Chapter 9

Material Editor:
Texture Maps-II

Learning Objectives

After completing this chapter, you will be able to:

• *Create transparent materials*
• *Apply transparency maps to objects*
• *Create procedural maps*

INTRODUCTION

In this chapter, you will create materials using opacity and procedural maps. An opacity map is used to control the transparency of a material. It can be applied to a simple 3D object to give it the appearance of a complex shape. Unlike a bitmap which contains a fixed number of pixels, a procedural map is generated in two or three dimensions by using a mathematical algorithm.

TUTORIAL

Before starting the tutorial, you need to download the *c09_3dsmax_2020_tut.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2020 for Beginners: A Tutorial Approach*

Extract the contents of the zip file and save them in the *Documents* folder.

Tutorial 1

In this tutorial, you will create materials using special texture maps. You will use the opacity and diffuse color maps to make a square block look like a flower, refer to Figure 9-1.

(Expected time: 20 min)

Figure 9-1 *Materials applied to models*

The following steps are required to complete this tutorial:

a.   Create the project folder.
b.   Open the file.
c.   Create a new material library.
d.   Create the vase material.
e.   Create the flower material.
f.   Create the wood block material.
g.   Assign the material to the objects.
h.   Save and render the scene.

Creating the Project Folder

Create the project folder with the name *c09_tut1* in the *3dsmax 2020* folder as discussed in earlier chapters.

Opening the File

1. Open Windows Explorer and then browse to *\Documents\c09_3dsmax_2020_tut*. Next, copy all the image files to *\Documents\3dsmax 2020\c09_tut1\sceneassets\images*.

2. Choose **Open** from the **File** menu; the **Open File** dialog box is displayed. In this dialog box, browse to the location *\Documents\c09_3dsmax_2020_tut* and select the **c09_tut1_start.max** file from it. Choose the **Open** button to open the file, refer to Figure 9-2.
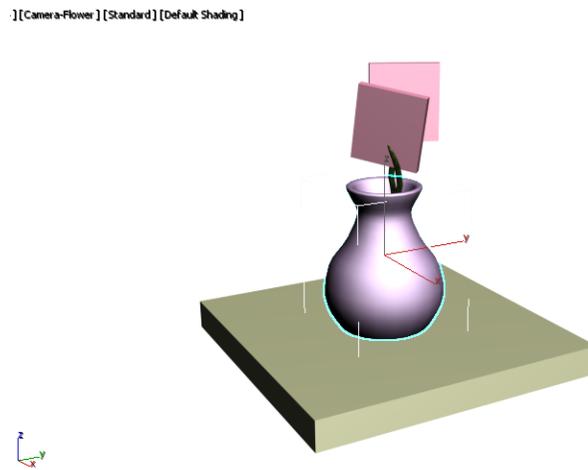

Figure 9-2 The c09_tut1_start file

3. Choose **Save As** from the **File** menu; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax 2020\c09_tut1\scenes*. Save the file with the name *c09tut1.max* at this location.

Creating a New Material Library

In this section, you will create a new material library which contains materials created in the scene.

1. Choose **Rendering > Material Editor > Compact Material Editor** from the menu bar; the **Material Editor** dialog box is displayed. You will notice that in the first slot, there is a material named *Stem* which is applied to the flower stems.

2. Choose the **Get Material** button in the **Material Editor** dialog box; the **Material/Map Browser** dialog box is displayed.

3. Choose the **Material/Map Browser Options** button from the **Material/Map Browser** dialog box; a flyout is displayed. Choose **New Material Library** from this flyout; the **Create New Material Library** dialog box is displayed.

As the project folder is already set, the *materiallibraries* folder of this project is displayed in the **Save in** drop-down list of this dialog box.

4.   Enter **Still-Life** in the **File name** text box as the new name for the material library and choose the **Save** button; the new **Still-Life** material library is created in the **Material/Map Browser** dialog box.

