6

Creating Objects

Modeling vs. Primitives

There are two ways of creating objects in Ray Dream Studio. You can create objects by combining a number of basic 3D shapes, called *primitives*, or you can model unique shapes using the Ray Dream Studio's *Free Form* and *Mesh Form* modelers. The method you use will depend on the type of object you want to create.

The first thing you need to do when creating an object, is decide how you're going to build it in 3D space. The easiest way of doing this is to break the object down to it's basic components. If those components turn out to be all geometric shapes, you use primitives to create it. If the object's basic components are shapes that can't be created using primitives, you use the modelers.

For example, when a sub is reduced to basic components, you can see that it's made up of cylinders, cones and cubes. Therefore you would use 3D primitives to create the object.

A complex object...

...and the primitives used to make it.

Following the same example, if you reduce a jellyfish to its basic components you'll end up with objects that are not geometric shapes. In this case you'd have to use a modeler to create this object.

A complex object...

...and the shapes used to make it.

This chapter covers the different types of primitives you can create using Ray Dream Studio, as well as introducing the **Text** and **Formula** modelers. The **Free Form** modeler is covered in . The **Mesh Form** modeler is covered in .

What are 3D Primitives?

Primitives are the most basic type of 3D object you can create in Ray Dream Studio.

There are two types of 3D primitives: *Geometric* and *Environmental*. Geometric primitives are 3D geometric shapes such as cones, squares or cylinders. Environmental Primitives are primitive volumetric objects like clouds or fire.

Creating Geometric Primitives

Geometric Primitive objects are the building blocks of 3D objects. When you closely examine any complex 3D object you'll notice that it can be reduced to simple primitive geometric shapes. In fact, the easiest way of creating an object is by combining a number of primitives.

Examples of geometric primitives.

When you create a Geometric Primitive object, it simply appears in your scene where you can move and resize it as necessary. Each type of object you can create has its own tool. The **Geometric Primitive** tools are located on a single pop-up tool.

All the Geometric Primitive tools can be accessed from a single pop-up.
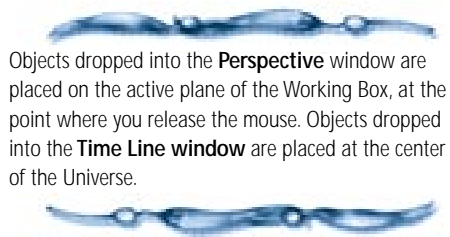
To create a Geometric Primitive object:

1 Choose a Geometric Primitive tool from the toolbar.

2 In the **Perspective** window, click a point in the Working Box to create an object of default size, or drag to create an object of a custom size.

or

Drag an object creation tool from the toolbar into the **Time Line** window to create an object of default size.

Objects dropped into the **Perspective** window are placed on the active plane of the Working Box, at the point where you release the mouse. Objects dropped into the **Time Line window** are placed at the center of the Universe.

or

Choose **Insert menu▶** type of object.

The object is created at a default size and placed in the center of the Universe.

Creating Environmental Primitives

Like Geometric Primitives, Environmental Primitives can be the building blocks of scenes. They can be used to quickly add an environment to any scene.

The **Cloud**, **Fog** and **Fire** primitives are volumetric. They behave slightly differently than other Ray Dream Studio objects when you change the size of the object. With other objects, changing the size causes the object itself to change scale. Changing the size of a volumetric object changes the size of the container of the object but the contents stay at the same scale. For example, a small cloud made larger results in a larger area of cloud, but the swirls within the cloud stay the same size. A fire object made taller results in higher flames.

Making the fire object wider results in a larger area of fire based on the parameters you have set.

Note: You must use either the Adaptive or Ray Tracer renderer to render **Cloud**, **Fire** and **Fog** primitives.

Each Environmental Primitive has its own tool which are located on a pop-up tool.

All the Environmental Primitive tools can be accessed from the same pop-up.

