Fractal Design

RADICAL F/X

FRACTAL DESIGN CORPORATION

Radical F/X User Guide

Introduction

Welcome to Fractal Design **Radical F/X** extensions package for Ray Dream Studio. With these exciting new extensions you can explode, warp, wave and dissolve objects. Punch a hole into the side of an object or have it sucked into a black hole. Morph any object into a spherical shape or have it grow spikes all over the surface. Create realistic clouds, fog and fire as well as fountains. Any of these new functions would be great in a still image but, of course, all of the new primitives, deformers, and shaders can be animated too. **Radical F/X** includes three new Shader functions and the ability to create complex objects using the new Boolean functions. We have also added two frequently requested items. The new Slider dialog box allows you to enter slider values numerically, using the keyboard. The new Counter dialog box shows you the number of objects, facets, patches and triangles in a particular object or scene.

The Online Documentation

This documentation is designed to be viewed on your computer monitor but if preferred you can print it out. When viewing on screen, click a topic in the Table of Contents to move to that particular topic in the documentation. You may also use the scroll bar at the right of the document. Or click the thumbnail to the left of the document.

We have divided the information into six chapters to make it easier for you to get to the information you want. Installation is explained in Chapter 1. Chapter 2 covers the new primitives: Fountain, Cloud, Fog and Fire. Chapter 3 covers the nine new deformers. Chapter 4 introduces the three new shader functions and Chapter 5 describes Boolean operations. The last chapter describes the new Slider Value dialog and the new Counter function.

Conventions

There are several conventions used to identify paths to certain tools and controls. The convention to a menu follows the rule of the **menu name> menu item.** When Macintosh and Windows instructions differ, Macintosh instructions are listed first, then Windows instructions are given.

Chapter 1: Getting Started

Installing the Radical F/X extensions

In order to use the new Radical F/X extensions you must install the updated version of Ray Dream Designer/Studio. Before doing the installation be sure to remove and save any documents you may have stored in your Ray Dream directory. The installation process completely replaces your current Ray Dream directory or folder.

Radical F/X extensions are included on the Ray Dream Designer/Studio CD. To install extensions you must do a custom install.

To install Radical F/X:

1. Insert the Ray Dream CD into the CD-ROM player.
2. Double click the **SetUp** icon (Macintosh) or **SetUp.exe** icon (Windows). Under Windows 95, click the **Install** button. The Installer screen presents welcome information.
3. Click **Next**. Set the location for Ray Dream Designer/Studio.
4. Click **Next**. Select a **Custom install**.
5. Click **Next**. Verify that Radical F/X is included in the list of items to be installed.
6. Click **Next**. Select a program folder.
7. Click **Next**. Review the settings you have selected.
8. Click **Start**. The Installer places all requested files onto your hard drive.

When the Installation is complete, launch Ray Dream Designer/Studio by double clicking its icon. Under Windows 95 you may also choose **Start> Programs> Ray Dream Studio.**

Chapter 2: Creating Boolean Objects

Boolean operations allow you to create new 3D objects based on two original 3D objects. This function is very powerful and allows you to create new shapes that were impossible to create with earlier versions of Ray Dream Designer. You can create a Boolean object from an original object which was previously made into a Boolean object to get some very interesting effects. You can also use paint shapes on the interior surfaces of a Boolean object.

To use Boolean Operations:

1. Select two objects that overlap each other. Ray Dream Designer/Studio will display the names of the selected items. The following text refers to the two objects as Object 1 and Object 2 but onscreen you will see the actual object names.

2. Choose **Edit menu> Geometric Operations> 3D Boolean**. The Options dialog opens allowing you to set options for the operation.

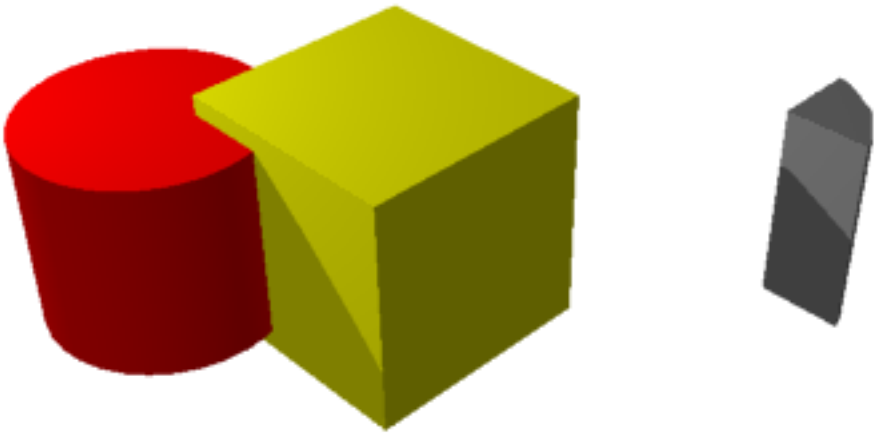
3. Click **OK**. The Boolean Operation is performed and the new object placed in the scene. The original objects are discarded.

4. If you are not happy with the resulting object select **Edit menu> Undo** or press **Command/Ctrl+Z**.

Options you can set for Boolean Operations include the type of Boolean function to be applied and the Silhouette Quality of the new object.

Intersection

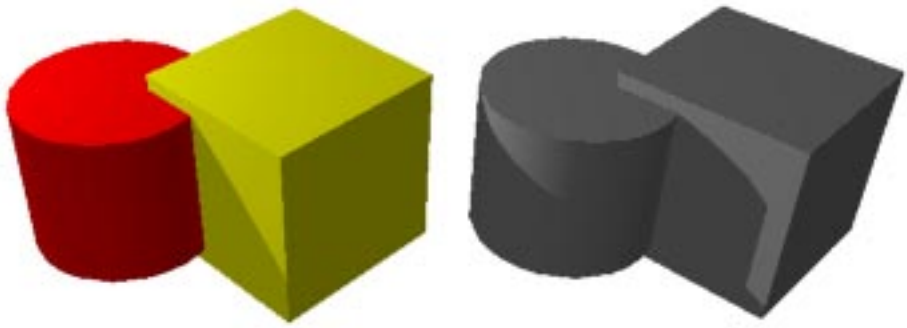
Intersection creates a new 3D object that includes all areas that are overlapping or common to both original objects. Areas that are within one object but not the other object are discarded.



Intersection, before and after.

Union

Union creates a new 3D object that is the sum of all areas within the two original objects.



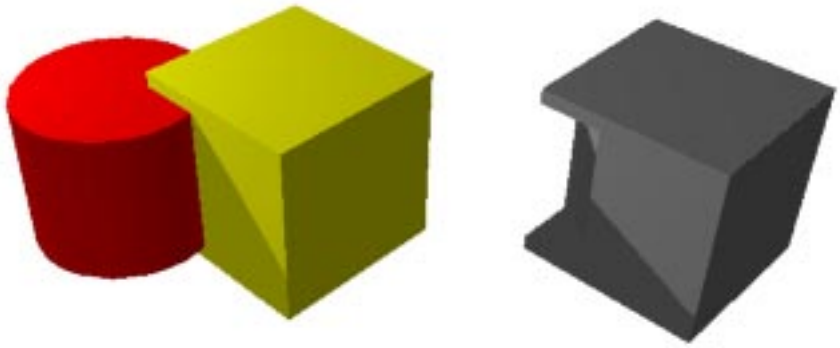
Union, before and after.

Subtraction

The new Boolean functions allow you to subtract one object from another. On your screen you will see the names of the two objects you have selected. In this document the two objects are referred to as Object 1 and Object 2.

Object 1 minus Object 2

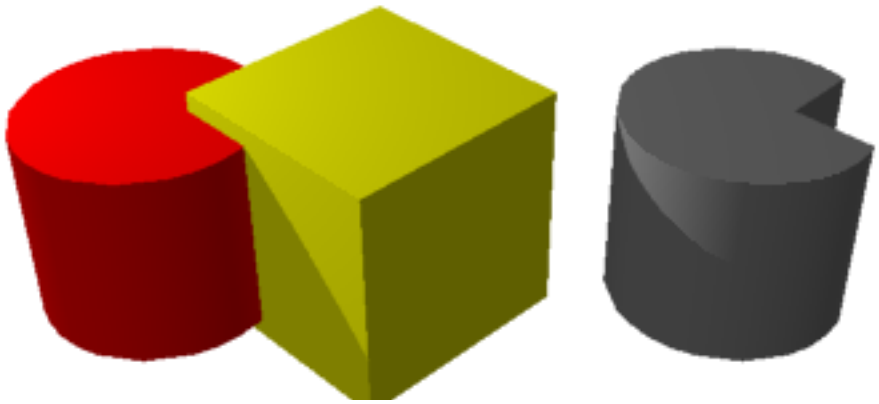
Object 1 minus Object 2 creates a new 3D object that includes all areas within Object 1 that are not also within Object 2. All areas within Object 2 are discarded.



Object 1 minus Object 2.

Object 2 minus Object 1

Object 2 minus Object 1 creates a new 3D object that includes all areas within Object 2 that are not also within Object 1. All areas within Object 1 are discarded.



Object 2 minus Object 1.

Silhouette Quality

The Silhouette Quality slider controls how the edges of objects are calculated during rendering. The slider ranges from 25% to 200%.A low setting results in grainy edges but renders quickly. A high setting results in smooth, non-faceted silhouettes but requires more time and RAM to render.

Chapter 3: Using the Radical F/X Primitives

Using the New Primitives

Radical F/X includes four new primitives accessible from the toolbar along the left edge of your screen.

Radical F/X primitives: Fountain, Cloud, Fog and Fire.

For the most part these primitives, Fountain, Cloud, Fog and Fire, behave just like any other primitive. Create, manipulate and animate objects as you would any other primitive. However, unlike the simple sphere, cube, cone, cylinder and icosahedra primitives built into Ray Dream Designer, these new primitives have specific attributes that you can control. Look below for a description of each primitive's specific attributes.

Generally you will define each attribute when you create a primitive but you can also edit the primitives attributes at any time. To edit attributes double click the object.

Note: To edit a duplicate object, you must first separate it from the original master by creating a new master. See the Ray Dream Designer User Guide for information on duplicating.

You may also select a Master Object in the Masters tab of the Hierarchy/Time Line window then Option-click (Macintosh) or Right-click (Windows).

Volumetric Objects

The Cloud, Fog and Fire primitives are volumetric primitives. They behave slightly different than other Ray Dream 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 area that is included in the object but keeps 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.

Shuffle

The volumetric primitives, Cloud, Fog and Fire allow you to shuffle the parameters slightly by clicking the Shuffle button. When you apply a function to a series of objects you may want the shader to apply exactly the same to each object. However, frequently you want the different objects to be shaded in a similar but not exact manner. For example, in a scene with several clouds you may want the clouds to be very similar but not

exactly the same. Shuffle changes the texture slightly, giving a more random appearance to each object. In the case of your clouds you will apply the shader to the first cloud then select the second cloud and click the Shuffle button. Then apply the shader to the second cloud. The result is a more realistic image as each cloud displays a slightly different cloud look.

Click **Shuffle** to change the shader slightly.

Fountain

The Fountain primitive is a particle primitive used to create special effects such as fountains or tornadoes. You can change the color of a fountain object by dragging a new shader onto it. Just be sure that the cursor is over a solid part of the fountain when you release the mouse button. You may also drop a shader onto the object in the Hierarchy/ Time Line window.

Using various settings you can control the appearance of the fountain object to create interesting new objects like a volcano, a spray of water from a fireman's hose or a romantic old world fountain. Remember, you can animate your fountain using the Ray Dream Studio Time Line to add more realism to your movie.

To create a Fountain object:

1. Select the Fountain icon from the toolbar.

2. Working in the Perspective window, position the pointer at any point along the active plane of the Working Box. Click to create an object of default size, or drag to create an object of custom size.

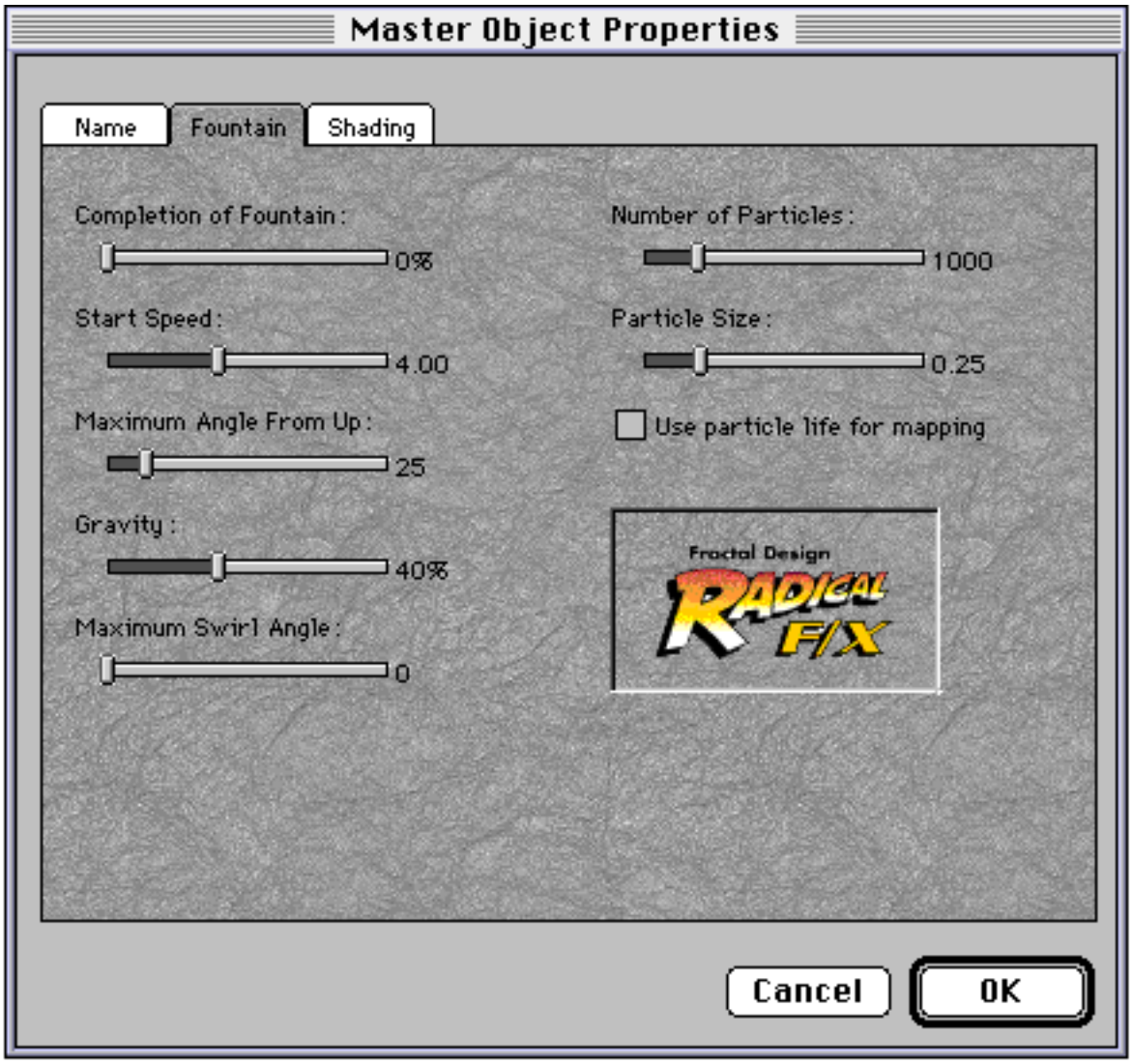
3. You may also drag the Fountain tool icon from the toolbar into the Perspective or Hierarchy window to create a Fountain object of default size or choose **Edit menu> Insert> Fountain**.

4. The Fountain dialog appears.

In the Fountain dialog, you can set the specific parameters you prefer for your fountain. You control the appearance of your fountain object by adjusting the various parameters described below.

To Edit a Fountain Object:

1. To edit a fountain object that already exists double click its bounding box in the Perspective window to open the Fountain dialog.



The Fountain dialog.

Completion of Fountain

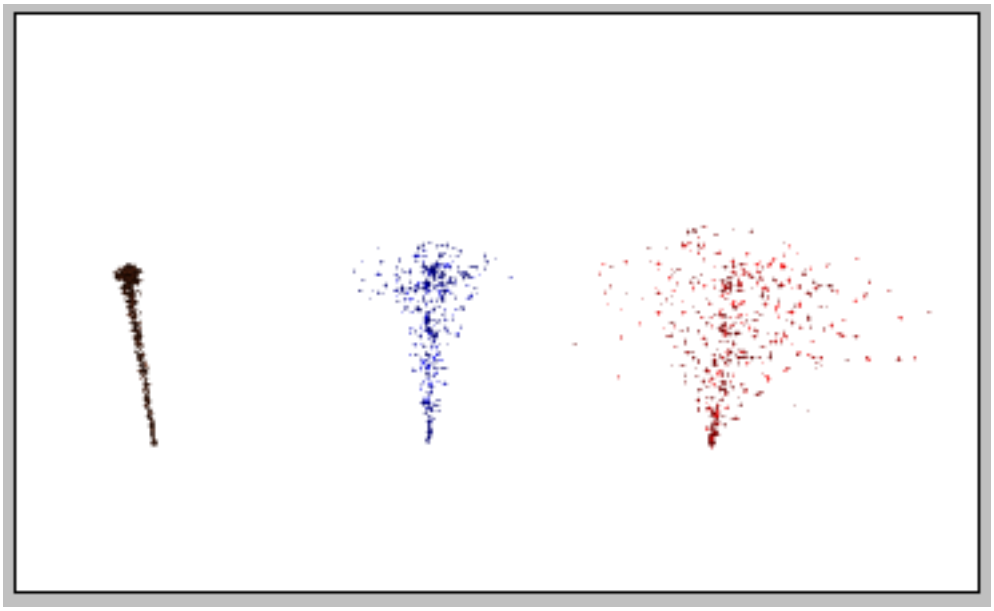
Use the Completion of Fountain slider to control animation. After setting the parameters for your fountain object at the first key event, move to the end of the animation on the Time Line. Create a new key event and use the Completion of Fountain slider to set the parameters for the end of the animation. A setting of 0% represents the beginning of the animation. A setting of 100% represents the end of the animation. You can have the animation begin or end at any place you prefer.

Start Speed

You can consider the Start Speed slider as a control for the nozzle or spout of the fountain. This slider ranges from 0.00 to 10.00 and controls the force of the fountain. A low setting will result in fast spouting fountain while a high setting will result in slowly spouting fountain.

Maximum Angle From Up

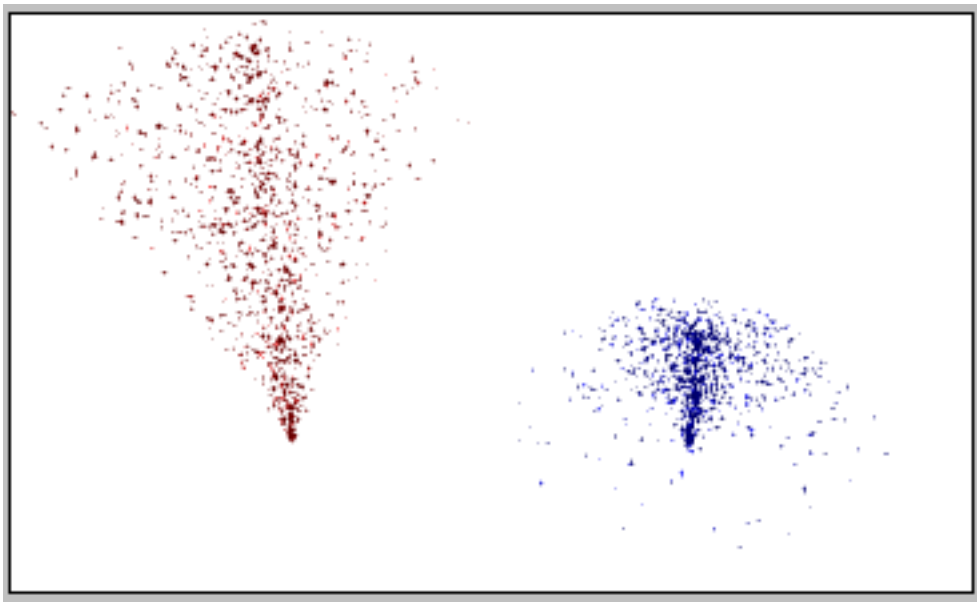
The Maximum Angle From Up slider ranges from 0 to 180 degrees and controls the angle of the spray from the fountain. When the slider is set to 0 degrees the spray goes straight up. When the slider is set to 180 degrees the spay goes out in a radius all the way around the fountain, parallel to the 'ground plane.' Up is always relative to object's local coordinates.



