# 4

# Tutorial

## Welcome

Welcome to the Bryce 3D tutorial. This tutorial introduces you to all the major features and functions of Bryce 3D. The main goal of this tutorial is to teach you the basic techniques you'll need to know to create incredible landscapes and environments.

Each section of this tutorial is self-contained, so you can start from any point. For example, if you need to know about positioning the camera, but already know how to create skies, start the tutorial at the Camera lesson. All the files necessary for completing the lessons are provided for you either on the Bryce 3D CD-ROM or in the Preset libraries.

*To help you follow along, every lesson contains a section called "The Story So Far," which summarizes the procedures and techniques that have been covered in the previous lessons. A section called "What You'll Need" tells you where to locate files that will help you complete the lesson.*

## Getting Started

Before you start any project in Bryce, it's probably a good idea to become acquainted with the unique Bryce interface.

The first thing you'll want to do is configure the window to best suit how you work.

**To configure the Bryce environment:**

**1.** Launch Bryce 3D.

The Bryce window appears and fills the entire screen.

This is a great way of working as it removes all the clutter from your desktop and gives you clear access to all of Bryce's tools.

To keep the Bryce interface as uncluttered as possible, some toolbars are layered on top of each other and others are hidden when you first start the application.

**To display layered palettes:**

⌘ Click the text buttons at the top of the Bryce environment. The active palette's title appears highlighted.



*The active palette's title appears highlighted.*

Some tools are hidden because you won't need them regularly, so they appear only when you need them and then they disappear again.

**To display hidden palettes:**

⌘ Move your cursor over one of the right edge of the Bryce window.



*Hidden palettes appear when you pass your cursor over them, then they slowly disappear.*

Along the right you'll find the Display palette.

Most of Bryce's tools have several options that extend their function. Whenever you see a triangle next to tool, you know that there are more options available.

**To display option menus:**

⌘ Click the triangle icon. The option menu appears.



*A triangle icon next to a tool indicates that there are more options available.*

Now that you're familiar with how to access the tools in Bryce, you can set up a new document. Refer to "Using the Bryce Interface" on page 26 for more on using the interface.

## Lesson 1: Setting Up a New Document

When you set up a new document, you're defining the size of your working space in pixels. The larger the resolution, the larger your working space. The resolution you choose depends on what type of scene you want to create.

To help you decide on a resolution, Bryce provides several presets aspect ratios for the most commonly used types of

documents. Refer to "Setting Up the Working Window" on page 23 for a complete discussion of resolutions and aspect ratios.

**To set up a new document:**

1. Choose **File menu > New**. The Document Setup dialog appears.
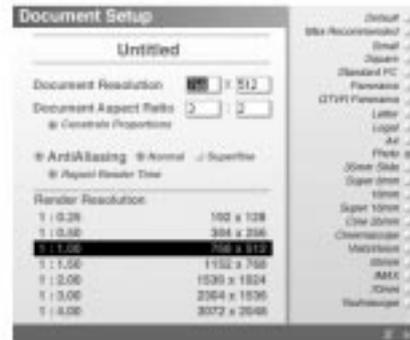


*Use the Document Setup dialog to set the resolution and aspect ratio of your scene.*

2. Click the Photo preset. The Resolution and Aspect Ration fields update automatically.

3. Click the checkmark icon at the bottom of the dialog to accept your changes and exit the dialog.

Now that you have a document, you can start creating a scene. When you're working through the tutorial, it's a good idea to start with a blank scene at the beginning of each new section.

## Lesson 2: Positioning the Camera

When you first open a file you'll be viewing the scene through the Director's View. In this view you can see all the objects in the scene including the camera.

The other main view is called the Camera View, which is the view as seen through the camera. You can switch between the two views to get a different perspective on your scene.

When you're working on setting up the composition of the scene, you can use either the Director's View or the Camera View to reposition or transform objects.

**To switch between views:**

⌘ Click the triangle icon beside the View Control icon and choose Director's View from the menu.

As you work on the scene, you may find that the camera object is somewhat distracting. To avoid this, you can hide the camera in the scene.

**To hide the camera:**

**1.** Click the camera in the scene.
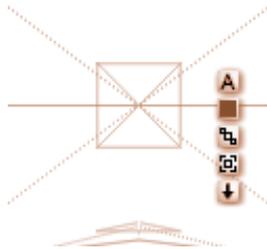


**2.** Click the A icon that appears next to the camera's bounding box. The Camera & 2D Projection dialog appears.

**3.** Enable the Invisible option. Click the OK icon.



This option only hides the camera in the current file. The next time you open this file, the camera will be visible in the scene.

In this lesson you'll use the Director's View to view and arrange objects. The controls for positioning the camera are the same, whether you're positioning the Director's View or the Camera View.

There are four controls you can use to position the camera: the Camera Cross controls, the Trackball, the Preset Views and the 2D Project and Camera dialog. Most of these tools are located on the Control Palette.

When you reposition the camera, you're changing the view of the scene, not the position of the objects.

To start this lesson, you'll need to open a file with some objects in it.

**To open the camera lesson file:**

**1.** Choose **File menu> Open**.

**2.** Locate the file **Tutorial: Camera: Camera Scene** and click Open.

**To reposition the camera using the Camera Cross Controls:**

**1.** On the XZ Cross, drag the Z arrow down. The scene moves towards you.

The cursor turns into an axis indicator when you move over a tip of the control.
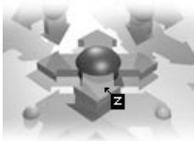


*When you move over the tip of an arrow in the Camera Cross control, the cursor turns into an axis indicator.*

**2.** On the XY Cross, drag the tip of the Y arrow up.
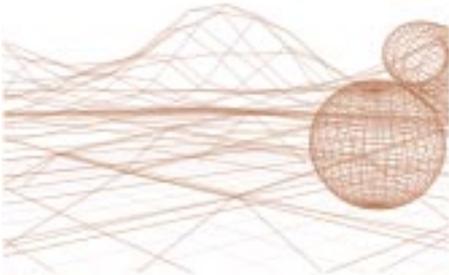


*Your scene should look like this when you're done using the Camera Cross controls.*

The objects should now be easier to see, but you can adjust the camera again to get a better angle on the scene.

**To reposition the camera using the Trackball:**

**1.** Click the center of the Trackball and drag to the right. The scene rotates to the left.



*Use the Trackball to rotate the camera around the scene.*

The camera is now in an almost perfect position to view the scene. You can place the camera in a precise position by moving it numerically.

**To reposition the camera numerically:**

**1.** Click the triangle icon next to the Trackball and choose Tripod from the menu.



This mode makes camera movements more precise as it uses absolute coordinates.

**2.** Double-click the Trackball. The Camera & 2D Projection dialog appears.

**3.** Enter Position X=24, Position Y=15, Position Z=-10, Rotate X=0, Rotate Y=-30, Z=0

**4.** Leave the remaining values at their defaults.

**5.** Click the OK icon to apply the changes to the camera.
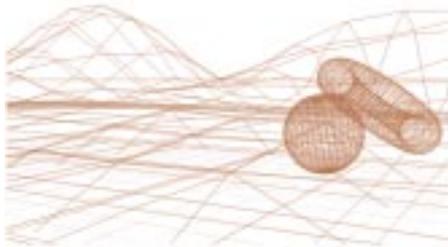


*When you apply the values you entered in the Camera & 2D Projection dialog, the view of your scene should look like this.*

Now that you can see your objects, you can select and reposition them.

**6.** Close the file and save it if you want.

## Arranging Objects in the Scene

A 3D illustration depends heavily on the arrangement of the objects in the scene to create a specific look or feel.

When arranging a scene, you should remember that you're working in 3D space, meaning that your object can be viewed from any angle. You should take all of these angles into account when you

're arranging objects—an arrangement that looks good from above may not look so good from the back and so on.

The lessons in this section will help you learn how to add, position and transform objects to create a 3D illustration.

### The Story So Far

Before starting this lesson, you should have your document set up and know how to access the tools and palettes in Bryce.

### What You'll Need

To complete these lessons you'll need some objects to arrange. These objects have been placed in the Preset Objects Library for you. Other than that, all you'll need is a blank scene.

### Lesson 1: Adding Objects

Bryce's Create palette lets you quickly add primitive objects and infinite planes to your scene. You can use these objects as the basis for more complex objects. Make sure you start this lesson with a blank scene.

**To add an infinite plane:**

**1.** Display the Create palette by clicking the Create text button.

**2.** Click the Water Plane tool.
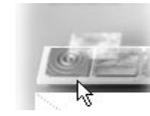


*Click the Water Plane tool to add a plane to your scene.*

The plane appears in the scene at a default position.
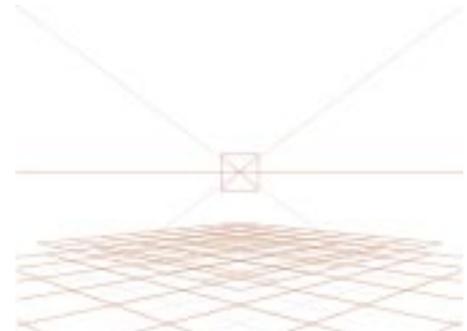


*The infinite plane appears in your scene at a default position.*

If you want to add more complex models, you can add a pre-made object from the Preset Objects Library. The library contains a host of objects modeled in Bryce.

**To add objects from the Preset Objects Library:**

1. Display the Create palette by clicking the Create text button.

2. Click the triangle icon next to the Create text button. The Preset Objects Library appears.



*Click the triangle icon next to the Create text button to open the Preset Objects Library.*

The Preset Objects Library contains a sample of all the pre-made objects available in Bryce, divided into different categories. You can also add or delete objects from this library. Refer to for more on adding objects to the library.
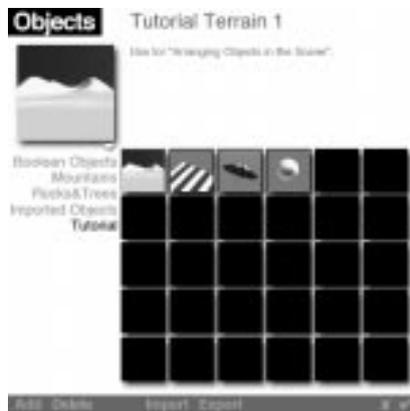


*Use the Preset Objects Library to add pre-made objects to your scene.*

3. Click the Tutorial category.

4. Click the terrain object labeled Tutorial Terrain1.

5. Click the OK icon. The terrain appears in your scene.



*When you exit the Preset Objects Library, the terrain appears in your scene.*

6. Click the triangle icon again, then, without releasing the mouse, drag the cursor over the Tutorial category and then drag over the Blanket object. Then, release the mouse.

The blanket appears in the scene.



*When you exit the Preset Objects Library, the blanket appears in your scene.*

**7.** Repeat step 6 again to add the umbrella and beach ball objects.
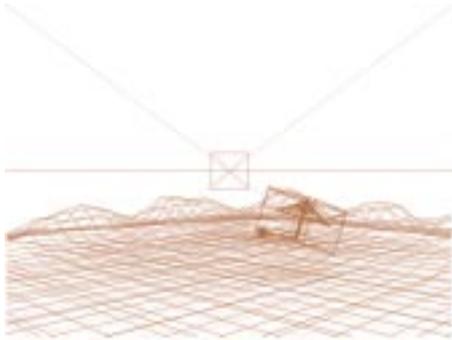


*When you're finished adding objects, your scene should look like this.*

## Lesson 2: Positioning Objects

Before you position your objects, you need to select them. There are several ways of selecting objects in Bryce. The easiest method is by simply clicking an object. However, as your scene becomes more complicated, simply clicking objects may become difficult.

