# 3D basics

*Things done in 3D computer applications are all around us. Just go to a movie, and you probably will see at least several minutes of things that did not exist except in a 3D program. The possibilities are endless, but the realities are more daunting - just look at the credits for that movie. 3D is a technique still in infancy. To replicate the varieties and subtleties in this world (and imagined ones) is a difficult task indeed. Still, a working knowledge of 3D is important, if only to make that mock-up of your wine bottle label or to use extrusion for that logo.*

## INTRODUCTION

3D programs come in an enormous variety of forms. A high-end program costs thousands of dollars (you can download a working demo of one of these - Maya - at no cost). But there are many cheaper and more specialized alternatives out there as well. Poser is a cheaper one which specializes in human modeling. There are several which specialize in landscapes, and some of these are free.

No matter which program you use, they all share very similar traits, and the following general steps you carry out are all the same. And one more thing - all 3D programs do like to crash periodically. Save early, save often.

## THE WORKSPACE

In a perfect world (and probably in the future as well), 3D creation would be on a virtual screen that you can "reach into" and manipulate objects. On the digital dirt road we are currently travelling, however, we have only a 2D screen where one ball could be in front of another or it could just be bigger. No way to tell. Unless you have a second window that shows the two balls from different points of view. And that is what we have - almost all 3D artists use at least two windows and usually at least four (front, top, side, and "camera") to see how the things are lining up. Complicated? Yes. But there are many things you can do with one window, especially if it shows a view that is from up and to the side.

All 3D programs have these different windows and ways to set the different viewpoints. They also have ways in which you can change the viewpoint as you work - this is like the grabber hand and magnifier in Illustrator or Photoshop - it doesn't change what you are working on, only your view of it. These are called viewing tools, and not only include equivalents to the grabber hand and magnifier, but also rotate tools. These may look very similar to the actual moving tools, and they may look like they do the same thing, but they do not (move something in Illustrator with the pointer tool and then with the grabber tool - likewise it looks similar).

Grids are also important in 3D programs, and like in Illustrator, they help you to line things up and keep your bearings.

## MODELING

The first step in playing a god to the little world you are making is to form the objects which inhabit it. This generally starts with making basic shapes like cubes, spheres, and cones. If you have taken drawing, this might seem like a perfectly normal way of starting things. Then you can shape and place these things.

You could also use pre-made models, which most programs come with. I, for one, am glad that Poser makes the people from the basic shapes and it is not me that has to do it!

Most shapes are made from little multi-sided shapes called polygons (which you can push or pull to shape) or three dimensional bezier curves which you can edit the same as in Illustrator.

## TEXTURES

After you make your models comes the painting. There are two types of textures that can be applied to a model's surface. The first is an image texture, also called an *Image Map*. This is just a photograph that is wrapped onto the object. You can make these in Photoshop, and it could be something like a photo (or drawing) of grass to make your object look like grass, or it could be a more recognizable image like a face. You can wrap any Photoshop image onto the surface of a model, scale it and/or have it repeat to cover everything.

The second kind of texture is called a *Bump Map*, or something like that (sometimes they are called *texture maps* or other things). These actually cause surface deformations as they are wrapped on objects, and again, they are just Photoshop files. So, let's say you have a Photoshop file that is just black dots on a white background. You wrap this as a bump map onto a sphere, and bingo, you have a golf ball. You may not be able to see the effect right away, however, as generally the scene needs to be rendered (see below) for them to be visible.

## SETTING LIGHTS

After you have textures (or before, it doesn't matter much), you need to set up your lights and background. Generally, one light and background come already on, but you can change them and add more. Lights are objects just like spheres, and they can be moved (and pointed if they are spotlights) just like any other object. You can also change the color and effects of lights.

## RENDERING

Rendering is the last step, and a crucial one in any 3D program. If it isn't rendered, it ain't done. Rendering is when the program shows you exactly what the scene looks like and presents it to you as a bitmap file that you can open in Photoshop (but which you can do no more 3D work on of course). If you have an animation, it will be rendered to a movie file that you can play in a program such as Quicktime (or import into a movie editing program).

Actually, before you render your image, the program is constantly crudely rendering your objects (in wireframe, solid, etc) so you can see your objects and an approximation of your textures and lighting. The good rendering is another step because it take a long time to render a scene well. If you have a complicated scene and a high quality renderer it can take several hours to make one image.

All programs have different rendering qualities built in. You should choose a quick one to make sure everything is right, then you choose a better one for your final image. This step can be so time-consuming that for high quality animations (like in movies), the job of rendering is sent to many computers at once. The faster and the more computers you have, the faster the render times.