

# Introduction to 3ds Max



**3**ds Max is a powerful 3D modeling, animation, effects, and rendering solution that has been used in everything from video games to feature films. 3ds Max has a wealth of features that can tackle almost any sort of project and generate incredibly realistic or highly stylized images.

3ds Max's large feature set may seem daunting to the newcomer, but the software has a consistent and easy-to-use interface, and this chapter introduces that interface. Once you have your feet wet, you can move on to the other areas of 3ds Max, covered in greater depth in subsequent chapters. By learning the package a little bit at a time, you'll discover the true power of 3ds Max.

# Understanding the 3ds Max Interface

Understanding the 3ds Max interface is the foundation of everything you'll do within the software, including modeling objects, creating textures, animating, and final rendering.

**Menu bar** Contains text-driven menus for all of the major features.

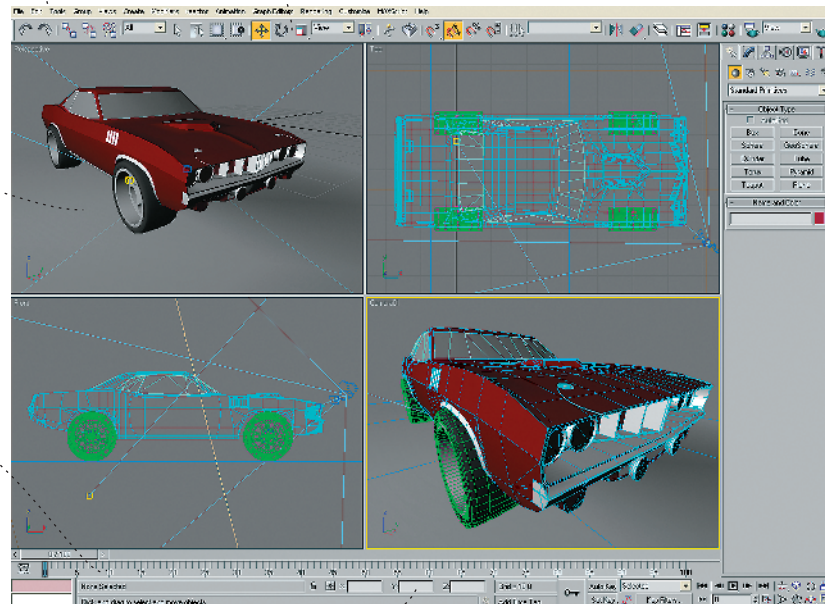
**Toolbar** Provides graphic representations of the most important and commonly used features, such as undoing, object linking, selecting, transforming, texturing, and rendering, among others.

**Command panel** Contains six tabbed panels (Create, Modify, Hierarchy, Motion, Display, Utilities) that contain rollouts to control just about every aspect of the scene.

**Viewports** Used mainly to view your 3D scenes through camera or perspective views. Viewports can also contain data about the scene, such as animation curves or schematics of the scene.

**Timeline** Lets you scrub through the scene and manipulate keyframes.

**Help line** Provides a short description of the tools and how to use them.



**Transforms** Numeric values for each of the transforms (Move, Rotate, Scale) can be viewed or changed.

**Keyframe tools** A collection of tools to create and manage keyframes.

**Navigation tools** Tools used to navigate within viewports.

The **toolbar** menu contains graphic representations of many major features of 3ds Max. The menu can be floated by left-clicking and dragging the double vertical line on the far left of the menu.

**Rendering tools** Tools used for rendering the scene and controlling rendering options.



- **Utilities** Contains miscellaneous utility programs and plug-ins to help manage the scene and objects within the scene



# Viewports

**Viewports** are where most of the work is done within 3ds Max. Viewports hold views of your scene as well as other types of windows that display information about your scene. There are two types of scene views within 3ds Max: perspective and orthographic.



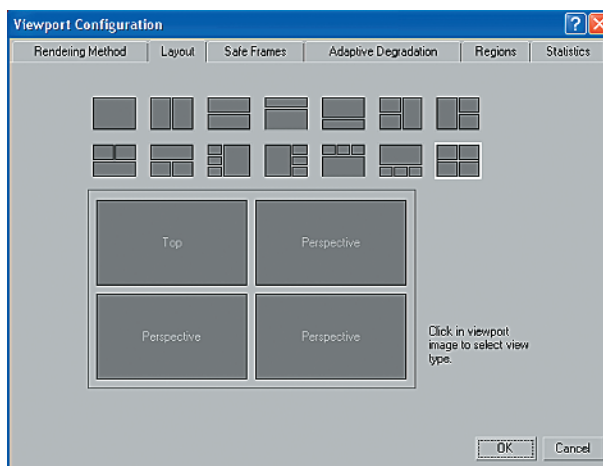
Orthographic views, such as top, left, and front allow only Pan and Zoom.



Perspective views can also be rotated in 3D space.



Right-click over the title of the viewport to bring up the Views menu. This enables you to change the type of view as well as the shading method. There are also options to display grids and safe frames, as well as configure the viewport.

