

HOW TO CREATE A REALISTIC SKY WITH THE ENVSKY TEXTURE

By S. Christov

Maya Complete
Rendering

The environment sky is a powerful procedural texture that you can quickly and easily add to your scene to give the appearance of a sky overhead.



[Play Movie](#) [~800k]

In this first part of a three part lesson you will learn how to create an environment sky and set attributes that will create a realistic looking sky.

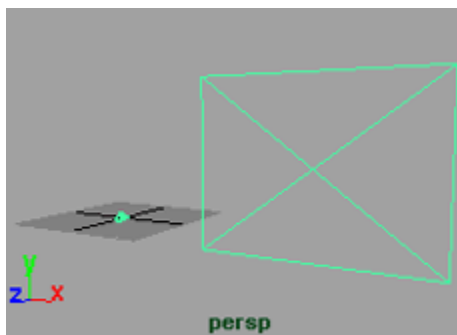
In the next lesson - [How to create realistic shadows using envSky](#) - you will learn how to achieve realistic shadows using the position of the sun on the envSky texture. In the final lesson you will learn how to "grow" a tree in Paint Effects from a simple black brush stroke - [How to create a tree using Paint Effects](#).

After these three lessons, you will be able to combine these elements to produce an animation similar to the one above where you create a time lapse animation of a sunset.

STEP ONE

You will first need to create a new camera and then attach an image plane to it.

Create a new camera by selecting **Create > Camera**.



- **Translate** the camera **2** units in the **Y axis** and **6** in the **Z axis**.

- Open the Attribute Editor for the new camera, and open the *Environment* section. **Click** on the **Create** button next to Image Plane. The Attribute Editor window will now switch to the Attribute Editor for the Image Plane.
- Open the *Placement* section and click on **Fit to Resolution Gate**. This will ensure that your image plane will fill the entire rendered scene.

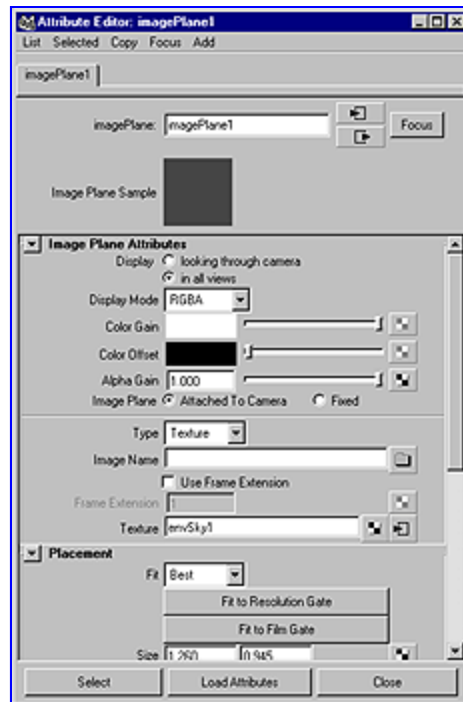
STEP TWO

While you are still in the Attribute Editor for the Image Plane, **Click** on the **Map**



button next to **Texture** and map an *envSky*.

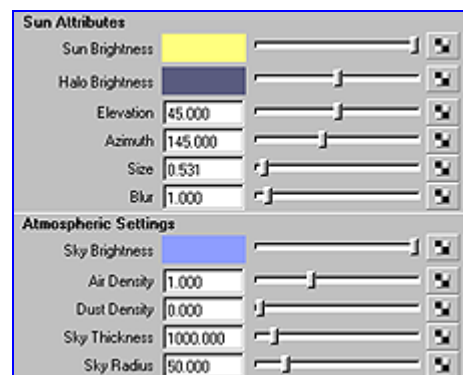
The *envSky* node is located in the *Environment Textures* section of the Create Render Node window.



STEP THREE

You will now set the colors for your environment. In the Attribute Editor for the *envSky*, **Set** the following attributes:


- **Sun Brightness** to **1, 1, 0.5**
- **Halo Brightness** to **0.35, 0.36, 0.5**
- Under *Atmospheric Settings*, **Set the Sky Brightness** to **0.56, 0.617, 1.0**



To change any of the color values, select the color icon next to the attribute. This will open the Color Chooser.

Make sure you are using the RGB values by checking the RGB box near the bottom of the window. You can then type the values in manually.

NOTE: To open the Attribute Editor for the envSky, select the 3D Icon for the envSky texture and open the Attribute Editor. Click the **Goto Output Selection**

Button  at the top right side. This will take you to the envSky Attribute Editor.

