
FUNDAMENTALS

A Taste of Maya

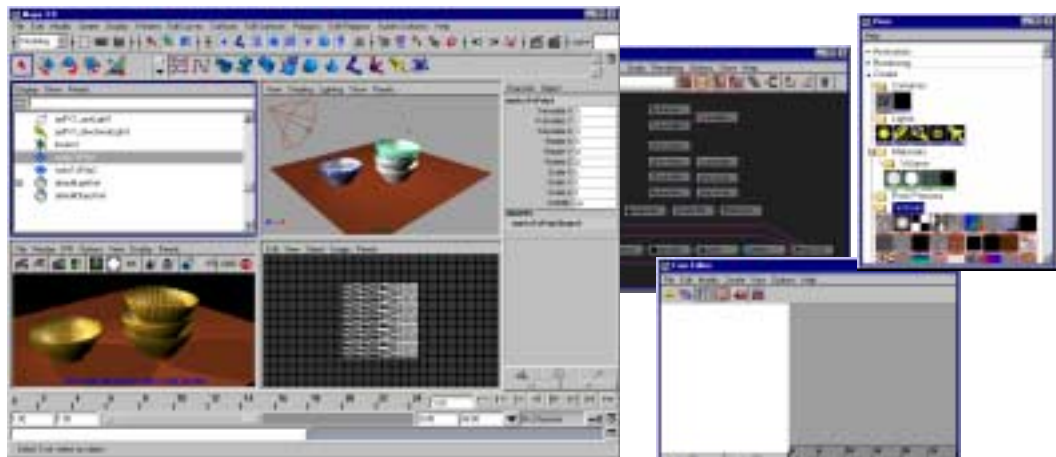
This lesson focuses on Maya basics. Subsequent lessons assume you have sufficient knowledge about Maya's User Interface and how to navigate the many windows and editors provided, as well as using such elements as tools, shortcuts, and marking menus.

If you are familiar with Maya, you can skip this lesson, but it's a good idea to refresh your memory from time-to-time and to check to see if any changes have been made to the interface since you last used the software.

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Before you start:

This tutorial requires Maya scene files. To download the tutorial files, please visit the Taste of Maya web site at www.aliaswavefront.com/tasteofmaya.

Starting Maya:

Double-click the **Maya 3.0 Evaluation** icon on the desktop, or from **Start > Programs > Maya 3.0 Evaluation > Maya**.

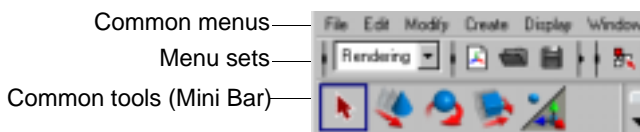
In Maya:

Once the tutorial files have been installed, set the current project to access the Maya scene files. To set the current project from within Maya:

- Select **File > Project > Set** and navigate to the directory where you installed the Maya scene files.
- Select the directory **Maya_tutorial_data** and press **OK**.

Getting started

- 1 Select **Start > Programs > Maya 3.0 Evaluation > Maya**.
- 2 Scan the top left of the main window. This is where the most often-used items are located.



- **common menus** (from File to Window) at the top of the main window contain items general to all Maya operations.
 - Each **menu set** corresponds to a Maya software module—*Animation*, *Modeling*, *Dynamics*, or *Rendering*. You switch to a different menu set by selecting it from the pull-down menu. Menus specific to the menu set display beside the common menus.
 - **common tools** (sometimes referred to as the “Mini Bar”) are located just below the menu set. You use these tools to select, move, rotate, and scale items.
- 3 Choose **Window > Settings/Preferences > Preferences**.

Maya provides a vast array of settings you can adjust to customize your Maya sessions. For instance, you may need to undo several operations as you go through these tutorials. You can specify the number of undo's and save this as a preference, which means this setting is used every time you start Maya.

- 4 From the category list on the left, click **Undo** (next to the bottom) and set **Queue to Infinite** (on the right). This setting lets you undo an unlimited number of previous operations using **Edit > Undo**.
- 5 Click **Save** to save your preferences.

BUILDING BASICS

This basic lesson steps you through using Maya's primitive shapes to build a door. You will learn how to use Maya's transformation tools, how to adjust the camera view using the mouse buttons, and how to use various editors and windows.

Using Maya's primitives and camera tools

Maya provides NURBS and polygonal primitives. These primitive shapes—cubes, spheres, planes, cylinders, and toruses—can be used as a base and then manipulated using Maya tools into the shapes you need. The door you will learn how to build in this tutorial starts with the most primitive of primitives, a cube.

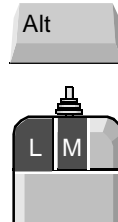
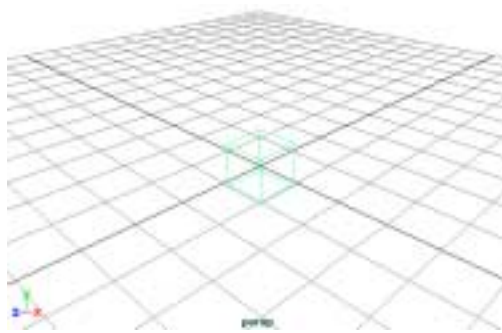
Create a door from a polygonal primitive cube

- 1 Select **Create > Polygon Primitives > Cube**.

The polygonal cube displays in a view, which is a window into your 3D scene. It is also called the *workspace*, and sometimes called the *camera view*.

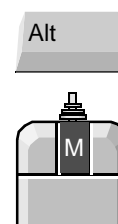
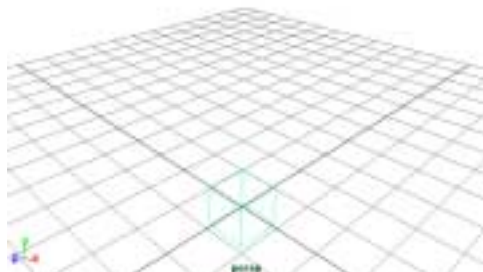
- 2 **Dolly in:** Hold the **Alt** key and **drag** to the right while pressing both the left (**LMB**) and middle (**MMB**) mouse buttons.

Dollying moves a virtual camera forward (drag right) or backward (drag left). Dolly in to get a closer view of the cube.



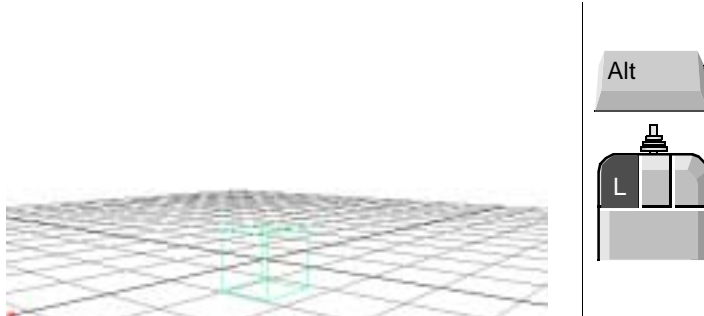
- 3 **Track down:** **Alt-drag-MMB**.

