

Fireplace Tutorial

In this tutorial you will create Multi/Sub-Object materials, and fog and combustion atmospheric effects, and apply them to a fireplace. The fireplace has two different types of brick (yellow interior firebrick and red exterior brick), a layer of soot on the yellow brick, burning logs with their own layers of soot, and multiple combustion objects to create flame effects.



Setup

Reset 3DS MAX and open file \Scenes\ol_fp01.max.

Lessons

Lesson 1: Setting Up Two UVW Mapping Channels

Lesson 2: Creating Multi/Sub-Object Materials for the Fireplace

Lesson 3: Adding Materials and Soot to the Fireplace Logs

Lesson 4: Adding Combustion

Lesson 5: Adding Firelight

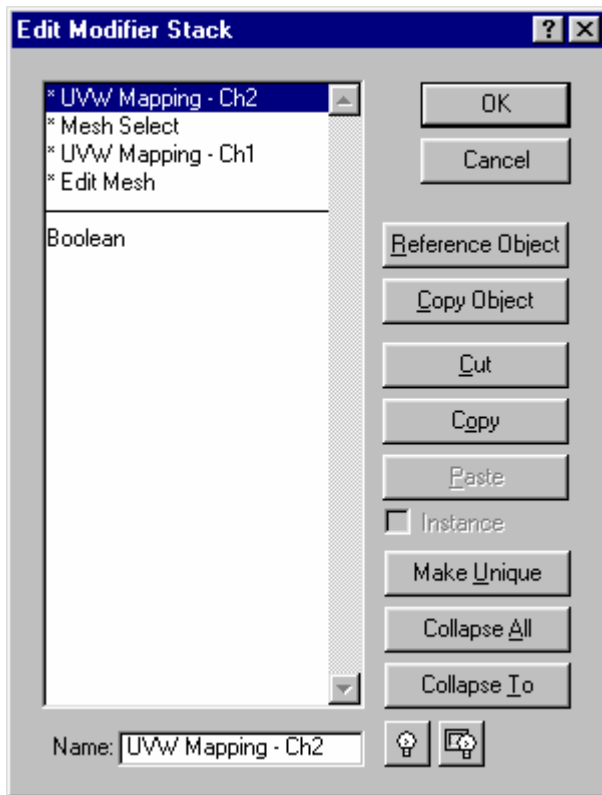
Lesson 1: Setting Up Two UVW Mapping Channels

The interior of the fireplace consists of yellow brick with a layer of soot over a portion of it. By using two UVW Map modifiers, you can scale, adjust, and orient the composited soot independent of the brick mapping.

- 1 On the toolbar, click Select by Name and select [Fireplace]. On the Group menu, choose Open.

Groups let you combine a selection set of objects or other groups into a single group. When you open a group, you can temporarily access parts of the group. Objects in a defined group can be regrouped using the Close command.
- 2 Click Select by Name again and select **fireplace main body**. On the Modify panel, click Edit Stack to open the Edit Modifier Stack dialog.

This mesh is a Boolean object with a subtraction to create the firebox.
- 3 On the dialog, choose the Edit Mesh modifier. On the Modifier panel, click Sub-Object and then choose Face from the list.
- 4 On the Edit Surface rollout, click Select by ID to verify there are two face selections: ID 1 for the firebox and ID 2 for the fireplace. Leave Sub-Object/Face open, and make sure ID 2 (i.e. the fireplace faces) is selected.
- 5 On the Modifiers rollout, click UVW Map. On the Parameters rollout, select Mapping = Box, Channel = 1, and Alignment = X.
- 6 Click Edit Stack, choose UVW Mapping from the list, and name the modifier **UVW Mapping - Ch1**. Then click OK to close the dialog.
- 7 On the Modifiers rollout, click Mesh Select. Make sure Sub-Object = Face, and Material ID = 1. Click Select by Material ID to select ID 1 (the firebox).
- 8 With Sub-Object selected, apply a second UVW Mapping modifier, with Mapping = Box, Channel = 2, and Alignment = X. Label this modifier **UVW Mapping - Ch2**. Close the dialog.