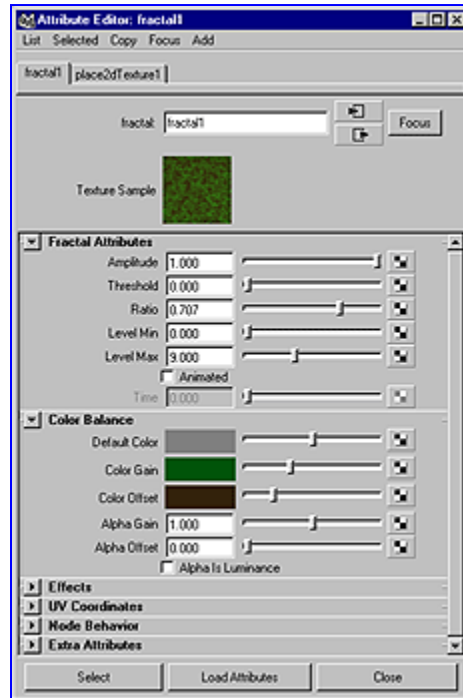
STEP FOUR

Open the Floor Attributes section for the envSky, **Map** the color of the floor to a **2D Fractal** texture.

Change the Color Gain to a Dark Green and the Color Offset to a Dark Brown. This will be your floor.

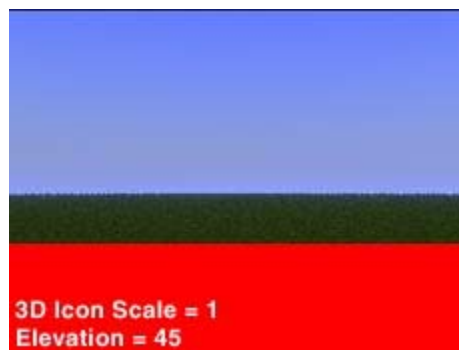
Select Camera 1 and Select > Panels > Look Through Selected. Turn on the Resolution Gate by selecting **View > Camera Settings > Resolution Gate**.

Render this view by selecting **Render > Render into New Window**.



STEP FIVE

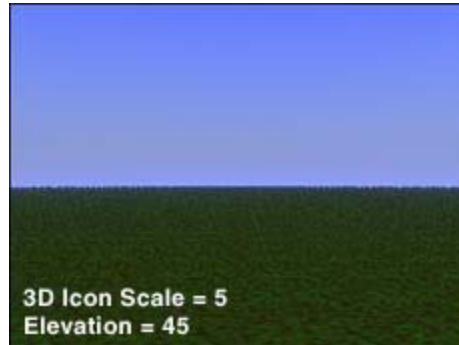
When you render with the floor turned on, you may encounter a bright red surface for part of the floor. This is due to the fact that your camera is rendering a point that is below the Floor Altitude. You



can fix this by either lowering the Floor Altitude, raising the look at point of the camera, or scaling the 3D icon. In this case we are going to scale the icon.

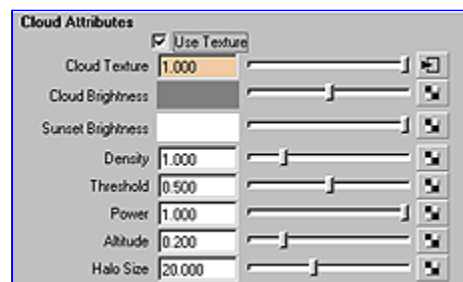
Select the **envSky** icon in the perspective view window. In the Channel Box set the **Scale X Y Z** to **5**.

Re-Render your scene. You should now have a floor that extends to a vanishing point.



STEP SIX

You are now ready to add clouds to the scene. Open the *Cloud Attributes* section in the Attribute Editor for the envSky. **Click** the box next to **Use Texture** to turn it on.



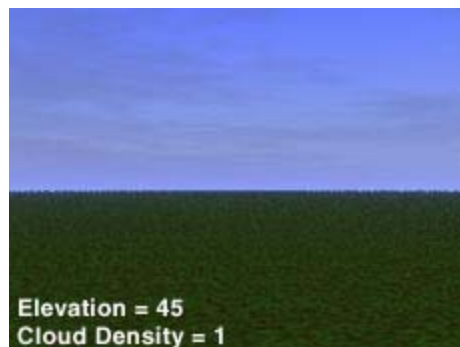
Click the box next to **Use Texture** to turn it on.