To help you select objects in more cluttered scenes, Bryce has two tools: the Selection palette, which lets you select objects by type, and the tab key, which cycles through all the objects in your scene. You'll use a different method in each of the following sections.

Once you've selected the objects, you can reposition them to set up the composition of your scene. There are several ways of positioning objects in Bryce:

• Using the Object Attributes dialog.

• Using the Nudge controls.

• Dragging the object to a new position.

• Using the Repositioning tool.

In this lesson you'll reposition an object using the Object Attributes dialog.

Before you start this lesson, adjust the camera's position so it's easier to see the objects you're transforming.

**To reposition the camera:**

**1.** Click the triangle icon next to the Trackball and choose Tripod from the menu.

**2.** Double-click the Trackball. The 2D Projection and Camera dialog appears.

**3.** Enter Position X=23.68, Position Y=17.16, Position Z=-6.1, Rotate X=-8.02, Rotate Y=-35.26, Rotate Z=0.

**4.** Enter Pan V=-128 and Pan H=0.

**5.** Click the OK icon to apply the changes to the camera.

**To reposition objects numerically:**

1. Press the tab key repeatedly until the large terrain object is selected.
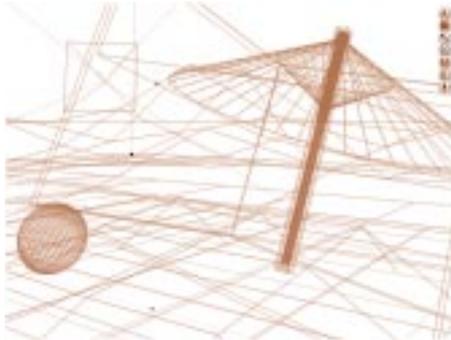


*The Terrain object selected using the tab key.*

2. Click the A icon that appears next to the terrain's bounding box.



*The series of icons that appear next to an object's bounding box can be used to access editors, change its material or quickly align it to the ground.*

The Object Attributes dialog appears.
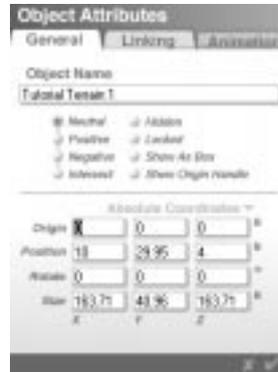


*Use the Object Attributes dialog to set the object's position numerically.*

3. Enter Position X=0, Position Y=29.95, Position Z=4.

4. Click the OK icon. The terrain moves to a new position.
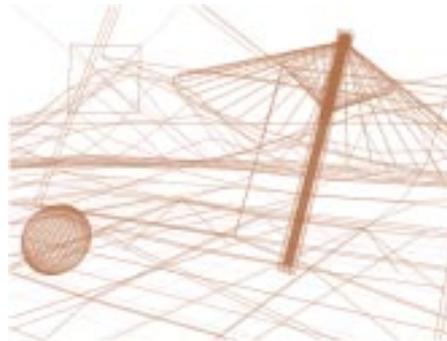


*The new position of the terrain after you enter values in the Object Attributes dialog.*

## Lesson 3: Rotating Objects

For most scenes, positioning objects is not enough to achieve an interesting arrangement. You can combine positioning with rotating to fine-tune your arraignment.

Before you begin rotating, you should adjust the object's origin point. The origin point acts as the center of rotation for the object. When you rotate an object, it rotates around its origin point.

**To adjust an object's Origin Point:**

1. Click the sphere object. The ball's bounding box appears.

   If you have trouble selecting the sphere, press tab repeatedly until the sphere is selected.

   At the corners of the object's bounding box are control handles that you can use to scale and rotate it directly in the Working window.

2. Click the A icon that appears next to the ball's bounding box. The Object Attributes dialog appears.

3. Click the General tab.

**4.** Click the Show Origin Handle button.



A green point appears at the center of the bounding box. The point represents the object's origin point.
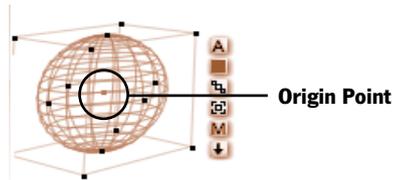


Origin Point

*An object's bounding box has control point on each corner and at the center of each face. You can use these points to scale and rotate an object. The origin point appears in the middle.*

**5.** Click the origin point and drag it away from the sphere to the center of the blanket.
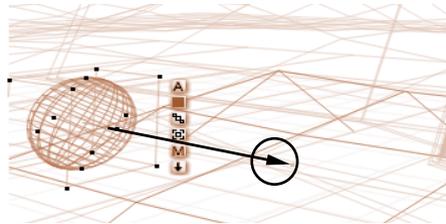


*When you offset the object's origin point, it rotates around the point instead of its center.*

Now that the origin point is in the correct position you can rotate the object.

## To rotate an object using its control points:

**1.** Hold down Command/Ctrl and drag one of the object's control points to the left. The object rotates around its origin point.
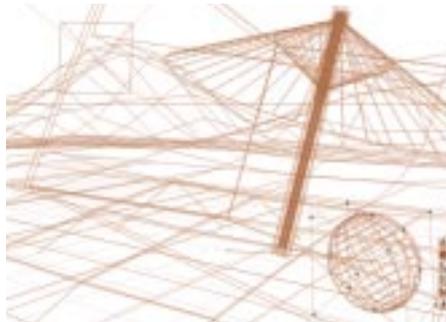


*This what the sphere looks like after its been rotated.*

## Lesson 4: Scaling Objects

The composition of your scene depends largely on the size relationships between objects. For example, a cork that's bigger than its bottle would seem awkward.

In the scene, the relationship between the umbrella and the beach ball is slightly off. You can use the object's control points and the Scale tool to adjust the scale of the objects and fix the unbalance.

## To scale objects using the Scale tool:

**1.** Click the umbrella object.

**2.** Click the Edit button at the top of the Bryce window to display the Edit palette.

**3.** Drag the mouse over the Scale tool until the Resize XYZ mode is active.
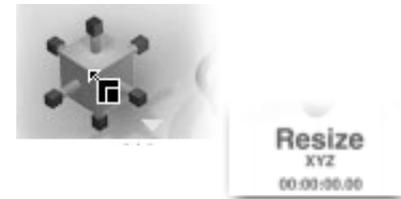


*Drag over the Scale tool until Resize XYZ appears in the Text Display area.*

The name of the mode appears in the Text Display area at the bottom of the Control palette.

4. Drag to the left to decrease the size of the umbrella.

Stop dragging when the umbrella is about the size shown.
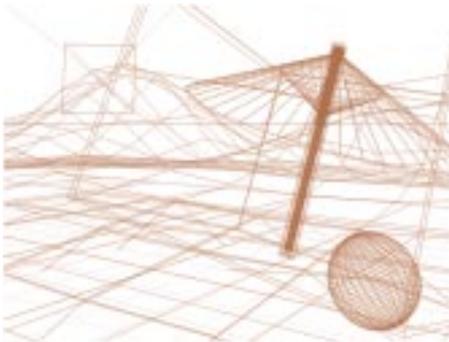


*Stop dragging when the umbrella is about the size shown.*

The arrangement of your first scene is now complete. If you want to see what your scene looks like, click the Render button and render it. Refer to "Rendering" on page 97 for more on Rendering.



*This is what the final scene looks like after it's rendered.*

## Moving On

The arrangement techniques discussed in this section are only a few of the transformations you can apply to your objects.

Many other transformations can be applied using the 3D transformation dialog and the other editing tools in the Edit palette. Refer to "Transforming Objects" on page 285 for more on transformations.

The next section of the tutorial will show you how to create terrains and skies.

## Creating Objects

For the most part, the scenes you create in Bryce will be natural landscapes and environments. To create these types of scenes you'll use terrain objects and skies. Terrains define the landscape of your scene. Using the Terrain Editor you can model almost any type of landscape from the Grand Canyon to the mountains on Mars.

Skies define the environment in your scene. Using the Sky & Fog palette you can set up the parameters that combine to create the atmosphere that surrounds your landscapes.

The lessons in this section will show you how to use the Terrain Editor and Sky & Fog palette to create a mountain scene.

### The Story So Far

At the start of this lesson you should be fairly comfortable transforming objects. If you're not clear on scaling, positioning and orienting objects, review the Arranging Objects section of this tutorial, or "Arranging Objects" on page 279.

**What You'll Need**

In this lesson the only objects in the scene will be the terrain you're creating, so all you'll need to start is a blank scene.

If you have trouble with the techniques described in this section, open the completed file **Terrain 1** located in the folder: **Tutorial: Creating Objects: Completed**.

## Lesson 1: Creating Terrains

Terrains are probably the objects you'll be using most. When you first add a terrain to your scene, Bryce randomly generates its shape. You can then customize this terrain using the Terrain Editor. In the editor, you use a process called Grayscale painting to draw the shape and contour of your object.

The grayscale levels in the image you create are mapped to altitudes and converted into a terrain object. White areas of your image produce high altitudes, while darker areas produce lower altitudes.

**To open the Terrain Editor:**

**1.** Display the Create palette.

**2.** Click the Terrain Object tool.



*Click the Terrain object tool to add a terrain to your scene.*

A terrain appears in the Working window.
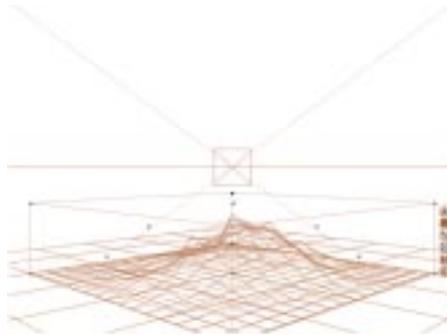


*When you click the Terrain object tool, a randomly generated terrain appears in your scene.*

**3.** Select the terrain object. A series of icons appears next to the its bounding box.

**4.** Click the E icon. The Terrain Editor appears.

When you first open the editor, the image used to create the random terrain appears in the Terrain Canvas and the Terrain 3D Preview.

The editor has a large number of tools for editing terrain elevation. These tools are divided into three tabs:

• **Elevation**, which provides tools for applying elevation effects.

• **Filtering**, which provides tools for fine-tuning the gray levels in your terrain canvas.

• **Pictures**, which lets you import a 2D image, which is then used to generate a terrain.



*The Terrain Editor contains all the tools you'll need to create and edit terrain objects.*

To create the terrain in this lesson you'll be using the paintbrush to draw a terrain image.

Before you start painting a terrain, you need to set up the editor preview and the paintbrush attributes.

The 3D preview can show you any view of your terrain. When you're painting it's a good idea to view the terrain from the top so you can see how the terrain canvas is converted to a terrain object.