Tracking moves the view up, down, left, or right. Track down to be able to see the door when it's finished.



4 Tumble down: **Alt-drag-LMB** up.

Tumbling revolves the virtual camera around a center of interest. It is easier to work with the cube when the camera view is level with it instead of looking down on it.



5 Select **Panels > Layouts > Four** from the menu bar in the view.

You can divide the workspace into multiple view panels. These four views, perspective, side, front, and top, are a common layout. (The top, front, and side views are called *orthographic* views.)

Notes

- Dolly and track work in all these views, but **tumble** works in the perspective view only.
- These camera tools and more are available from the **View > Camera Tools** menu in each view.
- To focus on just one view, click in the view, let go of the mouse, and press the space bar. To return to a four panel view, press the space bar again.

Using transformation tools

The following introduces you to Maya's transformation tools and how to transform objects effectively in different views.

Scale the cube

1 Click the **Scale** tool's icon from the Mini Bar at the top-left of the main Maya window.

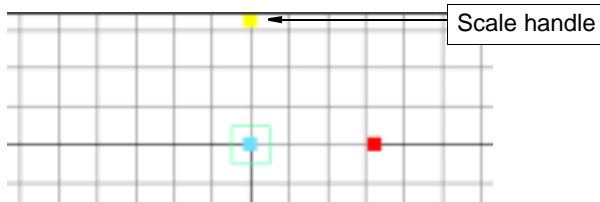


The name of the tool and a tip display in the **Help Line** at the bottom of the main Maya window. This is one of Maya's standard conventions.

Tip

Drag, but don't click, the mouse over an icon to find out what tool it represents.

- 2 In the **front view**, click the top square of the Scale tool's handle. If a handle does not display, click the cube.

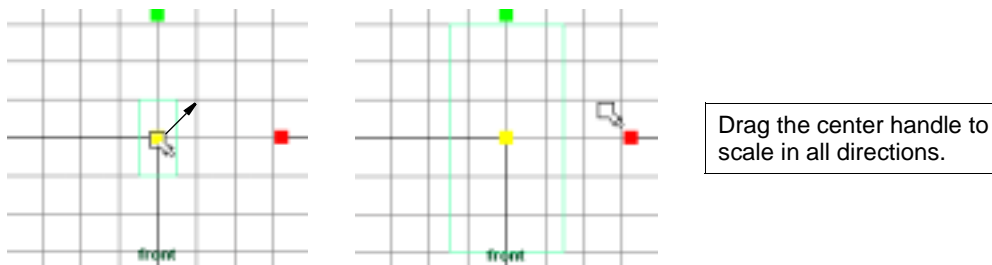


Maya's transformation tools have manipulator handles corresponding to the XYZ axes. The handles control the direction of the transformation. Clicking a handle isolates the transformation to that direction.

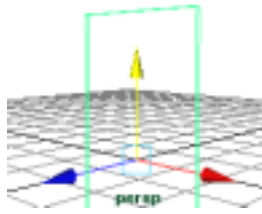
- 3 Drag the **top handle up** until the top of the cube reaches the first grid line above ground plane.

The *ground plane* is the XZ plane—assuming Y is the up axis—and displays as a dark horizontal line in the front view, and as a grid in the perspective view.

- 4 Click the **center handle** and **drag right** until the top of the cube reaches the third grid line. Dragging the center handle scales in all directions. This maintains the proportions you created in the previous step.



- 5 In the **top view**, click the **lower handle** and **drag up** until the cube's thickness is that of a door (look in the perspective view).
- 6 Click the **Move** tool icon. The manipulator handles change according to the transformation tool you select. If you're ever unsure which tool you selected, the handles can give you a good visual cue.



Move tool handles

- 7 In the **front view**, **drag the cube up** until the bottom is on the ground plane. You now have a basic door.

Using the Shelf and renaming objects

This portion of the tutorial uses a NURBS sphere primitive and the scale tool to create a doorknob.

Create a basic doorknob

- 1 Click the sphere icon in the Shelf to create a NURBS sphere.

Maya's **Shelf** provides quick access to any Maya operation. Since you can also customize it, you can organize commonly used actions and tools into groups, such as modeling, animating, and rendering.



Create NURBS Sphere

The sphere you created is based on the *NURBS* modeling system (Non-Uniform Rational BSpline). You can also create Maya's other modeling surfaces, *polygons* (such as the polygonal cube used to make the door) and *subdivision* surfaces. Each has its own purposes and behavior, as you will learn later.

- 2 The name **nurbSphere1** displays in a vertical box called the **Channel Box** located at the right of the workspace. Click the name and type a new name, **Knob**.

We recommend renaming objects to keep your scene organized. (You will learn more about the Channel Box in the following steps.)



- 3 Click the cube to select it and rename it **Door** in the Channel Box.
- 4 In the **side view**, select the sphere (Knob) and choose **View > Frame Selection** to quickly zoom your view.

The letter "f" displays next to the menu item to indicate the equivalent keyboard shortcut, called a *hotkey*.

- 5 Click the **Scale tool** and scale the sphere inward along the Z axis to about half its original width.

This approximates the shape of a classic doorknob. (Leave all other scaling the same—you will scale down the entire Knob later.)



Using the Channel Box and Outliner

Follow the steps to create another NURBS primitive object and learn about the Channel Box and the Outliner.

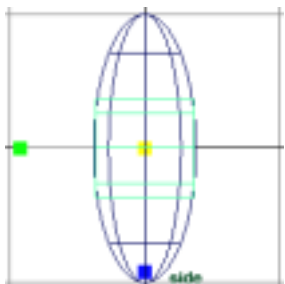
Add a doorknob base

- 1 Select **Create > NURBS Primitives > Cylinder**.
- 2 Rename **nurbsCylinder1** to **Base**.
- 3 In the **Channel Box** (the panel at the right side of the workspace), type **90** in the Rotate **X** box and press Enter. This rotates the cylinder 90 degrees so it is pointed in the right direction for the knob.

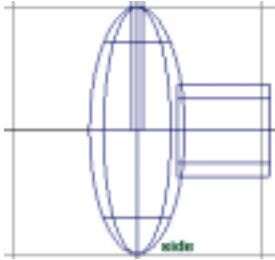
You have just adjusted one of the object's *attributes*. When you model, animate, render, and perform any kind of object manipulation, you change attribute values.