Click the **Map** button next to **Cloud Texture**. This will open the Create Render Node window. **Select** a **Cloud Texture**.

STEP SEVEN

Preview your sky by rendering the *Camera 1* view.

You will notice clouds in the scene but they are faint. You can make them more pronounced by setting the density. Set the **Density** under the *Cloud Attribute* of the envSky to **2.0**.



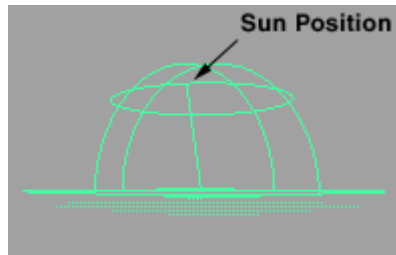
Render your scene. You should now see



clouds in the sky.

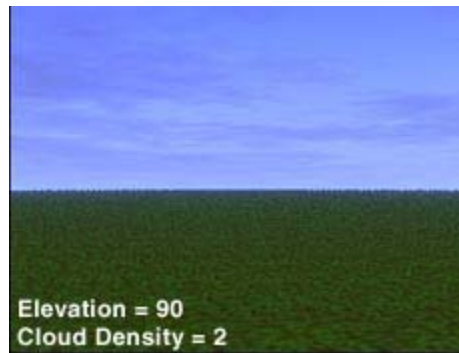
STEP EIGHT

Switch to your *persp camera*. If you take a close look at the 3D icon for the envSky, you will notice that there is a point that represents the sun. By adjusting the **Elevation**, **Azimuth** and **Size**, you will change the position and size of this point.



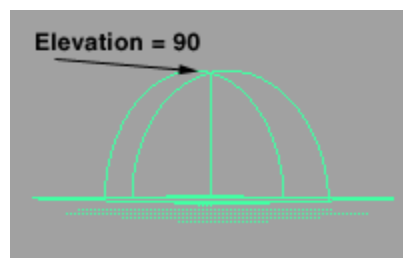
Set the **Elevation** to **90** degrees. This will position the sun directly in the middle of the sky and also produce the brightest light. Notice on the 3D icon, that the sun icon has moved directly to the top middle of your icon.

Render the scene. You should now see a bright blue sky.



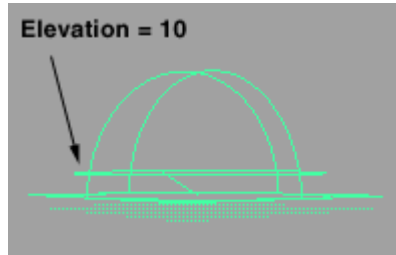
STEP NINE

You will now position the sun so that it appears in your scene. To do this you will need to align the line that represents the sun to intersect a point in your image plane. Make the following changes to position and size of the sun so that it will be seen in the image plane.



- **Elevation to 10**
- **Azimuth to 0**
- **Size to 3.0**

If you imagine the line on the 3D icon representing the sun going off to infinity, it will intersect the image plane which in turn will render the sun in your image. You may need to switch to your *persp* view and zoom out to see this.



Render the Scene. Notice how the color of the sky changes in relation to the elevation of the sun. At an elevation of 90, you get an image that has the brightest possible sky. At a lower elevation your sky begins to change to a darker color. However the appearance of the sun does not seem quite bright enough. In this case we will increase the total brightness to get a nice sunset.

Increase the Total Brightness to 3.0.

Render the Scene. You should now have a decent looking sunset.

Save your File.

CONCLUSION

You have now setup an envSky texture that will produce an environment complete with sun and clouds. There are many attributes to experiment with on this texture. You can achieve some interesting results by adjusting the some of the Atmospheric and Cloud attributes.



In the next lesson you will use this file and learn how-to achieve realistic shadows based on the position of the sun.

HOW TO CREATE REALISTIC SHADOWS WITH ENVSKY

By S. Christov

Maya Complete Rendering

This lesson is a continuation of [How to create a realistic sky using envSky](#).



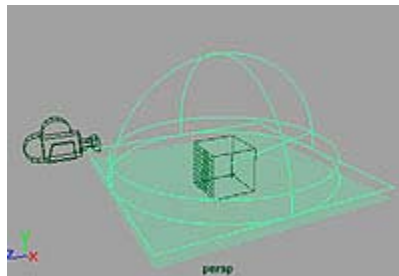
In this lesson you will use your environment sky texture from the last lesson and link a directional light to the elevation and azimuth that will simulate the shadows cast when you animate the position of the sun.

