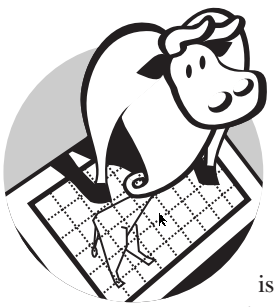
3

QUICK START



No matter what your experience with using 3D modeling programs, you'll have to overcome a few hurdles before you can use Blender. Although Blender is internally consistent, it is so different from other 3D programs that it can make using other 3D programs at the same time quite difficult.

Perhaps you've already started using Blender and clicked around with the mouse a bit—only to find out that you couldn't even exit the program. In fact, some of Blender's basic functions are simply so different from anything you may have encountered before that such frustrations are almost inevitable.

This Quick Start will help you avoid these frustrating experiences by giving you a feel for how to work with Blender and its peculiarities. Even if you already have a lot of experience with 3D graphics, you should work through the hands-on instruction in this Quick Start—it won't take long. Experienced 3D graphics users will probably finish the Quick Start in a couple of minutes and will have built their first Blender animation; beginners won't have to wait much longer for their first successes. Don't worry if you don't understand some of the concepts or terminology in this chapter—all it does is walk you through your first Blender animation to introduce you to the program. Chapter 4 covers the basic functions in more detail.

3.1 3 . . . 2 . . . 1 . . . Take Off

Blender installs the same way on all operating systems: download the compressed file from http://www.blender.nl (or copy it from the CD) and extract it into a folder of your choice. There's no time-consuming installation routine and you don't even need to restart your computer.

Depending on your operating system, you can start Blender from a command line or by clicking its icon. To start Blender in Windows, go to the Blender directory in Windows Explorer and click (either single or double, depending on your Windows version) either the Blender icon or `blender.exe`. (Note that Blender does not automatically put a shortcut in the Start menu or on the desktop. It's a good idea to set up one or the other for yourself if you plan to make a lot of use of the program.) If your system uses the command line, change to the Blender directory and issue the command

```
cw@mero ~/blender/ >./blender
cw@mero ~/blender/ >
```

Appendix E describes the installation process and different procedures for starting Blender in greater detail.

The first time it boots up, Blender copies a default file into your home directory or Windows folder. This file is the default *scene* (a scene is the "canvas" in Blender where all the data for your 3D world is stored), a large, almost empty window as shown in Figure 3-1. If you have a different system environment or window manager, your system's window decorations may look slightly different from those shown in the figure, but Blender itself looks the same in all operating systems because it uses its own interface. This aspect of Blender is a double-edged sword: a dyed-in-the-wool Windows user will find Blender's graphical user interface (GUI) unusual at first, but Blender operates exactly the same on all operating systems.

Pressing CTRL-X and then ENTER deletes the current scene and loads a new default one. If you get stuck, CTRL-X and then ENTER will always bring you back to Blender's default scene, though it will also delete the current scene.

3.2 Basic Functions

Figure 3-2 on page 26 shows the Blender screen (annotated to explain various elements) right after start-up. Don't worry if you don't recognize all the concepts yet; you'll learn about them as you make your way through the book. Here are some basic things to know about working with Blender.

3.2.1 Use Two Hands

Blender is designed to be used with two hands: one on the mouse and the other on the keyboard. This is one of Blender's great advantages: work proceeds quickly because you hardly ever have to move your hand from the mouse to the