The Channel Box only displays *keyable attributes* for which you can set animation keyframes. Sometimes, these keyable attributes are called *channels*.

- 4 In the **side view**, scale down **Base** from the center handle until it fits within the edges of Knob. This is roughly the proportion of a doorknob base.



- 5 Move **Base** to the right, keeping a small portion of it within the edge of the sphere.

Improving the object's display in the views

- 6** To complete the doorknob, select **Window > Outliner** to parent Base to Knob.

Parenting means a single object controls the attributes of one or several other objects, known as *children*. The **Outliner** shows all objects in your scene and displays the parent-child relationships. You use it mostly to organize your scene and select objects that may be difficult to select in the view.

- 7** In the Outliner, **MMB-drag** Base onto Knob. Knob becomes the parent of Base. By parenting these objects, you can transform both objects as one unit.

**Tip**

For extra practice, try selecting items in the Outliner using **Shift-click** for contiguous items and **Ctrl-click** for non-contiguous items.

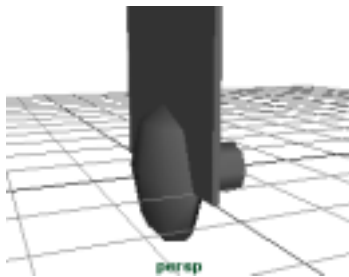
Improving the object's display in the views

The following steps show you how to quickly improve the object's display in the view.

Refine the doorknob's display

- 1** In the **perspective** view, select **Shading > Smooth Shade All**.

This shading mode is useful when you want to see the surface of your objects. Wireframe is the default display mode because smooth shading can slightly slow down the interaction speed.



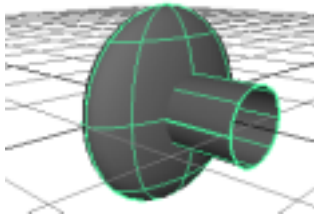
- 2 Select **Door** and choose **Display > Hide > Hide Selection** to hide the door and focus on the doorknob.

In this scene, the door is a minor distraction. As you create more complex scenes, hiding some objects is a convenient way to control clutter and focus on one task at a time.

- 3 Select **Knob** and choose **Display > NURBS Smoothness > Fine** to display the knob with more precision.

This operation works on a per-object basis and is useful when you want a closer approximation of how it will render. *NURBS smoothness is for display purposes only; it does not affect rendering.*

If you tumble the view to see the back of the doorknob, notice that the connection between Knob and Base is too blunt. You will correct this in the following steps.



- 4 Select **Base** and click the heading **makeNurbCylinder1** at the bottom of the **Channel Box**.
- 5 Change **Spans** from 1 to 2 and press Enter.

By setting the Spans value higher, you increase the number of surface curves that make up the cylinder. You will find out why in the next few steps.

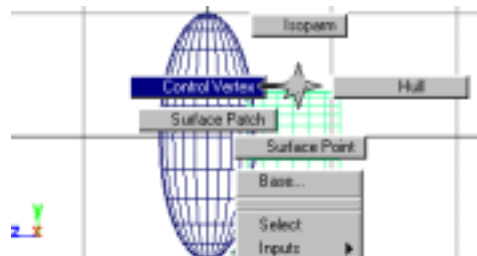
The most important point is that Maya lets you change these creation-related attributes. These attributes and others used in the object's construction are called *construction history*.

Selecting and transforming components

The following shows you how to use marking menus to quickly select an object's components and transform them.

Create a realistic-looking doorknob

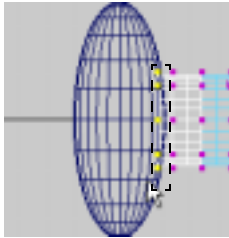
- 1 In the **side view**, **right-click** Base and select **Control Vertex** from the menu that displays.



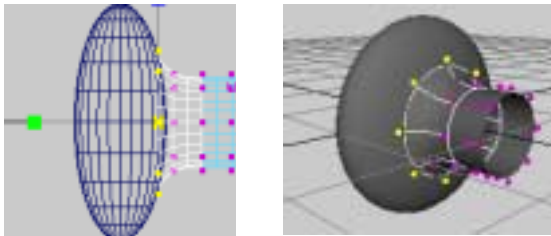
This menu is a *marking menu*, another Maya convention, used to quickly access actions and tools. The menu that displays depends on what object you select. In this case, the choices relate to the geometry options of a NURBS object's *components*.

Components are the points and elements that tie everything together. For example, *control vertices* (or CVs) are points that control the shape of a NURBS curve, and *vertices* are points that connect to lines to create polygons.

- 2 Drag a selection box (sometimes referred to as *marquee* or *marquee-select*) around the control vertices (**CVs**) located just inside the edge of Knob.



- 3 Scale out the CVs until the outer edges of Base reach the inside edge of Knob. Use the following example as a guideline.



The perspective view displays a smoother transition between Base and Knob.

Part of the reason the transition is this smooth is because you changed the number of surface curves—you set **Spans** to **2** in the Channel Box. With more curves, you can make finer and smoother edits to the NURBS object. For best results, you should always add curves or other construction history changes *before* you transform an object's individual components.

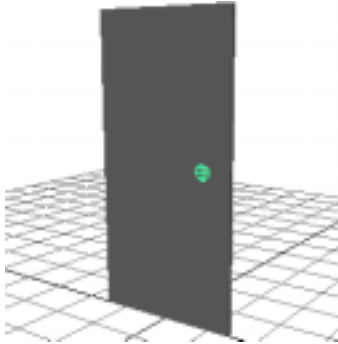
- 4 To quit component display mode and return to object selection mode, right click on Base again and choose **Select** from the marking menu.

Positioning objects

The following steps show you how to precisely position the doorknob into the door.

Position the doorknob


- 1 Choose **Display > Show > Show Last Hidden** to see the door again. The **Display > Show** submenu is the counterpart to the **Display > Hide** menu.
- 2 Select Knob. When you select Knob, Maya also selects Base because it is the child.
- 3 Scale down Knob in all directions to an appropriate size compared with the door. The transformation applies to both Knob and Base because of the parent-child relationship.
- 4 Move Knob forward, up, and to the edge of the door, as shown in the following image. You may want to keep a small portion of the doorknob base within the door's surface so it looks like they're connected.



Duplicating and instancing

In this section you learn about a common operation, *duplication*, and how to define what gets duplicated and how.

Finish the door

- 1 Select Knob and choose **Edit > Duplicate** . A window opens displaying Maya's duplication options.



Duplicate Options window

The settings in the Duplicate Options window, as well as most other option window settings in Maya, correspond to an object's attributes which you can edit later on.