Lesson 2: Creating Multi/Sub-Object Materials for the Fireplace

The fireplace consists of an exterior fireplace body and an interior firebox. In this lesson, you will create a Multi/Sub-Object material and apply it to the fireplace. The first material is a weathered red brick and is applied to the fireplace exterior. The second material is yellow brick with soot stains and covers the interior of the fireplace. (The hearth and mantle are separate objects with their own materials).

Lesson Tasks

Create the Red Brick Fireplace Material

Create the Yellow Brick Firebox Material

Create the Red Brick Fireplace Material

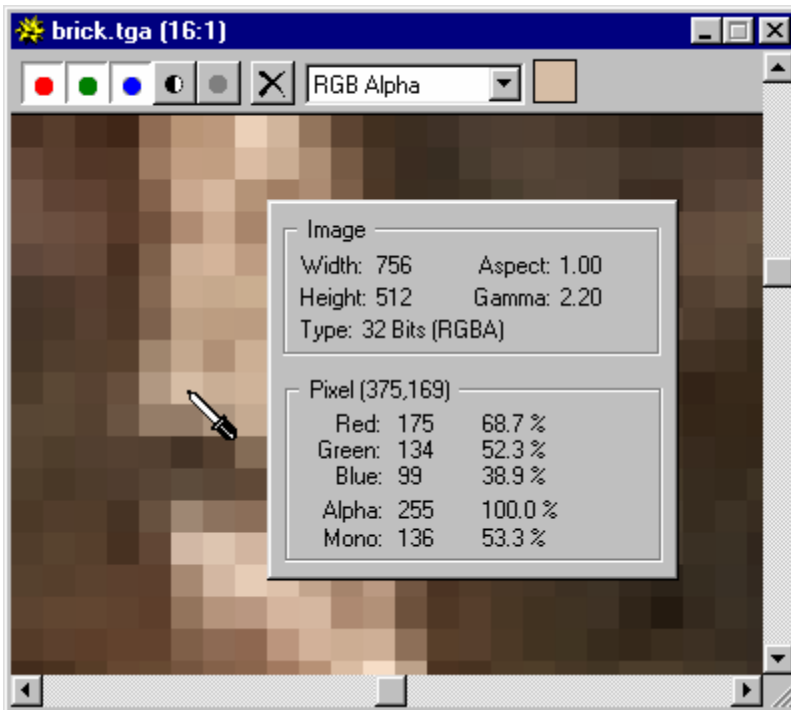
The fireplace in this scene is weathered, dented and stained, so the red brick bitmap alone will not due. In the following steps, you will mix the red brick bitmap with a Dent Map, and then mix that result with a red diffuse color taken from the bitmap.

- 1 Open the Material Editor and select an open sample slot. Click Type (Standard), and choose Multi/Sub-Object. Select Discard old material in the dialog, and then label the material **Fireplace**.
- 2 Set Number of Materials = 2. Label the first material **firebox** and the second material **fireplace**.
- 3 Click the second material button (fireplace). On the Utilities panel, click Asset Manager. Make sure it points to the \Maps directory.

The Asset Manager utility lets you view thumbnail displays of bitmap files on your hard disk, and then view them or drag and drop them to valid Map buttons or sample slots on the Material Editor. You can also render a view of a thumbnail image.