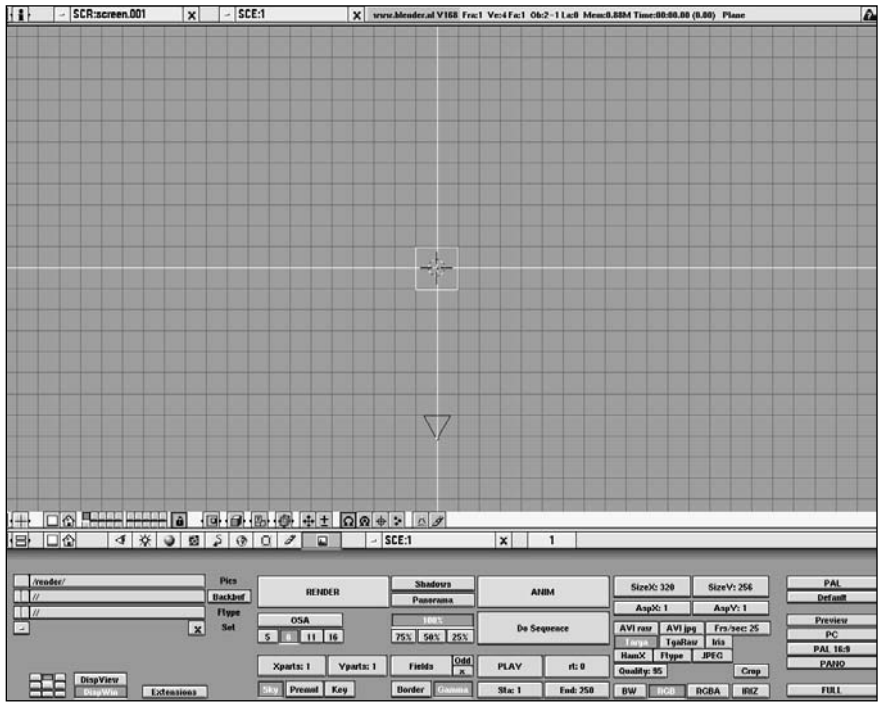


Figure 3-1: Blender's default scene

keyboard. And since the most important and often-used keyboard commands use single keys, you won't have to engage in any "finger acrobatics."

3.2.2 Selected Objects Are Displayed in Violet

Selected objects in Blender's 3D windows (the windows where objects and scenes appear) are always displayed in violet. The plane in Blender's default scene (shown in Figure 3-1) is selected, which is why it appears as a violet square in the 3D window.

In the default scene's 3D window (the large window), you see the default scene from above (a top view). The black triangle in the 3D window is the camera, which is looking—that is, turning the side with the open face, not its point—in the direction of the selected plane.

3.2.3 Active Window

Mouse and keyboard actions always relate to the active window. A window is active when the mouse pointer is in it (the window does not need to be clicked).

3.2.4 Using the Mouse Buttons

Unlike most software, Blender has you select items with the *right* mouse button. For example, right-clicking the camera selects the camera and turns it violet.

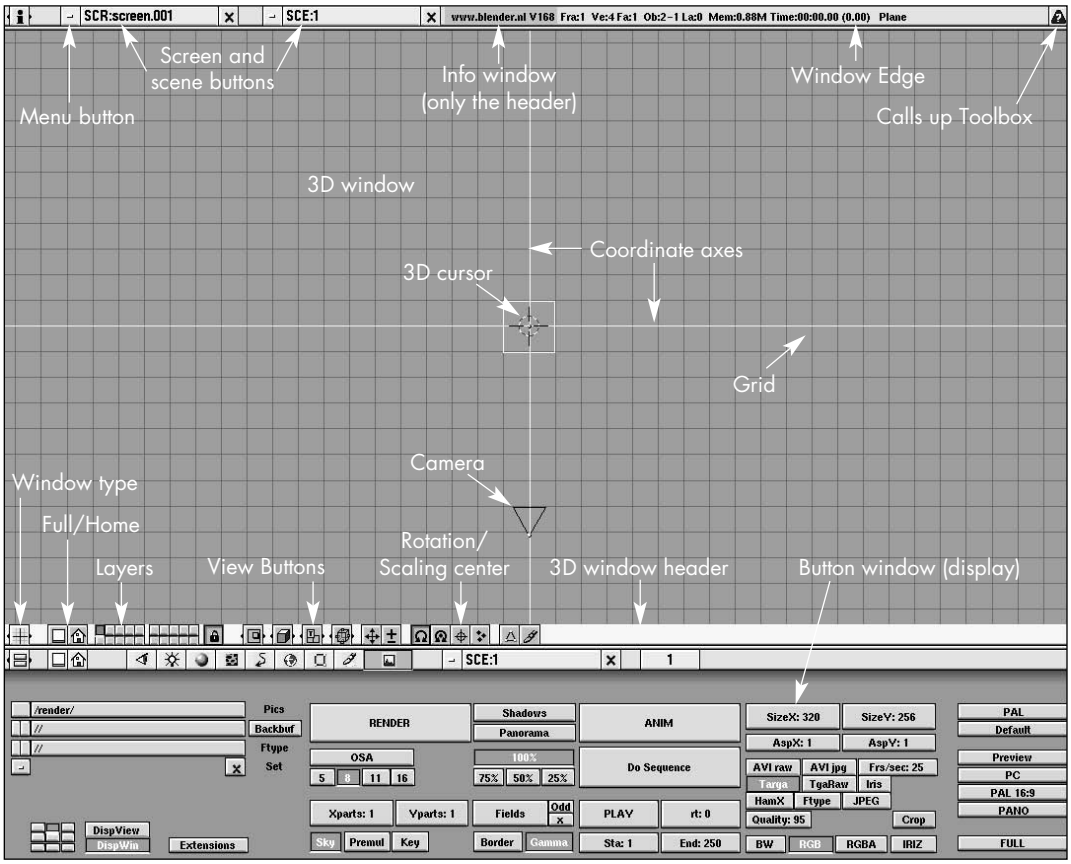


Figure 3-2: The annotated `Blender interface`

Clicking the *left* mouse button places the 3D cursor (the crosshair cursor with the red and white circle). The 3D cursor lets you precisely place objects in space even without views from all three sides. New objects are always placed where the 3D cursor is.

