Infini-D Tutorial Manual

Return to Mac Demo Return to PC Demo

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Credits

The Tutorial Guide was written by Dan Shortell; Product Management by Rafael Rodriguez and Erick Vera; Quality Assurance testing by Kate Blackmer, Trifton Chmil, Shaheen Gandhi, Liron Mandelbaum, and all of our dedicated beta testers.The Guide was Art Directed by Brian Moose; Illustrated by Aaron Begley, Heather Chargin and Javier Roca; Production by Laureen Ferguson; Prepress Production by Rich ORielly; review and validation by Jason Dirks; Cover artwork by Aaron Begley.

Chapter 1

Welcome

Welcome to the world of Infini-D! The tutorial projects in this book are designed to help you understand how Infini-D can help you create professional quality 3D images and animations. Some tutorials here may be of more immediate use than others, so feel free to skip to the sections if they do not seem appropriate for your needs. This book assumes that you have a basic working knowledge of the operating system that you are using. For more information about your operating system, please refer to the documentation that came with your system.

TUTORIAL OVERVIEW

The lessons in this book are organized into two groups: introductory tutorials and advanced tutorials. Chapters two through four cover the Infini-D basics, such as how to create objects, apply surfaces and make a simple animation. It is recommended that every Infini-D user complete these basic tutorials. Chapters five through seven show how to tap into the real power of Infini-D. They demonstrate the ins and outs of building custom objects and creating advanced animations. It is best to save these last tutorials until you have a good understanding of the basic concepts introduced in the earlier chapters.

Chapter 2—Introduction to Infini-D

This chapter provides an explanation of the basic concepts of 3D and animation. It explains how the 3D world works, as well as how to use Infini-D's tools to create a scene. The following topics will be discussed in this chapter:

- Launching Infini-D
- Using view windows to show objects in the 3D world
- Creating and manipulating objects
- Choosing the rendering mode of an image
- Saving Infini-D scenes and image files

Chapter 3—Building a Basic Scene

In this tutorial you will build a basic scene, complete with a logo, 3D text and a background image. Below is a list of what can be found in this chapter:

- Using the Control floater
- Creating objects
- Using EPS files to create objects
- Applying surfaces to objects
- Using background images
- Using environment maps
- Changing the rendering mode of view windows
- Rendering to an image file

Chapter 4—A Simple Animation

This tutorial will explain how to use the Sequencer window to create animations. The eventmark concept introduced here is the basis for all animations: all users should understand it well. The following topics will be covered:

- Using the Sequencer window
- Creating and manipulating eventmarks
- Using Animation Assistants

• Rendering an animation to a movie file

Chapter 5: Creating Objects

This chapter demonstrates how to create and customize many different kinds of objects. It is also an introduction to the SplineForm™ workshop, which is a powerful modeler in which almost any object can be hand-crafted. This chapter shows how to use the Control floater for precise positioning of objects in 3D space. In this chapter you will practice:

• Using the Control floater to resize objects

• Building extruded objects

• Building freeform objects

• Using QuickDraw 3D to view objects in the workshop

Chapter 6: Complex Surfaces

This chapter will demonstrate how to customize existing surfaces and how to build new ones. You will be introduced to the rich variety of surfaces available within Infini-D but more specifically, this chapter demonstrates:

• Customizing basic surfaces

• Using image maps as surfaces

• Making multiple layered, composed surfaces

• Using alpha channels to create transparencies in surfaces

Chapter 7: A Complete Animation

This chapter uses the scene built in chapters 5 and 6 to produce a complete animation. It fully explores the Sequencer window and is strongly recommended for anyone desiring to use Infini-D for animation. This chapter demonstrates:

• Using the sequencer to animate objects

• Linking objects

• Creating linear and spline eventmarks

• Using velocity graphs.

Conventions Used In This Manual

Infini-D was launched in 1991. Since then, we have heard from many users about ways they have been able to take best advantage of its power. Our years of engineering have convinced us that these tips or short cuts should be included along with information that will help you understand a topic. Notes are also included for additional clarification or to help solve anticipated problems.

This is the format of a note. We hope you find them useful.

Chapter 2

Introduction to Infini-D

This tutorial is as much an introduction to the Infini-D world as it is a hands-on tutorial. The purpose is to help you understand the 3D environment and explain how to use some of the tools needed to work within it. The following topics are addressed in this chapter:

- Launching Infini-D
- Understanding view windows
- Types of objects
- Creating and manipulating objects
- Choosing the quality of an image (choosing a rendering mode)

LAUNCHING INFINI-D

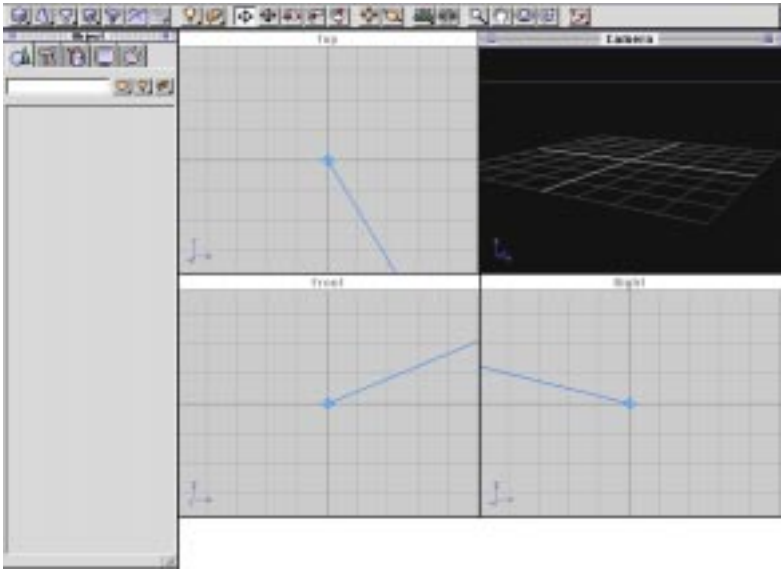
If you have not already installed Infini-D onto your hard drive, it is time to do so. The Infini-D User's Manual contains instructions for software installation.

Macintosh Double-click on the application icon to launch Infini-D.

Windows Choose Infini-D 4.5 from the Start menu or double-click the Infini-D.exe icon in the Program Files folder to launch Infini-D.

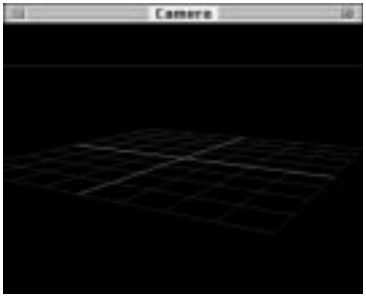
THE VIEW WINDOWS

Most work in Infini-D is done within its view windows Each window allows you to look into the same 3D scene from a different vantage point. To view the world from different sides, open the **Left**, **Bottom**, and **Back** views from the **Windows** menu. The views can be resized by clicking on the lower right-hand corner of the window and dragging the mouse, as you would do to windows in other applications.



Objects are manipulated (positioned, rotated, re-sized, etc.) using the view windows. To make a view window active, simply click on it with the mouse. There can only be one 'active' window at a time; all of the other windows are inactive. When objects are manipulated, all view windows are updated to show the current state of the world.

The Camera View Window



Most views in the 3D world are not attached to objects. The camera views, however, are special: Each is attached to a camera, allowing you to view everything that can be seen through the camera's lens. Since cameras are actual objects in the 3D world and can be repositioned, camera views can be animated over time.

A camera view gives a real-life perspective of the scene. If an object is very close to the camera, it will appear large. If the object is moved into the distance it will appear small.

The Standard view, **Front**, **Back**, **Left**, **Right**, **Top** and **Bottom** views are orthographic views. Objects appear at their 'actual' size, regardless of how far away they are. Orthographic views are very useful when building a scene; it is easy to align objects with precision.

Traditionally, the Top, Front, or Right views are used to build the scene, while the Camera view is used to view the final scene.

THE TOOLBAR

The **Toolbar** is the gray bar across the top of the screen.It contains the most common Infini-D tools. These tools allow you to create, customize, and re-position objects in a scene.

In order to use a tool it must first be selected by clicking on the tool's icon.

The Object Tools

You can fill your scene with several different kinds of objects created within Infini-D. Each object type has a corresponding tool, found on the left-hand side of the Toolbar. A description of object types and their tools follows.

Primitive Objects

Primitive objects are basic shapes, such as a cube, a sphere, or a cylinder. To select one of the objects, click and hold on the Primitive tool. When a list of objects appears, move the cursor onto the desired object and release the mouse button.

Extrude Objects

Extrude objects are based on outlines that are 'dragged' through 3D space to make a 3D object.

Lathe objects

Lathe objects are built from a shape that is 'spun' around an axis. Examples of lathe objects are vases, tires, and drinking glasses.

Spline Objects

Spline objects, also referred to as 'freeform objects', are complex objects that combine the properties of lathed and extruded objects. See Chapter 5 for directions on how to build freeform objects.

Mesh Objects

Mesh objects are built out of many small pieces or polygons. Many other 3D products work only with mesh objects. DXF and 3DMF files contain 3D mesh objects. Any object created within Infini-D can also be converted to a mesh object.

Text Objects

Text objects are objects built from the fonts loaded in your system. They can have bevels which make letters stand out in 3D.

Terrain Objects

Terrain objects are special mesh objects. They are useful for creating mountains, canyons, and other natural landscapes.

Particle System Objects

Particle system objects are objects that emit small particles into the 'air'. These can be used as water fountains, fireworks, snow, etc., and will put pizzazz into a scene. Particle warp objects are used to affect the flow of particles in different ways—wind, gravity, etc.

Light Objects

Lights are also objects. They come in six flavors: ambient lights, distant lights,

point lights, tube lights, spot lights, and targeted spot lights. Each adds illumination to your scene in a different way. The default new scene in Infini-D contains one distant light and one ambient light.

Camera Objects

Cameras can be added if you want additional views of the World. There are two types of cameras: standard (or 'free') cameras, and target cameras. Standard cameras can be focused on anything in the scene, while target cameras always point at a chosen target object. There can be many cameras of each type in the same scene. The default new scene in Infini-D contains a targeted camera.

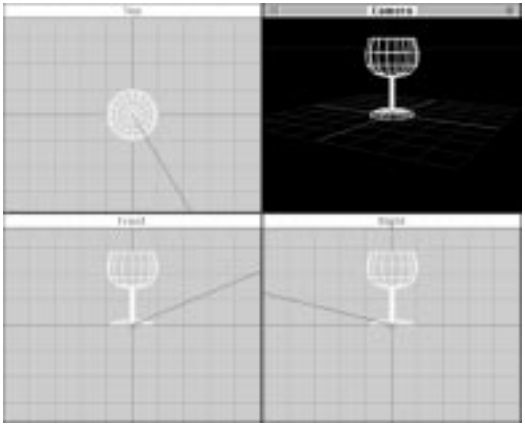
The object tools are not the only way to add models to your scene. Models created in other applications can be added as long as the file is saved in the correct format. DXF and 3DMF files can be added to the scene by choosing 'Import objects' from the File menu, and then loading the file that contains the object. Objects can also be created from EPS outlines imported from illustration programs such as Adobe Illustrator.

CREATING OBJECTS

Placing objects in a scene is simple: First, select an object tool from the Toolbar. Then simply click in one of the view windows and the object will appear. Try this:

Step 1: Click and hold on the **Lathe Object** tool and choose the wine glass from the list that appears.

Step 2: Click in the **Camera** view to create a wine glass.



Initially the wine glass appears as a wireframe outline. You'll learn how to change the wireframes to realistic, shaded images later in this chapter.

MANIPULATING OBJECTS

Once an object is in the scene, you will probably want to manipulate it in some way to give it a different size or rotation, for example, or to place it closer to another object in the scene. The tools to do this can be also found in the Toolbar. To use a tool, simply click on it and then use it. Below is a description of each of the tools. Experiment with each tool so you know how it works and what it can do for you.

Refer to the Infini-D Quick Reference Card for useful modifier keys and keyboard shortcuts to use with the tools described here.

The V-Plane Tool

The V-Plane tool is the most commonly used of all tools. It is a multi-purpose tool that is used to re-position an object in the world. With the V-Plane tool selected, click and drag an object up, down, left, or right, parallel to the plane of your screen.

The H-Plane Tool

The H-Plane tool is similar to the V-Plane tool in that it will re-position objects with a simple click and drag. However, dragging objects will move them to the left, to the right, closer to the view window, or further away from it. If you want to move an object closer or into the distance, the H-Plane tool is the one to use.

The Rotate Tools

The X, Y, and Z Rotate tools are used to rotate objects in any direction. To rotate or spin an object, select a rotate tool, then click and drag the object. The x rotate tool rotates objects around the x (east and west) axis; the y rotate tool rotates objects around the y (north and south) axis; and the z rotate tool rotates objects around the z (up and down) axis. You'll learn more about the x, y and z directions in the next chapter, but experiment and get the feel of it here.

Uniform Scale Tool

The Uniform Scale tool can increase and decrease the overall size of an object. Select the Uniform Scale tool and click and drag on an object to resize it. You may find yourself using this tool frequently when composing a scene, to adjust the size of an object in proportion to the sizes of the other objects in the scene.

Squash and Stretch Tool

The squash and stretch tool will 'squash' or 'stretch' an object in one direction, depending upon which side of the object you click. Select the Squash and Stretch tool then click and drag on a side of the object. The shape of the selected object changes as you drag; drag the object to the desired length then release the mouse button. Click and drag on the edge of an object's bounding box to scale in two directions at once.

Link Tool

The Link tool can be used to link two or more objects together, causing them to behave as one object. Object linking is used to build complex objects out of simpler components. Feel free to try it here (you'll need at least two objects in the scene). To use the Link tool, select the object you would like to be 'child', click on the Link tool, and then click on the object you would like to be the 'parent'. If you click on a third object, the first two objects become linked to the third. Now, move the parent and notice that the children move with it. There are four different kinds of links, free, position, pivot and full. (For more information on linking, see Chapter 8 of the User's Manual.)

Unlink Tool

The Unlink tool allows you to unlink a child object from a parent object, which is useful when objects have been linked together but should be separated. To use it, first select the parent object, choose the Unlink tool, and then click on the child object you would like to unlink.

Zoom Tool

The Zoom tool allows you to zoom in or out of the active window. There are two different zoom tools that work in different ways. With the Marquee Zoom Tool selected, clicking on a view window with the Zoom tool selected will zoom in a certain amount. To zoom in on a precise point in a window, click on a view and hold the mouse button. While the mouse button is pressed, drag a marquee (a rectangle) around the area into which you wish to zoom. To zoom out, hold down the Option/Alt key and click on the desired window. With the interactive zoom tool selected, click and drag left or right to zoom in or out the desired amount.

When you zoom in or out of the Camera View, you are actually changing the focal length of the camera's lens. Zooming in or out too much can make a fish-eye or flat image, just like with a real camera lens.

Hand Tool

The Hand tool is useful when you want to move the point of view of a window. Simply click and drag on the desired window; the Hand tool actually causes the view to move, instead of the objects. In a Camera View, the hand tool actually moves the camera object.

Orbit Tool

The Orbit tool rotates the camera around the target object while keeping the camera focused on it. The Orbit tool can only be used on camera views, and can only be used when the camera is a target camera. (For more on target cameras, see Chapter 17 of the User's Manual.)

Roll Tool

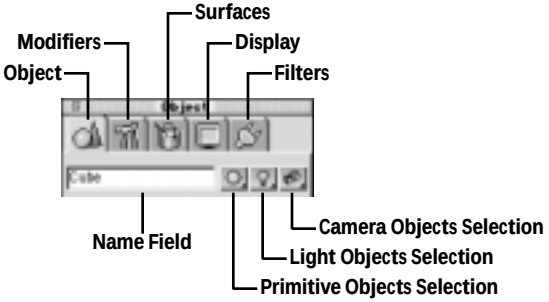
The Roll tool will keep a camera pointing ahead but will spin it on its side, much like a screw rotates as it is being threaded into a hole. Select the Roll tool, click on the Camera view and drag the mouse to the left and to the right. The camera will roll from side to side but remain looking ahead.

Marquee Render Tool

The Marquee Render tool gives you a detailed preview of a portion of a view window. It can be set to either ray trace or phong shade, which will determine the quality of the preview produced. Click on the Marquee Render tool, choose either the shade or trace tool, then click on the desired window and drag a rectangle around the area to be rendered in detail. The different levels of image quality are explained later in this chapter, and can be set in the Preferences dialog, in the Tools tab.

THE COMMAND FLOATER

The Command Floater contains settings and options that affect the Infini-D scene. Some settings affect a view window, while others may affect a selected object. The name of the currently selected object appears near the top of the Command Floater in the Name field. Think of the Command Floater as the 'control room' for the scene; you will use it throughout the creation process.



Immediately to the right of the Name field are three icons: a sphere, a light and a camera. These buttons can be used to select any object in the scene. To select an object, click and hold on the appropriate icon and choose the object from the list that appears. 'Normal' objects are found under the first icon. Lights are found under the second icon, and cameras can be selected with the third icon.

Across the top of the Command Floater are five tabs. When a tab is selected, certain settings and options appear in the window pane below. A very brief description of each tab follows, but you should consult the User's Manual for further explanations of the contents of the Command Floater.

• **Object**—The Object tab contains settings for the selected object.

- **Modifiers**—Here you will find tools that 'deform' objects in different ways. Twisting and bending are examples of the ways the modifier tools can change an object.
- **Surfaces**—This tab contains the surfaces that can be applied to objects. Custom surfaces you create will also be placed here. (You will learn to apply surfaces in Chapter 3, while you will build custom surfaces in Chapter 6.)
- **Display**—These settings control the way the World appears in each view window. For example, objects can be shown as simple 'wireframe' outlines or realistic objects that are reflective and transparent. You'll learn more about this later in this chapter.
- **Filters**—From the Filters tab you are able to apply 2D filters to objects, lights, and view. Filters that are compatible with Adobe After Effects™ can be used.

You may wish to familiarize yourself with the tabs in the Command Floater before continuing on to more detailed material.

CHANGING THE IMAGE QUALITY OF VIEW WINDOWS

The process of turning object data inside the computer into an image on the monitor is called rendering. There are different ways to render an object to the screen—these are called rendering modes. The more detailed the rendering, the more time it will take for the object to appear on the screen. The rendering mode can be changed from the Display tab of the Command Floater

Step 1: Click on the **Display** tab of the **Command Floater**. A **View** pane and a **View Detail** pane appear in the Command Floater.

Step 2: Click and hold on the **Mode** popup menu.

A list of rendering modes appear. Choosing a rendering mode causes the active view window to be rendered using the new rendering mode. A description of each rendering mode follows:

- **Bounding Box** is sometimes refered to a "BBox." Bounding Box takes the least time to render, but objects only appear as boxes.
- **Wireframe** is the default rendering mode. The objects appear as wire outlines. Generally, the wireframe mode is used only when building a scene. A higher quality rendering mode is used when the final image or animation file is made.
- **Flat** shading will show solid, shaded objects. It is the fastest 'shading' mode, but objects are limited to one color per polygon.
- **Gouraud** shading will start to show multi-colored surfaces; it is still fairly fast.
- **Phong** shading will produce a high-quality, realistic rendering of objects in the scene. Surfaces of objects are sharp and crisp when Phong shading is used. Phong shading is usually used to render the final version of a scene because of the high quality it produces.
- There is one additional rendering mode called **Ray Tracing** that does not appear in the Render Mode list. In older versions of Infini-D, ray tracing was the only rendering mode that showed transparent and reflective objects. Since Phong shading now shows the transparent and reflective qualities of object surfaces, ray tracing is rarely needed. Ray tracing renders surfaces slightly more accurately than Phong shading, but in almost all cases the difference is not noticeable. Ray tracing is required to use Infini-D's Boolean operations.

There are a number of check boxes and pop-up menus in the Display tab, but you don't need to use them yet. (Explanations of these can be found in Chapter 23 of the User's Manual.)