Maximum Angle From Up set to 2, 10 and 25 degrees.

Gravity

Gravity determines how the speed at which the particles from your fountain fall to the ground. The Gravity 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. Gravity is relative to the object's local coordinates, not the global coordinates.



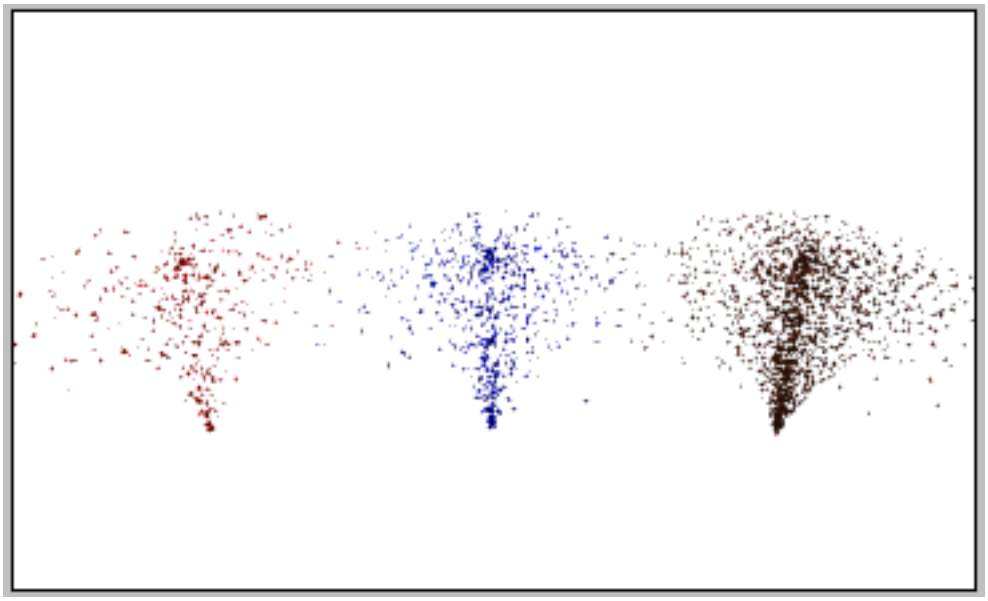
Gravity set to 10% and 60%.

Maximum Swirl Angle

As the particles from your fountain fall to the ground they may also be rotating around the fountain. Use the Maximum Swirl Angle slider to control this rotation. This slider ranges from 0 to 360 degrees and 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.

Number of Particles

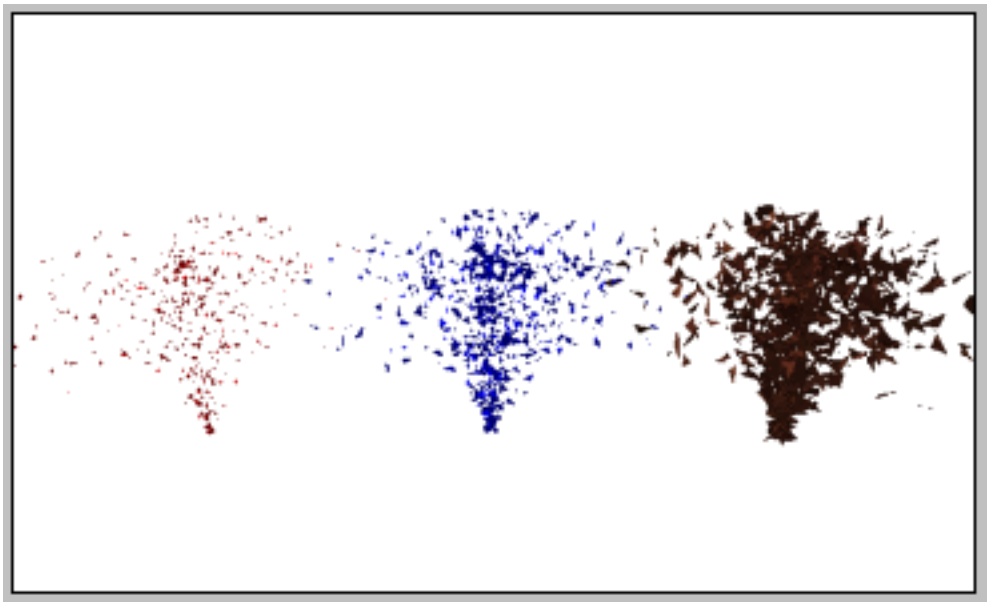
The Number of Particles slider controls the number of particles in your fountain. The range is from 0 to 5000. With a very low number you may not see the fountain effect at all. With a very high setting your fountain may appear almost solid as the particles are close together. Increasing the number of particles increases redraw and rendering time.



Number of Particles set to 1000, 2000 and 4000.

Particle size

Large particles might be great when you want a scene that shows buckshot spewing from a rifle. You might want very small particles when you are trying to create a waterfall. Use the Particle size slider to control the size of particles. This slider ranges from 0.05 to 1.00 and controls the size of the particles in the fountain. Setting this slider to a small number results in small particles. Setting this slider to a high number results in larger particles.



Particle Size set to 0.25, 0.50 and 0.95.

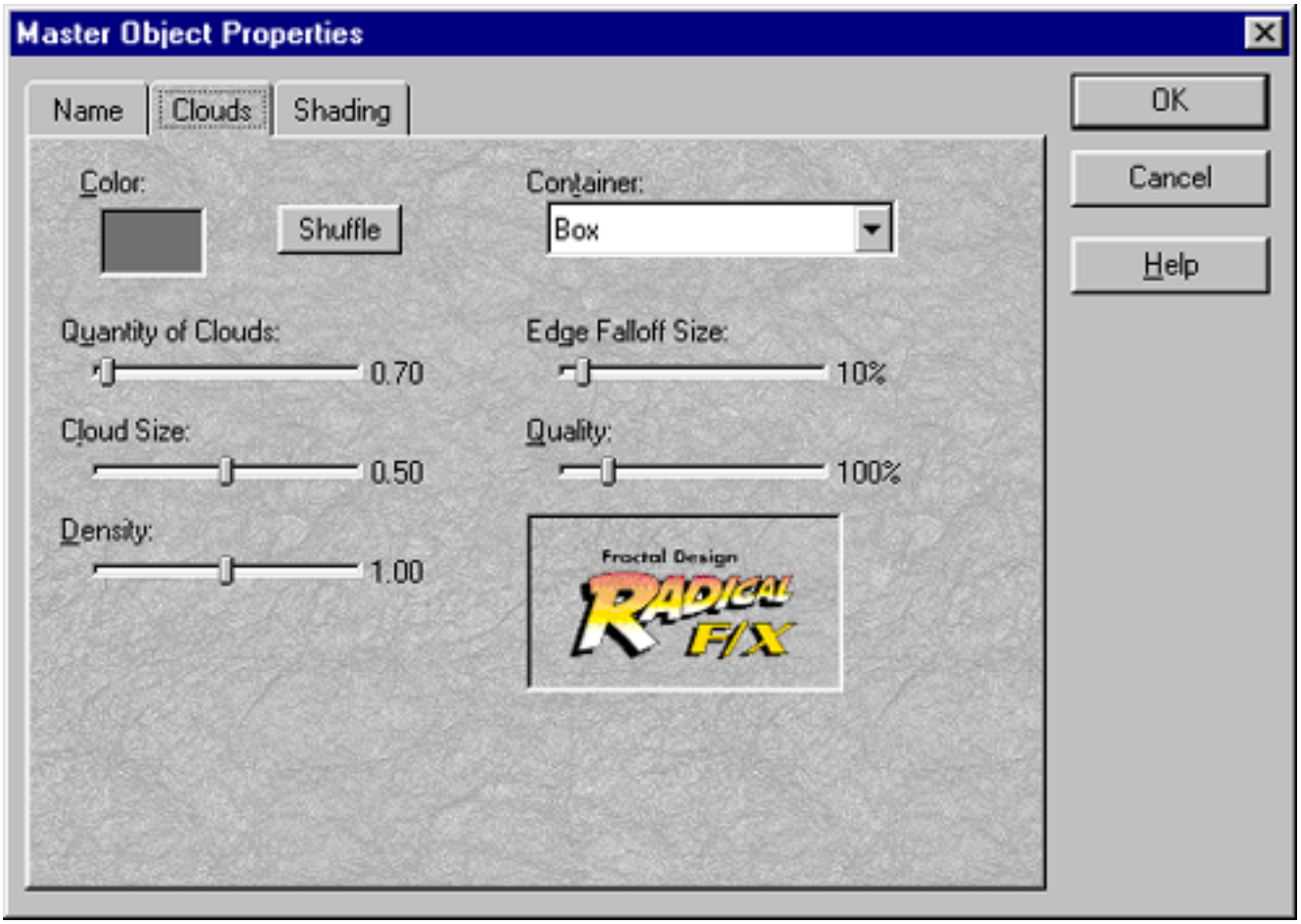
Use particle life for mapping

When you apply a shader to a fountain object the shader can map to each individual piece or to the entire fountain object. Check this box to apply the shader to the entire object. Deselect this box to apply the shader to each individual particle. This function would be useful in creating a fireworks display. Apply a gradient ranging from blue at the bottom to red at the top. The particles at the base of the fountain display blue while the particles farther away display red.

Cloud Primitive

The Cloud primitive creates a volumetric cloud, that is a cloud that has a three dimensional shape. There is no on screen representation except the bounding box that indicates the cloud's size and location. The cloud is not seen until it is ray traced. Other objects can be placed within a Cloud or partially within the cloud. Remember that you can animate your clouds to add more realism to your movie.

Note: Changing the size of the cloud by dragging a larger or smaller bounding box does not change the scale of the clouds. It changes the area that is covered with clouds.You can consider the cloud's bounding box like a window or mask that reveals clouds in the covered area. To change the scale of the clouds use the Cloud Size slider.



Cloud dialog.

To create a Cloud object:

1. Select the **Cloud** icon from the toolbar.

2. Working in the Perspective window, position the pointer at any point along the active plane of the Working Box. Click to create an object of default size, or drag to create an object of custom size.

3. You may also drag the Cloud tool icon from the toolbar into the Perspective or Hierarchy window to create a Cloud object of default size or choose **Edit menu> Insert> Cloud**.

4. The Cloud dialog appears.

To edit a cloud object:

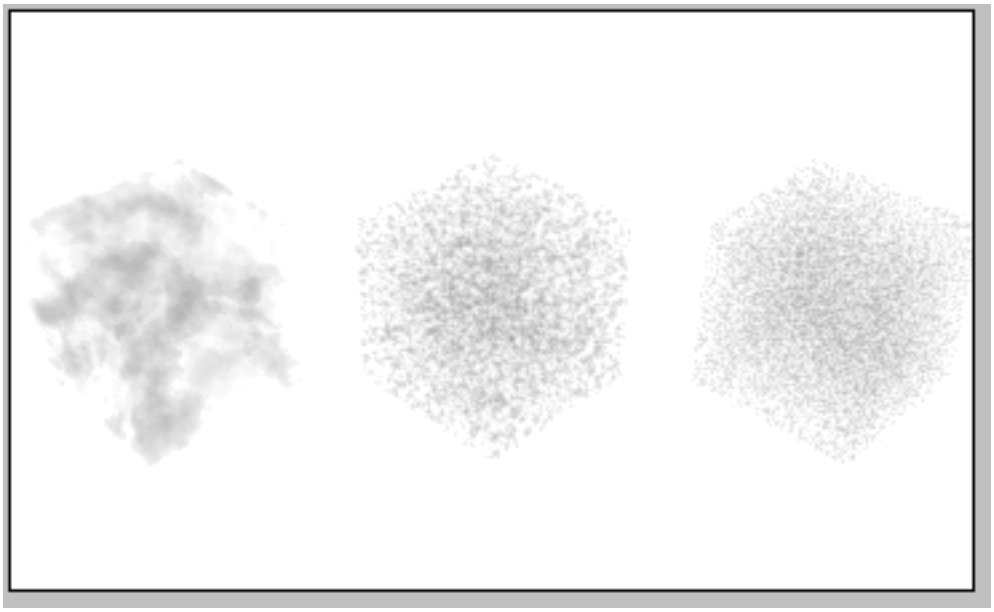
1. To edit a Cloud object that already exists double click its bounding box in the Perspective window to open the Cloud dialog.

Color

The color of your cloud can change the mood of your scene. A dark cloud gives a feeling of gloom while a bright white cloud might make the scene cheerful. Click the color sample to select a color for the cloud.

Quantity of Clouds

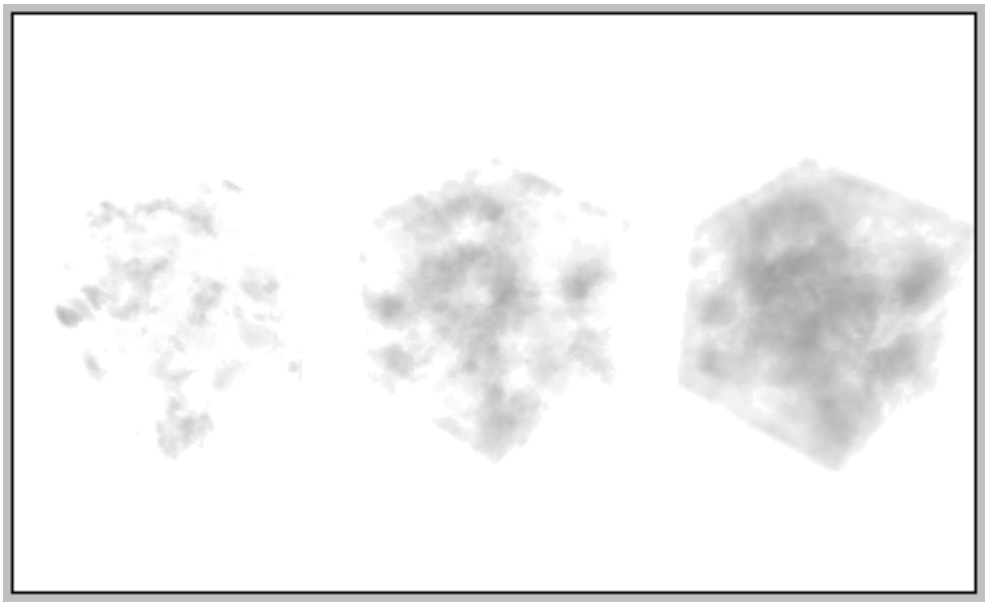
The Quantity of Clouds slider controls the number of clouds that are included in the bounding box. It ranges from 0.10 to 10.00. A low setting results in fewer clouds while a high setting results in more clouds.



Cloud Quantity set to 0.70, 5.00 and 10.00.

Cloud Size

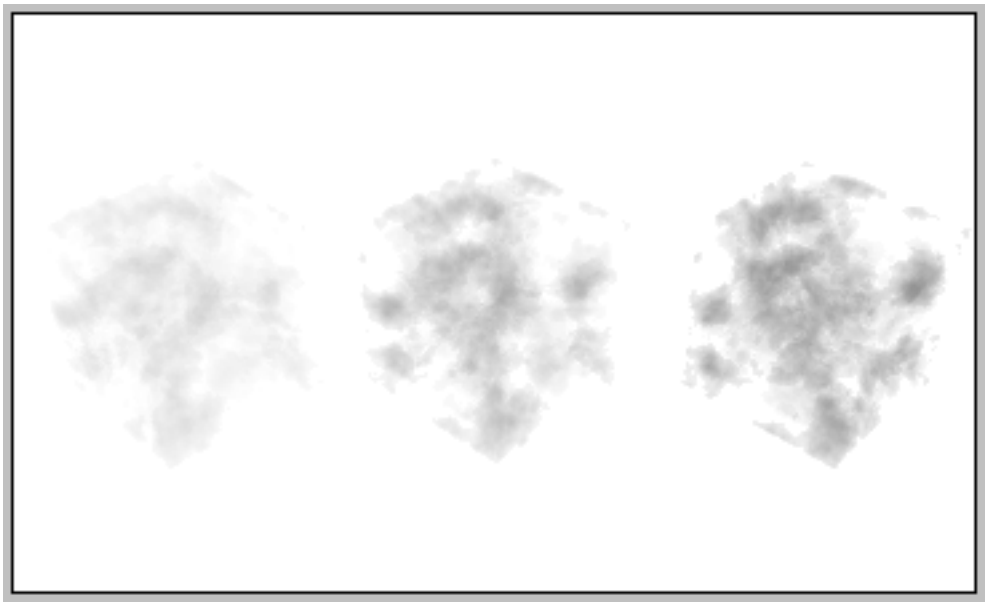
The Cloud Size slider controls the size of clouds that are included in the bounding box. It ranges from 0.00 to 1.00. A low setting results in small clouds while a high setting results in large clouds.



Cloud Size set to 0.25, 0.50 and 0.75.

Density

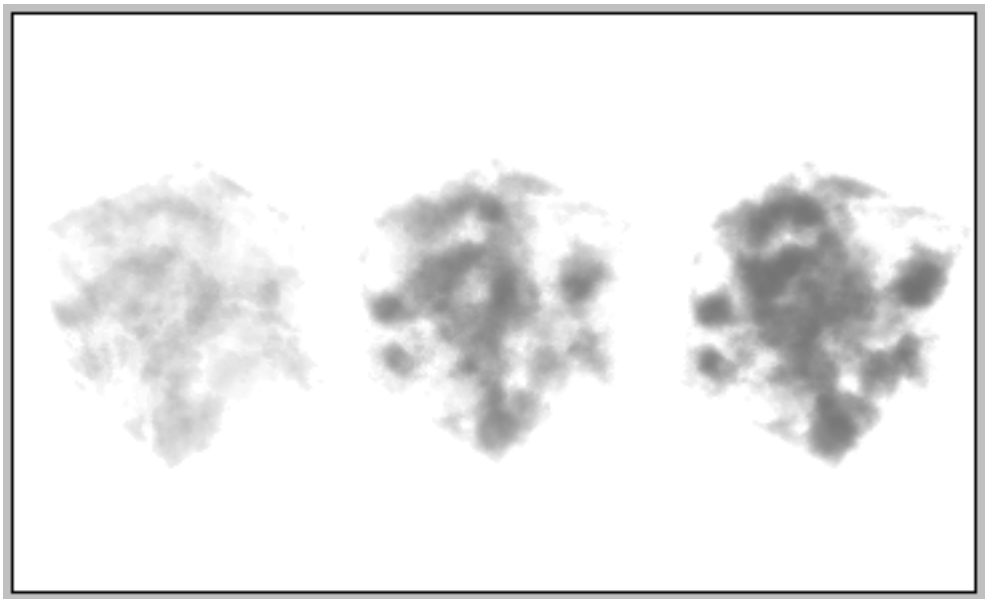
The Density slider controls the density of clouds. It ranges from 0.00 to 2.00. A low setting results in clouds that are almost transparent while a high setting results in clouds that are almost opaque, allowing little light to penetrate.