3.2.5 The Toolbox

The Toolbox (shown in Figure 3-3) is Blender's most important tool. To access it, press the spacebar or click the question mark icon in the upper right-hand corner of the Blender screen and use the mouse to call up its menu items. Mouse off the Toolbox area or press ESC to close it.

3.3 Loading a Scene

To load a saved scene, press F1 from within Blender and either middle-click the file in the file list (if you have a three-button mouse) or left-click the file and press ENTER to load it. Let's get started on your first Blender animation by loading `basic_scene.blend` (in `tutorials/chapter03` on the CD-ROM).

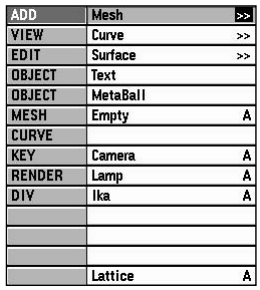


Figure 3-3: The Toolbox

NOTE *To change to a file directory on your hard disk, CD-ROM, or other media, click and hold the left mouse button on the Menu button (in the upper left of the File window) to call up a menu of paths (or drives in the case of Windows). The directory entry ".." changes to the next higher directory or drive and the Parent button (the button with the "p" on it) does the same thing.*

NOTE *You can replace Blender's default scene with your own customized one and make it Blender's default scene to be loaded on start-up. Using your own default scene will speed up the start of a new construction since you won't have to build a complete modeling foundation every time. In Section 4.13 I'll describe how to customize Blender to your own way of working and how to configure your default scene accordingly.*

The scene `basic_scene.blend` contains a grid that is already lit by two light sources. After loading it, Blender should look like Figure 3-4, with its interface divided into three views: a top view (the scene from above, in the large 3D window), a camera view (in the small window in the upper right), and a side view (the scene from the side, in the lower right-hand section of the window).

The camera (symbolized by the pyramid) looks down obliquely toward the ground (see the camera view window in the upper right). The side view makes it easy to see the camera angle.

3.4 The Object

Call up the Toolbox and choose Add • Mesh and left-click Mesh to show its menu options. Select UVsphere and click OK in the two dialog boxes that follow to accept the defaults of 32 segments and 32 rings.

NOTE *Confirm queries in Blender by clicking OK or pressing ENTER. If you're unsure, press ESC or mouse off the query to cancel the action.*

You have just created your first Blender object—a sphere that appears where the 3D cursor was, shown in different views as a wireframe model with yellow vertices. If you didn't move the 3D cursor before creating the sphere, the sphere should take up almost the entire camera view and be displayed with filled-in faces. It should appear as a wireframe in the other views.

