



AUTODESK  
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Autodesk®  
**3ds Max® 2015**  
ESSENTIALS



SYBEX  
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# Introduction

Welcome to *Autodesk® 3ds Max® 2015 Essentials*. The world of computer-generated (CG) imagery is fun and ever changing. Whether you are new to CG in general or are a CG veteran new to 3ds Max designing, you'll find this book the perfect primer. It introduces you to the Autodesk 3ds Max software and shows how you can work with the program to create your art, whether it is animated or static in design.

This book exposes you to all facets of 3ds Max by introducing and plainly explaining its tools and functions to help you understand how the program operates—but it does not stop there. This book also explains the use of the tools and the ever-critical concepts behind the tools. You'll find hands-on examples and tutorials that give you firsthand experience with the toolsets. Working through them will develop your skills and the conceptual knowledge that will carry you to further study with confidence. These tutorials expose you to various ways to accomplish tasks with this intricate and comprehensive artistic tool. These chapters should give you the confidence you need to venture deeper into the feature set in 3ds Max, either on your own or by using any of the software's other learning tools and books as a guide.

Learning to use a powerful tool can be frustrating. You need to remember to pace yourself. The major complaints CG book readers have are that the pace is too fast and that the steps are too complicated or overwhelming. Addressing those complaints is a tough nut to crack, to be sure. No two readers are the same. However, this book offers the opportunity to run things at your own pace. The exercises and steps may seem confusing at times, but keep in mind

that the more you try and the more you fail at some attempts, the more you will learn how to operate the 3ds Max engine. Experience is king when learning the workflow necessary for *any* software program, and with experience comes failure and aggravation. But try and try again. You will find that further attempts will always be easier and more fruitful.

Above all, however, this book aims to inspire you to use the 3ds Max program as a creative tool to achieve and explore your own artistic vision.

## **Who Should Read This Book**

Anyone who is interested in learning to use the 3ds Max tools should start with this book.

If you are an educator, you will find a solid foundation on which to build a new course. You can also treat the book as a source of raw materials that you can adapt to fit an existing curriculum. Written in an open-ended style, *Autodesk 3ds Max 2015 Essentials* contains several self-help tutorials for home study as well as plenty of material to fit into any class.

## **What You Will Learn**

You will learn how to work in CG with Autodesk 3ds Max 2015. The important thing to keep in mind, however, is that this book is merely the beginning of your CG education. With the confidence you will gain from the exercises in this book, and the peace of mind you can have by using this book as a reference, you can go on to create your own increasingly complex CG projects.

## **What You Need**

Hardware changes constantly and evolves faster than publications can keep up. Having a good solid machine is important to production, although simple home computers will be able to run the 3ds Max software quite well. Any laptop (with discrete graphics, not a netbook) or desktop PC running Windows XP Professional, Windows 7, or Windows 8 (32- or 64-bit) with at least 2GB of RAM and an Intel Pentium Core 2 Duo/Quad or AMD Phenom or higher processor will work. Of course, having a good video card will help; you can use any hardware-accelerated OpenGL or Direct3D video card. Your computer system should have at least a 2.4 GHz Core 2 or i5/i7 processor with 2GB of RAM, a few GBs of hard-drive space available, and a GeForce FX or ATI Radeon video card. Professionals may want to opt for workstation graphics cards, such as the ATI FirePro or the Quadro FX series of cards. The following systems would be good ones to use:

- Intel i7, 4GB RAM, Quadro FX 2000, 400GB 7200 RPM hard disk
- AMD Phenom II, 4GB RAM, ATI FirePro V5700, 400GB hard disk

You can check the list of system requirements at the following website: [www.autodesk.com/3dsmax](http://www.autodesk.com/3dsmax).

## Free Autodesk Software for Students and Educators

The Autodesk Education Community is an online resource with more than five million members that enables educators and students to download—for free (see website for terms and conditions)—the same software used by professionals worldwide. You can also access additional tools and materials to help you design, visualize, and simulate ideas. Connect with other learners to stay current with the latest industry trends and get the most out of your designs. Get started today at [www.autodesk.com/joinedu](http://www.autodesk.com/joinedu).

## What Is Covered in This Book

*Autodesk 3ds Max 2015 Essentials* is organized to provide you with a quick and essential experience with 3ds Max to allow you to begin a fruitful education in the world of computer graphics.

**Chapter 1, “The 3ds Max Interface,”** begins with an introduction to the interface for 3ds Max 2015 to get you up and running quickly.

**Chapter 2, “Your First 3ds Max Project,”** is an introduction to modeling concepts and workflows in general. It shows you how to model using 3ds Max tools with polygonal meshes and modifiers to create a retro alarm clock.

**Chapter 3, “Modeling in 3ds Max: Architectural Model Part I,”** takes your modeling lesson from Chapter 2 a step further by showing you how to use

some of the Architecture Engineering and Construction (AEC) tools to build an interior space using a room from an image.

**Chapter 4, “Modeling in 3ds Max: Architectural Model Part II,”** continues with the interior space from Chapter 3 by adding some furniture. The main focus of this chapter is the Graphite Modeling Tools tab and its many tools.

**Chapter 5, “Introduction to Animation,”** teaches you the basics of 3ds Max animation techniques and workflow by animating a bouncing ball. You will also learn how to use the Track View - Curve Editor to time, edit, and finesse your animation.

**Chapter 6, “Animation Principles,”** rounds out your animation experience by showing the animation concepts of weight, follow-through, and anticipation when you animate a knife thrown at a target.

**Chapter 7, “Character Poly Modeling Part I,”** introduces you to the creation of polygon mesh character model of an alien. In this chapter, you begin by blocking out the primary parts of the body.

**Chapter 8, “Character Poly Modeling: Part II,”** continues the alien model, focusing on using the Editable Poly toolset. You will finish the body details, head, hands, and feet.