[Play Movie](#) [~800k]

In the final lesson you will learn how to "grow" a tree in Paint Effects from a simple black brush stroke - [How to create a tree using Paint Effects](#).

STEP ONE

Open [Env_Sky.ma](#) file that you saved from the last lesson.



In the Attribute Editor for the *envSky*, **Set the Elevation and Azimuth to 0. Set the Total Brightness to 1.0.**

Providing you have not moved or rotated the 3D icon the sun position should be lined up along the Z axis.

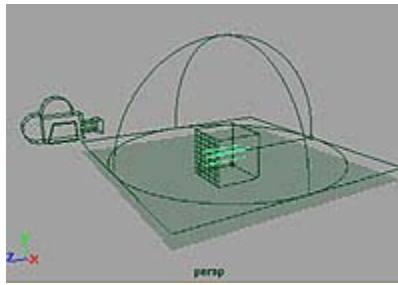
STEP TWO

You are now ready to create a directional light and link it into the attributes of the *envSky*

texture.

Create a Directional Light.

You will want this light to cast shadows so you will need to turn on shadows. Open the Attribute Editor for the light. In the shadows section, **Click** the box next to the **Use Depth Map Shadows**.



You will notice that the light is pointing at the sun rather than away from it. **Rotate** the light **180** in the **Y axis**. This will align it properly.

STEP THREE



With the light selected, **Group** it to itself by selecting **Edit > Group**.

In the Attribute Editor **Rename** this node *lightLinker*.

STEP FOUR



Open the Hypergraph window and holding the shift key, **Select** the **lightLinker** node and the **place3dTexture** node for *envSky*.

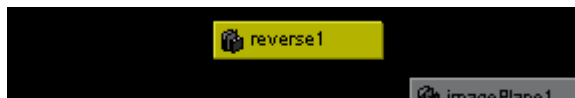
Select **Graph > Up and Downstream Connections**.

With the Middle Mouse Button, Drag the **EnvSky1** node onto the **lightLinker** node.

In the Connection Window that opens, click on **Elevation** on the left side, then click on **Rotate X** on the right. This connects the Elevation on the envSky node to the Rotate X attributes on the *lightLinker* node.

Close the Connection Editor window.

STEP FIVE



In the Hypergraph window, click on **Rendering > Create Render Node window. . .**

If you were to directly connect the *azimuth* to the directional light you would find that as you adjust the azimuth your light would rotate in the opposite direction. In this case a reverse node will be used to correct this.

In the *Create Render Node* window, click on the Utilities tab. Under *General Utilities* section, **Create a Reverse** node.

STEP SIX



In the Hypergraph window, **Drag** with the Middle Mouse Button, the **envSky1** node onto the **Reverse** node. This will open the Connection Editor.

Connect the **Azimuth** on the left side, with the **Input X** on the right side.

In Hypergraph, **Drag** the **Reverse** node onto the **lightLinker** node. In the Connection Editor, **Connect Output X** to the **Rotate Y**.

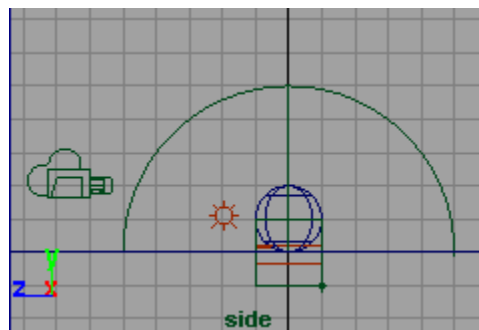
Test your light connection by opening the Attribute Editor for the envSky node, and changing the **Elevation** and **Azimuth** settings.

You should now notice that the directional light will rotate along with the Elevation and Azimuth.

STEP SEVEN

Create a plane, by selecting **Create > NURBS Primitive > Plane**.

Because you are unable to cast shadows on the floor of the *envSky*, you will need to



turn it off. Open the Attribute Editor and **Uncheck** the box next to **Has Floor**. **Scale** the **Plane** out to roughly 35 units.

Create a new Lambert material in the Hypershade, Change the color of the new Lambert to white. This will make it easier to see the shadow.