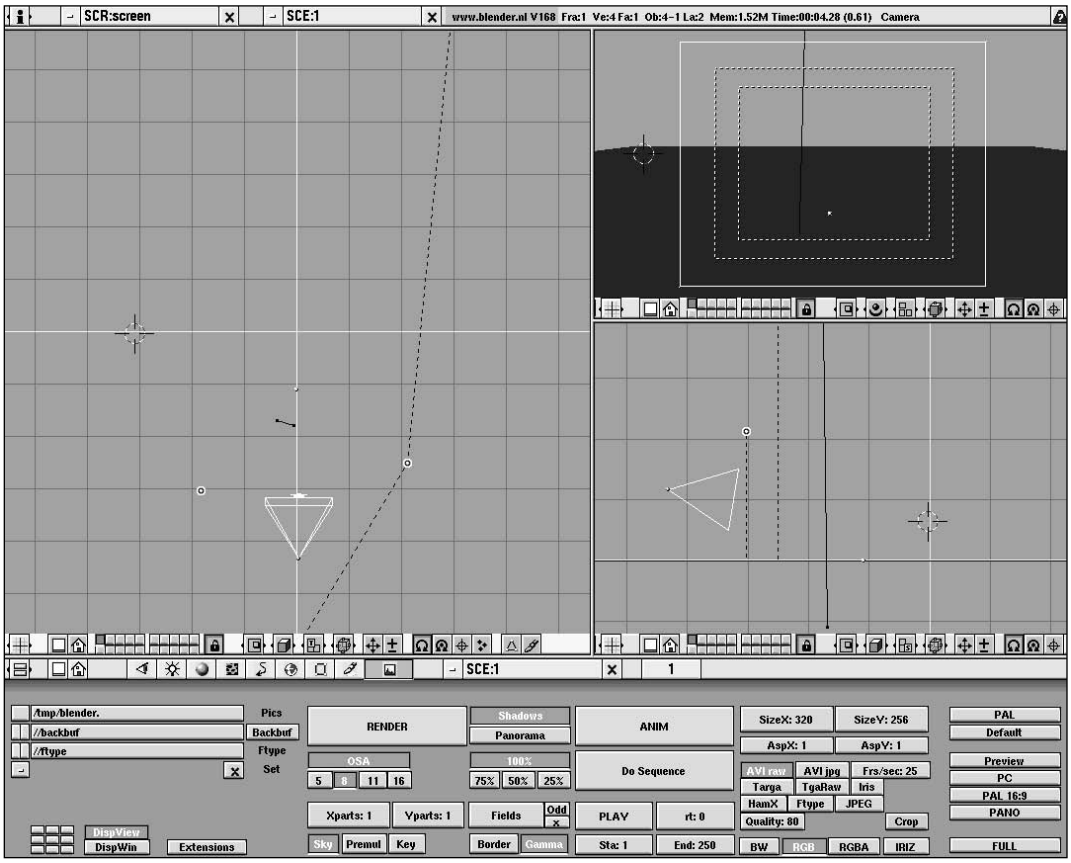


Figure 3-4: The Quick Start basic scene

Once you've created an object in Blender, the program enters *EditMode*. Now leave EditMode by pressing TAB; the sphere should appear as a violet wireframe showing that it's selected.

NOTE *Using the Toolbox quickly becomes second nature, so from now on I'll abbreviate the procedure for making a selection in the Toolbox menu. To describe the procedure for the sphere, for example, I'll write "*Add • Mesh • UVsphere.*"*

3.5 Adjusting the Sphere's Size

Our sphere isn't quite right (see Figure 3-5): It's too big and poorly positioned in the scene, so let's translate (move) and scale (resize) it.

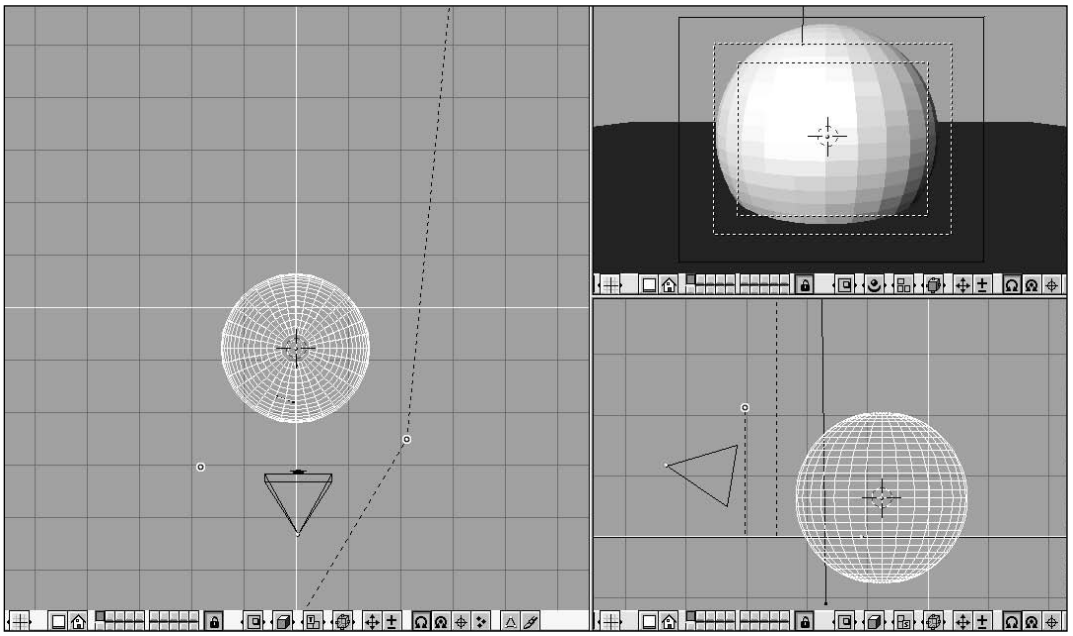


Figure 3-5: The sphere when first created (in three 3D views)

1. To edit the sphere you first have to select it. If it is not already selected, mouse over the sphere in the top view or side view and right-click once. If you got it right, the sphere will turn violet (that is, selected).
2. Move the mouse into the large 3D window and press S on your keyboard. (The sphere should now appear as a white wireframe.)
3. Use your mouse to adjust the sphere's size by moving it toward the sphere (to make it smaller), or away (to enlarge it), keeping the mouse within the 3D window the entire time. (The size change is simultaneously displayed in the other 3D windows.) Right-click to restore the sphere to its old size (right-clicking cancels a function).
4. Press S again and move the mouse toward the sphere until the sphere is just over the green line in the side view, then set this new size by left-clicking.