Density set to 0.50, 1.00 and 1.50.

Quality

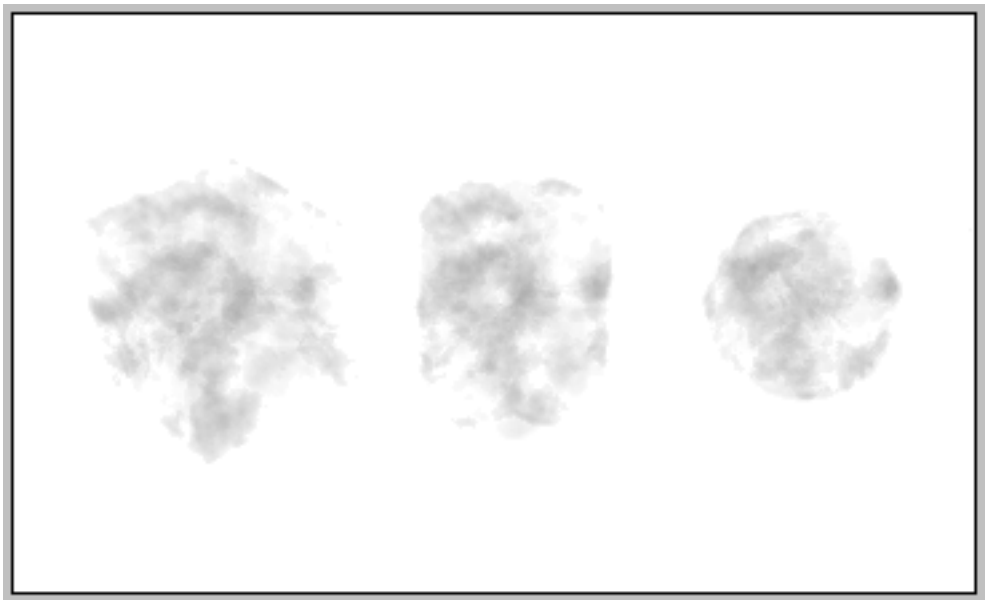
The Quality controls the quality of the clouds as they are rendered. It slider ranges from 10% to 500%. The default setting is 100%. The higher the quality the longer time it will take to render the image.



Quality set to 100, 300 and 500.

Container

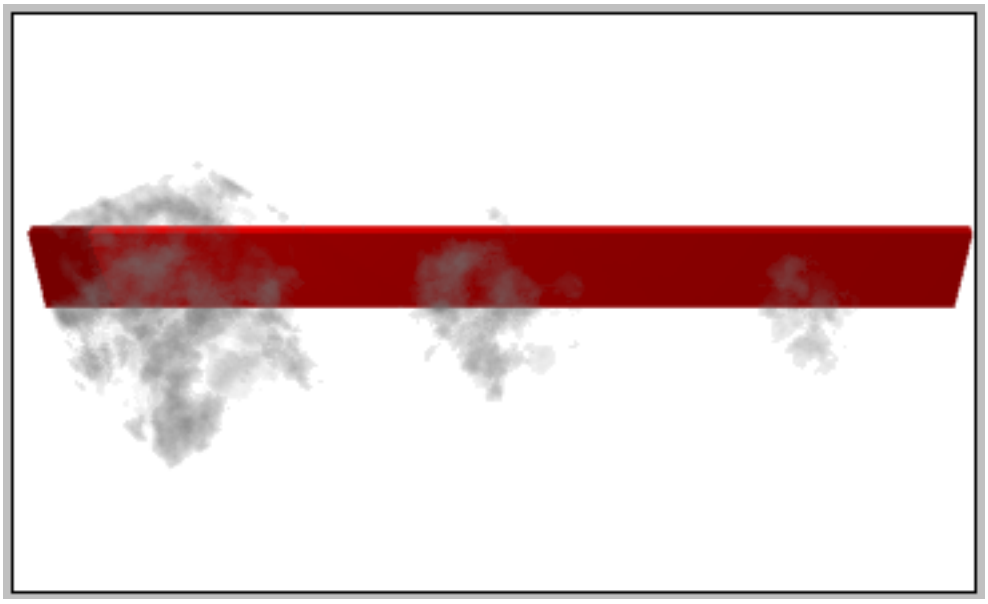
The container you select for your cloud object determines the general shape of the cloud. To select the container choose from the drop down menu. The container can be a box, a cylinder or a sphere.



Container set to Box, Cylinder and Sphere.

Edge Falloff Size

Falloff refers to how quickly the edge of the Cloud primitive fades to no clouds at all. The Edge Falloff Size 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. A setting of 10% means the cloud remains almost opaque for 90% of the object, then the last 10% decreases linearly and fades to the end of the range.

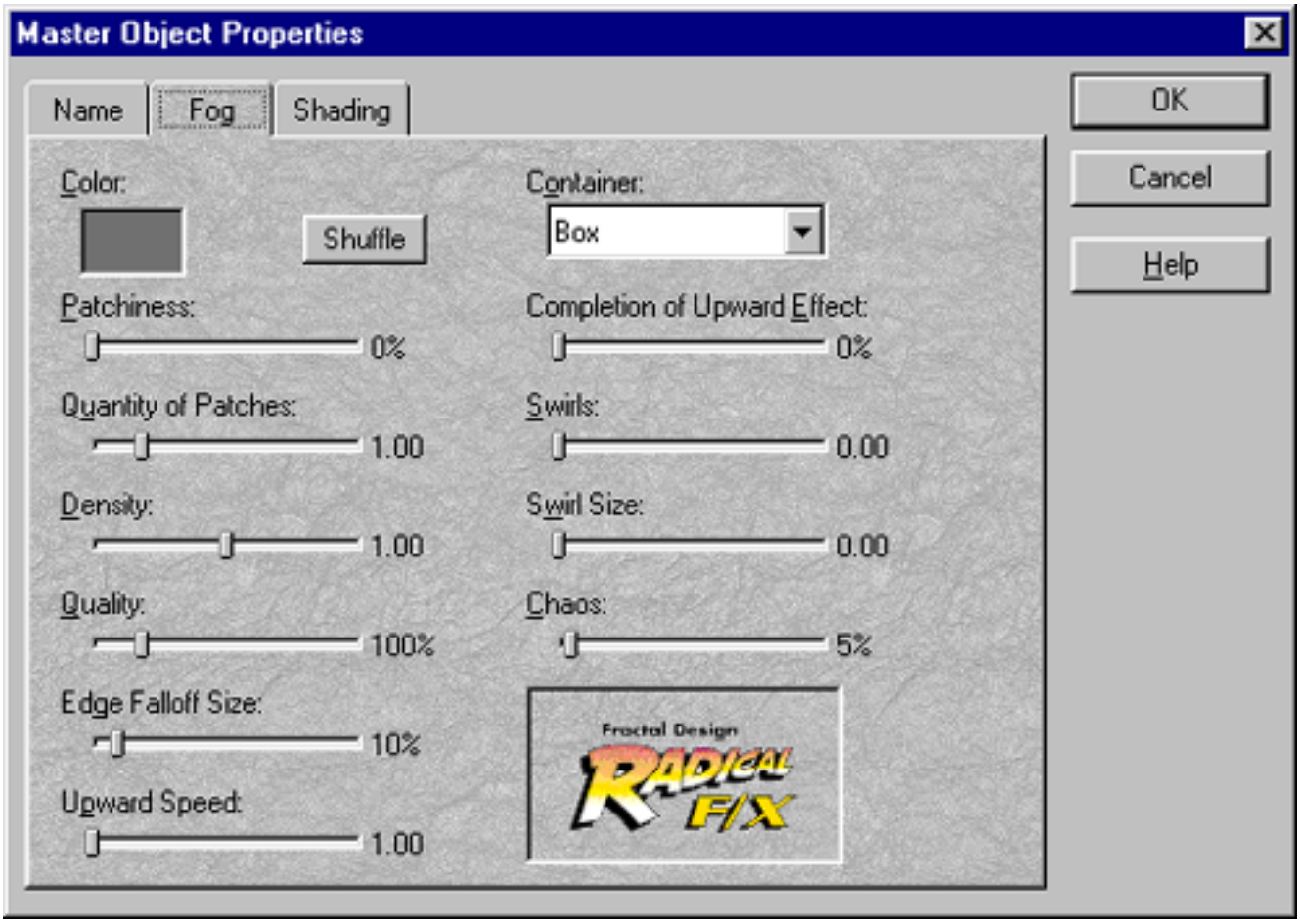


Edge Falloff Size set to 10%, 50% and 75%.

Fog Primitive

The Fog primitive creates a volumetric fog, that is a fog that has a three dimensional shape. There is no on screen representation except the bounding box that indicates the fog's size and location. The fog is not seen until it is ray traced. Other objects can be placed within a fog or partially within a fog. Frequently you will want your fog object to be large enough to include all or many of the other objects in your scene. Don’t overlook the cool effects you can get by animating Fog.

Note: Changing the size of the fog by dragging a larger or smaller bounding box does not change the scale of the fog. It changes the area that is covered with fog.You can consider the fog's bounding box like a window or mask that reveals fog in the covered area. To change the scale of the fog use the Swirl Size slider



Fog dialog.

To create a Fog object:

1. Select the Fog icon from the toolbar.

2. Working in the Perspective window, position the pointer at any point along the active plane of the Working Box. Click to create an object of default size, or drag to create an object of custom size.

3. You may also drag the Fog tool icon from the toolbar into the Perspective or Hierarchy window to create a Fog object of default size or choose **Edit menu> Insert> Fog**.

4. The Fog dialog appears.

To Edit a Fog Object:

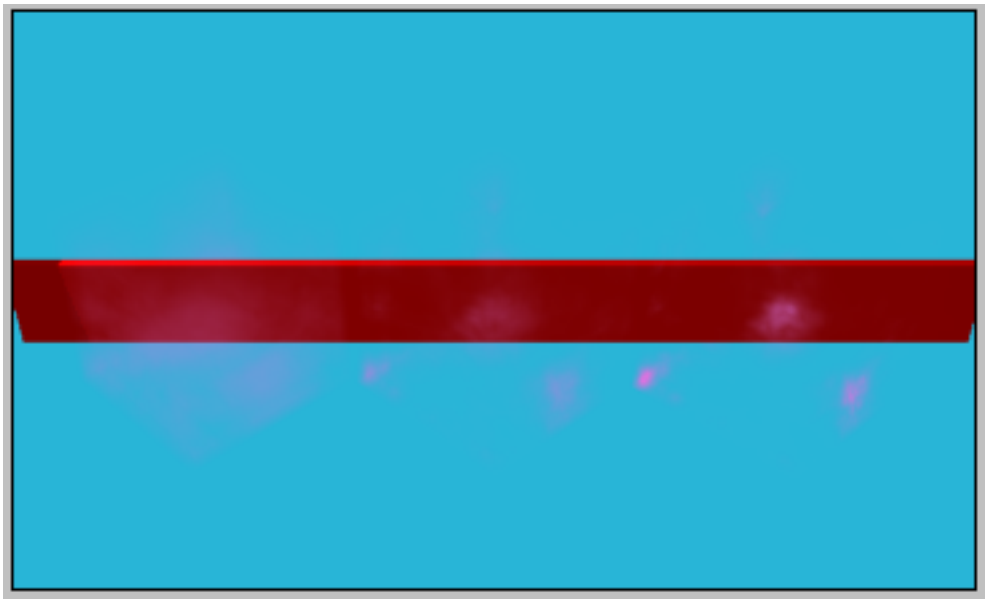
1. To edit a Fog object that already exists double click its bounding box in the Perspective window to open the Fog dialog.

Color

The color you choose for your fog can determine the mood of your scene. Click the color sample to select a color for the fog.

Patchiness

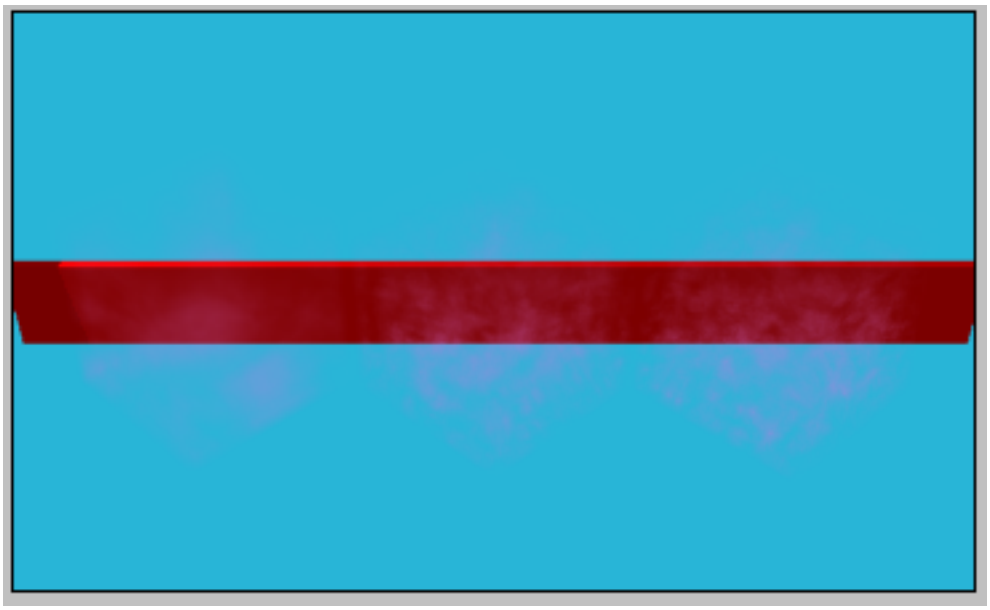
The Patchiness slider controls the regularity of the fog throughout the bounding box. A low setting results is little patchiness or a uniform fog. A high setting results in high patchiness or irregular fog.



Patchiness set to 0%, 50% and 90%.

Quantity of Patches

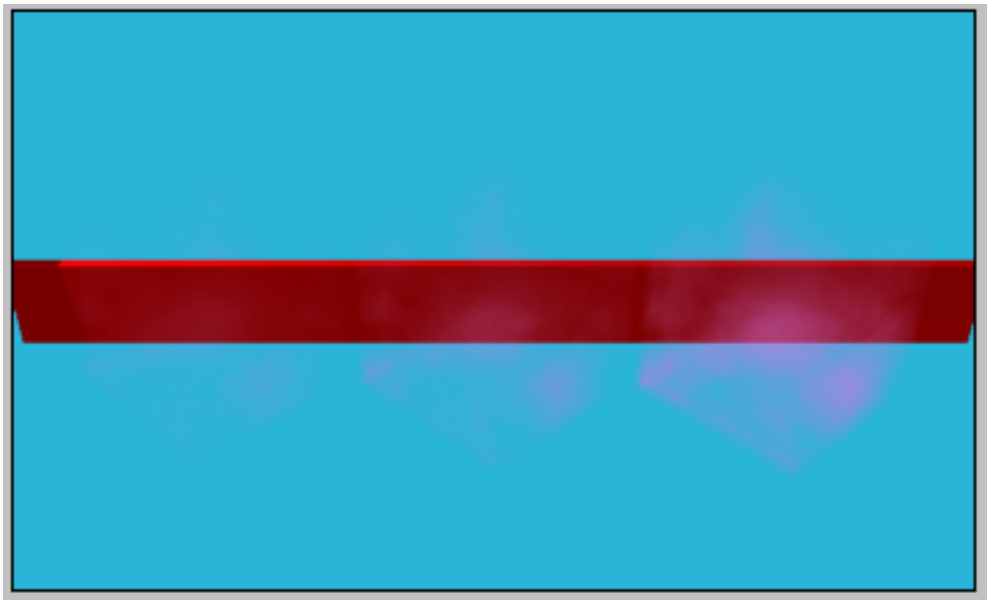
The Quantity of Patches slider controls how many patches of fog are contained in the bounding box. It ranges from 0.10 to 5.00. A low setting results in a small number of fog patches and a high setting results in more patches of fog.



Quantity of Patches set to 1, 3 and 4.

Density

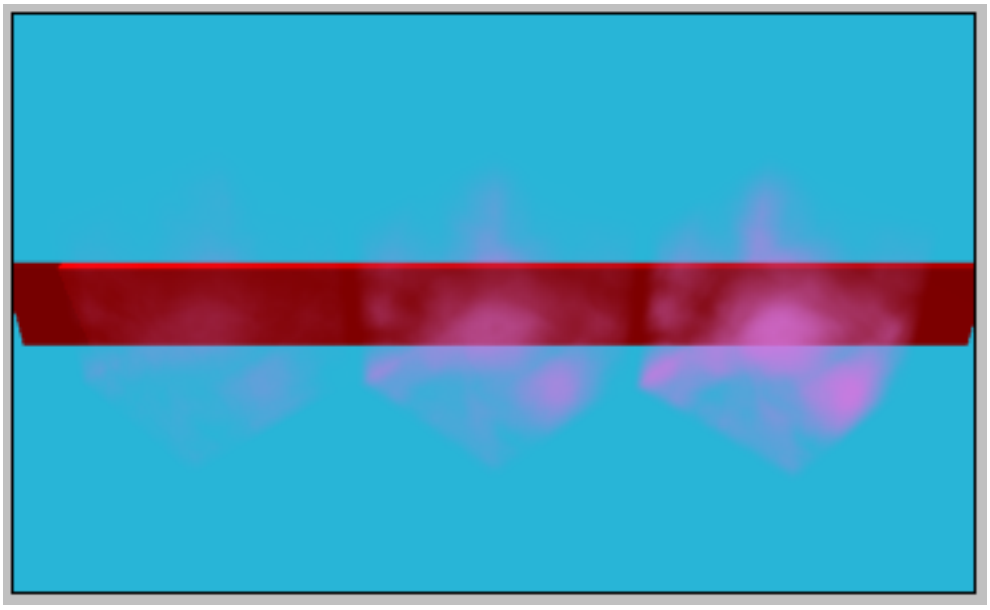
The Density slider controls the amount of light that penetrates the fog. It ranges from 0.00 to 2.00. A low setting results in fog that is almost transparent while a high setting results in fog that is almost opaque, allowing little light to penetrate.



Density set to 0.50, 1.00 and 1.75.

Quality

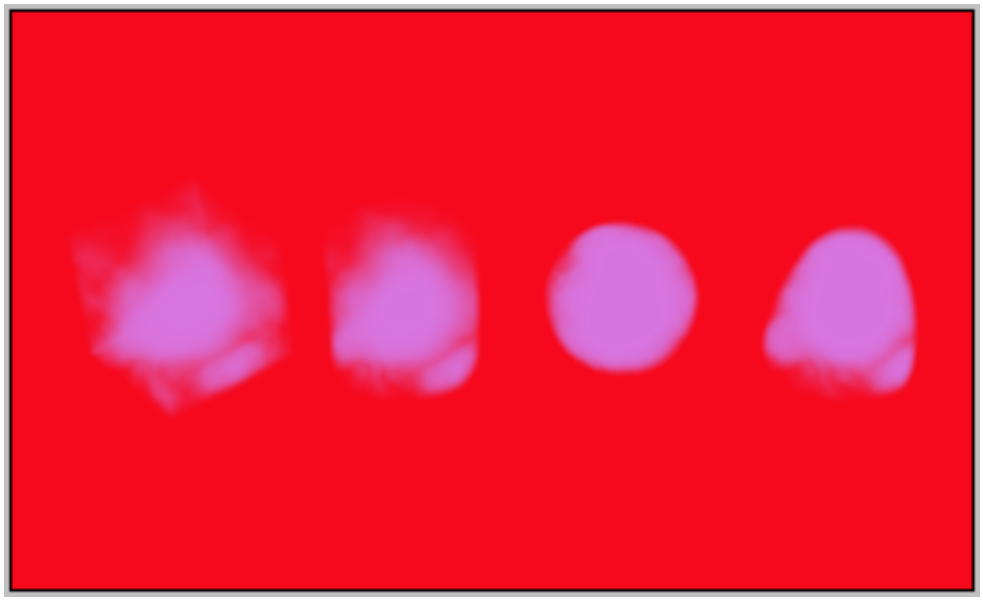
The Quality slider controls the quality of the fog as it is rendered. It ranges from 10% to 500%. The higher the Quality the longer the rendering will take.