Fountain Primitive

The **Fountain** primitive is a particle primitive you can use to create objects like geysers or tornadoes. The **Fountain**'s attributes let you change the density of its particles and rate of animation.
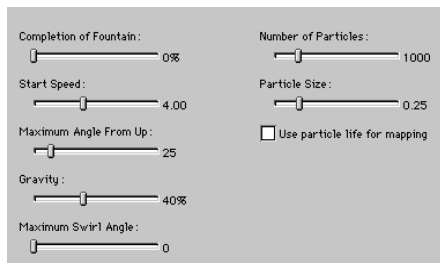
To create a Fountain object:

1 Choose the **Fountain** tool and drag it into the **Perspective** or **Hierarchy** window.

or

Choose **Edit menu▶ Insert▶ Fountain**.

2 Double-click the new object. The **Fountain** primitive controls appear.

Use the Fountain primitive controls to set fog attributes.

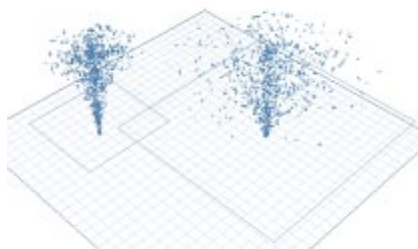**3** Adjust the value of the **Completion of Fountain** slider.

This slider controls the fountain's animation. Set the slider to 0% at the beginning of the animation and 100% at the end.

4 Adjust the value of the **Start Speed** slider.

This slider controls the force of the fountain. A low setting creates a fast spouting fountain while a high setting creates a slow spouting fountain.

5 Adjust the value of the **Maximum Angle From Up** slider.

This slider controls the angle of the spray from the fountain. When the slider is set to 0 degrees the spray goes straight up, at 180 degrees it goes out in a radius all the way around the fountain.

The example above illustrates the Maximum Angle From Up control set at 0 and 180.

6 Adjust the value of the **Gravity** slider.

This slider controls the amount of gravity applied to the fountain. When the setting is low, gravity has little effect on the fountain. When the setting is high, gravity pulls the particles down quickly.

7 Adjust the value of the **Maximum Swirl Angle** slider.

This slider controls how much the particles rotate parallel to the ground plane as they fall. A low setting causes very little rotation while a high setting causes a particle to rotate a great distance as it falls.

8 Adjust the value of the **Number of Particles** slider.

This slider controls the number of particles in your fountain.

9 Adjust the value of the **Particle Size** slider.

This slider controls the size of the particles in your fountain.

10 Enable or disable the **Use particle life for mapping** check box.

This setting determines how the shader is mapped to the fountain primitive. When it's enabled, the shader is mapped over the entire fountain, with the particles near the bottom of the fountain appearing different from those nearer the top (depending on the shader content).

When its disabled, all the particles are mapped individually, so they all appear identical.

Cloud Primitive

The **Cloud** primitive creates a three dimensional, or volumetric, cloud. You can use this primitive to quickly add a sky to any scene.

There is no on-screen preview of the cloud except its bounding box that indicates the cloud's size and location. You won't be able to see the cloud until it's rendered.

You can place objects inside the cloud or partially within the cloud. Cloud attributes can also be animated.

Note: Changing the size of the cloud by dragging a larger or smaller bounding box does not change the scale of the clouds. It only changes the area that is covered with clouds.
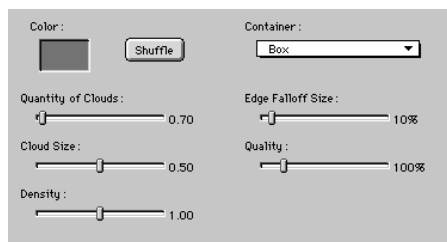

To create a Cloud object:

1 Choose the **Cloud** tool and drag it into the **Perspective** or **Hierarchy** window.

or

Choose **Edit menu▶ Insert▶ Cloud**.