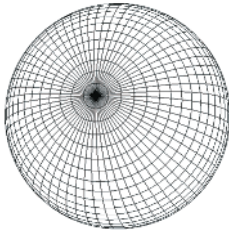


The Viewport Configuration menu enables you to change the arrangement of the viewports as well as decide the way those viewports will be rendered.



# Shading

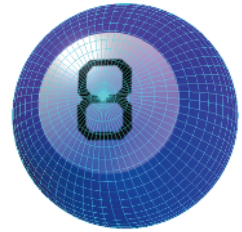
Each viewport can have its own type of **shading**, for viewing different parts of the scene in different ways. When you are modeling, you may choose to work in wireframe mode, and when rendering, you may choose one of the shaded modes. The quality of the shading depends on the graphics card as well as the graphics mode. Direct3D drivers are faster and will show more-realistic textures and transparencies, whereas OpenGL drivers are faster for deforming meshes, such as in character animation.



Wireframe shows a basic outline of the object.



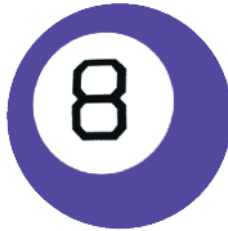
Smooth shows the object rendered.



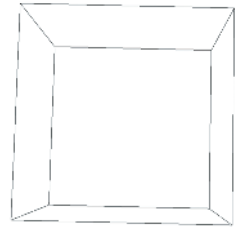
Wireframe On Shaded shows the wireframe superimposed on a shaded object.



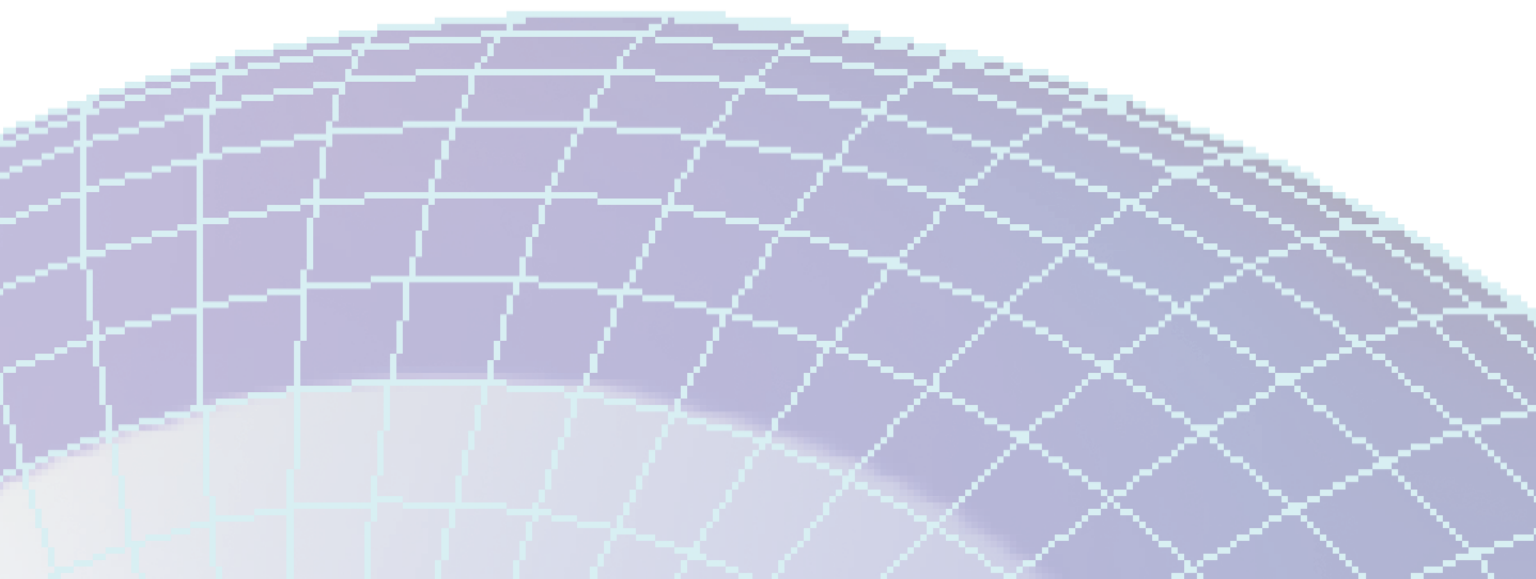
Facets shows the model without smoothing, making the polygonal edges visible.



Flat eliminates shading for a more-2D look.



Bounding Box creates a box around the object. Bounding Box is great for navigating complex scenes that update slowly in the more-detailed modes.



# Navigation

**Navigation** in 3ds Max can be accomplished by using the mouse or by using the navigation bar at the bottom-right corner of the screen. Mouse navigation is accomplished by using the middle button along with the keyboard.



Middle-click and drag to pan the viewport.



Roll the middle button to zoom. If the mouse does not have a rolling middle button, press Ctrl+Alt while pressing the middle button to zoom.



