Classroom in a Book Instructor Notes

Adobe® After Effects® 7.0

Lesson 1: Getting to Know the Workflow

Lesson 1 uses a sample project to provide an overview of the typical After Effects workflow, from creating a project to importing footage, creating a composition, applying effects, and outputting content. Along the way, students are introduced to the various elements of the After Effects workspace, which they'll need to understand as they proceed with the lessons in this book.

About the Adobe workspace

After Effects 7.0 offers a redesigned, unified user interface. Adobe video and audio applications provide a consistent, customizable workspace. Although each application has its own set of panels (such as Tools, Properties, Timeline, and so on), you move and group panels on your computer screen in the same way across products.

The main window of a program is the application window. The various panels are organized in this window in an arrangement called a workspace. The default workspace contains groups of panels as well as panels that stand alone.

You customize a workspace by arranging the panels, usually by dragging them, in the layout that best suits your style of working. You can create and save several custom workspaces for different tasks—for example, one for editing and one for previewing.

You can drag panels to new locations, move panels into or out of a group, place panels alongside each other, and undock a panel so that it floats in a new window above the application window. As you rearrange panels, the other panels resize automatically to fit the window.

You can use floating windows to create a workspace more like those in previous versions of Adobe applications, or to place panels on multiple monitors.

Using a scroll-wheel mouse

If your mouse has a wheel for scrolling, you can zoom in the Timeline, Project, Render Queue, Composition, Layer, Footage, Flowchart, Effect Controls, and Effects & Presets panels, and scroll in the Timeline, Project, Render Queue, Flowchart, Effect Controls, and Effects & Presets panels.

Do any of the following:

• **To zoom into the center of the panel, or into the feature region when tracking, roll the mouse wheel forward.**

• **To zoom out of the center of the panel, or out of the feature region when tracking, roll the mouse wheel backward.**

• **To zoom into the area under the pointer, hold down Alt (Windows) or Option (Mac OS) as you roll the mouse wheel forward.**

• **To zoom out of the area under the pointer, hold down Alt (Windows) or Option (Mac OS) as you roll the mouse wheel backward.**

• **To scroll vertically, roll the mouse wheel forward or backward.**

• **To scroll horizontally, hold down Shift as you roll the mouse wheel backward or forward. When you are in the Timeline panel, rolling backward moves you forward in time and vice versa.**

Note: You can scroll in a panel even if it is not currently active as long as you move the pointer over it. For instance, you can scroll in the Composition panel even if the Effect Controls panel is currently active.

Lesson 2: Creating a Basic Animation Using Effects and Presets

After Effects 7.0 lets you produce great-looking animations quickly using hundreds of fully customizable animation presets, including presets for animating text, effects, transitions, backgrounds, and behaviors. You can also use included project templates for DVD motion menus and motion graphics backgrounds. Lesson 2 explores how to create a composition using some of these new presets. At the end of the lesson, students export their animation in Flash format for use on the web. These notes provide additional background about animation presets and Flash export.

About animation presets

Animation presets let you save and reuse specific configurations of properties and animations, including keyframes, effects, and expressions. After Effects includes hundreds of animation presets that you can drop into your projects and then modify to suit your needs.

You can apply an entire animation preset to a layer, or you can apply a single effect or property from an animation preset. If a property or effect exists in the animation preset but not in the target layer, the property or effect is added to the target layer.

See Gallery of animation presets for animated illustrations of animation presets included with After Effects.

Many animation presets don't contain animation; rather, they contain combinations of effects, transform properties, and so on. You can save one or more properties with all of the desired settings to an animation preset without including keyframes. A particularly convenient category of animation presets is behaviors, which you can use to quickly and easily animate without keyframes.

Animation presets can be saved as FFX files and transferred from one computer to another. By default, animation presets are stored in the Presets directory.

For additional information, go to Adobe Studio on the Adobe website.

Saving animation presets

You can save settings of one or more effects as an animation preset. Saving an effect as an animation preset also saves any set keyframes, as well as expressions used in the effect. For example, if you created an explosion using several effects with complex parameter and animation settings within those effects, you can save all those settings as a single animation preset. You can then apply that animation preset to any other footage, or you can apply any single effect from that animation preset to any footage. The 20 most recently saved or applied animation presets appear under Recent Animation Presets in the Animation menu.

