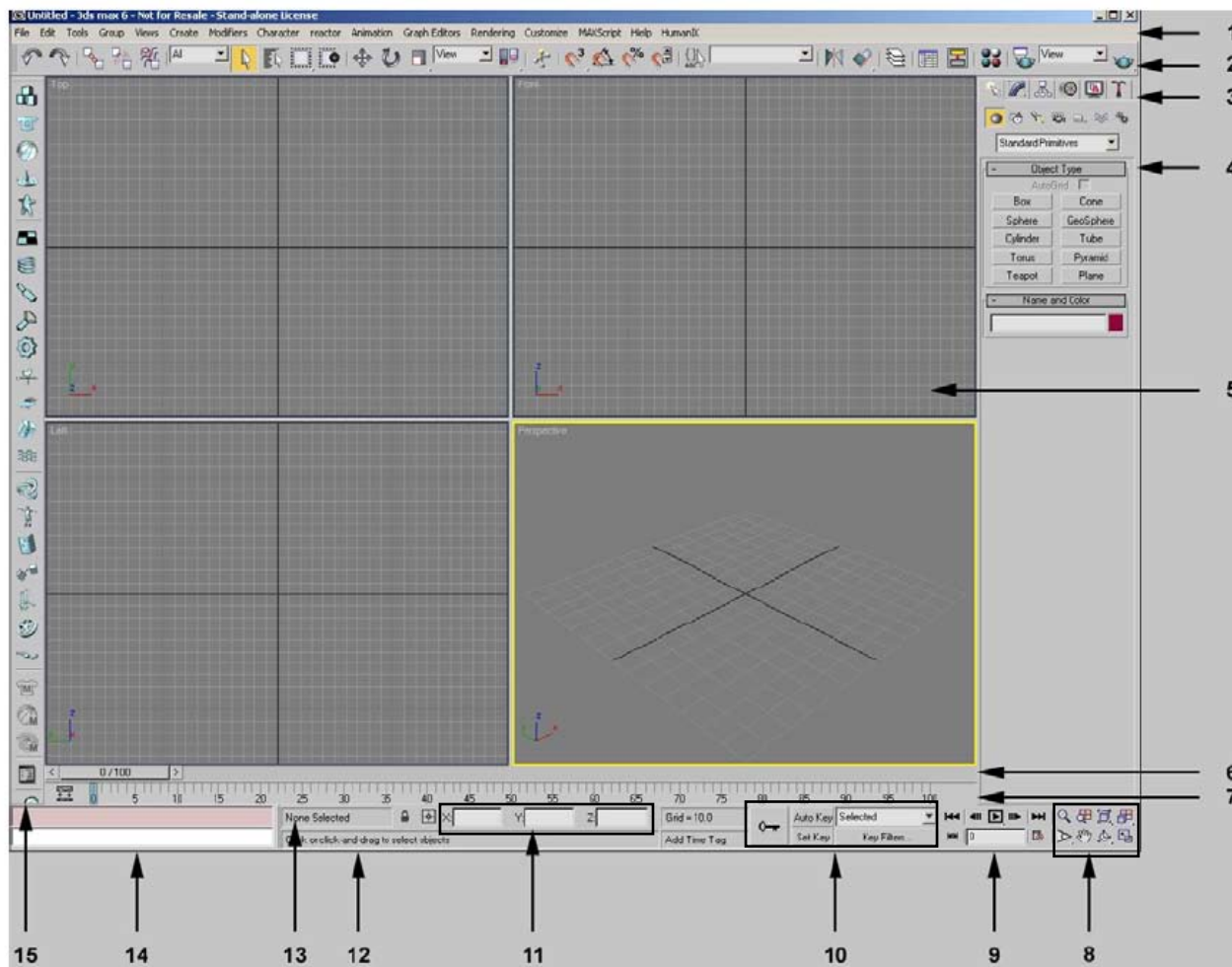


Intro to 3ds max 8

A resource by the Centre for Distance Education

Before you start, it is best to get acquainted with the 3dsmax window by learning the names of the options. This will help you learn faster. You can find out more about a specific area by opening up the User Reference Help file from within the software and typing in the name of the area as listed below.