**Chapter 9, “Introduction to Materials,”** shows you how to assign textures and materials to your models. You will learn to texture the couch, chair, and window from Chapter 4 as you learn the basics of working with 3ds Max materials and UVW mapping.

**Chapter 10, “Textures and UV Workflow: The Alien,”** furthers your understanding of materials and

textures, and introduces UV workflows in preparing and texturing the alien.

**Chapter 11, “Character Studio: Rigging,”** covers the basics of Character Studio in creating a biped system and associating the biped rig to the alien model.

**Chapter 12, “Character Studio: Animation,”** expands on Chapter 11 to show you how to use Character Studio to create and edit a walk cycle using the alien model.

**Chapter 13, “Introduction to Lighting: Interior Lighting,”** begins by showing you how to light a 3D scene with the three-point lighting system. It then shows you how to use the tools to create and edit 3ds Max lights for illumination, shadows, and special lighting effects. You will light the furniture to which you added materials in Chapter 9.

**Chapter 14, “3ds Max Rendering,”** explains how to create image files from your 3ds Max scene and how to achieve the best look for your animation by using proper cameras and rendering settings when you render the interior scene.

**Chapter 15, “mental ray,”** shows you how to render with mental ray. Using Final Gather, you will learn how to use indirect lighting.

The companion web page to this book at [www.sybex.com/go/3dsmax2015essentials](http://www.sybex.com/go/3dsmax2015essentials) provides all the sample images, movies, and files that you will need to work through the projects in *Autodesk 3ds Max 2015 Essentials*.



**NOTE** This book is a great primer for Autodesk 3ds Max. If you're interested in taking the Autodesk Certification exams for 3ds Max, go to [www.autodesk.com/certification](http://www.autodesk.com/certification) for information and resources.

## The Essentials Series

The Essentials series from Sybex provides outstanding instruction for readers who are just beginning to develop their professional skills. Every Essentials book includes these features:

- Skill-based instruction with chapters organized around projects rather than abstract concepts or subjects
- Downloadable tutorial files showing the start and end state of each exercise
- Digital files (via download) so you can work through the project tutorials yourself. Please check the book's web page at [www.sybex.com/go/3dsmax2015essentials](http://www.sybex.com/go/3dsmax2015essentials) for these companion downloads.

You can contact the authors through Wiley or on Facebook at [www.facebook.com/3dsMaxEssentials](http://www.facebook.com/3dsMaxEssentials).

# Chapter 1

## The 3ds Max Interface

The Autodesk® 3ds Max® software interface is where you view and work with your scene. This chapter explains its basic operations and tools. You can use this chapter as a reference as you work through the rest of this book, although the following chapters and their exercises will orient you to the 3ds Max user interface (UI) quickly. It's important to be in front of your computer when you read this chapter so you can try out techniques as we discuss them.

### In this chapter, you will learn to:

- Navigate the workspace
- Transform objects using gizmos
- Model with the Graphite Modeling Tools set
- Manage animation with the time slider and track bar

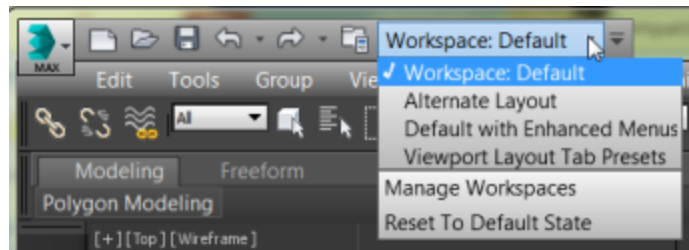
## Navigate the Workspace



The following sections present a brief rundown of what you need to know about the 3ds Max user interface and how to navigate in the 3D workspace.

When you first open the program, you will see the Default workspace ([Figure 1-1](#)). The Workspace feature controls the interface, and with this menu you can define as many different workspaces as you want. You can then switch




among them from the drop-down list on the Quick Access toolbar or the Current Workspaces list on the Manage Workspaces dialog.

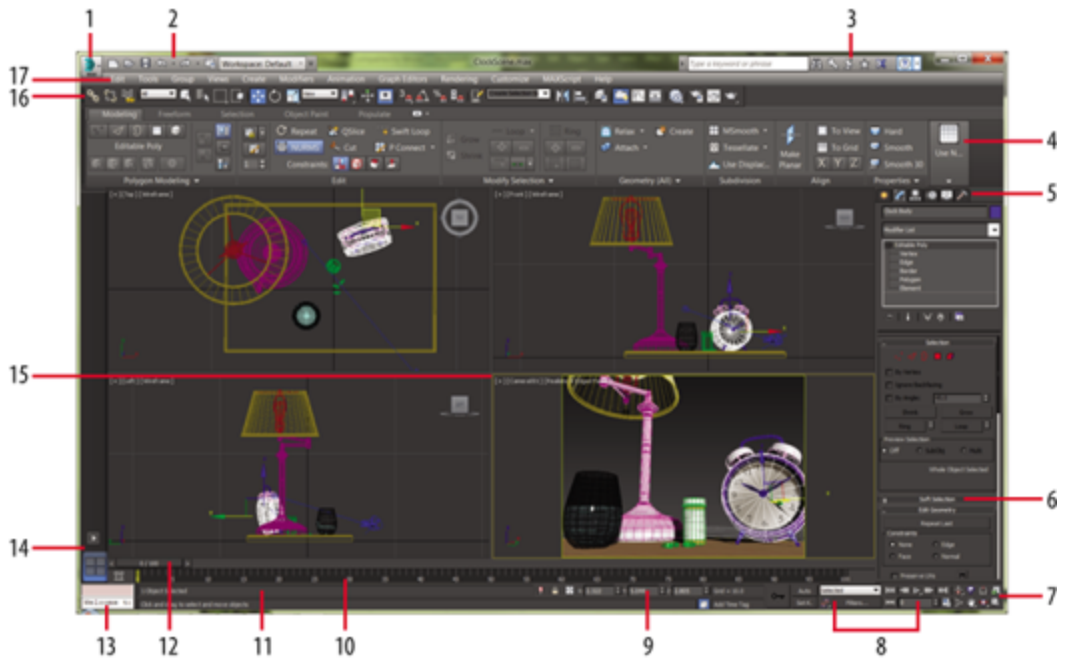


**Figure 1-1:** Workspace drop-down menu

## User Interface Elements

[Figure 1-2](#) shows the 3ds Max UI. (See [Table 1-1](#) for explanations of the UI elements.) At the top left of the application window is an icon called the Application button