Animation presets also appear in the Animation Presets menu in Effect Controls and in Effects & Presets. The Animation Presets menu in the Effect Controls panel lists only those animation presets that contain the current effect. For example, if the Mirror effect is selected, the menu will show only those presets that include the Mirror effect. If the Animation Presets category in Effects & Presets does not appear, choose the Show Animation Presets option from the Effects & Presets panel menu.

Note: When you apply an effect from the Animation Presets pop-up menu, only the current effect from the animation preset is applied.

Exporting Flash animations

Flash (SWF) and Flash Video (FLV) formats offer popular standards for producing interactive web content—and now you can output both formats directly from After Effects 7.0.

The following tutorial explores the two formats to help students understand which to use for a given circumstance. It then details how to export these file types

from After Effects. You can use it to enhance the Lesson 2 Flash animation export exercise.

Note: Though you can generate SWF and FLV files from After Effects, incorporating these files into web content and adding interactivity is typically done through a Flash authoring application.

The files used in this tutorial are on Disc 2 of the Total Training Video Workshop (included with After Effects). Depending on the television standard for your region, copy either the NTSC or PAL folder from the After Effects 7.0 folder to your desktop. Alternatively, you can follow along using your own files. You'll need a file with a vector logo (such as an Adobe Illustrator file).

SWF vs. FLV

SWF files deliver vector graphics (especially animations) and other data types, including video, over the Internet. SWF files also allow viewer interaction, such as following a web link. To view SWF files, you need Adobe Flash Player, a plug-in for your web browser.

FLV files contain only video. They may or may not be part of a larger SWF file, and they don't allow interactivity themselves. To view FLV files, you need Flash Player 7.0 or later; these files can also be viewed by embedding Flash Video Player code directly into a web page. Several third-party standalone players for FLV files are also available. (At the time of this writing, Windows Media Player and QuickTime Player don't support FLV files.)

Create a comp

You'll start by creating a comp, which you'll then turn into a common example of SWF content: a logo animation that links to a company's home page, used as a web advertisement.

1. Create a new After Effects project by choosing File > New > New Project, and then import MC_logo.ai from the folder you copied to your desktop.

2. Choose Composition > New Composition. Name the composition Linked_Logo, and from the Preset menu, choose Web Banner 468 x 60. Enter a duration of 500 (to make the composition 5 seconds), and then click OK.

3. Press the Home key to ensure that the current-time indicator is at the start of the composition, and then drag MC_logo.ai from the Project panel to the Timeline panel.

4. Because the logo is too large for the banner, you'll scale it to fit. With MC_logo.ai selected in the Timeline panel, press S to reveal its Scale property. Enter a scale value of 25%.

5. Now change the color of the logo so you'll be better able to view the alpha channel later on. Choose Effect > Color Correction > Change To Color. In the Effect Controls panel, click the color swatch for To and then enter values of R=239, G=9, B=9 to create a bright red. Click OK, and then select Hue, Lightness & Saturation from the Change menu.

6. Select the Linked_Logo comp in the Project panel and choose Composition > Background Color. Click the color swatch and then enter values of R=0, G=88, B=238 to create a bright blue. Click OK twice to apply the new color.

Animate the logo

1. With MC_logo.ai selected in the Timeline panel, choose Animation > Browse Presets. After Adobe Bridge opens, choose Presets from the navigation menu at the top of the window, and then open the Behaviors folder. Select the first behavior, Autoscroll - horizontal.ffx. The preview panel displays a thumbnail of the behavior. Double-click Autoscroll - horizontal.ffx to apply it to the layer in After Effects, and then close Bridge.

2. Press the spacebar to preview the animation—logos marching across the screen. The march is a bit frantic; you'll edit the effect to slow it down. In the Effect Controls panel, locate the Autoscroll - horizontal effect, and set Speed (pixels/second) to 25.