### To change the 3D Terrain Preview:

⌘ Drag the top of the 3D Preview down towards the bottom of the editor.



*The 3D Terrain Preview can show you any view of the terrain. The preview is interactive so you can drag it to any position.*

Now that the preview is set up, you can start setting up the paintbrush.

### To set up the grayscale paintbrush:

**1.** Drag the cursor over the Size control until the setting looks like the one shown.



*Drag the cursor over the Size control to set the size of the brushstrokes.*

**2.** Make sure the Hardness control looks like the one shown.



*Drag the cursor over the Harness control to set the hardness of the edges of the brushstrokes. The position shown is the default setting for the control.*

**3.** Drag the cursor over the Flow control until the setting looks like the one shown.



*Drag the cursor over the Flow control to set how much color is applied when you drag the brush.*

**4.** Drag the Level control until the setting looks like the one shown.



*Drag the Level control to set the brightness of the brushstrokes.*

**5.** Click the triangle icon below the Brush Behavior control and choose Elevation from the menu. Your brush will now paint graylevels.



*The option menu that appears lets you change the behavior of the brush.*

Now that you have the brush set up, you can start painting. Since you're creating a new terrain, you need to start with a blank canvas.

### To clear the Terrain Canvas:

**1.** Click the Elevation tab title to make it visible.

**2.** Click the New button.The current image in the Terrain Canvas is erased.

Now that the canvas is empty, you can start painting your new terrain.

**To paint a terrain:**

**1.** Position the brush at the top right corner of the Terrain Canvas.

**2.** Click the mouse once.



*Click the mouse at the top right corner of the canvas to add the first point of your canvas.*

**3.** Move the brush to the left and down slightly and click again.

**4.** Continue moving and clicking the mouse to create a curved shape like the one shown.



*Continue dabbing the mouse in an arc shape to create the base of your canvas.*

This method of painting is like dabbing a paintbrush on canvas.

The shape you've created acts as the base of your terrain.

**5.** Adjust the size of your brush by dragging over the Size control until the setting looks like the one shown.



*Drag the Size control right to decrease the size of the brush.*

**6.** Drag the Level control up to adjust the brightness of the gray your painting.



*The Level control should look like this when you're done adjusting it.*

**7.** Dab the brush over two or three areas of the terrain to add hills.

**8.** Decrease the size of the brush again.

**9.** Adjust the Level control to get a brighter gray.

**10.** Dab over the tops of the hills to add more height.

Now that you've created hills, you can soften an area of the terrain to create a beach.



*This is what your terrain looks like when you're done painting.*

**To soften an area of your terrain:**

1.  Drag right over the Size control to increase the size of the brush.



*The Size control should look like this when you're done adjusting it.*

2.  Decrease the hardness of the brush, by dragging to the left over the Hardness control.



*The Hardness control should look like this when you're done adjusting it.*

3.  Drag to the left over the Flow control to decrease the flow of color from the brush.



*The Flow control should look like this when you're done adjusting it.*

4.  Drag down over the Level control to decrease the gray level of the brush color.



*The Level control should look like this when you're done adjusting it.*

5.  Drag the brush over the center portion of your terrain.
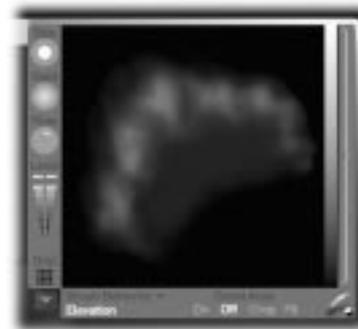


*The terrain should look something like this when you're done.*

6.  Click the OK icon to exit the editor.

The basic shape of your terrain is now complete. Next you'll refine the terrain by applying some Elevation effects.

**To scale the terrain object:**

1.  Click the Edit button at the top of the Bryce window. The Edit palette appears.

**2.** Click the triangle icon below the Resize tool and choose 3D Transformations from the menu. The 3D Transformations dialog appears.



*The triangle icon below any of the editing tools lets you quickly access its options.*

**3.** Enter Scale X=200, Y=200, Z=200.

**4.** Click the OK icon.
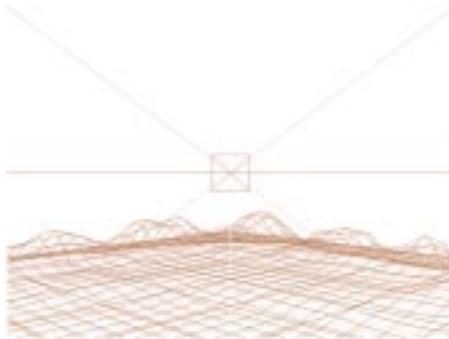


*This is what the scaled terrain object looks like in the scene.*

Your terrain is almost finished. The last thing you should do is name the object. An object's name is used to identify it when you're selecting multiple objects of the same type and is also used in animation hierarchies.

If you don't add a name to an object, Bryce gives it a default name.

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**To name an object:**

**1.** Click the terrain object.

**2.** Click the A icon that appears next to the terrain's bounding box. The Object Attributes dialog appears.

**3.** Enter UTOPIA in the Object Name field and click the OK icon to exit the dialog.

Now that the terrain object is complete, you have the basis for a new world. To get a more realistic environment you'll need to create a sky for the scene.

## Lesson 2: Adding Skies

A scene's sky defines the environment that surrounds the objects. Using different settings you can change a scene from day to night, sunny to cloudy, photo-realistic to fantastical.

In this lesson you'll create a fairly common sky that can be used for any number of environments.

The first thing you need to do to set up a sky is select a sky mode. Sky modes control the base colors and tones of sky elements.

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**To select a sky mode:**

**1.** Click the Sky & Fog text button to display the Sky & Fog palette.

**2.** Click the triangle icon under the Sky Mode thumbnail (the thumbnail furthest to the left) and choose Soft Sky.



*The sky mode thumbnail sets the base color and tones for your sky.*

Now you need to set the attributes for the rest of the sky elements.

**To set shadow intensity:**

1. Pass your cursor over the Sky & Fog palette until the name Shadows appears in the Display Text area. This means that you're over the Shadow Intensity control.



*The name of a Sky & Fog control appears in the Display Text area when you pass your cursor over its thumbnail in the palette.*

2. Drag to the left over the thumbnail until the number 85 appears in the Display Text area.
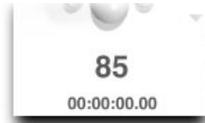


*As you drag over the Shadow thumbnail, the value for the shadow intensity changes in the Display Text area.*

**To set fog color and intensity:**

1. Pass you cursor over the Sky & Fog palette until the name Fog appears in the Display Text area. This means that you're over the Fog Intensity control.



*The name of the Fog control appears in the Display Text area when you pass your cursor over its thumbnail.*

2. Drag to the right over the thumbnail until the number 2 appears in the Display Text area. This sets the strength of the fog.
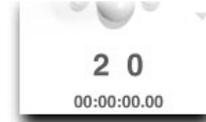


*As you drag right over the Fog thumbnail, the value for the fog strength changes in the Display Text area.*

3. Drag up over the thumbnail until the value in the Display Text area reads 1. This sets the height of the fog.



*As you drag up over the Fog thumbnail, the value for the fog height changes in the Display Text area.*

**4.** Hold down Option/Alt and click the color below the Fog thumbnail. The Color dialog appears.



*The color strip below the Fog thumbnail lets you pick fog colors from the color palette or the color dialog.*

**5.** Enter the values R=210,G=210, B=210. These values create a light gray color.



*The Color dialog lets you mix RGB colors using values or by combining the slider settings.*

### To set haze intensity and color:

**1.** Pass your cursor over the Sky & Fog palette until the name Haze appears in the Display Text area. This means that you're over the Haze Intensity control.

**2.** Drag left over the thumbnail until the value in the Display Text area reads 5. This decreases the haze intensity.



*As you drag left over the Haze thumbnail, the value of the haze intensity decreases in the Display Text area.*

**3.** Hold down Option/Alt and click the color below the Haze thumbnail. The Color dialog appears.



*The color strip below the Haze thumbnail lets you pick haze colors from the color palette or the Color dialog.*

**4.** Enter the values R=185,G=185, B=185. These values create a light gray color.

Now that you've set up the general environment, you can set the options for the clouds in your sky.

### To set cloud altitude:

**1.** Pass your cursor over the Sky & Fog palette until the name Cloud Height appears in the Display Text area. This means that you're over the Cloud Height control.
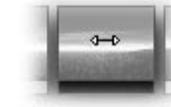


*The name of the Cloud Height control appears in the Display Text area when you pass your cursor over its thumbnail.*

**2.** Drag right over the thumbnail until the value in the Display Text area reads 20. This increases the altitude of cloud layer in your sky.



*As you drag right over the Cloud Height thumbnail, the value of the cloud height setting increases.*

**To set cloud coverage:**

1. Pass your cursor over the Sky & Fog palette until the name Cloud Cover appears in the Display Text area. This means that you're over the Cloud Cover control.



*The name of the Cloud Cover control appears in the Display Text area when you pass your cursor over its thumbnail.*

2. Drag right over the thumbnail until the value in the Display Text area reads 28. This increases the amount of the clouds in the cloud layer of your sky.
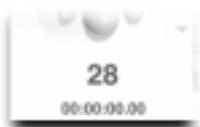


*As you drag right over the Cloud Cover thumbnail, the value of the cloud coverage increases in the Display Text area.*

**To set cloud frequency and amplitude:**

1. Pass your cursor over the Sky & Fog palette until the name Cloud Frequency/Amplitude appears in the Display Text area. This means that you're over the Cloud Frequency/ Amplitude control.



*The name of the Cloud Frequency/Amplitude control appears in the Display Text area when you pass your cursor over its thumbnail.*

2. Drag to the right over the thumbnail until the number 30 appears in the Display Text area. This sets the frequency of the clouds in the cloud layer.
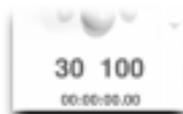


*As you drag right over the Cloud Frequency/ Amplitude thumbnail, the value for the cloud frequency changes.*

3. Drag up over the thumbnail until the number 116 appears in the Display Text area. This sets the amplitude of the clouds in the cloud layer.
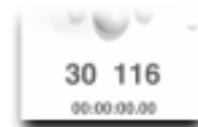


*As you drag up over the Cloud Frequency/ Amplitude thumbnail, the value for the cloud amplitude changes.*

The settings for the clouds in your sky are now complete. However, you won't be able to see these settings until you add some clouds.

**To add clouds to a sky:**

⌘ Click the triangle icon below the memory dots at the far right of the palette and choose Cumulus from the menu.



*Click the triangle icon below the memory dots to access the Sky & Fog palette options menu.*

A layer of clouds is added to your sky.



*When you choose a cloud type from the Sky & Fog palette options menu, a layer of clouds is added to your scene. Here the layer is shown in the Nano-Preview.*

The last thing you need to do to finish your sky is position the sun. The position of the sun effects how shadows appear in the scene as well as the general brightness of the scene.

There are two ways of positioning the sun: by dragging over the Sun Control, or by entering values in the Edit Sky & Fog dialog. In this lesson you'll use the Edit Sky & Fog dialog to precisely position the sun.