Try each rendering mode after placing a few objects in your scene. Notice the differences in qualities they produce, and the different time each mode takes to render. Since objects only have white surfaces now, there may not be a visible difference with Gouraud shading, Phong shading and ray tracing. You will see a difference, however, when detailed surfaces are used.

You should now be familiar with the tools needed to work in the 3D world. Feel free to experiment for yourself; you'll become more proficient with the tools and ready to build a basic scene, complete with objects, surfaces and a background image.
That's next!

Chapter 3

Building a Basic Scene

In this chapter, you will learn how to position objects in a scene using the Control Floater. You will also learn to make 3D text and logos. The final mini-project in this chapter is an advertisement for 'Donkey-Back Canyon Tours', which will be used in the next chapter to create an animation. A list of topics in Chapter 3 follows:

- The Control Floater
- Text objects
- Importing EPS logos
- Applying surfaces to objects
- Background images
- Environment maps
- Saving an Infini-D scene file
- Rendering to an image file

SETTING UP A NEW SCENE

Step 1: Create a new scene by choosing '**New**' from the **File** menu.

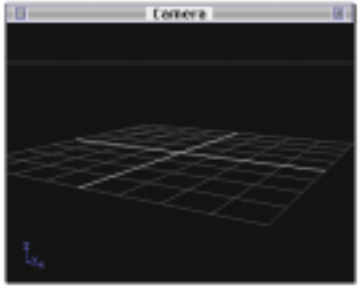
The default Camera view is currently viewing the World from an angle, which is fine most of the time. However, it will be easier to animate this scene in the next chapter if the Camera is viewing the world from the front, like the Camera view.

Step 2: Click on the **Camera** view to make it the active window.

Step 3: Click on the **Display** tab of the **Command Floater**.

Step 4: Click and hold on the **Bookmarks** arrow button. Then choose **Target Front** from the list that appears.

Bookmarks are preset settings for the view windows that contain the view's position, orientation, and zoom factor. You can create your own bookmarks by clicking the Add button. This is useful when you know you will use a particular camera angle frequently. (For more information on Bookmarks, see Chapter 17 of the User's Manual.)



Another thing that needs to be done is to turn on an option called 'Underground'. Underground is off by default, which means that objects below the ground plane are not visible.

Step 5: Click once on the blue arrow on the left side of the **View Detail** pane. The View Detail pane opens, showing more options for the active view window.

Step 6: Click once on the **Underground** checkbox so that it is checked.

If there were any objects below the ground plane, they would now become visible. The last thing is to remove the Grid Plane from the Camera view.

Step 7: Click once on the **Grid Plane** checkbox so that it is not checked.

The grid plane is the grid that appears in the Camera view when a new scene is made. It can be helpful when positioning objects in a scene because it gives you a better sense of where an object is placed but it does not appear in the final image. In this case, however, it isn't needed.

CREATING 3D TEXT

The first thing to do is to create the 'Donkey-Back' text object.

Step 1: Click on the **Text** tool which is located in the **Toolbar.**

Step 2: Click in the **Camera** view. The **Text** dialog appears.

Step 3: Type '**Donkey-Back**' in the text field.

Step 4: Click on the **Font** button to select a font.

In the following graphics, a font called "Metropolis ICG" from Adobe was used. If you do not have this font, feel free to use any font you wish.

Step 5: Choose a **Straight** bevel by clicking on the Straight bevel button. Set the **Size** to **50%** and the **Depth** to **20%**.

Step 6: Click the **OK** button.

The text should appear in the Camera View. Chances are, it is too large to fit completely into the camera window.

Step 7: Click on the **V-Plane** tool from the **Toolbar**.

Step 8: Click on the '**Donkey-Back**' text and drag it to the top of the **Camera** view.

The 'Donkey-Back' text should fit nicely at the top of the Camera view. It should be almost as wide as the camera view, with a little room to spare on each side. If your text is the correct size, you are all set and can skip steps 9 and 10. If 'Donkey-Back' is too large or too small, then you must re-size it.

Step 9: Click on the **Uniform Scale** tool from the **Toolbar**.

Step 10: Click and hold on the '**Donkey-Back**' text. Drag the mouse to the left or right to re-size the text; It should fit completely in the **Camera** view.

Once 'Donkey-Back' is positioned correctly, it is time to create the 'Canyon Tours' text. It is possible for both words to be one text object, but in this case they must be separate objects (so they can be animated separately in the next chapter). To create the text:

Step 1: Click on the **Text** tool from the **Toolbar**. Then click in the **Camera** view to open the Text dialog.

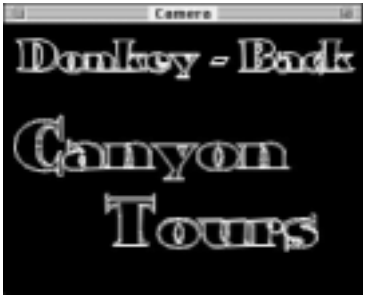
Step 2: Type '**Canyon**' in the text field.

Step 3: Choose a font, set the bevel to **Straight** with **Size** set to **50%** and **Depth** set to **20%**. Click **OK**.

Step 4: Click on the **Text** tool again, and click in the **Camera** view to open the **Text** dialog.

Step 5: Type '**Tours**' in the text field.

Step 6: Choose a font, set the bevel to **Straight** with **Size** set to **50%** and **Depth** set to **20%**. Click OK.



These two text objects need to be positioned at the bottom of the Camera view, as if they were one object. 'Canyon' should be on the left side and 'Tours' should be on the right side. Unfortunately, 'Canyon' and 'Tours' are probably not the correct size. They need to be re-sized so that their letters are the same size as the letters of the 'Donkey-Back' text.

Step 7: Click on the **Uniform Scale** tool.

Step 8: Click and hold on the '**Canyon**' text; drag the to re-size it, until it is the same size as the '**Donkey-Back**' text.

Step 9: Click on the '**Tours**' text and make it the same size as the '**Canyon**' text.

Now center 'Canyon' and 'Tours' at the bottom of the Camera view.

Step 10: Click on the **V-Plane** tool.

Step 11: Click and drag '**Canyon**' to the bottom-left side of the **Camera** view.

Step 12: Click and drag '**Tours**' to the bottom-right side of the **Camera** view.

IMPORTING AN EPS FILE

The final object in this scene is a logo that will be placed in the middle of the view, between the text objects. It is saved in the EPS file format, a common file format used by applications such as Adobe Illustrator™. To Import the logo:

Step 1: Choose '**Import** -> **EPS**' from the **File** menu.
The Import EPS dialog will appear.

Step 2: Navigate to the **Tutorial Files** folder of the Infini-D CD-ROM or to your hard drive if you chose to install them.

Step 3: Select the '**Donkey Logo.eps**' file, then click **Open**.

The logo should be positioned in the center of the Camera view.

Step 4: Click on the **V-Plane** tool.

Step 5: Click and drag the logo object to the center of the **Camera** view, if it is not already centered.

Step 6: Name the logo by clicking the **Display** tab of the **Command Floater** and typing "**Donkey Logo**" in the name field at the top of the floater.

THE CONTROL FLOATER

You may find it difficult to center objects precisely using the V-Plane tool; it requires a good eye and some trial and error. The Control Floater is quite useful when objects need precise sizes, rotations or positions. Here's a brief tour of the Control Floater:

Step 1: Open the **Control Floater** by choosing **Information** from the **Windows** menu.

The Control Floater has three tabs: Info, Navigation, and Animation.

Step 2: Click on the **Info** tab.

The numbers in the Info tab represent information about the selected object. Since objects are three-dimensional, the numbers in the Info tab come in groups of X, Y, and Z values.

- The top group of numbers shows the position of the object in the 3D world.
- The second group shows the orientation or rotation of the object.
- The third group shows its dimension values (also called scale values). When the squash and stretch tool is used on an object, the X, Y and Z values change. When the Uniform Scale tool is used, the fourth number changes; the fourth number represents the overall dimension of the object.
- There is a fourth group of numbers that can be shown or hidden using the pop-up arrow on the right. This group of numbers represents the object's position in relation

to its centerpoint. This affects how an object rotates, but is not used as often as the position, rotation, and dimension fields.

You may be wondering how to tell direction from the X, Y, and Z values. Think of the X direction as east and west, and the Y direction as north and south. The Z direction is the height (up and down). If an object's X, Y, and Z position values are all set at zero, the object is at the center of the World. Chances are that the object will also be in the center of the view windows, but if you have changed view windows by moving the camera, using the zoom or pan tool, etc., the object may not be centered in the windows.

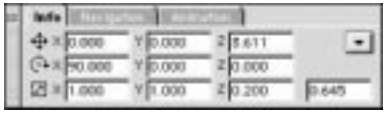
Using the Control Floater to Center Objects in the Camera view

The Control Floater will be used to center 'Donkey-Back' horizontally at the top of the Camera view, and the logo will be centered both horizontally and vertically in the view.

Step 1 Click on the **V-Plane** tool, and select the '**Donkey-Back**' text object.

Look at the X Position value in the Info tab of the Control Floater. Setting this position value to zero moves it to the horizontal center of the World which, in this case, also happens to be in the center of the Camera view.

Step 2: Set the **X** position value in the **Information** tab to zero and press **ENTER**.



The text will automatically be moved to its new location

Step 3: Click on the logo object to select it.

Step 4: Set its **X** and **Z** positions to zero, and press **ENTER**.

The logo is now centered in the horizontal and vertical center of the World. In this case, it just happens to be the exact center of the Camera view.

You now see how it is easy to move objects to precise positions with the object floater. You may still want to use the move tools from time to time, however. For example, it is difficult to use the object floater to center 'Canyon' and 'Tours' side by side in the window. In this case just drag them with the V-Plane tool. However, align them vertically by setting their z position values the same.

APPLYING SURFACES TO OBJECTS

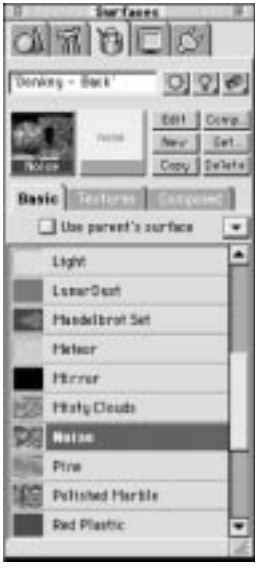
It is time to give our objects some color. First, we will make the wireframe outline objects appear shaded. To shade objects in a view window:

Step 1: Click on the **Camera** view to make it the active window.

Step 2: Click on the **Display** tab of the **Command Floater**.

Step 3: Click on **Wireframe** and change it to **Flat**.

Now the objects in the Camera View appear as shaded objects, rather than just wire-frame outlines.



Step 4: Click on the **Surfaces** tab of the **Command Floater**. Then click on the tab that reads '**Basic**'.

A list of Infini-D's default surfaces appears in the list below. All surfaces in the list can be seen if you click and drag the scroll bar to the right of the list.

Step 5: Select the '**Donkey-Back**' text by clicking on it with the **V-Plane** tool.

Step 6: Double-click on the **Amber** surface to apply it to the text.

Step 7: Select the logo object and double-click on the **Robin's Egg Blue** surface to apply it to the logo.

Step 8: Select the '**Canyon**' text and double-click on the **Powder Blue** surface.

Step 9: Select the '**Tours**' text and double-click on the **Powder Blue** surface.

Objects take on an entirely new look when surfaces are applied. The shading mode being used now is flat shading, a fast way to get 'solid' images of the objects. Switching the shading mode to Phong produces a much higher quality image, but takes longer to render.

Step 10: Click on the **Display** tab of the **Command Floater** and click on the **Camera** view to make it the active view.

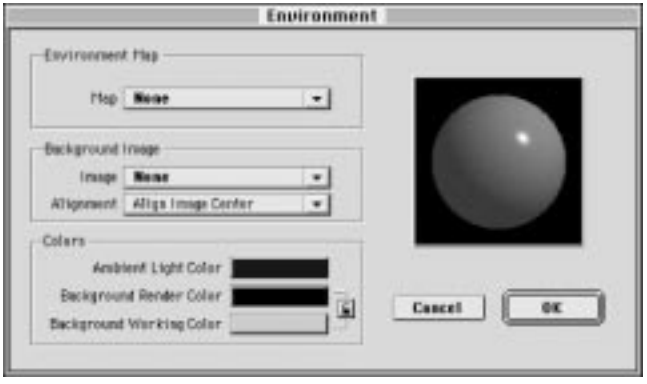
Step 11: Switch the **Render** to **Phong**.

Notice the difference in the quality of the image. This scene is almost finished, but there are three more things that will add some excitement to this scene: another light, an environment map, and a background image.

ADDING AN ENVIRONMENT MAP

Shiny objects in the real world reflect their surroundings. Unfortunately, the objects in Infini-D don't always have objects around them to reflect. What Infini-D does to make up for this is to use an image to simulate a world around the objects. This image is called an environment map. When Infini-D renders a view, the colors in the environment map image are 'thrown' onto the objects; objects will reflect the environment map, depending on how reflective they are. A well-chosen environment map adds a nice touch to surfaces, as you will see. Here's how to add an environment map to your World:

Step 1: Choose **Environment** from the **Edit** menu to open the Environment dialog.



Step 2: Change the **Environment Map** setting from **None** to **Load Image**.

The standard open file dialog will appear.

Step 3: Navigate to the **Tutorial Files** folder of the Infini-D CD-ROM and select the '**Canyon Environment.pic**' file.

Step 4: Click **Open** to return to the **Image Info** dialog and then click **OK** to return to the **Environment** dialog.

Step 5: Click **OK** to return to the **World**.

Notice the difference the environment map makes in Phone Shading mode. The surface of the logo shows variation, as if it is reflecting the surrounding world.

ADDING A BACKGROUND IMAGE

Background images don't need much explanation; they simply appear behind the objects of a scene. Any image or movie can be used as a background image.

Adding a background image is similar to adding an environment map. To add a background image:

Step 1: Choose **Environment** from the **Edit** menu.

Step 2: Change the **Background Image** setting from **None** to **Load Image**.

The standard open file dialog will appear.

Step 3: Navigate to the **Tutorial Files** folder of the Infini-D CD-ROM and select the '**Canyon Background.pic**' file.

Step 4: Click **Open** to return to the **Image Info** dialog.
Then click **OK** to return to the **Environment** dialog.

Step 5: Click **OK** to return to the **World**.

SAVING THE SCENE FILE

It is a good idea to save the scene file, because it will be used in the next chapter.

Step 1: Choose '**Save As**' from the **File** menu.

Step 2: When the standard save file dialog appears, type a name in the text field and save it onto the hard drive.

A scene file contains all the information necessary to build the scene the way it was when the file was saved, but it is not an image. Infini-D scene files cannot be read by other applications . To create an image of the file and use it elsewhere, you must render it to an image file.

Scene files and image files are less complicated than you may think. Use the analogy of a recipe and a cake: The scene file is the recipe, while the rendered image file is the cake. If the final image file (the cake) needs to be changed, the scene file (the recipe) must be loaded and changed before another cake can be baked.

RENDERING TO AN IMAGE FILE

Now that the scene is complete, it is time to save it as an image on the hard drive for future use. This process is called “rendering to disk. “

Step 1: Choose **Render** from the **File** menu.

The Render dialog has three tabs: Render, Image, and Animation.

Step 2: Click on the **Render** tab to show the rendering options.

Step 3: Set the **View** to **Camera**.

The image is rendered from the View setting, which means that this image will be taken from the Camera view.

Step 4: Set the **Quality** to **Phong**.

Step 5: Set the **Anti-Aliasing** to low.

Anti-Aliasing is the process of removing the sharp, ‘jagged’ edges that can appear on objects, usually near the edges. Low anti-aliasing is very fast, but doesn’t smooth out the colors as much as high anti-aliasing.

Step 6: Click on the **Image** tab.

Step 7: Set the **Colors** to thousands or millions and set the **Alpha Channel** to none.

Step 8: Set the **Width** to **320** pixels and the **Height** to **240** pixels.

Step 9: Click the **Render** button to open a standard save file dialog.

The file can be saved in a number of different image formats.

Step 10: Choose a file format from the popup menu.

Step 11: Type a name in the text field, choose a place on the hard drive to save the file, and click **Save**.

The image may take a minute or two to render. When the image is done, you can view it in an application such as MetaCreations' Painter™ or Adobe PhotoShop™. In fact, at this point the image file is like any other image on your computer: you can edit it in a paint program, build it into a Web page, or make it your desktop image.

Chapter 4

Animating Objects

In this chapter you will work with the objects built in Chapter 3 to create a complete animation. The goal is to understand the fundamentals of animating objects. In this chapter you will:

- Open an Infini-D scene file
- Use the Sequencer to animate text
- Use an Animation Assistant
- Render to a movie file

OPENING A SCENE FILE

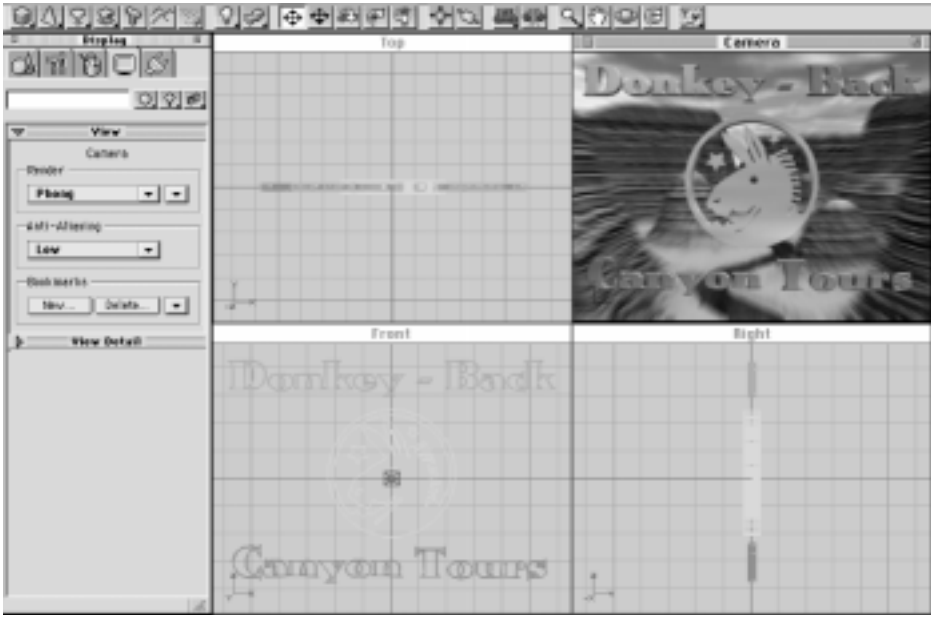
The first step is to load the scene file that was saved at the end of Chapter 3. You may also open the 'Chapter 4.id4' file, which can be found in the Tutorial Files folder of the Infini-D CD-ROM or on your hard drive if you installed the files.

Step 1: Choose **Open** from the **File** menu.

The standard open file dialog appears.

Step 2: Navigate to the scene file saved in Chapter 3.

Step 3: Click on the file to select it, then click **Open.**



When the scene file opens, be sure that the Front, Top, Right, and Camera views are open. If any are closed, they may be opened by selecting a view window's name in the Windows menu.

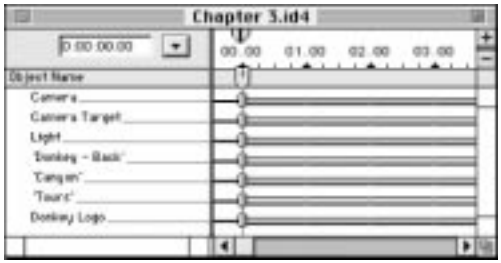
The quality of the Camera view is set to Phong shade. While the quality is nice it may be a little sluggish to work with if you are using slower machine.

Step 4: Click on the **Display** tab of the **Command Floater**.

Step 5: Click on the **Camera** view to make it the active window.

Step 6: Click on the **Render** button and choose **Wireframe** from the list that appears.

THE SEQUENCER



To use the Sequencer, open the Sequencer window by choosing 'Sequencer' from the Windows menu.