5.   Close the **Material/Map Browser** dialog box to return to the **Material Editor** dialog box.

Creating the Vase Material

In this section, you will create the transparent vase material by setting different parameters in the **Material Editor** dialog box.

1.   Select the second material sample slot in the **Material Editor** dialog box to make it the current sample.

2.   In the **Shader Basic Parameters** rollout, select **Blinn** from the drop-down list, if it is not already selected.

3.   In the **Blinn Basic Parameters** rollout, unlock the **Ambient** and **Diffuse** color swatches. Next, choose the **Ambient** color swatch; the **Color Selector: Ambient Color** dialog is displayed.

4.   In the **Color Selector: Ambient Color** dialog box, set the values as given next:

Red: **133**   Green: **166**   Blue: **47**

The ambient color is set to green. Choose the **OK** button to close the **Color Selector: Ambient Color** dialog box.

5.   Choose **Rendering > Environment** from the menu bar or press 8; the **Environment and Effects** dialog box is displayed. In the **Global Lighting** area of the **Common Parameters** rollout, choose the **Ambient** color swatch; the **Color Selector: Ambient Light** dialog box is displayed. In this dialog box, set the value **75** in the **Value** spinner and then choose the **OK** button to close the dialog box. Next, close the **Environment and Effects** dialog box.

This ambient light will bring out the ambient portion of the material color, which was added in the previous steps. If the ambient light value remained at 0, the ambient color settings would have no effect on the appearance of the material.

6.   In the **Material Editor** dialog box, choose the **Diffuse** color swatch; the **Color Selector: Diffuse Color** dialog box is displayed.

7.   In this dialog box, set the values as given next and then choose the **OK** button to close this dialog box:

Red: **153**   Green: **175**   Blue: **255**

8. In the **Material Editor** dialog box, choose the **Specular** color swatch; the **Color Selector: Specular Color** dialog box is displayed.

9. In this dialog box, set the values as given next:

    Red: **255**   Green: **255**   Blue: **255**

10. Close the **Color Selector: Specular Color** dialog box.

11. In the **Specular Highlights** area of the **Blinn Basic Parameters** rollout, set the value **60** in the **Specular Level** spinner.

12. Set the value **40** in the **Glossiness** spinner and **30** in the **Opacity** spinner.

    Note that smaller the opacity value, more transparent the material will be.

13. Choose the **Background** button located in the right side of the **Material Editor** dialog box; the background is displayed in the selected sample slot. This helps to view the effect of transparency settings in a better way; refer to Figure 9-3.
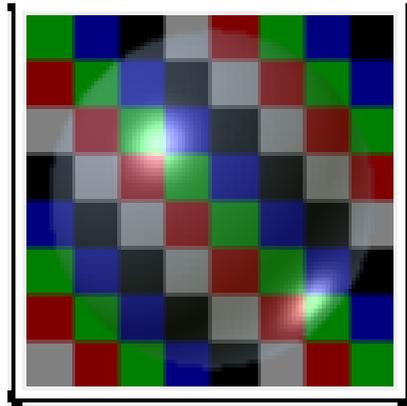

Figure 9-3 *The background displayed in the material sample slot in the **Material Editor** dialog box*

    Next, you will name the material and save it in the material library.

14. Choose the **Put to Library** button in the **Material Editor** dialog box; a flyout is displayed. Choose **Still-Life.mat** from the flyout; the **Put To Library** dialog box is displayed.

    If the **Material Editor** message box is displayed prompting to put the entire material/ map tree to the library, choose the **Yes** button. If you are at the root level of the material definition, the **Material Editor** message box does not appear because the entire tree is added by default.

15. Enter **Vase** as the name of the new material in the **Put To Library** dialog box and choose the **OK** button; the material is assigned the name *Vase* and is added to the **Still-Life** material library.

Creating the Flower Material

In this section, you will create the flower material using the opacity maps.