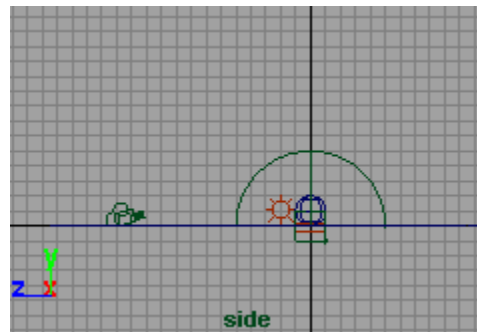
Assign this material to the **Plane**.

Select **Create > NURBS Primitive > Sphere**. **Move** the sphere up in the **Y axis**. This will be your shadow casting object and will make it easier to see where the shadow will fall. **Assign** a new material to the sphere. Move the sphere so that it sits just above the floor.

Create an Ambient Light. Move the light to a point in front of the cone. Set the **Intensity** to **0.5**.

STEP EIGHT

Position Camera1 in your scene. The most effective positioning of the camera when using an *envSky* is to point the camera slightly towards the sky.



Move the camera away from the cone to see a good portion of the floor in front of it. This is where your shadow will be cast. Make sure that the camera is not positioned past the edge of the plane.

STEP NINE

You are now going to animate the clouds.

Select the 3D icon for the cloud. **Move** it **6 units** in the **Z axis**. **Set a key** at time **1** by selecting **Translate Z** in the channel box and with the right mouse button select

place3dTexture2	
Translate X	0
Translate Y	0
Translate Z	0
Rotate X	60
Rotate Y	0
Rotate Z	0
Scale X	1.5
Scale Y	1.5
Scale Z	1.5
Visibility	on

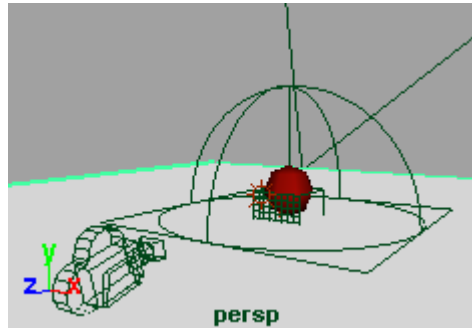
Key Selected from the drop down menu. **Set another key** for the **Rotate X** attribute value at time 1.

Move the time slider to time 100. Change the **Translate Z** of the icon to **0** and **set a key**. Change the **Rotate X** to **60** and **set another key**.

STEP TEN

You are now ready to animate the setting of the sun.

Move your time slider to **1**. **Set** the elevation attribute on the *envSky* to **75** and click the attribute with your right mouse button and select **Set Key**.



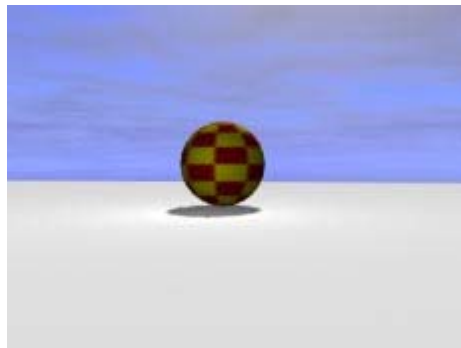
Change the time slider to **100**. Change the elevation to **0** and **Set a Key**.

Press **Play**, you should now see the *envSky* icon animate the elevation over time.

Set up your Render Globals to render out 100 frames from *Camera1*. Save your file and then render out the frames.

CONCLUSION

You have now constructed an *envSky* that will cast accurate shadows according to the position of the sun. Click on the image to get a "time lapse" animation of a setting sun. Pay attention to the length and direction of the shadow as the sun sets.



[Play Movie](#)[~800k]

You can further enhance the animation by keying the size and total brightness of your sun as it sets to produce a more dramatic sunset. You may also want to key the ambient light slowly to zero intensity at around

HOW TO CREATE A TREE IN PAINT FX

By S. Christov

Maya Complete
Paint Effects

In this lesson you will create a tree in Paint Effects starting from a simple black brush stroke.



While this approach is somewhat drastic it will help you form a good understanding of the attributes that make up Paint Effects.

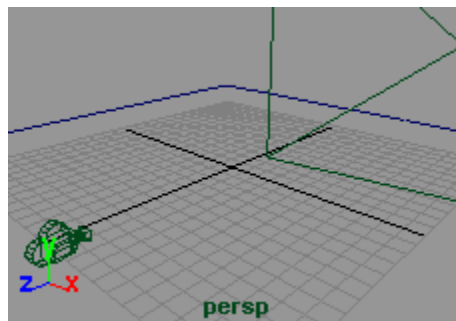
[Play Movie](#) [~800k]

This article assumes you have Paint Effects loaded into Maya. Please see the Maya help menu on how to install Paint Effects if you have not already done so.