- 1. Menu Bar** - Most options can be found here; most importantly, Opening and Saving files.
- 2. Main Toolbar** - Often-used features such as Snap, Render, and transforms (move, rotate, scale).
- 3. Command Panels** - These six tabs make up the Command Panel. You will most often use the Create & Modify Panels (the first and second).
- 4. Rollout** - Command options are organized into Rollouts, which can be rolled up or down by clicking on the gray box that holds their title.
- 5. Viewports** - There are four default viewports: Top, Front, Left and Perspective. These viewports are how you achieve the effect of 3D while working on a 2D monitor. When working in a scene, it is often helpful to keep track of your objects in all four viewports to get an idea of how they work together.
- 6. Time Slider** - Move the time slider back and forth (called "scrubbing") to see your animation or to move to a specific frame.
- 7. Track Bar** - This area shows you which frame you are in, and displays keyframes for you to edit.
- 8. Viewport navigation controls** - These two rows allows you to zoom in and out, enlarge one viewport, pan and orbit around the screen.
- 9. Time Controls** - These buttons are set up like a VCR - you can view your animation and change the total number of frames from here.
- 10. Animation controls** - There are two methods to create keyframes, Auto Key or Set Key. You can use either or both from this area.
- 11. Transform Type-In** - This allows you to display/ change the coordinates of an object.
- 12. Prompt line** - This area prompts you to do the next step for a specific command you've just chosen.
- 13. Status Bar** - This area allows you to lock selections and informs you about object selection.
- 14. MAXScript mini-listener** - This is an advanced feature to keep track of the MAX scripting language
- 15. Reactor Toolbar** - Another advanced toolset for dynamic calculations.

Important Concepts & Procedures

It is important to understand how vast the 3ds max software is. The **UI** (User Interface) is complicated, but extremely useful once you get the hang of it. Below are some things to keep in mind as you navigate through the software.

3ds max's menu options are often found in more than one area. You will be shown many options, and you can choose the ones that work best for you. Make sure to follow along on your screen as you read here.

Right-Clicking & Quad Menus

Right-clicking in the viewport will bring up a short menu of important options (Fig 1.1). It is context-sensitive, which means that the contents of some of the menu will change depending on what you have selected in the scene (Fig 1.2).

The quad menus will save you time as you work by giving you some of the most common options at one click, instead of trying to find them in duplicate menus.

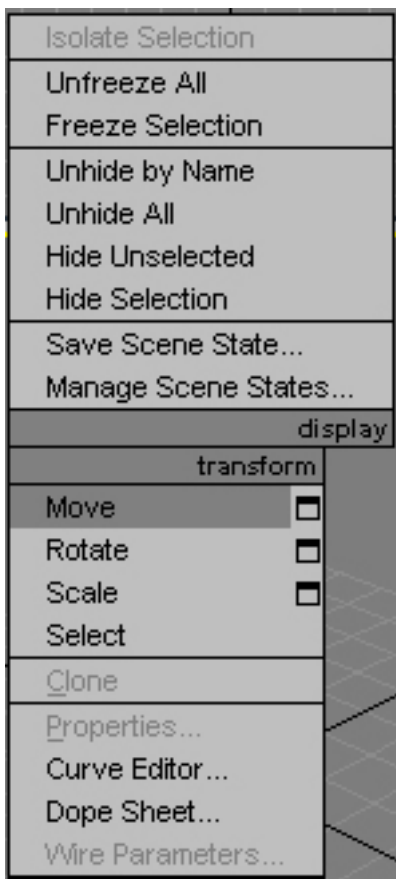


Fig. 1.1 - The basic quad menu, accessed via a right-click in the viewport.