**To position the sun numerically:**

1. Click the triangle icon below the memory dots at the far right of the palette and choose Edit Sky & Fog from the menu. The Environmental Attributes palette appears.



*The Environmental Attributes palette contains controls for setting sun and moon position and adding a variety of environmental effects.*

2. Click the Sun & Moon tab.

3. In the Numerical Sun Values fields enter X=82, Y=36, Z=-41.

4. Click the OK icon. The sun moves to the new position.



*This is what your sky looks like when you reposition the sun.*

The basic setup of your sky is now complete. If you're happy with the sky, you can save it in the Preset library for future use. Refer to "Adding and Deleting Preset Skies" on page 160 for more on saving skies.

There are a few special effects you can use to add more realism to your sky. The most spectacular effect you can add to a daytime sky is a rainbow. The rainbow acts much like a real rainbow would. It is dependent on the position and color of the sun. The position of the sun in the sky you just created is ideal for viewing the rainbow, so you won't need to make any adjustments.

The most realistic effect you can add to a night sky is a star field. Much like rainbows, star fields are dependent on the color and position of the moon.

## Lesson 3: Creating Infinite Slabs

Infinite slabs are infinite planes that have volume. These planes are most commonly used to create bodies of water. With the added volume you can actually sink the camera into the water.

**To add infinite slabs:**

1. Click the Create button to display the Create palette.

2. Hold down the mouse button over the Water Plane tool and choose Volume from the menu.



*Choose Volume from the menu that appears when you click the Water Plane tool to create infinite slabs of water.*

3. Click the water slab in the Working window.
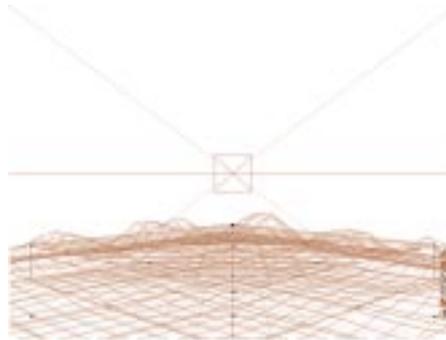


*This is what the slab looks like in the Working window.*

4. Click the A icon the appears next to the slab's bounding box to display the Object Attributes dialog.

5. Make sure the General tab is visible.



*Use the Object Attributes dialog to set the depth of your slab.*

6. Enter OCEAN in the Object Name field. This gives the slab a name. Names are used when you're selecting objects or arranging them.

7. Enter Size Y=2 and leave the other values as is.

8. Click the OK icon.
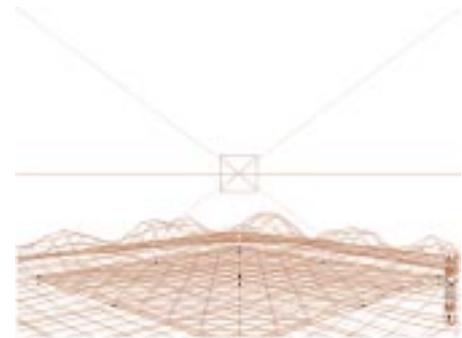


*This is what your slab looks like in the scene.*

Your scene now has a body of water with depth. If you sink a camera into the water you'll be able to see the effects of the water on the environment.



*This is what your slab looks like if you were to sink a camera into it. In this example, materials have been added to both the slab and the terrain to increase realism. The next lesson will show you how to create and add materials.*

### Moving On

After completing the lessons in this section you should be familiar with the various types of objects you can create in Bryce. However, terrains are only one type of object you can create to populate your scene.

You can use the various object creation tools to create primitive objects that you can combine to create much more complex objects. Refer to "Boolean Operations" on page 121 for more on this process.

The sky you created in this section is only one example of the many types of environments you can create in Bryce. You may want to take a look at the skies in the Preset Skies Library to get some idea of the skies you can create. Refer to "Using the Preset Skies Library" on page 160 for more.

The next section will teach you how to create materials and add them to objects.

## Creating Materials

A material defines the surface properties of an object: color, opacity, shininess, brightness, reflectiveness and even the color of its interior. By combining different surface properties in the Materials Lab you can create any type of surface; from the most realistic to the most whimsical.

A material is made up of different channels. Each channel determines a characteristic of the object's surface. A channel's setting can be determined using either values, or texture components. Components are combined in the Materials Lab.

In the these next lessons you'll be creating materials using 3D textures as components, as well as creating a volume material.

### The Story So Far

So far in this tutorial you learned how to create and arrange objects. In these next lessons you'll learn how to apply surface properties to those objects. The material you create will depend largely on the type of object, so you should be familiar with the procedure for creating terrains and other objects. You may want to refer to "Creating Objects" on page 63 and "Creating Terrains" on page 170 for more.

### What You'll Need

In order to see the effects your materials create, you'll need to apply them to some objects. The file Materials 1, provided for you, contains all the objects you'll need to complete the lessons in this section.

**To open the Materials tutorial file:**

1. Choose **File menu> Open**. The Open dialog appears.

2. Locate the file Materials 1 in the Tutorial folder on the Bryce 3D CD-ROM and click Open.

## Lesson 1: Creating Materials Using 3D Textures

When you use a texture as a component of your material, the values in the texture are used to determine the value of the channel they are applied to. For example, if you use a texture to determine the value of the Diffuse channel, the colors in the texture are applied as the diffuse color of the material.

When you use texture components in a material, you can combine the components in three different ways:

• In mode A, only one component is used to set the channel's value.

• In Mode AB, two components are combined to set the channel's value, based on altitudes. The values from texture A are applied at low altitude and values from texture B are applied at higher altitude.

• In Mode ABC, the values of two textures, A and B, are applied based on the alpha channel of texture C.

Refer to "Combining Components" on page 223 for more on alpha channels and combination modes.

In this lesson you'll be using Mode ABC to create a material for a terrain object.

Materials are created by combining components in the Materials Lab, so the first thing you need to do is access the Materials Lab.

**To display the Materials Lab:**

1. Click the terrain object in the scene.

2. Click the M icon that appears next to the terrain's bounding box. The Materials Lab appears.



*Use the Materials Lab to combine components to create a material.*

Before you start combining textures you need to find the right textures to use as components. The textures you choose should contain properties that you want to apply to the surface of your object.

For the terrain in this lesson you'll be using Fire, Zion and Slope Bump from the Texture library list. To use these textures you'll need to set them up as components.

**To activate a component:**

1. Click the A column of the Diffuse channel. An indicator ball appears in the column.



*Click the column A to activate the first component.*

Also, a random texture appears in the first component window.

2. Click the arrow button at the top of the component window and choose Fire from the menu.



*When you click the arrow button the list of all the textures in the Texture Library appears.*

The Fire texture appears in the first component window.

3. Click the B column of the Diffuse channel. An indicator ball appears in the column.

4. Click the arrow button at the top of the component window and choose Zion from the menu.

The Zion texture appears in the second component window.

5. Click the C column of the Diffuse channel. An indicator ball appears in the column

6. Click the arrow button at the top of the component window and choose Slope Bump from the menu.

The Slope Bump texture appears in the Component C window.
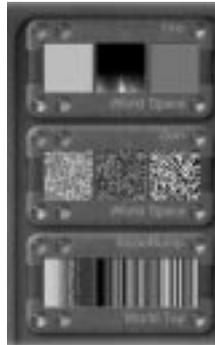


*When you activate the third component, you can place a texture from the library in the component window.*

Now you have three components that you can use to determine the values of the various material channels.

The textures provided in the Texture library aren't the only textures you can use as components. You can edit these textures in the Deep Texture Editor to create completely new textures or variations of an existing one.

**The Deep Texture Editor**

Before you start editing a texture, you'll need a little background on how textures are made. A 3D texture is made up of three channels: Color, Alpha and Bump. These channels are used in the Materials Lab to drive the values of the material channels.

The Deep Texture Editor lets you edit each of the components in the textures and shows you how they're combined. The editor contains several tools to help you adjust the make-up and output of each component in the texture.
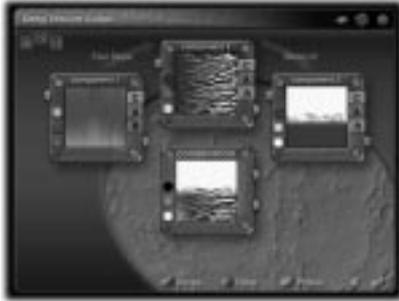
*The windows in the Deep Texture Editor represent the texture's components. The window in the center represents the combined texture.*

*Editing textures can quickly become extremely technical. This lesson will guide you through the process step-by-step, but you should read "Textures" on page 239 before editing textures on your own.*

**To edit a texture component:**

1. Click the pink button at the top of the Component A window. The Deep Texture Editor appears.



*Click the pink button in the component window to open the Deep Texture Editor.*

When the editor appears you can see the components that make up the Fire texture.
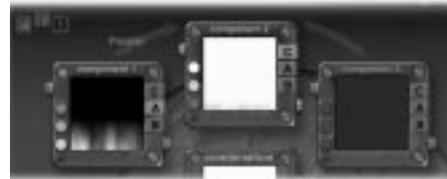


*The three windows show the components that make up the Fire texture.*

You can see that Fire has two components. Component 1 is the alpha component and Component 2 is the color component.

2. In the component 2 window, Option/Alt-click the first color circle. The Color dialog appears.



*The three color circles along the left side of the component window show the main colors that make up the texture.*

3. Enter the values R=215, G=192, B=139 and click the OK icon.

4. Option/Alt-click the second color circle.



*You can adjust each texture color individually to change the color scheme.*

5. Enter the values R=221, G=204, B=159 and click the OK icon.

6. Click the OK icon to exit the Deep Texture Editor.

**7.** In the Materials Lab, click the pink button at the top of component B window. The Deep Texture Editor appears displaying the Zion texture.
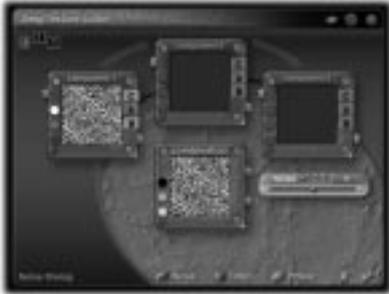


*When you open the Deep Texture Editor, the components that make up the Zion texture are displayed.*

**8.** In the component 1 window, Option/Alt-click the first color circle. The Color dialog appears.

**9.** Enter the values R=252, G=252, B=252 and click the OK icon.

**10.** Option/Alt-click the second color circle.

**11.** Enter the values R=133, G=116, B=72 and click the OK icon.

**12.** Option/Alt-click the third color circle.

**13.** Enter the values R=84, G=63, B=45 and click the OK icon.

**14.** Click the Noise button at the bottom of the editor.
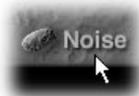


*The Noise button at the bottom of the editor displays the Noise palette.*

The Noise palette appears.