1.   In the **Material Editor** dialog box, select the third material sample slot. Various rollouts are displayed in the **Material Editor** dialog box to modify the **Standard** material.

2.   Expand the **Maps** rollout. Next, choose the **Diffuse Color** map button, currently labeled **No Map;** the **Material/Map Browser** dialog box is displayed showing the types of maps that may be added.

3.   Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed.

4.   In this dialog box, make sure **All Formats** is selected in the **Files of type** drop-down list. As the project folder is already set, the *images* folder of this project is displayed in the **Look in** drop-down list of this dialog box. Select the **daisy.tif** file and choose the **Open** button; the image file is loaded and the parameters are displayed for the map in the **Material Editor** dialog box.

5.   In the **Material Editor** dialog box, click and hold the **Sample Type** button located on the right side of the material slots. Now, choose the **Square** button from the flyout displayed; the sample slot in the **Material Editor** dialog box changes into square shape.

6.   In the **Coordinates** rollout, make sure the **Use Real-World Scale** check box is cleared and the value **1** is set in the **U: Tiling** and **V: Tiling** spinners.

     The material uses daisy flower image. When the material is applied to an object, you want the background portion of the image to be transparent. This can be done with an opacity map. The map consists of another image of the daisy with the daisy portion completely white (opaque) and the background portion completely black (transparent).

7.   Choose the **Go to Parent** button in the **Material Editor** dialog box to move one level up; the root level of the material is displayed.

8.   In the **Maps** rollout, choose the **Opacity** map button that is currently labeled as **No Map**; the **Material/Map Browser** dialog box is displayed showing the types of maps that can be added.

9.   Select the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed.

10. In this dialog box, make sure **All Formats** is selected in the **Files of type** drop-down list. As the project folder is already set, the *images* folder of this project is displayed in the **Look in** drop-down list of this dialog box. Select the **daisy-o.tga** file and choose the **Open** button; the image file is loaded and the parameters are displayed for the map in the **Material Editor** dialog box.

You will notice that the preview of image displayed in the **Select Bitmap Image File** dialog box has black and white areas. The white area will be opaque while the black area will be transparent when the material is rendered.

11. In the **Coordinates** rollout, make sure the **Use Real-World Scale** check box is cleared and set the value **1.0** in the **U: Tiling** and **V: Tiling** spinners.

12. Choose the **Background** button in the **Material Editor** dialog box; the material sample slot reflects the effect of opacity map, as shown in Figure 9-4.
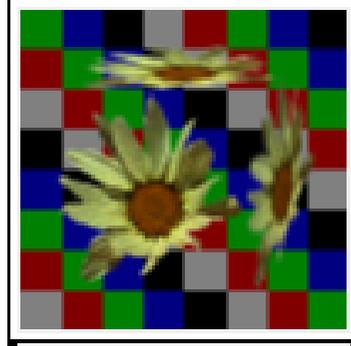
*Figure 9-4 The material sample slot displayed in the **Material Editor** dialog box*

Note

*The transparent area of the material will still accept specular highlights. In other words, it will look like a clear glass. If you want the transparent areas of the material to be completely invisible, you can set **0** in the **Specular Level** spinner of the **Blinn Basic Parameters** rollout or add a specular level map that matches the opacity map.*

Next, you will name the material and save it in the material library.

13. Choose the **Put to Library** button in the **Material Editor** dialog box; a flyout is displayed. Next, choose **Still-Life.mat** from the flyout; the **Put To Library** dialog box is displayed.

If the **Material Editor** message box is displayed prompting to put the entire material/map tree to the library, choose the **Yes** button, refer to Figure 9-5. If you are at the root level of the material definition, the **Material Editor** message box does not appear because the entire tree is added by default.