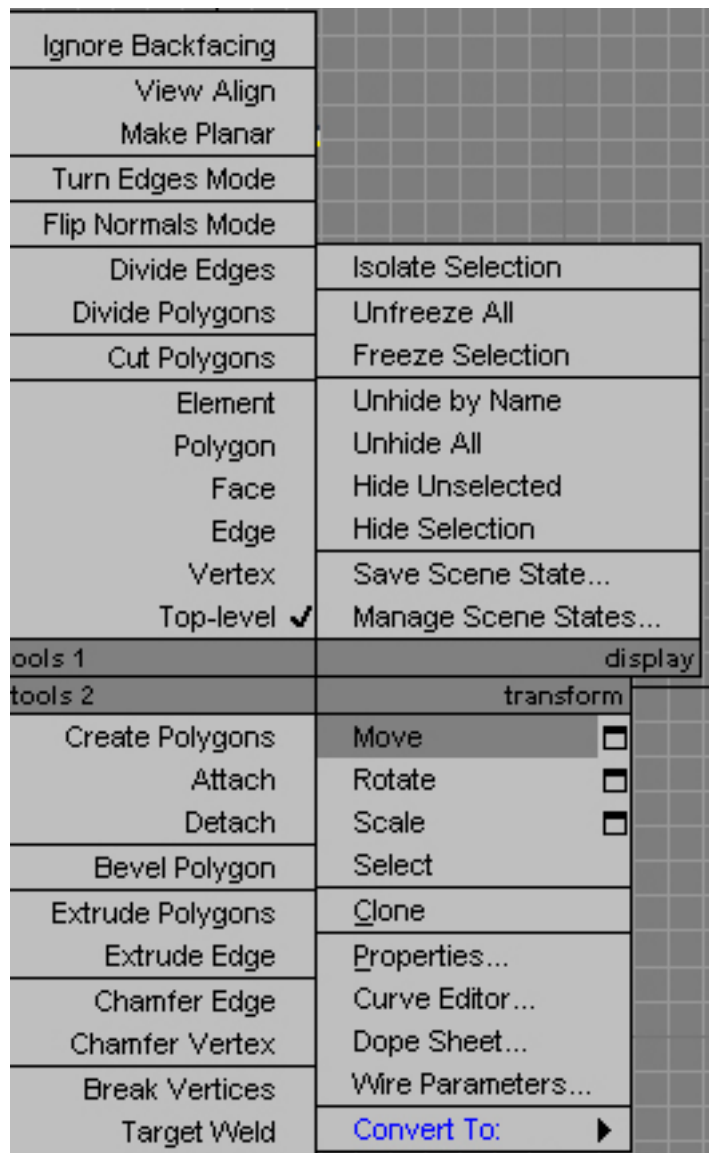


Fig. 1.2 - The quad menu with an editable mesh object selected.

Icons and Flyouts

Many icon buttons on the Main Toolbar have little arrows in the bottom-right corner, such as the Scale tool (Fig 1.3). This means that if you press and hold this button, there are more options for that tool underneath, in what is called a **flyout** (Fig 1.4).



Fig 1.3



Fig 1.4

Transforms

There are three main operations you can perform on an object: **Move**, **Rotate**, and **Scale**. These operations are called **Transforms**. They can be accessed from the Main Toolbar (Fig 1.5), by using keyboard shortcuts (Fig 1.6), or from the Quad Menu (Fig 1.1).



Fig 1.5

Transform Keyboard Shortcuts

Move: w Rotate: e Scale: r

Fig 1.6

The Transform Gizmos

As you select objects and have the different Transform tools active, you will notice red, yellow and green objects appear near the centre of your selected objects. These are called **gizmos**. Each transform has its own gizmo (Fig 1.7, 1.8, 1.9).

The colours represent the different **axes** in 3D space: **X**, **Y**, and **Z**. If you are looking at a Front viewport, X is defined as the horizontal axis (from left to right); Y is the vertical axis (from top to bottom), and Z is the third dimension, the invisible axis that points straight out of the screen directly at you.

With respect to the transform gizmos, X is always red, Y is always green, and Z is always blue. By clicking on a single axis, you will **constrain** your transform to that axis.

Constraining a transform tool to an axis means your object will only move on or rotate around the axis you've chosen.

You can transform an object around two axes or all three axes by using the yellow guides between axes.