Tip

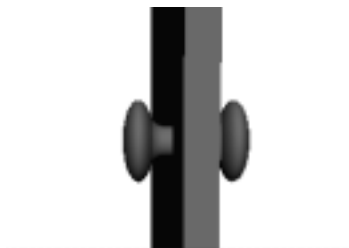
Any changes you make in an option window apply to that menu selection from then on. You can return to the factory option settings by choosing **Reset Settings** from the **Edit** menu in the option window.

- 2 For this example, the default geometry type, Copy, should be turned off and **Instance** turned on.

When you create an *instance*, you do not create an actual copy of the selected object's geometry. Instead, Maya re-displays the original geometry so that you can transform it separately.

Instances use less system memory than actual copies. The only disadvantage is that you cannot change the instance's components, such as CVs, to be different from the original.

- 3 Click the **Duplicate** button in the option window. Maya creates a duplicate named *Knob1*.
- 4 Select **Knob1**, change **Rotate X** to **-180**, and move it to the opposite side of Door. You now have two doorknobs—a complete door.



Working with pivots

Make the door swing open

Suppose you want the door to swing open as if on hinges. An easy way to do this is to move the point around which the whole door rotates. This point is called the *pivot*. In this section you learn about working with pivots.

- 1 **Shift-click** Knob, Door, and Knob1 to select them all.
- 2 Select **Edit > Group** from Maya's main window to group together the objects you selected.

Grouping is another way to apply transformations to a group of objects. All three objects are parented under one group, which means all transformations to the group apply to the children as well.

- 3 Rename **group1** to **DoorGroup**.
- 4 Select **DoorGroup** (use the Outliner if you cannot select it) and press the **Insert** key to display the group's pivot point.

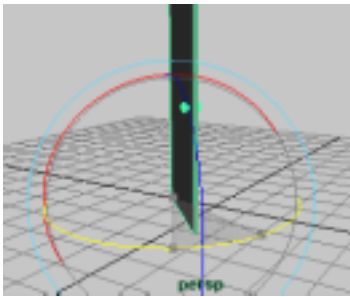
Pressing Insert lets you edit the position of the pivot—which is the point Maya uses as the basis for all transformations.

- 5 In the **front view**, move the pivot point to the lower left corner of Door, as shown in the next image.



The left side of the door is the logical place for a hinge, so you need the pivot point's Y axis to align with the left edge of the door. The alignment of the pivot point's X axis doesn't matter in this case, but it is aligned with the bottom edge of the door by default.

- 6 Press **Insert** again to set the new pivot point position.
- 7 Select the **Rotate** tool.
- 8 In the **perspective view**, click the **green Y axis handle** (it turns yellow once selected) and drag left and right. The door and knobs appear to swing on a hinge as you rotate DoorGroup.



Using editors to select nodes and adjust attributes

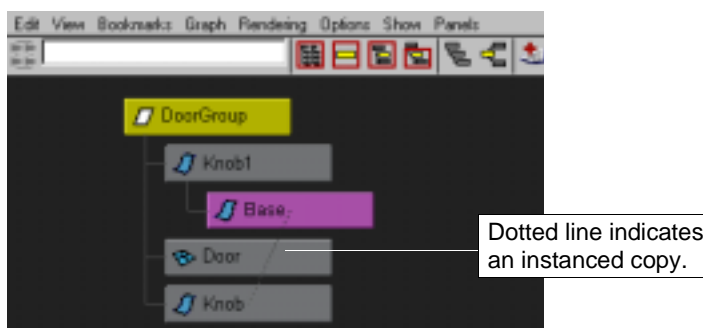
The final lesson introduces the Hypergraph, Attribute Editor, and the concept of *nodes*.

Examine the scene

- 1 In any view panel, select **Panels > Panel > Hypergraph**.

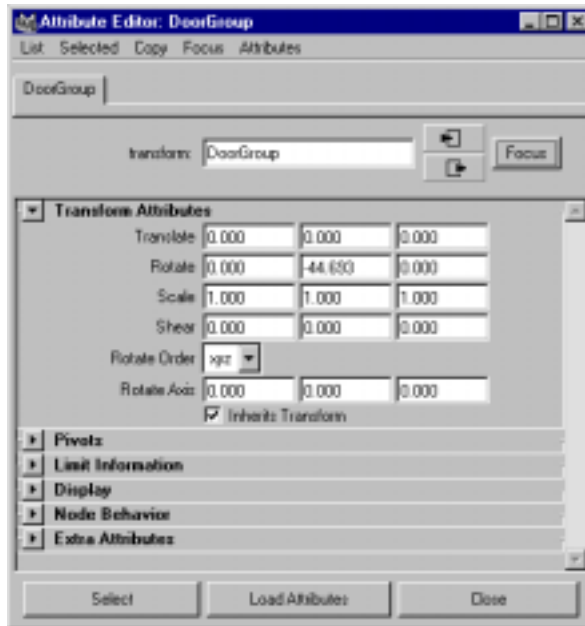
The *Hypergraph* is a general scene editor like the Outliner, only more powerful. Like all editors, you can open it as a separate window (from the Window menu), but sometimes it's convenient to open it in a view panel.

- 2 Dolly (**Alt-LMB-MMB**) and Track (**Alt-MMB**) until the Hypergraph resembles the following image.



Like the Outliner, the Hypergraph shows the hierarchy of the objects in your scene. In this case, the Hypergraph also indicates something else: a dotted line between Knob1 and Base shows that Knob1 is an instanced copy.

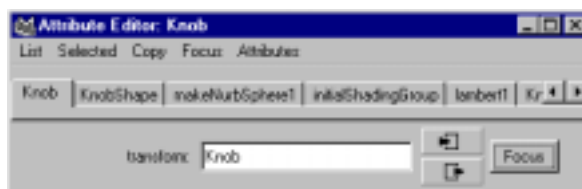
- Click DoorGroup and select **Window > Attribute Editor** to see the relationship between objects and attributes.



The *Attribute Editor* shows all the attributes related to the selected object. Use this editor to examine or change attributes directly, especially if they do not appear in the Channel Box (such as *Shear*, which slants an object).

- In the Hypergraph, click the Knob rectangle to select the object. The Attribute Editor displays Knob's attributes.