3. Save the project, naming it Flash_Export.aep.

4. In the Timeline panel, move the current-time indicator to 4:00 (four seconds). Make sure that MC_logo.ai is selected, and then choose Layer > Add Marker. A layer-time marker is added at the four-second mark.

5. Double-click the marker to display the Marker dialog box. Type Company link in the Comment text box, type http://www.adobe.com in the URL text box, and then type _blank in the Frame Target to specify a new browser window. Click OK.

Note: With the marker in place, the link is invoked automatically at the four-second mark. If you prefer that the user initiate the link, you could simply add a link to the SWF file after placing it on a web page (as opposed to embedding the link within the SWF file as you just did.)

Export the comp to SWF

Now that the animation is complete, you can export the comp to SWF. After Effects creates the SWF file, and then places it in an HTML file for convenient viewing.

1. Choose File > Export > Macromedia Flash (SWF). Choose a location for the file, name it Logo_Ad.swf, and then click Save.

Note: Be sure to include the .swf extension so that the HTML file After Effect generates can locate the SWF file.

2. In the SWF Settings dialog box, choose Rasterize from the Unsupported Features menu, and then select Include Layer Marker Web Links.

Note: The SWF format doesn't support several effects; choose to rasterize the unsupported features to make sure that all effects are included in the SWF file. See After Effects Help for more information on SWF settings.

3. Click OK. After Effects exports an HTML file and a SWF file.

4. Start your web browser and open the HTML file to view the animation. If your browser is set up correctly, when the animation reaches the four-second mark, the Adobe home page opens in a new browser window.

Export the comp for FLV

FLV output can drastically improve the workflow efficiency for developing animated Flash content in After Effects. You can import FLV files from After Effects directly into your Flash authoring software without having to recompress (encode) the video data. FLV even supports alpha channels, helping to combine multiple files over a consistent background.

Now you'll export the comp you just created, including an alpha channel, in Flash Video (FLV) format. But first, you'll view the alpha channel.

1. Choose Alpha from the Show Channel menu at the bottom of the Composition panel.

2. When you're finished viewing the alpha channel, choose RGB from the Show Channel menu, and then choose File > Export > Flash Video (FLV).

Note: QuickTime 6.5.2 or later is required to export FLV files from After Effects.

3. In the Flash Video Encoding Settings dialog box, choose Flash 8 - Medium Quality (400 kbps) from the Please Select A Flash Video Encoding Profile menu. Then click Show Advanced Settings.

4. In the Encode Video section, select Encode Alpha Channel. Then deselect Encode Audio, since the animation doesn't include any audio. You can leave the other settings at their defaults. Click OK.

Note: Two codecs are available for FLV export. You must use the On2 VP6 codec to include an alpha channel.

5. Specify a location for the FLV file, name it Logo_ad, and then click Save. After Effects exports the FLV file.

6. To view the FLV file, do either of the following:

• Add the file to a web page, and then open the web page in a browser with Flash Player installed.

• Open the file in a third-party standalone player. A quick search on the Internet should locate several standalone players available for download.

Lesson 3: Animating Text

Lesson 3 explores the many text options and text-animation features in After Effects 7.0. The following material provides additional background on formatting and animating text in After Effects.

About text layers

With After Effects, you can add text to layers with flexibility and precision. You can create and edit text directly on-screen in the Composition panel and quickly change the font, style, size, and color of the text. You can apply changes to individual characters and set formatting options for entire paragraphs, including alignment, justification, and word wrapping. In addition to all of these style features, After Effects provides tools for easily animating specific characters and features such as text opacity and hue.

About fonts

A font is a complete set of characters—letters, numbers, and symbols—that share a common weight, width, and style. In addition to the fonts installed on your system, After Effects uses font files in this local folder:

Windows Program Files\Common Files\Adobe\Fonts

Mac OS X Library/Application Support/Adobe/Fonts

If you install a Type 1, TrueType, OpenType, or CID font into the local Fonts folder, the font appears in Adobe applications only.

To use smart quotes

Smart quotes, or printer's quotation marks, use a curved left or right quotation mark instead of straight quotation marks. To apply smart quotes, choose Use Smart Quotes from the Character panel menu.