14. Enter **Daisy** as the name of the new material in the **Put To Library** dialog box and then choose the **OK** button; the material is assigned the name *Daisy* and is added to the **Still-Life** material library.
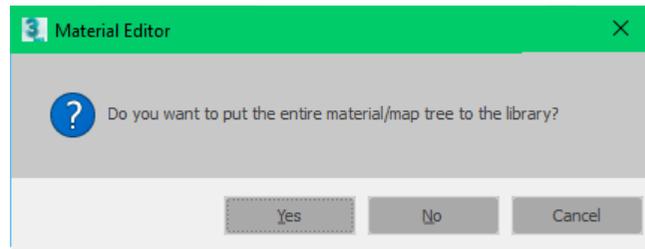
Figure 9-5 *The* ***Material Editor*** *message box*

Creating the Wood Block Material

In this section, you will create a wood procedural map.

1. Select the fourth material sample slot in the **Material Editor** dialog box.

2. Expand the **Maps** rollout. Next, choose the **Diffuse Color** map button that is currently labeled as **No Map**; the **Material/Map Browser** dialog box is displayed, showing the types of maps that can be added.

3. Choose **Advanced Wood** from the **Maps > General** rollout and choose the **OK** button; the **Material/Map Browser** dialog box is closed and the parameters for the *Advanced Wood* map are displayed in the **Material Editor** dialog box.

    Various settings in the rollouts of the **Material Editor** dialog box allow you to control the appearance of the wood material.

    You can set the parameters in these rollouts as per your requirement.

4. Make sure *Base* is selected. Choose the **Modify** tab. Next, apply the **UVW Map** modifier to it. In the **Parameters** rollout, select the **Box** radio button. Next, enter **400** in the **Length** spinner.

    As you change parameters, the material sample is dynamically updated.

    Next, you will name the material and save it in the material library.

5. Choose the **Go to Parent** button twice in the **Material Editor** dialog box to move one level up; the root level of the material is displayed. Next, choose the **Put to Library** button in the **Material Editor** dialog box; a flyout is displayed.

6. Choose **Still-Life.mat** from the flyout; the **Put To Library** dialog box is displayed.

7. Enter **Wood** as the name of the new material in the **Put To Library** dialog box and choose the **OK** button; the material is assigned the name *Wood* and is added to the **Still-Life** material library.

    Next, you will save the **Still-Life** material library.

8. Choose the **Get Material** button in the **Material Editor**; the **Material/Map Browser** dialog box is displayed.

9. Right-click on the **Still-Life.mat** in the **Material/Map Browser** dialog box; a flyout is displayed. Choose **Save** from the flyout, as shown in Figure 9-6.
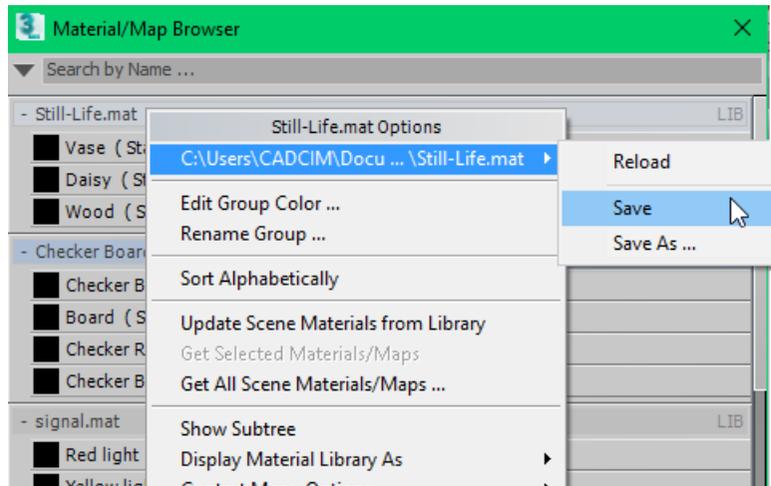

Figure 9-6 *Saving the material library*

10. Close the **Material/Map Browser** dialog box.

Assigning Materials to the Objects

In this section, you will assign materials to the objects in the scene.