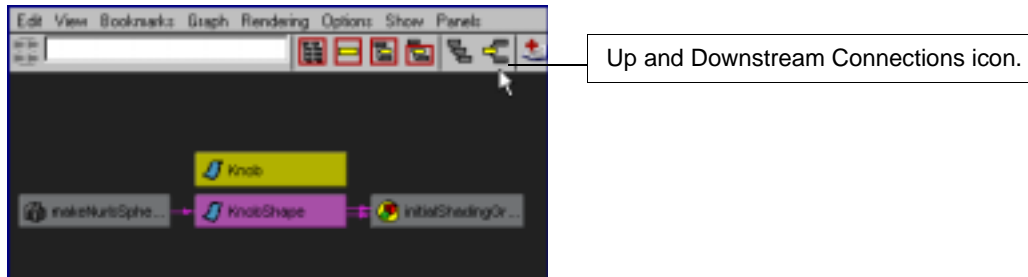
The Knob attributes display under various tabs. Each tab represents a *node*, which is a group of related attributes.



Each tab represents a node.

The first tab, Knob, contains the attributes describing Knob's transformation. It is a *transform node*.

- In the Hypergraph, click the **Up and Downstream Connections** icon to see the relationship between Knob's nodes.



The Hypershade displays a *dependency graph*. It shows the flow of data dependencies between different types of nodes. For instance, an arrow points from `makeNurbSphere` to `KnobShape`. This means information flows from the `makeNurbSphere` node, which contains the construction history used to create the sphere, to the `KnobShape` node, which contains the resulting mathematical description of Knob's shape.

Maya continually analyzes the dependency graph with every change you make to the scene, up through your final render. Using the Hypergraph, programmers and advanced users can examine and alter the dependency graph for more direct control. They can examine rendering-related connections between shaders, materials, textures, and lights, or connect nodes, such as the rotation attributes of two orbiting spheres.

There are not many connections in this simple scene. As you learn about rendering and animation, particularly character animation, you will see many more connections between nodes.

CONCLUSION

You just completed the first lesson which should at least get you comfortable with Maya's interface. The next section of this lesson describes Maya's UI in brief. It is a reference point for you to return to should you forget what certain windows are for, or for such things as what hotkeys to use for which operation.

MAYA'S EMBEDDED LANGUAGE (MEL)

MEL (Maya's Embedded Language) is a scripting language whose commands provide the foundation for Maya's capabilities. MEL can be used at any time to create tools that streamline the use of Maya and buttons for frequently used commands.

Creating a window with MEL

Many of the tools you create with MEL are window-based.

Display window commands

- 1 To display a window you need two commands; one to make the window and one to show it. In the Script Editor, type the following lines:

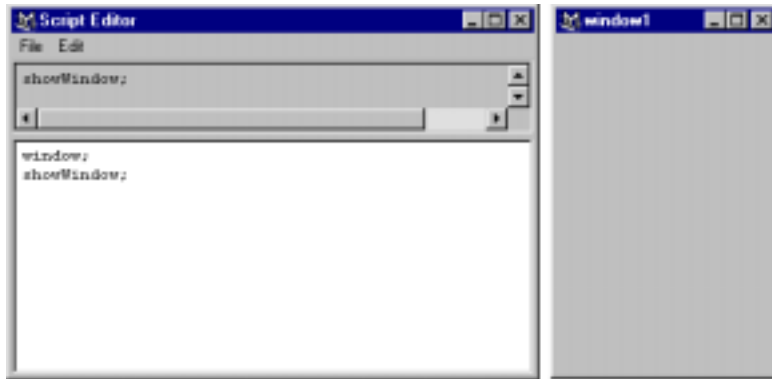
```
window;  
showWindow;
```

- 2 Highlight the text and press **Enter** on the numeric keypad, or select **Edit > Execute** in the Script Editor.

Tip

Highlighting the commands before you execute them keeps them at the bottom of the Script Editor for easy editing.

- 3 An empty window displays. Close this window.



Add flags to control commands

Every MEL command has flags to control what the command will do. Flags can be added to the window command to specify the size of the window and to give it a meaningful title.

Edit the existing script to add the following flags to the window command and execute as you did above.

```
window -title "My Toolbox"  
-width 200 -height 300;  
showWindow;
```

A larger window called *My Toolbox* is created and displays on the screen.

Add a button to the window

Many control items can be placed in a window—text fields, buttons, and sliders are some of the most common items.

- 1 To add a button (or any other item) to a window, you first have to add a layout to the window. Edit the script as shown in the following:

```
window -title "My Toolbox"  
-w 200 -h 300;  
columnLayout;  
button;  
showWindow;
```

- 2 Execute the script as you did before. Notice the new button in the window.



Currently, the window does nothing. At this stage, flags are added to the button command to name it and make it do something, for this example, create a sphere.

- 3 To find the command to create a sphere, select **Create > NURBS Primitives > Sphere**, click in a view, and look at the top of the Script Editor (the gray area).
- 4 Copy and paste the command into the bottom portion of the Script Editor, highlight it, and press Enter from the numerical keypad.

Edit the script in the Script Editor as follows. This attaches the command to the sphere button:

```
window -title "My Toolbox"
-w 200 -h 300;
columnLayout;
button -label "sphere"
-command "sphere -p 0 0 0 -ax 0 1 0 -ssw 0 -esw 360 -r 1 -d 3\
-ut 0 -tol 0.01 -s 8 -nsp 4 -ch 1;objectMoveCommand;";
showWindow;
```

Tip

If the command spans a line, as in the above (-command "sphere -p 0 0 0 -ax 0 1 0 -ssw 0 -esw 360 -r 1 -d 3\), add a backslash at the end. This tells Maya to ignore the space and continue with the command on the next line.

- 5 Press the **sphere** button from the My Toolbox window to place the NURBS sphere in the center of the view.



Add a button to create a light

- 1 To find the command to create a directional light, select **Create > Lights > Directional Light**.
- 2 Copy and paste the command from the top of the Script Editor just after the last line of the script you just completed.

```
window -title "My Toolbox"
-w 320 -h 240;
columnLayout;
button -label "sphere"
-command "sphere -p 0 0 0 -ax 0 1 0 -ssw 0 -esw 360 -r 1 -d 3\
-ut 0 -tol 0.01 -s 8 -nsp 4 -ch 1;objectMoveCommand;";
button -label "light"
-command "defaultDirectionalLight(1, 1,1,1, \"0\", \
0,0,0);rotate -a -45 90 0;";
```

When this command is used as a command from a button, it must be modified slightly so that the quotation marks (") are not misinterpreted. Quotation marks are used on either side of a string of text like the title of the window or the label of the button. Since the light command uses quotation marks around the strings in the command, a backslash (\) is in front of the quotation marks that are part of the command.

Add a button to Render the scene

When you render the scene, you will not get the command in the Script Editor unless you turn on **Echo All Commands** from the Edit menu.