To edit text in text layers

You can edit text in text layers at any time. If you set the text to follow a path, designate it as a 3D layer, transform it, or animate it, you can still continue to edit it.

The pointer for a type tool changes as you move it around the Composition panel. When it is directly over a text layer, it appears as the edit text pointer; click to edit the existing text. When the pointer is not directly over a text layer, it appears as a new text pointer; click to create a new text layer. Shift-click always creates a new layer.

1. Select the Horizontal Type tool or the Vertical Type tool.

2. In the Timeline panel, double-click the text layer to set the type tool to editing mode and select the text.

3. Edit text

To blend overlapping characters in a text layer

1. In the Timeline panel, expand the text layer and the More Options group.

2. Choose a blending mode from the Inter-Character Blending menu.

Note: To blend a text layer with the layers beneath it, specify a blending mode from the Modes column in the Timeline panel.

To change the direction of text

The Vertical Type and Horizontal Type tools let you enter text that flows horizontally or vertically. Horizontal text flows from left to right; multiple lines of horizontal text lie from top to bottom. Vertical text flows from top to bottom; multiple lines of text lie from right to left.

When you convert the vertical or horizontal orientation of a text layer, the results from paragraph text (justifiable text that wraps within a bounding box) are very different from the results of point text (independent lines of text) because paragraph text flows relative to its bounding box while point text lies relative to the Composition panel. For example, when you convert paragraph text from horizontal to vertical or vice versa, the text's bounding box doesn't change its orientation, but the flow of text inside the box does.

About text animation presets

You can browse and apply text animation presets as you would any other animation presets.

The text animation presets were created in an NTSC DV 720 x 480 composition, and each text layer uses 72-point Myriad Pro. Some preset animations move the text on, off, or through the composition. The animation preset position values may not be appropriate for a composition that is much larger or smaller than 720 x 480; for example, an animation that is supposed to start off-screen may start on-screen. You may need to adjust the text animator's position values.

If the text isn't positioned as expected or the text disappears unexpectedly, adjust the text animator's position values in the Timeline or Composition panel.

The Paths category of text animation presets automatically replaces source text with the preset's name, changes the font color to white, and may change other character properties.

The Fill And Stroke category of animation presets contains presets that may change the fill color and stroke properties of the preset that you apply. If the animation preset requires a stroke or fill color, the animation works only if you have assigned one to your text.

To animate text with text animator groups

Once you create and format your text layers, use text animator groups to quickly and easily create elaborate animations. A text animator group includes one or more selectors and one or more animator properties. A selector is like a mask—it specifies which characters or section of a text layer you want an animator property to affect. Using a selector, you can define a percentage of the text, specific characters in the text, or a specified range of text.

Using a combination of animator properties and selectors, you can create complex text animations that would otherwise require painstaking keyframing. Most text animations require you to animate only the selector values—not the property values. Consequently, text animators use a small number of keyframes even for complex animations. For example, to animate the opacity gradually from the first character to the last, set the Opacity value (in the Animator group) to 0, and

then set the End (Range Selector property) to 0% at 0 seconds and 100% at the end of the animation.

Text animator groups animate a character's position, shape, and size-related properties relative to each character's own anchor point. The text property Anchor Point Grouping lets you reposition each character's anchor point relative to its word, line, or entire text block. In addition, you can control the alignment of the anchor point relative to the anchor point group and the font with the Grouping Alignment property.

About selectors

Each animator group includes a default Range selector. You can add additional Range selectors to an animator group or add multiple animator properties that use the same Range selector.

In addition to this Range selector, you can add a Wiggly selector. Use the Wiggly selector to create selections that wiggle—vary within a specified amount—over time. You can add one or more Wiggly selectors to an animator group, and that animator group can contain one or more properties.

When you add multiple selectors to an animator group, you can control the way they interact with each other by using each selector's Mode property. You can set values for the Start and End properties by changing the values in the Timeline panel or by using the selector bars in the Composition panel.

About the Expression selector

The Expression selector lets you dynamically specify how much you want characters to be affected by an animator property through the use of expressions. You can add one or more Expression selectors to an animator group, and that animator group can contain one or more properties.

