STEVE CAPLIN'S A TO Z OF DESIGN

Z: Z axis

Steve Caplin walks us alphabetically through the concepts essential to success for any jobbing or aspiring designer.

ABOUT THE AUTHOR

Steve Caplin is a designer and illustrator working for a range of national newspapers. His best-selling *How to Cheat in Photoshop*, now in its fourth edition, is published by Focal Press. *http://books.macuser.co.uk/caplin*

In the last issue of *MacUser,* we looked at X and Y coordinates. Moving objects around in two dimensions is simple since the mouse itself moves on a 2D plane – and if you use a graphics tablet, there's a 1:1 correspondence between stylus movement and cursor position.

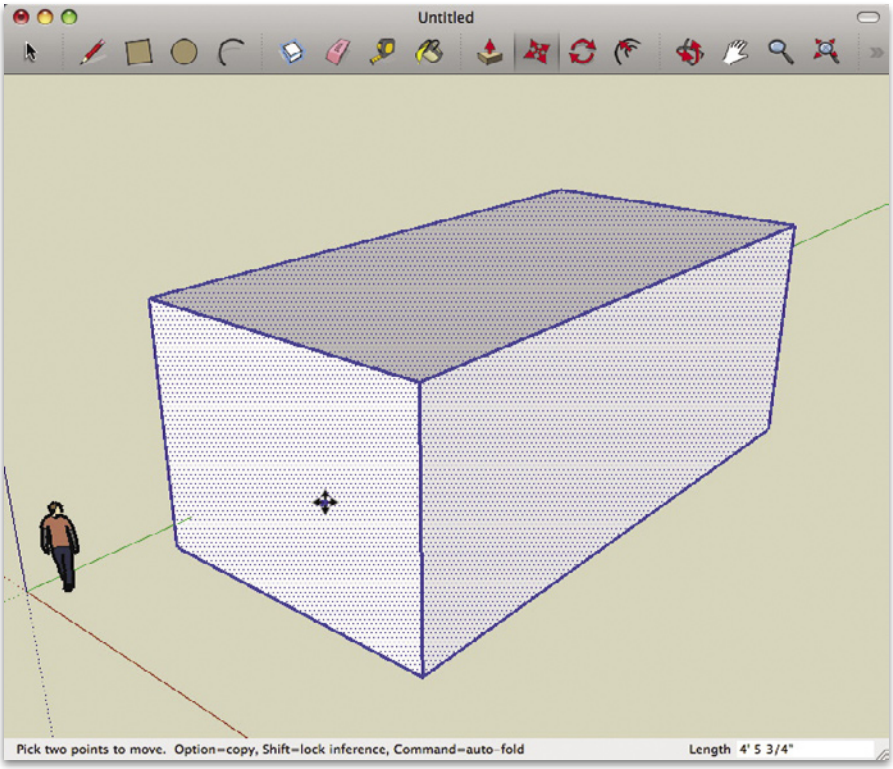
When working with 3D modelling applications, the relationship between mouse movements and object position and orientation is far less straightforward. Dragging an object will tend to move it in the Z axis as well as X and Y, which means the simple relationship between mouse and cursor has been broken. When we position two objects relative to each other, they may seem to be perfectly aligned in one view. But when seen from a different angle we frequently find that one is further into the distance than the other.

Movement in the Z axis is a problem that should have been resolved decades ago. The trouble is that each 3D modelling application has its own approach to dealing with the issue. In the absence of overall conformity we have to learn the technique separately for each program. In some applications, for example, dragging an object will always move it in the X-Y plane, while holding the Z key will move it backwards and forwards.