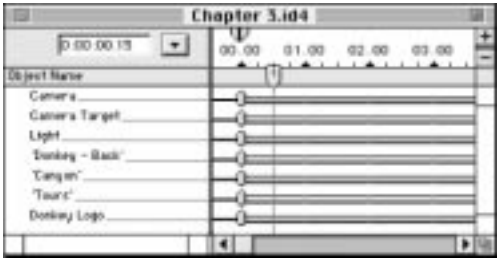
The Sequencer is where you will do most of your animation work. All of the objects in the scene are listed down the left side, and any object can be selected by clicking on its name in the list.

EVENTMARKS

Eventmarks are the gray ovals next to each object in the Sequencer and contain all the information about an object—its shape, surface, directional orientation, etc. Above the eventmarks you will see a timeline; the numbers on it stand for seconds:frames. The current time is indicated int he scene time box in the upper left corner.

Every object must have at least one eventmark or it wouldn't exist. However, each can have many eventmarks, depending on how many times it changes over time. When an object has more than one eventmark, it is "animated". The object will have the characteristics stored in one eventmark at a certain time, then smoothly change to have the characteristics stored in the next eventmark, further down the timeline. Eventmarks can be dragged to different places on the timeline, causing changes in the timing of an object's animation.

THE SCENE TIME MARKER



The Scene Time Marker, located directly above the timeline in the Sequencer window refers to the "present" in the 3D World. Objects will be shown as they appear at the exact time specified by the Scene Time Marker: If the Scene Time Marker is at two seconds on the timeline, the view windows will show the state of the World at two seconds. If you slowly drag the Scene Time Marker back and forth, the active view window will show a quick 'scrub' of the animation. This can be very useful to get the general idea of how an animation looks.

Since you haven't yet animated this scene, you won't see any movement if you move the Scene Time Marker. In just a moment you will begin to animate the objects.

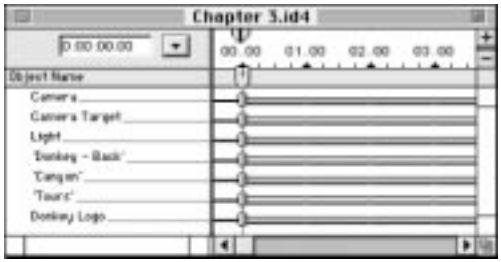
CREATING NEW EVENTMARKS

By now, you are probably wondering how to create new eventmarks. It's easy: Simply move the Scene Time Marker to the time you want a change to happen, and then change the object in one of the view windows. A new eventmark will appear in the Sequencer underneath the Scene Time Marker. Infini-D smoothly changes the object from one eventmark to the next during the time between the eventmarks.

ANIMATING THE 'DONKEY-BACK' TEXT

It is time to start animating this scene. The goal is to make 'Donkey-Back' come into view from the top, then fly down to rest above the logo.

Step 1: If the **Scene Time Marker** is not at time zero, move it back to time zero by clicking and dragging with the mouse.



Step 2: Click on the **Camera** view to make it the active window.

Step 3: Click on the **V-Plane** tool.

Step 4: Click on '**Donkey-Back**' in the **Camera** view, and drag it upwards. Drag it far enough up so it disappears off the top of the **Camera** view.

If you find that you cannot drag the text completely above the Camera view, switch to the front view and zoom out a bit. To zoom out the Front view: Click on the Zoom tool, click on the Front view, and drag the mouse to the left. This will zoom out a bit and you will be able to drag the text further upward.

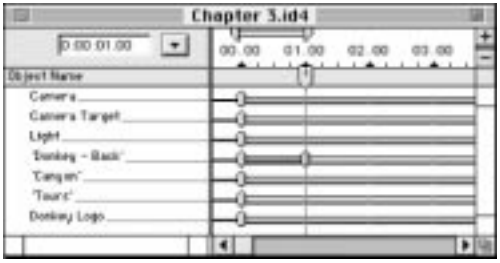
Step 5: Click on the **Sequencer** window to activate it.

Step 6: Move the **World Time Marker** to one second by dragging it with the mouse.

Step 7: Click on the **Camera** view to make it the active window.

Step 8: Drag the '**Donkey-Back**' text back down until it is positioned in its original position.

A new eventmark will appear in the Sequencer under the World Time Marker.



The 'Donkey-Back' text is now animated! For a preview of the animation:

Step 9: Choose **Animation** from the **Windows** menu.

The Control Floater appears with the Animation tab open.

Step 10: Click on the **Camera** view to make it active, and click the **Play** button (the large button with an arrow facing to the right).

You will see a bounding-box preview of the animation.

USING AN ANIMATION ASSISTANT

The next step is to make the logo spin. It is possible to rotate the logo by hand, but it is easier to use the Spin Animation Assistant. Animation Assistants are plug-in tools that can do tasks that make your job easier. To make the logo spin, first move the Scene Time Marker back to zero, then:

Step 1: Click on the **V-Plane** tool, and click on the logo to select it.

Step 2: Choose **Animation Assistant** -> **Spin** from the **Animation** menu.

Step 3: Set the **Axis** to **Z**, **Rotations** to **2** and the **Seconds** to **3**. Click **OK**.

Look in the Sequencer window. The Animation Assistant has added some new eventmarks next to the logo object. These eventmarks define the spin of the logo; each eventmark rotates the logo a quarter of a turn.

This is a good time to scrub the sequencer to see the rotation of the logo.

Step 4: Click on the **Camera** view to make it the active view, and click on the **Sequencer** window.

Step 5: Click and drag the **Scene Time Marker** from time zero slowly to the right.

You will see the logo object rotating. Now the objects only appear as wire boxes, but they will look great in the final rendered animation file.

ANIMATING THE 'CANYON' TEXT

The 'Canyon' text will fly in from the left and stop at the bottom left-hand side of the Camera view. This movement is very similar to the 'Donkey-Back' text movement and could be done with similar steps. However, this time the steps will be different in order to demonstrate an alternate way of animating the text. This time we'll build the animation backwards, then use the Reverse Animation Assistant to get the result you want:

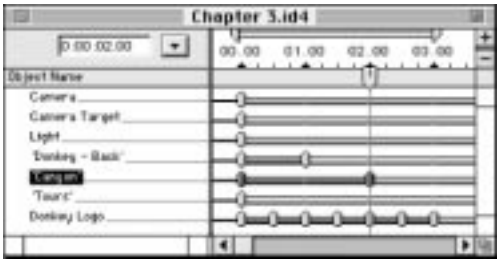
Step 1: Click on the **Scene Time Marker** and drag it to two seconds.

Step 2: Click on the Camera view; then use the V-Plane tool to drag 'Canyon' to the left. Drag it far enough to the left so that it disappears off the left side of the Camera view.

Look at the Sequencer. A new eventmark appeared next to 'Canyon' at two seconds on the timeline. The animation is fine, except that it is reversed. The text starts in the Camera view, and then flies off to the left instead of starting out of view, and flying into the Camera view. Another Animation Assistant is helpful here.

Step 3: In the sequencer, click on '**Canyon**'s first eventmark with the mouse. It will become selected.

Step 4: Hold down the **Shift** key and click on the second eventmark—it will also become selected.



Many eventmarks can be selected at the same time by clicking near an eventmark and dragging a marquee around the eventmarks you want to select.

Step 5: Choose '**Animation Assistant** -> **Reverse**' from the **Animation** menu.

These two selected eventmarks are now switched, causing 'Canyon' to fly in correctly! Scrub the Sequencer to see the change.

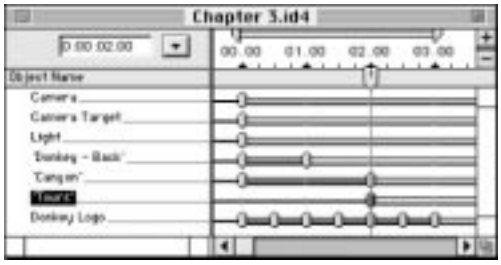
ANIMATING THE 'TOURS' TEXT

'Tours' is the last object that needs to be animated. Its animation is a mirror image of the 'Canyon' movement; it will fly in from the right side of the Camera view. The animation will be built another way, to demonstrate another way to use the Sequencer. To animate the 'Tours' text:

Step 1: Click on the **Sequencer** to make it active.

Notice that the 'Tours' object only has one eventmark representing its current position. Since we want 'Tours' to end it smotion at this position, we can copy its eventmark out to where we want it:

Step 2: Adding the Option (Mac) or Alt (Win) key, click and drag the '**Tours**' eventmark to two seconds on the timeline. Notice that the eventmark is copied to the new location.



With the Scene Time Marker still at zero you can now specify the starting position for the object:

Step 3: Click on the **Camera** view, and select the **V-Plane** tool.

Step 4: Drag '**Tours**' to the right using the **Camera** view. Drag it far enough to the right so that the object moves out of the **Camera** view.

A colored bar now appears between the two eventmarks, indicating that animation occurs. If you do another Preview of the Camera view, you will see that 'Tours' starts off of the Camera view then flies in from the right.

It is time to render the animation to a file. Before doing that it is a good idea to save the scene file.

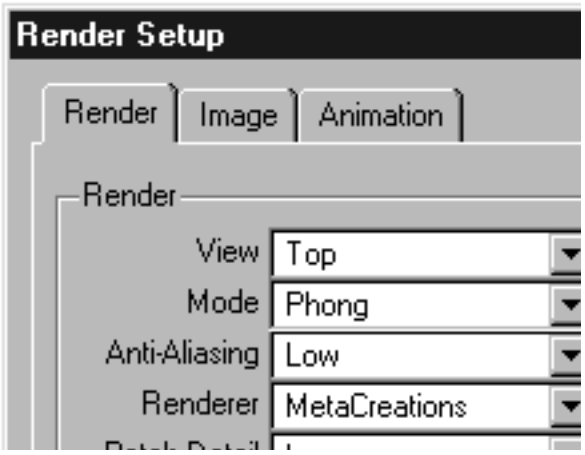
Step 6: Choose **Save** from the **File** menu.

RENDERING AN ANIMATION FILE

The last step of any animation project is to render the final animation to a file. This is the process of making lots of images (called frames) and saving them to a movie file on a hard disk. To render an animation to disk:

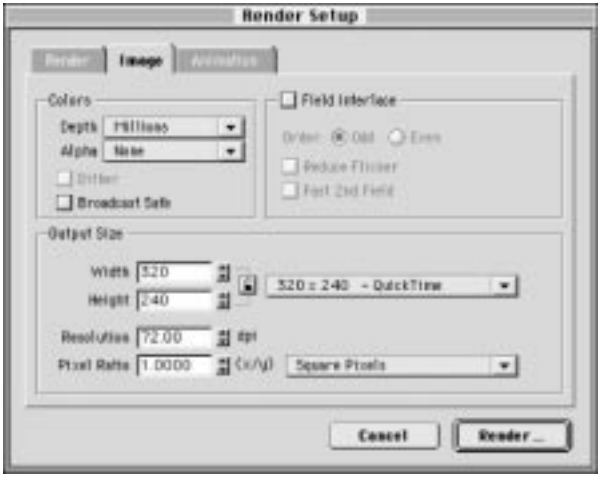
Step 1: Choose **Render** from the **File** menu.

Step 2: Click the **Render** tab to open the **Render Setup** dialog.



Step 3: Set the **View** to **Camera**, the **Quality** to **Phong**, and the **Anti-Aliasing** to low.

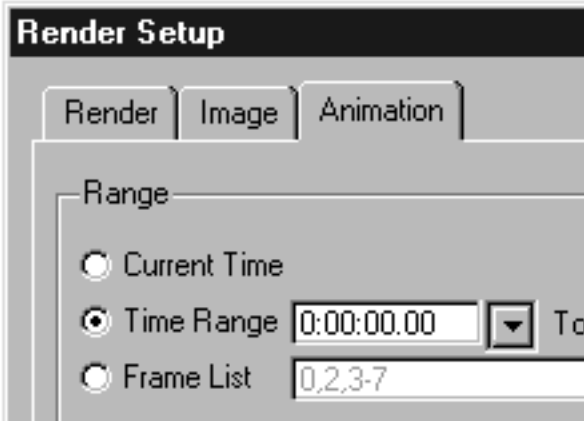
Step 4: Click on the **Image** tab.



Step 5: Set the **Color Depth** to **Millions**. Enter **320** as the **Width** and **240** as the **Height.**

If the width or height changes when you change the other number, click on the small lock button that connects the Width and Height fields. When the locked button is set and the Width or Height field is changed, the other field changes proportionately.

Step 6: Click on the **Animation** tab.



Step 7: Set the **Frames Per Second** to **10**, and click **Render**.
A dialog similar to the Standard Save File dialog will appear.

Step 8: Set the **Format** to **QuickTime**.

Step 9: Click the **Options** button, and set the compression to the highest quality.

You will be able to save different types of movie files depending on your computer. Feel free to choose the file format you prefer. However, each format has its own way of compressing movies in order to conserve disk space. Be sure to set the compression quality to high in order to preserve image quality.

Step 10: Type a name in the name field, choose a place on the hard drive to save the animation, and click **Save**.

Infini-D will render for a few minutes. When the rendering is complete, double-click on the animation file that was saved. Movie Player should open and play the animation. On the Mac, you may also play the movie using Peter's Player (which may play movies more smoothly than Movie Player). Peter's Player can be found on the Infini-D CD-ROM.

If this animation was being put onto video tape, it would have been rendered to a larger size and higher frame rate. The small size works fine for this tutorial and takes less time to render than a full-size animation. If you intend to work with this scene some more, you may want to save the scene file by choosing Save from the File menu.

We hope these chapters have given you an initial understanding of the Infini-D basics. You should be able to go on from here and explore other parts of Infini-D on your own. The tutorials that follow will give you an idea of the power Infini-D can bring to your professional and creative work. It is strongly recommended that those wishing to create professional images and animations read the rest of the tutorials and try as many mini-projects as time permits. Some familiarity with these easy techniques ahead of time will allow you to successfully employ them in an actual project when time is more critical.

Chapter 5

Creating Objects

In this chapter, you will learn how to create several common kinds of objects. The specific objects created here will be used in chapters six and seven, when you will produce a complex animation. The specific topics covered in this chapter are:

- Precise positioning of objects
- Safe Action and Safe Title markers
- Building extruded objects
- Building freeform objects
- Using templates
- Using QuickDraw 3D™ to view objects in the workshop

The following scene is a television advertisement for a fictional brand of olive oil. A bottle sits on a spinning table while a globe jumps in and out of the bottle. The text reads “World Class Olive Oil”; it flies across the top and bottom of the screen.

SETTING UP THE SCENE

Start with a new scene. Some default settings will be changed to suit this particular scene.

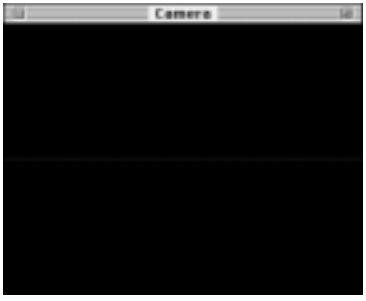
Step 1: Choose **New** from the **File** menu.

The camera is now viewing the world from above and from the side. This is fine in many scenes, but in this case, the camera should be viewing the World from the front.

Step 2: Click on the **Camera** view to make it the active view.

Step 3: Open the **Display** tab of the **Command Floater**. Click on the **Bookmarks** arrow button and choose the **Target Front** position.

Step 4: Click on the **Bookmarks** arrow button and choose the **Target Front** position.



Any objects that are below the ground plane are invisible by default. In this scene, objects should be visible regardless of their positions.

Step 5: Click on **View Detail** to open the View Detail options.

Step 6: Click on the **Underground** checkbox, so that is checked.

The ground plane is also helpful in most scenes, but in this case it isn't needed.

Step 7: Click on the **Grid Plane** checkbox so, that it isn't checked.

The Safe Action and Safe Title markers are helpful items; they help you prevent important parts of an animation from being clipped off the side of a television screen. It is good to turn on the Safe Title and Safe Action markers when building animations for video.

Step 8: Choose **Edit View** from the **Edit** menu.

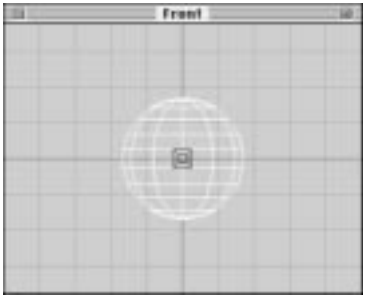
Step 9: Check the **Show Safe Action Area** and **Show Safe Title Area** checkboxes, and click **OK**.

CREATING A GLOBE

Objects in this scene will be built in the order of simple to complex; the globe will be created first. Since a globe is just a sphere, in this chapter it will simply be positioned in the center of the Camera view. In the next chapter it will look like a real globe, when a map of the earth will be wrapped around the sphere. To create a globe:

Step 1: Click and hold on the **Primitive Object** tool and choose the sphere from the list that appears.

Step 2: Click in the **Camera** view to create a sphere.



The sphere appears in the view windows. It is now called 'Sphere' but should be named 'Globe'.

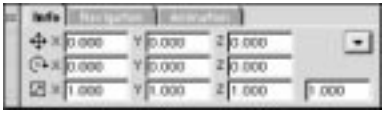
Step 3: Type '**Globe**' in the name field at the top of the **Command Floater**.

It is important that the sphere be positioned in the center of the World so that it aligns with the table and bottle to be built later in this chapter. The Control Floater will help you position the sphere accurately.

Step 4: Choose **Information** from the **Windows** menu.

The Information tab of the Control Floater will appear.

Step 5: Set the **X**, **Y** and **Z** position fields in the **Information** tab of the **Control Floater** to **0**, **0**, **0**.



CREATING THE 'WORLD CLASS' TEXT

'World Class' will be positioned at the top of the Camera view. To create this text:

Step 1: Click on the **Text** tool, and then click in the **Camera** view to open the text dialog.

Step 2: Type '**World Class**' in the text field.

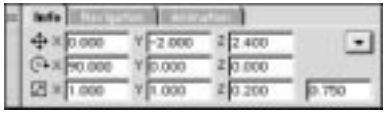
Step 3: Click on the **Font** button to select a font.

In the following graphics, the font "Stone Sans" from Adobe was used. If you do not have this font, feel free to use any font you wish.

Step 4: Choose a **Straight** bevel, then click **OK**.

The 'World Class' text has been created, but it must be positioned correctly. It belongs near the top of the Camera view and also should be brought a bit closer to the camera. Again, the Control Floater will be helpful in positioning the text accurately.

Step 5: Using the **Information** tab of the **Control Floater**, set the **X Position** to **0**, **Y Position** to **-2** and **Z Position** to **2.3**. Also, set the **Uniform Scale** to **.750**.



Look in the Camera view and notice how the text has moved toward the bottom of the window. The 'World Class' text will just barely fit within the Safe Title area of the camera view.

CREATING THE 'OLIVE OIL' TEXT

The steps to create the 'Olive Oil' text are basically the same as the ones above, except that the worlds 'Olive Oil' belong at the bottom of the Camera view. To create this text:

Step 1: Click on the **Text** tool, then click in the **Front** view to open the Text dialog.

Step 2: Type '**Olive Oil'** in the text field.

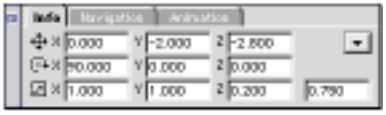
Step 3: Click on the **Font** button to select a font.

In the following graphics, the font "Stone Sans" from Adobe was used. If you do not have this font, feel free to use any font you wish.

Step 4: Choose a **Straight** bevel, then click **OK**.

The 'Olive Oil' text has been created, but it must be positioned correctly. It belongs near the bottom of the Camera view, and should be brought a bit closer to the camera.

Step 5: Using the **Information** tab of the **Control Floater**, set the **X Position** to **0**, **Y Position** to **-2** and **Z Position** to **-2.8.** Also, set the **Uniform Scale** to **.750**.



Your scene should look like this so far:

BUILDING A TABLE

The olive oil bottle rests on a table. This table is a very simple round table. A round cylinder, actually, that is squashed to the correct proportions. To build a table:

Step 1: Click and hold on the **Primitive Object** tool, and then choose the cylinder from the list that appears.

Step 2: Click in the center of the **Camera** view to create the cylinder.