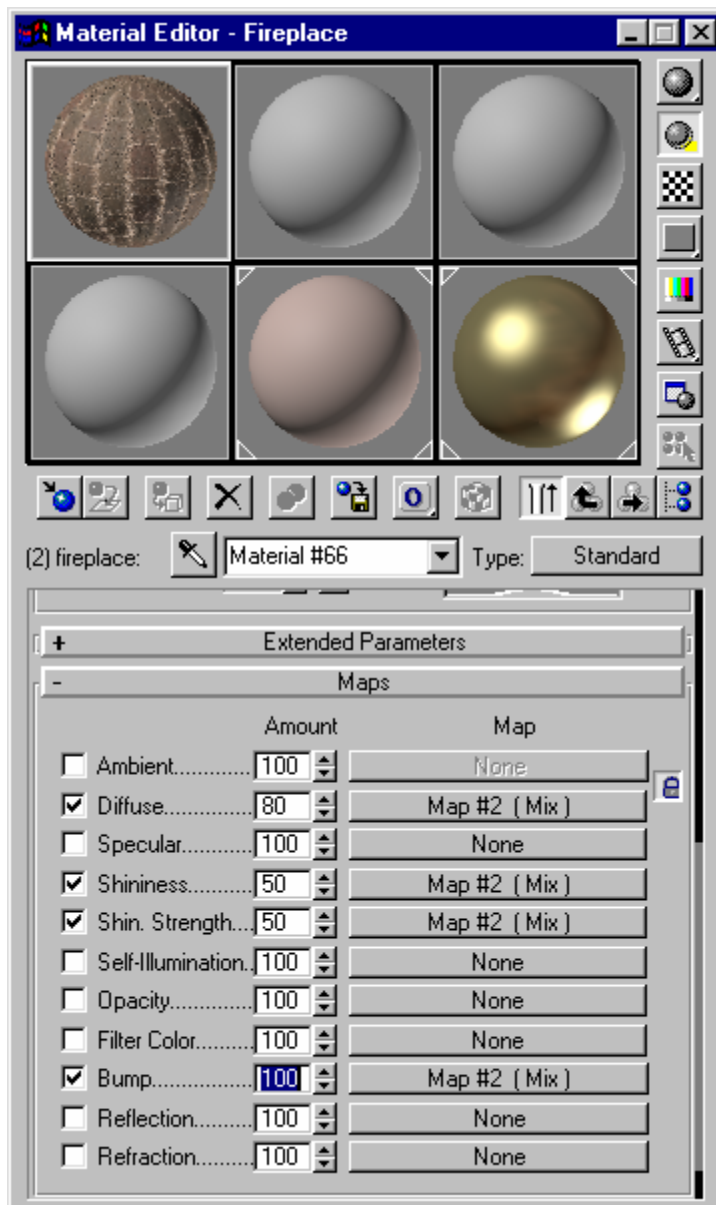
- 4 Double-click the **brick.tga** thumbnail to render a view of the material. CTRL+Click (about four times) in the rendered window to magnify the result until individual color pixels are clearly visible.
- 5 Find a light red color, and then right-click on it.

An eyedropper appears with the selected color in the color swatch at the top-right of the Virtual Frame Buffer (VFB). Notice that you can drag the dropper around the image and see the changes in color values.



- 6 Drag the color swatch located in the top-right of the VFB to the Diffuse color swatch on the Material Editor, and then click Copy in the dialog. Close the VFB.
- 7 On the Material Editor, open the Maps rollout and click the Diffuse Map button. Choose a Mix material type. Drag **brick.tga** from the Asset Manager to the Color #1 Maps button and click that button to move to the Bitmap material level.

- 8 On the Coordinates rollout, set U Tiling = **2**, V Tiling = **2**, select WU, and set Angle U, V, and W each = **90.0**.
- 9 Open the Noise rollout and select On and set Levels = **5**.
- 10 On the Material Editor toolbar, click Go to Parent to return to the Mix material level. Drag the Color #1 Maps button (brick.tga) to the Mix Amount Maps button. Select Instance from the dialog.
- 11 Click the Color #2 Maps button and assign a Dent map. On the Coordinates rollout, make sure XYZ is selected, and set Angle X, Y, and Z each = **30.0**.
- 12 On the Dent Parameters rollout, set Size = **250**, Strength = **40**, and Iterations = **3**. Make sure Color #1 is Black and set Color #2 to Taupe (H = **17**, S = **55**, and V = **148**).
- 13 Return to the Standard material level and drag an Instance copy of the finished Diffuse map to the Shininess, Shin Strength, and Bump Map buttons. Then set Diffuse Amount = **80**, Shininess Amount = **50**, Shin Strength Amount = **50**, and Bump Amount = **100**.



