull-down, and Texture Attributes palette



Projector Info dialog box

Click on the Render Type pull-down and select RayTrace.

Note: Make sure that the green light bar above each of the first two and the last red balls is lit.

To start rendering, click on the Camera icon. Enter a name for the rendered image and click on the Save button. To replay the rendered scene, select Open Image/Movie from the File menu and open your rendered image.

End of Scene IV

In this part, you rendered with a light bulb, spot light, and projector. Notice the effects of the lamp on the surrounding scene. Try rendering again with the lamp brighter and with it dimmer to see the affect it has on the scene. You also might try adding a lamp to the other side of the scene.

Tip: Since this is a digital studio, you can add some light to the whole scene by turning the sun on with a very low brightness to simulate moonlight.

From the current position of the camera, you can't see the image projected on the wall. To see the image you need to place the camera in front of the wall. Using the Active Camera control screen as a reference, move the camera directly in front of the wall so that the wall fills up the screen.

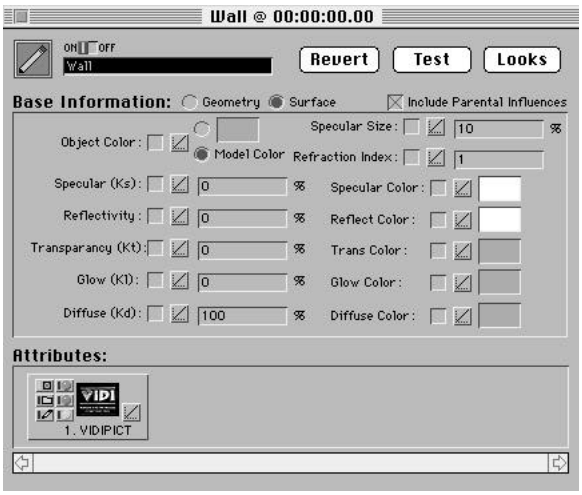
Tip: Turn off all the objects except for the wall by clicking in the D column next to their name in the Script Object List. Click on the second ball at the top-left of the screen to turn shadows off. This will speed up your rendering.

You previously used ray tracer to render your scenes. This time use RenderMan, if you have it, in place of ray trace. Click on the Render Type pull-down and select RenderMan. Click on the Camera icon to start rendering. Enter a name for the rendered image and click on the Save button. To display the rendered scene, select Open Image/Movie from the File menu and open your rendered image.

Tip: You can use the Wall's Object Information dialog to change the color of this object. Click on the Surface button to display surface attributes. Click on the button next to the color box to assign a new color to the Wall object. This turns the object's color off and assigns the current color, white, to the object. To make the wall black, click on the white color box to display the color edit and drag the slider down all the way. Click OK to set the color.

Notice that the black background is gone and how light the projected image looks. Remember that a projector is a light shining through a slide, so this type of effect is expected. The black in the image corresponds to the transparent portion of the slide so it doesn't show up. Try projecting on a white or black wall to see the difference the color of the background makes.

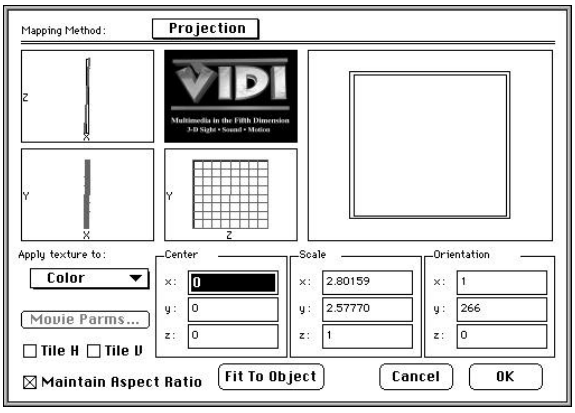
To see the difference between a Projector light and projection mapping, turn the Projector off by clicking it off in the top-left of its Object Information dialog. If Wall isn't visible in the Script Object List, click on the arrow next to Ground to open the folder. Double-click on Wall to open its Information dialog. Select the same texture used for projection from the Texture Attributes list and drag it into the Attributes section of the Wall's Information dialog.



Assigning a color and a texture map to an object

Double-click on the PICT image icon in the dialog to display the texture mapping dialog. Click and hold on map to display the mapping options pop-up. Drag to projection and release to display the projection mapping controls. Click, hold, and drag the cursor in the Positioning window to turn the object so you are looking at its front face. As an alternative, you can position the object by entering numerical data in the Orientation fields at the bottom-right of the dialog. The p (pitch) field should be 0, the y (yaw) field should be 77, the b (bank) field should be 0. Enter 2 for x in the scale fields to double the size of the PICT map on the object. Since Maintain Aspect Ratio is already checked, the y scales up to the same value.