Lesson 4: Animating a Multimedia Presentation

Lesson 4 builds a complex animation involving multiple layers, several types of keyframes, audio, and more. It starts from a layered, imported Photoshop file. These notes provide additional background and teaching material on how After Effects works with Photoshop and Illustrator files.

Layered files

You can import Adobe Photoshop, Adobe Illustrator, EPS, and many PDF files directly into an After Effects project.

After Effects imports attributes that were applied in Photoshop, including position, blending modes, opacity, visibility, transparency (alpha channel), layer masks, layer groups (imported as nested compositions), adjustment layers, common layer styles (Drop Shadow, Inner Shadow, Outer Glow, Inner Glow, Bevel and Emboss, and Color Fill), layer clipping paths, vector masks, image guides, and clipping groups.

You can also create a new Photoshop file and add it as the top layer in a composition from within After Effects, or use After Effects to create a new Photoshop file without adding it to a specific composition.

When you import an Illustrator file, After Effects makes all empty areas transparent by converting them into an alpha channel.

After Effects can import Illustrator CMYK files. However, to maintain accurate color, convert your CMYK images to RGB images in Illustrator.

You can import a multilayered Photoshop or Illustrator file in the following ways:

• As a new composition, with each layer in the Photoshop or Illustrator file becoming a separate layer in the composition that keeps its original dimensions. This option, Composition - Cropped, makes it easier to manipulate layers and speeds their rendering time.

• As a new composition, with each layer in the Photo-

shop or Illustrator file becoming a separate layer in the composition and changing dimensions to match the composition size. This option, Composition, is helpful when you need to align layers manually.

• As a single still-footage item imported from any one layer in the Photoshop or Illustrator file.

• As a single still-footage item merged as you import multiple Photoshop or Illustrator layers.

Preparing layered Photoshop files

Importing layers into After Effects makes it possible to prearrange a composition in Photoshop using layers and preserve those layers in After Effects so that they are ready for animation. Preserving layers is also useful if you want to use a single Photoshop file as a source for both print and dynamic media.

Before you import a layered Photoshop file, prepare it thoroughly to reduce preview and rendering time. Avoid problems importing and updating Photoshop layers by naming them properly. Before you import them into After Effects, do the following:

• Organize and name layers. If you change a layer name in a Photoshop file after you have imported it into After Effects, After Effects retains the link to the original layer. However, if you delete a layer, After Effects is unable to find the original layer and lists it as Missing in the Project panel.

• Make sure that each layer has a unique name to avoid confusion.

• If you want to import a composited version of a layered Photoshop file along with a layered version, select Always Maximize Compatibility For Photoshop (PSD) Files in the Photoshop File Handling Preferences dialog box.

Preparing Illustrator files

Before you save an Illustrator file for importing into

After Effects, consider doing the following:

• To ensure that Illustrator files appear correctly in After Effects, select Create PDF Compatible File in the Illustrator Options dialog box.

• To copy paths between Illustrator and After Effects, make sure that the AICB and Preserve Paths options are selected in the Files & Clipboard section of the Illustrator Preferences dialog box. If you don't select AICB in Illustrator, After Effects prompts you when you attempt to paste the path.

• To ensure that files rasterize most faithfully in After Effects, save your file in AI format instead of Illustrator 8.x or 9.x EPS format.

Transparency in Photoshop files

Photoshop supports a transparent area and one optional layer mask (alpha channel) for each layer in a file. You can use these layer masks to specify how different areas within a layer are hidden or revealed. If you import one layer, After Effects combines the layer mask (if present) with the transparent area and imports the layer mask as a straight alpha channel.

If you import a layered Photoshop file as a merged file, After Effects merges the transparent areas and layer masks of all the layers into one alpha channel that is premultiplied with white.

If the layered Photoshop file contains clipping groups, After Effects imports each clipping group as a composition nested within the main composition. After Effects automatically applies its Preserve Underlying Transparency option to each layer in the clipping-group composition, maintaining transparency settings.