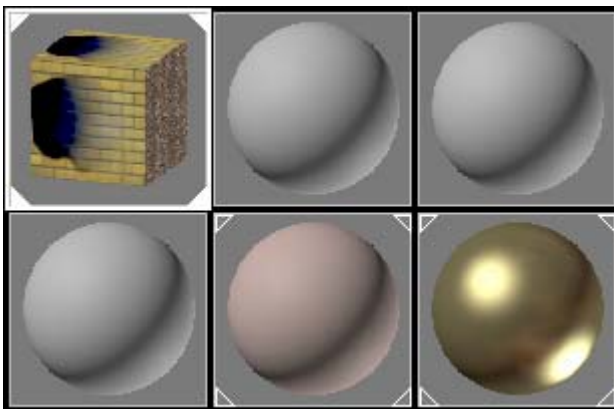
Create the Yellow Brick Firebox Material

- 1 Return to the Multi/Sub-Object material level and click the first Material button (firebox).
- 2 Drag **yellobrk.tga** from the Asset Manager to the Diffuse Map button on the Maps rollout.
This material is a composite of the yellow brick bitmap material and a “soot” bitmap overlay.
- 3 Drag **yellobrk.tga** from the Diffuse Map button to the Bump Map button. Select Instance from the dialog. Then set Bump Amount = **200**.
- 4 Click the Diffuse Map button and assign a Composite material. Select Keep old map (yellobrk.tga) as a sub-map. Make sure Number of Maps = **2**. (Map 1 should be yellobrk.tga.)
- 5 Click the Map 2 button and assign a Mask map. Drag **a_soot2.tga** to the Mask button and click on it. On the Coordinates rollout, set Mapping = Explicit UVW2, and Angle W = **90**.
- 6 Open the Output rollout and set Output Amount = **2** and RGB Level = **1.6**.
- 7 Return to the Mask material level. Click the Map button and assign a Noise map. Drag **soot2.tga** to the Color #1 Maps button, and drag **a_soot2.tga** to the Color #2 Maps button. Click the Color #1 Maps button and set Mapping = Explicit UVW2, and Angle W = **-90** (minus 90).

Note: Compositing a black image with a mask can be confusing because the mask itself is colored black and white. Here, soot2.tga is a black bitmap, and is used to illustrate how to combine a bitmap and a mask to make a composite material that will be applied to a second UVW map channel – if you use a bitmap as Color #1, you must set its mapping to Explicit UVW2. Alternatively, you set Color #1 to black, with no Mapping setting, and apply Explicit UVW2 setting only to Color #2.

- 8 Return to the Noise material level. Click the Material #2 Maps button and set Mapping = 8Explicit UVW2, and Angle W = **-90** (minus 90).
- 9 Return to the Multi/Sub-Object material level and view the final material in the Material Editor. Change the Sample Type shape to a cube and double-click the slot image to render a larger view. Right click and choose Drag/Rotate to view the material from various angles.
- 10 Click Select by Name and select fireplace main body. On the Material editor, make sure the Fireplace material slot is still selected and then click Assign Material to Selection.

The new Fireplace Multi/Sub-Object material is assigned to the fireplace main body object.



Lesson 3: Adding Materials and Soot to the Fireplace Logs

The three fireplace logs each have two assigned material ID's. You will use one for representing the tree bark surface, and the other for representing the exposed surface where the log was split. You will also apply a soot effect to the logs. Applying a "soot" bitmap using a composite material and UVW Channel 2 mapping requires working with the 3 logs separately and can create problems during animation. Instead, you will apply soot to the logs using localized black fog.