(); clicking it opens the Application menu, which provides access to many file operations. Also running along the top is the Quick Access toolbar, which provides access to common commands, and the InfoCenter, which offers access to many product-related information sources. Some of the most important commands in the Quick Access toolbar are file management commands such as Save File and Open File. If you do something and then wish you hadn't, you can click the Undo Scene Operation button () or press Ctrl+Z. To redo a command or action that you just undid, click the Redo Scene Operation button () or press Ctrl+Y.




**Figure 1-2:** The 3ds Max interface elements

**Table 1-1:** The 3ds Max interface elements\*

<b>Element</b>	<b>Function</b>	
1	Application button	Opens the Application menu, which provides file management commands.
2	Quick Access toolbar	Provides some of the most commonly used file management commands as well as Undo Scene Operation and Redo Scene Operation.
3	InfoCenter	Provides access to 3ds Max product-related information.
4	The ribbon	Provides access to a wide range of tools to make building and editing models in 3ds Max fast and easy. In <a href="#">Figure 1-2</a> , the ribbon is shown in a horizontal orientation but can be switched to vertical using the Workspace drop-down menu shown in <a href="#">Figure 1-1</a> .
5	Command panel tabs	Where all the editing of parameters occurs; provides access to many functions and creation options; divided into tabs that access different panels, such as Create panel, Modify panel, etc.
6	Rollout	A section of the command panel that can expand to show a listing of parameters or collapse to just its heading name.
7	Viewport navigation controls	Icons that control the display and navigation of the viewports; icons

		may change depending on the active viewport.
8	Animation Time/Keying controls	Controls for animation keyframing and animation playback.
9	Coordinate display area	Allows you to enter transformation values.
10	Track bar	Provides a timeline showing the frame numbers; select an object to view its animation keys on the track bar.
11	Prompt line and status bar controls	Prompt and status information about your scene and the active command.
12	Time slider	Shows the current and total frames and allows for changing the current frame by moving (or scrubbing) the time bar.
13	MAXScript Mini Listener	A command-prompt window for the MAXScript programming language. The window is useful for performing interactive work and developing small code fragments.
14	Viewport Layout tab bar	This is an easy-access tab for quickly changing viewport layouts. Preset layouts can be added to the menu on the tab bar.
15	Viewports	You can choose different views to display in these four viewports as well as different layouts from the viewport label menus.
16	Main toolbar	Provides quick access to tools and dialog boxes for many of the most

		common tasks.
17	Menu bar	Provides access to commands grouped by category.
*The numerals in the first column refer to labels in <a href="#">Figure 1-2</a> .		

Just below the Quick Access toolbar is the menu bar, which runs across the top of the interface. The menus give you access to a ton of commands—from basic scene operations, such as Duplicate and Group under the Edit menu, to advanced tools such as those found under the Modifiers menu. Immediately below the menu bar is the main toolbar. It contains several icons for functions, such as the three transform tools: Select And Move, Select And Rotate, and Select And Uniform Scale ().

When you first open 3ds Max, the workspace has many UI elements. Each is designed to help you work with your models, access tools, and edit object parameters.

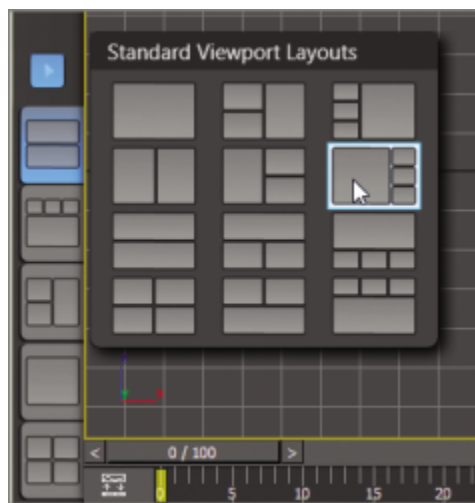
### **Viewports**

You’ll be doing most of your work in the viewports. These windows represent 3D space using a system based on Cartesian coordinates. That is a fancy way of saying “space on X, Y, and Z axes.”

You can visualize X as left-right, Y as in-out (into and out of the screen from the Top viewport), and Z as up-down within the Perspective and Camera viewports. In the orthographic viewports, you can visualize Y as up-down and Z as in-out. The coordinates are expressed as a set of three numbers, such as (0, 3, -7). These coordinates represent a point that is at 0 on the X-axis, 3 units up on the Y-axis, and 7 units back on the Z-axis.