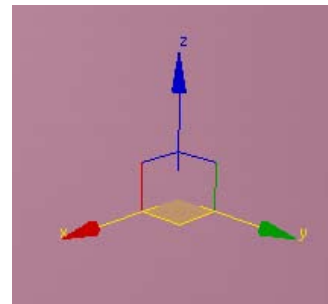


Fig 1.7: The Move Gizmo

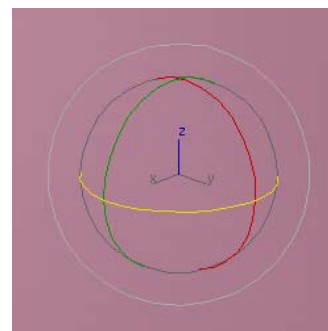


Fig 1.8: The Rotate Gizmo

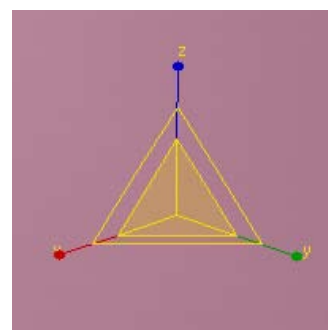


Fig 1.9: The Scale Gizmo

Selecting Objects

A 3D scene is made up of objects. In order to manipulate an object, you must **select** it. To select an object you can:

- » Click the object in the viewport using the Select tool, or any one of the Transform tools
- » Click and Drag around an object or a set of objects
- » Select a single object in the viewport, hold CTRL on your keyboard, and continuing clicking objects to add them to your selection
- » Press H on your keyboard to Select By Name.

A selected object will turn white and will have a white selection box around it.

To **deselect** an object, simply click in the viewport away from any objects, or select a different object.



You can lock selections by using the **Selection Lock** toggle button. The Spacebar is the keyboard shortcut for Selection Lock and you can sometimes turn it on by mistake; if you find yourself unable to deselect an object, check this toggle. It will turn yellow when it is on.

Yellow in the 3dsmax UI means a button is activated.

Cloning Objects

To **clone** (make a copy of) an object, hold down SHIFT on your keyboard and use any of the Transform tools on your object.

As you drag your selection, the clone is created, selected, and transformed. The original object is deselected and unaffected by the transform.

When you release the mouse button, the Clone Options dialog displays. You have three options at this point:

- » **Copy**—Creates a completely separate clone from the original. Modifying one has no effect on the other.
- » **Instance**—Creates a completely interchangeable clone of the original. Modifying an instanced object is the same as modifying the original and will affect both objects.
- » **Reference**—Creates a clone dependent on the original up to the point when the object is cloned. Changing parameters for modifiers that were applied to the object before the object was referenced, will change both objects. However, a new modifier can be applied to one of the reference objects, and it will affect only the object to which it is applied.

Navigating in the 3ds max User Interface

Please open 3ds max and choose Help > Reference > Viewing and Navigating 3D Space. Read and practice all of the concepts in this section.

Command Panels



Create Panel

Contains controls for creating objects. In general, to create an object, you choose the correct option from within this panel, choose the type of object you wish to create, and then click within a viewport.

- » Some objects are single-click creation, such as Omni lights.
- » Some objects are click-and-drag creation, such as spheres (dragging creates the circumference).
- » Some objects are multi-click-creation, such as a box where you click-and-drag to define the width and length, and then move the mouse and a second click to define the height.

After creating an object, it is a good habit to right-click. This turns off Object Creation Mode and prevents you from accidentally creating more objects.

The **Create** panel has seven categories of objects available. Within each category there can be several different subcategories of objects. A drop-down list lets you choose among object subcategories, and each kind of object has its own button, which you click to begin creation.

Seven Categories of Creation Objects



Geometry

Geometry is the renderable geometry of the scene. There are geometry primitives such as Box, Sphere, Pyramid, and more advanced geometry such as Booleans, Lofts, and particle systems.



Shapes

Shapes are splines or NURBS curves. They have only one local dimension, although they can exist in 2D space, such as a Rectangle shape, or 3D space, such as a Helix.

You can give shapes a thickness so they will render, but primarily you use them for constructing other objects such as Lofts, or for motion trajectories.



Lights

Lights illuminate the scene and improve its realism. There are several kinds of lights, each of which models different types of lighting in the real world.