Quality set to 100%, 300% and 500%.

Container

The container you select for your fog object determines the general shape of the fog. To select the container choose from the drop down menu. The container can be a box, a cylinder, a sphere or a half sphere.



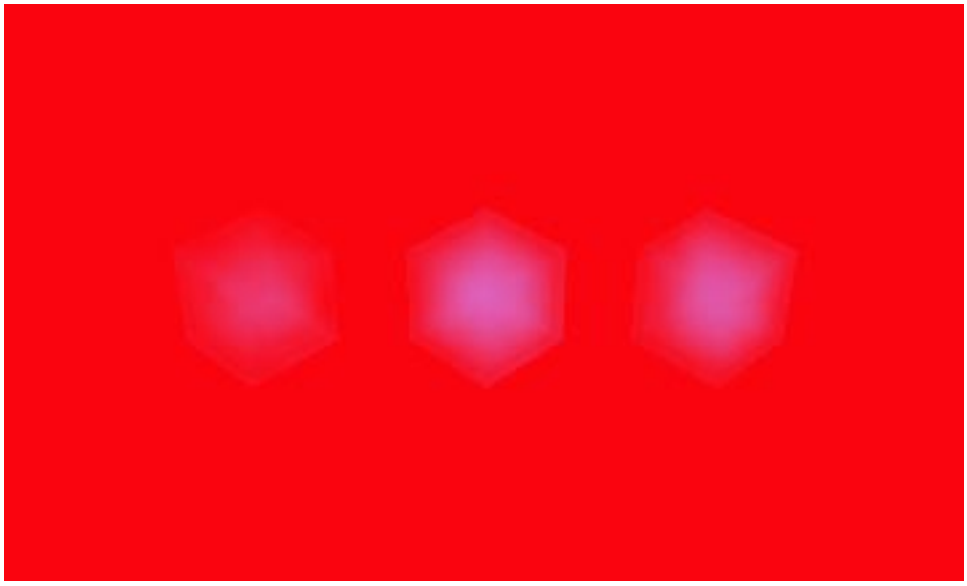
Container set to Box, Cylinder, Sphere and Half Sphere.

Completion of Upward Effect

The Completion of Upward Effect slider controls the animation of the fog. After setting the parameters for your fog object at the first key event, move to the end of the animation on the Time Line. Create a new key event and use the Completion of Upward Effect slider to set the parameters for the end of the animation. A setting of 0% represents the beginning of the animation. A setting of 100% represents the end of the animation. You can have the animation begin or end at any place you prefer.

Upward Speed

The Upward Speed slider controls the rate at which the fog rises during an animation. It ranges from 0.00 to 256. A low setting results in fog that remains close to the ground while a high setting results in fog that slowly rises. Higher settings are appropriate for longer animations.



Upward Speed set to 1, 2.5 and 5.

Swirls

The Swirls slider controls how the fog swirls or rotates as it rises. This rotation is similar to the images you see on TV weather reports, when the clouds swirl around as they move across the globe. It ranges from 0.00 to 5.00. A low setting results in very little swirl while a high setting results in a lot of swirl.

Swirl Size

The Swirl Size slider controls the size of the swirls. It ranges from 0.00 to 1.00. A low setting results in small swirls while a high setting results in large swirls.

Chaos

The Chaos slider controls the uniformity of the fog. A low setting results in a uniform fog while a high setting results in a random application of fog.

Chaos set to 5%, 50% and 100%.

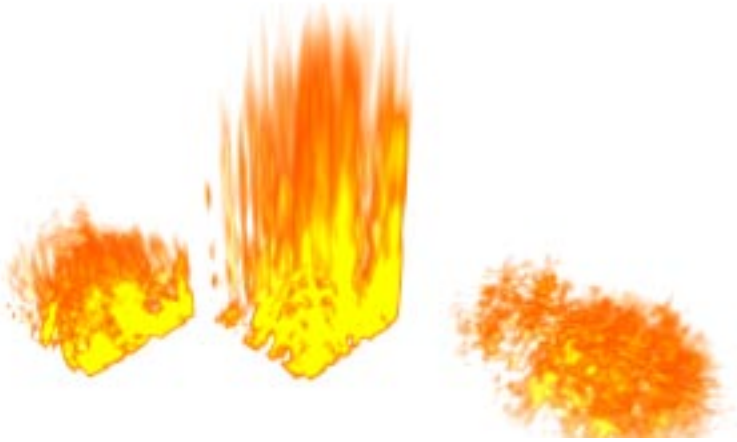
Edge Falloff Size

Falloff refers to how quickly the edge of the Fog primitive fades to no fog at all. The Edge Falloff Size 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. A setting of 10% means the fog remains almost opaque for 90% of the object, then the last 10% decreases linearly and fades to the end of the range.

Fire Primitive

The Fire primitive creates a volumetric fire object, that is a fire object that has a three dimensional shape. There is no on screen representation except the bounding box that indicates the fire object's size and location. The fire object is not seen until it is ray traced. Other objects can be placed within a fire object or partially within the fire object. For really cool movies, add animated fire objects.

Note: Changing the size of the fire by dragging a larger or smaller bounding box does not change the scale of the fire. It changes the area that is covered with fire. Making the bounding box taller results in higher flames but making it wider results in a larger area of fire, rather than fatter fire.



Fire, taller Fire and wider Fire.

To create a Fire object:

1. Select the Fire icon from the toolbar.

2. Working in the Perspective window, position the pointer at any point along the active plane of the Working Box. Click to create an object of default size, or drag to create an object of custom size.

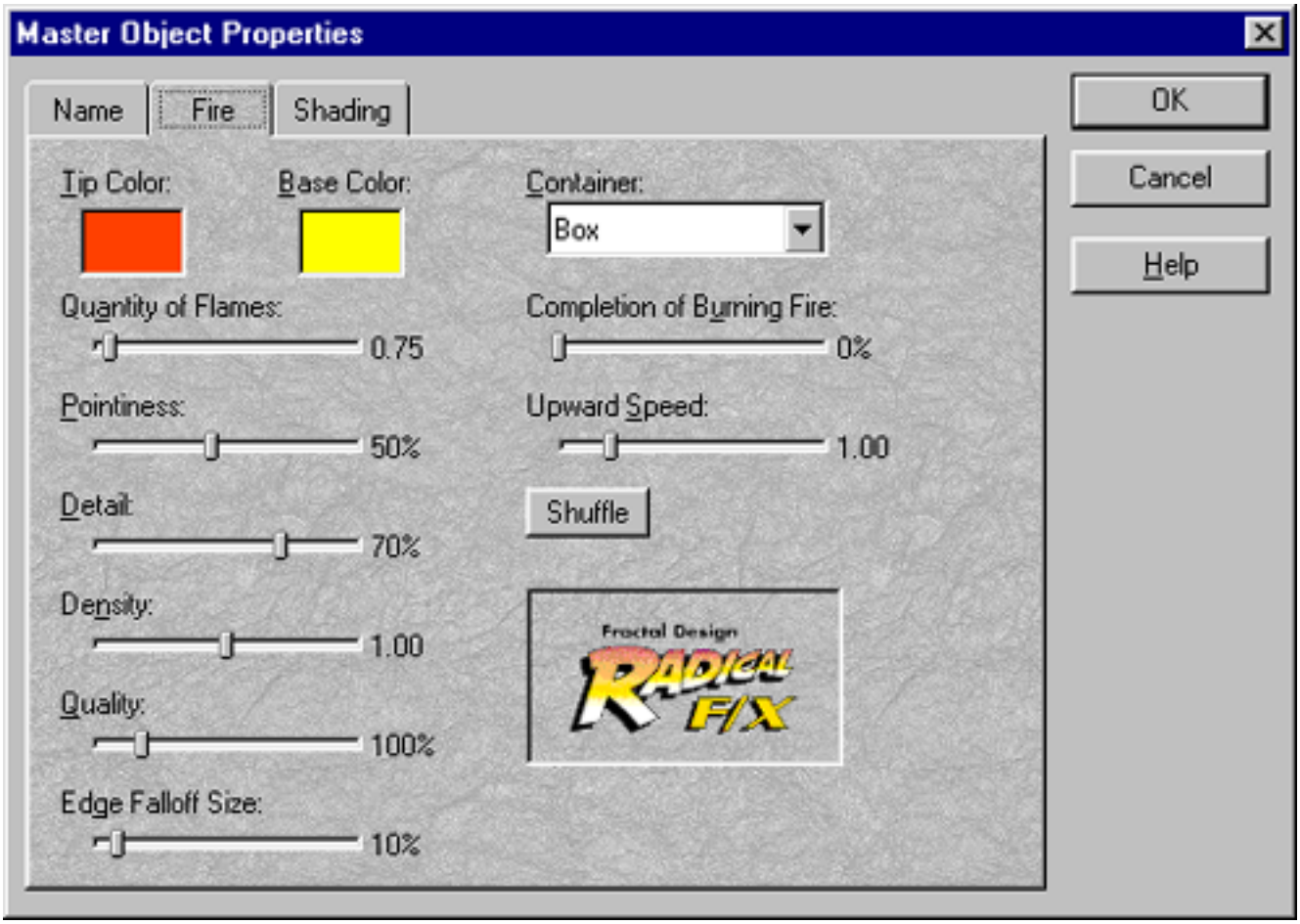
3. You may also drag the Fire tool icon from the toolbar into the Perspective or Hierarchy window to create a Fire object of default size or choose **Edit menu> Insert> Fire**.

4. The Fire dialog appears.

In the Fire dialog, you can set the specific parameters you prefer for your fire. You control the appearance of your Fire object by adjusting the various parameters described below.

To Edit a Fire Object:

To edit a Fire object that already exists double click its bounding box in the Perspective window to open the Fire dialog.



Fire dialog.

1. Assigning Fire colors

The Fire object contains two colors: base and tip. To select the particular color you desire for each part of your Fire object click the appropriate color sample. The standard color picker appears. Select the desired color and click **OK**.

Quantity of Flames

The Quantity of Flames slider controls the quantity of flames that appear in your Fire object. The slider ranges from 0.10 to 10.00. A low setting results in few flames while a high setting results in more flames.

Quantity set to 0.75, 5 and 10.

Pointiness

A slow burning fire may appear to have blunt tips and a fast burning fire or a fire with a strong upward draft may have more pointed tips. The Pointiness slider controls the percentage of your Fire object that is points or tips of flames. The slider ranges from 10% to 100%. A low setting results in fewer, less tapered points while a high setting results in many more tapered points.

Pointiness set to 25%, 50% and 100%.

Detail

The Detail slider controls the degree of detail in the Fire object. A low setting results in a Fire object with low detail and mix of colors that renders quickly. A high setting results in a Fire object with greater detail and mix of colors.

Detail set to 25%, 70% and 100%.

Density

The Density slider controls the density of the fire. The slider ranges from 0.00 to 2.00. A low setting results in fire that is almost transparent. A high setting results in fire that is almost opaque, allowing little light to penetrate.

Density set to 0.50, 1.00 and 2.00.

Quality

The Quality slider controls the detail of the fire as it is rendered. The slider ranges from 10% to 500%. Increasing the quality can add significantly to rendering time.

Quality set to 100, 300 and 500.

Container

The container you select for your Fire object determines the general shape of the fire. To select the container choose from the drop down menu. The container can be a box, a cylinder or a ball.

Container set to Box, Cylinder and Ball.

Edge Falloff Size

The Edge Falloff Size slider controls the appearance of the edges of the fire. Fall off refers to how quickly the edge of the fire transitions to no fire at all. A low setting results in a sudden change or little fall off. A high setting results in gradual change or longer fall off. A setting of 10% means the fire remains full fire for 90% of the object, then the last 10% decreases linearly to the end of the range.

Fire set to 10%, 50% and 85% Falloff.

Completion of Burning Fire

Use the Completion of Burning Fire slider to control animation. After setting the parameters for your fire object at the first key event, move to the end of the animation on the Time Line. Create a new key event and use the Completion of Burning Fire slider to set the parameters for the end of the animation. A setting of 0% represents the beginning of the animation. A setting of 100% represents the end of the animation. You can have the animation begin or end at any place you prefer.

Upward Speed

The Upward Speed slider controls the speed at which the flames appear to shoot up. The slider ranges from 0.00 to 256. A low setting results in slow movement while a high setting results in fast movement. Higher setting are appropriate for longer animations.

Chapter 4: Applying the Radical F/X Deformers

Radical F/X includes a set of nine new deformers: Atomize, Black Hole, Dissolve, Explode, Punch, Spherical Morph, Spike, Wave and Warp. All of these deformers can be used for still images or animations.

For general information regarding deformers, see your Ray Dream Designer User Guide.

To use a specific deformer:

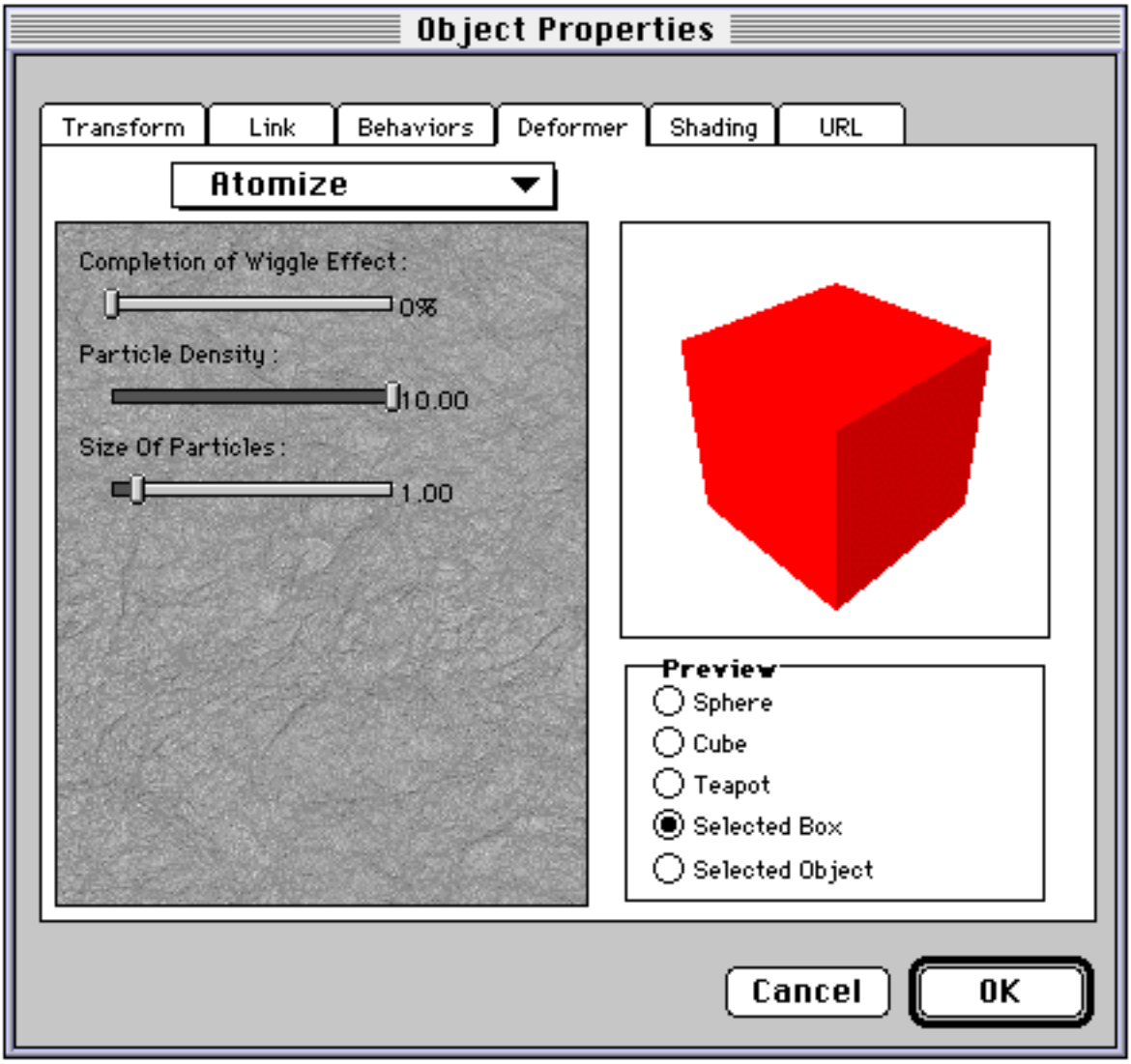
1. Select the object or group you wish to deform.
2. Choose **Edit menu> Object Properties** (or Command/Ctrl+T).
3. Click the **Deformer** tab to bring it forward and make it active.
4. Select the deformer you wish to apply from the pop-up list of deformers.
5. Select the preview sample you prefer.
6. Set the parameters desired by manipulating the appropriate sliders and checking the relevant radio buttons or boxes. These will vary by deformer and will be described below.
7. Click **OK**. The deformation you have specified is applied to your selection.

Preview

Click to select the preview object that is used to demonstrate the settings you change. Your choices are Sphere, Cube, Teapot, Selected Box or Selected Object.

Atomize

The Atomize deformer replaces the surface of the selected object with small balls which are then slightly scrambled or wiggled.



Atomize deformer dialog.

Completion of Wiggle Effect

The Completion of Wiggle Effect slider controls the amount of movement the balls display as they jiggle or wiggle. This slider ranges from 0% to 600%. A setting of 0% represents the starting position of the balls. A setting of 600% may result in the same position. Settings between 0% and 600% represent the various positions as the balls independently wiggle. A setting of 0% represents the first frame of the animation. A setting of 100% represents the last frame of the animation. After setting the parameters for your

atomized object at the first key event, move to the end of the animation on the Time Line. Create a new key event and use the Completion of Wiggle Effect slider to set the parameters for the end of the animation.

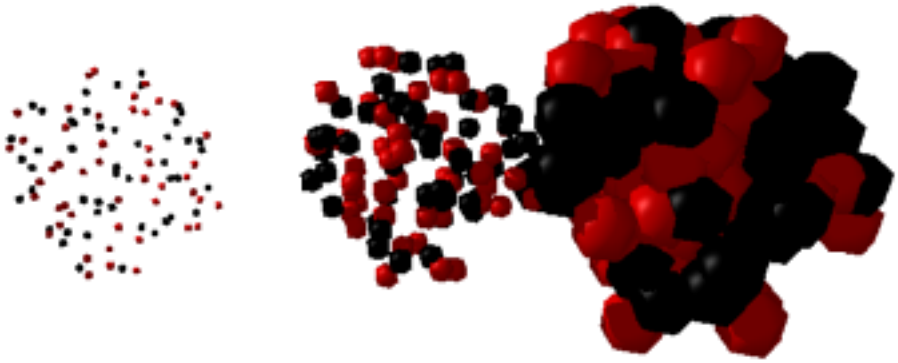
Particle Density

The Particle Density slider controls the number of particles or balls created by the Atomize deformer. The slider ranges from 0.00 to 10.00. A low setting results in few particles while a high setting results in many particles.