This lesson is the third of a three part lesson. You may want to complete parts one "[How to create a realistic sky using EnvSky](#)" and two "[How to create realistic shadows using EnvSky](#)" before you start this lesson.

STEP ONE

Download and open the scene [Env_sky_shadow.ma](#). If you have completed the previous lessons, you can use your last saved scene file.



Delete the sphere.

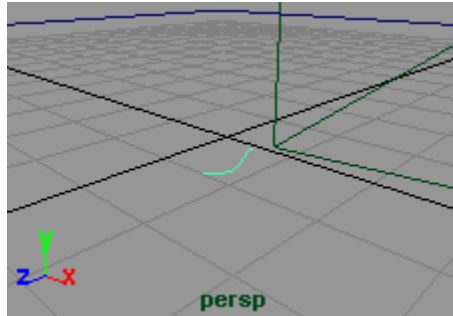
Select the lights, *3D env_sky icon*, and the 3D texture icon for the cloud.

Select **Display > Hide > Hide Selection**. This will

unclutter the scene so we can concentrate on the Paint Effects stroke.

STEP TWO

Switch to the Persp window. Select the plane and select the **Paint Effects > Make Paintable**.



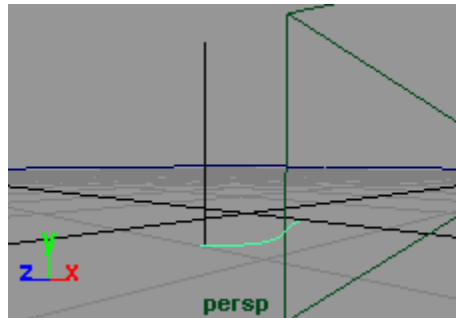
Open the Visor by selecting **Windows > Visor**. Scroll to the bottom and open the section marked **Brushes**. This will give you access to the Paint Effects preset brushes.

Open the **Pens** and select the **simpleLine** brush.

In your perspective window, **Paint** a small stroke near the origin.

STEP THREE

With the stroke still selected, open the **Attribute Editor**. Open the tab *simpleLine1*. Your first step is to add tubes to the brush.



Open the tubes section and **Click** beside **Tubes** and then **Tube Completion**.

Open the **Tubes > Creation** section. Change the **Tubes Per Step** to **0.1** and the **Tube Rand** attribute to **0**. Also change the **Length Min** to **0.8**, and the **Length Max** to **0.9**.

You will also see some attributes called *Tube Width1* and 2. These set the width for the base of the tube and the tip of the tube respectively. Change the **Tube Width1** to **0.12** and **Tube Width2** to **0.09**. There are settings for randomness and bias for multiple tubes across the same stroke but because we are only creating one tube, we can ignore these settings.

Change the number of **Segments** to **40**. This will increase the number of segments that are used to create the tube.

The *Elevation* attribute dictates the lean on the tube. Where **0** is the tube lying flat against the curve and **1** standing straight up. Since you want the tree to stand straight up, set the **Elevation Min** and **Max** to **1.0**.

NOTE: You may notice that your tube is still lying flat against the curve despite changing the elevation attribute. You can fix this in the attribute editor. **Open Behavior > Forces**. Change the **Path Follow** to **0.0**.

STEP FOUR

Now that you have the basic shape of the trunk you are now ready to shade it.



Open the *Shading* section in the Attribute Editor. **Click** on the color swatch next to **Color1**. In the color chooser change the RGB values to **0.64, 0.52, 0.41**.

Open the *Tube Shading* section. Click on the color swatch next to **Color2**. Set the RGB values to **1.0, 0.85, 0.83**.

You have now set the colors for the trunk of your tree. If you render now you will see that it will render out in one uniform color. By adding a simple ramp texture to the tube you can simulate bark.

Open the *Texturing* section. **Click** on the icon next to **Map Color**. We are going to map a **V Ramp** to the trunk of the color to give the appearance of bark.

From the drop down menu beside **Texture Type**, Select **V Ramp**. **Set** the following attributes:

- **Texture2 Color** to **RGB 0.54, 0.49, 0.44**
- **Repeat U** to **6.0**
- **Repeat V** to **2.2**
- **Blur Mult** to **.26**
- **Smear** to **0.203**

- **Smear V to 0.61**

You can preview the progress this far by pressing the hotkey "8" while in the persp window to switch to the paint effects preview render window. In the menu select **Stroke Refresh > Rendered**. However it will take longer to refresh with each change.