Hold down the Ctrl key while pressing the middle button to rotate around the scene.

The navigation bar at the bottom-right corner of the screen contains additional navigation tools.

**Zoom** Zooms the active viewport

**Zoom All** Zooms all viewports

**Frame** Frames the selected object(s) in the viewport

**Frame All** Frames the selected object(s) in all viewports

**Field Of View** Changes the field of view

**Pan** Pans the viewport

**Rotate** Rotates the viewport

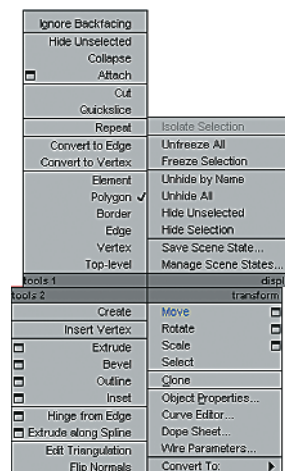
**Maximize View** Maximizes the current viewport



Clicking the Frame, Frame All, and Rotate icons brings up a selection menu. Gray icons act on the entire scene, and white icons act on the selected object.

# Quadmenus

**Quadmenus** are a set of context-sensitive menus that activate at the cursor when you right-click in any viewport. Up to four menus appear and contain the most commonly used commands for the particular situation. If you're modeling, for example, modeling commands will appear.



In a quadmenu, Display and Transform tools are in the right quadrants, while context-sensitive tools are on the left.

# Selecting Objects

3ds Max has a wide variety of object types, such as geometry, lights, cameras, and bones, among others. 3ds Max can select objects individually, by group, and by name.

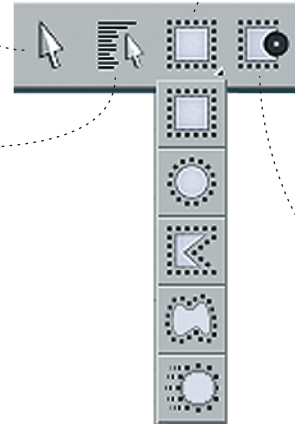
Objects can be selected individually or in groups by using the mouse. When left-clicking an object selects it, left-clicking and dragging selects a region. Holding down the Ctrl key while selecting adds to a selection, and holding down the Alt key removes from the selection.

**Select** Selects the object by using the mouse.

**Select By Name** Brings up the Select By Name floating menu.

**Selection Region** Clicking and holding this icon enables you to change the way objects are selected: rectangular, circular, polygonal lasso, lasso, and paint.

**Window/Crossing** This determines whether objects need to be entirely within the selection region to be selected.



**Name Type-In** Typing in a name or partial name selects all objects that match.

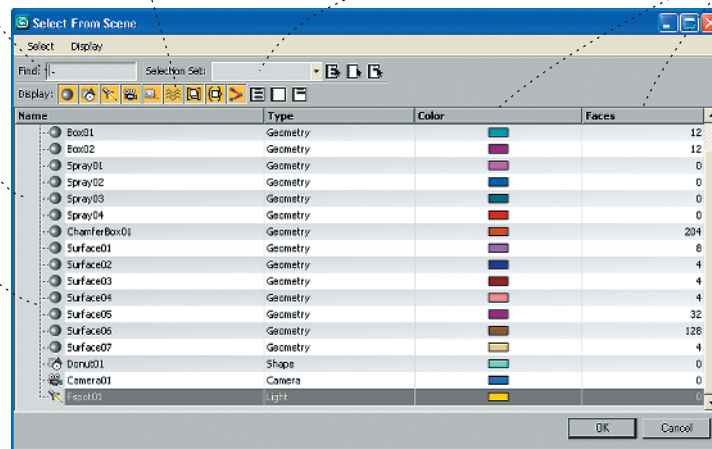
**List** The objects in the scene listed by name.

**Subtrees/Dependents** Organizes the list by hierarchies or dependencies.

**List Types** Displays or hides objects in the list according to type.

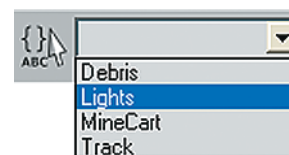
**Selection Set** Selects a predefined selection set.

**Sort** Sorts the list by object name, type, color, or size.



The Select From Scene floating menu

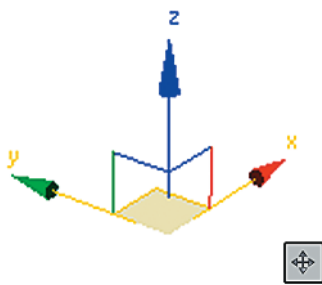
Groups of selected objects can be given names so they can be reselected later. This is done by using the Selection Sets pull-down menu on the main toolbar. To create a set, simply type the name of the set and hit Enter. This places the set in the pull-down menu, where it can be recalled later. Sets can be edited by left-clicking the icon to the left of the pull-down.