*The Noise palette can adjust the amount of noise in any of the texture components.*

**15.** Make sure the indicator ball is in the first hole. This tells you that you're editing component 1.

**16.** Drag the Noise slider to the right to increase the noise in the texture.
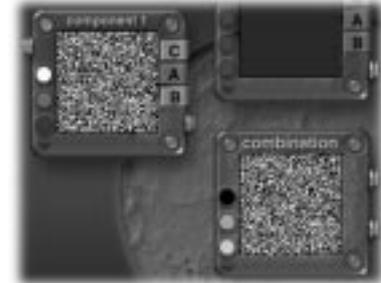


*You can see the increase of noise in both the component 1 window and the combination window.*

**17.** Click the button at the bottom right of the component 1 window.
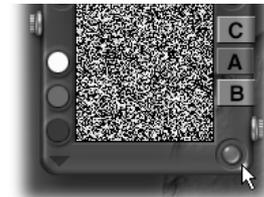


*The buttons along the outside of a component window let you access the various editing palettes. The bottom-right button opens the Phase palette.*

**18.** Make sure the indicator ball is in the first hole. This tells you that you're editing component 1.

**19.** Drag the Phase slider to the right to increase the frequency of the noise in the texture. This gives your texture added detail.



*The Phase slider controls the frequency of the noise in the texture. The higher the frequency, the more detail is added to the texture.*

**20.** Click the OK icon to exit the Deep Texture Editor.

The Deep Texture Editor lets you change the make-up of a texture, but that's not the only editing you can do to a component. You can also control where its applied to the surface of an object. The Edit Texture palette lets you change the orientation, position or scale of a texture component.

**To transform a texture component:**

**1.** In the component B window (Zion), click the green button at the top-left of the window.



*The buttons along the rim of the component window access the two texture editing tools. The green button displays the Edit Texture palette.*

The Edit Texture palette appear.



*The Edit Texture palette lets you change the position, orientation or scale of a texture.*

**2.** Next to the Resize tool, drag left over each of the X, Y and Z fields until the values read X=14%, Y=4%, and Z=14%.



*The Resize tool lets you change the size of the texture applied to your object. This tool acts like a frequency control. The larger the texture, the lower the frequency: the larger the scale, the higher the frequency.*

**3.** Click the T button in the lower-right of the palette to close it.

The last thing you need to do to a texture component is to decide how it's going to be mapped onto an object. Different mapping modes can create very different effects. Refer to "Texture Mapping Modes" on page 216 for a complete listing of mapping modes and their effects.

### To choose a mapping mode for textures:

1. In the component A window (Fire), click the arrow button at the bottom right corner of the window and choose World Space from the menu.



*The triangle icons in the component window access various texture options. The button at the bottom right opens the mapping modes menu.*

2. Make sure that the other two components are both set to World Space.

Now that the texture components have been customized, you're ready to combine them on the Material Grid.

### To combine components on the grid:

1. Control/Ctrl-click the C column in the Diffuse channel. Indicator balls appear in the A, B and C columns of the channel.



*Control/Ctrl-click the C column of the Diffuse channel to use Mode ABC to combine components.*

Mode ABC is now used to determine the value of the Diffuse channel.

2. Control/Ctrl-click the B column in the Ambient channel. An indicator ball appears in the A and B columns of the channel.



*Control/Ctrl-click the B column of the Ambient channel to use Mode AB to combine components.*

Mode AB is used to determine the value of the Ambient channel.

3. Leave the Specular, Transparent Specular Halo, and Volume channels as is.

4. Drag the slider in the Diffusion channel to the left until the value is set at 100.



*Drag over the Value control in the Diffusion channel to set a value for the channel.*

5. Drag the slider in the Ambience channel to the left until the value is set at 45.

6. Leave the Specularity and Metallicity channels as is.

7. Control/Ctrl-click the C column in the Bump Height channel. An indicator ball appears in the A, B and C columns of the Bump Height channel.



*Control/Ctrl-click the C column of the Bump Height channel to use Mode ABC to combine components.*

Mode ABC is used to determine the value of the Bump Height channel.

8. Drag the slider in the Bump Height channel until the value is set at 5.

9. Leave the Transparency, Reflection and Refraction channels as is.
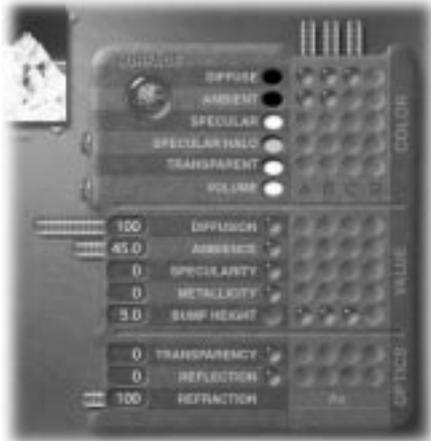


*This is what your Materials Grid should look like when you're done.*

10. Click the OK icon at the bottom of the Materials Lab to apply the texture to the terrain.



*This is what the material looks like when it's applied to the terrain object.*

Your first material is complete. The next material you're going to create is a volume material.

## Lesson 2: Creating Volume Materials

Volume materials are unique to Bryce. When you apply one of these materials to your object, the surface properties are applied to the object inside and out. Your object becomes a volume that contains the texture within it. For example, when you apply a regular blue dot material to a sphere, blue dots appear in the surface of the ball.
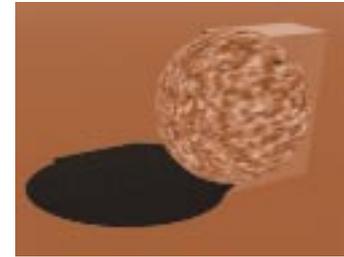


*This is what a regular blue dot material looks like when it's applied to a sphere.*

However, when you apply the same texture as a volume material, you get a spherical volume that contains little blue spheres within it.



*This is what the same material looks like when it's applied as a volume material.*

Refer to for more on volume materials.

In this lesson you'll be applying a volume material to a sphere to create flames for your fire.

**To create a volume material:**

1.  Click the Swap button at the bottom of the Bryce window. The Selection palette appears.



*The Swap button switches between the Animation controls and the Selection palette.*

2.  Hold down the mouse button over the Sphere button and choose Fireball from the menu.



*The Sphere tool lets you select all the spheres in the scene.*

3.  Click the M icon that appears next to the sphere's bounding box. The Materials Lab appears.

4.  Click the Volume Material button in the top left corner of the lab.



*This button toggles between Surface Material mode and Volume Material mode in the Materials Lab.*

The Optics channels are replaced by the Volume channels.



*When you're creating a volume material, the Materials Lab changes to display the unique volumetric channels.*

5.  Click the A column in the Diffuse channel. The first component becomes active.

6.  Click the triangle icon in the top right corner of the texture component window and choose Fire from the menu.

7.  Click the A column in the Ambient, Specular and Transparent channels. The Fire texture will be used for all these channels.

8.  Leave Specular Halo as is.

9.  Option/Alt-click the Volume Color oval and enter R=252, G=213 and B=11.

10. Click the A column in the Diffusion channel, then drag the slider left to set the value at 98.

11. Click the A column in the Ambient channel, then drag the slider left to set the value at 38.

12. Click the A column in the Specularity channel, then drag the slider left to set the value at 11.

13. Click the A column in the Base Density channel, then drag the slider left to set the value at 25.

14. Drag the slider in the Edge Softness channel left to set the value at 100.

15. Drag the slider in the Fuzzy Factor channel left to set the value at 100.

**16.** Leave Quality/Speed at the default.



*This is what the Materials Grid should look like when you're done.*

**17.** Click the OK icon to exit the lab.

### Moving On

By now you're probably getting a sense of the incredible power of the Materials Lab. The materials you created in these lessons are only meant to show you what's possible with Bryce materials. Now that you've seen the basics, you can go off and explore some of the more complex features of the Materials Lab on your own. Refer to "A Quick Tour of the Materials Lab" on page 230 for more details.

A good way to learn more about materials is by applying some of the materials in the Preset Materials Library and then examining them in the Materials Lab. You'll be able to see the components and values that make up the material. Refer to "Using the Preset Materials Library" on page 234 for more on the library.

In the next section you'll learn how to add lights to your scene.

## Adding Lights

The look of your scene depends largely on the light sources in the environment. Many of the material effects you created can only be seen when objects are lit properly. For example, you can't see the reflection off an object unless light hits it.

In Bryce the main source of light is the sun. It provides light for the entire scene and its position determines the length and intensity of shadows. In the night sky, the main source of light is the moon, like the sun it controls the overall brightness of your scene. Refer to "Positioning the Sun" on page 150 for more on positioning the sun.

However, the sun and moon are not the only sources of light in the real world. Many objects cast their own light, like lighthouses or lamps. That's why Bryce lets you create individual light sources. Light sources can be positioned just like any other object.

In this section you'll learn how to create and position various types of lights and create a few lighting effects.

### The Story So Far

Up to this point in the tutorial, you've learned how to create, arrange, and apply materials to the objects in your scene. In this section you're going to learn how to light objects. Lighting depends heavily on positioning, so you should be fairly familiar with transformation concepts. You may want to refer to "Transforming Objects" on page 285 for more.

### What You'll Need

To see the effects of lighting, you'll need a scene, preferably one that contains objects that cast light. The file Light Tut contains all the objects you'll need to complete this lesson.

1. Choose **File menu> Open**.

2. Locate the file Light Tut in the Tutorial folder on the Bryce 3D CD-ROM and click OK.

You won't be able to see the effects of lighting on your objects in Wireframe preview mode, so you'll have to rely heavily on the Nano-Preview. Before you begin this section you should make sure that the Nano-Preview is set to Auto-Update.



*Use the Nano-Preview to help you see the effects of your light sources on the scene.*

**To set the Nano-Preview to Auto-Update:**

⌘ Click the triangle icon below the Nano-Preview window and choose Auto-Update from the menu.

This option is enabled when a checkmark appears next to the menu item.

In this lesson you'll create a light source for a lighthouse.

## Lesson 1: Adding Lights

In Bryce you can add four different types of light sources: Radial, Spot, Square Spot, and Parallel lights. Radial lights throw light in all directions, while Spot and Square spots throw light in one specific direction. Parallel Lights cast parallel rays, resulting in no spatial distortion of shadows.

The type of light you choose to add to your scene depends on the type of effect you want to create. For example, lamps cast radial light, while flashlights cast spotlights.

When deciding how many lights to add you should consider the contents of your scene and the limitations of your system. The more lights you have, the longer a scene will take to render.

In most cases your scene should be adequately lit by the sun or moon, so you only need to add lights to create very specific lighting effects.

There are two types of light effects you can create: Surface Visible lights and Volume Visible lights. Surface Visible lights create a kind of visible light shell. This type of light has no volume and does not interact with the objects it strikes.

In this lesson you'll be creating a Volume Visible light. A visible light is a light source that has a light cone that you can see in your scene.

The light from a Volume Visible light interacts with the objects it hits. The light also has actual volume.
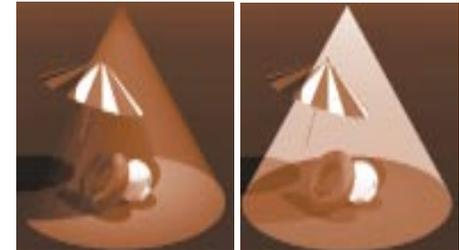


*These examples show the difference between Volume Visible lights and Surface Visible light.*

**To add a light:**

1. Click the Create button to display the Create palette.

**2.** Click the Spotlight tool.
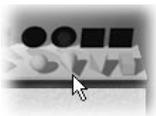


*The Spotlight tool creates spotlights that you can place anywhere in your scene.*

A new spot light appears in your scene.