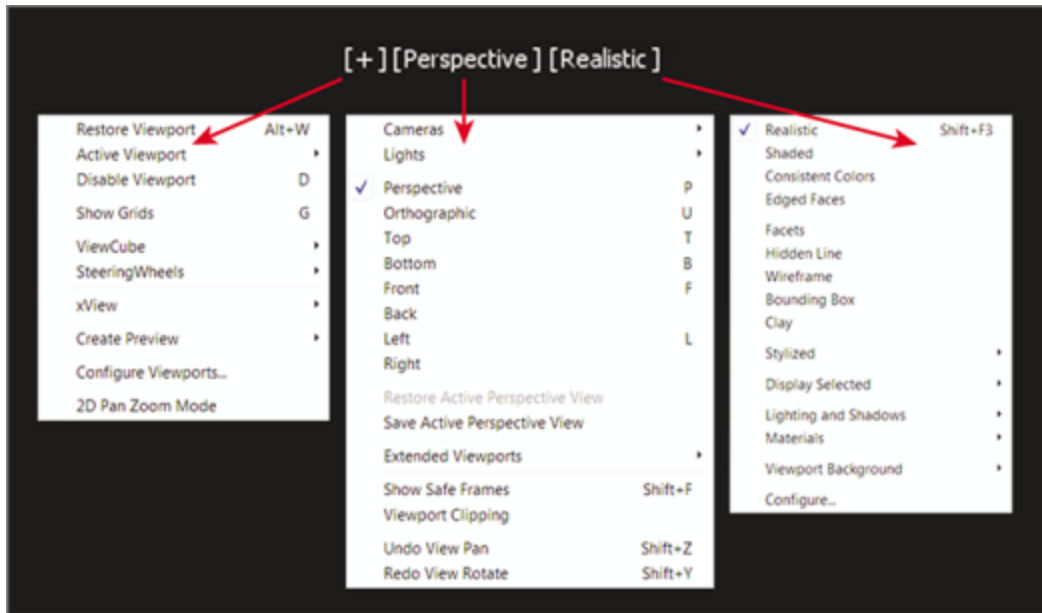
### **Four-Viewport Layout Tab Bar**

The viewports in 3ds Max are the windows into your scene. By default, there are four views: Front, Top, Left, and Perspective. The first three—Front, Top, and Left—are called orthographic views. They are also referred to as modeling windows. These windows are good for expressing exact dimensions and size relationships, so they are good tools for sizing up your scene objects and fine-tuning their layout. The default viewport layout has the four views, but this can be changed. The Viewport Layout tab bar, which is located at the lower-left corner of the interface, allows you to switch between many different viewport layout configurations with a single click. When you click the arrow button on the tab bar, the Standard Viewport Layouts menu gives you access to choose a layout. It will then be added to the tab bar for easy access, as shown in [Figure 1-3](#).



**[Figure 1-3:](#)** Viewport Layout tab bar

The General Viewport label menus (**[+]**) in the upper-left corner of each viewport provide options for overall viewport display or activation, as shown in [Figure 1-4](#). They also give you access to the Viewport Configuration dialog box.



**Figure 1-4:** Viewport label menus showing the General Viewport, Point-of-View, and Shading Viewport menus

The Perspective viewport displays objects in 3D space using perspective. Notice in [Figure 1-2](#) how the distant objects seem to get smaller in the Perspective viewport. In actuality, they are the same size, as you can see in the orthographic viewports. The Perspective viewport gives you the best representation of what your output will be.

To make a viewport active, click in a blank part of the viewport (not on an object). If you do have something selected, it will be deselected when you click in the blank space.

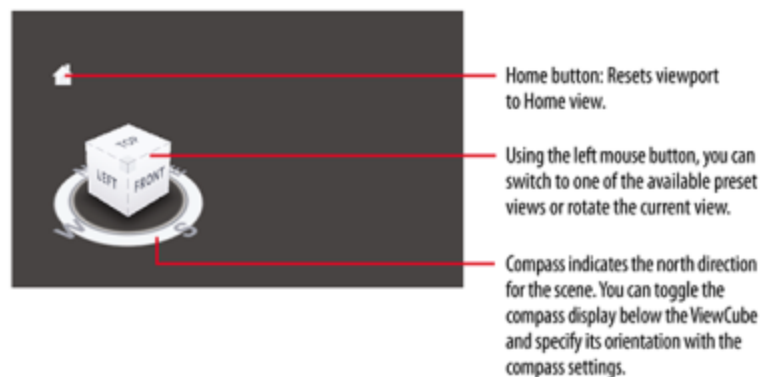
You can also right-click anywhere in an inactive viewport to activate it without selecting or deselecting anything.

When active, the view will have a mustard-yellow highlight around it. If you right-click in an already active viewport, you will get a pop-up context menu called the quad menu. You can use the quad menu to access some basic

commands for a faster workflow. We will cover this topic in the section “Quad Menus” later in this chapter.

## ViewCube

The ViewCube® 3D navigation control, shown in [Figure 1-5](#), provides visual feedback of the current orientation of a viewport; it lets you adjust the view orientation and allows you to switch between standard and isometric views.