2 Double-click the new object. The **Cloud** primitive controls appear.

Use the Cloud primitive controls to set cloud attributes.

3 Click the **Color** color chip and choose a color for the cloud.

4 Adjust the value of the **Quantity of Clouds** slider.

This slider controls the number of clouds that are included in the bounding box.

5 Adjust the value of the **Cloud Size** slider.

This slider controls the size of clouds that are included in the bounding box.

6 Adjust the value of the **Density** slider.

This slider controls the density of clouds.A low setting creates almost transparent clouds while a high setting creates almost opaque clouds.

7 Adjust the value of the **Density** slider.

This slider controls the quality of the clouds as they are rendered. The higher the Quality, the longer the render time.

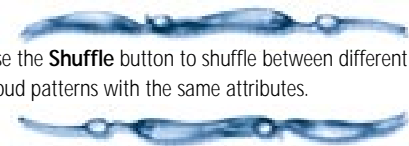**8** Click the **Container** pop-up and choose a container for your cloud.

The container determines the general shape of the cloud

The cloud primitive in Box and Sphere containers.

9 Adjust the value of the **Edge Falloff Size** slider.

This slider controls the appearance of the edges of the clouds. A low setting results in a sudden change or little falloff while a high setting results in gradual change or longer falloff.

Use the **Shuffle** button to shuffle between different cloud patterns with the same attributes.

Fog Primitive

The **Fog** primitive creates a three dimensional, or volumetric fog. The **Fog** primitive is best for creating distinct local areas of fog, while the fog available through the **Atmosphere** controls in the **Scene Settings** dialog are best for applying fog to the whole image.

There is no on-screen preview of the fog except its bounding box that indicates the fog's size and location. You won't be able to see the fog until it's rendered.

You can place objects inside the fog or partially within the fog. You'll probably want your fog object to be fairly large so you can place a portion of your scene inside it. Fog attributes can also be animated.

Note: Changing the size of the fog by dragging a larger or smaller bounding box does not change its scale. It only changes the area that it covers.
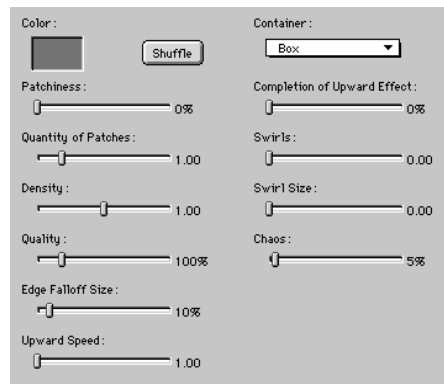
To create a Fog object:

1 Choose the **Fog** tool and drag it into the **Perspective** or **Hierarchy** window.

or

Choose **Edit menu▸ Insert▸ Fog**.

2 Double-click the new object. The **Fog** primitive controls appear.

Use the Fog primitive controls to create fog.

3 Click the **Color** color chip and choose a color for the fog.

4 Adjust the value of the **Patchiness** slider.

This slider controls the regularity of the fog throughout the bounding box. A low setting creates a blanket of fog. A high setting creates patches of fog.

5 Adjust the value of the **Quantity of Patches** slider.

This slider controls how many patches of fog are contained in the bounding box.

6 Adjust the value of the **Density** slider.

The **Density** slider controls the amount of light that penetrates the fog.

7 Adjust the value of the **Quality** slider.

This slider controls the quality of the fog as it is rendered.

8 Adjust the value of the **Edge Falloff Size** slider.

This slider controls the appearance of the edges of the fog. A low setting results in a sudden change or little falloff while a high setting results in gradual change or longer falloff.

9 Adjust the value of the **Upward Speed** slider.

The **Upward Speed** slider controls the rate at which the fog rises during an animation. Use a higher setting for longer animations.

10 Click the **Container** pop-up and choose a container for your fog.

The container determines the general shape of the fog

11 Adjust the value of the **Completion of Upward Effect** slider.

The **Completion of Upward Effect** slider controls the animation of the fog. Set this value to 0% at the start of your animation and 100% at the end.