1. Activate the Camera-Flower [Standard] [Default-Shading] viewport.

2. Invoke the **Render Production** tool from the **Main Toolbar**; the rendered image is displayed, refer to Figure 9-7.

   You will notice that all the objects except the stems are currently assigned a default material. Notice that the flowers are created as simple 3D boxes. The opacity map on *Daisy* material will give the flowers their shape. The stems already have an appropriate material assigned. Also, the required mapping coordinates have already been applied to the objects.

3. Close the rendered image. Next, invoke the **Select Object** tool from the **Main Toolbar**. Next, select *Vase* in the Camera-Flower [Standard] [Default Shading] viewport; the object is highlighted and *Vase* is displayed in the **Name and Color** rollout.

4. In the **Material Editor** dialog box, select the material sample slot which is named as *Vase* and then choose the **Assign Material to Selection** button; the *Vase* material is assigned to *Vase*. Next, choose the **Show Shaded Material in Viewport** button to display the material on *Vase* in the viewport.

Figure 9-7 *The rendered image*

5. Similarly, assign *Daisy* material to the two boxes representing the daisies. Also, assign *Advanced Wood* material to *Base*. Next, choose the **Show Shaded Material in Viewport** button to display the material on *Base* in the viewport.

    The two boxes for the daisy flowers are a single object.

6. Select the first material sample slot in the **Material Editor** dialog box.

7. Choose the **Diffuse Map** button that is labelled as M.

8. Select the field located next to **Bitmap** in the **Bitmap Parameters** area; the **Select Bitmap Image File** dialog box is displayed.

9. In this dialog box, navigate to the *C:\Users\CADCIM\Documents\3dsmax 2020\c09_tut1\ sceneassets\images* folder and select **EVERGREEN** from it. Next, choose the **Open** button; the map for the stem material is relinked.

10. Close the **Material Editor** dialog box.

Saving and Rendering the Scene

In this section, you will save the scene that you have created and then render it. You can also view the final rendered image of this model by downloading the *c09_3dsmax_2020_rndr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2020 for Beginners: A Tutorial Approach*

1. Change the background color of the scene to light grey.

2. Choose **Save** from the **File** menu.

3. Make sure the Camera-Flower [Shaded] viewport is activated. Next, invoke the **Render Production** tool from the **Main Toolbar**; the rendered image is displayed, refer to Figure 9-8.
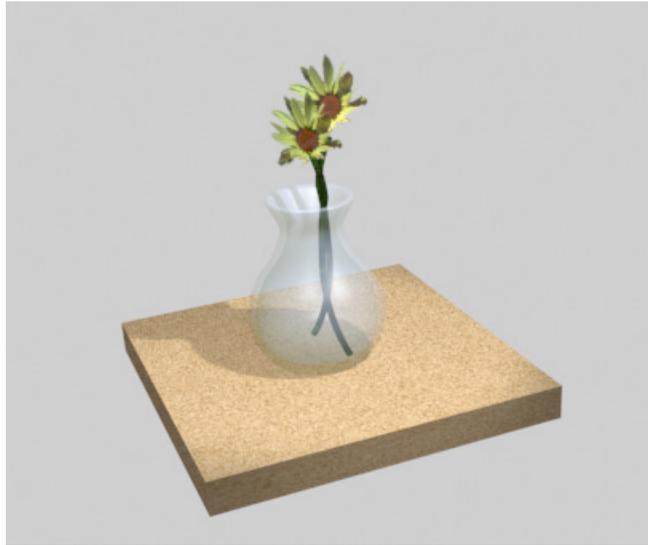
Figure 9-8 *The rendered image with materials assigned to the objects*

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which of the following maps is used to control transparency of the material?