*This is what the new light source looks like in your scene.*

**3.** Click the light to select it.

**4.** Click the E icon that appears next to its bounding box. The Edit Light dialog appears.

**5.** Click the triangle icon below the light preview and choose Volume Visible Light from the menu.

The preview changes to a volume light.
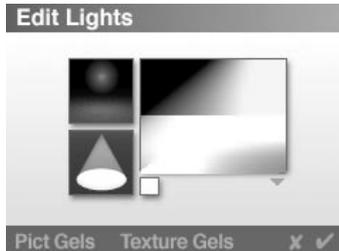


*When you choose the Volume Visible Light option, the light preview changes to a volumetric light.*

**6.** Click the Texture Gel button at the bottom of the Edit Light dialog. The Preset Materials Library appears.

**7.** Click the Tutorial category.
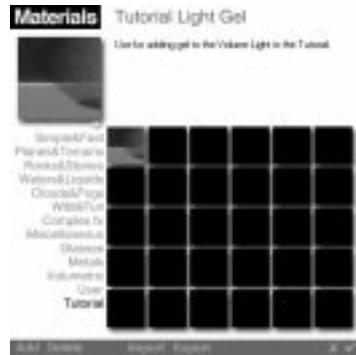


*The Preset Materials Library's Tutorial category contains the gel used in this lesson.*

**8.** Click Tutorial Light Gel and click the OK icon. The material is applied to the light.
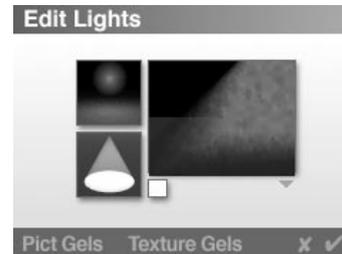


*When you apply a Texture Gel to a volume light, the material is visible all the way through the light cone.*

**9.** Click the OK icon to exit the Edit Lights dialog. The new light appears in the scene.

Although your light is completely set up, it's stuck in the ground. You'll need to reposition it to the top of the lighthouse.

**To position lights:**

**1.** Select the light in the Working window.

**2.** Click the A icon that appears next to its bounding box. The Object Attributes dialog appears.

**3.** Make sure the General tab is visible.

**4.** Enter Position: X=-20.52, Y=34.47, Z=28.68, Rotate: X=180, Y=0, Z=-180, Size: X=20.32, Y=17.02, Z=21.44.

The light moves to the top of the lighthouse.



*This is what you scene should look like after you reposition the light and render the scene.*

### Moving On

After completing the lessons in this section you should have a fairly good idea of the types of lighting effects you can create in Bryce. Now you can experiment with other types of lights and gels. Refer to "Setting Up Lights" on page 342 for more on lighting.

Remember, the lights you create should compliment the light generated by the sun or moon. Also, keep in mind the cost, in rendering time and memory, of volumetric light effects.



# Animating Objects

Bryce 3D uses a process known as key frame animation to add motion to your scene. In key frame animation, the key points in an action are recorded as key frames. All the frames in between are filled in by Bryce to create the illusion of smooth motion. Using this method, you can animate almost any property of an object: size, position, or material.

The motion of an object is represented in the scene by a motion path. The path is a graphical representation of the object's movement through time. The points on the path represent key frames. You can edit the shape of the path to adjust the trajectory of an object.

You can also control how an object moves along the path using the Advanced Motion Lab. The lab lets you apply a time mapping filter to the object's properties, which will change the action of the object within the movie.

The lessons in this section show you how to create motion paths and edit velocity curves to create animations.

### The Story So Far

By this point in the tutorial you've learned how to create and arrange objects and position the camera and lights. In this next section you'll learn how to animate these objects. Before you animate an object, you should know how to create one. Refer to "Creating Objects" on page 63 and "Creating Objects" on page 101 for more on creating objects.

Key Frame animation uses changes in position and orientation to create motion, so it's important that you know how to transform objects. Refer to "Transforming Objects" on page 285 for more on performing transformations.

### What You'll Need

In order to teach you how to animate objects, you'll need to have a few sample objects handy. The file **Tutorial: Animate Tutor** on the Bryce 3D CD-ROM has been designed specifically for the lessons in this section.

**To begin the animation tutorial:**

1. Choose **File menu > Open**. The Open dialog appears.

2. Locate the file **Animate Tutor** in the Tutorial folder on the Bryce 3D CD-ROM.

3. Click Open.

   The animation scene appears in the Bryce window.
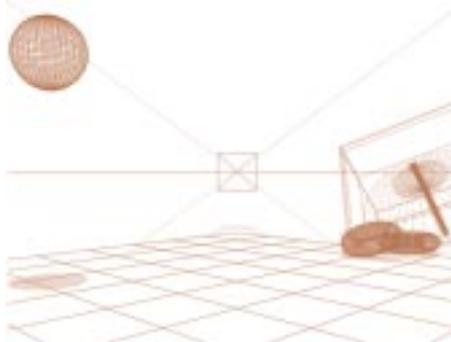


*The animation scene contains all the objects you'll need to complete the animation lesson.*

Before you start creating key events, you should set up some general properties for your new animation file. The Animation Attributes dialog lets you set the duration, frame per second and preview behavior.

**To setup your animation:**

1. Choose **File menu> Animation Setup** or double-click the Current Time Indicator. The Animation Attributes dialog appears.

2. Enter 24 in the FPS field.

3. In the Duration fields enter 0:00:03:00. This sets the duration of your animation to 3 seconds.

4. Enable the Once button in the Play area to have your animation preview only once when you hit the play button.

5. Enable the SMPTE Time button in the Display area to set your time display as: Hour:Minutes:Seconds:Frame.

## Lesson 1: Creating Key Frames

In key frame animation, you create a key frame anywhere you want action to start, stop or change. In Bryce, you can create key frames by recording your actions at different points in time. In this lesson you'll be animating a bouncing beach ball, so you'll need to create key frames

for each point of the ball's bounce. This tells Bryce where you want the ball to bounce up and where it hits the ground.

You'll be using the Director's View for this lesson since the changes in camera position are not keyed. This will avoid any unwanted changes in the view of your scene.

**To create key frames:**

1. Click the triangle icon to the left of the animation controls and choose Auto-Key from the menu.



*The Auto-Key option is enabled when a checkmark appears next to its title.*

   Auto-Key is enabled by default.

2. Drag the Current Time Indicator to time 00:00:00.12.



*Drag the Current Time Indicator in the timeline to move to different points in time.*

The current time is displayed in the Display Text area at the bottom of the control palette.

**Time**
Scrub Time
00:00:00.12

*When you're working with the Animation controls, the Display Text area of the Control palette displays the current time.*

*If you have trouble moving the Current Time Indicator to the right time, double-click the indicator and enter the time in the Current fields in the Animation Attributes dialog.*

**3.** Click the ball and move it down and to the right.
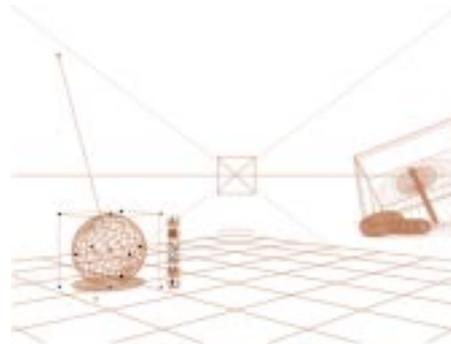
*When you move the ball, Bryce draws the motion path.*

**4.** Move the Current Time Indicator to time 00:00:01.00.
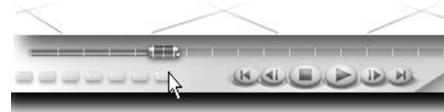
*As you create key frames a green bar appears in the timeline, representing the Working Area.*

**5.** Drag the ball in the scene up and to the left.
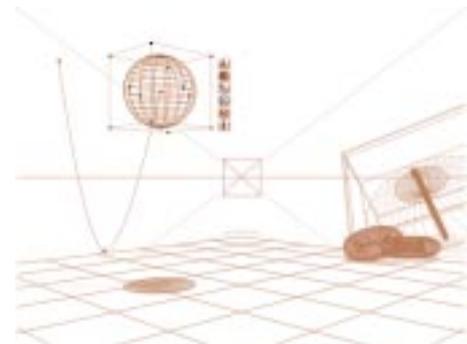
*Your motion path should look like this when you're done.*

**6.** Move the Current Time Indicator to time 00:00:01.12.

*This is where 00:00:01.12 appears on the timeline.*

**7.** Drag the ball in the scene down and to the right.
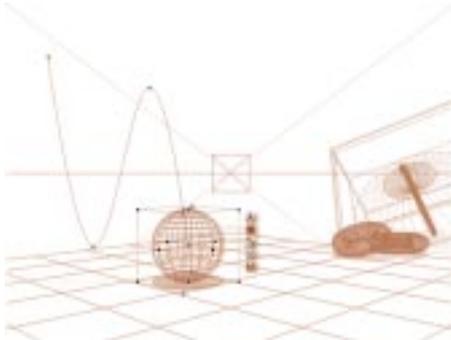


*Your motion path should look like this when you move the ball down.*

**8.** Move the Current Time Indicator to time 00:00:02.00.



*This is where 00:00:02.00 appears on the timeline.*

**9.** Drag the ball in the scene up and to the right.
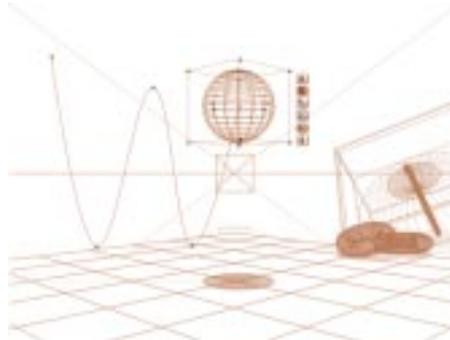


*Your motion path should look like this when you're done moving the ball.*

**10.** Move the Current Time Indicator to time 00:00:02.12.



*This is where 00:00:02.12 appears on the timeline.*

**11.** Drag the ball in the scene down and to the right.
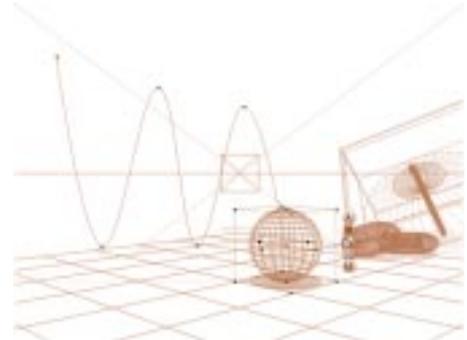


*Your motion path should look like this when you're done.*

**12.** Move the Current Time Indicator to time 00:00:03.00.



*This is where 00:00:03.00 appears on the timeline.*

**13.** Drag the ball in the scene to the right.
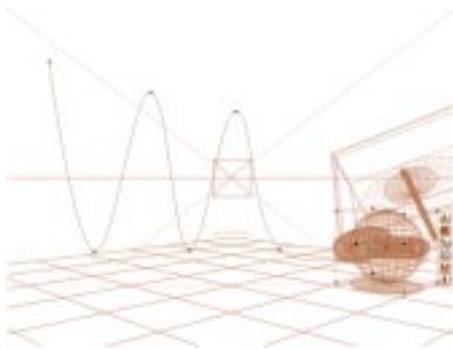


*This is what your completed motion path looks like.*

Your motion path is complete. Now you can use the preview controls to see how your animation looks.