Name the cylinder 'Table'.

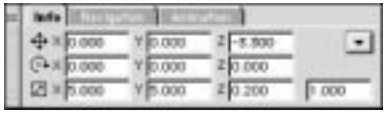
Step 3: Type '**Table**' in the name field at the top of the **Command Floater**.

In order for it to look like a table, the cylinder must have a larger radius but be much thinner. Also, the table needs to be positioned at the bottom of the Camera view. It is important that the table is centered horizontally in the window, so that the bottle created later can be positioned perfectly in the center of the table. Again, the Control Floater will be of help.

Step 4: Set the **X** and **Y Scale** fields to **5.0**.

Step 5: Set the **Z Scale** field to **0.2**, and press **Enter**.

Step 6: Set the **X** and **Y** position to **0** and **Z** position to **-3.3**.



Remember that setting the X and Y position values to zero centers the object horizontally in the World. It just so happens that the center of the World is in the center of the Camera view, but this is not always the case.

Now it is time to create more complex objects—the bottle and bottle cap. They will be modeled in the Splineform workshop.

SPLINE OBJECTS

Spline objects, built from spline curves, are very versatile. A spline object of any shape can be changed or morphed into a spline object of any other shape. Lathed, extruded, and freeform objects are just terms that help us understand what objects look like, but in Infini-D they are built out of the same basic components. The extrusion, lathe, and freeform object tools all create spline objects.

MODELING A BOTTLE CAP

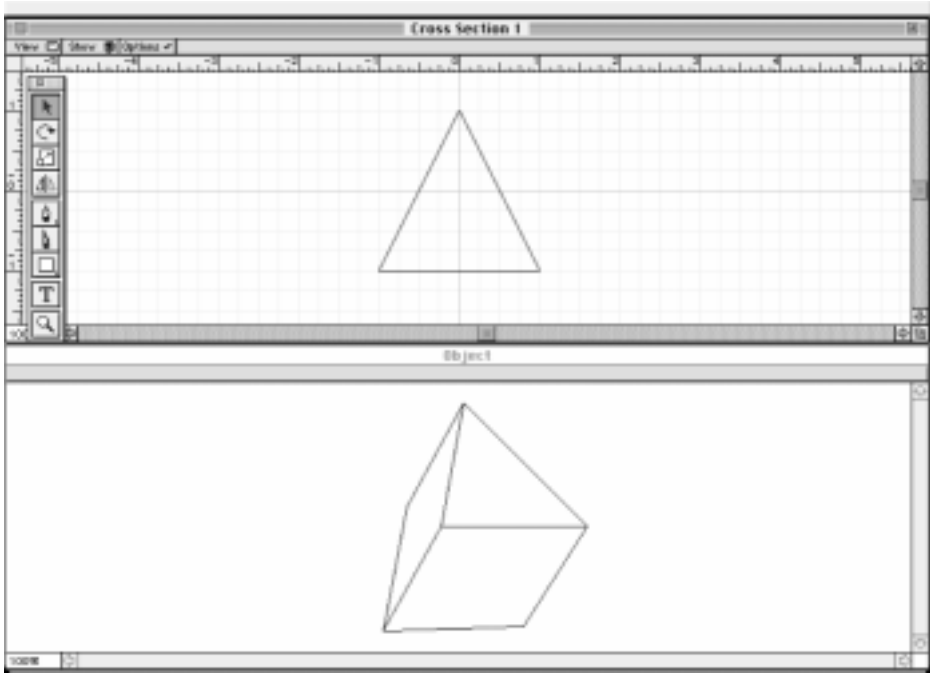
The bottle cap will be built first. The workshop cannot be entered without an object, so the first thing to do is create an object. To create a bottle cap:

Step 1: Click on the **Extrude Object** tool and choose the prism from the list that appears.

Step 2: Click on the **Camera** view to create an extruded triangle.

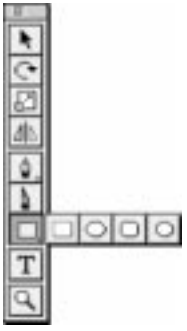
Step 3: Rename the object by typing '**Bottle Cap**' in the name field at the top of the **Command Floater**.

Step 4: Choose **Edit Object** from the **Model** menu to enter the **Splineform** workshop (or double-click on the object).



The Cross Section Window

The Cross Section window appears across the top of the screen. Think of it as a top view of the object. It has a grid, rulers along the top and left-hand sides, and a triangle in the middle. The outline in the Cross Section window is literally the cross section of the object, which is then extruded or 'dragged' through space to make a 3D object.



The toolbar contains tools that can be used to draw new outlines in the Cross Section window. Many of these tools are the same tools used in drawing applications such as Adobe Illustrator™.

The shape of the cross section is currently a triangle. For an interesting effect, let's make the cap with a hexagonal top, instead of an ordinary, rounded top. The shape of the current cross section will be a hexagon, instead of a triangle. Here's how to do it:

Step 1: Click on the **Cross Section** window to make it the active window.

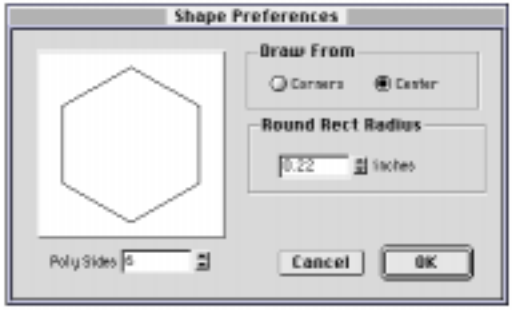
Step 2: Choose **Select All** from the **Edit** menu.

This selects all of the points in the Cross Section view. Now that the whole triangle is selected, you can remove it to make way for the new shape.

Step 3: Press the **Delete/Backspace** key to delete the selected points.

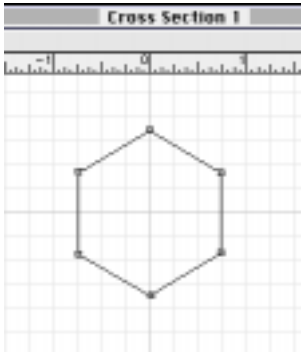
Step 4: Click and hold on the **Rectangle** tool, and choose the last tool from the list that appears, the Polygon tool.

Step 5: Double-click on the **Polygon** tool to open the **Shape Preferences** dialog.



Step 6: Type '**6**' in the **Poly Sides** field, and click **OK**.

Step 7: Click and hold in the center of the **Cross-Section** window (where the dark grid lines cross), and drag the mouse down and to the right to make the hexagon appear. Hold down the **Shift** key to make the hexagon have 'square' proportions. Make the hexagon extend to three-quarters of an inch to the left and right, and then release the mouse button.



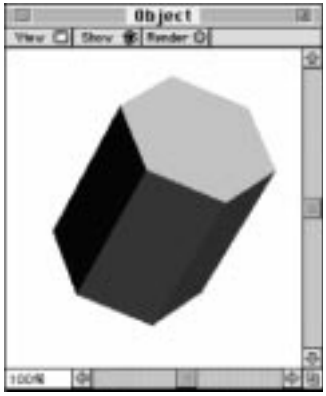
The bottle cap should be an inch and a half wide, which will fit on top of the bottle you will make later in this chapter.

The Object Window

The Object window shows a preview of the object. If you click on the Object window, the toolbar will change to a Hand tool, a rotation tool, and a Zoom tool; you can use these tools to adjust the view of the object (it is installed by default with Infini-D).

If QuickDraw 3D™ is loaded on your computer, the Object window can be changed to a shaded mode—quite helpful when modeling an object. To change the Object window to a shaded mode:

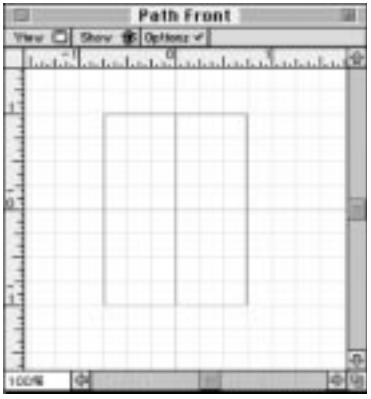
> Switch to the shaded mode by choosing **Shaded** from the **Render** pop-up located at the top of the **Object** window.



If the 'Shaded' choice is grayed, QuickDraw 3D™ either is not properly installed on the computer or there is not enough free RAM for QuickDraw 3D™ to load. Consult the User's Manual for help. However, it is not critical to use QuickDraw 3D™; it simply makes a quick, shaded object preview that can be helpful when creating models.

The bottle cap is the right shape, but it is too tall. The extrusion length (height) needs to be shortened. This can be done in the Path Front Window.

The Path Front Window



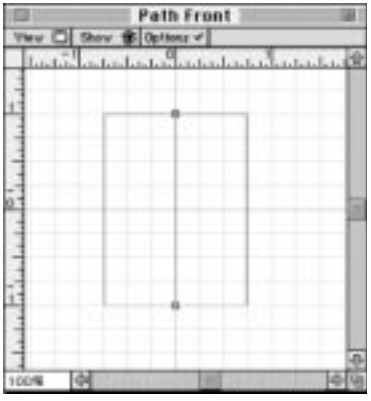
Step 1: Open the **Path Front** window by choosing **Path Front** from the **Windows** menu.

This window is the view of the object from the front. The bottom of the object is a horizontal pink line, which is simply the cross-section shape seen from the side. The vertical pink line is the path along which the cross-section is extruded or 'dragged'. The gray lines on the left and right sides are the outline or silhouette of the object.

The toolbar displays the tools that can be used in this window.

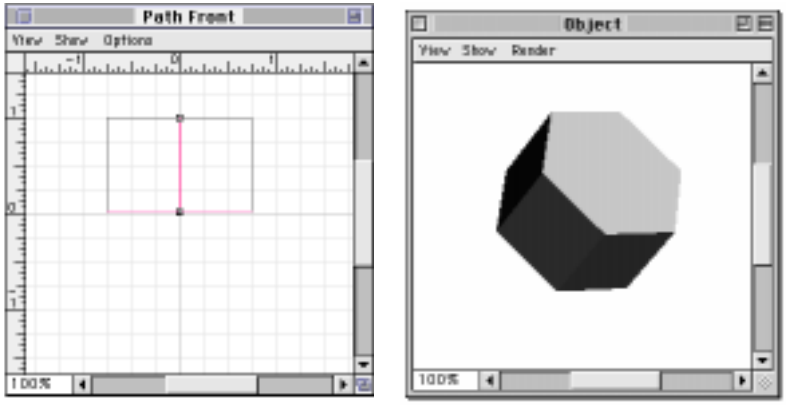
Step 2: Click on the **Arrow** tool at the top of the **Toolbar**.

Step 3: Click on the vertical pink path line in the **Path Front** window to select the points on the Path.



The points on the path should appear. The rulers show that the bottle cap is two inches tall, but it should only be one inch tall.

Step 4: Click on the top path point and drag it halfway down to the bottom point.

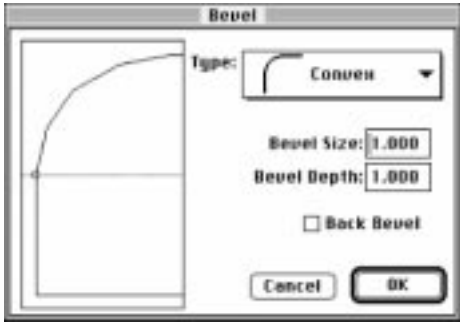


The bottle cap is now only one inch tall.

Adding a Bevel

A smooth bevel will make the bottle cap look more attractive. They are simple to apply:

Step 1: Choose **Bevel** from the **Object** menu.



Step 2: Select a bevel, and click **OK**.

Bevels can only be given to extruded objects. If the Bevel choice is grayed in the Object menu, Infini-D thinks the object is not an extruded object. If this occurs, choose Simplify to Extrusion from the Object menu. This will turn the object into an extruded object and you will now be able to add a bevel.

The bottle cap is now finished!

Step 3: Choose **Exit Workshop** from the **File Menu** to return to the **World**.

This is a good time to save the scene file, choose 'Save' from the File menu. The next step is to build the bottle. You are learning important parts of the modeler that will enable you build your own objects in the future.

BUILDING AN OLIVE OIL BOTTLE

Building the bottle involves more than simply changing the shape of the cross section. The base of the bottle is squarish and wide, while the neck is small and rounded. Since this isn't a simple extruded or lathed type of object, it is referred to as a freeform object. When modeling complex shapes, it is often useful to start with a simple object, rather than a complex freeform object. To build an olive oil bottle:

Step 1: Click on the **Primitive Object** tool, and choose the cube from the list that appears.

Step 2: Click in the **Camera** view to create a cube.

Step 3: Rename it by typing '**Bottle**' in the **Name** field at the top of the **Command Floater**.

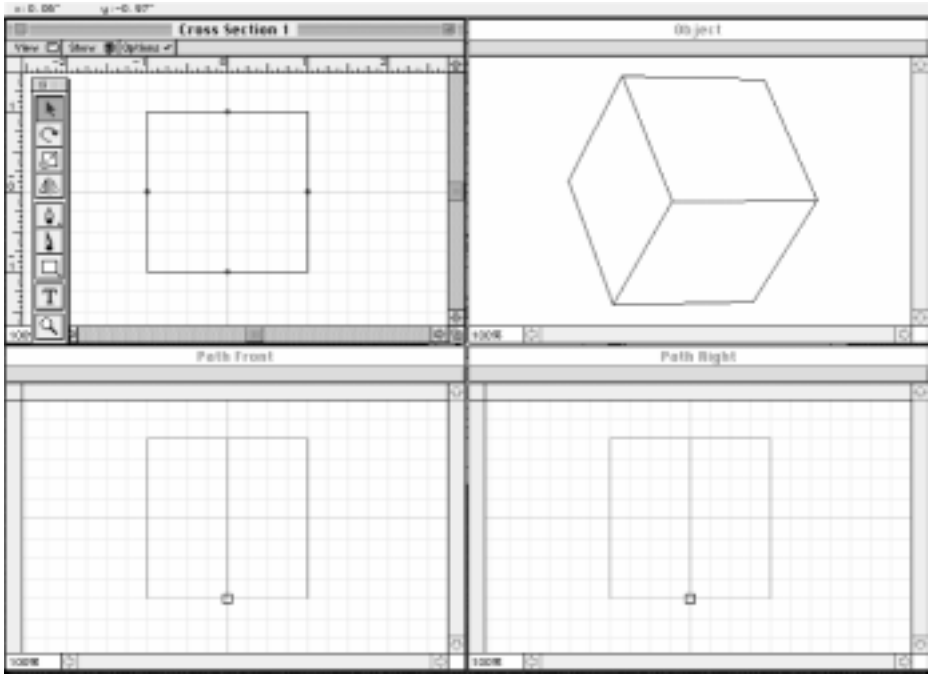
The cube is not a Splineform object when it is first created. It must be converted into a Splineform.

Step 4: Choose **Convert to Splineform** from the model menu.

When the workshop opens, only the Cross Section and Object windows will appear.

The object type is what determines which workshop windows will open. This is because Infini-D anticipates which windows you will need to use. All the windows can be opened from the Windows menu, however.

Step 5: Choose **Layout** -> **Freeform Vertical** from the **Windows** menu to open the **Path Front** and **Path Right** windows.



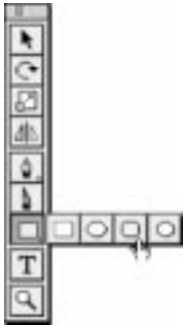
The Cross Section, Object, Path Front, and Path Right windows will open. The Path Right window is the only window that hasn't been explained. It is the same as the Path Front window, except the object is viewed from the right side.

Unlike most bottles, this one has a square shape except for the neck, which is round. The first step is to change the cross section from a sharp-cornered square to a rounded square.

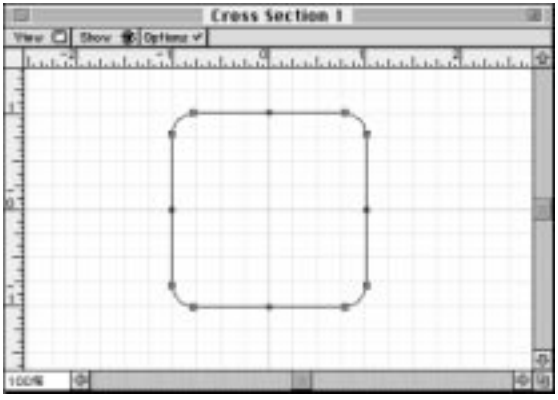
Step 6: Click on the **Cross Section** window to make it the active window.

Step 7: Choose **Select All** from the **Edit** menu, and press **DELETE** to erase the current cross section.

Step 8: Click and hold on the **Rectangle** tool in the toolbar. Then select the **Rounded Rectangle** tool from the list that appears.



Step 9: Click and hold in the center of the **Cross Section** window, where the two dark grid lines cross. Hold down the **Shift** key and drag the mouse down and to the right. A rounded square will appear; make it two inches wide.



The next step is to draw the outline of the bottle as it is viewed from the front. This is done in the Path Front window. You may notice that this window looks different than it did the last time you opened it. There are two blue lines called Rails added; they are simply the left and right sides of the object. If the rails are gray, they are inactive; if they are blue, they are active and can be manipulated, just like the Path. The rails in the Path Right window are green to differentiate them from the rails in the Path Front window. Settings like this were automatically turned on when you switched to the Freeform Vertical layout, but they can also be turned on manually from the menus.

USING A TEMPLATE

A template is helpful when building objects that need to have precise shapes or sizes. An image can be used as a template: it will act as tracing paper from which to build.

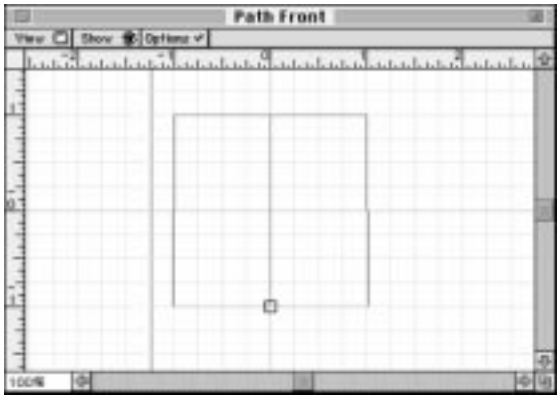
On the Macintosh, a PICT file can be used as a template. On Windows, many formats can be used, including .pic, .tif, and .bmp files.

To use a template:

Step 1: Click on the **Path Front** window to make it the active window.

Step 2: Click on the **Options** button at the top of the **Path Front** window and choose **Get Template** from the menu that appears.

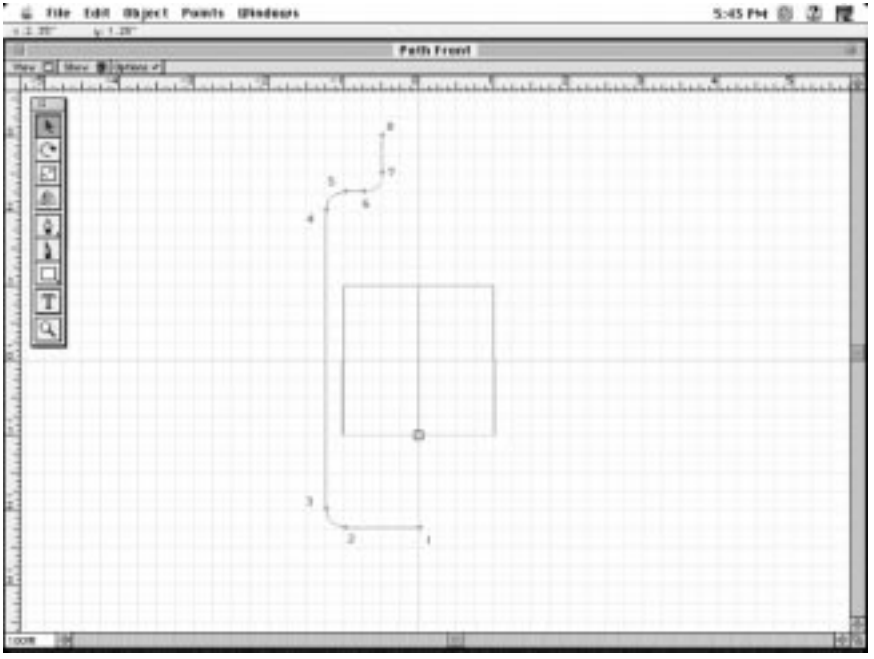
Step 3: When the open file dialog appears, navigate to the **Tutorial Files** folder on the Infini-D CD-ROM and open the **Template.pic file**.