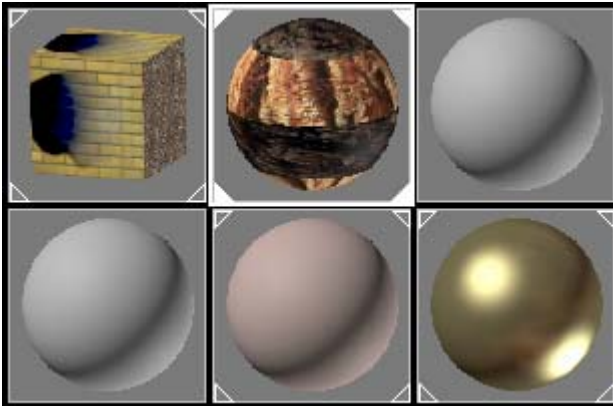
Lesson Tasks

Create the Log Material

Create the Log Soot

Create the Log Material

- 1 Assign a Multi-Sub-Object material to an open sample slot in the Material Editor. Select Discard old material on the dialog, and then label the material **Logs**.
- 2 Set Number of Materials = **2**. Label the first material **bark** and the second material **exposed**.
- 3 Click the first material button (bark), and open the Maps rollout.
- 4 Drag **barkier.jpg** from the Asset Manager to the Diffuse Map button. Then drag the Diffuse Map to the Bump Map button, and select Instance on the dialog. Set Bump Amount = **200**.
- 5 Return to the Multi/Sub-Object material level.
- 6 Click the second material button (exposed), and open the Maps rollout.
- 7 Drag **bark4.jpg** from the Asset Manager to the Diffuse Map button. Drag the Diffuse Map to the Bump Map button, and select Instance on the dialog. Then set Bump Amount = **200**.
- 8 Use Select By Name and select the three logs, and then click Assign Material to Selection.



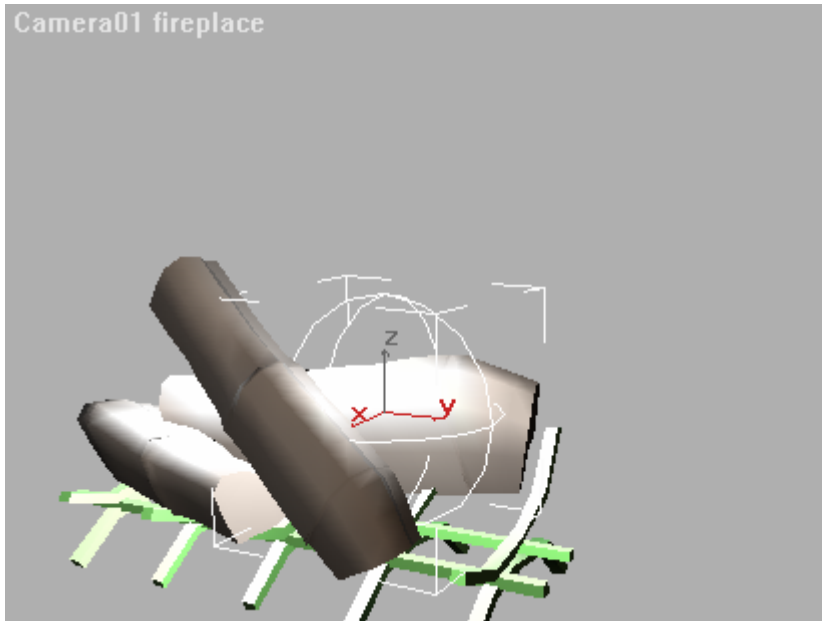
- 9 Close the Material Editor and the Asset Manager for now.

Create the Log Soot

Volume fog provides a fog effect in which the fog density is not constant through 3D space. By default, volume fog fills the entire scene. However, you can create a gizmo (Atmospheric Apparatus) to contain the fog to any area.

In the following steps, you will apply soot to the "burning area" of the logs using localized black fog.

- 1 Before proceeding, hide all scene objects except for the three logs and the grate. Select [Grate], log 1, log 2, and log 3. Then go to the Display panel and click Hide Unselected. In the Camera viewport, dolly the camera until the logs and fire grate fill the frame.
- 2 Create a spherical Atmospheric Apparatus. On the Create panel, click Helpers, choose Atmospheric Apparatus from the list, and click SphereGizmo.
- 3 In the Front viewport, drag a Radius = **20** over the log area, and then right-click to end input mode. Using the Camera viewport as a guide, position the gizmo in the three other viewports so that it covers the burning area of the 3 logs, leaving other areas exposed. Label the gizmo **soot**.