NOTE: When you render, depending on the length of your original stroke, you may have more than one tube attached to your stroke. One way to solve this is to lower the **Tubes per Step** attribute in the *Tubes > Creation* section.

STEP FIVE

In Paint Effects you have the option to illuminate the tree with simulated or real lights.

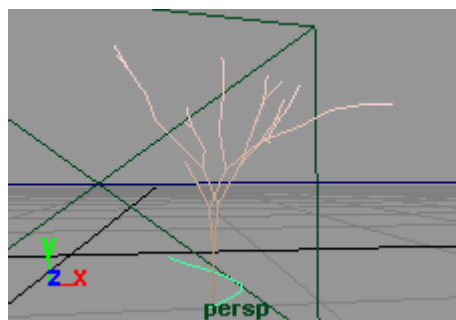


Open the *Illumination* section, **Check** the box next to *Illuminated*. This will use real lights from your scene on your paint effects tree.

We are also going to add some specular qualities to the tree to give it some highlights. **Set Specular to 0.15.**

STEP SIX

Now that we have the trunk, we are ready to add some branches. **Open** the *Tubes Growth* section and **click** next to **Branches** to add them to the trunk.



Open the **Branches** section. Increase the **Split Max Depth** to 7. This increases the number of times the branch will split up.

Increase the **Branch Dropout** to 0.02.

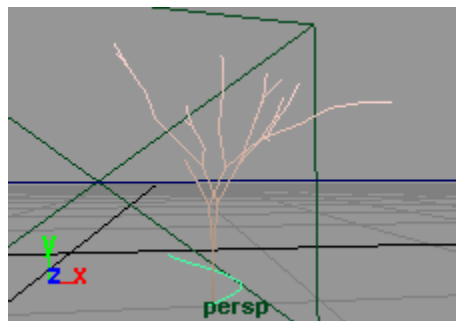
The next set of values control different attributes for the split on the branch including Randomness, Angle of split, Twist. Feel free to experiment with these values and come up with your own style of tree or you can set the following values:

- **Split Rand** to **.017**
- **Split Angle** to **26.3**
- **Split Twist** to **0.32**
- **Split Size Decay** to **0.67**
- **Split Bias** to **0.19**

STEP SEVEN

Click on the box next to **Twigs** to turn them on. Open the *twigs* section.

Set the **Num Twig Clusters** to **8.0** and set the **Twig Dropout** to **0.439**.



Then next attribute set length, width, angle and twist. Again feel free to experiment with the settings to get your own tree or set the following attributes:

- **Twig Length** to **0.08**
- **Twig Base Width** to **0.7**
- **Twig Tip Width** to **0.15**
- **Twig Angle1** to **52.5**
- **Twig Angle2** to **54.0**
- **Twig Twist** to **0.512**

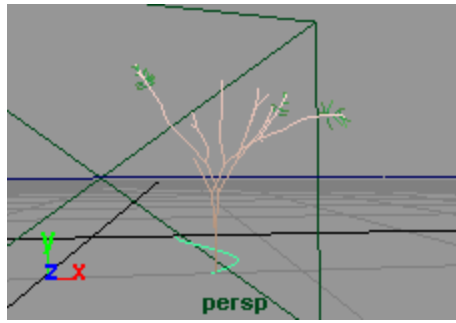
Keep in mind that your twigs will decide the placement of leaves. So these settings can have a pretty dramatic effect down the line.



For example increasing the number of Twig Clusters will result in more leaves on your final tree.

STEP EIGHT

You will now add some leaves to the tree to complete the look. **Click** the box next to **Leaves**. Set the following attributes:



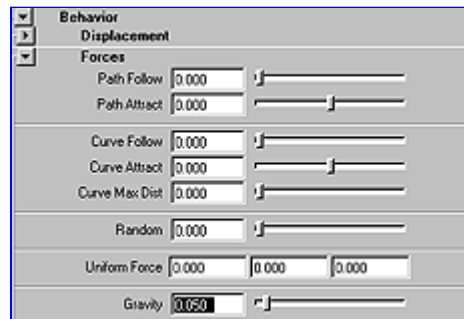
- **Leaves in Cluster** to **5.0**
- **Num Leaf Clusters** to **4.0**
- **Leaf Dropout** to **0.154**
- **Leaf Length** to **0.04**
- **Leaf Base Width** to **0.035**
- **Leaf Tip Width** to **0.01**
- **Leaf Start** to **0.9**
- **Leaf Twist** to **0.5**
- **Leaf Translucence** to **0.561**
- **Leaf Sat Rand** to **0.033**
- **Leaf Val Rand** to **0.114**



Check the box next to **Terminal Leaf**. This will place a leaf at the end of each twig.