Cameras

Camera objects provide a view of the scene. The advantages of cameras over the views in the standard viewports are that cameras have controls similar to real-world cameras, and that you can animate a camera's position.



Helpers

Helper objects are aids to constructing a scene. They help you position, measure, and animate the scene's renderable geometry.



Space Warps

Space warps produce various kinds of distortions in the space surrounding other objects. Some space warps are meant especially for use with particle systems.



Systems

Systems combine objects, controllers, and hierarchies to provide geometry associated with some kind of behavior. Also contains Sunlight and Daylight systems that simulate sunlight in your scenes.



Modify panel

Contains controls for applying modifiers to objects and editing editable objects such as meshes and patches.

When you create an object using the Create panel, you give each object its own set of creation parameters such as Width and Height, which define its geometry and other characteristics, depending on the type of object.

Once placed in a scene, objects carry their creation parameters with them. You can change these parameters on the Modify panel.

You also use the Modify panel to assign modifiers. Modifiers are tools for reshaping an object. Creating and modifying objects in this way is called **Parametric Modelling**, (sometimes called Procedural Modeling) and is the basis of 3ds max.

You use the Modify panel to:

- » Change the creation parameters for existing objects.
- » Apply modifiers to adjust the geometry of an object or a set of objects.
- » Change the parameters of modifiers and select their components.
- » Delete modifiers.
- » Convert a parametric object to an editable object; see Modifier Stack Controls.



Hierarchy panel

Contains controls for managing links in a hierarchy, joints, and inverse kinematics.



Motion panel

Contains controls for animation controllers and trajectories.



Display panel

Contains controls that let you hide and unhide objects, along with other display options



Utilities panel


Contains miscellaneous utility programs, most of which are plug-ins to 3ds Max.

Creating Objects

Lines

A line is made up of **vertices** (say: ver'ta sees'), which are points in space connected by segments. Think of a bicycle chain: Each link is a **segment**, and each joint is a **vertex**. The segments join together to create a line. The entire line is called a "**spline**."

To create a line:

- »  Go to the Create panel and choose Shapes.
- » On the **Object Type** rollout, click the **Line** button.
- » Choose a creation method:
 - Corner** - Produces a sharp point. The spline is linear to either side of the vertex.
 - Smooth** - Produces a smooth, nonadjustable curve through the vertex. The amount of curvature is set by the spacing of the vertices.
- » Click or drag the start point.
- » Click or drag additional points.
 - Clicking creates a corner vertex; dragging creates a Bezier vertex (curved, adjustable with control points).
- » Next, do one of the following:
 - Right-click to create an open spline.
 - Click the first vertex and click Yes in the "Close spline?" dialog to create a closed spline.

Geometry

The basic object creation method for geometry is the same.

Box produces the simplest of the primitives. You can vary the scale and proportion to make many different kinds of rectangular objects.

To create a box:

- » On the Object Type rollout, click Box.
- » In any viewport, drag to define a rectangular base, then release to set length and width.
- » Move the mouse up or down to define the height.
- » Click to set the finished height and create the box.

Immediately after creating an object, you can change its parameters in the creation Parameters Rollout area (Fig 1.10).

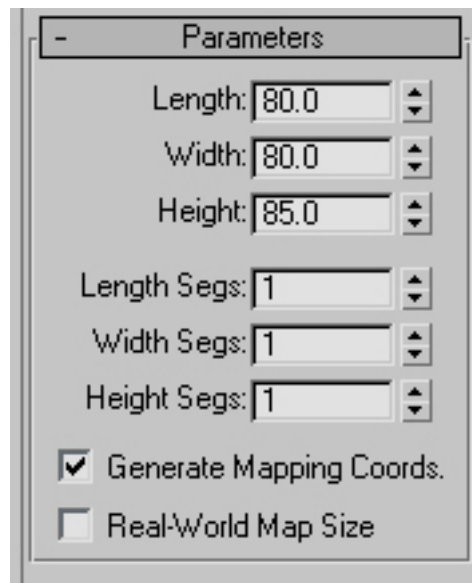


Fig. 1.10

Further changes should be made in the Modify panel.