The template appears, but it is much too large to fit in the Path Front window. The window size must be increased.

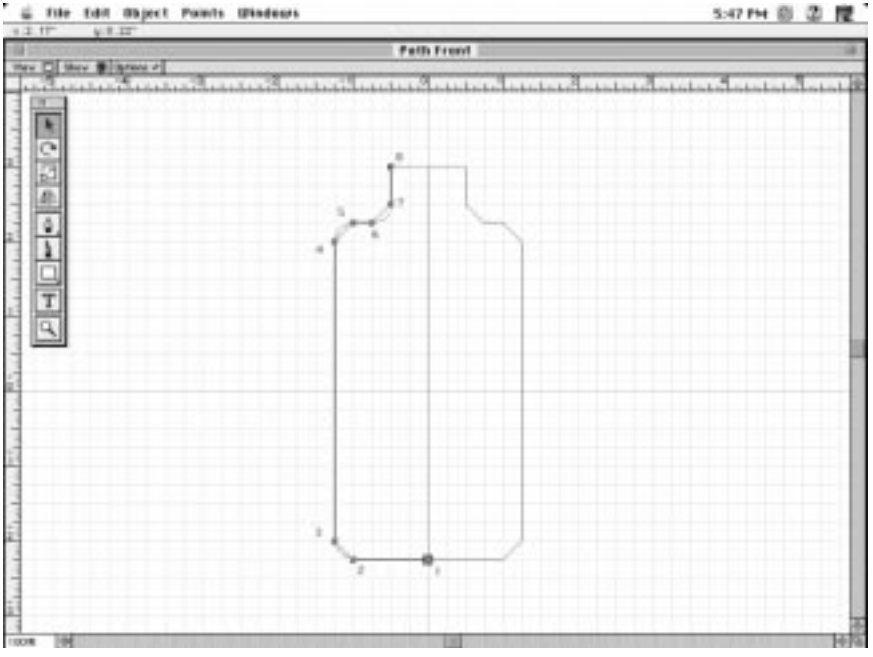
Step 4: Click on the **Maximize** button in the upper right hand corner of the **Path Front** window to make the window fill the entire monitor.

Step 5: Hold down the **SPACE** bar and click in the **Path Front** window. Drag down and to the right until the entire template is visible.



Step 6: Click on the **Pen** tool from the **Toolbar**.

Step 7: Starting at the first point on the template, click on each point in succession, to draw the left side of the bottle.



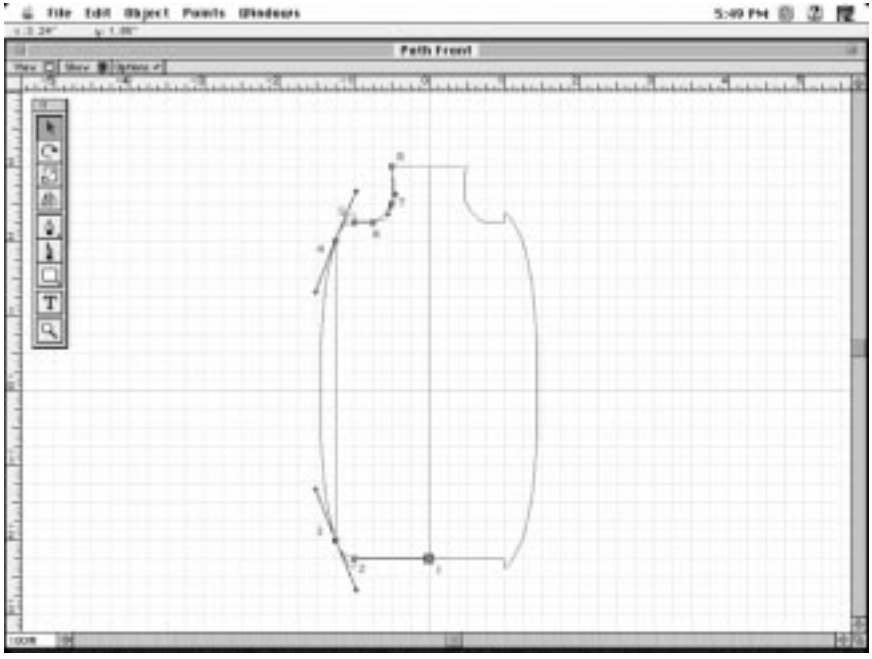
The right, front, and back sides will mirror what is done on the left side. Don't worry if the bottle isn't rounded as it is in the template, you'll change that next by turning key points into smooth points.

Step 8: Click on the **Arrow** tool from the **Toolbar**, and select the third point by clicking on the point labeled '**3**' on the template.

The point will be darkened, indicating that it is selected.

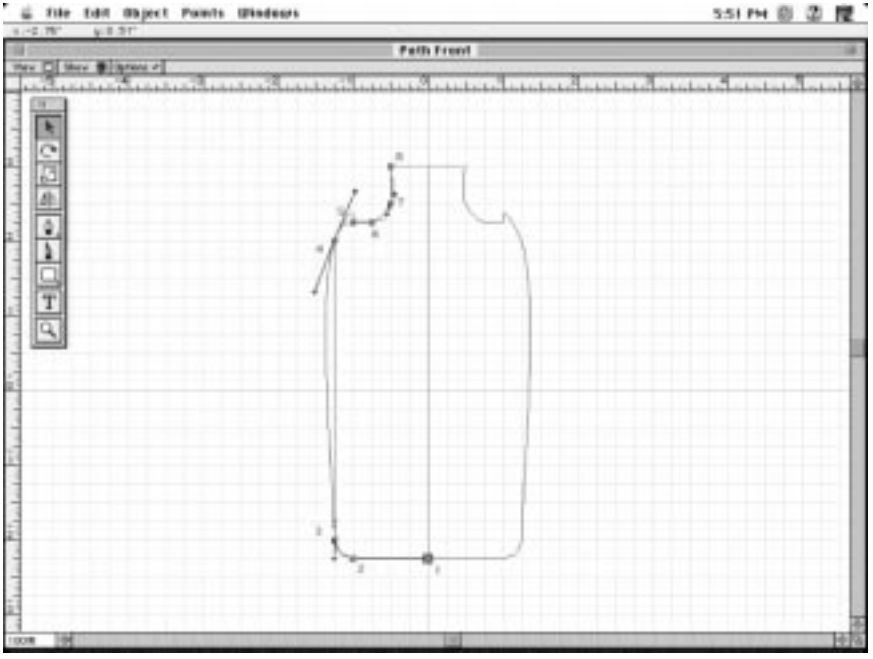
Step 9: Hold down the **SHIFT** key and click on points **4** and **7**, so that they are also selected.

Step 10: Choose **Smooth** from the **Points** menu to turn the selected points into smooth points.

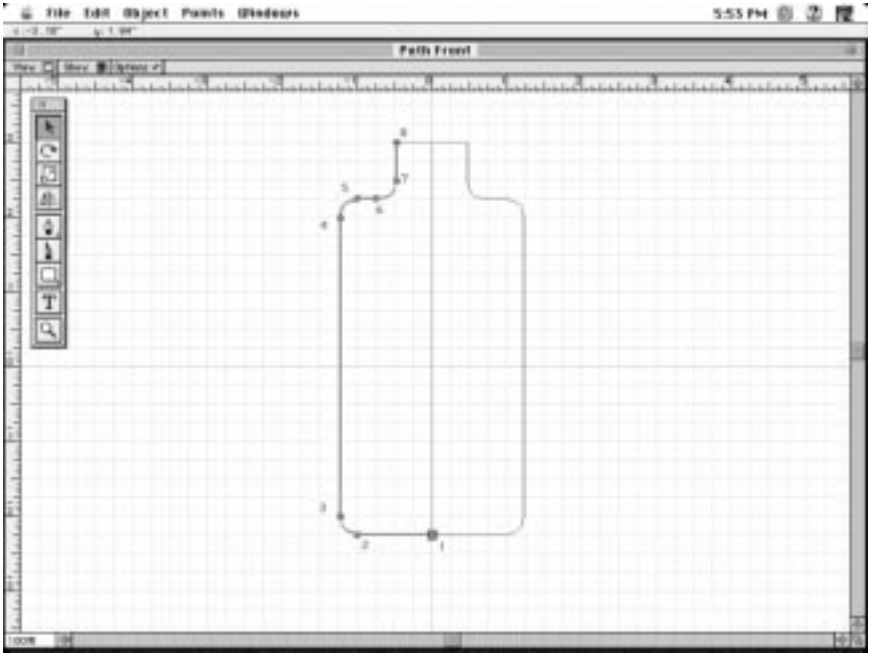


This turns the selected points into smooth points. Two spline handles should appear on each point.

Step 11: Click and drag the bottom point of point **3** so that the bottle has a nice, rounded corner.



Step 12: Make points **4** and **7** rounded the same way point 3 was rounded.

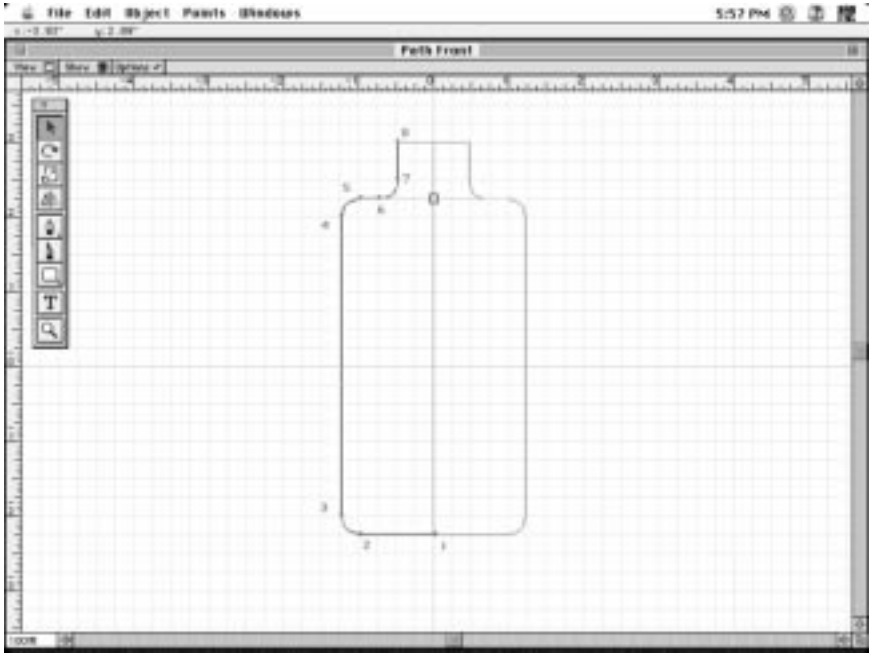


ADDING CROSS SECTIONS

The cross section of the bottle is now a rounded square, which makes the whole bottle squarish in shape. The neck needs to be round, however. This can be done by changing the shape of the cross section near the top of the bottle.

The vertical pink line in the Path Front view is the extrusion path. At the bottom of the path is a black square. This is called the Cross Section Marker, which can be moved up and down the path by clicking and dragging with the mouse. The shape in the Cross Section window is the shape of the object at the point that the Cross Section Marker is on the path. To add cross sections:

Step 1: In the **Path Front** window, drag the **Cross Section Marker** upward until it snaps into place beside points **5** and **6**.



Step 2: Choose **Insert Cross Section** from the **Options** menu at the top of the **Path Front** window.

Another horizontal pink line appears, representing the new cross section. Notice that the name of the cross section window is now 'Cross Section 2', indicating that this is the shape of the second cross section.

The shape of this cross section doesn't need to be changed. It simply acts to keep the top of the fat part of the bottle square. In a moment, you will make the neck of the bottle round, which will cause the bottle to be square at the top of the fat portion and change to round at the base of the neck.

Step 3: Drag the **Cross Section Marker** upward until it snaps into place beside point number 7.

Step 4: Choose Insert **Cross Section** from the **Options** menu in the **Path Front** window.

Step 5: Click on the minimize button in the upper right hand corner of the **Path Front** window to make it small again.

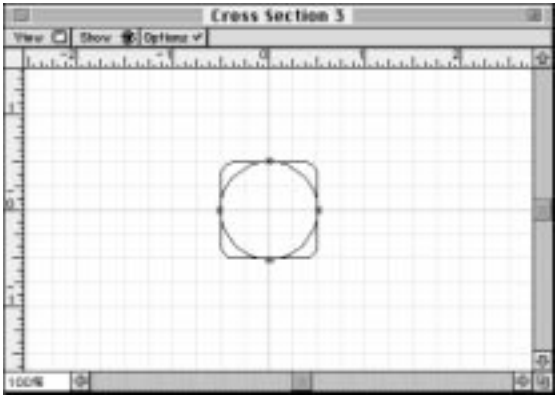
This cross section is at the base of the bottle neck, and should be a circle. The square cross section needs to be replaced with a circular one.

Step 6: Click on the **Cross Section** window to make it the active window.

Notice that the label of the Cross Section window is 'Cross Section 3". You are now looking at the cross section of the bottle near the top of the bottle, at the base of the neck.

Step 7: Click and hold on the **Rounded Rectangle** tool, and choose the **Circle** tool from the list that appears.

Step 8: Click and hold at the center of the grid. Hold down the **SHIFT** key, then drag to make the circle the same size as the rounded square that is already there.



Step 9: Click on the **Arrow** tool from the **Toolbar**, then click on the rounded square to select its points.

Step 10: Press **DELETE** to delete the rounded square.

Look at the preview in the Object view. Notice that the shape of the cross sections change from square to circle between the second and third cross sections. Infini-D interpolates from the shape at one cross section to the shape of the next cross section, which is why it was necessary to insert the second cross section and leave it as a rounded square.

If you have QuickDraw 3D™ loaded on your system, this would be a great time to choose Shaded from the Object window's Render menu. You will be able to see a solid, shaded version of the bottle.

END CAPS

The last thing that needs to be done to the bottle is remove the top. Currently the top has no opening, which would make a bottle very difficult to use. This is easy to change.

Choose **End Caps** -> **Starting Cap** from the **Object** menu, so that it is unchecked.

This removes the top of the bottle, but leaves the bottom.

Choose **Exit Workshop** from the **File** menu to return to the **Scene.**

WRAPPING IT UP

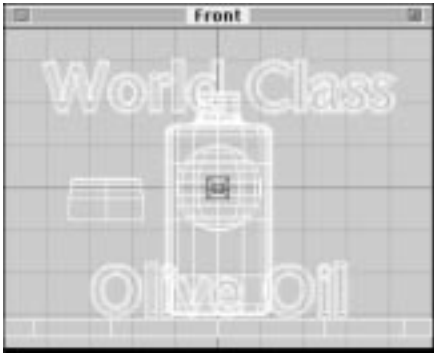
All of the objects have been built. All that remains is to position the bottle correctly in the World. The bottle cap and globe also need positioning, in order to align them with the bottle. To reposition:

Step 1: Click on the **V-Plane** took, then click on the **Camera** view to make it the active window.

Step 2: Drag the bottle in the **Camera** view so that it is resting on the table.

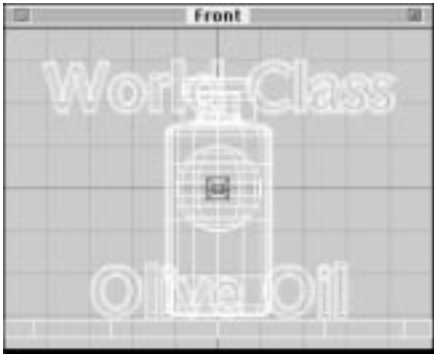
The bottle should be centered perfectly on the table.

Step 3: Set the **X** and **Y** position valued to **0.0** in the **Info** tab of the **Control Floater**, and press **ENTER**.



Step 4: Click on the bottle cap and drag in onto the neck of the bottle using the **Camera** view.

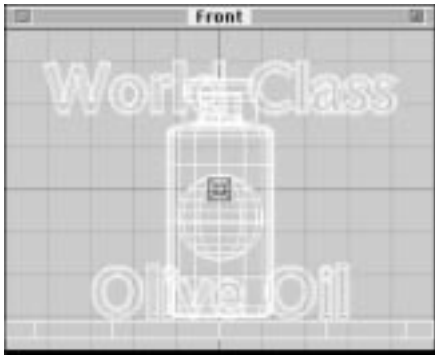
Step 5: Set the **X** and **Y** position valued to **0.0** in the **Info** tab of the **Control Floater**, and press **ENTER**.



The globe should be positioned in the center of the bottle.

Step 6: Drag the globe into the center of the bottle using the **V-Plane** tool and **Camera** view.

Step 7: Set the **X** and **Y** position values to **0.0** in the **Info** tab of the **Control Floater,** and then press **ENTER**.



Step 8: These objects will be used in the next chapter, so save the scene by choosing **Save** or **Save As** from the **File** menu.

The objects are completely built and positioned. In the next chapter, you'll learn how to create surfaces for each object.

Chapter 6

Surfaces

A well-chosen surface can make the difference between merely good looking objects and a scene that makes one wonder, “Is that a photograph?”. You are about to learn what the different types of surfaces are and how to create each one. In this chapter you will:

- Change a basic procedural surface
- Tile an image on an object
- Wrap an image around a sphere.
- Make a multiple layered, composed surface
- Use an alpha channel in an image as a transparency mask

TYPES OF SURFACES

Surfaces within Infini-D fall into three categories: basic surfaces, texture maps, and composed surfaces. Each kind is briefly described below.

Basic Surfaces

Basic (Procedural) surfaces are defined by mathematical equations. Several different kinds of basic surfaces, such as marbles, wood grains, and flat colors allow you to vary the look of common objects. Infini-D's many pre-made basic surfaces can be found on the Surfaces tab of the Command Floater. These can all be edited and new ones can be created.

Textures

Textures are image files that are mapped onto objects. On the Macintosh any PICT file or Quicktime™ movie can be used as a texture, while on a PC .pic, .tif, .avi and many other types of files can be used as textures. If a movie is used as a surface it will play on the object, creating a very interesting effect.

Composed Surfaces

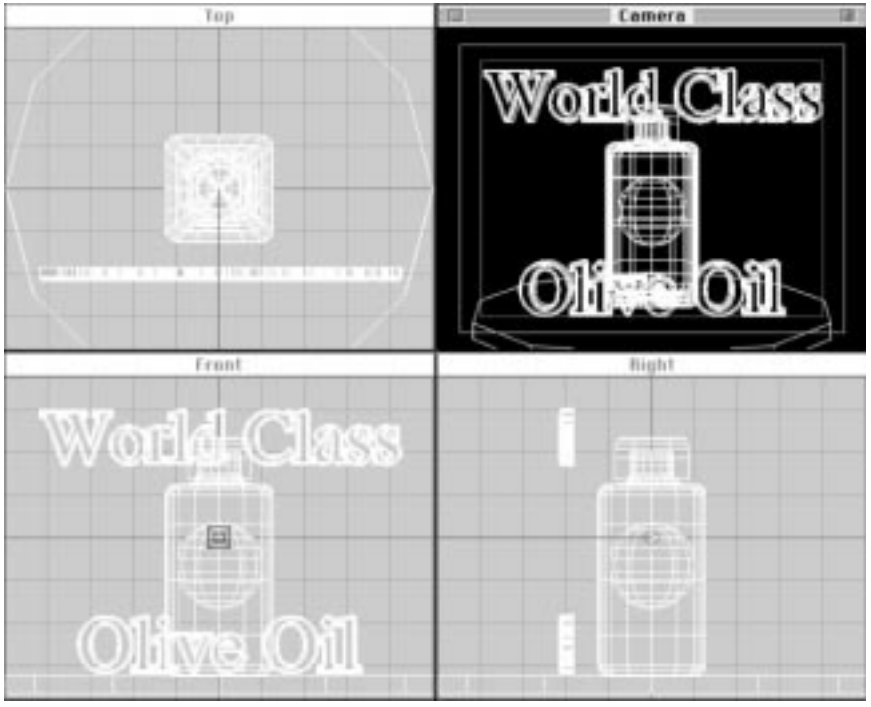
Composed surfaces are the most powerful surface type. A composed surface is created from one or more basic surfaces layered and precisely positioned on an object. You can create almost any surface imaginable by combining other surfaces and textures into a composed surface.