NOTE *The closest thing Blender has to an undo function is pressing the U key in EditMode, which restores the condition before entering EditMode.*

3.6 Changing the Sphere's Position

The steps for translating or moving an object are similar to the scaling procedure described above.

1. Select the sphere.
2. Place the mouse pointer over the wireframe display of the sphere and press G on your keyboard. The sphere will change to a white wireframe and can now be translated by moving the mouse.
3. Left-click to set a new position; right-click to restore the sphere to its original position.

NOTE *Object movement is limited to one plane in a translation. For example, if the mouse is in the top view and you press G, you can move the sphere to the left or right but not to or from the surface in the side view. Similarly, if you translate in the side view, you can move the sphere to and from the surface and along the camera's line of sight. This limitation is necessary because the mouse can move in only two directions. Thus movement in three directions always consists of two translations, each in a different view.*

4. Now place the sphere so that it's clearly visible in the camera view. (Note that the outer broken line in the camera view is the edge of the camera's field of vision.)
5. Press F12 to create the first image of the sphere (press F11 to hide or redisplay the image); it should look something like Figure 3-6. In contrast to the preview shown in the camera view, the sphere now casts a shadow, the two light sources produce separate reflection points on the sphere, and the sky and ground have changed colors. This process of creating a realistic 3D scene out of a simple description of the scene is called *rendering*.

NOTE *You may also render an image by selecting the large* RENDER *button in Blender's Button window (at the bottom of the screen). The Button window contains several important Blender function groups, which will be especially important in the next section.*

6. Finally, save your scene (if you like it; remember, there are few ways to undo mistakes in Blender) by pressing F2 or choosing File • Save File as in the Toolbox menu to call up the File window; choose the destination for your file by clicking with your mouse and then name the scene to be saved. After typing in the name, press ENTER twice—once to confirm the name and once to save the scene and close the File window.

3.7 From Rough and Gray to Smooth and Bright

The rendered image still clearly shows the individual faces used to create the image of the sphere so we'll need to fix that. To make the sphere look round, we could use a whole bunch of really small faces, but the sheer number of faces needed would demand a lot of power and memory from the computer. Fortunately, a simple mathematical trick can smooth out the sphere without adding more faces.