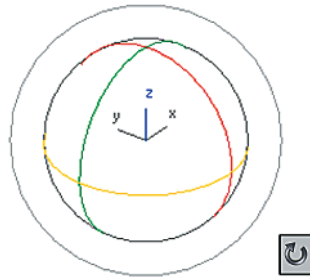
# Transforming Objects

Selected objects can be moved, rotated, and scaled. These transforms can be accessed by using the icons on the main toolbar or by pressing the hot keys W (Move), E (Rotate), and R (Scale).

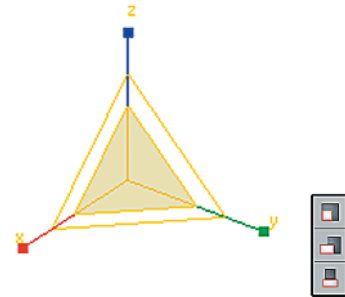
Each transform uses a color-coded gizmo. Red transforms along the X-axis, green along the Y-axis, and blue along the Z-axis. Clicking and dragging in the center of the gizmo transforms the object on all available axes, while clicking in the box connecting two axes transforms on only those two axes.



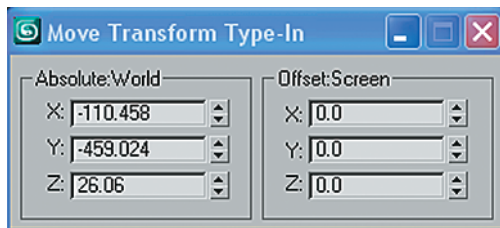
Move gizmo



Rotate gizmo



Scale gizmo



Right-clicking the Move, Rotate, or Scale icon brings up a floating menu that accepts numeric input.

## Coordinate Systems

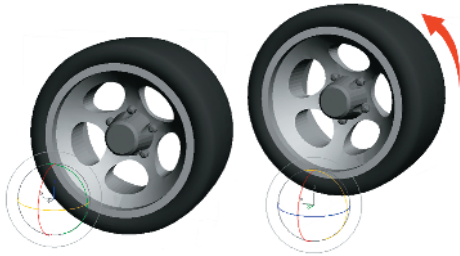
Transformations can take place along a number of user-selectable XYZ coordinate systems. These change how the transform gizmo is oriented relative to the object. 3ds Max has several types of coordinate systems, including View, Screen, World, and Parent.



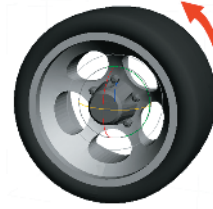


# Pivots

The **pivot** is the center of each object's coordinate system, which is particularly important when rotating an object, because the object will rotate around the pivot. Pivots are managed in the Command panel under the Pivot panel of the Hierarchy tab.



When the pivot is placed outside the wheel, the wheel rotates around its edge.



When the pivot is in the center of the wheel, it rotates around the axle.

**Pivot panel** This panel contains tools to adjust an object's pivot.

**Affect Pivot Only** Allows you to move the position of the pivot.

**Affect Object Only** Allows you to move the object while the pivot remains stationary.

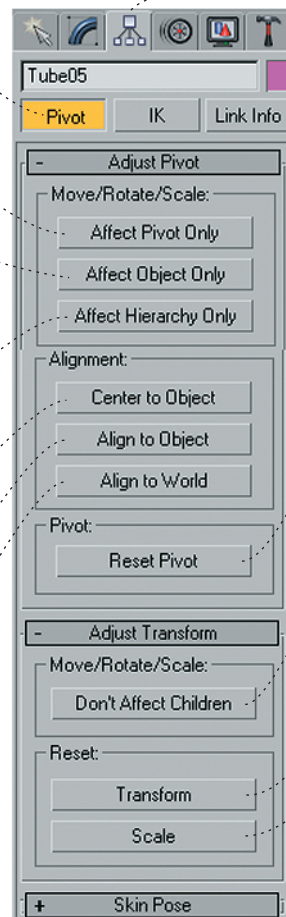
**Affect Hierarchy Only** Applies the rotation or scale to the hierarchy by rotating or scaling the position of the pivot point without rotating or scaling the pivot point itself.

**Center To Object** Moves the pivot to the center of its object.

**Align To Object** Rotates the pivot to align with the object's transformation axis.

**Align To World** Rotates the pivot to align with the world axis.

**Hierarchy tab** The Pivot panel is located under the Hierarchy tab.



**Reset Pivot** Resets the pivot to when the object was first created.

**Don't Affect Children** Moves the pivot without affecting the position of child objects in the hierarchy.

**Reset Transform** Resets the transform to zero.

**Reset Scale** Resets the scale of the object to 100 percent.

# Snapping

The **Object Snapping tools** are good for snapping objects to precise positions. When you are moving objects, these tools let you snap objects to grids, other objects, or parts of other objects. Rotations can be snapped so the object rotates in specific increments. There are three snap modes:



2D snap snaps only in 2D space along grids; the vertical dimension is ignored.



2D snap snaps in 2D space along grids, but maintains the vertical dimension. The effect is like holding up a sheet of glass and drawing the outline of an object on it.