Three cubes with Atomize deformer, Particle Density set to 2, 4 and 8.

Size of Particles

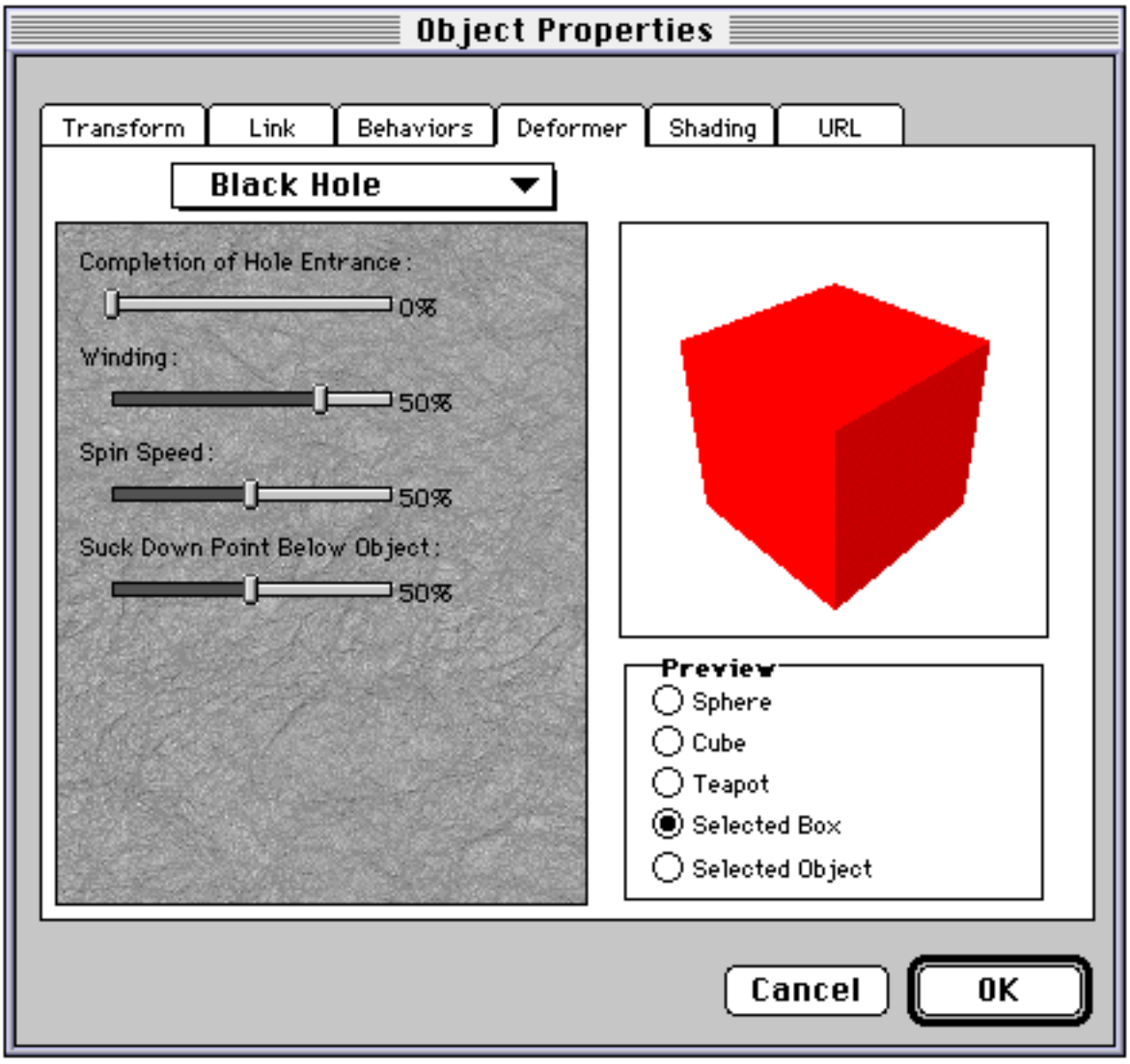
The Size of Particles slider controls the size of the individual balls created by the Atomize deformer. A low setting results in small particles while a high setting results in large particles.



Particle density set to 2 and size set to 1.00. 3.00 and 8.00.

Black Hole

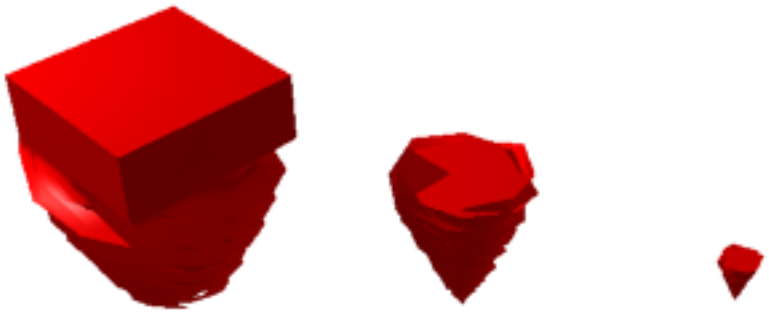
The Black Hole deformer creates a vortex effect, similar to the way water swirls as it is being sucked down a drain. In an animation the Black Hole deformer creates a whirling, circular motion that tends to form a cavity or vacuum at the center of its action.



The Black Hole dialog.

Completion of Hole Entrance

The Completion of Hole Entrance slider controls how much of the object has gone into the vacuum at the center. A low setting results in little distortion while a high setting results in most of the selection disappearing into the center. A setting of 0% represents the first frame of the animation. A setting of 100% represents the last frame of the animation. Use the slider to view any specific frame along the animation.



Cubes with Black Hole deformer at 30%, 70% and 90% completion.

Winding

The Winding slider controls the rotation as the Black Hole deforms. The slider ranges from -100% to 100%. A negative setting creates rotation counterclockwise, while a positive setting creates rotation in a clockwise direction.

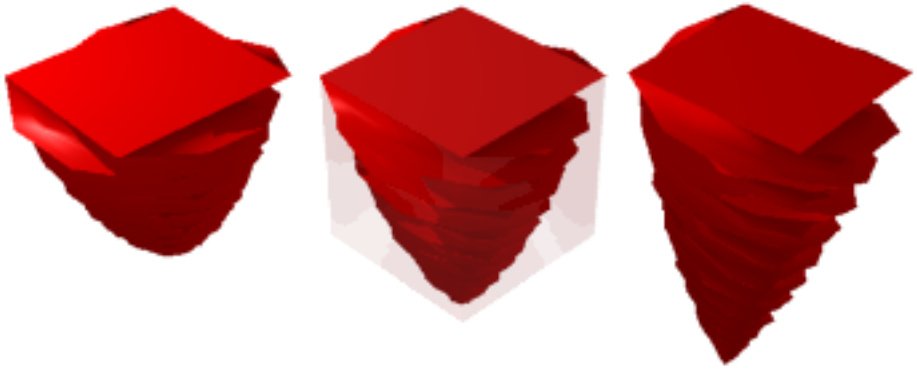
Cube with Black Hole deformer set at 75% completion with Winding set to -90, 0 and 75.

Spin Speed

The Spin Speed slider controls how fast the object turns as it goes down the vortex. A low sets results in slow spinning while a high setting results in fast spinning.

Suck Down Point Below Object

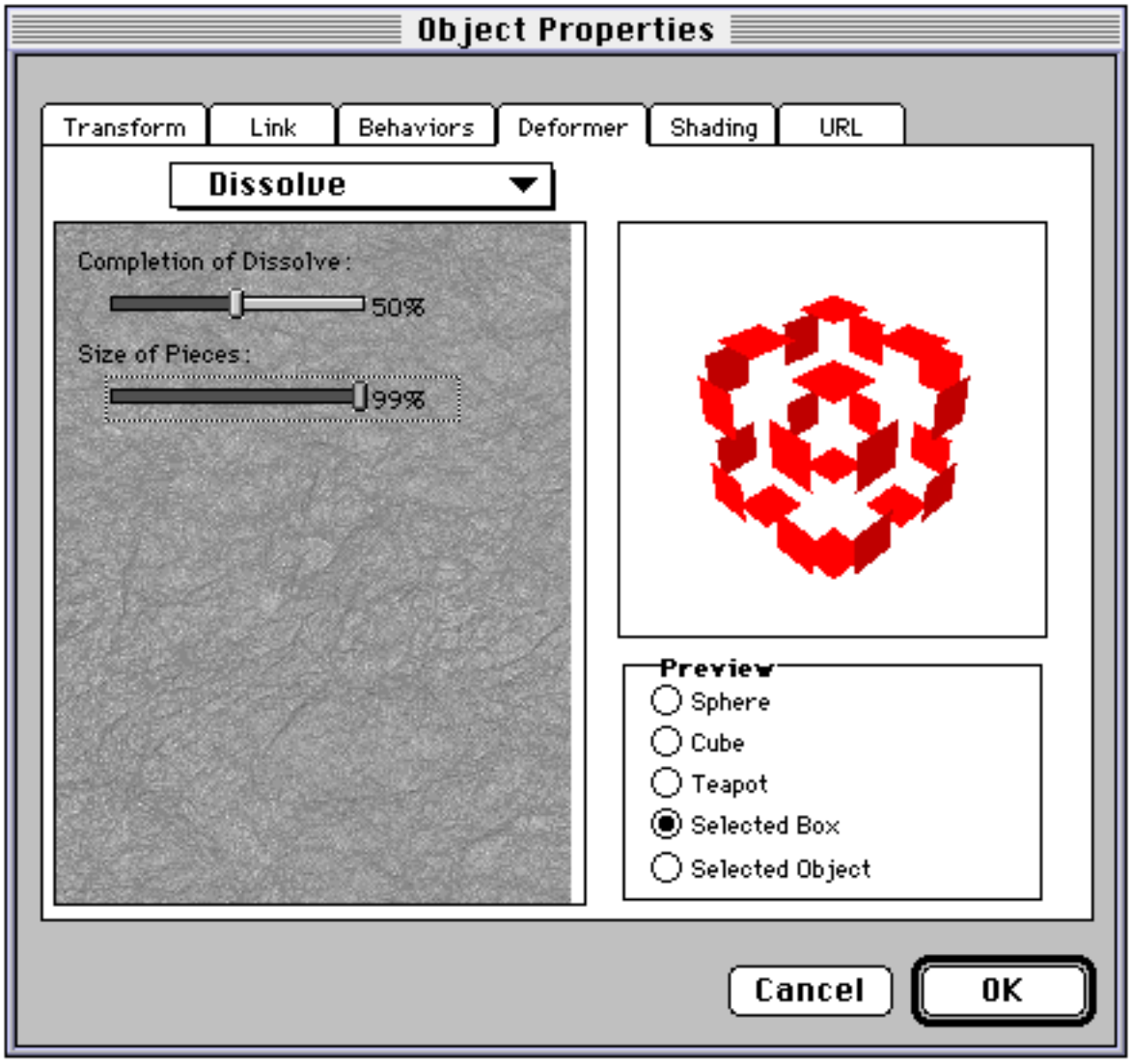
In some cases, especially in animation, you want your object to appear to sink down as it is pulled into the Black Hole. This might work well for creating a tornado effect, with the whole object getting closer to the earth as it progresses. The Suck Down Point Below Object slider controls how far below the object the center of gravity is placed. A low setting results in little gravity pull while a high setting results in a stronger pull.



Cubes with Black Hole deformer at 50% completion, showing settings of 10%, 50% and 90% for Suck Down Point Below Object. Transparent cube shows original size and shape.

Dissolve

The Dissolve deformer reduces the object to triangles or polygons then diminishes the object so that it gradually fades away or disintegrates. Use this deformer to create interesting sci-fi effects such as a transporter or a mummy dissolving before your face in a horror flick.

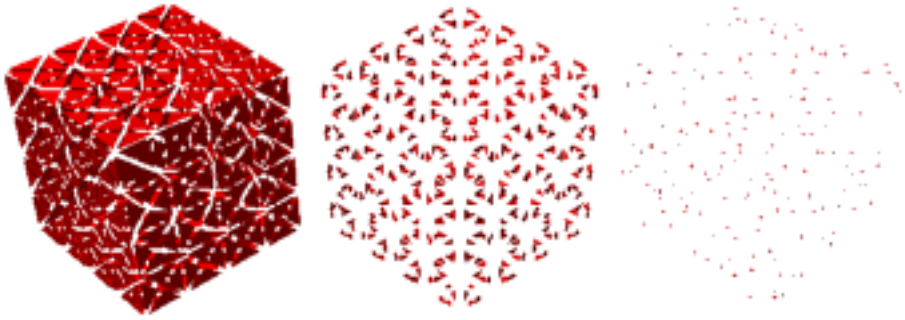


Dissolve dialog.

Completion of Dissolve

The Completion of Dissolve slider controls how much the object has dissolved. This slider also controls the animation of the object as it dissolves. A low setting represents the object near the beginning of the dissolve where the object is mostly whole while a high setting represents the ending of the dissolve where the object is mostly gone. A set-

ting of 0% represents the first frame of the animation. A setting of 100% represents the last frame of the animation. Use the slider to view any specific frame along the animation.



Completion of Dissolve set to 25%, 70% and 90%.

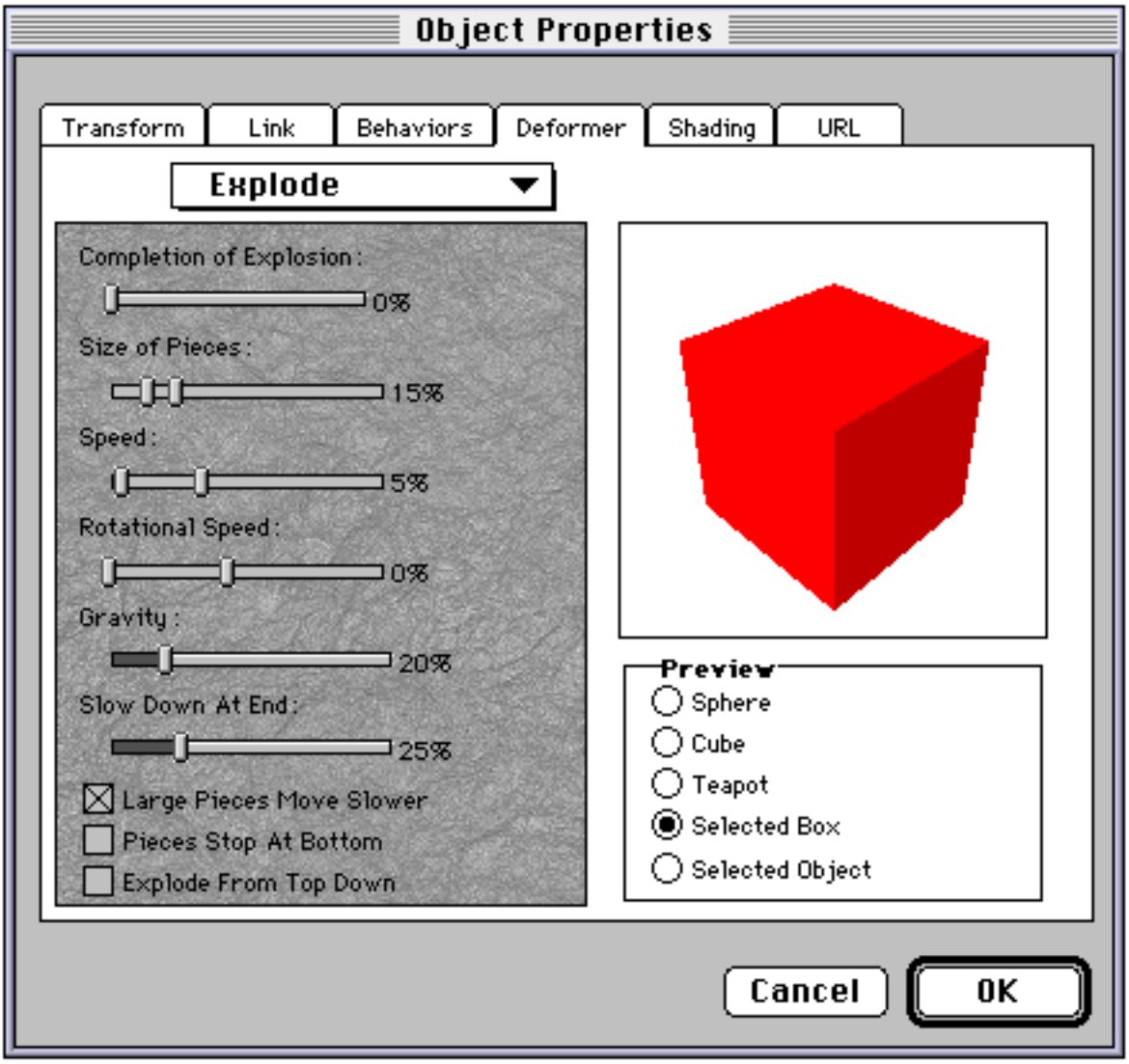
Size of Pieces

The Size of Pieces slider controls the size of the piece the object dissolves into. A low setting results in small pieces while a high setting results in large pieces.

Cubes with Dissolve Size of Pieces set to 20%, 50% and 100% at 50% completion.

Explode

The Explode deformer causes the object to burst apart with the small pieces dispersed. Use this deformer to create images with exploding objects.

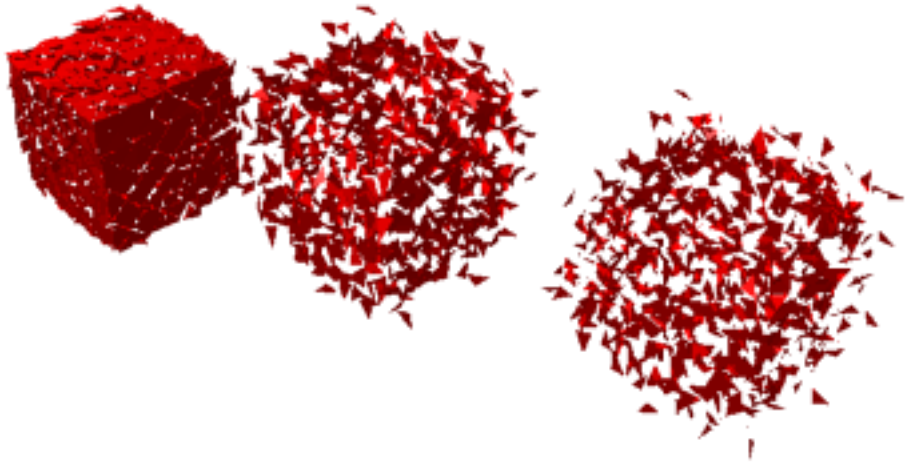


Explode dialog.

Completion of Explosion

The Completion of Explosion slider controls how much the object has exploded. A low setting represents the beginning of the explosion where the object is being broken into pieces which are still located near the original center of the object. A high setting represents the ending of the explosion where the pieces have flown far from the original center of the object. The pieces gradually fall to the ground as the explosion progresses. A

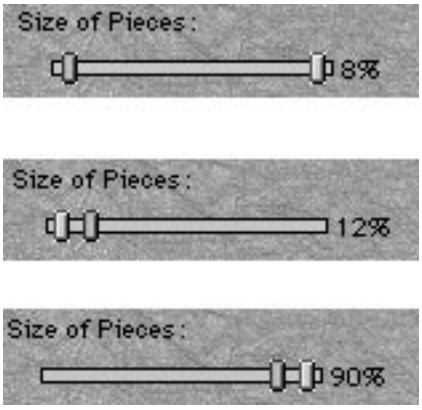
setting of 0% represents the first frame of the animation while A setting of 100% represents the last frame of the animation. Use the slider to view any specific frame along the animation.



Three cubes with Explode deformer at 10%, 50% and 100% completion.