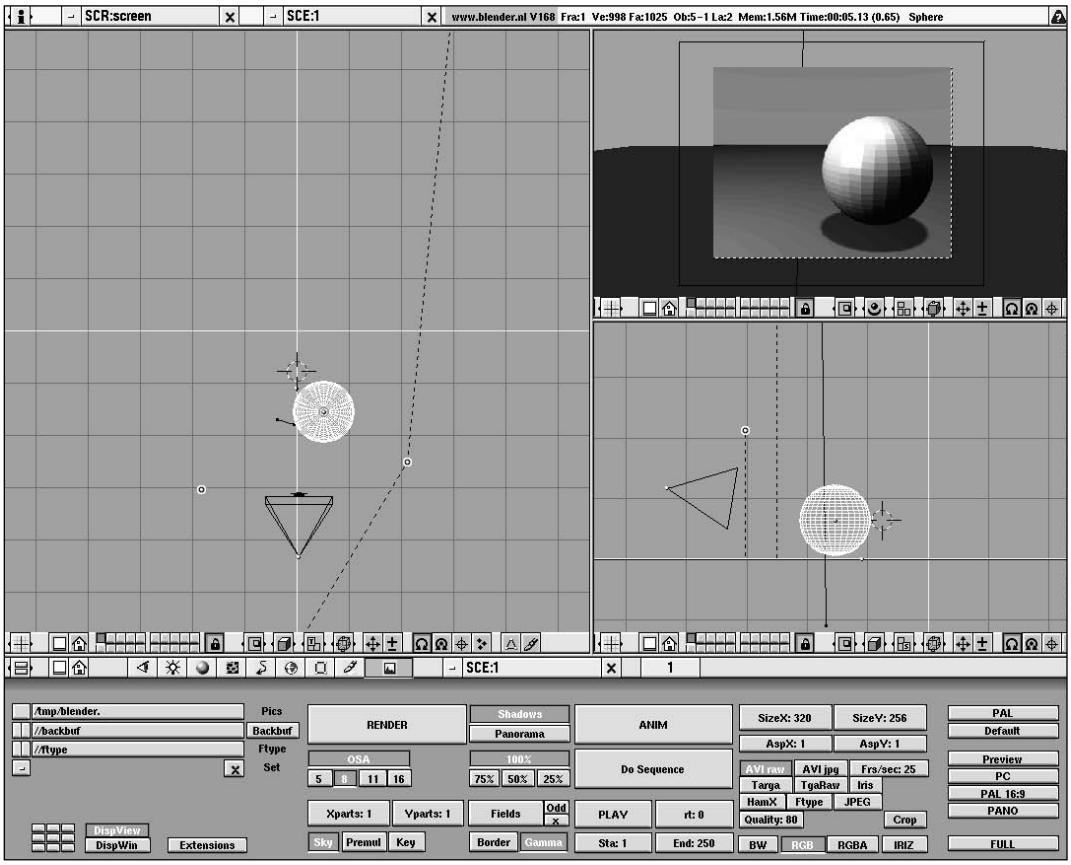


Figure 3-6: A rendered scene in the camera view

1. Right-click the sphere to select it and then press F9 or the Edit buttons icon in the Button window *header* (a bar in every Blender window that, depending on the type of window, contains different buttons and information) under the 3D views (see Figure 3-7); note the new menu options that appear in the Button window.

Figure 3-7: The Button window header

2. Click Set Smooth in the Button window (at the bottom of the third column from the left). The sphere should now appear smooth in the camera window and in the rendered image.

NOTE *If you like to experiment, go ahead and try all the icons in the header. However, since Blender displays different buttons depending on the type of active object, some icons won't give you very many buttons at this point.*

3.7.1 Gray Is Boring: Adding Color with a Material

But even though our sphere is now smooth, it's still a bit on the drab side, so let's spruce it up with a material.

1. Call up the Material buttons for the selected sphere by pressing F5 or the corresponding icon in the Button window header.

2. Left-click and hold the Menu button in the Button window header and choose ADD NEW from the pop-up menu that appears to create a material called `Material.001` and call up the material settings (Figure 3-8).

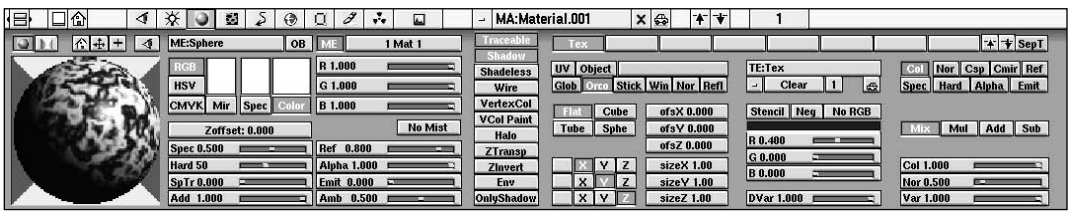
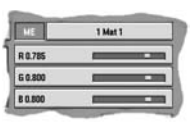


Figure 3-8: Material buttons

NOTE *The Menu button is unique to Blender and surfaces often. When you use it, remember to hold the mouse button down to give yourself time to see the menu options.*



RGB sliders

3. Define the material's color using the sliders for each of the three primary (RGB) colors (red, green, and blue) found at the left side of the Material buttons, in the third column (see margin). (For an introduction to Blender's color system, see Section 2.1.2.) Let's produce a red and white marbled material. First we'll set the material's primary color to white (R,G,B = 1.0); do so by left-clicking the small knobs on the controls and dragging them to the right to increase the value. (You can, of course, set any other color; gold, for example, is R = 0.9, G = 0.8, and B = 0.) Don't worry about the red for the moment—we'll get to that shortly.

3.8 Surface Structures: Texture

Now let's produce a marbled effect using a *texture*. A texture is a pattern that determines an object's surface appearance. In addition to simple color textures, *procedural textures* can control other parameters such as transparency or illumination. And beyond procedural textures, which are mathematically

generated, a texture can also be an actual image—for example, a photograph of a rock face or a pile of jelly beans—that is "wrapped" around a sphere.

To create a new texture, do the following:

1. Select the sphere and click the Texture buttons icon or press F6.

2. Add a new texture using the Menu button (just as you did for the new material)—left-click and hold the Menu button in the Button window header and choose ADD NEW from the pop-up menu.