Make sure it's on and select **Render > Render into New Window**.

```
button -label "render"  
-command "RenderIntoNewWindow;" ;
```

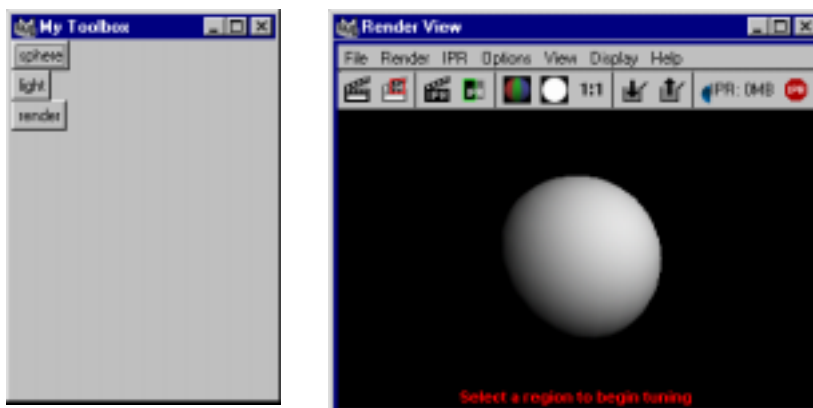
The Script Editor displays a lot of lines. The one you want is **Render into New Window**. Generally, when a lot of commands result from a single menu selection, the one you need has a recognizable name. To test a command, just cut and paste it into the Command Line to execute it.

Run the entire scene

Execute the string as shown in the following:

```
window -title "My Toolbox"  
-w 320 -h 240;  
columnLayout;  
button -label "sphere"  
-command "sphere -p 0 0 0 -ax 0 1 0 -ssw 0 -esw 360 -r 1 -d 3  
-ut 0 -tol 0.01 -s 8 -nsp 4 -ch 1;objectMoveCommand;" ;  
button -label "light"  
-command "defaultDirectionalLight(1, 1,1,1, \"0\",  
0,0,0);rotate -a -45 90 0;" ;  
button -label "render"  
-command "RenderIntoNewWindow;" ;  
showWindow;
```

Now that all the commands have been pasted together, when you press the **sphere** button and the new **light** and **render** buttons in My Toolbox, a light is created, the sphere is rendered, and the scene displays in Render View.



Try adding more flags to the buttons to further customize the look of the window. When satisfied with the script, save it to your scripts directory as a text file, and/or drag it onto your shelf for easy access.

Helpful tips

- The command can be written across multiple lines. Place a semi-colon (;) at the end of each command so that Maya knows when it has come to the end.
- The on-line MEL documentation can be used to see all of the commands and flags available for them as well as short forms of each flag.

MAYA UI DEFINITIONS IN BRIEF

The items included in the following by no means cover all Maya's user interface components. This lesson covers the basics—the tools and operations you are most likely to use during most of your Maya sessions.

The lessons in the tutorial set use many of the following editors, windows, operations, and tools, so if you need to refresh your memory, you can always return to this list for quick information.

MAYA'S MAIN WINDOW

The following items are common to every Maya session and display by default when you first open Maya.

Menu sets

Maya has four basic menu sets. When you select a menu set from the Status Line's pull-down menu, the menus that display in the main menu bar contain the tools and actions specific to the type of operation you want to perform. These menu sets are:

Animation

Contains menus for setting keyframes, creating set driven key relationships, path animation and constraints. Skinning and IK skeleton creation menus as well as menus supporting Deformers are also part of this set.

Modeling

Contains menus for creating curves and surfaces as well as Polygon creation and editing tools.

Dynamics

Contains menus for Particles, Rigid and Soft Body creation and editing tools. The Effects menu contains many pre-made dynamics effects tools and examples of what you can do with Maya's dynamics tools.

Rendering

Contains menus for creating lights and materials as well as texture application tools. The Paint Effects tool set menus are also located here.

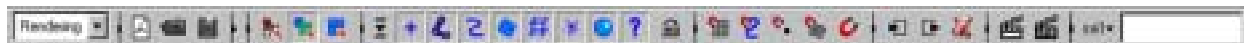
Common Menus

The first six menus from the left are common to all menu sets (File, Edit, Modify, Create, Display, and Window). When you select a different menu set, these six menus remain the same.

Mini Bar

The Mini Bar contains commonly used tools including Selection, Move (or *translate*), Rotate, Scale, the Show Manipulator Tool, and the Currently Active Tool. The associated hotkeys for these tools are, from left to right, **Q W E R T Y**.

Status Line



Drag the cursor over the icons to display pop-up help which shows the names of the items. The Status Line icons are, from left to right:

- Menu sets
- Create a new scene
- Open a scene
- Save the current scene
- Show/hide the selection set icons
- Select by hierarchy and combinations
- Select by object type
- Select by component type
- Set the object selection mask (pull-down menu)
- Pick masks
- Lock/unlock current selection
- Snapping: Grid, Curve, Point, View Planes
- Make selected object live
- Input and Output operations lists
- Turn construction history on/off
- Render into a new Render View window
- IPR Render into a new Render View window
- Set the field entry mode (pull-down menu)

Layer Bar

To see the Layer Bar, select **Display > UI Elements > Layer Bar** and check it on. The Layer Bar provides layer creation and display buttons. Layers in Maya are a powerful method of organizing the display and collection of objects in your scene. Clicking the button at the far left of the Layer Bar creates a new layer.

Layers are mutually exclusive—an object can only exist in one layer at a time. RMB clicking on a layer in the Layer Bar displays a menu which lets you control the layer contents and display its characteristics.

There are several ways to use Layers in Maya. Some artists find layers invaluable when compositing, for instance. When preparing to composite, they put all the background objects on one layer, the central object on its own layer, while the foreground objects reside on yet another layer.

Shelf

Maya's Shelf is comprised of two sections—the Mini-Bar section at the left and the user-defined *shelf*, or tabbed command storage sections, at the right.

Time Slider

The Time Slider buttons control playback, pause, rewind, and some keyframing operations. From the Time Slider, you can set the current frame as well as advance or retreat from the next keyframe on the selected object.

- **LMB-drag** to “scrub” the current time.
- **Shift + LMB-drag** selects a region of time (highlighted in red) which can then be moved around the time slider—in effect, moving keyframes around as a group.
- **RMB** in the main region of the time slider to display a menu with a list of choices. For example, you can **Cut and Paste** a selected region of keyframes back into the Time Slider or onto a different object.

Range Slider

The Range Slider contains extra options used to control animation attributes. You can establish the range of animation frames in the scene, and by growing or shrinking the range slider, you can focus on specific regions of your frames.