Setting Up the Scene

A scene full of objects was created in Chapter 5. In this chapter, you will create surfaces for those objects.

1. Choose **Open** from the **File** menu.
2. Open the scene file saved at the end of Chapter 5.

You may also open the Chapter 6.id4 scene file, which is found in the Tutorial Files folder of the Infini-D CD-ROM or on your hard drive if you installed the files.



APPLY BASIC SURFACES

All basic, texture, and composed surfaces are available from the Surfaces tab of the Command Floater. Basic surfaces appear in a list under the Basic tab, texture maps appear under the Textures tab, and composed surfaces appear under the Composed tab. To apply any surface to an object, select the object, and then double click on the desired surface from the list.

More information on the types and characteristics of surfaces can be found on Chapter 14 of the User's Manual.

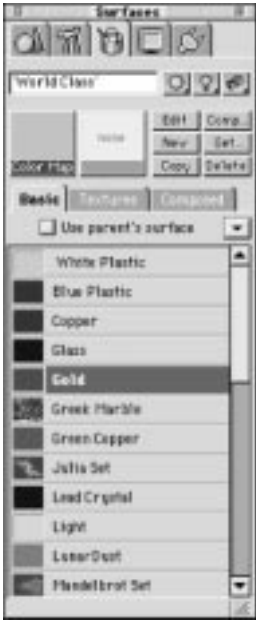
Start by applying the basic surfaces first. Both text objects need a shiny surface.

Step 1: Select the '**World Class**' text object.

Step 2: Click on the **Surfaces** tab of the **Command Floater**.

Step 3: Double-click on **Green Copper** in the surface list to apply it to '**World Class**'.

Step 4: Select '**Olive Oil**', and double-click on the **Green Copper** surface to apply it to the text.



The bottle cap looks good with a marble surface. It is unlikely that an olive oil bottle would have a hexagonal marble cap, but this is no ordinary olive oil—it's World Class olive oil!

Step 5: Select the bottle cap, and double-click on the **Greek Marble** surface to apply it to the bottle cap.

CUSTOMIZE A BASIC SURFACE

The bottle in this scene will have a golden glass surface. If you look at the list of basic surfaces, you'll notice that there is already a glass surface. There's no need to re-invent the wheel; the glass surface can easily be copied and changed into a golden glass surface. To edit a surface:

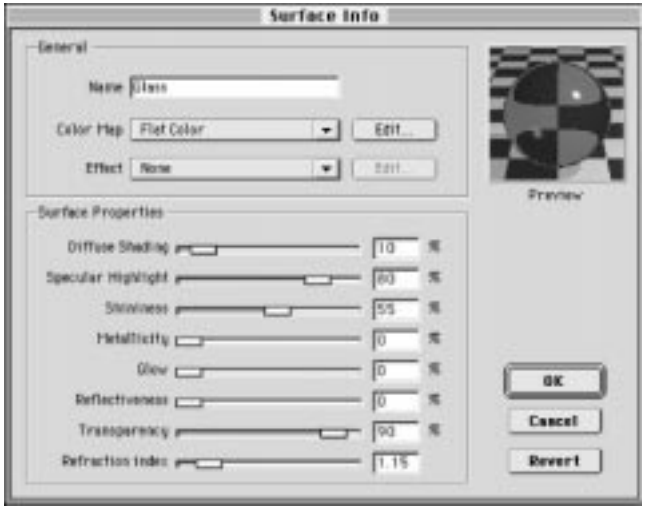
Step 1: Select the Glass surface and click the Duplicate button at the top of the Surfaces panel.

Step 2: Select the bottle.

Step 3: Double-click on the **Glass 1** surface in the surface list of the **Command Floater** to apply it to the bottle.

Step 4: Click the **Edit** button near the top of the **Command Floater** to open the **Surface Info** dialog.

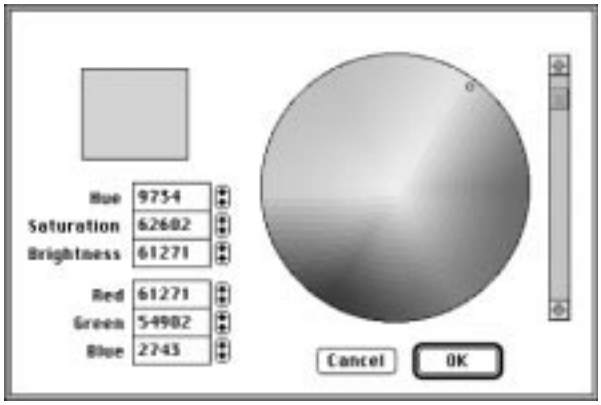
The Surface Info dialog appears. This is where basic surfaces are created and edited.



The color of the glass will be changed to a golden brown color.

Step 4: Click on the **Edit** button beside **Color Map**.

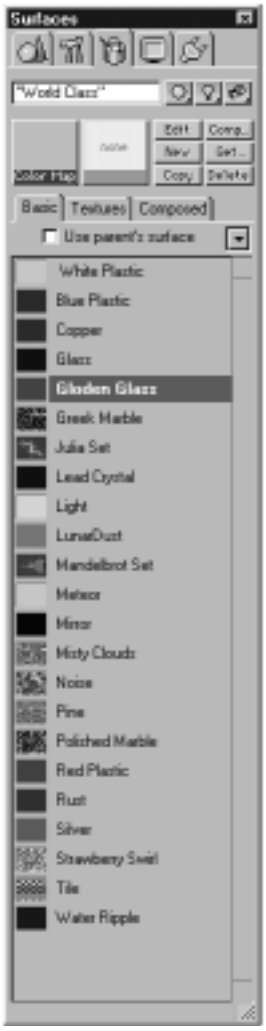
One of a number of color picker dialogs will appear, depending on your machine.



Step 5: Choose a golden color, then click the **OK** button to return to the **Surface Info** dialog.

Step 6: Lower the **Transparency** to **80%** by clicking and dragging the **Transparency** slider to the left.

This makes the golden glass less transparent than colorless glass, which is typical with colored glass.



Step 7: Rename this surface by typing '**Golden Glass**' in the text field at the top of the dialog.

Step 8: Click the **OK** button to return to the **World**.

The bottle now has a new golden glass surface. It still needs a label, but that will be added a bit later.

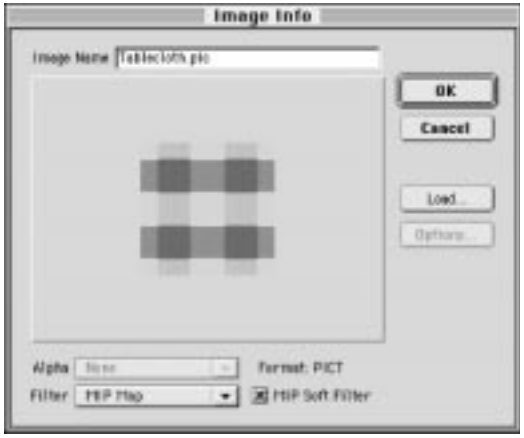
USING AN IMAGE FILE AS A SURFACE

The table needs a tablecloth. On the Infini-D CD-ROM there is a red checkered image that will work fine. To do this:

Step 1: Click on the **Get...** button in the **Surfaces** tab of the **Command Floater**.

The standard open file dialog will appear.

Step 2: Open the **Tablecloth.pic** file from the **Tutorial Files** folder of the Infini-D CD-ROM.



Step 3: Click **OK** in the **Image Info** dialog to return to the **World**.

The image is now loaded into the Surface Library, but it needs to be applied to the table.

Step 4: Select the table object.

Step 5: Double click on the **Tablecloth.pic** texture to apply it to the table.

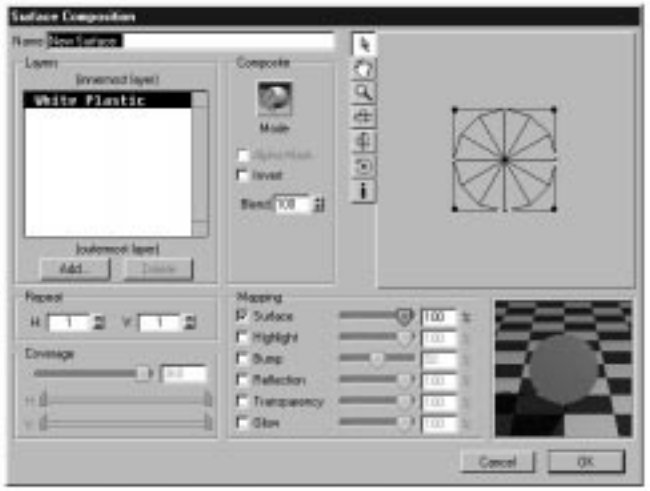
Now is a good time to use the Marquee Render tool to see a clear version of the tablecloth.

Step 6: Click on the **Camera View** to activate it, and then double-click on the **Shade Marquee Render** tool to see a high-quality rendering of the scene.

CREATING A COMPOSED SURFACE

The texture applied to the table looks good, but the checkered pattern is much too large. The table would look more realistic if the checks were much smaller. Unfortunately, textured surfaces aren't very flexible—they simply get placed on the object and cannot be adjusted. In order to make the texture smaller on the table, a composed surface must be used. Composed surfaces are very powerful, and are used to create more complex surface effects. Here, one will be used to make the checks smaller on the table and to 'tile' the smaller image so that it covers the entire table. To create a composed surface:

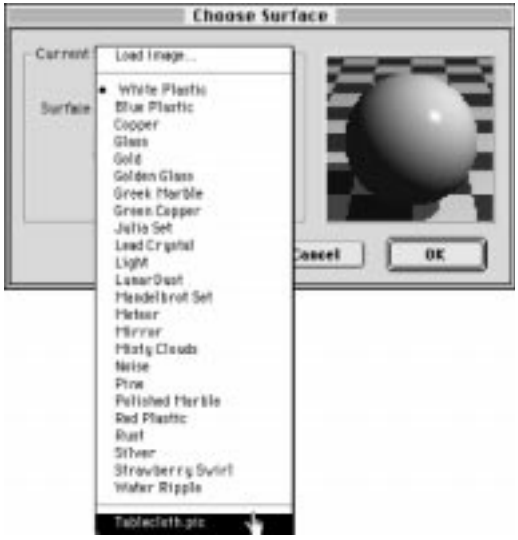
Step 1: Select the **Table** object and then click on the **Comp...** button near the top of the **Surfaces** tab to create a new composed surface.



The Surface Composition dialog will appear. At the left of the dialog you will see a box with the title 'Layers'. The only layer there is White Plastic, but there can be as many layers as you want in a single composed surface. Any surface can be used as a layer except tile surfaces (a type of procedural surface) and other composed surfaces.

Step 2: Double-click on the **White Plastic** layer to bring up the **Choose Surface** dialog.

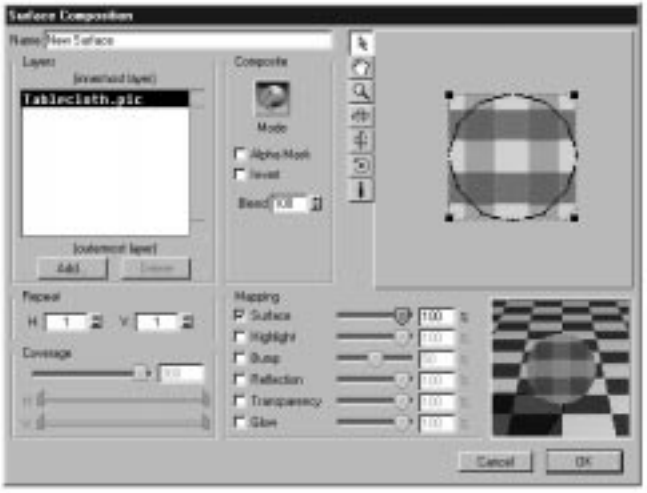
Step 3: Click and hold on the **White Plastic** surface.



Step 4: Choose the **Tablecloth.pic** texture from the list that appears. It can be found by scrolling to the bottom of the list.

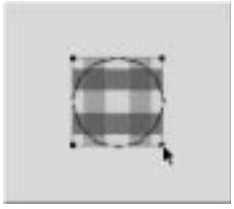
Step 5: Click **OK** to return to the **Surface Composition** dialog.

The White Plastic layer has now been replaced by the Tablecloth.pic texture. On the right-hand side of the dialog you will see a wireframe outline of the table, viewed from the top. The texture covers the entire object.

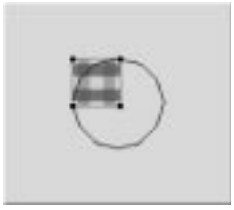


In order to make the checker pattern smaller, the image must be scaled down on the table. This can be done by dragging the square black handles found on the corners of the image.

Step 6: Click and hold on the small, black box at the bottom-right corner of the texture in the wireframe preview window.



Step 7: Holding the Shift key to keep it square, drag the corner of the image up and to the left; position on the center of the table object.



The checkered texture is now a smaller, more realistic size on the table. Unfortunately, it only covers about a fourth of the table's surface. The texture can be tiled across the entire table by changing the Repeat values. These are found above the wireframe preview box.

Step 8: Click once on the down arrow beside the **H Repeat** field.

This changes the horizontal repeat from one to infinity, causing the texture to tile as many times as needed to cover the object horizontally.

Step 9: Click once on the down arrow beside the **V Repeat** field.

This tiles the texture until the table is covered.

When both repeat fields are set to infinity, the texture should completely cover the object.

Step 10: Name this surface by typing
'**Tablecloth Composed**' in the **Name** field.

Step 11: Click **OK** to return to the **World**.

The table's surface is finished. It would be a good time to see a high-quality rendering of the camera view.

Step 13: Click on the **Camera** view to make it the active window.

Step 14: Double-click on the **Shade Marquee Render** tool.

It is a good idea to save scene files often to prevent lost work in case of an accident.

Step 15: Choose **Save** from the **File** to save the scene file.

WRAPPING A WORLD MAP AROUND A GLOBE

The sphere will become a globe once an image of the earth is wrapped around it. Its surface will be another composed surface, similar to the surface used on the table. In the next chapter this globe will play a central role when it is animated with the bottle.

Step 1: Select the **Globe** object (you may need to use the **Object Selector,** located at the top of the **Command Floater**).

Step 2: Click on the **Get...** button in the Surfaces Tab to load an image to be used.

The Load Image dialog appears, a standard open file dialog.

Step 3: Open the '**World Map.pic**' file from the **Tutorial Files** folder of the Infini-D CD-ROM.

Step 4: When the **Image Info** dialog appears, click **OK**.

Step 5: Double-click the World Map in the Textures list to apply it to the sphere.

There are a number of different ways to map an image onto an object. Infini-D automatically uses a Spherical mapping mode since the object is a sphere. THe mapping mode for the object can be changed using the Mapping pop-up in the Object tab of the Command Floater. In this case, we will leave it set to spherical.

CREATING A MULTIPLE LAYERED SURFACE

To put a label on a glass bottle, another composed surface must be used. In the last example, there was only one layer used in the composed surface—the tablecloth image. In this example, the surface will have two layers. The bottom layer will be the green glass surface that was created at the beginning of this chapter, while the top layer will be another image of a label that can be found on the Infini-D CD-ROM. Follow these steps to apply the label:

Step 1: Select the bottle and choose Decal from the Mapping pop-up in the Object tab of the Command Floater.

Step 2: Click on the **Comp...** button near the top of the **Surfaces** tab of the **Command Floater** to create a new composed surface.

The Surface Composition dialog appears.

Adding the First Layer

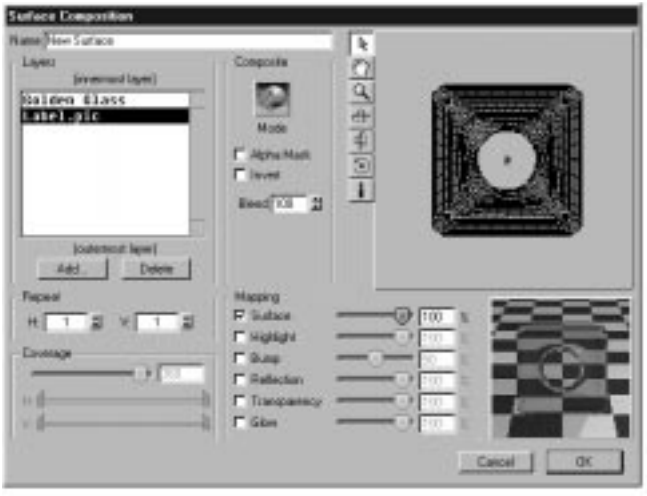
The default White Plastic layer needs to be changed to Golden Glass. This will be the bottom, or underlying layer of the composed surface.

Step 1: Double-click on the **White Plastic** surface in the Layers list.

The Choose Surface dialog will appear.

Step 2: Click and hold **White Plastic,** and select **Golden Glass** from the list of surfaces that appears.

Step 3: Click **OK** to return to the **Surface Composition** dialog.



Adding the Second Layer

The second layer is the label for the olive oil bottle. When each new layer is added, it is applied on top of the layers below.

The layer at the top of the Layers list is 'painted' onto the object first. Then the second layer is painted, and the third, and so forth.

Step 1: Click on the **Add** button to create a new layer.

The Choose Surface dialog will appear. The default surface is White Plastic, but needs to be changed to the 'Label.pic' image that can be found in the Tutorial Files folder of the Infini-D CD-ROM.

Step 2: Click and hold on **White Plastic**, and choose **Load Image** from the top of the surface list that appears.

The standard open file dialog will appear.

Step 3: Open the '**Label.pic**' file from the **Tutorial Files** folder of the Infini-D DC-ROM.

The Image Info dialog will appear. The image contains an alpha channel, so the **Alpha** should automatically be set to Straight.

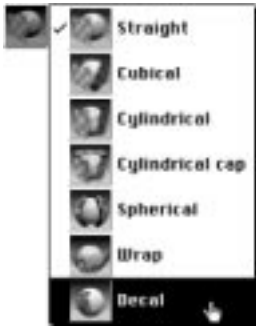
Step 4: Click **OK** to return to the **Choose Surface** dialog. Then click **OK** again to return to **Surface Composition** dialog.

The Label.pic image is now in the Layers list of the Surface Composition dialog but it is not oriented correctly. The label needs to be placed on the front of the bottle.

Using a Decal Map

When creating the globe's surface you used the Spherical map to wrap the map of the Earth around the globe. Here you will use the Decal mapping mode to position the

label on the front of the bottle. Decal is the most versatile mapping mode, allowing precise positioning along the object's surface. To use the Decal mapping mode:

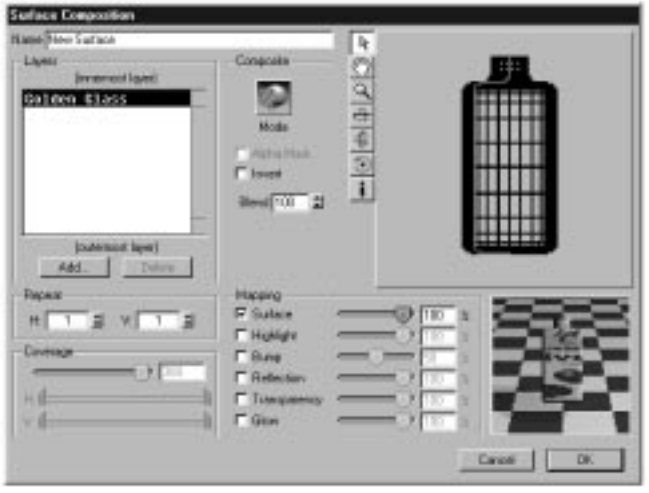


Step 2: Click on the **Mode** button in the center of the **Surface Composition** dialog, and choose **Decal** from the list that appears.