Modifying Objects



Modify Panel

You can generally do the following with the Modify panel:

- » Modify anything you can select. This includes any object or set of objects, or any part of an object down to the sub-object level.
- » Apply an unlimited number of modifiers to an object or part of an object.
- » The order or sequence in which you make modifications is important. Each modification affects those that come after it.
Note: Some modifiers can be applied only to certain types of objects.

Modifier Stack

The modifier stack and its editing dialog (Fig 1.11) are the keys to managing all aspects of modification. You use these tools to:

- » Find a particular modifier and adjust its parameters.
- » View and manipulate the sequence of modifiers.
- » Copy, cut, and paste modifiers between objects, or sets of objects.
- » Deactivate the effect of a modifier in the stack, the viewport display, or both.
- » Select a modifier's components, such as gizmo or center.
- » Delete modifiers.

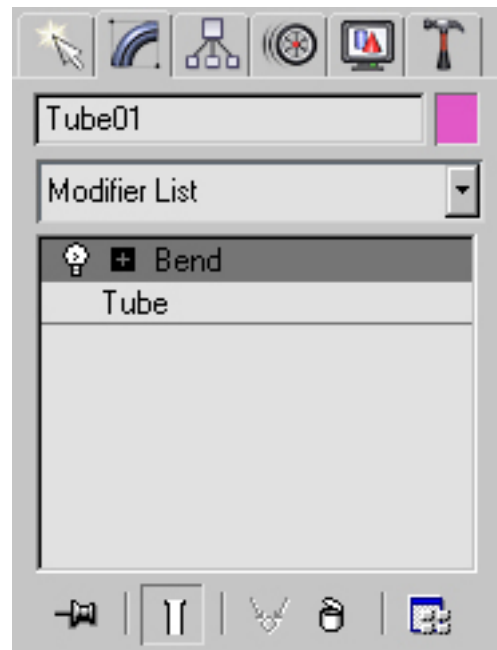


Fig 1.11

By navigating up and down the stack, you can change the effect of the modifier, or remove it from the object. Or you can choose to "collapse" the stack and make your changes permanent - similar to flattening layers in Photoshop.

There are other general things to know about using modifiers:

- » You can apply an unlimited number of modifiers to an object or part of an object.
- » When you delete a modifier, all its changes to the object disappear.
- » You can move and copy modifiers to other objects using controls in the modifier stack display.
- » The order or sequence in which you add modifiers is important. Each modifier affects those that come after it. For instance, adding a Bend modifier before a Taper can give you distinctly different results than if you first added the Taper followed by the Bend.
- » The Modifier Stack lists all modifiers from the bottom up. At the bottom of the Stack is your original object; each modifier applied afterwards is shown on top of the selected item in the stack.

Modifying Creation Parameters

After adding objects to your scene from the Create panel, you often move to the Modify panel to change an object's original creation parameters.

To use the Modify panel:

- » Select an object in your scene.
- » Click the Modify tab to display the Modify panel.

The name of the selected object appears at the top of the Modify panel, and fields change to match this object.

The object's creation parameters appear in rollouts on the Modify panel, below the modifier stack display. You can use these rollouts to change the creation parameters for an object. As you change them, the object updates in the viewports.

In order for many modifiers to have an effect, the original object needs to have enough segments. For instance, if you tried to apply a bend modifier to the box below left (Fig 1.12), it wouldn't bend.

Again, think of links in a chain. If you have no segments or links, the box is rigid. You need to add links - segments - to make the box flexible. The more segments it has, the more flexible it becomes. Adding segments also increases processing speed, so make sure to add only as many segments as necessary.

The box on the right (Fig 1.13) has had its creation parameters modified in the Modify Panel so that it has 3 segments on all sides.