Size of Pieces

The Size of Pieces slider controls the range of sizes for the pieces created by the explosion. The slider contains two controls. The right control sets the size of the largest pieces while the left control sets the size of the smallest pieces. The range of the slider is from 0% to 100% but the position of each slider limits the range of the other slider. With the left control set to the far left (0%) and the right control set to the far right (100%) you will have the greatest variety of sizes for the pieces. With the two controls set close together the difference between the largest and smallest pieces will be less dramatic.



Explode Size of Pieces sliders with different settings.

Three cubes with Size of Pieces set differently. First with wide range, second with small range low setting, third with small range high setting.

Speed

The Speed slider controls the speed of the pieces as they move away from the original position of the object. The slider contains two controls. The left control sets the speed for the slowest moving particles while the right control sets the speed for the fastest moving particles. The range of the slider is from 0% to 100% but the position of each slider limits the range of the other slider. With the left control set to the far left (0%) and the right control set to the far right (100%) you will have the greatest variety of speed. With the two controls set close together the difference between the fastest and slowest pieces will be less dramatic.

Explode Speed slider.

Rotational Speed

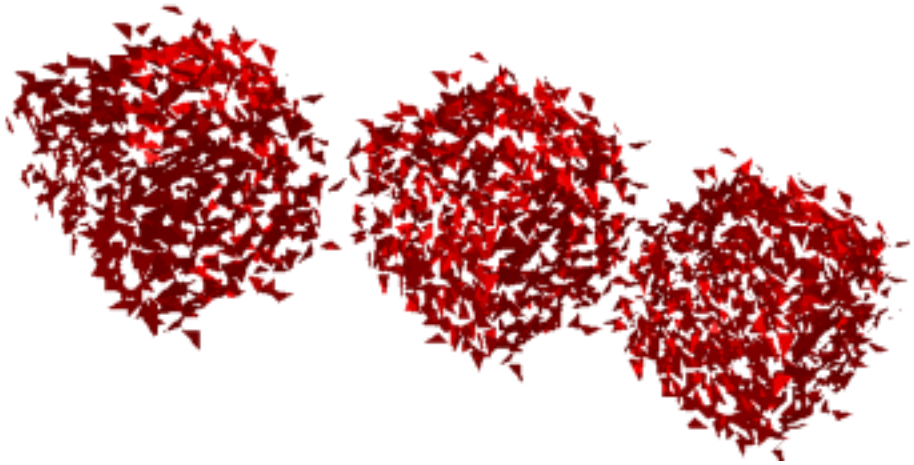
The Rotational Speed controls the speed at which the pieces rotate as they move away from the original position of the object. The slider contains two controls. The left control sets the speed for the slowest moving pieces while the right control sets the speed for the fastest moving pieces. The range of the slider is from 0% to 100% but the position of each slider limits the range of the other slider. With the left control set to the far left (0%)

and the right control set to the far right (100%) you will have the greatest variety of speed. With the two controls set close together the difference between the fastest and slowest pieces will be less dramatic.

Explode Rotational Speed slider.

Gravity

The Gravity slider controls how much gravity is applied to the pieces. Use a low setting when you want the explosion to display little gravity, for example, an explosion in outer space. Use a high setting for a stronger gravitational pull so pieces fall downward quickly.



Three cubes with Explode Gravity set to 20%, 50% and 100%.

Slow Down at End

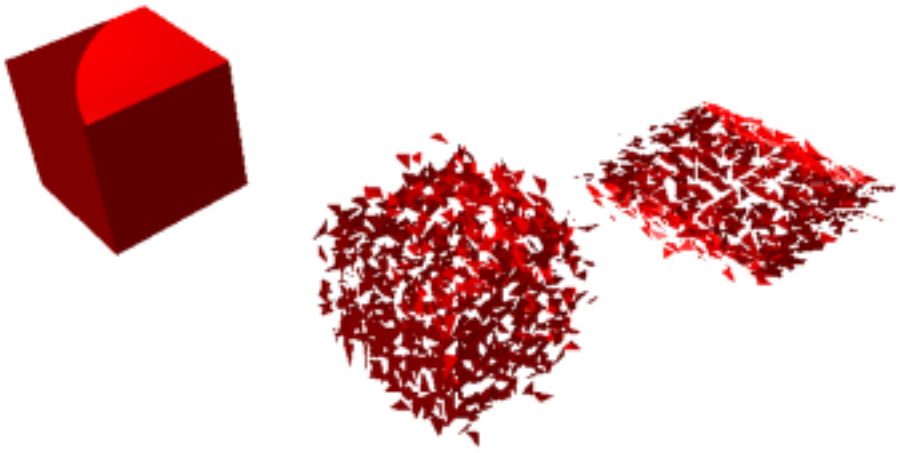
The Slow Down at End slider controls the rate at which the pieces slow down as they get farther from the center of explosion. A low setting results in a fairly consistent speed while a high setting results in slowdown or dispersal at the end.

Large Pieces Move Slower

Enable the Large Pieces Move Slower checkbox to have larger pieces move more slowly, which is more realistic. Disable this checkbox to have all pieces move at the same rate.

Pieces Stop At Bottom

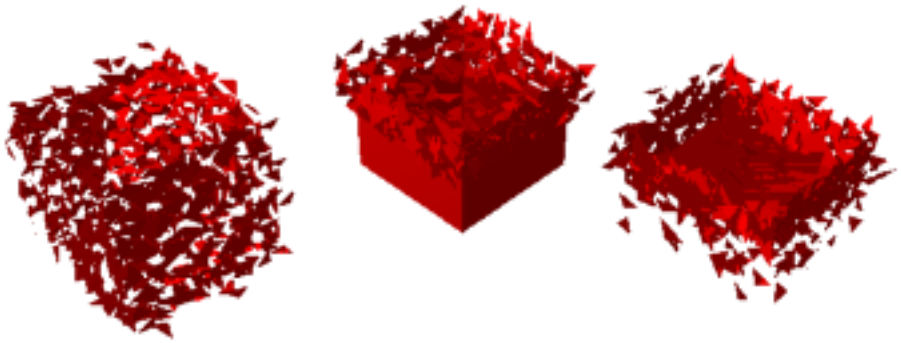
Enable the Pieces Stop At Bottom checkbox to have all pieces stop falling when they reach the bottom of the original object's bounding box. Disable this checkbox to allow pieces to fall below the bottom.



Original cube, exploded cube and exploded cube with Pieces Stop at Bottom enabled.

Explode from Top Down

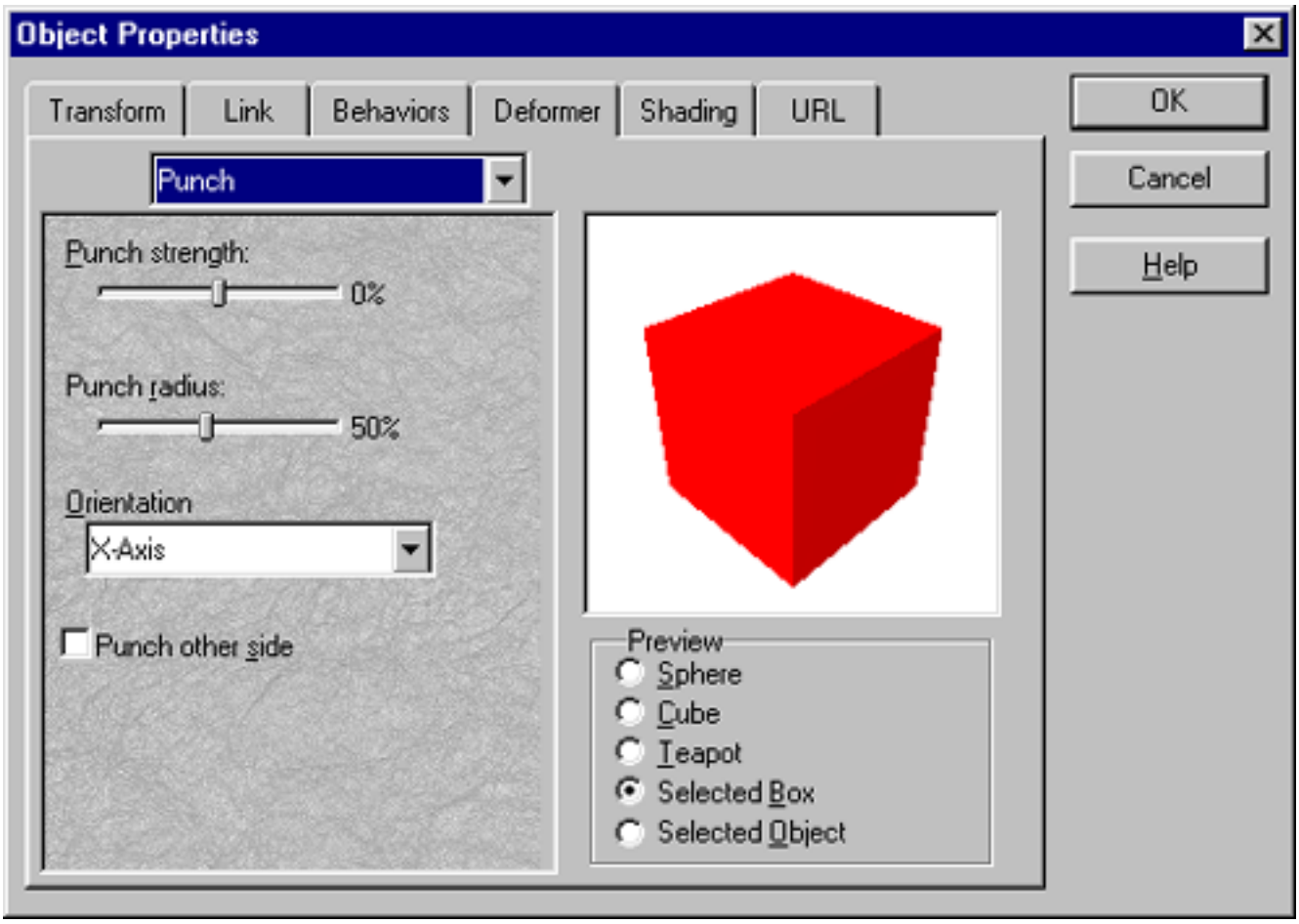
Enable the Explode from Top Down checkbox to have the object explode starting from the top then working down to the bottom. Disable this checkbox to have the object explode all at once.



Explode set to 30% completion. Same setting with Explode From Top Down enabled.
Explode set to 50% completion with Explode From Top Down enabled.

Punch

The Punch deformer punches a dent into an object.



The Punch deformer dialog.

Punch strength

The Punch Strength slider ranges from -100% to 100% and controls the depth of the dent. A negative setting results in a bulge. A positive setting results in a dent into the object. A setting close to 0% results in a slight dent or bulge. A setting far from 0% results in a deeper dent or more extreme bulge.

Punch deformer, Punch strength set to -100%, 0% and 100%.

Punch radius

The Punch Radius slider controls the size of the dent. The slider ranges from 10% to 100%. A low setting results in a small dent while a higher setting results in a larger dent.

Radius set to 20 (with strength set to -100%), 20 (with strength set to 100%), and 100 (with strength set to 100%).

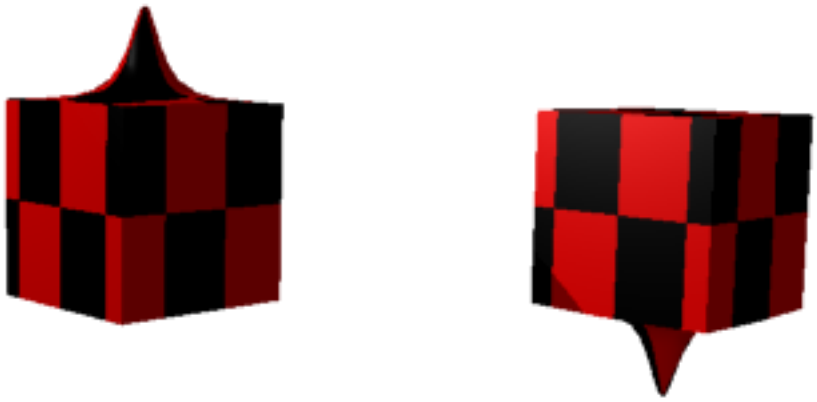
Orientation

The Orientation menu allows you to choose which surface of your object receives the dent or bulge. Select X-Axis, Y-Axis or Z-Axis.

Orientation set to X-Axis, Y-Axis and Z-Axis with strength set to -100%.

Punch other side

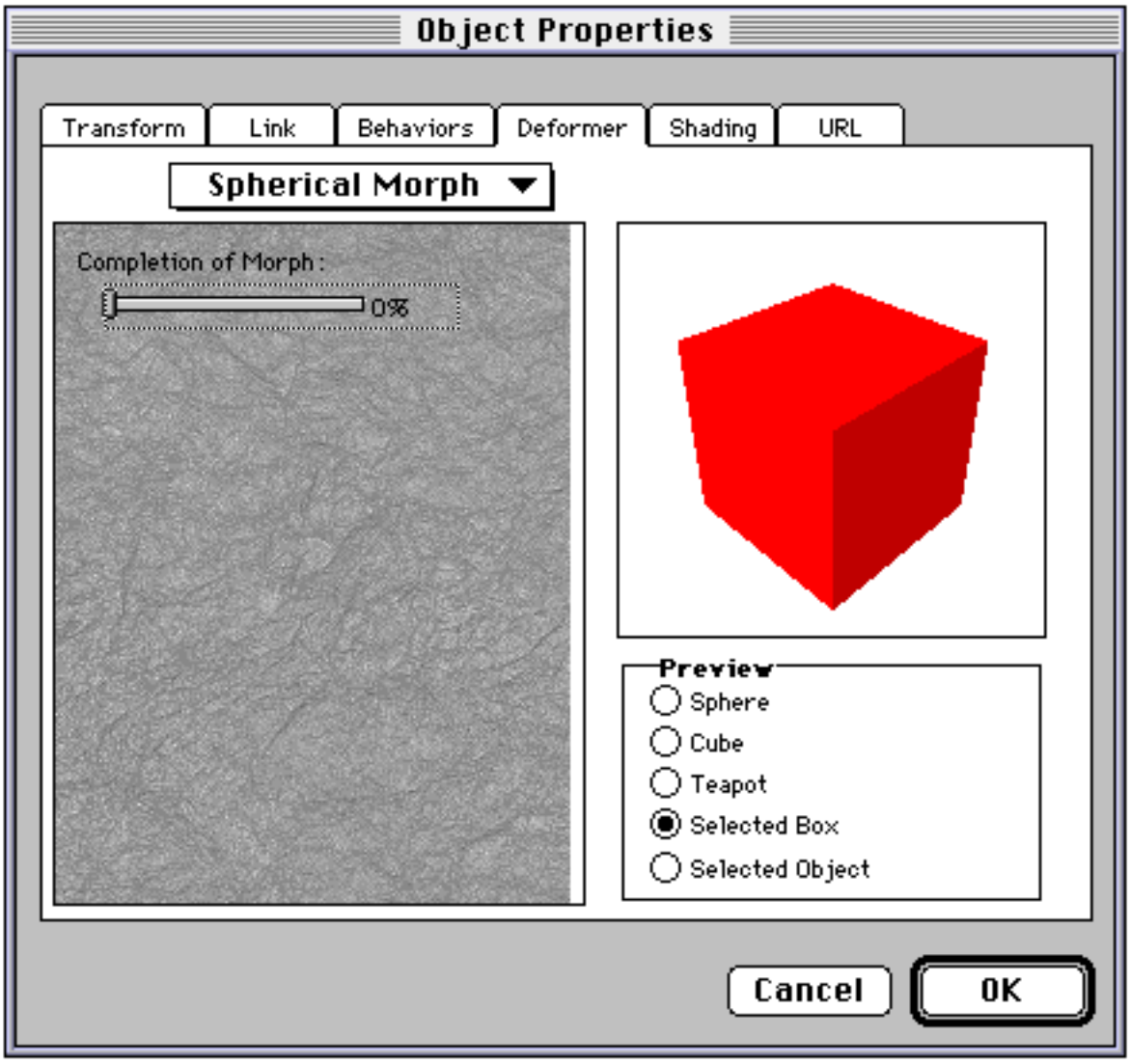
Enable the Punch Other Side checkbox to place the dent on the other side of the object. Assuming the bounding box center is 0, 0, 0 the default punch is positive (a number greater than 0) while the other side is negative (a number less than 0). Uncheck this box to place the dent on the positive side.



Same cube without and with Punch Other Side checked.

Spherical Morph

The Spherical Morph deformer turns the selected object into a sphere. The Spherical Morph deformer has only one control.



Spherical deformer dialog.

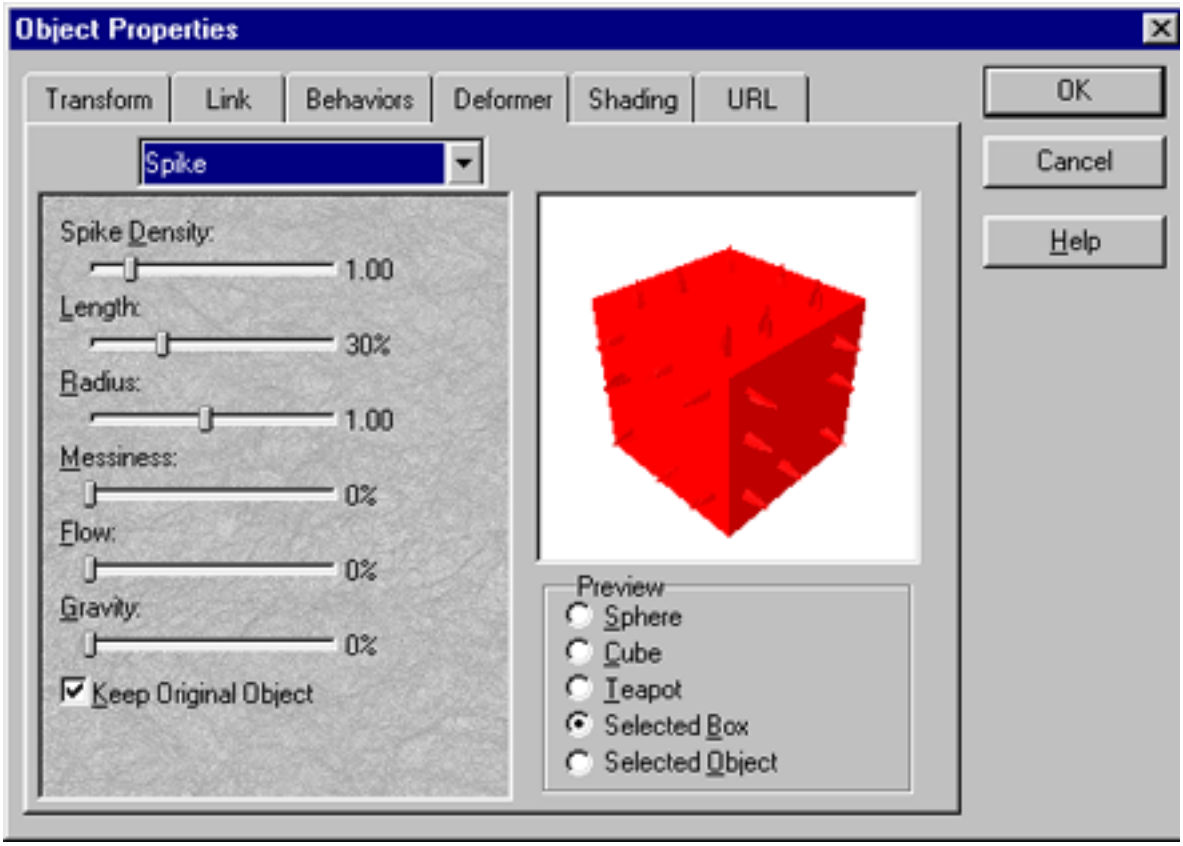
Completion of Morph

The Completion of Morph slider controls the morphing of the object into a sphere. It also controls the animation of the morph. A low setting results in an object that is only slightly changed from the original while a high setting results in a object that is more spherical.