3. Choose Marble from the list of texture types to create a procedural texture with a marbled look (Figure 3-9).

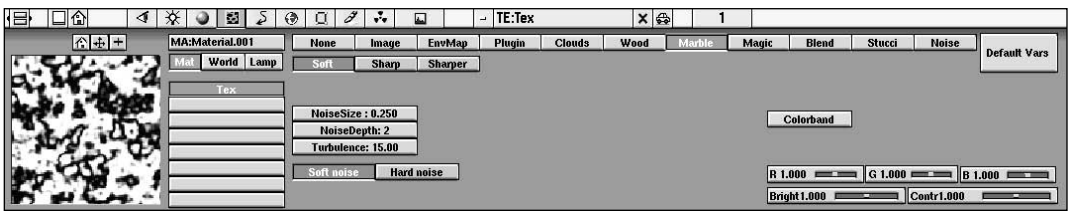


Figure 3-9: The Texture buttons

4. Use the default settings for the other parameters, or, depending on your taste, increase the turbulence (to 15.0, for example) to create a more marbled texture. To increase the turbulence, left-click and hold the Turbulence button and move the mouse to the right or left to increase or decrease the value, respectively. The texture preview to the left will update when you release the mouse button.

NOTE *This method of clicking and dragging to change the numerical value of a button is common in Blender. To enter a value directly with the keyboard, click and hold the left mouse button in the button with the numerical value, right-click, let go of both buttons, and type in the numerical value you want. This procedure is awkward to describe on paper, but it's easy in practice. If you have a two-buttoned mouse, try holding* SHIFT *and left-clicking.*

5. At this point, a test rendering with F12 should produce a white and violet marbled sphere.

6. To change the texture color, switch back to the Material buttons with F5 (Figure 3-8) and set the texture color controls (to the right in the Material buttons) to a red (R = 0.6, G = 0, B = 0).

   At this point, your image should look like the one in Figure 3-10.

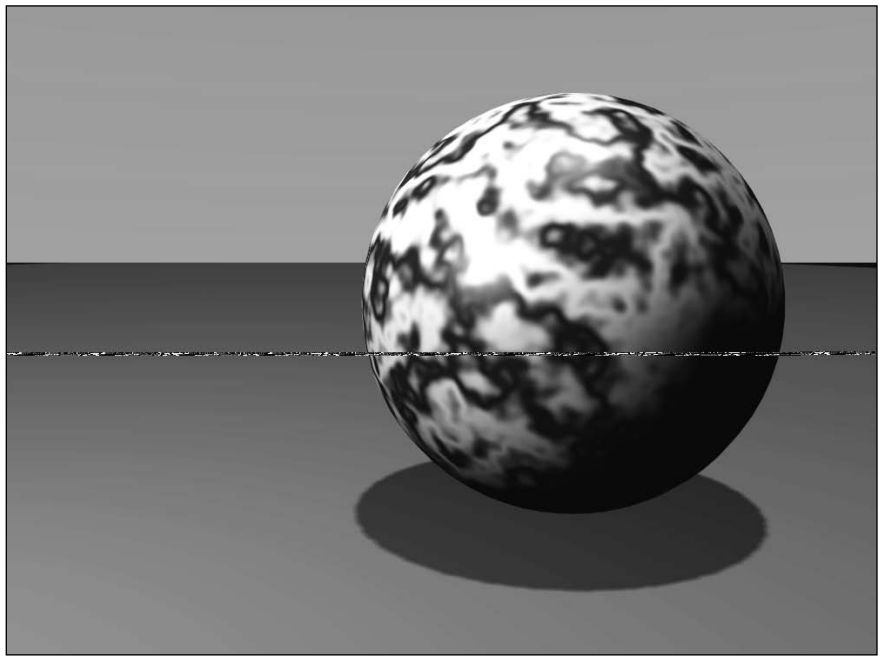


Figure 3-10: A finished image from the Quick Start scene

3.9 Bringing Movement into the Game: Animation

We'll now construct a very simple animation using *keyframes*—frames between which Blender automatically calculates an animation. (Chapter 8 will cover the diverse animation possibilities Blender offers in more depth; this is just a taste of what the program has to offer.)

1. Make sure the frame slider is set to one. If it isn't, move it to the left until you see the "1" in the window, as shown here:

NOTE *You can flip through an animation frame by frame by using the left and right arrow keys. The up and down arrow keys move ten frames forward and backward, respectively.*

2. Press G in the top view to move the sphere to the spot where you want the animation to start (you can control the positioning best in the camera view). To have the sphere come slowly into the frame at the beginning of the animation, place it to the left so that it's outside the outermost broken line in the camera view. Left-click to record the position change.

3. With the sphere still selected, press I and choose Loc (location) from the pop-up menu to create the sphere's first keyframe in Frame 1.

4. Using the mouse (or the arrow keys) set the frame slider to 51. (If you hold CTRL while adjusting, the value in the control will increase by tens.)