This is the default. The cursor snaps directly to any geometry in 3D space.

**Vertex** Snaps to a polygonal, mesh, or patch vertex

**Endpoint** Snaps to the end points of edges on meshes or spline vertices

**Midpoint** Snaps to the middle of edges on meshes and spline segments

**Edge/Segment** Snaps to a polygonal or mesh edge or a spline segment

**Face** Snaps anywhere on the surface of a face

**Frozen** Snaps to frozen objects

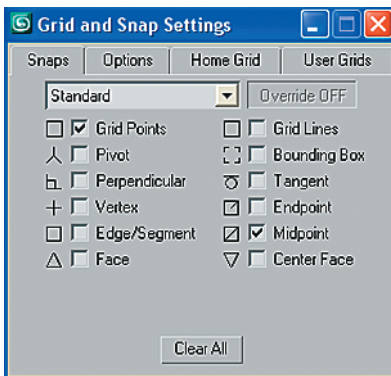
**Pivot** Snaps to the pivot point of an object

**Grid Points** Snaps to grid intersections

**Axis Constraints** Brings up the axis constraints toolbar, which limits motion along specified axes



One way to control snapping is to use the Snaps toolbar, which is accessed via Customize → Show UI → Show Floating Toolbars.



Right-clicking the snaps icon brings up the Grid And Snap Settings menu. This floating menu offers more options and precise control over snapping.

# Managing Objects

3ds Max has a number of tools that allow you to manage the display and behavior of objects within the scene. Objects can be organized by type, color, and name. Objects can also be hidden or frozen. This helps to organize scenes and eliminate clutter.

## Hiding and Freezing Objects

3ds Max has the capability to hide objects from view, or to freeze them so that they can be viewed but not selected. If you're working with one set of objects, for example, you can hide or freeze other objects in the scene to make it easier to select and manipulate the desired objects. Selected objects can be hidden and/or frozen by using the quadmenu or the Display panel.

**Display Color** Controls whether the object's color or the material color is displayed.

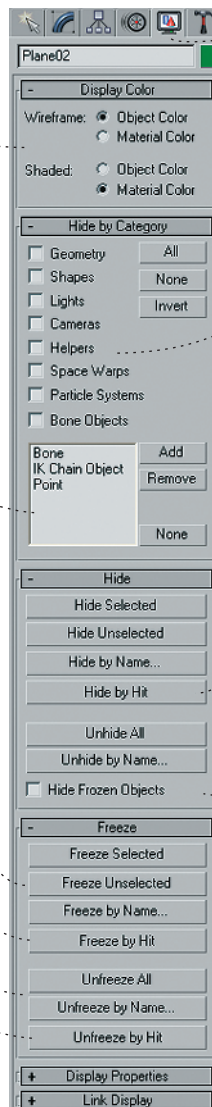
**Custom Hide** Highlighting a type of object hides it, and other types of objects can be added or removed from the list by using the buttons to the right of the list.

**Freeze** Freezes selected objects or unselected objects as well as by name.

**Freeze By Hit** interactively hides objects.

**Unfreeze** Unfreezes all objects or by name.

**Unfreeze By Hit** interactively unfreezes objects.



**Display Tab** Brings up the display options.

**Hide By Category** Hides objects by the listed categories.

**Hide** Hides selected objects or unselected objects as well as by name.

**Hide By Hit** interactively hides objects.

**Unhide** Unhides all objects or by name.

**Hide Frozen** Hides all frozen objects.

# Using Layers

Another way to manage objects is to separate them into layers by using the Layer Manager, which is accessed through the main toolbar. A **layer** is simply a collection of objects. Each layer has a unique name, and layers can be hidden or frozen. Layers can also be used for such tasks as rendering.

**Create Layer**  
Creates a new layer with the selected objects.

**Add To Layer**  
Adds selected objects to the active layer.

**Hide All** Hides all layers.

**Freeze All** Freezes all layers.

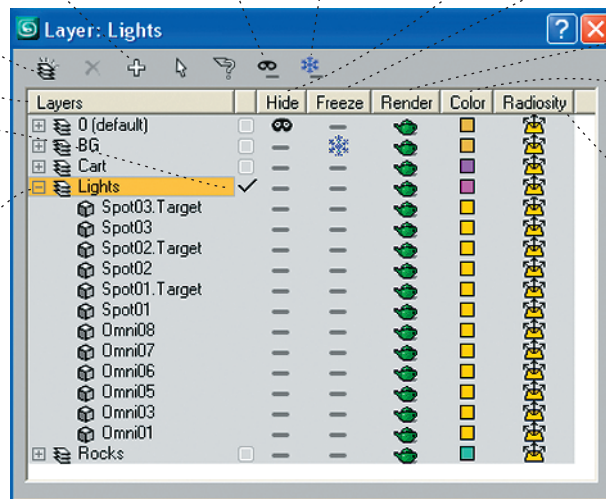
**Hide** Hides all objects in the layer.