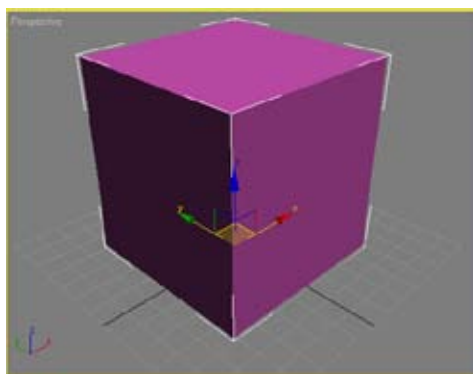
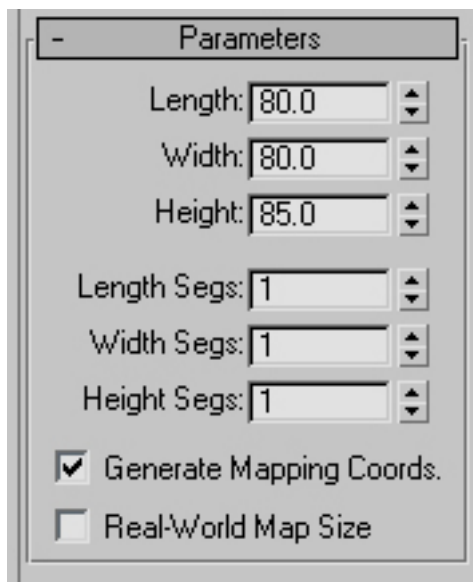


Fig 1.12

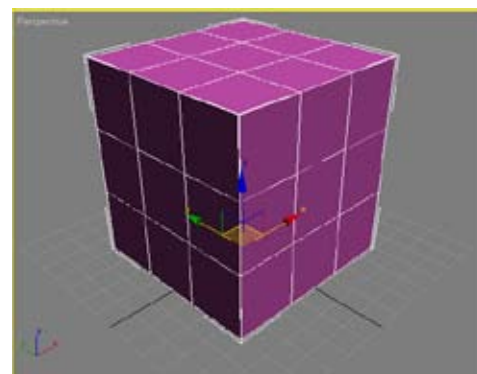
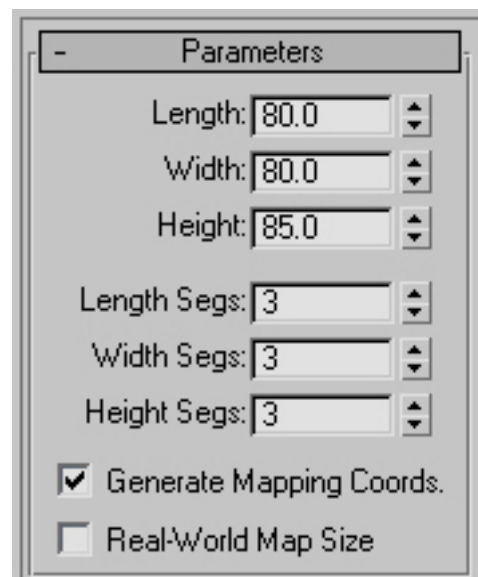


Fig 1.13

Modifiers

Modifiers, as the name implies, modify an object's geometrical structure, deforming it in some way. They are the basic tools for reshaping and adjusting primitive geometry. When you apply a taper modifier to the end of a cylinder, for example, the vertices near the end move closer together.

Modifiers make changes in the geometry that stay in effect until you adjust or delete the modifier.

After you apply a modifier, it becomes active, and rollouts below the modifier stack display settings specific to the active modifier.

To apply a modifier to an object:

» Select the object.

Do one of the following:

» Choose a modifier from the Modifier List. This is a drop-down list at the top of the Modify panel (Fig 1.11).

» Choose a modifier from the Modifiers menu. Like the Modifier List, this menu is organized into sets.

Rollouts are now displayed below the modifier stack display, showing settings for the modifier (Fig 1.14).

As you change these settings, the object updates in all viewports.