### To preview an animation:

**1.** Click the First Frame button. The ball jumps to the first key frame on the motion path.



*The First Frame button moves the Current Time Indicator to the first key frame in the animation.*

**2.** Click Play.



*The Play button plays a preview of your animation.*

The ball bounces across the screen.

## Lesson 2: Editing Time Mapping Curves

By recording different combinations of transformations, you create a wide variety of effects, but transformations won't let you control the speed of an object.

Objects in the real world change speed as they move. For example, when a ball bounces, it's moving faster when it rebounds off the ground than when it's falling towards the ground. Bryce's time mapping feature let you simulate these changes in speed.

When you're working with time mapping, speed is expressed in terms of time. How long an event takes is directly related to how fast it moves. For example, a bounce that takes three seconds to complete is faster than a bounce that takes four seconds to complete.

So, if you reduced the amount of time it takes to complete a bounce, you'd be speeding up the ball. This is how time mapping works. By remapping the key frames in your animation, you can create velocity effects like a ball speeding up and slowing down as it bounces.

You can see when an event occurs by determining the intersection of the key event line with the curve.
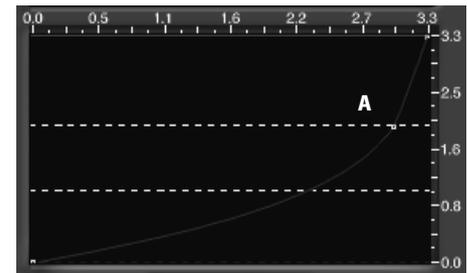


*For example, at point A in the this timeline, an event that occurred at 2 seconds in the original animation, will occur at 3 seconds after it's passed through the time mapping filter.*

In this lesson you'll remap the bouncing ball's key frames to create more realistic motion. Time Mapping curves are edited in the Advanced Motion Lab.

**To display the Advanced Motion Lab:**

1. Click the ball in the Working window.

2. Make sure the animation controls are visible. If they're not, click the Swap button.



*The Animation controls let you add and delete key frames and access the Advanced Motion Lab.*

3. Click the Advanced Motion Lab button. The Advanced Motion Lab appears.



*The Advanced Motion Lab button displays the Advanced Motion Lab.*

In the Time Mapping Editor, you'll see the default curve for the ball. This curve represents no change in time. Events occur at the time they were originally recorded.

A flat curve represents no motion, since all the events on the timeline occur at exactly the same point in time.

A sharp increase in the slope of the curve represents an increase in speed as events occur much closer together.

An oscillation in the curve represents recurring action as the events occur more than once (that is, the time mapping curve intersects the key event line more than once).

You'll need to edit the ball's curve so that it alternates between low and high speeds.

**To edit time mapping curves:**

1. Drag the first point on the curve up to the position shown.
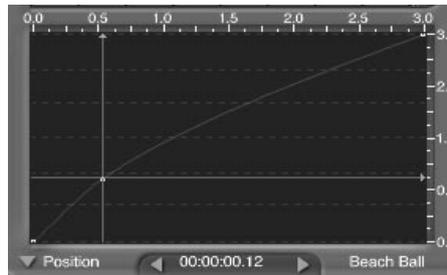


*Your curve should look like this after you move the first point.*

2. Drag the second point up and to right so that the curve flattens slightly.
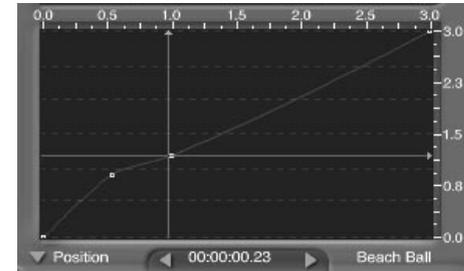


*This is what the curve should look like after you move the second point.*

3. Drag the third point up as shown.
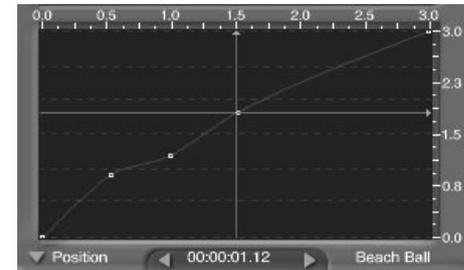


*This is where you should position the third point on the curve.*

**4.** Drag the fourth point up and to the right as shown.
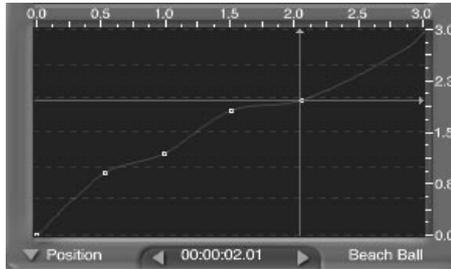


*This is what the curve looks like after you move the fourth point.*

**5.** Leave the fifth point as is.

**6.** Drag the sixth point down slightly as shown.
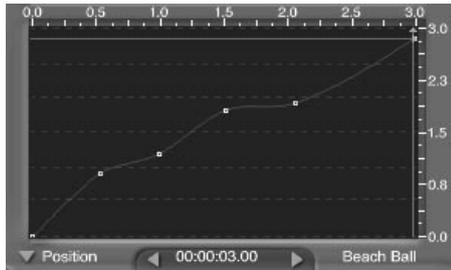


*This is what the ball's curve looks like when you move the last point.*

The new time mapping curve is complete. When you preview this animation, the ball will drop slowly, and then jump up quickly as it bounces off the ground.

## Moving On

The animation you created in this section is only a sample of the types of motion you can create in Bryce. The more you experiment with all the animation tools available, the more complex your animations will become. Refer to "Creating Animations" on page 354 for more details.

The editing you did on the beach ball's time mapping curve is only the beginning. Refer to "Time Mapping Curves" on page 367 for a detailed discussion of Time Mapping curves.

The next section of the tutorial leads you through the process of animating the camera.

# Animating the Camera

One of the most spectacular types of animations you can create is to change the position of the camera over the course of time. This technique is how you create fly-throughs of your terrains. This type of animation is like seeing the scene through the cockpit of an airplane.

To produce this type of animation you'll have to use the Camera View for rendering, since the position of the Director's View cannot be recorded. When auto-record mode is on, every change in the camera's position you make using the positioning controls is recorded as a key event and animated.

Although you have to use the Camera View to render a camera animation, you'll quickly find that it is somewhat difficult to produce precise camera movements. To help you with more complex camera motions, you can use either the Director's View or the orthogonal views and move the camera just like an object.

## The Story So Far

In the previous sections of this tutorial you've learned how to create, arrange, shade, light and animate objects. In this section, you'll be adjusting camera positions, so you should be familiar with positioning the camera. You may want to refer to "Lesson 2: Positioning the Camera" on page 55 or "Positioning the View of Your Scene" on page 331 for more on camera concepts.

**What You'll Need**

To create the effects described in this section, you'll need a scene to fly through. The file
**Tutorial: Animating: Cameras: Camera Tutor** contains the scene used in this section.

## Lesson 1: Animating the Camera

In this lesson you'll be creating a fly-through of a beach scene. You'll notice that as you move the camera, you may lose parts of your scene. That's because your camera is no longer facing the main part of the scene. To bring it back into view, you'll need to change the camera's aim.

**To aim the camera:**

**1.** Move the cursor over the line that extends out from the front of the camera icon, until it changes to a four-headed arrow.
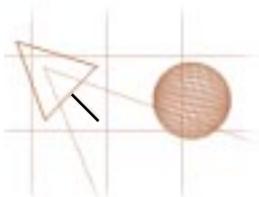


*The line that extends from the front of the camera represents the aim control.*

**2.** Drag the tip of the line, or the Aim control, from the camera to the point in the scene where you want it to aim. As you drag, a red dot appears at the end of the line.
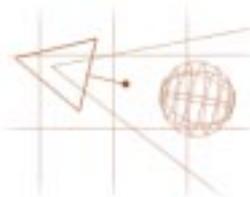


*You can change the aim of the camera by dragging the Aim Control line from the camera to a point in the scene.*

**To animate the camera position:**

**1.** Make sure you're in Director's View. If you're not, click the triangle icon next to the View Control and choose Director's View from the menu.

**2.** Click the triangle icon next to the View Control and choose From Top.

**3.** Click the Camera icon in the scene.
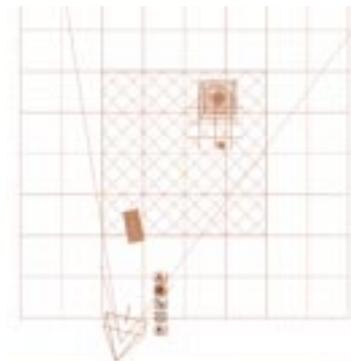


*This is what the camera looks like in the top view of the scene.*

**4.** Click the triangle icon to the right of the Animation controls and make sure Auto-key is enabled.

**5.** Move the Current Time Indicator to time 00:00:00:12.

**6.** Drag the camera icon to the position shown.
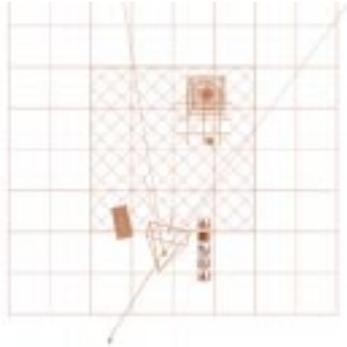


*This is what the what your scene should look like when you're done positioning the camera wireframe.*

**7.** Change the aim so that the camera is facing the lifeguard chair.

**8.** Move the Current Time Indicator to time 00:00:01:06.

**9.** Drag the camera icon to the position shown.
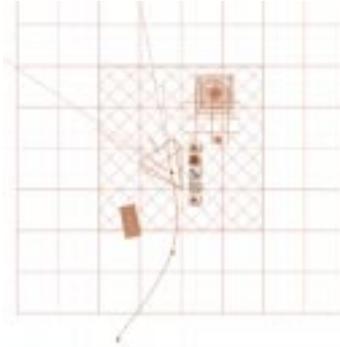


*This example shows the view of your scene after you move the camera icon.*

**10.** Change the aim again so that the camera faces the umbrella.

**11.** Move the Current Time Indicator to time 00:00:02:00.

**12.** Drag the camera icon to the position shown.
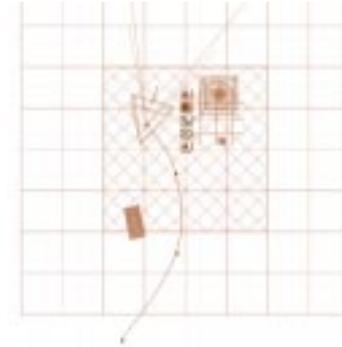


*This is what your scene should look like when you're done positioning.*

**13.** Change the aim so that the camera faces the beach ball.

**14.** Move the Current Time Indicator to time 00:00:02:12.

**15.** Change the aim so that the camera is facing the ocean.

**16.** Click the triangle icon next to the View Control and choose Camera View from the menu.

**17.** Click the First Frame button in the Animation controls and then click Play to preview your animation.

## Moving On

The animation you created in this section is only a sample of the types of camera motion you can create in Bryce. You can create an orbiting camera by adjusting the camera's origin point, or you can attach a camera to a path.