When you import a Photoshop file as a composition, any vector masks convert to After Effects masks. You can then modify and animate these masks within After Effects.

After Effects also supports any blending modes applied to the file.

For more details about how After Effects works with transparency in Photoshop files, visit the support area of the Adobe website.

To use adjustment layers from Photoshop

Adjustment layers in Photoshop change the color and tonal qualities of an image without permanently modifying the original image. Photoshop adjustment layers affect the appearance of all layers below them. When you import a Photoshop file containing one or more adjustment layers as a composition, After Effects directly converts the Photoshop adjustment layers to After Effects adjustment layers.

• To remove the effect and display the layer as a white solid, turn off the Adjustment Layer switch in After Effects.

• To remove the effect and the white solid, either delete the adjustment layer or turn off the Video switch for the layer.

To continuously rasterize an Illustrator file

When you import a vector file, After Effects automatically rasterizes it. However, if you want to scale a vector file above 100%, you need to continuously rasterize it to maintain image quality. You can continuously rasterize an Illustrator file (or any other vector file) at any time while designing your project. Continuously rasterizing causes After Effects to rasterize the file as needed based on the transformation for each frame. A continuously rasterized file generally produces higher quality results, but it may preview and render slower than a rasterized image.

When you apply an effect to a continuously rasterized layer, the results may be different than when you apply the effect to a nonrasterized layer. This is because the default rendering order for the layer changes. The default rendering order for a nonrasterized layer is masks, effects, and then geometrics (transformations), whereas the default rendering order for a continuously rasterized layer is masks, geometrics (transformations), and then effects. You can change the default rendering order.

For example, if an Illustrator file pictures a dog and if you want to animate the scale of the dog and apply the Bulge effect to the dog's nose, turn off continuous rasterization so that the bulge stays on the dog's nose as the picture scales larger and smaller. Make sure to check the results of the effect before continuing to

work on your project.

Whether or not you continuously rasterize, if you view and render a composition using Best Quality, After Effects anti-aliases (smooths) the art. For general information about rasterizing, see Illustrator Help.

Note: You cannot paint interactively on a continuously rasterized layer. However, you can apply a paint effect by copying and pasting or using the Favorites menu.

Design an Illustrator CS2 workflow for video production

When you import Illustrator CS2 files into video production applications, you can save production time by setting up Illustrator CS2 files for maximum efficiency:

• Customize the startup file—You can customize the default settings for new files by editing the startup file that Illustrator CS2 uses for RGB files. In the Plug-ins folder within the Adobe Illustrator CS2 applications folder, you'll find two files: Adobe Illustrator CS2 Startup_CMYK.ai and Adobe Illustrator CS2 Startup_RGB.ai. These files contain the default settings for new Illustrator CS2 CMYK and RGB documents, respectively. For a video production workflow, edit the Adobe Illustrator CS2 Startup_RGB.ai file. You can set the default Artboard Size to match your most frequently used After Effects composition size. In addition, you can customize the contents of any palette. For example, if your shop has a standard set of Illustrator CS2 graphic styles or symbols, you can save them into the Adobe Illustrator CS2 Startup_RGB.ai file, and they'll be available in every Illustrator CS2 document you create. As you create documents using the File > New command, you can adjust the artboard size, orientation, and document color mode in the New Document dialog box.

• Create document templates—A template is a customized Illustrator CS2 document that creates an untitled document when you open it. You can use templates to create frequently-used documents that differ from your customized startup file. There's only one difference between saving a document as a document or as a template: To save a document as a template, choose Illustrator CS2 Template from the Format menu in the Save As dialog box. Open a template using the same methods you use to open a document.

• Draw closed paths for masks—When you draw masks in Illustrator CS2 for pasting in After Effects, always draw closed paths. You can't use open Illustrator CS2 paths as masks.

• Control layer dimensions—If you import an Illustrator document into After Effects and the Illustrator document dimensions aren't what you expect, specify the layer dimensions in the Illustrator CS2 document. By default, an Illustrator CS2 document imports using the largest area covered by all objects, not the artboard size. To override the default behavior, specify a document size by drawing a rectangle in Illustrator CS2, and with the rectangle selected, choose Object > Crop Area > Make. This command sets the outer bounds of the document to the size of the rectangle. Areas outside the artboard are still clipped even if you extended the rectangle past the artboard.