12 Adjust the value of the **Swirls** slider.

This slider controls how the fog swirls or rotates as it rises.
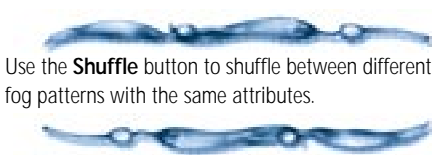
13 Adjust the value of the **Swirl Size** slider.

The **Swirl Size** slider controls the size of the swirls.

14 Adjust the value of the **Chaos** slider.

This slider controls the uniformity of the fog. A low setting creates uniform fog while a high settings create random fog.

Use the Chaos slider to control the uniformity of the fog. This example uses the low (left) and high (right) settings.

Use the **Shuffle** button to shuffle between different fog patterns with the same attributes.

Fire Primitive

The **Fire** primitive creates a three dimensional or volumetric fire. You use this primitive to set your scene on fire.

There is no on screen preview of the fire except its bounding box that indicates the fire's size and location. You won't be able to see the fire until it's rendered.

You can place objects inside the fire or partially within it. Fire attributes can also be animated.

Note: Changing the size of the fire by dragging a larger or smaller bounding box does not change its scale. It only changes the area that it covers.
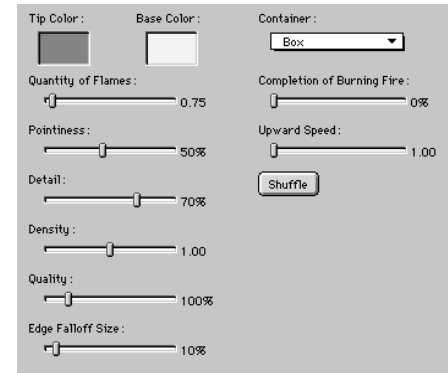

To create a Fire object:

1 Choose the **Fire** tool and drag it into the **Perspective** or **Hierarchy** window.

or

Choose Edit menu▶ Insert▶ Fire.

2 Double-click the new object. The **Fire** primitive controls appear.

Use the Fire primitive controls to create a 3D or volumetric fire.

3 Click the **Tip Color** color chip and choose a color for the tips of the flame.

4 Click the **Base Color** color chip and choose a color for the base of the flame.

5 Adjust the value of the **Quantity of Flames** slider.

This slider controls the quantity of flames that appear in your **Fire** object.

6 Adjust the value of the **Pointiness of Flames** slider.

The **Pointiness** slider controls the percentage of your Fire primitive that is points or tips of flames. A low setting

results in fewer, less tapered points while a high setting results in many more tapered points.

7 Adjust the value of the **Detail** slider.

This slider controls the degree of detail in the Fire primitive.

8 Adjust the value of the **Density** slider.

This slider controls the density of the fire. A low setting creates fire that is almost transparent. A high setting creates fire that is almost opaque.
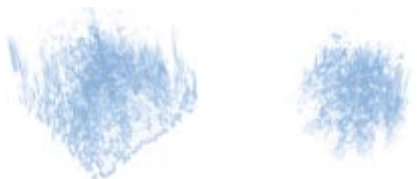
9 Adjust the value of the **Quality** slider.

This slider controls the detail of the fire as it is rendered.

10 Adjust the value of the **Edge Falloff Size** slider.

This slider controls the appearance of the edges of the fire. A low setting results in a sudden change or little fall off. A high setting results in gradual change or longer fall-off

11 Click the **Container** pop-up and choose a container shape for your fire.

The container determines the general shape of the fire.

The container determines the shape of the fire. This example uses the Box and Sphere containers.

12 Adjust the value of the **Completion of Burning Fire** slider.

This slider controls the animation of your fire. Set this slider to 0% at the start of your animation, and at 100% at the end.

13 Adjust the value of the **Upward Speed** slider.

The **Upward Speed** slider controls the speed at which the flames appear to shoot up during an animation.