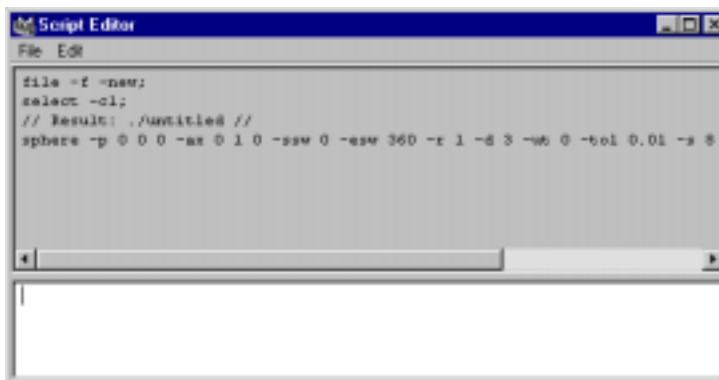
The buttons at the right side of the Range Slider let you select the current Character and turn Auto Keyframing on or off. Clicking the button at the far right displays the **Animation Timeline and Playback Preferences** window from which you can change default settings.

Command Line

MEL stands for Maya Embedded Language and is Maya’s built-in scripting language. The Command Line, located directly above the Help Line, is a single line where you can view and write MEL commands.

The left side of the Command Line is a text field where you enter MEL commands. The right side displays the last printed line of MEL feedback visible in the Script Editor.

The button at the far right opens the **Script Editor**. (See Maya's Embedded Language (MEL)... *page 16* for information on how to create buttons, etc.).



In addition to editing and running MEL commands, you can use this editor to add MEL commands to the Shelf. For example, if you write a simple script that you use often, such as scaling certain objects in a scene to a specified value, add that script to the Shelf where you can click the icon to access it immediately.

Help Line

The Help Line, located at the bottom of the main window, is very useful for beginners. It displays information about tools and procedures as you work in Maya.

When drag your mouse over areas of the interface, information describing the item displays in the Help Line. When working with a command or tool, the Help Line *prompts* you for the next expected action, or provides tips on using the current tool.

Channel Box

The Channel Box is located at the right of the main window. This is where you view and enter information about nodes and the attributes for these nodes. If you make it part of your view, (which it is by default), you can quickly adjust attributes and instantly view the results. To close the Channel Box, select **Display > UI Elements > Layer Bar** and check it off.

The top section of the Channel Box contains basic information about the selected object. These are the attributes that control where the object is located in the scene. The other nodes related to this object are located directly under this section.

The Shape nodes carry information about an object beyond its position, rotation and scale. For example, the **makeNurbCube** shape node contains information about width, length to height ratio, and Patches in U and V directions. These attributes are editable and keyframable.

Also listed in the Channel Box are the input and output nodes related to the selected object.

Some attributes in the Channel Box contain preset pull-down menus from which you choose a setting. If you are not sure, **LMB** on an attribute to see if it contains a pull-down menu.

Tips

- In the Channel Box and Attribute Editor, **RMB** over attributes to access a drop-down menu specific to that attribute
- To edit multiple values, **Shift-select** and type a value to repeat this number for other items. For example, if you want to position an object in the center of the view, Shift-select the Translate X, Y, and Z attributes, type 0, and press Enter.

Cameras (views)

Viewing your scene in 3D is made easy in Maya using the camera views. The hotkey and mouse interaction for camera manipulation in Maya is widely regarded as the best in the industry. By default, a new scene in Maya contains *four* cameras, or views,—a perspective camera and 3 orthogonal cameras.

Perspective Camera

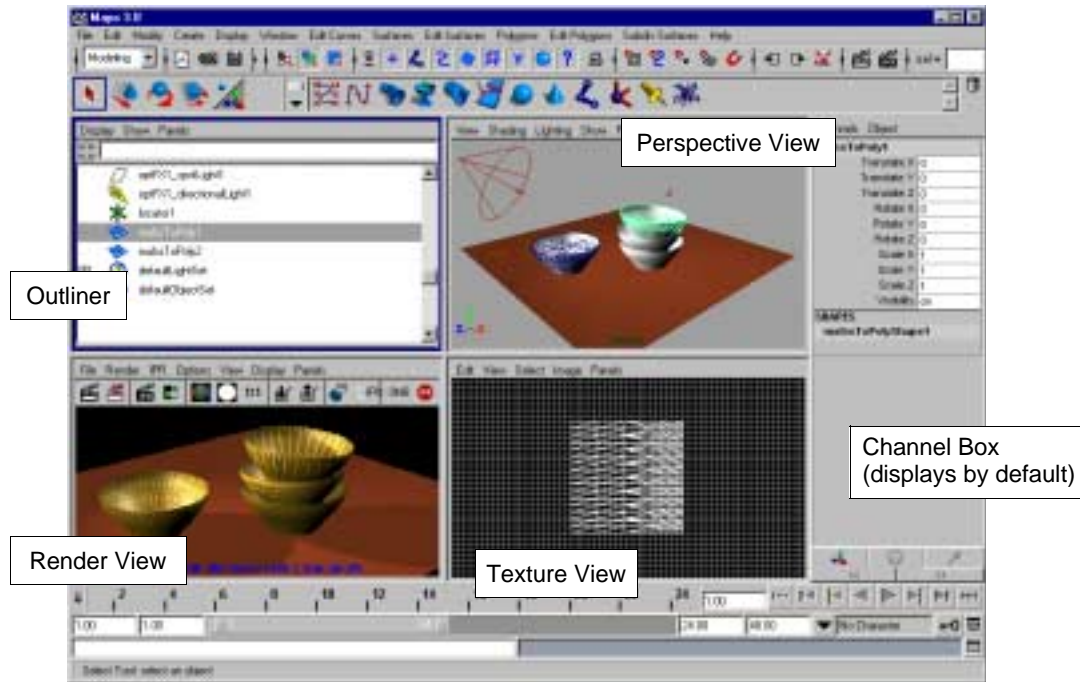
The perspective camera mimics the way a film or television camera operates. This is the only camera in which you can tumble the view (**Alt-LMB**).

Orthogonal Cameras

Top, side, and front orthogonal cameras are provided by default. These cameras display the scene without a *vanishing line of sight*, or perspective view. They are used to accurately position objects in relation to world space and the grid used to measure distances.

Panels

Once you become more familiar with Maya, there may be times when having extra windows or editors open can become a nuisance. Select the **Panels > Panel** menu in a view and select the type of window or editor you want to place in that view. See the following example:



To return to a camera view, select a menu item from the Panels menu in each view.

Hotbox

By pressing and holding down the **space bar** you open the **Hotbox**. The Hotbox is a centralized heads-up display for all the menus in Maya which contains marking menus and zones of interaction that can greatly increase your productivity.

The Hotbox can take a while to get used to, but it can also unlock a great amount of screen space by removing the need for the main menus.