Click OK to exit the dialog. Close the Information dialog by clicking in the close box at the top-left of the dialog.



Positioning the projection map

Click on the Camera to render. Notice how different this looks from the image created using the Projector. You might try projecting other images on to the Wall.

This completes the lighting tutorial. A summary of the Presenter lights is provided for you to review.

Summary

In this scene, the sun has set on the playground in your digital studio. The lamp and spot light have been brightened and the projector was turned on. The sun was turned off. The brightness of the light bulb and spot light were increased. A projector was added to the scene and an image was projected on the playground wall.

Lighting Summary

Point Light Source

The point light simulates a light bulb. It radiates light in all directions. It is the first lighting tool on the light pop-up icon.

Place by selecting the light bulb icon and click in any of the 3 stage views to place.

Move the light bulb by clicking on the arrow tool, then click and drag the light in any of the 3 stage views.

Expand or decrease the radius of the light source by clicking and dragging on any of the light source's 4 control handles in any of the 3 stage views.

Alter the location and brightness of the light by numerical data entry through the Object Information dialog. This dialog is accessed by double-clicking on the point light source in any of the 3 stage views or double-clicking on the name (point light) in the script.

Brightness determines the size of the sphere of influence and increasing or decreasing the radius increases or decreases the brightness.

Sun Light Source

Like the sun, it radiates light of equal intensity in the same direction. It is the second lighting tool on the right of the light pop-up icon. A default sun is always added when opening a new demo.

Place by selecting the sun icon on the light pop-up icon (second icon to the right) and click once in any of the 3 stage views.

Where the sun is placed determines it's target point.

Move the sun by clicking on the arrow tool and then clicking and dragging the sun in any of the 3 stage views.

Move the target point by using the arrow tool and clicking and dragging on the target point control handle (if you can't see the control handle, click on the sun and drag it slightly).

Alter the location of the sun, the target point, and the brightness by numerical data entry through the Object Information dialog. This dialog is accessed by double-clicking on the sun in any of the 3 stage views or double-clicking on the name (sun) in the script.

Spot Light

The spot light sends out a round, radial beam of light. It is the third lighting tool on the right of the light pop-up icon.

Place by selecting the spot light icon from light pop-up icon (third icon to the right) and click once in any of the 3 stage views.

Move the spot light in the 3 stage views by clicking on the arrow tool and then clicking and dragging the spot light. Notice that as you move the spot light in any of the 3 stage views, a round mask appears in the Camera Control Screen. This mask shows what portion of the model is within the spot light's beam.

Move the spot light using the Camera Control Screen by clicking in the Camera Control Screen selecting spot light from the pull down menu on the title bar. Move the spot light in one of the 3 stage views until the light appears in relation to the model in the Camera Control Screen. Click on an object or portion of the model in the stage view and drag and the spot light moves in the 3 stage views as well.

Adjust the angle of the spot light by clicking on either of the control handles and dragging.

Adjust the target point by clicking on the target point control handle and dragging.

Adjust the location, target point, field of view (angle), and brightness by numerical data entry through the Object Information dialog. This dialog is accessed by double-clicking on the spot light source in any of the 3 stage views or double-clicking on the name (spot light) in the script.

Projector

The projector sends out a rectangular, radial beam of light. It displays QuickTime movies or PICT images in the same way that a movie or slide projector does in the real world. It is the fourth lighting tool on the right of the light pop-up icon.

Place by selecting projector icon from light pop-up icon (fourth icon to the right) and click once in any of the 3 stage views.

Move the projector using the 3 stage views by clicking on the arrow tool and then clicking and dragging the projector in any of the 3 stage views. As you move the projector in any of the 3 stage views, a rectangular mask appears in the Camera Control Screen that shows what portion of the model is within the projector's beam.

Move the projector using the Camera Control Screen by clicking in the Camera Control Screen selecting spot light from the pull down menu on the title bar. Move the projector in one of the 3 stage views until the light appears in relation to the model in the Camera Control Screen. Click on an object or portion of the model in the stage view and drag and the projector moves in the 3 stage views as well.

Adjust an angle of the projector's field of view by clicking on either of the control handles and dragging.

Adjust the target point by clicking on the target point control handle and dragging.

Adjust location, target point, field of view (angle), brightness, and bank(?) by numerical data entry through the Object Information dialog. This dialog is accessed by double-clicking on the sun in any of the 3 stage views or double-clicking on the name (projector) in the script.

Notes