- 4 On the Rendering menu, choose Environment. On the Atmosphere rollout, click Add and choose Volume Fog. Name it **Volume Fog - soot**.
- 7 On the Volume Fog Parameters rollout under Gizmo, click Pick Gizmo and select the soot gizmo. Set Soften Gizmo Edges = **0.5**.
- 8 Under Volume, set Color = black, Density = **100**, select Exponential, and clear Fog Background.
- 9 Under Noise, set Size = **50**.
- 10 Render the logs. You should see the 3 logs on the grate and with the central area of the logs darkened. The background should be unaffected by the fog. Below is the result with Exponential selected.

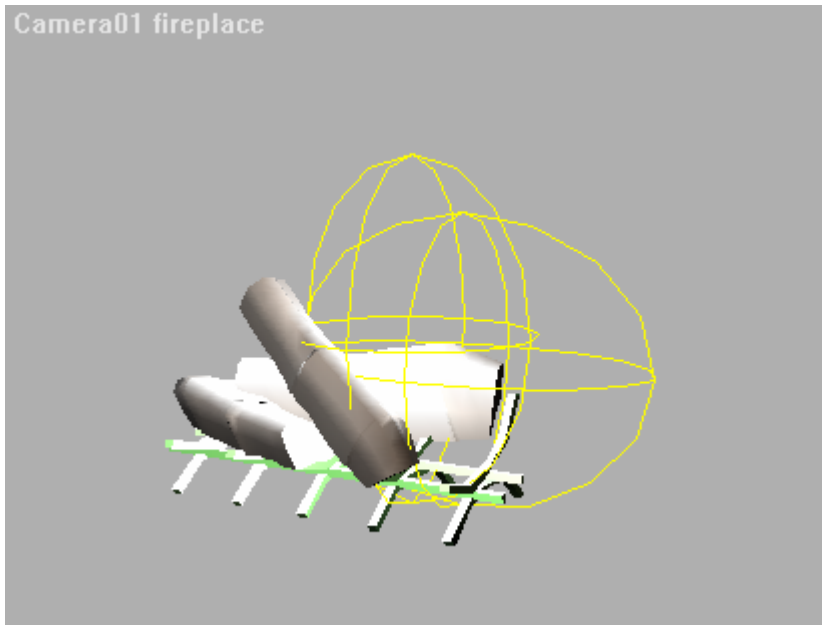


- 11 Experiment with the effect created by a combination of moving the soot gizmo, changing the Soften Gizmo Edges setting, clearing Exponential and Active, and selecting Fog Background.
- 12 Dolly Camera01 fireplace out to return it to the original setting.
- 13 Hide the soot gizmo.
- 14 Before leaving this scene close the VFB, and make sure that Active and Exponential are selected, and that Fog Background is clear before closing the Environment dialog.

Lesson 4: Adding Combustion

Combustion is most compelling when non-identical flames are layered. In this task, you'll create two spherical Atmospheric Apparatus gizmos and apply two separate Combustion effects to create a flaming fire effect.

- 1 On the Create panel, click Helpers, choose Atmospheric Apparatus from the list, and click SphereGizmo. In the Front viewport, create a gizmo slightly larger than the probable size of flames. Label the gizmo **fire gizmo 1**. Align the gizmo in the other viewports so that it is approximately in the center of the logs.
- 2 Activate the Right viewport. On the toolbar, click Select and Non-Uniform Scale, then click Restrict to Y, and squash the gizmo down slightly.
- 3 In the Front viewport, create another gizmo about the same size as the previous one. Label the gizmo **fire gizmo 2**. Click Select and Non-Uniform Scale, then click Restrict to X, and squeeze the gizmo up slightly. Align the gizmos in the other viewports to approximate different overlapping flames.