EDITORS AND WINDOWS

You can use adjust attributes in Maya, change tool properties and save them, and interactively view the results of those changes and adjustments. In order to do this efficiently, most of Maya's editors and windows correspond to each other. For example, no matter what the items are (lights, special effects, objects, polygons, etc...) you open its associated Attribute Editor, change the default settings, and watch the results in the views. The following describes the windows and editors most used during a typical Maya session.

Attribute Editor

The Attribute Editor is a more detailed version of the Channel Box. Where the Channel Box is an abbreviated list of keyable attributes, the Attribute Editor lists all attributes on the selected node or object.

The Attribute Editor includes such items as sliders, pull-down menus, and drag-and-drop functionality. The tabs located at the top of the Attribute Editor let you choose which node to edit. The items displayed in the body of the Attribute Editor are the attributes associated with that node.

Transform node

Objects in Maya have a top level node called a *Transform node*. This basic node is used to control an object's position, rotation, and scale. These attributes are known as the *Transform Attributes*.

Shape node

Objects have a secondary node, a *Shape node*, which contains information about an object's surface history, render properties, and display quality.

Other nodes

Other nodes, such as texture and material nodes, are best edited using the Attribute Editor in conjunction with the Hypershade/Visor.

CUSTOMIZING MAYA'S UI

In the **Window > Settings/Preferences** menu, various items open editors where you can set the commands that you use most often and save them to make your Maya experience truly your own.

Included in this menu are editors to assign hotkeys, change default display colors, re-arrange view panels, and many more.

Preferences window

Maya's preferences are broken up into several areas. Interface, Display, Settings, and Modules. When you open the Preferences window (**Window > Settings/Preferences > Preferences**), you will notice the Categories at the left and the options at the right. Simply choose menu items, enter values, or turn items on or off to customize your Maya sessions.

For example, in the **Interface** Category, click to turn off **In Separate Window** for **Open Attribute Editor** so the Attribute Editor will not be floating when you press the **Ctrl-a** hotkey.

Interface/UI Elements

The **Interface** categories provide options to set how the UI behaves. You can also access these menus and options from the main menu bar.

Tip

When you first start to use Maya, tear off the **Display > UI Elements** menu and check items to see what you are turning on or off.

Hotkeys

In addition to the hotkeys indicated beside menu items, Maya provides quick and easy ways to perform several operations you will use during each working session.

These are default settings. If you want, you can re-assign these hotkeys in the Hotkeys Editor (**Window > Settings/Preferences > Hotkeys**).

Default hotkeys for cameras

Cameras and views in Maya are positioned and oriented by pressing the **Alt** key in conjunction with the **LMB** (Left Mouse Button) and **MMB** (Middle Mouse Button). See the following list:

- Orbit: **Alt-LMB**
- Zoom: **Alt-LMB-RMB**
- Pan: **Alt-MMB**
- Frame selected: press **f**
- Frame all: press **a**

Default hotkeys used to control the display in the views

In each of Maya's views there are menus and hotkeys you can use to control display properties, such as shaded and wireframe modes:

- Press **1**, **2**, or **3** keys for lowest to highest resolution display smoothness on selected NURBS objects.
- Press **4** key for **wireframe** display
- Press **5** for **shaded display no textures**
- Press **6** for **shaded display with textures**
- Press **7** for **shaded display with textures and lights**

Default hotkeys for transformation tools and manipulators

These keys are the **QWERTY** keys on the keyboard. They have been chosen for these often-used operations because they are located in a comfortable position on the keyboard.

Move (translate)= w

Rotate= e

Scale=r

Select Tool=q

Special Tool manip=t

Learn to use these hotkeys to speed up your Maya sessions.

Outliner

There are two methods to look at the contents of a Maya scene file: the **Outliner** and the *Hypergraph*. The Outliner displays the contents of your scene file in a listed format. The contents of the Outliner display as nested groups if the items under this group are part of a hierarchy.

- to **Re-order** an object, **MMB-click-drag** (line between other objects).
- to **Parent** on object, **MMB-click-drag** (lines outline parent).
- to **Expand/Collapse hierarchy**, **LMB** on the **+** and **-** symbols.
- to **Show Shape Nodes**, **RMB-click-select** a menu item.
- to **Select multiple continuous objects** in a list, **Shift-LMB-select** the top object then the bottom object of list.
- to **Select multiple non-continuous objects** in list, **Ctrl-LMB-select** each object.

Hypergraph

The Hypergraph displays the contents of your scene in a window that shows the items in rectangles, and how they are connected by lines. The Hypergraph's two modes of operation for looking at the contents of your scene are described in the following:

Scene Hierarchy mode

This mode lets you see objects and their hierarchies much like the Outliner, but in a more freeform layout.

- to **Re-order** an object, **LMB-click-drag** (first select **Options > Layout > Freeform Layout** from the Hypergraph menus).
- to **Parent** an object, **MMB** click dragging one object on top of another object or group.
- to **Expand/Collapse hierarchy**, **RMB-select Expand** or **Collapse** from a menu.
- to **Show Shape Nodes**, by select **Options > Display > Shape Nodes** in the Hypergraph **Options** menu.
- to **Select multiple contiguous** objects, **LMB-marquee** a box around the objects.
- to **Select multiple non-contiguous objects**, **Shift-LMB-select** each object.

Upstream and Downstream Connections mode

This mode lets you see how the flow of information is moving from one node to another through connected attributes. This is similar to a production line where each piece of information travels between nodes, each with the specific task it performs on the information before passing it along to the next node in the stream.

Hypershade / Visor

The Hypershade and Visor windows are used to build and manage textures and materials for establishing the rendered look of your scene. Although these are listed as separate UI elements, they are most often used together and appear as a single UI component.

Hypershade

The Hypershade portion of the Hypershade/Visor shares similar functionality to the Hypergraph. It displays materials and textures much like the Hypergraph displays nodes and attribute connections.

Visor

The Visor is the portion of the Hypershade/Visor combination where you find scene elements in your scene, or may want to bring into your scene, to help create the look of objects when they are rendered. **Lights, Cameras, Textures, Sourceimages,** and **Materials** are found in the Visor. You can also use the Visor to navigate the hard drive to find and load other elements and scenes not associated with the current project.

Render Globals

General rendering settings are set in the Render Globals window. From the Render Globals window you can adjust settings for the rendered image size or resolution, Anti-aliasing quality, Raytracing quality, Motion blur, and IPR options among many others.

Render View

The Render View is where you test render your scene. The Render View window is also where you use IPR, Maya's Interactive Photo-realistic Renderer.

Graph Editor

The Graph Editor is where you manage the keyframe animation you have created. The Graph Editor displays keyframe animation as curves called **animCurves**.