STEP NINE

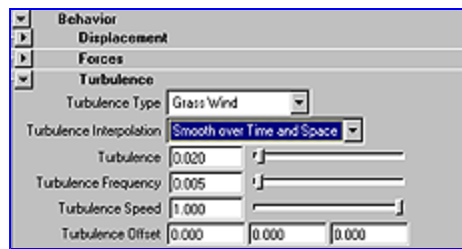
If you render your image at this point you should have a basic looking tree. You are now ready to add various other attributes to further enhance your tree.



In the Attribute Editor open the Behavior > Forces section. Set the **Gravity** slider to **0.05**. You will notice that the branches and leaves spread out as if the weight of the leaves was pulling the branches down.

STEP TEN

You are now ready to add some animation to the tree to simulate it swaying in the wind.



Open the **Behaviour** then the **Turbulence** section. Set the **Turbulence Type** to **Grass Wind**. Set **Turbulence Interpolation** to **Smooth over Time and Space**.

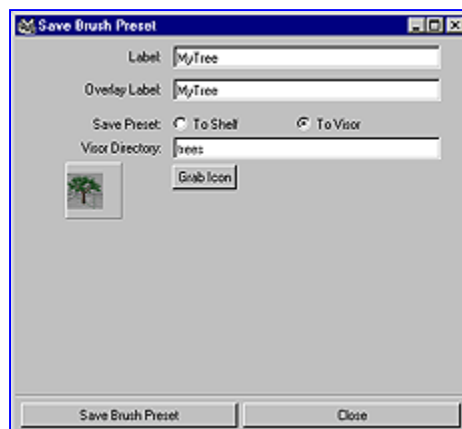
Because we are going to use this tree with a time lapse sunset, you will want the tree to behave with tight motion in the tree trunk and branches but you do want the the leaves to give the impression of some quick fluttering in the wind. Set the following values:

- **Turbulence** to **0.02**
- **Turbulence Frequency** to **0.005**
- **Turbulence Speed** to **1.0**

Set the **Time Slider** to **100**. **Press Play**. Switch to the Perspective window. The wireframe will give you an indication of the general motion of the tree.

STEP ELEVEN

You will now save your brush to the visor so you can access it in the future. With the tree selected, go to **Paint Effects > Get Settings from Selected Stroke**. This will apply your tree to the template brush.



Now select **Paint Effects > Save Brush Preset. . .**

Set the **Label** and **Overlay Label** to *Mytree*.

Save it To Visor and set the **Visor Directory** to *Trees*.

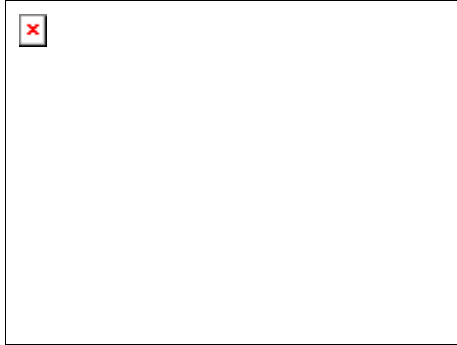
Click on **Grab Icon** and drag around your tree in the render view to make an icon for you brush.

Click **Save Brush Preset**.

STEP TWELVE

Select **Panels >**
Perspective >
Camera 1.

Position your tree in the frame by selecting the stroke and moving it with the manipulator. Add a texture to the ground plane.



Do some test renders at different frames to make sure you are happy with the framing and lighting. When you are satisfied with the results, set the render globals to render the animation for 100 frames from *Camera1*.

CONCLUSION

You have now assembled a complete scene similar to the one above. By this point you have learned how to create and use an environment sky, add a light to it to simulate realistic shadows based on the sun position, and made your own tree in paint effects.



[Play Movie](#)[~800k]

Enhance your scene by sculpting the floor surface with Artisan to make some nice rolling hills and adding some grass strokes to it.

[Download](#) the completed scene file. [~100k]