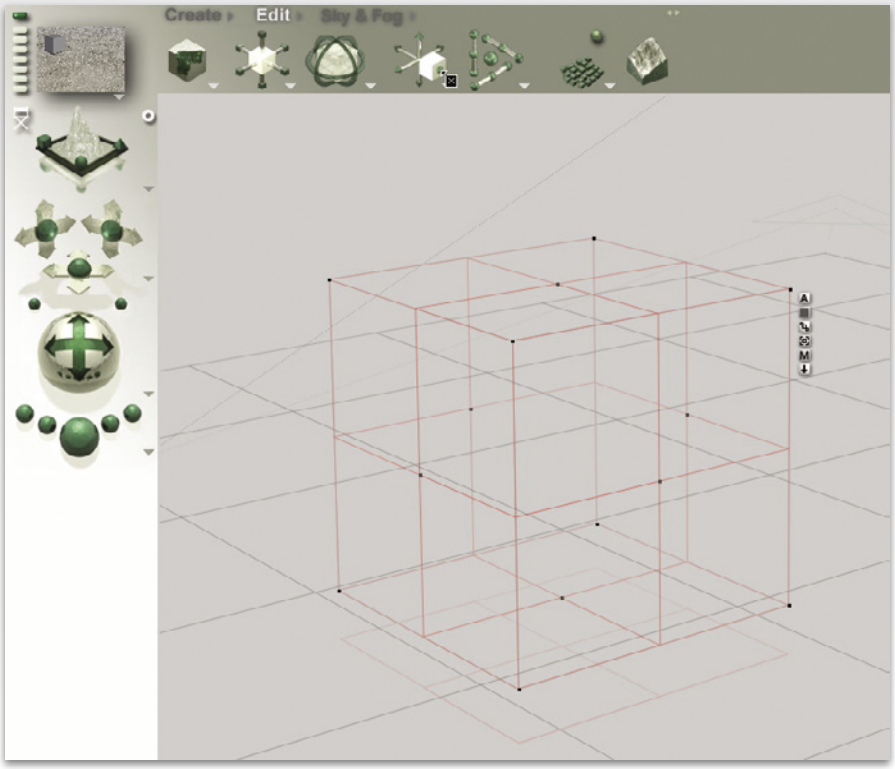
The problem here is: how do you define that X-Y plane? Is it an absolute relative to the geometry of the scene, or a plane that's always precisely facing the user, whatever angle he or she happens to be viewing the scene from? It's further complicated by the fact that we want to both move an object around in 3D space and to move our camera position independently of the objects within the scene.

Ironically it tends to be the cheaper, lower-end modelling applications that offer a more intuitive solution. This is probably because while users of Maya, FormZ and Cinema4D have shelled out a lot of cash and can therefore be expected to take the time to research the methods and learn the required techniques, those who pick up Bryce or Poser on an impulse want more immediate access to the toolset.

Users of the free Google Sketchup want to get modelling in minutes, so it's in these consumer applications that we tend to see the biggest interface enhancements. Professional users on the other hand are content to continue using the perhaps outdated methods they've rigorously learned.



◄ Moving objects in Google Sketchup involves first selecting the direction with the cursor keys, then holding the Shift key to constrain motion in that direction. Clumsy – but practical when you get the hang of it.



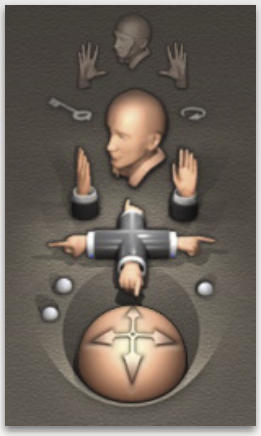
▲ **Toolbar icons in Bryce allow us to move, scale and rotate objects in each direction by dragging on the corresponding handle. It's all too easy for an object to zoom off the screen and disappear though.**

Sketchup uses a straightforward approach to 3D movement: we press the up, down, left and right cursor keys to set the direction of movement, then hold the Shift key while dragging with the Move tool to constrain movement of objects to those directions. It's not ideal and is a little clumsy in operation; but for basic modelling it's a competent if somewhat inelegant method of manipulating in 3D space.

In Bryce, arguably the most approachable 3D modeller of all, we can move objects using the Move icon on the toolbar. This displays a cube with arrows coming out of it in the positive and negative X, Y and Z axes – dragging on this icon in any of these directions will correspondingly move the object. A cube surrounded by hoops in each dimension allows us to rotate the object in each direction as well.