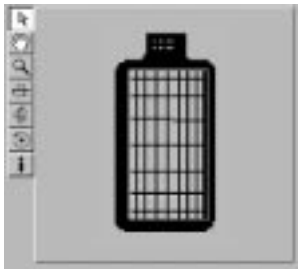
The wireframe preview window shows the bottle from the top, but when using Decal it is more useful to view the object from the front. The bottle can be rotated using the rotation tools next to the wireframe preview window.

Step 2: Click on the first rotation tool (the topmost tool with a red arrow), which can be found next to the wireframe preview window.

Step 3: Click and hold on the wire frame bottle and drag upward to rotate the bottle to an upright position.



If the bottle is too big to fit inside the wireframe preview window, use the zoom tool (the magnifying glass) to zoom out until the entire bottle fits within the window.



In the Coverage Control section on the left side of the window, there are two bars, labeled H and V. Each bar has two sliders, which can be dragged with the mouse. The two sliders on the H bar control the left and right sides of the decal, while the two sliders on the V bar control the top and bottom of the decal. Moving the sliders moves the sides of the decal on the object. In this way, the layer can be positioned on the object.

Step 4: Drag the left **V slider** a bit less than one half inch to the right.

This moves the top of the layer down the bottle. The top and bottom edges of this layer are represented by red lines.

Step 5: Drag the right **V slider** about one eighth of an inch to the left.

This moves the bottom of the layer upward onto the side of the bottle.

Step 6: Drag the left **H slider** about one twentieth of an inch to the right.

This moves the left side of the layer onto the front of the bottle. The left and right sides of the layer are shown as green lines.

Step 7: Drag the right **H slider** one inch to the left.

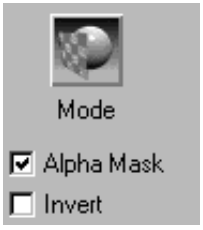
This moves the right edge of the layer to the front of the bottle.

The label should now be positioned on the front of the bottle. If the layer is not yet positioned correctly, use the H and V sliders to reposition the sides of the layer. The ray-traced preview in the lower-right corner of the Surface Composition dialog will show if the layer is placed correctly or if it needs to be readjusted.

Using an Alpha Channel as a Mask

The label is now on the front of the bottle, but the white edges of the label need to be removed. There are a number of ways to make parts of an image transparent, but using an alpha channel is often the easiest method. To remove the background from the Label.pic image, and complete the surface:

Step 1: Click the **Use Alpha Mask** checkbox, located near the top of the **Surface Composition** dialog.



The image used as the decal contains an alpha channel. Checking the Use Alpha Mask checkbox tells Infini-D to make certain parts of the image transparent, depending upon the information stored within the alpha channel.

If you wish for a more detailed explanation of alpha channels, consult the user manuals of applications such as Adobe Photoshop™. To see how the alpha channel of the label image was created, open the 'Label.pic' image in Photoshop or Painter and view the fourth channel (the alpha channel).

Step 2: Name the surface by typing '**Bottle Compose**d' in the name field.

Step 3: Click **OK** to return to the **Scene.**

FINISHING TOUCHES

There are a few items that will improve the look of the scene. You may have noticed how dark the objects' surfaces are. Adding another light to the scene will illuminate the objects nicely. You will add a light, positioned in front of the objects, and a little bit to one side. To create and position the light:

Step 1: Click and hold on the **Light** tool from the **Toolbar**, and choose the **Point** light from the list (the picture of the ordinary light bulb).

Step 2: Click in any view window to create a light.

Use the Control Floater to position the light accurately.

Step 3: Choose **Information** from the **Windows** menu to open the **Control Floater**.

Step 4: Set the **X** position to **-5.0**, the **Y** position to **-10.0**, and the **Z** position to **0.0**.

The scene is now illuminated brightly. Effective lighting adds a lot to any scene; we suggest you become more familiar with the different kinds of lights and how to use them by referring to the Infini-D User's Manual

The second item that will improve the quality of the scene is an environment map. The steps are the same as they were in Chapter 3:

Step 5: Choose **Environment** from the **Edit** menu to open the Environment dialog.

Step 6: Change the **Environment Map** setting from **None** to **Load Image**.

The standard open file dialog will appear.

Step 7: Open the '**Chrome Map.pic**' file from the **Tutorial Files** folder of the Infini-D CD-ROM.

Step 8: Click **OK** from the **Surface Composition** dialog to return to the **World**.

Background images don't need much explanation; they simply appear behind the objects of a scene. Any image or movie can be used as a background image. Adding a background image is similar to adding an environment map.

Step 9: Choose **Environment** from the **Edit** menu.

Step 10: Change the **Background** Image setting from **None** to **Load Image**.

The standard open file dialog will appear.

Step 11: Navigate to the **Tutorial Files** folder of the Infini-D CD-ROM and select the '**Stars.pic**' file.

Step 12: Click **Open** to return to the **Image Info** dialog then click **OK** to return to the **Environment** dialog.

Step 13: Click **OK** to return to the **Scene.**

These objects will be used in the next chapter to create a final animation, so it is important to save the work you have done in this chapter.

Step 14: Choose **Save** from the file menu and save this scene file.

This chapter has introduced you to a variety of surfaces found in Infini-D. Using these basic techniques, you can create an infinite variety of complex and realistic surfaces.

Chapter 7

Creating a Complete Animation

The goal of this tutorial is to give you a sound understanding of how to animate a scene.

There are many ways to animate objects; this chapter will demonstrate those that are most common. Objects built and surfaced in Chapters 5 and 6 will be animated here, producing a 5 second animation that can be looped to create a seamlessly repeating movie.

The following topics are discussed in this chapter:

- Extended Use of the Sequencer
- Object Linking
- Linear and Spline Eventmarks
- Velocity Graphs

This tutorial is quite lengthy, but each step is straight-forward and easy to follow. While doing the small steps in each section, keep focused on the 'big picture' of what is being done. If you understand the big picture, the small steps come naturally and need not be memorized.

SETTING UP THE SCENE

The scene saved at the end of the last chapter will be used here. This scene file can also be found in the Tutorial Files folder of the Infini-D CD-ROM and is called 'Chapter 7.id4'. To retrieve the scene you created:

Step 1: Choose **Open** from the **File** menu.

The standard open file dialog will appear. If you completed Chapter 6, open the file saved at the end of that chapter.

Step 2: Open either the scene file you saved at the end of Chapter 6 or **Chapter 7.id4** from the **Tutorial Files** folder of the Infini-D CD-ROM.

LINKING OBJECTS

Currently all objects in the scene function independently from each other. If one moves, the others will not move. In the real world, however, if a bottle is moved, the bottle cap will obviously follow. If the table spins the bottle would spin with the table. This can be accomplished in Infini-D by linking the objects. When objects are linked, one object becomes the parent while the other becomes the child. When the parent object is moved or rotated the child moves as if it is glued to the parent.

To link the bottle cap to the bottle:

Step 1: Select the bottle cap.

Step 2: Click on the **Link Tool** from the **Toolbar**.

Step 3: Click on the bottle.

There are different kinds of links, but any will work for this chapter. To learn about the different types of links see Chapter 8 of the User's Manual.

A line will momentarily be drawn from the bottle cap to the bottle, indicating that the cap is linked to the bottle. The next step is to link the bottle to the table. Objects can also be linked using the Sequencer.

Step 4: Choose **Sequencer** from the **Windows** menu.

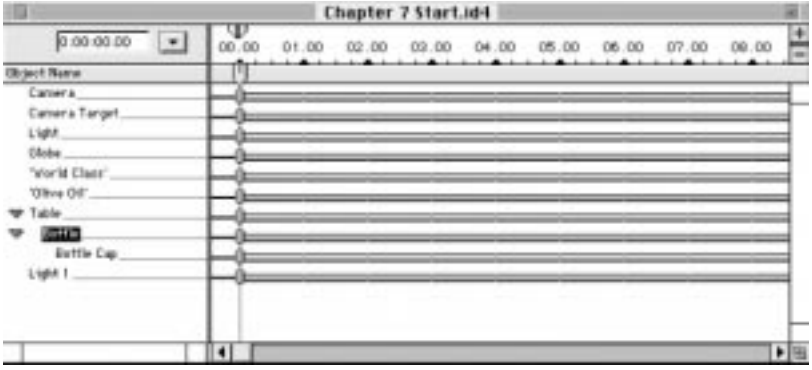
You may need to use the scroll bar at the right edge of the Sequencer window to see the names of all the objects in the scene.

It is easy to tell how objects are linked by looking in the Sequencer—child objects are indented under their parent objects. Notice that the bottle cap is indented under the bottle.

Step 5: Click and drag the name of the bottle and drop it on the

name of the table.

The bottle becomes indented under the table, indicating that it is linked to the table. The bottle cap is now linked to both objects.



To unlink an object, simply drag the name of the child and drop it in any empty space in the name list between two unlinked objects. The Unlink tool from the Toolbar may also be used.

SPINNING THE TABLE

The first object to animate is the table. The table simply spins in place, so the Spin Animation Assistant can be used. Since the bottle and bottle cap are linked to the table they will also spin. The bottle must begin the animation facing backwards so the table will first be rotated 180 degrees. To make the table face backwards:

Step 1: Select the **Table**.

Step 2: Choose **Information** from the **Windows** menu.

This opens the Control Floater and shows the object's position, rotation, and scale information.

Step 3: Set the **Z** rotation value in the **Information** tab to **180** then press **ENTER**.

The table, bottle and cap rotate half a turn so the bottle's label faces away from the camera.

Now it is time to rotate the table and bottle. It could be rotated by hand, but it is easier to let the Spin Animation Assistant do the work:

Step 4: With the table still selected, choose **Animation Assistant** -> **Spin** from the **Animation** menu to open the Spin dialog.

Step 5: Set the **Rotations** to **1**, the **Seconds** to **5**, and click **OK**.

Some eventmarks connected by blue lines will appear beside the table's name in the Sequencer window. These were created by the Animation Assistant and indicate that the table is animated over time.

At any time during this chapter you may want to 'scrub' the Sequencer to see a preview of the animation. To scrub the Sequencer, click and drag the Scene Time Marker. The Scene Time Marker is located above the eventmarks but below the time numbers in the Sequencer. Be sure to move the Scene Time Marker back to its original position after doing a scrub.

ANIMATING THE 'OLIVE OIL' TEXT

The 'Olive Oil' text will fly across the Camera view. Initially, the text will be off the view to the right, but then it will move across the Camera view and out of sight to the left.

Step 1: Use the **V-Plane** tool to select the '**Olive Oil**' text in the **Camera** view window.

Step 2: Drag the '**Olive Oil**' text to the right side of the **Camera** view. Drag it far enough to the right so that it disappears off the right side of the **Camera** view.

If you cannot drag the 'Olive Oil' text far enough to the right using the Camera view, use the Zoom tool to zoom out of the Front view, and manipulate the text there.

The text now begins off the Camera view. It needs to start moving at 1 1/4 seconds. To animate the text:

Step 3: Click and drag the '**Olive Oil**' text's only eventmark in the **Sequencer** to **1 1/4** seconds.

Since the 'Olive Oil' text's first eventmark is at 1 1/4 seconds, the text doesn't exist in the Scene until that time. The animation is simple—just fly the text across the Camera view to the left.

Step 4: Move the **Sequencer's Scene Time Marker** to **3 3/4** seconds.

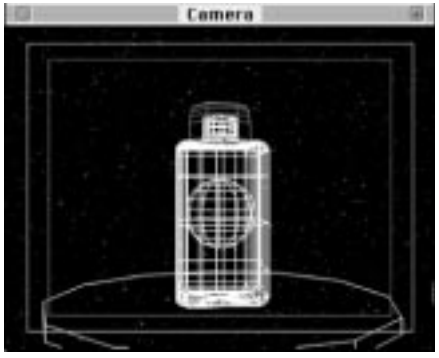
Step 5: Use the **V-Plane** tool and the **Camera** view to drag the text to the left. Drag it far enough to the left so that it flies off the left side of the **Camera** view.

ANIMATING THE 'WORLD CLASS' TEXT

The 'World Class' text flies across the screen similar to the 'Olive Oil' text. However, the motion of 'World Class' is a bit different than that of 'Olive Oil'. 'World Class' starts above the bottle and then flies off the left side of the Camera view. A moment later it flies back onto the Camera view from the right side, and comes to rest where it began.

Step 1: Move the **Sequencer's Scene Time Marker** to **1 1/4** seconds.

Step 2: Use the **V-Plane** tool to drag '**World Class**' to the left in the **Camera** view; drag it until it disappears off the left side of the **Camera** view.



Step 3: Move the **Scene Time Marker** to **3 3/4** seconds.

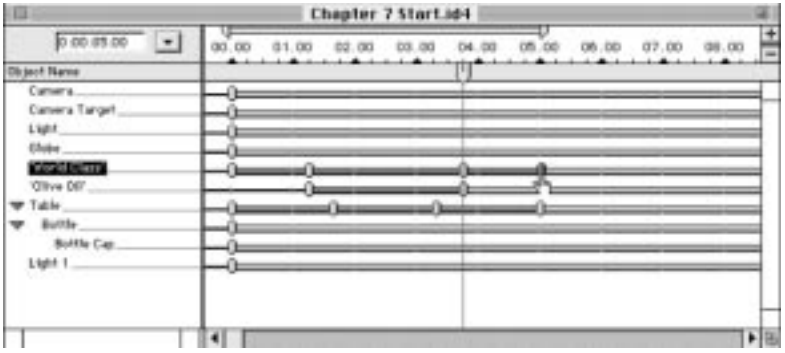
Step 4: Drag 'World Class' to the right using the Camera view until it crosses and disappears off the right side of the camera view.

At the end of the animation the 'World Class' text needs to be in exactly the same location as it started. This can be easily done by duplicating the text's first eventmark and placing the duplicate at the end of the animation.

Step 5: Click on the **Sequencer** to make it the active window.

Step 6: Hold down the **OPTION** key (Mac) or **ALT** key (Windows).

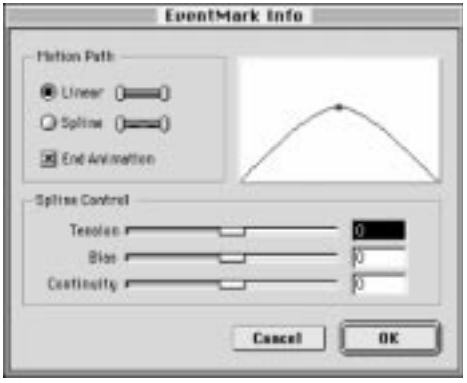
Step 7: Click and drag the '**World Class**' text's first eventmark to the right and place it at five seconds under the timeline.



The animation of 'World Class' is complete, with one exception: In the middle of the animation, the text flies across the Camera view from left to right. It should not be seen during this time. The solution is to simply make it disappear between the second and third eventmarks.

Step 8: Double-click on the '**World Class**' text's second eventmark in the **Sequencer**.

The Eventmark Info dialog will appear.



Step 9: Click the **End Animation** check-box, and click **OK**.

The second eventmark of the 'World Class' text is now a square, indicating that it is an end animation eventmark. This means that the object is essentially gone from the scene until the next eventmark, when it will reappear.

The 'World Class' text is now animated. A Scrub of the Sequencer will show the 'World Class' flying off the left side of the Camera view then flying back into the view from the right.

ANIMATING THE GLOBE

Animating the globe is the trickiest part of this chapter. The globe begins inside the bottle, then squeezes out of the top of the bottle. Hovering in the air for a moment, it then returns to the bottle. The steps below are quite precise, because the globe needs to fit snugly into the bottle. The Control Floater will be very useful here because such exact control is needed. To animate the globe:

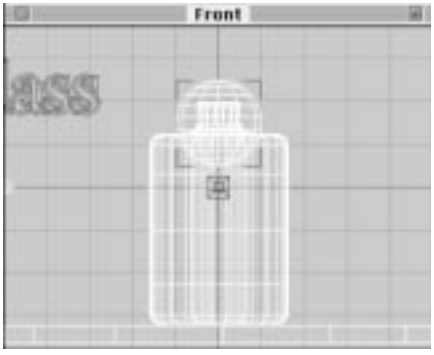
Step 1: Select the globe, then click on the **Sequencer** to make it the active window.

Step 2: Move the **Scene Time Marker** to **1** second.

The globe's movement will be built in pieces. Complex motions like the globe's are

often built in this fashion: move the Scene Time Marker down the timeline; move the object; move the Scene Time Marker further down the timeline; move the object again, and so on.

Step 3: Using the **Camera** view, drag the globe upward until it is positioned in the middle of the bottle neck.



If the bottle cap gets in the way when building the globe's animation, temporarily make the cap invisible. To do this, select the bottle cap, and then open the Object tab of the Command Floater. Un-check the Show Object checkbox. When the time comes to animate the bottle cap you will need to make it visible again.

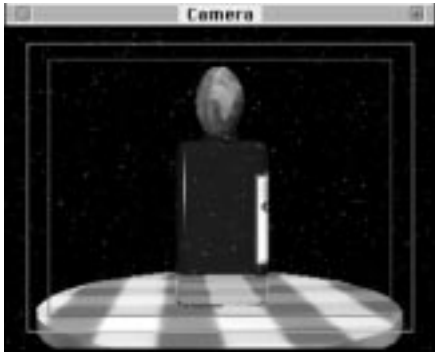
The globe needs to be squished to fit inside the bottle neck.

Step 4: Set the **X** and **Y** dimension to **0.4** in the **Information** tab of the **Control Floater**, and press **ENTER**.

Step 5: Move the **Sequencer's Scene Time Marker** to **1 1/4** seconds.

Step 6: Drag the globe upward until only one fourth of it is still inside the bottle.

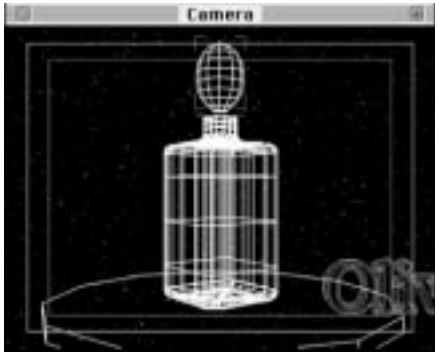
Step 7: Set the **X** and **Y** dimension fields to **0.7** in the **Information** tab of the **Control Floater**, and press **ENTER**.



The globe is almost a perfect sphere, but is still a bit squished.

Step 8: Move the **Scene Time Marker** to **2.0** seconds.

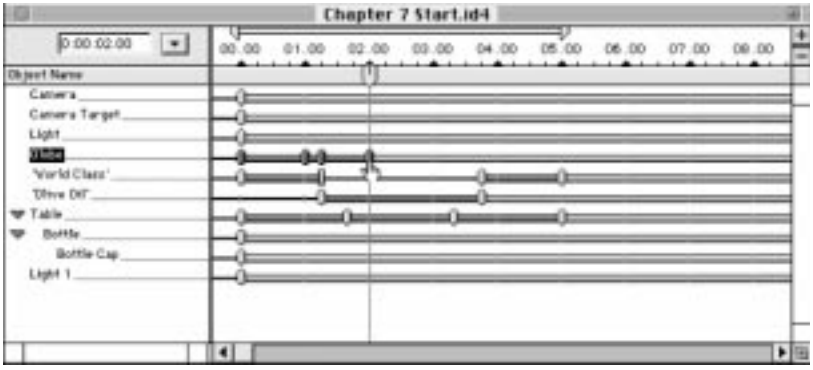
Step 9: Drag the globe upwards until it is slightly above the bottle.It should be near the top of the **Camera** view, but remain within the **Safe Action** area.



Step 10: Set the globe back to its spherical shape by setting the **X** and **Y** dimension fields to **1.0** in the **Information** tab of the **Control Floater**, and then press **ENTER**.