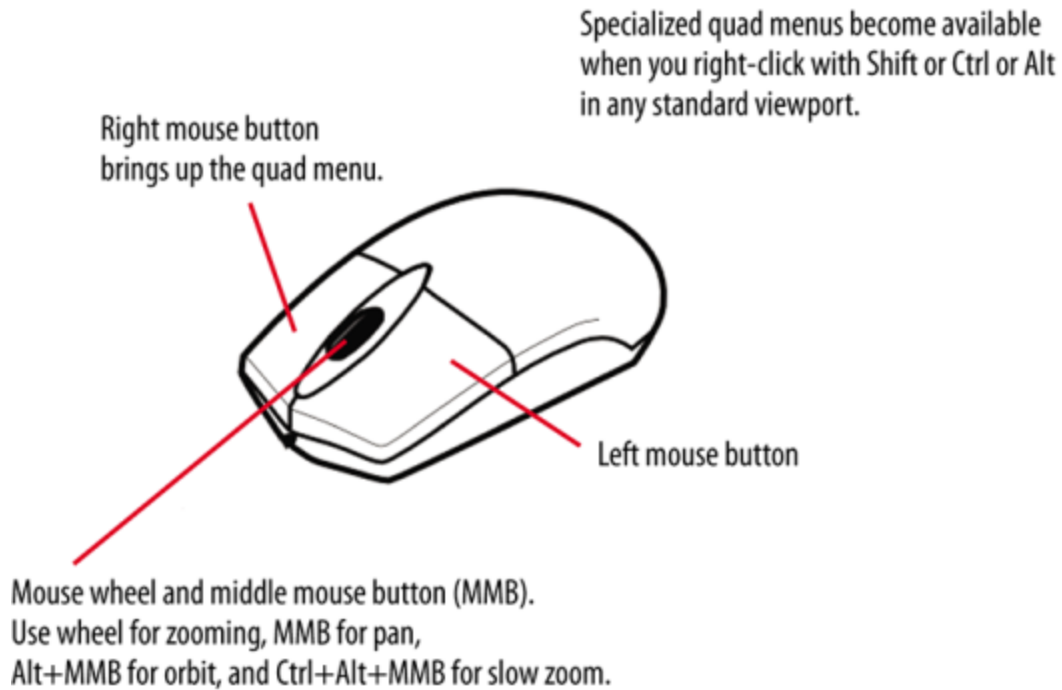


**Figure 1-5:** ViewCube navigation tool

The ViewCube is displayed by default in the upper-right corner of the active viewport; it is superimposed over the scene in an inactive state to show the orientation of the scene. When you position your cursor over the ViewCube, it becomes active. Using the left mouse button, you can switch to one of the available preset views, rotate the current view, or change to the Home view of the model. Right-clicking the ViewCube opens a context menu with additional options.

## Mouse Buttons

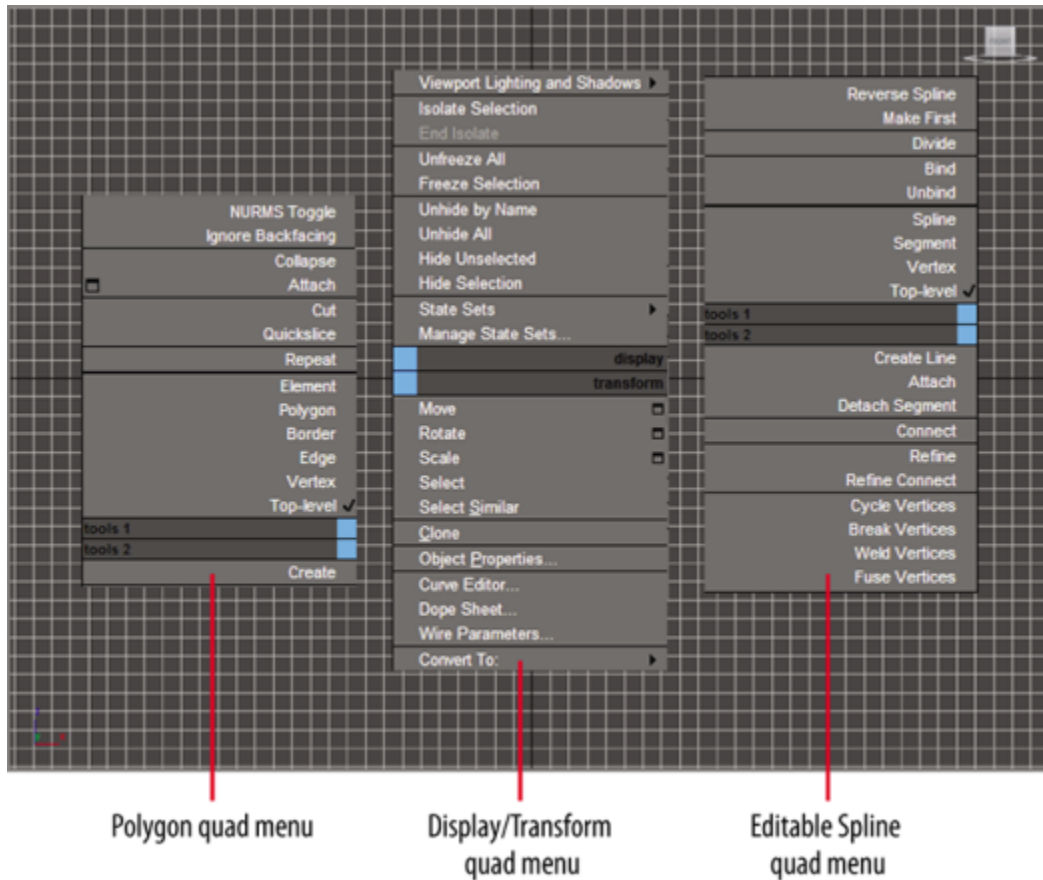
Each of the three buttons on your mouse plays a slightly different role when manipulating viewports in the workspace. When used with modifiers such as the Alt key, they are used to navigate your scene, as shown in [Figure 1-6](#).



**Figure 1-6:** Breakdown of the three mouse buttons

## Quad Menus

When you click the right mouse button anywhere in an active viewport, except on the viewport labels and the ViewCube, a quad menu is displayed at the location of the mouse cursor, as shown in [Figure 1-7](#). The quad menu can display up to four quadrant areas with various commands without your having to travel back and forth between the viewport and rollouts on the command panel (the area of the interface to the right—more on this later in the section “Command Panel”).



**Figure 1-7:** Quad menus

The right quadrant of the default quad menu displays generic commands, which are shared among all objects. The left quadrant contains context-specific commands, such as mesh tools and light commands. You can also repeat your last quad menu command by clicking the title of the quadrant.

The quad menu contents depend on what is selected. The menus are set up to display only the commands that are available for the current selection; therefore, selecting different types of objects displays different commands in the quadrants. Consequently, if no object is selected, all of the object-specific commands will be hidden. If all of the commands for one quadrant are hidden, the quadrant will not be displayed.