5. Now move the sphere to the desired end position for your animation (for example, outside the camera's field of vision to the right and nearer the camera). Figure 3-11 illustrates the two suggested keyframe positions.

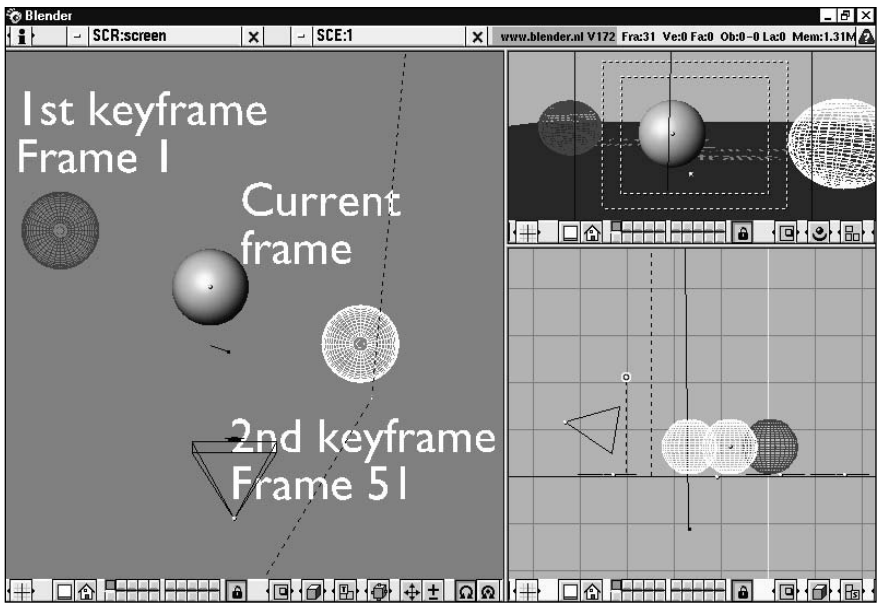


Figure 3-11: The two keyframes and the sphere's current position

6. Press I to add a keyframe for the sphere's end position and choose Loc again from the menu.

3.9.1 Playing the Animation Preview

To preview your animation based on the keyframes selected above, set the frame slider to Frame 1. ALT-A plays the animation in the active 3D window (where the mouse is); SHIFT-ALT-A plays the animation preview in all views. Press ESC to stop the animation preview.

In 50 frames, the sphere goes in a straight line from your defined start position to the end position and then stops, with the current frame number indicated by the mouse cursor. After Frame 250 Blender begins playing the animation from Frame 1 again (the sphere sits at its final position from Frames 51 to 250 and then returns to its starting position at Frame 1).

3.10 Rendering the Animation

Even though computers become faster and cheaper every day, they are still not powerful enough to render a convincing animation in real time. In particular, finely tuned lighting, reflective or transparent objects, and various other special effects (like smoke and fog) overwhelm even today's most powerful and expensive computers.

For this reason, individual frames are rendered separately (in a process that can take hours, depending on the scene), after which the frames are played back in sequence, at the desired speed. Figure 3-12 gives you a look at five of the frames that produce the animation we've been working on. This playback is recorded by the computer and can be output to video or even exposed on film to produce the animation.

Figure 3-12: A few frames from the animation

Let's render our animation.

1. Switch to the Display buttons by pressing F10 and enter the first and last frame to be rendered using the Sta:1 and End:250 buttons. Since our animation is set for 50 frames, use the mouse to set End:250 to 51 (counting begins with 1). (If you have trouble setting the value precisely, hold down SHIFT to let you enter the exact value with the keyboard.)

NOTE *Depending on your computer's power and your patience, you may use the* 100%–25% *buttons in the middle of the Display buttons to render a smaller version of the animation. Use the* SizeX *and* SizeY *buttons to set an exact resolution.*

2. Tell Blender where to save the frames using the field at the upper left of the Display buttons window; left-clicking in this field allows you to enter the destination path with the keyboard. The end of the path requires the frame name, and Blender will add to that the relevant frame number. (Clicking the gray button near the path brings up the familiar File window.)

Path for saving frames

3. Click the big ANIM button to render the animation, display the finished frames, and store them on your hard drive.

4. When the animation is finished, preview it by pressing PLAY; press ESC to stop the preview.

Depending on the setting in the Display buttons, the rendered animation will be saved as a numbered frame sequence or as a digital video file. In this example scene, the uncompressed, standard AVI file format (readable by every program that supports AVIs) is selected. (Note that Windows requires a fairly new player or Apple's QuickTime version 4 to play compressed JPEG AVIs, so choose your format with care.)

Press Q to exit Blender.