   (a) **Opacity**   (b) **Procedural**
   (c) **Mix**   (d) None of these

2. Which of the following maps can be created to represent a solid piece of wood?

   (a) **Opacity**   (b) **Procedural**
   (c) **Mix**   (d) None of these

3. Which of the following buttons is used to move one root level up in the **Material Editor** dialog box?

   (a) **Go to Parent**   (b) **Get Material**
   (c) **Material/Map Navigator**   (d) **Put Material to Scene**

4. In an opacity map, the _____ pixels will be completely transparent and the _____ pixels will be opaque.

5. The lower the value in the **Opacity** spinner, the higher will be the transparency of the material. (T/F)

6. As you change the parameters of the material types in the **Material Editor** dialog box, the material sample is dynamically updated. (T/F)

Review Questions

Answer the following questions:

1. Which of the following buttons in the **Material Editor** is used to display the opacity effect?

    (a) **Background**   (b) **Make Preview**
    (c) **Backlight**   (d) None of these

2. The opacity maps help control the _____ of a material.

3. The _____ button in the Main Toolbar is used to render the current frame.

4. If you apply a procedural map to an object with a whole cut in it, the texture will still appear correct. (T/F)

EXERCISES

The rendered output of the models used in the following exercises can be accessed by download-ing the *c09_3dsmax_2020_exr.zip* from *www.cadcim.com*. The path of the file is as follows: *Textbook > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2020 for Beginners: A Tutorial Approach*.

Exercise 1

Extract the contents of the *c09_3dsmax_2020_exr.zip* and then open *c09_exr01_start.max*. Next, create materials and assign them to three glasses placed on a tray, as shown in Figure 9-9. You will require three transparent materials with different opacity settings.

(Expected time: 20 min)
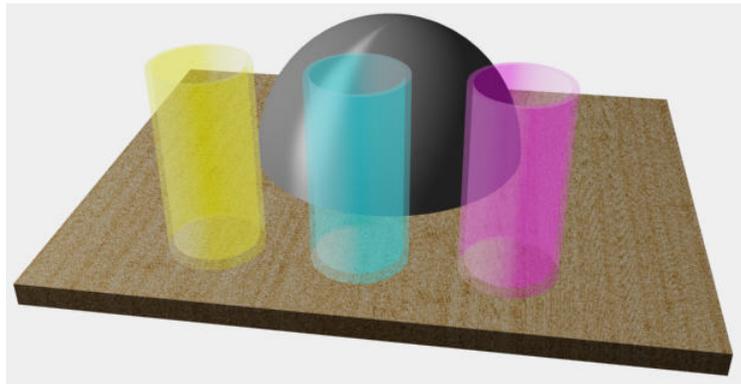
Figure 9-9   *Three glasses with assigned materials*

Exercise 2

Open *c09_exr02_start.max*. Create materials needed to assign to a scene displaying a broken piece of marble and a wooden board with a notch cut in it, as shown in Figure 9-10. In this exercise, you need to create two procedural map materials.   **(Expected time: 15 min)**
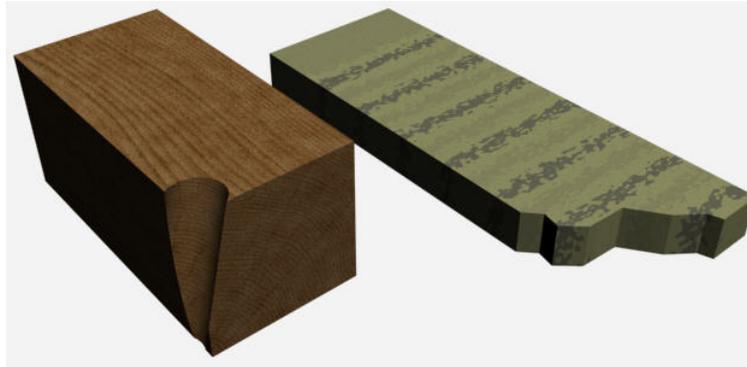

Figure 9-10 *Broken piece of marble and a wooden board*

Answers to Self-Evaluation Test

1. a, **2.** b, **3.** a, **4.** black, white, **5.** T, **6.** T