Cascading menus display submenus in the same manner as context menus. The menu item that contains submenus is highlighted when expanded. The submenus are highlighted when you move the mouse cursor over them.

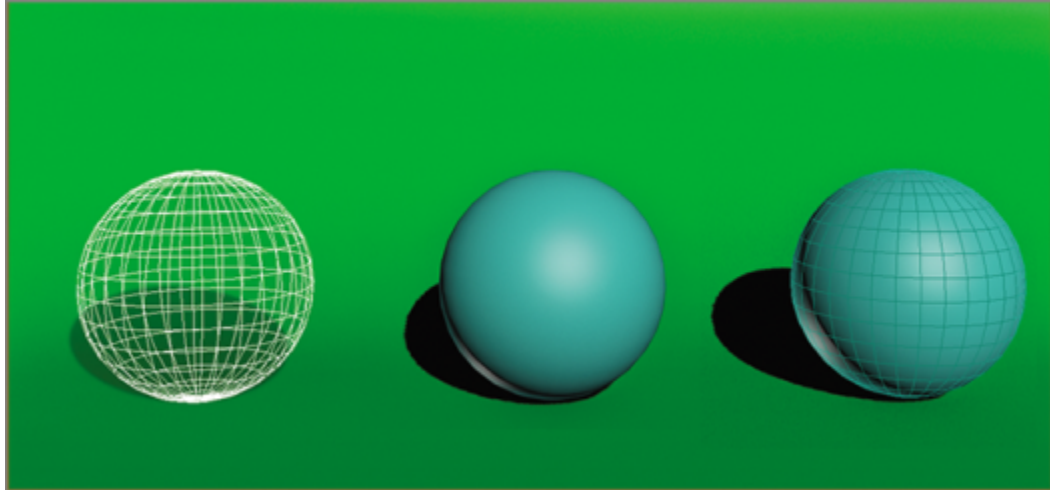
To close the menu, right-click anywhere on the screen or move the mouse cursor away from the menu and click the left mouse button. To reselect the last-selected command, click in the title of the quadrant of the last menu item. The last menu item selected is highlighted when the quadrant is displayed.

Some of the selections in the quad menu have a small icon next to them. Clicking this icon opens a dialog box where you can set parameters for the command.

## Display of Objects in a Viewport

Viewports can display your scene objects in a few ways. If you click the viewport's name, you can switch that panel to any other viewport angle or point of view. If you click the Shading Viewport label, a menu appears to allow you to change the display driver. The display driver names differ depending on the graphics drive mode you selected when you first start 3ds Max. This book uses the default display driver Nitrous.

**Wireframe Mode** Wireframe mode displays the edges of the object, as shown on the left in [Figure 1-8](#). It is the fastest to use because it requires less computation on your video card.



**[Figure 1-8:](#)** Viewport rendering options with the default Nitrous driver modes

**Realistic Mode** Realistic mode is a shaded view in which the objects in the scene appear solid. It shows realistic textures with shading and lighting, as shown in the middle of [Figure 1-8](#).

**Edged Faces Mode** In Edged Faces mode the wireframe edges of selected objects appear along with the shaded surfaces, as shown on the right of [Figure 1-8](#).

Each viewport displays a ground plane grid, called the *home grid*. The home grid represents one of three planes that intersect at right angles to one another at a common point called the origin; the coordinates are (0, 0, 0). It's defined by three fixed planes on the coordinate axes (X, Y, Z). The home grid is visible by default, but it can be turned on and off in the context General Viewport Label menu or by pressing the G key.

### **Selecting Objects in a Viewport**

Click an object to select it in a viewport. If the object is displayed in Wireframe mode, its wireframe turns white while it is selected. If the object is displayed in a Realistic or Shaded mode, a white bracket appears around the

object. This is set by default in the Perspective view; to toggle the selection brackets on and off use the keyboard shortcut J.


To select multiple objects, hold down the Ctrl key as you click additional objects to add to your selection. If you Alt+click an active object, you will deselect it. You can clear all your active selections by clicking in an empty area of the viewport.

### **Changing/Maximizing the Viewports**

To change the view in any given viewport—for example, to go from a Perspective view to a Front view—click the current viewport’s name. From the menu, select the view you want to have in the selected viewport. You can also use keyboard shortcuts. To switch from one view to another, press the appropriate key on the keyboard, as shown in [Table 1-2](#).

**Table 1-2:** Viewport shortcuts

<b>Viewport</b>	<b>Keyboard shortcut</b>	<b>Viewport</b>	<b>Keyboard shortcut</b>
Top view	T	Bottom view	B
Front view	F	Left view	L
Camera view	C	Orthographic view	U
Perspective view	P		

If you want to have a larger view of the active viewport than is provided by the default four-viewport layout, click the Maximize Viewport Toggle icon () in the lower-right corner of the 3ds Max window.

You can also use the Alt+W keyboard shortcut to toggle between the maximized and four-viewport views.

## Viewport Navigation

3ds Max allows you to move around its viewports by using either key/mouse combinations, which are highly preferable, or the viewport controls found in the lower-right corner of the 3ds Max UI. An example of navigation icons is shown for the Top viewport in [Figure 1-9](#), although it's best to become familiar with the key/mouse combinations.



**Figure 1-9:** The viewport navigation controls are handy, but the key/mouse combinations are much faster to use for navigation in viewports.

Open a new, empty scene in 3ds Max. Experiment with the following controls to get a feel for moving around in 3D space. If you are new to 3D, using these controls may seem odd at first, but it will become easier as you gain experience and should become second nature in no time.

**Pan** Panning a viewport slides the view around the screen. Using the middle mouse button (MMB), click in the viewport and drag the mouse pointer to pan the view.