Creating Infinite Planes

An Infinite Plane is a flat primitive whose sides extend out to infinity in all directions. This type of primitive is used to create a surface for your scene such as a sky, ocean or ground.

To create an Infinite Plane:

Click the **Infinite Plane** tool and drag it into the **Time Line** or **Perspective** windows.

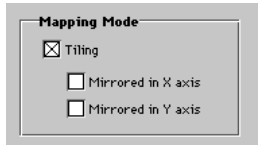

Use the Infinite Plane tool to create an Infinite plane.

Although the plane appears finite in the **Perspective** window, it will extend out to infinity in the final rendering.

Shading an Infinite Plane

Apply shaders to an Infinite plane can be tricky since the texture or color you apply will extend out to infinity. This can be a especially tricky when using texture maps or gradients. The plane's tiling controls can help you adjust how shaders are tiled on the plane.

To adjust shader tiling:

1 Double-click the Infinite Plane.

Use the Infinite plane tiling controls to set the attributes for tiling a shader across the plane.

2 Enable the **Tiling** option if you want your shader to be tiled across the plane.

If you don't enable tiling, the shader will be stretched to cover the entire surface of the plane.

3 Enable either the **Mirrored in X axis** or **Mirrored in Y axis** option.

These options let you control the continuity of the pattern created by tiling the shader.

The X and Y refer to the plane's own coordinate system, not the global coordinate system.

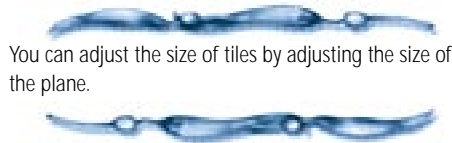**Mirrored in X axis** mirrors the tile in the X axis as it tiles it across the plane.

Tile mirrored in X the axis.

Mirrored in Y axis mirrors the tile in the Y axis as it tiles it across the plane.
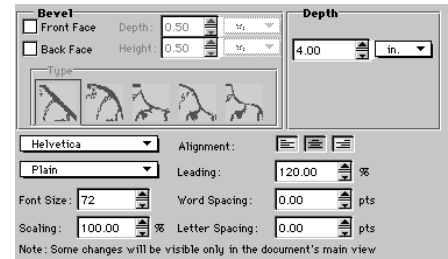

Tile mirrored in the Y axis.

You can adjust the size of tiles by adjusting the size of the plane.

Creating Text Objects

When you create a **Text** object, Ray Dream Studio immediately opens it in the **Text Modeling** dialog, allowing you to enter the text you want, specify its depth, and add bevels.

To create Text objects:

1 Choose the **Text** tool and then drag in the **Perspective** window. The **Text Modeling** dialog appears.
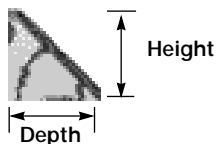

Use the Text Modeling dialog to create text.

2 In the region at the bottom of the dialog (where it says "text..." in the figure above), type the text you want.

3 Choose a font from the font pop-up.

Any TrueType and Type 1 fonts you have in your system are available for creating **Text** objects.

4 Choose a font style from the style pop-up.

5 Enter a value in the **Font Size** entry box. Font size is measured in points. You can also use the scroll arrows to set a value.

6 Use the **Depth** controls to set the width of the text.

7 Enable the **Front Face** checkbox to add a bevel on the front face of the text object.

8 Enable the **Back Face** check box to add a bevel to the back of the **Text** object.

9 Enter values in the **Depth** and **Height** fields to specify the slope or contour of the bevel on the text.

Height

Depth

The Depth and Height settings control the contour of the bevel on the back of your text object.

10 Click on a bevel type in the **Type** controls at the top of the dialog.

11 Click **Done**. You can also choose `Edit menu▸ Jump Out`.

The **Text** dialog changes back to the **Perspective** window, and your text object is drawn.