Poser, known for its quirky interface, has a equally quirky method for moving objects. A hand with its palm towards us is the tool for moving in the X and Y plane; a hand viewed side-on moves in Y and Z. A four-way arm with pointing fingers moves in the X and Z plane; and a recessed ball is used to rotate in all three dimensions. It sounds clumsy, but it works in practice. Best of all though, Poser offers a split window that can contain multiple views of the scene: typically, you'd want to view front, left (or right) and top, with the fourth pane showing the camera view. This does mean, of course, that each working space is only a quarter of the size it could be.

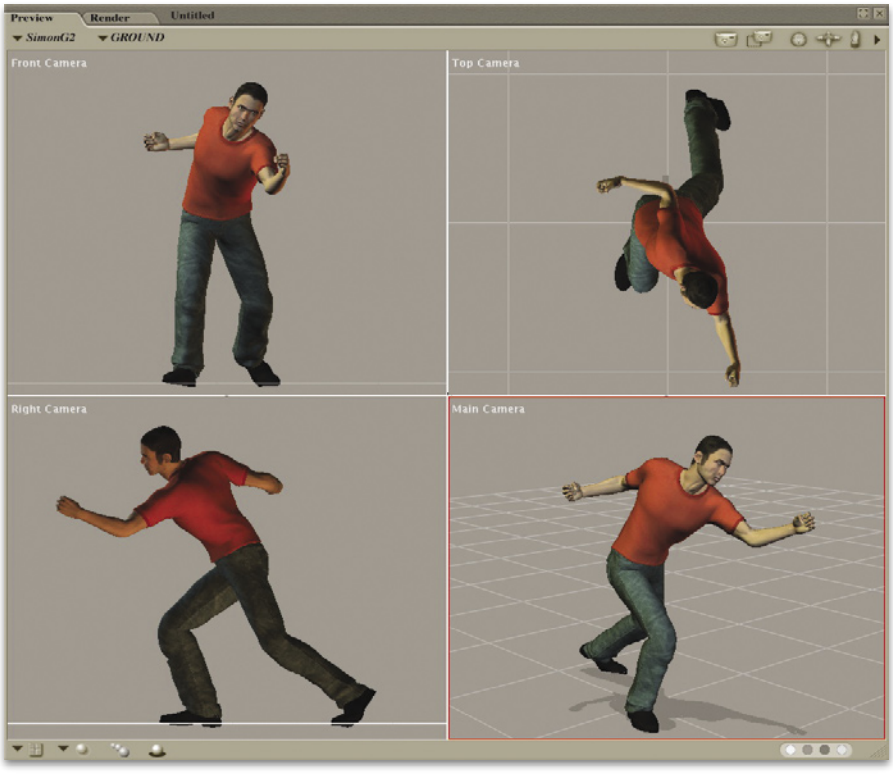
The result is that objects can be manipulated in any one pane while being viewed in all the others simultaneously.



◄ **Characteristically quirky, the Poser icons for moving in the X, Y and Z planes are intuitive and easy to grasp. The icons may be too kitsch for some tastes but they do their job effectively.**

Thus we get more control over the object's absolute position and avoid the errors normally associated with aligning objects in three dimensions. This multi-pane view is the system used by high-end 3D modelling applications and is the most satisfactory method for ensuring that what we see from one angle is indeed what we want to achieve.

A 3D controller makes the job that much easier. Take 3D Connexion's Space Navigator that we reviewed earlier this year (see Reviews, 8 June 2007, p34). It moves in three dimensions: not just forward and backward, side to side and twisting left and right, but also up and down. Within 10 minutes the motion becomes second nature, whether rotating scenes in Sketchup, positioning 3D objects in Photoshop CS3 Extended or flying over a landscape in Google Earth. And it's just £39.



► **The four-up view offered by Poser, used by all high-end modellers, gives us the most control by showing the top, side, front and camera views simultaneously. This makes object modelling and alignment that much more assured.**