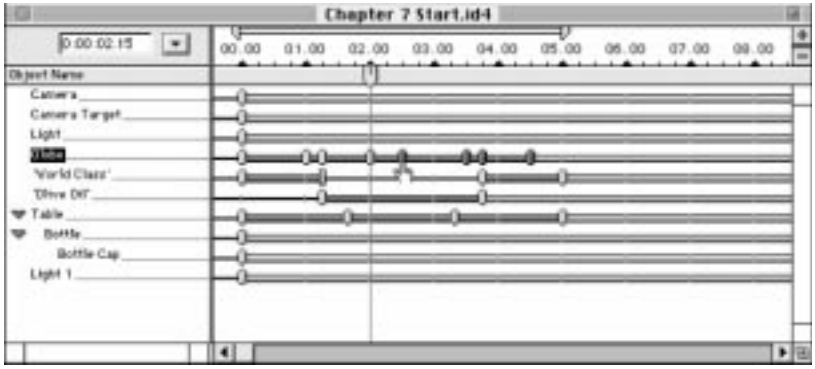
The first half of the globe's animation is done. The second half of the globe's animation is simply the reverse of the first half, when the globe falls back into the bottle. Since an object's animation is contained in the eventmarks of the Sequencer, they can simply be duplicated and then reversed, to mirror the globe's current motion.

Step 11: Click on the globe's first eventmark in the **Sequencer**.Hold down the **SHIFT** key and click on the rest of the globe's eventmarks.



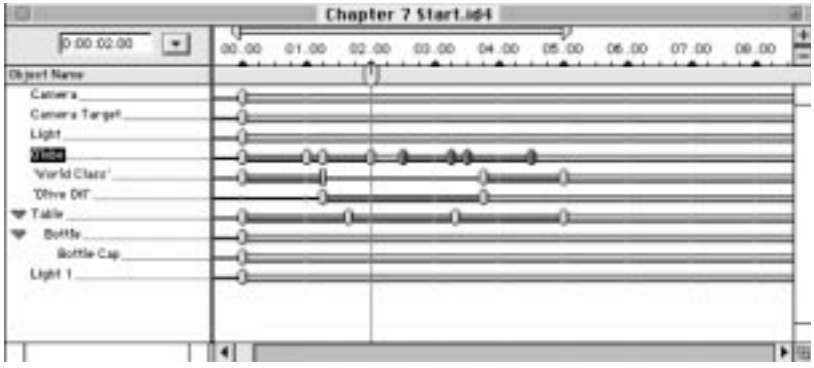
The next step is to copy the selected eventmarks to a place further down the timeline.

Step 12: Hold the **OPTION** key (Mac) or **ALT** key (Windows), click on the first selected eventmark, and then drag them to the right so that the first duplicated eventmark sits at **2.5** seconds.



If you scrub the Sequencer, you will see that the globe has two 'copies' of its animation. The first starts at time zero, while the second starts at 2.5 seconds. The second 'copy' of the animation will be reversed so that the globe returns to the bottle.

Step 13: Choose **Animation Assistants** -> **Reverse** from the **Windows** menu.Be sure that only the new, duplicate eventmarks are still selected.



The selected eventmarks have been reversed. A scrub of the Sequencer will show the globe moving out of the bottle, pausing for a moment above the bottle, and then returning to the bottle in the exact opposite way it left the bottle.

Linear Versus Spline Eventmarks

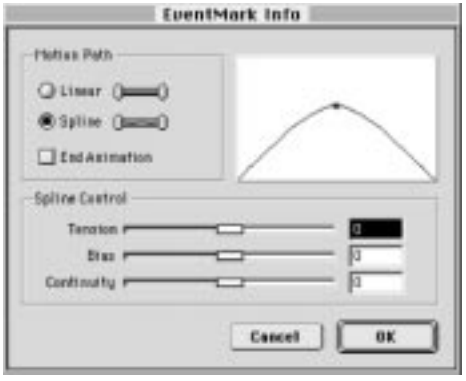
Many eventmarks in the Sequencer are connected by blue bars. They indicate that an object is changing in some way at the time that a blue bar appears. Where there is no blue bar, an object is not changing. The blue bars also indicate that the eventmarks are 'linear' eventmarks—This means that the changes happen sharply and abruptly. There is another type of eventmark, called a 'spline' eventmark, which is used to ensure that changes in eventmarks happen smoothly.

Here's a good way to understand linear and spline motion. Think about a baseball player running around the bases. A linear path would be to run to first base, pivot, and then run straight to second base. A smooth, spline-like path is the realistic curved path that human runners take.

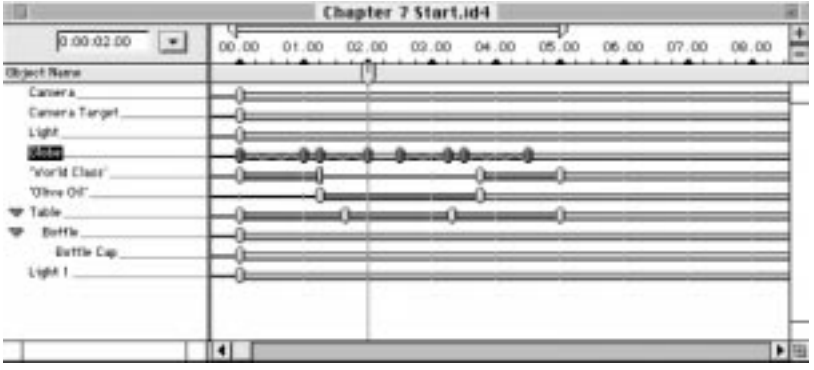
To change the globe's eventmarks to spline eventmarks.

Step 1: Select all of the globe's eventmarks.

Step 2: Double-click on one of the selected eventmarks to open the **Eventmark Info** dialog.



Step 3: Click the **Spline** button, and click **OK**.



The motion of the globe is smooth and easier to watch. This may not be noticeable at this point but it definitely affects the rendered movie.

ANIMATING THE BOTTLE CAP

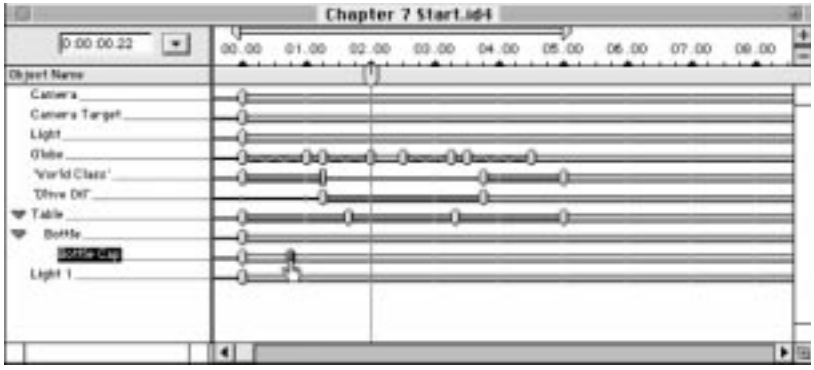
Until now the bottle cap has just been sitting on top of the bottle. You are about to give the cap an animation that is similar the globe's animation: The bottle cap sits on top of the bottle until the globe starts to squeeze out of the bottle. The cap then flies upward, out of the Camera view. It then pauses for a moment and drops back onto the bottle, giving the effect that it is pushing the globe back into the bottle.

If you made the bottle cap invisible while animating the globe, make it visible now. Invisible objects can be selected by using the selector tool at the top of the Command Floater or by clicking on the name in the Sequencer.

The bottle cap should sit on top of the bottle until three quarters of a second, after which it should fly off the top of the bottle.

Step 1: Hold down the **OPTION** key (Mac) or **ALT** key (Windows).

Step 2: Click and drag the bottle cap's eventmark to **3/4** of a second in the **Sequencer**.

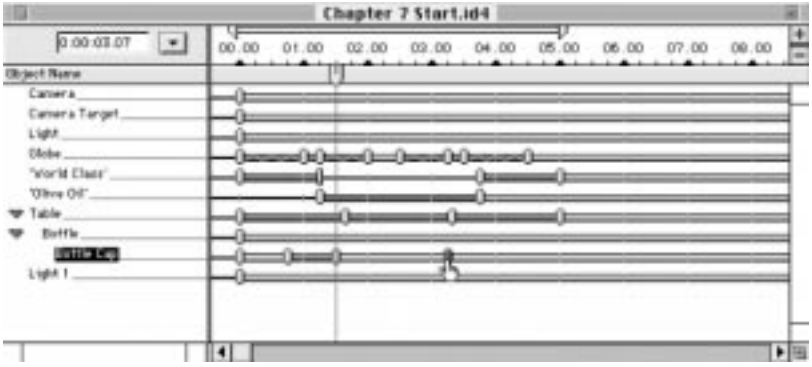


Step 3: Move the **Sequencer's Scene Time Marker** to **1 1/2** seconds.

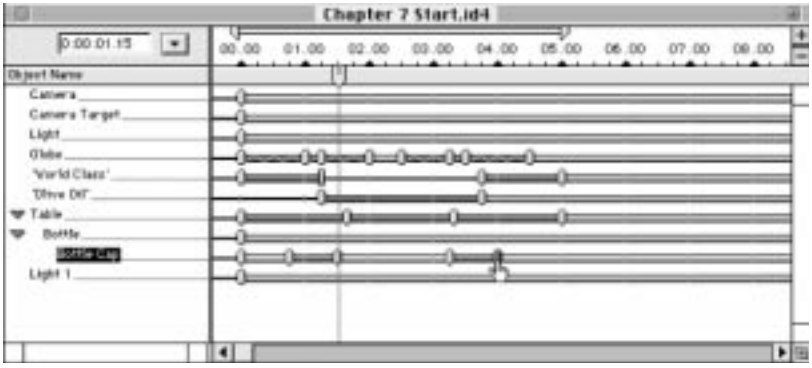
Step 4: Drag the bottle cap upward in the **Camera** view, far enough so that it disappears off the top of the **Camera** view.

The first half of the bottle cap's animation is now built. The second half is simply the reverse of this first half. You could duplicate these eventmarks as you did the Globe's, and use the Reverse Animation Assistant again. However, since this animation only has two eventmarks, you'll build the second half of the bottle cap's animation by hand.

Step 5: Hold down the **OPTION** key (Mac) or **ALT** key (Windows), and click and drag the bottle cap's third eventmark to the right. Drop it at **3 1/4** seconds.



Step 6: Hold down the **OPTION** or **ALT** key, and click and drag the bottle cap's second eventmark to the right; drop it at **4** seconds.



If you scrub the Sequencer now, you will see that the bottle cap flies off of the bottle out of the Camera view and pauses for a moment before coming back down on the bottle neck. If the globe and bottle cap animations are built properly, the globe will appear to push the bottle cap into the air. A moment later the bottle cap will fall down on the globe and push it back inside the bottle.

Velocity Graphs

The animation can be rendered and viewed now; it would look fine, except for a pause at the beginning and end of the animation as the objects speed up (from their initial stopped position) and slow down (to finish in a stopped position). This is usually desirable, since it makes object motion very smooth and realistic. However, this animation is best viewed while it loops, so the spinning objects should not be pausing, but spinning as if they were rotating forever. The velocity graph will allow you to do this.

Velocity graphs are quite powerful. Use them when the motion of an object needs to be precisely controlled or fine-tuned. They are an important tool for creating the subtleties of realistic motion.

If you would like to see how the animation looks now, feel free to render a movie. There is a movie file in the Tutorial Files folder of the Infini-D CD-ROM, called 'C7AlmostDone.mov'; it can be played by double-clicking the file icon. Watch the animation play, and notice how the objects pause at the end of the animation.

Back to your own animation.

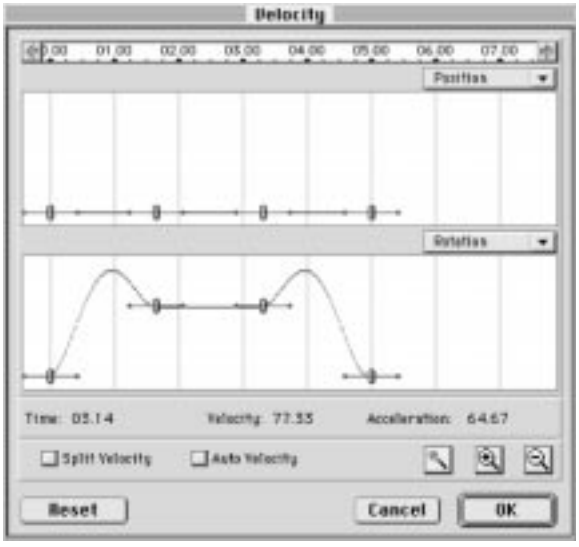
The table, the bottle, the bottle cap and the 'World Class' text need to move at a constant rate. Since the bottle and bottle cap are linked to the table, their motion will follow the table's perfectly when it is changed.

Work on the table first. To make it rotate at a constant rate:

Step 1: Select the table.

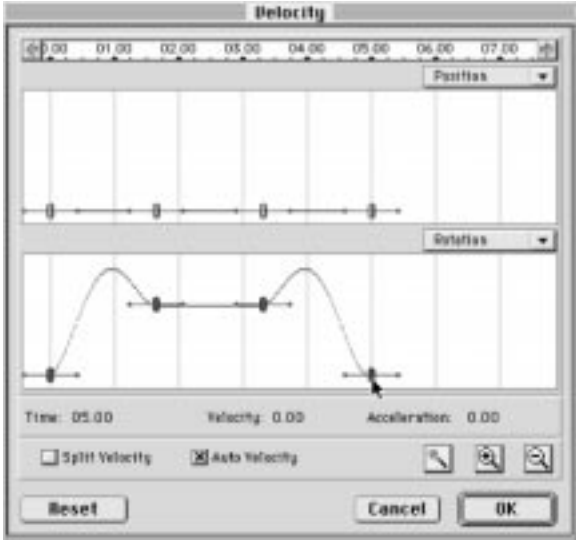
Step 2: Choose **Velocity** from the **Model** menu to open the Velocity dialog.

The top graph shows the bottle's position, while the bottom graph shows the bottle's rotation. The eventmarks are the same eventmarks seen in the Sequencer. The height of each eventmark shows how fast the object is moving or rotating at a given time.



The Magic Wand tool can be used to apply useful effects. The Constant Velocity item will be used here.

Step 3: Select all of the **Rotation** eventmarks by clicking on each one separately with the **SHIFT** key pressed.



Step 4: Click and hold on the **Magic Wand** tool, and choose **Constant Velocity** from the list that appears.

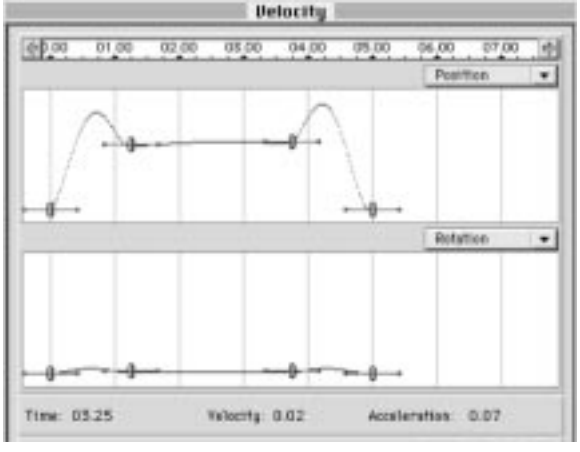
The Rotation eventmarks move into a straight line, indicating that the bottle's speed of rotation is now constant. This will prevent it from pausing when the final movie file loops.

Step 5: Click **OK** to return to the **World**.

The same technique must be used on the 'World Class' text to remove its pause in the middle of the screen when the movie loops.

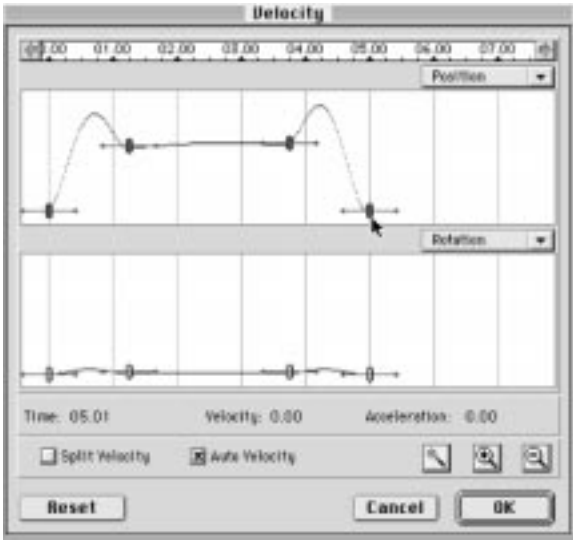
Step 6: Select the '**World Class**' text.

Step 7: Choose '**Velocity**' from the **Model** menu.



The Velocity dialog appears again, but this time the Position eventmarks need to be changed because this object is moving, not rotating.

Step 8: Select all of the **Position** eventmarks by clicking on each one with the **SHIFT** key pressed.



Step 9: Click and hold on the **Magic Wand** tool, And choose **Constant Velocity** from the list that appears.

The Position eventmarks are now in a straight line, indicating that the text's movement speed is constant. This eliminates the pause in the middle of the screen.

Step 10: Choose **OK** to return to the **World**.

Although not as critical, you may also want to make the velocity of the 'Olive Oil' text constant. This is done in exactly the same way as was the 'World Class' text.

RENDERING THE FINAL ANIMATION

You are done! It is time to render the animation and view the final movie. It is also a good time to save the scene file.

Step 1: Choose **Save** from the **File** menu and save the scene file.

Step 2: Choose **Render** from the **File** menu.

The Render Setup dialog will appear.

Step 3: Set the **View** to **Camera**, the **Mode** to **Phong**, and the **Anti-Aliasing** to **Low**.

The anti-aliasing smooths the 'jaggies' that may occur on the edges of objects. If you set the anti-aliasing to Medium or High, the objects will appear smoother but the animation will take longer to render.

Step 4: Check the **Background Image** check-box and the **Transparency** check-box. Leave **Shadows** un-checked.

Step 5: Click on the Image tab of the **Render** dialog.

Step 6: Set the **Colors** to **Millions** or **Thousands** and set the **Alpha** to **None**.

Step 7: Set the **Width** to **320** and the **Height** to **240**.

Step 8: Click on the **Animation** tab.

Step 9: Change the **Frames Per Second** to **10**.

Step 10: Click the **Render** button.

A standard save file dialog will appear.

Step 11: Click and hold on the **Format** button and choose QuickTime.

The image quality of movies is sometimes lowered due to file compression. If you chose the QuickTime™ file format, click on the Options button to enter the Quicktime Options dialog. Set the Quality to 100%. This prevents any loss of quality through file compression (but makes the file larger).

Step 12: Type a name in the **Name** field, choose a good location on the hard drive, and click **Render**.

The render window will appear. It may take a few minutes to render the animation, so you may want to take a quick break.

Step 13: When the rendering is finished, choose **Exit** from the file menu to return to the **Scene.** Then choose **Quit** from the **File** menu to **Exit** Infini-D.

Step 14: Double-click on the movie icon to load the standard movie player application.

Turn on the loop option and watch the animation play.

As the animation plays, the objects should move smoothly in a never-ending loop. Feel free to view the 'Chapter 7 Final.mov' animation saved in the Tutorial files folder of the Infini-D CD-ROM. If your animation does not look like the 'Chapter 7 Final.mov' movie, you may want to retrace your steps and determine why they are different. It is not important that the animation be perfect. It is important that you understand the techniques used to build the animation.

Onward

Congratulations! You have completed the tutorial manual and are well on your way to becoming a skilled Infini-D user. The material in this book was presented in a step-by step fashion, but in the 'real' world, creating 3D scenes often requires trial and error. It is not important to memorize every step or master every topic covered in this book—the goal is that you understand the basic idea of how to create 3D animations. The general rule of thumb is to build objects first. After the objects have been created, place them in their starting position and apply surfaces. Finally, animate the objects. Save often to avoid losing precious work.

There are many advanced features that were not mentioned in this tutorial manual, such as lens flares, particle systems and visible lighting effects. With a good understanding of the basics, advanced features are easy to learn. Keep the User's Manual handy and don't be afraid to poke and prod in strange, unknown places. Good Luck!