To edit a Text object:

Double-click a **Text** object in the **Perspective** or **Hierarchy** window, or select a **Text** object and choose `Edit menu▸ Jump In`.

Ray Dream Studio opens the **Text** object in the **Text Modeling** dialog, where you can change its content, extrusion depth, bevels, or any of the type specifications.

The Size of Text Objects in the Universe

The size of a text object in the Universe depends on the font size you choose in the **Text Modeling** dialog. You can determine how large a **Text** object will be by multiplying its font size by 0.333. This calculation gives you the approximate height (in inches) of a capital letter; lowercase letters are proportionally smaller, of course.

For example, if you created a **Text** object using 72-point type in the **Text Modeling** window, any capital letters in the text object would be approximately 23 inches tall in the Universe. Knowing the height of the letters in your object, you can set a value in the **Extrusion Depth** field to control the relationship between height and depth.

Creating Formula Objects

Formula objects are 3D objects you create using mathematical equations. The Formula Editor lets you enter parameters, variables and operators to create unique objects.
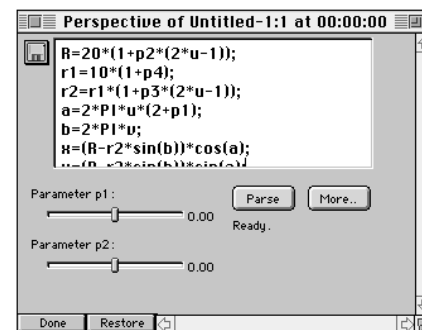
To create a Formula object:

1 Click the **Formula** tool and drag it into either the **Perspective** or **Time Line** windows.

Drag the Formula tool into the Perspective window to open the Formula controls

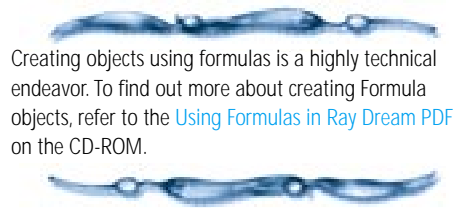**2** Double-click the object. The **Formula** controls appear.

Use the Formula controls to create unique objects.

3 Enter a formula into the editor.

- You can load a formula by clicking the **Load** button.

- You can use the parameter sliders to increase/decrease the value of parameters.
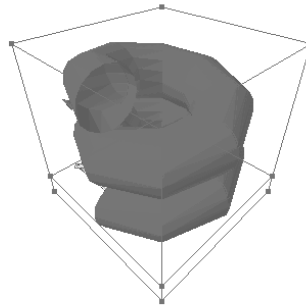
- Click **More** to display the **Formula Editor**.

The Formula Editor lets you see more of the parameter sliders and has controls for adding parameters and functions.
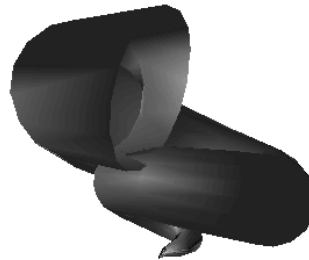
Creating objects using formulas is a highly technical endeavor. To find out more about creating Formula objects, refer to the Using Formulas in Ray Dream PDF on the CD-ROM.

4 When you're finished editing the formula, click **Done**.

When you're done creating your formula, Ray Dream creates an object and places it in the Perspective window.

When your formula object is finished you can edit it by adjusting the values of its parameters.

You can change the shape of your formula object by adjusting the values of its parameters.

Creating Objects Using the Modeling Wizard

The Modeling Wizard is a picture-based assistant that guides you through the basic steps of creating an object. After a few sessions with the Wizard you'll better understand the concepts of **Free Form** modeling.

Note: The Modeling Wizard only creates **Free Form** objects.

To create an object using the Modeling Wizard:

1 Drag the **Modeling Wizard** tool into the **Perspective** or **Time Line** window.

The Modeling Wizard appears.

2 Follow the instructions provided.