**Freeze** Freezes all objects in the layer.

**Layers** A list of the current layers.

**Active Layer**  
The active layer is indicated by a check mark. Left-clicking a layer activates it.

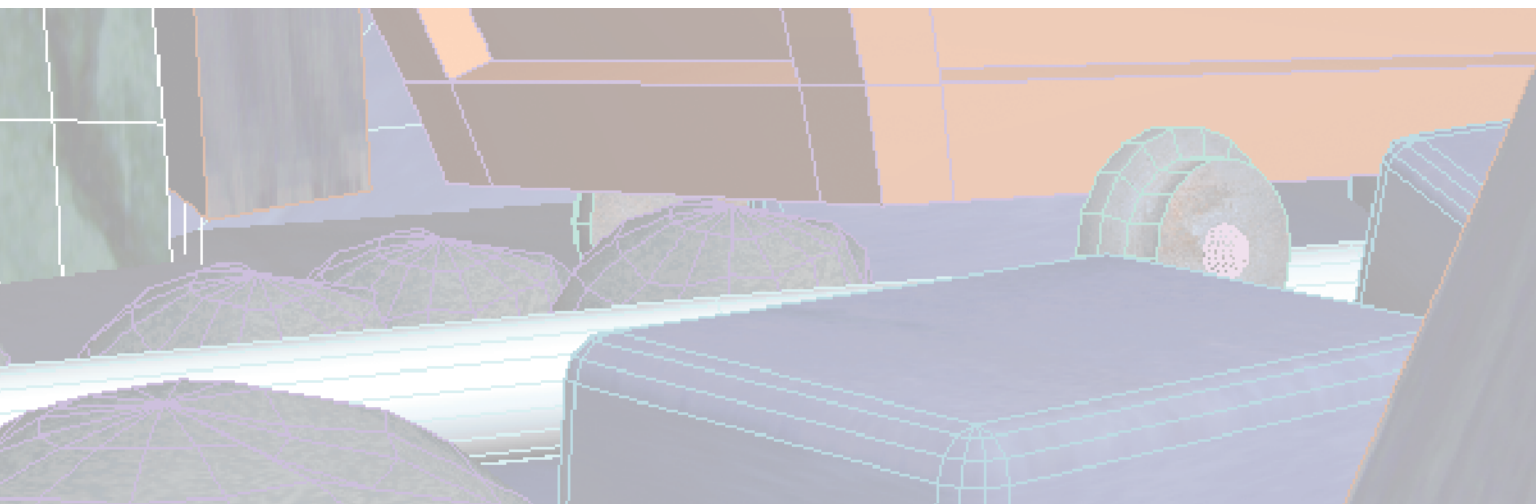
**Expand/Contract**  
Click this icon to display the objects in the layer.



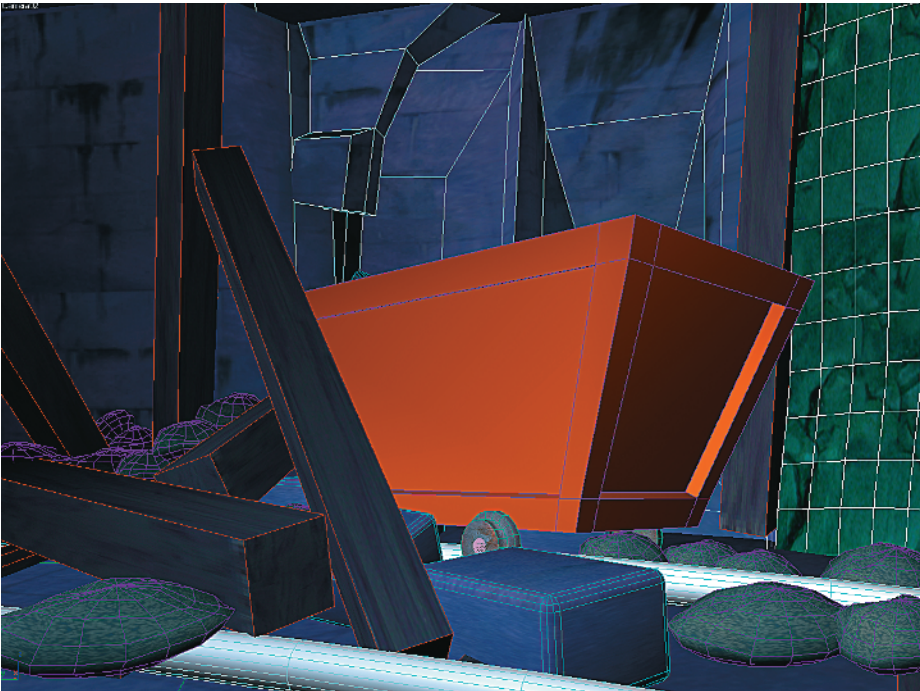
**Render** Turns rendering on/off for the current layer.

**Color** Changes the color of objects in the layer.

**Radiosity** Turns radiosity (a rendering parameter) on/off for the layer.







A complex scene such as this can be made easier to work with by hiding objects or separating the objects into layers.