Tower Base with Spherical Morph deformer set to 0%, 50% and 90%.

Spike

The Spike deformer adds needle-like pointed spikes to the selected object. Use the Spike deformer to add stubble to a character's chin or create a field of grass, blowing in the wind.



Spike deformer dialog.

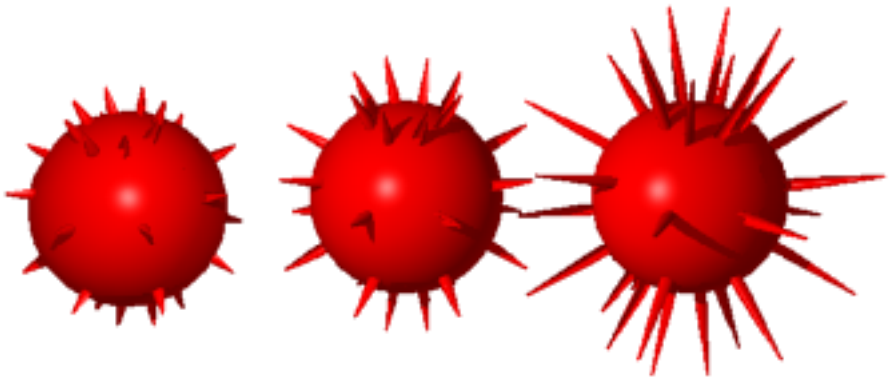
Spike Density

The Spike Density slider controls how many spikes are on the object. The slider ranges from 0.00 to 6.00. A low setting results in few spikes while a high setting results in more spikes.

Spheres with Density set to 1.00, 2.50 and 6.00.

Length

The Length slider controls the length of the spikes. A low setting results in short spikes while a high setting results in long spikes.



Spheres with length set to 30%, 50% and 100%.

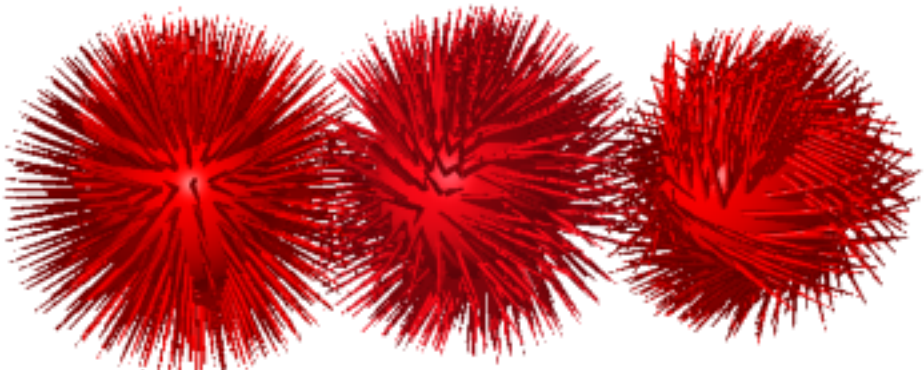
Radius

The Radius slider controls the radius of the spikes. The slider ranges from 0.10 to 2.00. A low setting produces thin spikes. A high setting produces thick spikes.

Spike deformer with Radius set to 0.50, 1.00 and 2.00.

Messiness

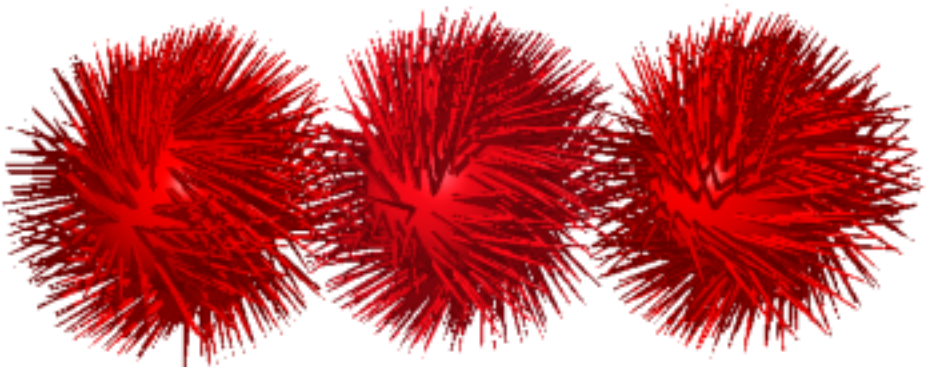
The Messiness slider controls how wavy the spikes appear. A low setting results in fairly straight spikes while a high setting results in very wavy spikes.



Spike deformer with Messiness set to 0%, 25% and 100%.

Flow

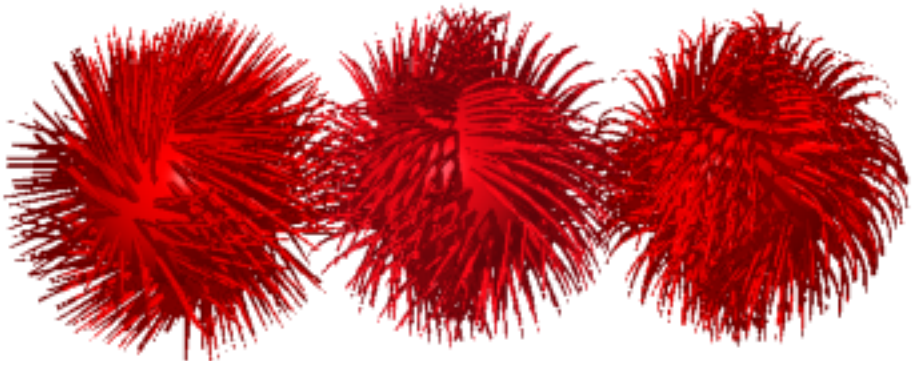
The Flow slider works with Messiness and controls the wiggles of the spikes during animations. A low setting results in little movement. A high setting results in much movement.



Spheres with Messiness set to 50% and Flow set to 0%, 50% and 100%.

Gravity

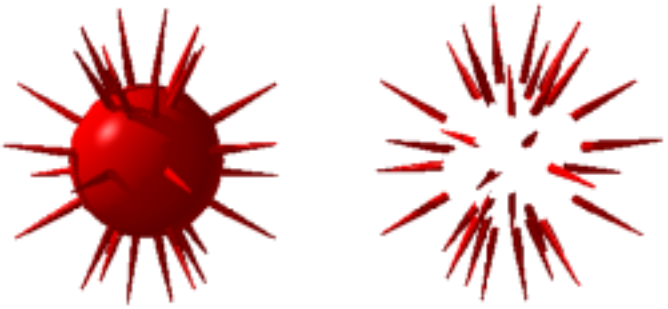
The Gravity slider controls the droopiness of the spikes. A low setting results in spikes which are straight and stiff. A high setting results in spikes that droop toward the bottom of the object as if pulled by gravity.



Gravity set to 0%, 30% and 90%.

Keep Original Object

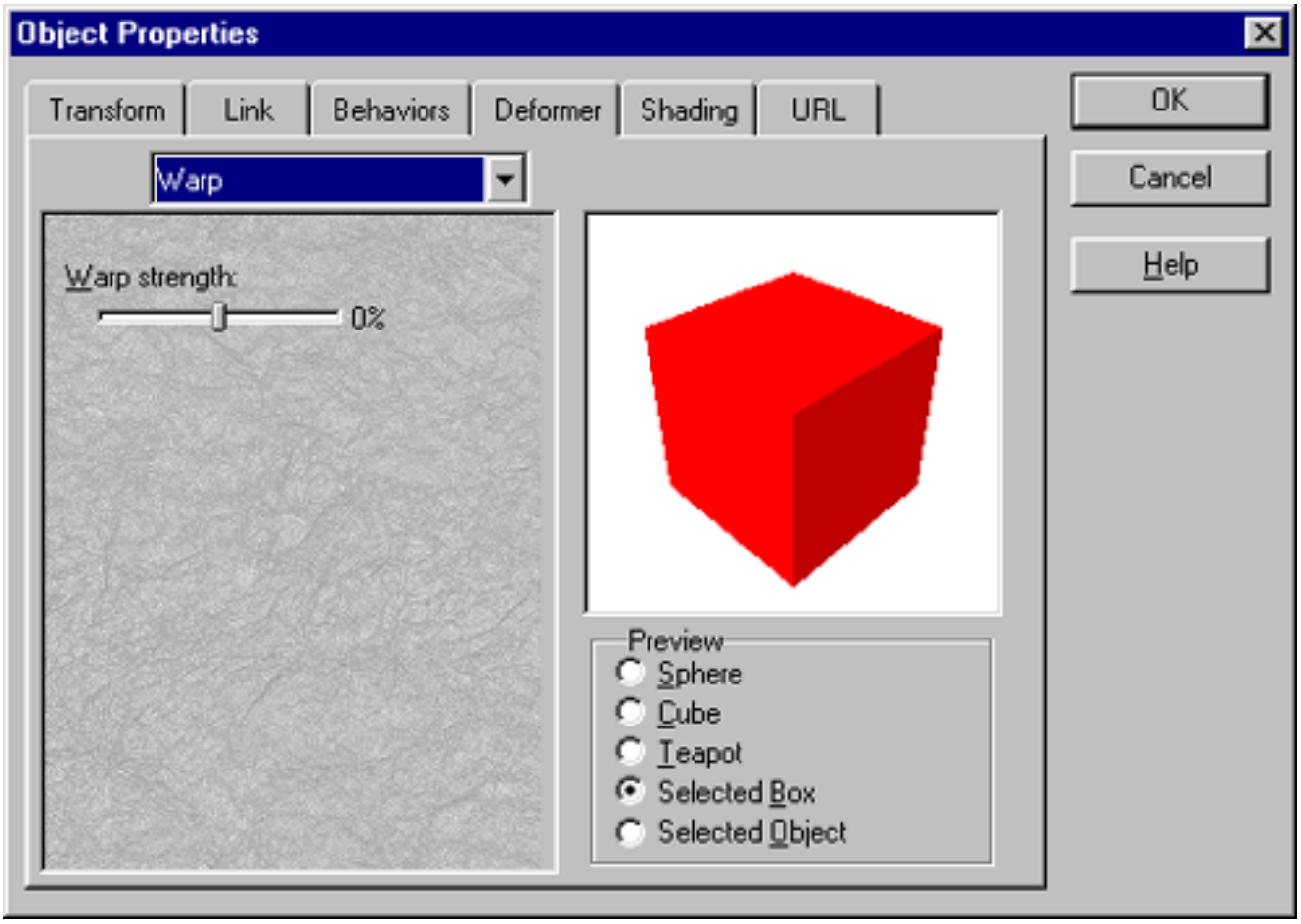
Enable the Keep Original Object checkbox to keep the original object, adding the spiked around it. Disable this checkbox to replace the original object with spikes only.



Warp

The Warp deformer accentuates the extreme points of the object. The Warp deformer takes the surface points that are farthest from the center of the object and moves them out farther. At the same time, surface points that are nearest the center of the object move in closer to the center.

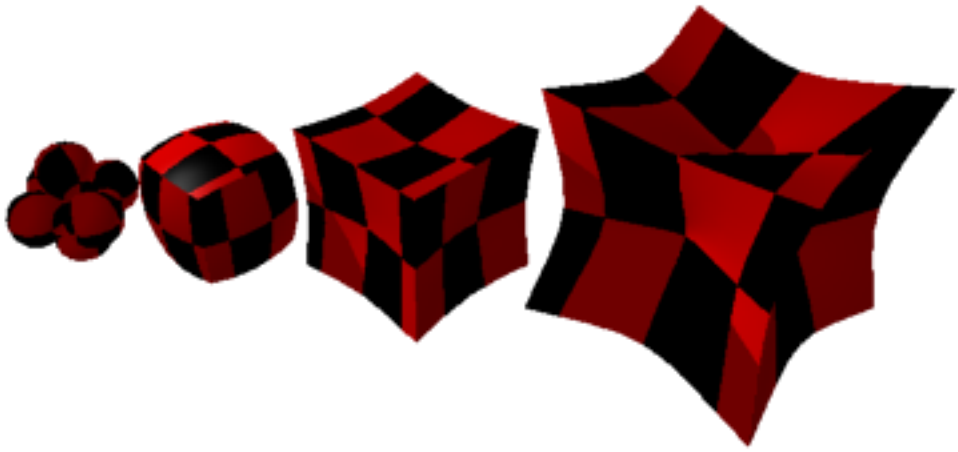
Note: On a sphere all the points are the same distance from the center point so the Warp deformer will not change the shape of the object.



Warp deformer dialog.

Warp strength

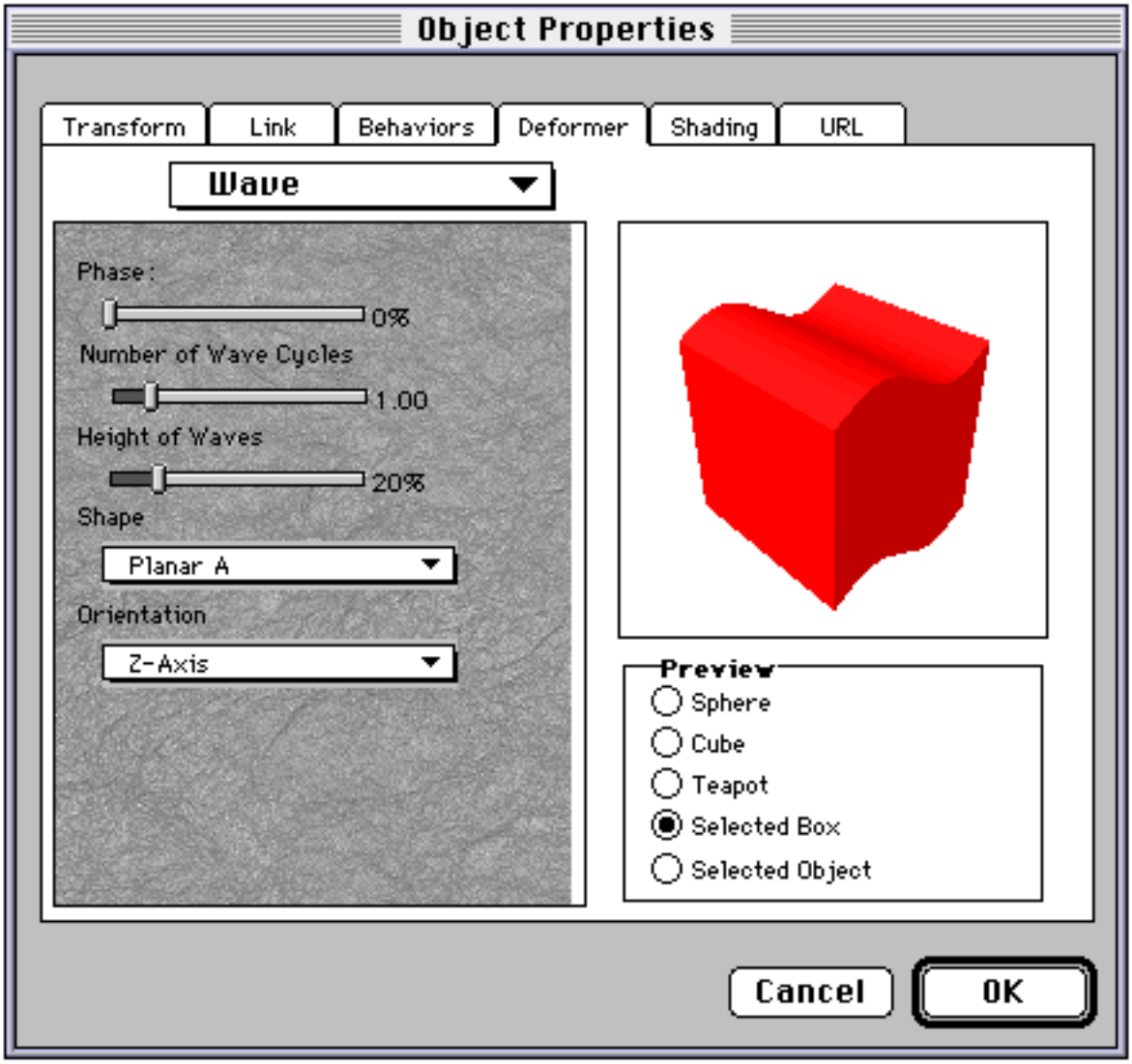
The Warp Strength slider controls the amount of distortion. The slider ranges from-200% to 200%. A negative setting results in moving surface points near the center away from the center and surface points far from the center pulling in toward the center. A positive setting results in moving surface points far from the center farther away from the center and surface points near the center pulling farther in toward the center.



Cubes with Warp deformer set to -200%, 50% and 200%.

Wave

The Wave deformer distorts the object by pulling it along an imaginary wavy sweep path. Use the Wave deformer to create a flag blowing in the wind.



Wave deformer dialog.

Phase

The Phase slider controls the animation of the wave. A setting of 0% or 100% results in the same state. A setting between 0% and 100% results in the wave at different points along the animation. After setting the parameters for your wave object at the first key event, move to the end of the animation on the Time Line. Create a new key event and use the Phase slider to set the parameters for the end of the animation.

Cubes with Wave deformer, Phase set to 0%, 50% and 100%.

Number of Wave Cycles

The Number of Wave Cycles slider controls the number of wave cycles. The slider ranges from 0.25 to 5.00 allowing you to create objects with a quarter wave or five waves and any number of waves between one quarter and five.

Cubes with Wave Cycles set to 1, 2 and 5.

Height of Waves

The Height of Waves slider controls how high the wave crest extends and how low the trough of the wave dips. A low setting results in gentle waves while a high setting results in extreme waves.

Cubes with Wave Height set to 20%, 50% and 100%.

Shape

The Shape menu determines the shape of the wave. The choices are Planar A, Planar B, Radial and Cylindrical.

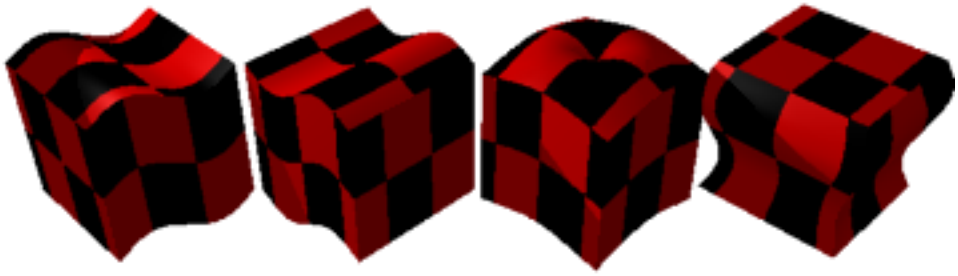
Planar A: Wave moves along the plane A.

Planar B: Wave moves along the plane B.

Radial: Wave moves from center point outward.

Cylindrical: Wave moves around the outside of the object as if it were in a cylinder.

The direction in which the wave is applied depends on the setting in the Orientation box below.



Cubes with Wave deformer set to Planar A, Planar B, Radial and Cylindrical.

Orientation

The Orientation menu determines which axis receives the deformation. The choices are X-Axis, Y-Axis or Z-Axis.

Cubes with Wave deformer set to Z-Axis, X-Axis and Y-Axis.