- 4 On the Rendering menu, choose Environment and add a Combustion Atmospheric Effect. Name it **Combustion gizmo 1**.
- 5 On the Combustion Parameters rollout, click Pick Gizmo, select fire gizmo 1, and do the following:
 - Set Inner Color H = **42**, S = **215**, V = **252**; Set Outer Color H = **255**, S = **238**, V = **225**
 - Under Shape, select Tendril, set Stretch = **8.8**.
 - Under Characteristics, set Flame Size = **11.0**, Flame Detail = **10.0**, Density = **10.0**, and Samples = **2**
 - Under Motion, set Phase = **50.0**, and Drift = **25.0**
- 6 Add another Combustion Atmospheric Effect, name it **Combustion gizmo 2**.
- 7 Click Pick Gizmo, select fire gizmo 2, and do the following:
 - Set Inner Color H = **34**, S = **153**, V = **253**; Set Outer Color H = **6**, S = **238**, V = **121**
 - Under Shape, select Tendril, set Stretch = **0.7**, and Regularity = **0.25**

- Under Characteristics, set Flame Size = **15.0**, Flame Detail = **10.0**, Density = **13.0**, and Samples = **3**
- Under Motion, set Phase = **15.0**, Drift = **5.0**.

8 Render the scene.

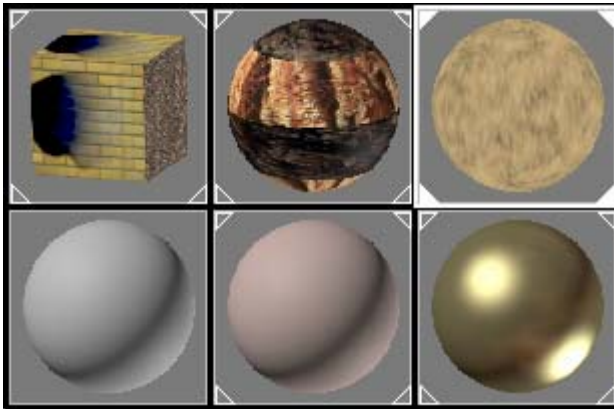


Experiment by changing the sizes of the gizmos and by moving them around until you are satisfied with the effect. You can also change some of the settings on the Environment dialog.

Lesson 5: Adding Firelight

The firelight projecting into the firebox and scene comes from a multi-layered Noise map applied to an Omni light as a projector.

- 1 Unhide the objects in the scene. On the Display panel, click Unhide All. On the Hide by Category rollout, select Helpers to hide the gizmos.
- 2 Select an empty sample slot in the Material Editor and label it **Firelight**. Click Get Material and select a Noise map. On the Coordinates rollout, do the following:
 - Set X Tiling = **3.0**, and Y Tiling = **2.0**.
- 3 On the Noise Parameters rollout, do the following:
 - Select Fractal, and set Size = **15.0**, Low = **0.3**, Levels = **10**, and Phase = **2.6**
 - Set Color #1 to H = **255**, S = **123**, and V = **29**
 - Set Color #2 to H = **29**, S = **159**, and V = **170**.
- 4 Click the Color #1 Maps button and assign a second Noise map. On the Noise Parameters rollout do the following:
 - Set Color #1 to H = **85**, S = **51**, and V = **5**
 - Set Color #2 to H = **21** S = **173**, and V = **187**



- 5 Unhide the Omni lights. On the Display panel on the Hide by Category rollout, clear Lights.
- 6 Select the Omni in firebox and Omni in firebox01 lights and go to Modify panel. On the General Parameters rollout, set Multiplier = **4.0**, and make sure Affect Diffuse and Affect Specular are selected. Make sure Attenuation/Far/Start = **40** and End = **100**.
- 7 Drag the firelight map from its slot in the Materials Editor to the Projector Map button on the Projector Parameters rollout. Select Instance from the dialog.

The light casts a multi-colored pattern on the firebox and out into the room.