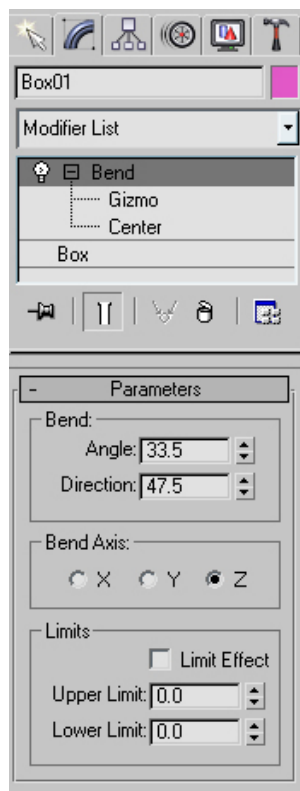
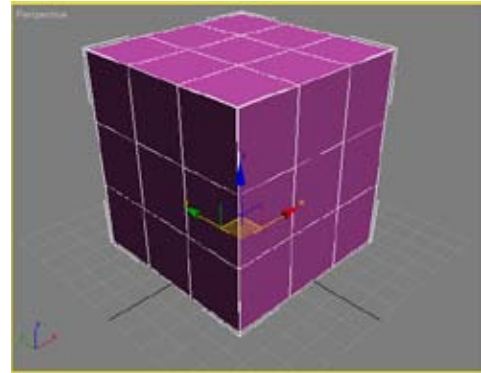


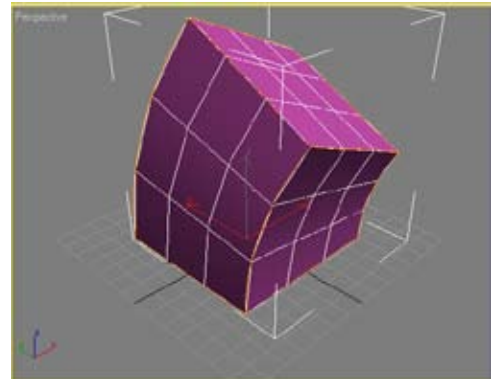
Fig 1.14

The order in which you apply multiple modifiers makes a difference. See the examples to the right:

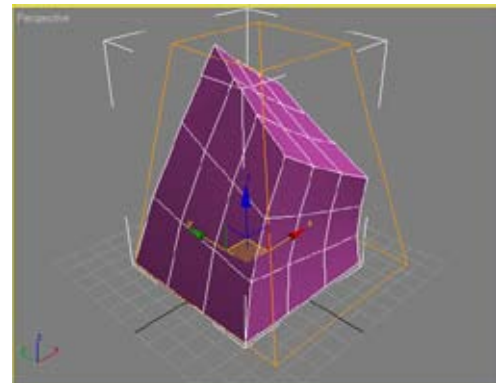
A plain box:



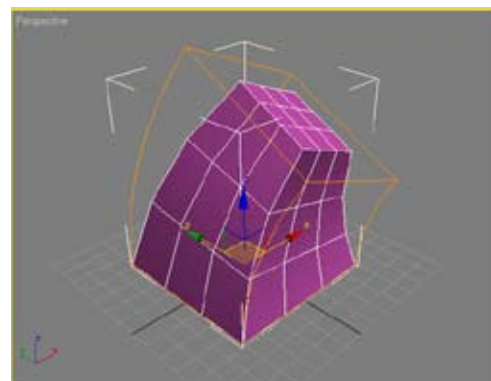
Applying the Bend modifier:



Applying the Taper modifier on top of the Bend:



The exact same box, with the exact same modifiers, only this time the Taper modifier was applied first:



Sub-Objects

3D Mesh objects can be broken down into smaller parts, called sub-objects. These sub-objects can be further modified in order to change and mold the object.

Many objects have various types of sub-objects that you can work with independently. For example, an editable mesh object's sub-objects are vertices, edges, faces, polygons, and elements. A line's sub-objects are its vertices, the segments, and the full spline.

Vertex: A point in space

Edge: Connects two vertices in a Mesh object. Edges can be hidden or visible - hidden edges (such as those between two faces) are shown via dashed lines

Face: Always a triangle, this is the surface between three vertices.

Polygon: Any flat surface that connects solid edges only.

Element: All of the connected parts of an object are considered an element.

To access sub-objects, go to the Modifier panel. In the modifier stack display, click the plus-sign button to display an object's hierarchy, and then choose the sub-objects level from the hierarchy (Fig 1.15).

At the sub-objects level you can select sub-objects, transform the selections, apply modifiers, and so on.

Many topics in the online reference deal with sub-objects. To see a list of sub-object-related topics, search on the term "sub-object" (include the quote marks in the keyword).

Fig 1.15