Chapter 5: Using the Radical F/X Shader Functions

Radical F/X includes three new shader function components. These components can be used in the various channels of the Shader Editor to create new surface characteristics. Generally you will use these components as functions in a mix. Try working with the Cellular shader in the Bump channel. The Psychedelic shader might be used in the Color and Bump channels to create a nice water texture. Experiment with the Gradient shader and transparency.

A function generates a value between zero and 100 for each point on an object or paint shape. When you place a function on the middle branch of the Mix operator, the operator uses the values generated by the function to mix the components on the left and right branches. Where the value equals zero, the left component is used. Where the value equals 100 the right component is used. Intermediate values produce a blending of the two components.

When you place a function in a channel by itself, it assigns a value directly to each point on the object or paint shape. In a non-color channel, each value is used 'as is.' In any of the channels designed for color input (Color, Highlight, Reflection, Transparency or Glow), each value is converted to a shade of gray, with zero translating to white and 100 translating to black.

To use a shader function:

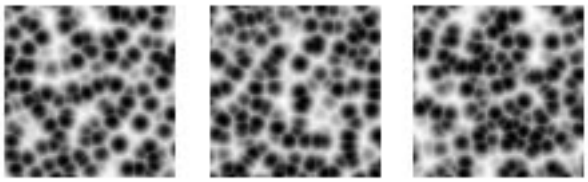
1. In the Shader Editor, select the tab for the shader channel you wish to edit.
2. Choose **Shader Editor> Component menu> Operator** then select **Mix** or other operator of your choice.
3. With the left component selected choose **Shader Editor> Component menu> Color** or other component of your choice.
4. With the right component selected choose **Shader Editor> Component menu> Color** or other component of your choice.
5. Choose choose **Shader Editor> Component menu> Pattern Functions or Natural Function**, then select the function you wish to apply.
6. Set the parameters described below then click **Apply**.

Shuffle

When you apply a function to a series of objects you may want the shader to apply exactly the same to each object. However, frequently you want the different objects to be shaded in a similar but not exact manner. For example, with a wooden table you might want each leg of the table to be very similar but not exactly the same. Shuffle changes

the texture slightly, giving a more random appearance to each object. In the case of your wooden table you will apply the shader to the first leg then select the second leg and click the Shuffle button. Then apply the shader to the second leg. The result is a more realistic image as each leg displays a slightly different wood grain.

Click **Shuffle** to change the shader slightly.

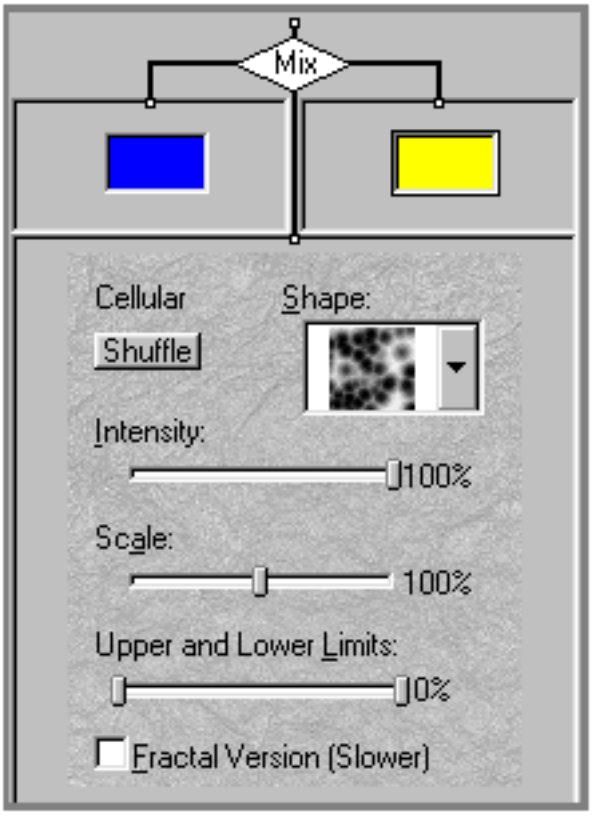


Cellular function, original and two with Shuffle.

For more information regarding Shading see the *Ray Dream Designer User Guide*.

Cellular

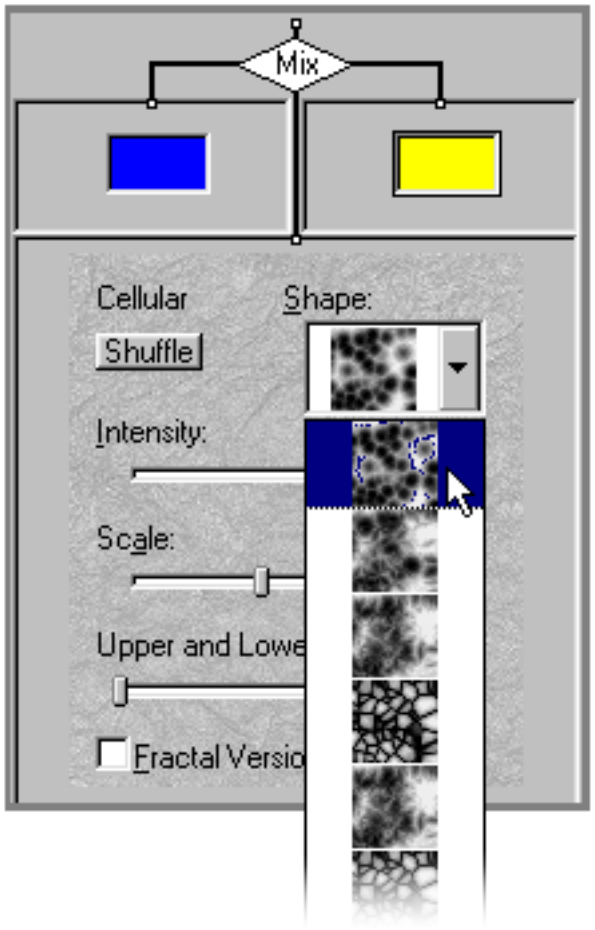
The Cellular function creates a surface that looks like cells. It can be used very effectively in the Color and Bump channels but you should also experiment with other channels. Use this shader component to create neat alien skin textures, realistic dinosaur hide or space-blasted meteors.



Cellular function dialog.

Shape

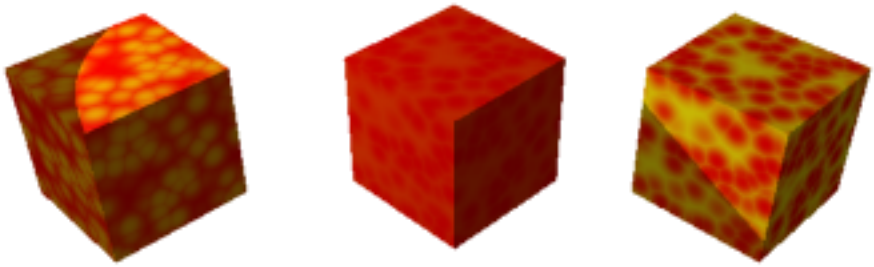
The Shape menu allows you to select the basic shape of the cells for your texture.



Cellular function dialog showing some of the basic shapes.

Intensity

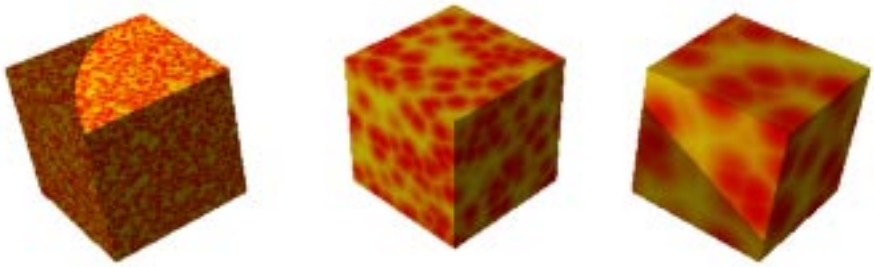
The Intensity slider controls the contrast of the two colors. The slider ranges from -100% to 100%. Negative settings result in negative images (dark areas become light and light areas become dark). A positive setting results in higher contrast in the original dark and light areas. A setting of 0 results in an even blend of the two components or no contrast.



Cellular function Intensity set to -75%, 25% and 100%.

Scale

The Scale slider controls the size of the shape used. The slider ranges from 1% to 200%. A low setting results in small cells. A high setting results in large cells.



Cellular function Scale set to 25%, 100% and 200%.

Upper and Lower Limits

The Upper and Lower Limits slider controls the range of values you can use. Use the two markers to set the upper and lower limits. The slider ranges from 0% to 100% but the setting of each slider limits the other. When the difference between the two settings is small the range is small. When the difference between the two settings is large a large range is available.

The slider contains two controls. The right control sets supper limit. The left control sets the lower limit. The range of the slider is from 0% to 100% but the position of each slider limits the range of the other slider. With the left control set to the far left (0%) and the right control set to the far right (100%) you will have the greatest variety of values. With the two controls set close together the difference between the values will be less dramatic.

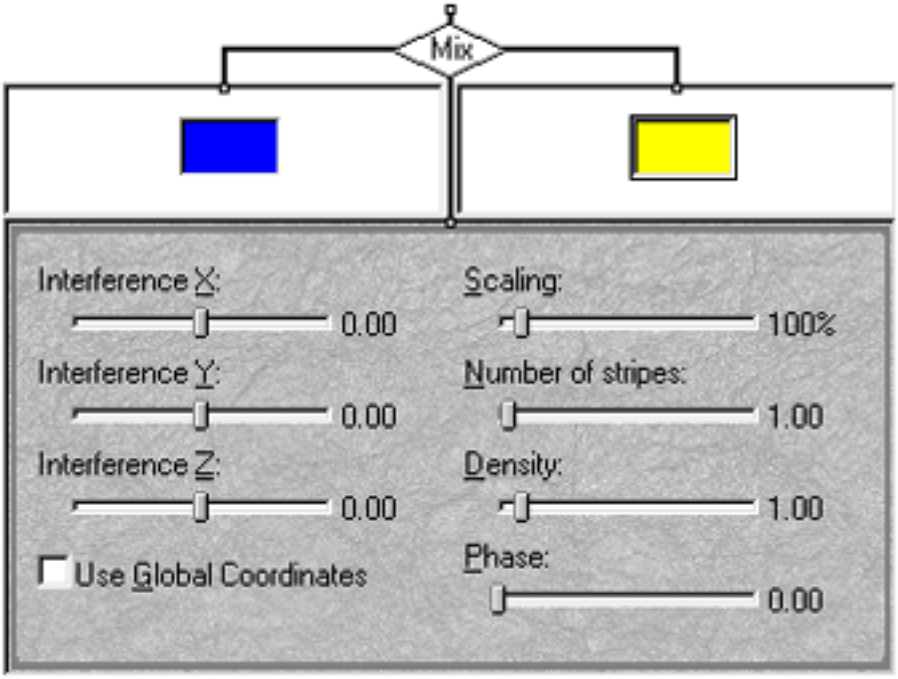
Fractal Version

Enable the Fractal Version checkbox to use fractals instead of more regular shapes for the cells.

Note: Using the Fractal Version can significantly increase the time required to redraw and to render your image.

Psychedelic

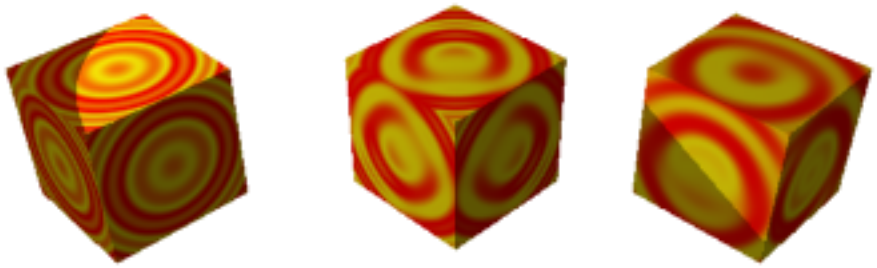
The Psychedelic shader function can be used to create some very unusual textures including swirls of colors reminiscent of the psychedelic Op Art of the 1960s.



Psychedelic function dialog.

Interference X, Interference Y and Interference Z

The three Interference sliders control the amount of interference applied to each plane. The sliders range from -1.00 to 1.00. Each slider controls the stripes applied on the specific plane. A setting of 0 results in no interference on that plane. Using all three planes you can create more interesting design elements.



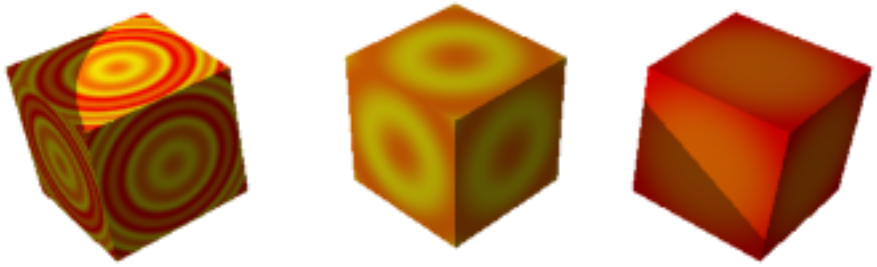
Psychedelic function with all Interference sliders set to zero and two other examples.

Use Global Coordinates

By default the individual Object's coordinates are used. Enable the Use Global Coordinates checkbox to use the Global Coordinates when applying the Psychedelic function. When using Global Coordinates the shading remains static in space while the object moves. The object behaves as a mask or window on the shading.

Scaling

The Scaling slider controls the size of the design elements. The slider ranges from 1% to 1000%. A low setting results in smaller design elements while a high setting results in larger design elements.



Scaling set to 100, 500 and 1000.

Number of Stripes

The Number of Stripes slider controls the number of stripes in each element. The slider ranges from 0.00 to 20.00. A low setting results in few stripes while a high setting results in many stripes.

Number of stripes set to 1, 5 and 20.

Density

The Density slider controls the density of the pattern. The slider ranges from 0.10 to 10.00. A low setting results in few repetitions of the pattern while a high setting results in a high density patterning.

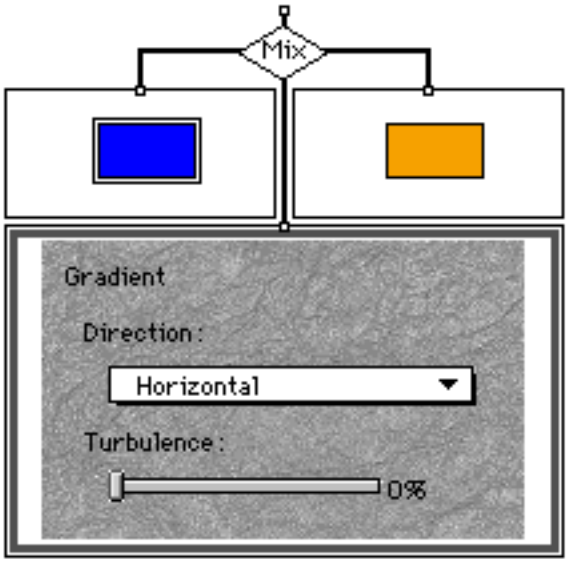
Density set to 1, 5 and 10.

Phase

The Phase slider controls which view of an animation is displayed. This slider ranges from 0.00 to 1.00. The two extreme settings display the animation at the same point but intermediate settings display specific frames along the animation time line. Use the Phase slider with the flat preview in the Shader Editor to see how the shader changes. After setting the parameters for your object at the first key event, move to the end of the animation on the Time Line. Create a new key event and use the Phase slider to set the parameters for the end of the animation. A setting of 0% represents the beginning of the animation. A setting of 100% represents the end of the animation. You can have the animation begin or end at any place you prefer.

Gradient

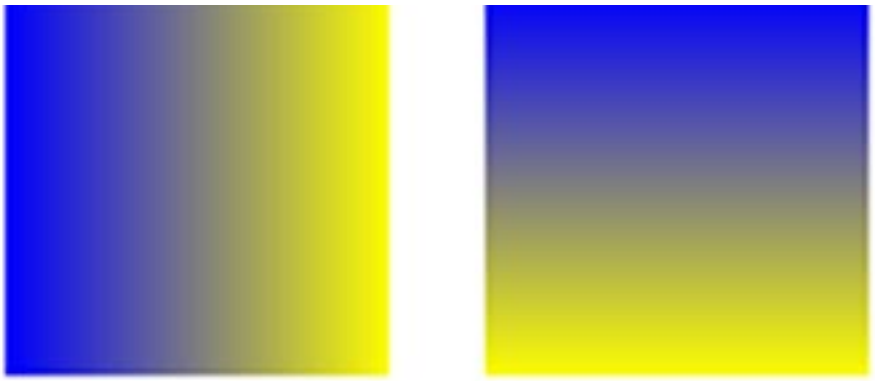
The Gradient pattern function produces a gradient, or a gradual blend moving from one color to another. Try using the Gradient shader in the Color and Transparency channels. The Gradient pattern function has two parameters: Direction and Turbulence.



The Gradient pattern function.

Direction

The Gradient may be Horizontal or Vertical. Choose Horizontal or Vertical from the Direction menu.



Gradient set to Horizontal and Vertical.

Turbulence

Ordinarily a gradient displays a gradual change from one color to the another. Use the Turbulence slider to mix up the colors as they change. A low setting results in a fairly uniform change from one color to the next while a high setting results in greater irregularity in the change.

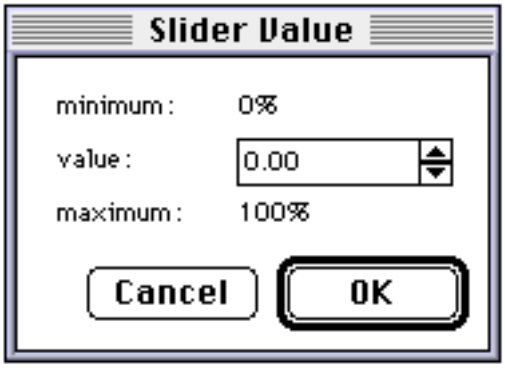
Turbulence set to 0%, 20% and 60%.

Chapter 6: Using other Radical F/X Improvements

Radical F/X includes two other frequently requested improvements: Slider Value dialog and Counter.

Slider Value

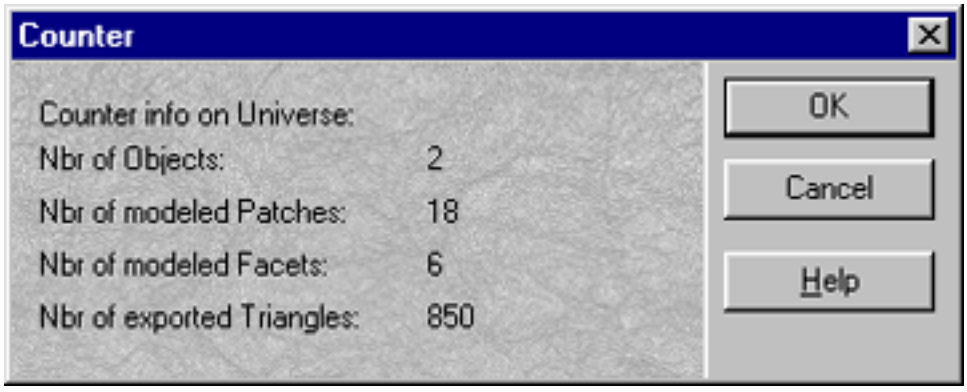
Now when you double click on any slider, a Slider Value dialog opens. Use this dialog to enter exact numbers to control the slider.



Double click on any slider to open the Slider Value dialog.

Counter

A new Counter function has been added to help you keep track of the objects in your scene. Choose **Arrange menu> Counter** to see information on the number of objects, patches and facets included in your scene. If one object is selected, Counter displays information about that objects patches and facets. If no objects are selected, or if more than one object is selected, Counter displays information about the entire scene.



The Counter dialog.