## Using Groups

3ds Max can also combine objects into groups by using the Group menu on the main menu. Once grouped, objects appear as a single object in your scene. You can click any object in the group to select the group object, and then transform or modify it however you choose. Groups can be nested, so you can group objects, and then group again with another set of groups or objects.

**Group** Combines selected objects or groups into a new group

**Ungroup** Removes the selected group, releasing the objects or groups

**Open** Opens the group, allowing you to transform or modify individual objects within the group

**Close** Closes an open group

**Attach** Attaches an object to an existing group

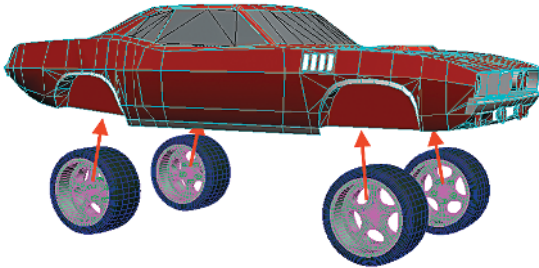
**Detach** Detaches an object from an existing group

**Explode** Ungroups all objects in a group, regardless of the number of nested groups

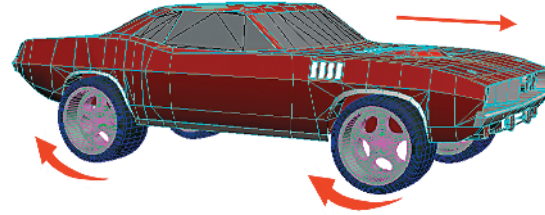


# Linking Objects into Hierarchies

3ds Max can connect objects together in a hierarchy so that an object can parent other objects. Moving the parent object also moves the children. Hierarchies are very useful in animation because they can attach objects to one another, so when one object moves, the rest follow. Linking is done by using the Select And Link tool on the main toolbar. Select the object or objects to be linked, and drag the link to the desired parent.



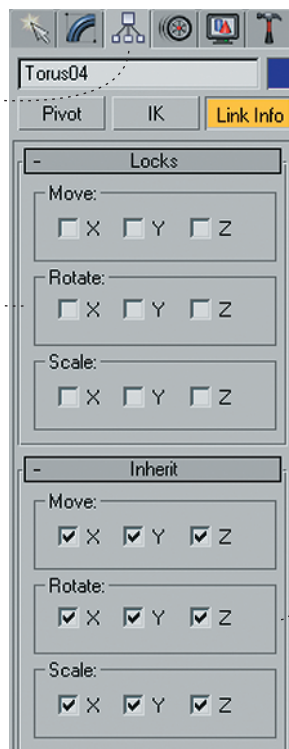
Using Select And Link, the wheels of this car are attached to the body as children in a hierarchy.



This allows the wheels to follow the body as it transforms, but also move and rotate around their own individual axes.

**Hierarchy tab** The Pivot panel is located under the Hierarchy tab.

**Locks** Selecting one of these check boxes will lock an object's motion along the specified axis.



**Link Info** This panel contains tools to control how objects are linked.

**Inherit** When these are selected, the object inherits the motion of its parent.

The Link Info rollout, located on the Command panel, controls how objects link to each other and inherit those links.

# Scene Explorer

Scene Explorer is a new feature in 3ds Max 2008. It presents a comprehensive view of all the objects in a scene. Objects can be sorted, filtered, and selected from within Scene Explorer. Changes can also be made to individual objects or groups of objects. Scene Explorer is very helpful for large scenes with many objects. Scene Explorer allows you to create custom views for different types of objects, so you could have a view to display just lights and lighting parameters, for example.

**View** Selects a custom Scene Explorer view.

**Selection Set** A pulldown that shows 3ds Max selection sets.

**Select All** Selects all objects in a scene.

**Select None** Deselects selected objects.

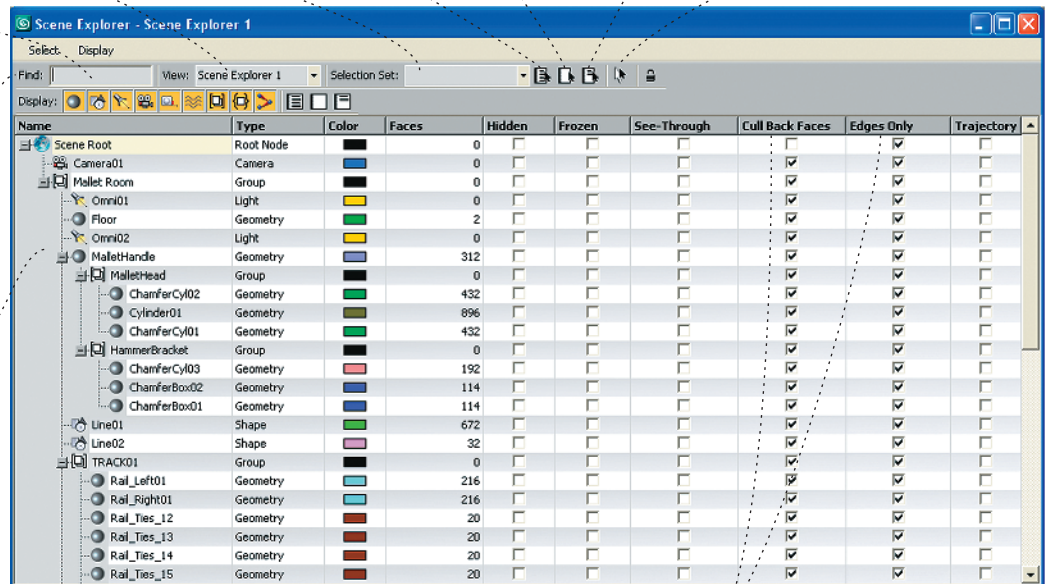
**Select Invert** Inverts the current selection.