Refer to "Animating the Camera" on page 379 for more on animating the camera, and "Positioning the View of Your Scene" on page 331 for more on positioning and aiming the camera.

The next section of the tutorial will lead you through the process of animating an object's material.

## Animating Materials

An object's material defines how its surface interacts with light. As a result the material determines the object's color, transparency, reflectiveness and its volume properties.

In Bryce, you can animate almost any property of an object, including materials. The Materials Lab has animation controls similar to those found in the Working window. Using these controls, you can change an object's surface properties over time. For example, you could have a ball of ice that becomes rock over the course of the animation.

The lessons in this section will show you how to create realistic fire.

### The Story So Far

In the previous sections of the tutorial you've learned how to create, arrange, shade, light and animate objects. In this section, you'll be adjusting material properties, so you should be familiar with material concepts. You may want to refer to "Creating Materials" on page 74 or "Building Materials" on page 232 for more on material concepts.

### What You'll Need

To create the effects described in this section, you'll need some objects with materials and lights. The file Animate Mat has all the objects you'll need.

**To begin animating materials:**

1. Choose **File menu >Open**. The Open dialog appears.

2. Locate the file Animate Mat in the Tutorial folder on the Bryce 3D CD-ROM.

3. Click Open.

## Lesson 1: Animating Between Materials

When you animate an objects position, you create key frames that define the object's position at different points in time. When you animate a material, you use key frames to define the state of the material at specific points in time. Bryce interpolates between materials to fill in the gaps. The result is a smooth transition from one surface to another.

For example, if you were animating between an ice and rock surface, you would define two frames: one where the object is ice and the other where the object is rock. When you run the animation, Bryce interpolates between the ice color and the rock color, and between the ice texture and the rock texture, to produce intermediate colors and textures that create a smooth transition between the materials.

In this lesson, you'll change the appearance of a fire texture to make it look like it's burning brightly.

**To animate between materials:**

1. Click the sphere object in the fire pit.

2. Click the M icon that appears next to the sphere's bounding box. The Materials Lab appears showing the Fire texture in the Material Grid.

3. Click the First Frame button in the Animation controls at the bottom of the lab.
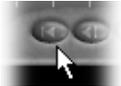


*The First Frame button moves the current time indicator to the first frame in the animation.*

4. Click the triangle icon to the right of the Animation controls and make sure Auto-key is enabled. If it's not, click the Add Frame button to add a key frame.



*The Key Frame Indicator lights up when you're over a key frame. The other two controls let you add and delete frames.*

5. Drag the Current Time Indicator to 00:00:02.00.



*This is what the timeline looks like at time 00:00:02.00.*

6. Drag the slider in the Fire material's channels to set the following values:

   Diffusion=98, Ambience=38

   Specularity=11, Base Density=25

   Edge Softness=50, Fuzzy Factor=100
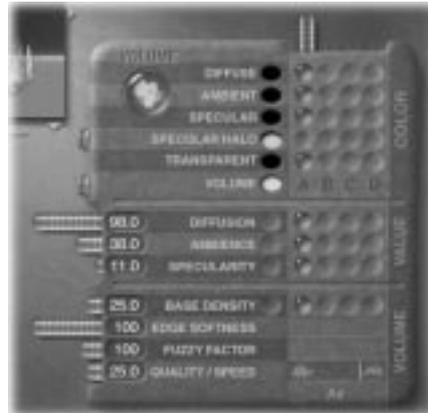


*This is what your Materials Grid should look like when you're done.*

7. Click the Add Frame button to store your changes in a key frame.

8. Click the First Frame button to move to the beginning of the animation.

9. Click the Play button to preview the animation. The animation is shown as rendered previews so it can be somewhat slow.

## Moving On

After completing this lesson you should have some idea of the power of the Materials Lab. Any material can be changed to any other material over time. The key events you created in the Materials Lab are directly related to any key frames you create in the Working window, so you could create an animation where the object travels along a path and changes texture and color as it moves.

The types of effects you create using this technique depend entirely on the types of materials you apply to the objects. You can create subtle effects like shifting waves in a water material by adjusting the position properties of the texture over time, or you can create more dramatic effects by animating between two completely different materials. Refer to for more on animating materials.

# Rendering

Rendering is the process of creating a two-dimensional image or movie from a three-dimensional scene. Rendering is a very complex and time-consuming process. The more complex your scene, the longer it'll take to render. That's why Bryce has several features that can help you speed up the rendering process. The lessons that follow explain all these features.

There are also several time-saving tips you may want to try before you start rendering. Refer to "Fast Render Strategies" on page 409 for a listing of these techniques.

The lessons in this section teach you how to render an image and an animation from your 3D scene.

## The Story So Far

The other sections in this tutorial taught you how to create, transform, arrange, shade, light and animate the objects in your scene. Now in this final section you'll learn how to turn those elements into a two-dimensional image or movie. The final output of your scene depends heavily on the placement of the camera.

## What You'll Need

The materials you need to complete this lesson depend on how you've been using this tutorial. If you've been following along from the beginning, you can use one of the scenes you created in the previous lessons. If you just jumped in at this point, you can use the preset file provided for you.

**To open the preset file for rendering:**

1. Choose **File menu > Open**.

2. Locate the file Rendering Tut in the Tutorial folder on the Bryce 3D CD-ROM.

3. Click Open.

## Lesson 1: Rendering an Image

When you're ready to render your final image, you'll want to disable all the fast rendering options and choose a final rendering resolution for your image.

**To choose a rendering resolution:**

1. Double-click the Render button in the Rendering controls.
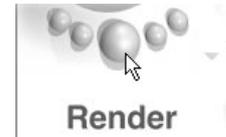


*The Render button starts the rendering process.*

The Document Setup dialog appears.
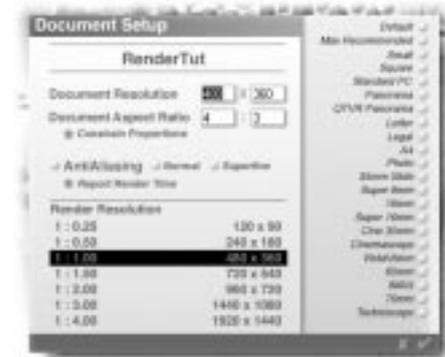


*Use the document setup dialog to choose a render resolution for your image.*

2. Click 480 x 360 at the bottom of the dialog.

This resolution does not affect your document in the Working window, only the resolution of the final image.

**3.** Click the OK icon.

**To choose rendering options:**

**1.** Click the triangle icon next to the Rendering controls and select AnitAliasing Fine Art [Slow] from the menu. This option should be enabled for your final rendering.

**2.** Make sure Texture On/Off is disabled.

*Texture On/Off is disabled when the button is not depressed.*

**3.** Make sure Fast Render mode is off.
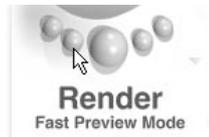
*Fast Render mode is off when the button is not depressed.*

**4.** Click the triangle icon next to the Render controls and make sure Perspective Render mode is enabled.

**5.** Click the triangle icon next to the Render controls and choose Spacial Optimization High from the menu.

This option helps speed up the render of your complex scene.

The options for your final image are now set. Now you can begin the rendering session.

**To start rendering your final image:**

⌘ Click the Render All button in the Rendering controls.

Bryce starts rendering your image. The rendering occurs in passes. The antialiasing pass is the final and slowest pass. When the rendering is done, a report appears.

*This is what the final render of your scene looks like.*

## Lesson 2: Rendering an Animation

The procedure for rendering an animation is almost the same as rendering an image. The difference is that you need to set compression options for the animation file. You can also choose a range of frames to render.

**To render an animation:**

1. Choose **File menu> Render Animation**. The Render Animation dialog appears.
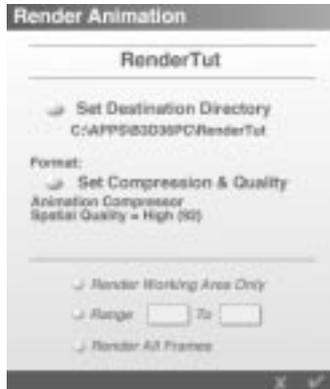


*The Render Animation dialog contains all the options you'll need to set up an animation render.*

2. Click the Set Destination File if you want to change the name or location of the animation to go to the same folder as the scene.

3. Click the Output Type popup to choose a format for the rendered file.

4. Click the Set Compression button if you want to change the compression used for the animation. The available options on this menu depend on the compressors installed on your system,

5. Set a range of the animation to render.

6. Click OK and the render of the animation begins.

## Moving On

The options you set up in this section can be used for a large number of rendering sessions. You don't have to set up options each time you render: once you have the settings you like, just keep pressing the Render button.

If you find that your rendering is taking too long, you may want to batch render your scene so that the rendering process won't take up any of your working time. You may also want to consider reducing the complexity of your scene.

Additionally, you should keep an eye on the number of textural and volumetric materials you use. These types of materials require a great deal of time to render. Refer to "Fast Render Strategies" on page 409 for a complete discussion on speeding up renderings.

## Wrapping Up

The lessons in this Tutorial were designed to give you just a taste of the incredible things you can do with Bryce.

The terrain you created in the Creating Terrains lesson is only a starting point. By applying the basic principles explained, you can create almost any type of landscape you can imagine. To get an idea of the different types of terrains you can create, add one of the preset terrains from the Preset Objects Library to your scene, then access the Terrain Editor. There you'll see the image map used to create the terrain, which can give you an idea of how you might go about creating your own terrains. Refer to "Using the Presets Object Library" on page 125 for more on this library.

The sky you created in the Adding Skies lesson can be used in a variety of different scenes. Just by changing the position of the sun you can create a very different environment. The Preset Skies Library contains several dozen different types of skies you can use to simulate almost any environment. Refer to "Using the Preset Skies Library" on page 160 for more on the library.

The materials you created in the Creating Materials section are just two examples of the infinite range of materials you can create. The Preset Materials Library contains a vast number of materials you can use as starting points for your own materials. You can add any material you create to the existing materials library, so eventually you'll have your own library of materials. Refer to "Using the Preset Materials Library" on page 234 for more on the library

The animations you created in the Animating Objects section highlight the basic concepts involved in animating an object, but there are many more techniques you can use. The Motion Path is a very versatile tool. You can use it to create very complex motion. Refer to "Motion Paths" on page 372 for a detailed discussion of this tool.

You're now ready to explore Bryce 3D in more detail. The remaining chapters in this User Guide explain in detail how to use the features and functions in Bryce and explain the major concepts involved in creating 3D scenes.

You can also use this tutorial as a reference tool. If at some point you want to brush up on a particular skill, just jump into the tutorial at the lesson that deals with the topic you want to review.