**Zoom** Zooming moves your view closer to or farther away from your objects. To zoom, press Ctrl+Alt and MMB+click in your viewport and then drag the mouse up or down to zoom in or out. The zoom will occur around the cursor location. You may also use the scroll wheel to zoom.

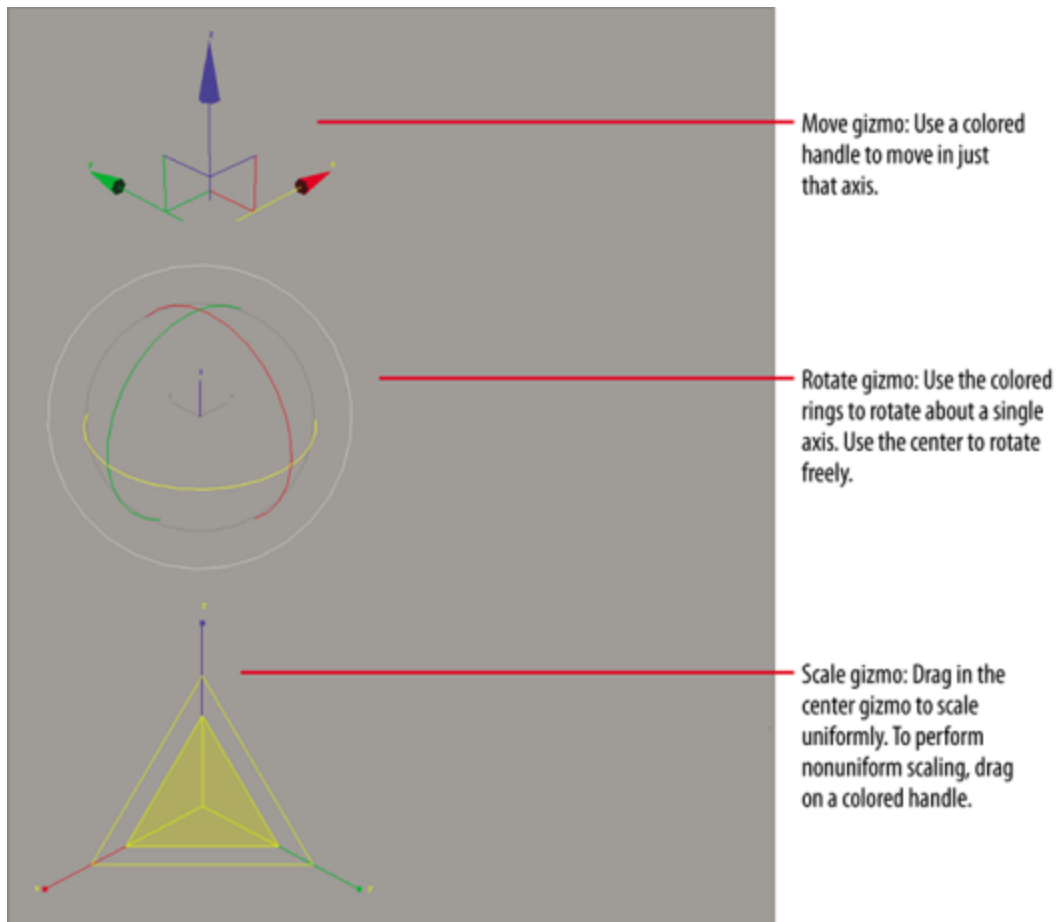
**Orbit** Orbit will rotate your view around your objects. To orbit, press Alt and MMB+click and drag in the viewport. By default, 3ds Max will rotate about the center of the viewport.

The ViewCube will not display in a viewport that has been switched to a Camera or Light viewport.


## Transforming Objects Using Gizmos



The Transform gizmos are viewport icons that let you quickly choose the axes when moving, rotating, or scaling an object. Using gizmos is a fast and effective way to transform your objects with interactive feedback. When you select a transform tool such as Select And Move, a gizmo appears on the selected object. Gizmos let you manipulate objects in your viewports interactively to transform them. Coordinate display boxes at the bottom of the screen display coordinate, angular, or percentage information on the position, rotation, and scale of your object as you transform it. The gizmos appear in the viewport on the selected object at their pivot point as soon as you invoke one of the transform tools, as shown in [Figure 1-10](#).



**Figure 1-10:** Gizmos for the transform tools

You can select the transform tools by clicking the icons in the main toolbar's Transform toolset (  ) or by invoking shortcut keys:

W for Select And Move

E for Select And Rotate

R for Select And Scale

In a new scene, to create a sphere, go to the menu bar at the top of the interface and choose Create ⇒ Geometry ⇒ Standard Primitives ⇒ Sphere. Then in the perspective viewport, click and drag to create the Sphere object. Follow along as we explain the transform tools next.

**Select And Move** Invoke the Select And Move tool by pressing W (or accessing it through the main toolbar), and your gizmo should look like the top image in [Figure 1-10](#). Dragging the X-, Y-, or Z-axis handle moves an object on a specific axis. You can also click the plane handle, the box between two axes, to move the object in that two-axis plane.

**Select And Rotate** Invoke the Select And Rotate tool by pressing E, and your gizmo will turn into three circles, as shown in the middle image in [Figure 1-10](#). You can click one of the colored circles to rotate the object on the axis only, or you can click anywhere between the circles to freely rotate the selected object in all three axes.

**Select And Scale** Invoke the Select And Scale tool by pressing the R key, and your gizmo will turn into a triangle, as shown in the bottom image of [Figure 1-10](#). Clicking and dragging anywhere inside the yellow triangle will scale the object uniformly on all three axes. By selecting the red, green, or blue handle for the appropriate axis, you can scale along one axis only. You can also scale an object on a plane between two axes by selecting the side of the yellow triangle between two axes.