**Sync Selection** Syncs the selection to the selection in the viewport.

**Find** Allows you to search the scene for objects that meet certain criteria.

**Display Filters** Turns objects on or off depending on type.

**Object List** A list of objects in the scene. Objects are listed hierarchically.



**Object Parameters** These columns can be customized to display a wide range of parameters. These allow for parameters to be changed to a selection of objects.

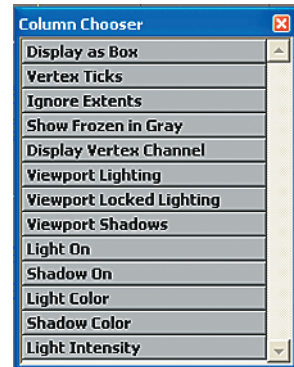
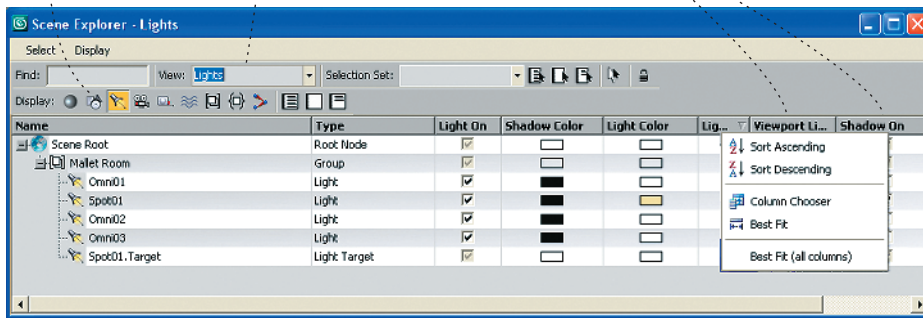
# Customizing the Interface

Scene Explorer can be customized in several ways. The object filters determine the type of objects displayed, such as lights, cameras, geometry, bones, etc. The columns associated with each object can also be customized using the Column Chooser. Once a view has been customized, it can be saved by typing a name into the View box.

**Filters** Selecting just the light icon will display only lights.

**View** Typing a name here saves the view for later recall

**Columns** Click and drag a column to delete it. New columns can be added using the Column Chooser, which is accessed by right clicking over a column.

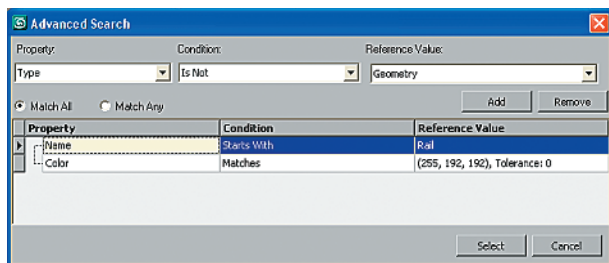


The Column Chooser displays a list of parameters that can be placed in columns of a Scene Explorer View. Click and drag to place a new column into a view.

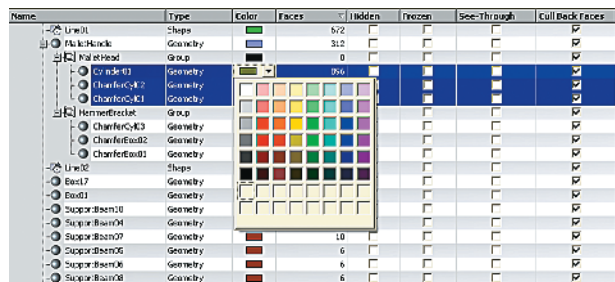
A custom Scene Explorer view to work with lighting.

## Using Scene Explorer

Scene Explorer can be used to select objects as well as change their parameters. Object can be selected by clicking, by using selection sets, or by using the Find utility. Selected objects appear in the 3ds Max scene. You can also change parameters for selected objects by adjusting the parameters listed in the columns.



The Find utility allows you to search the scene for objects which meet specific criteria.



Clicking over a column for selected objects allows you to change the parameters for those objects. In this case, the color of the highlighted objects is being changed.