The transform tools, which are called Select And Move/Rotate/Scale, will be just called the Move, Rotate, and Scale tools in this book.

## Graphite Modeling Tools Set

The ribbon interface is a toolbar containing these tabs: Modeling, Freeform, Selection, Object Paint, and Populate. Each tab comprises a number of panels and tools whose availability depends on the context. The ribbon can be oriented horizontally or vertically. The default for the ribbon is horizontal, as shown earlier in [Figure 1-2](#). The ribbon contains additional tools for creating, selecting, and editing geometry. The Freeform tab allows for polygon painting within the viewport for modifying the polygon surface. The Selection tab contains additional tools for making selections at a sub-object level. The Object Paint tab enables you to paint objects freehand anywhere in the scene or onto specific object surfaces. The Populate tab has tools for adding animated characters quickly and easily.



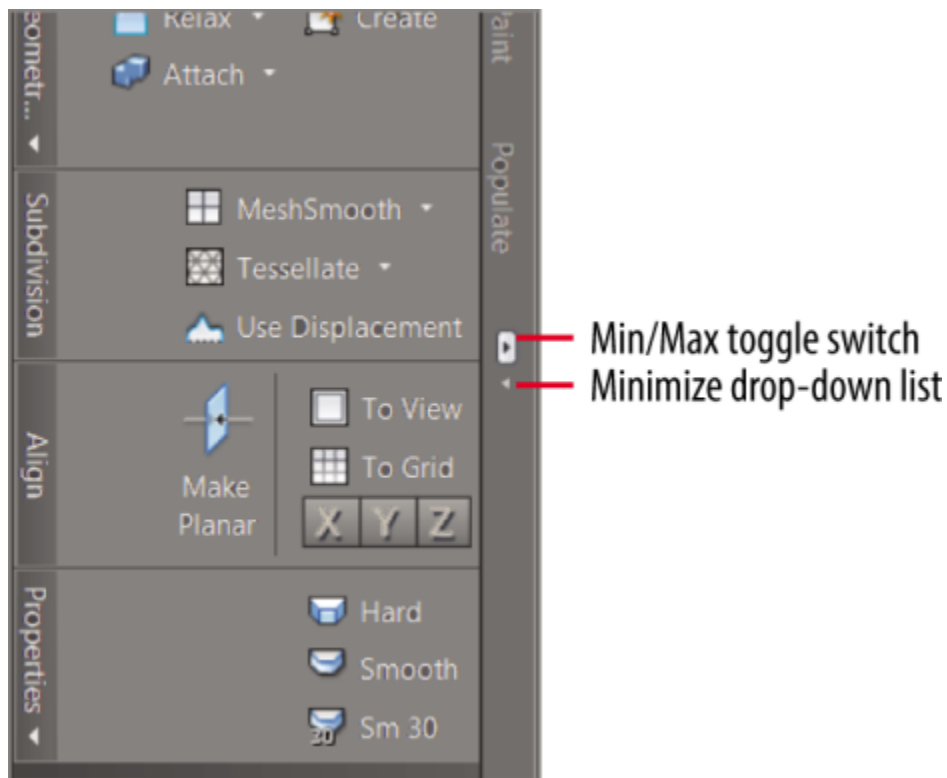
**Figure 1-11:** The Modeling tab found in the ribbon

The Modeling tab, shown in [Figure 1-11](#), provides you with a wide range of modeling tools to make building and editing models in 3ds Max fast and easy. All the available tools are organized into separate panels for convenient access:

- Polygon Modeling
- Edit
- Modify Selection
- Geometry (All)
- Subdivision
- Align

- Properties

One easy way to customize the ribbon is by using the Min/Max toggle switch, as shown in [Figure 1-12](#). By clicking the button, you toggle the minimum/maximum options; when you maximize the ribbon, you are able to view most of the controls. The Minimize drop-down list, which is the small arrow next to the Min/Max toggle switch, gives access to different ribbon states.



**Figure 1-12:** The Min/Max toggle for the Graphite Modeling Tools set

## Command Panel









Everything you need to create, manipulate, and animate objects can be found in the command panel running

vertically on the right side of the UI ([Figure 1-2](#)). The command panel is divided into tabs according to function. The function or toolset you need to access will determine which tab you need to click. When you encounter a panel that is longer than your screen, 3ds Max displays a thin vertical scroll bar on the right side. Your cursor also turns into a hand you can use to click and drag the panel up and down.

You will be exposed to more panels as you progress through this book. [Table 1-3](#) is a rundown of the command panel functions and what they do.

**[Table 1-3:](#)** Command panel functions

<b>Icon</b>	<b>Name</b>	<b>Function</b>
	Create panel	Create objects, lights, cameras, etc.
	Modify panel	Applies modifiers to objects and edits object parameters.
	Hierarchy panel	Adjust the hierarchy for objects and adjust their pivot points
	Motion panel	Access animation tools and functions
	Display panel	Access display options for scene objects
	Utilities panel	Access several functions of 3ds Max, such as motion capture utilities and the Asset Browser

## **Object Parameters and Values**

The command panel and all its tabs give you access to an object's parameters. Parameters are the values that define

a specific attribute of or for an object. For example, when an object is selected in a viewport, its parameters are shown in the Modify panel, where you can adjust them. When you create an object, that object's creation parameters are shown (and editable) in the Create panel.

## **Modifier Stack**

In the Modify panel you'll find the modifier stack, as shown in [Figure 1-13](#). This UI element lists all the modifiers that are active on any selected object. Modifiers are actions applied to an object that change it somehow, such as bending or warping. You can stack modifiers on top of each other when creating an object and then go back and edit any of the modifiers in the stack (for the most part) to adjust the object at any point in its creation. You will see this in practice in the following chapters.