Edit Illustrator CS2 files from within After Effects projects

Whenever you have an Illustrator CS2 file in an After Effects project, you can open the file in Illustrator CS2 directly from After Effects. To open an Illustrator CS2 file, select it in the Project panel and choose Edit > Edit Original. When you save the file in Illustrator CS2, the file is automatically updated in After Effects.

Lesson 5: Animating Layers

Lesson 5 introduces students to the Layer panel, which they use to remap time, and to the Graph Editor, where they edit Time Remap keyframes.

About the Graph Editor

To view and manipulate all aspects of effects and animations, including effect property values, keyframes, and interpolation, use the Graph Editor. The Graph Editor represents changes in effects and animations as a two-dimensional graph, with playback time represented horizontally (from left to right). In layer bar mode, on the other hand, the time graph represents only the horizontal time element, without showing a visual representation of changing values.

There are two types of graphs available in the Graph Editor: value graphs, which show property values; and speed graphs, which show rates of change of property values.

Working with the Graph Editor

In the Graph Editor, each property is represented by its own graph. You can view and work on one property at a time, or you can view multiple properties simultaneously. When more than one property is visible in the Graph Editor, each property's graph has the same color as the property's value in the layer outline.

To select which properties are shown in the Graph Editor

Click the Show Properties button at the bottom of the Graph Editor, and select from the following options:

• Show Selected Properties Displays selected properties in the Graph Editor.

• Show Animated Properties Displays animated properties of selected layers in the Graph Editor.

• Show Graph Editor Set Displays properties that have the Graph Editor toggle selected.

To select Graph Options in the Graph Editor

Click the Graph Options button at the bottom of the Graph Editor, and select from the following options:

• Auto-Select Graph Type Automatically selects the appropriate graph type for a property: speed graphs for spatial properties (such as position), and value graphs for other properties.

• Edit Value Graph Displays the value graph for all properties.

• Edit Speed Graph Displays the speed graph for all properties.

• Show Reference Graph Displays the unselected graph type in the background for viewing only. (The gray numbers to the right of the Graph Editor indicate the values for the reference graph.)

• Show Audio Waveforms Displays the audio waveform for any layer that has at least one property in the Graph Editor.

• Show Layer In/Out Points Displays In and Out points of all layers that have a property in the Graph Editor.

• Show Layer Markers Displays layer-time markers in the Graph Editor, if they exist.

• Show Graph Tool Tips Toggles the graph tool tips on and off.

• Show Expression Editor Shows or hides the expression editor field.

• Allow Keyframes Between Frames Allows placement of keyframes between frames for fine-tuning animation.

Using the Snap button

When you drag a keyframe in the Graph editor with the Snap button toggled, the keyframe snaps to the following items:

Keyframes (both vertically and horizontally)

Current-time indicator

In/Out points

Markers

Work area start/end

Composition start/end

When the keyframe snaps to one of these items, an orange line appears in the Graph Editor to indicate the object you're snapping to. Ctrl-drag (Windows) or Command-drag (Mac OS) to temporarily toggle the Snap button.

Note: Shift-dragging the current-time indicator also snaps to the items in the list above.

To pan and zoom in the Graph Editor

To pan vertically or horizontally, drag with the Hand tool.

To invoke the Hand tool momentarily, press and hold the spacebar.

To pan vertically, spin the mouse scroll wheel.

To pan horizontally, press the Shift key as you spin the mouse scroll wheel.

To zoom in, click with the Zoom tool.

To zoom out, Alt-click (Windows) or Option-click (Mac OS) with the Zoom tool.

To zoom using the mouse scroll wheel, press Alt (Windows) or Option (Mac OS) while scrolling to zoom horizontally; press Ctrl (Windows) or Command (Mac OS) to zoom vertically.

To zoom horizontally, Alt-drag (Windows) or Option-drag (Mac OS) with the Zoom or Hand tool to the left to zoom out or to the right to zoom in.

To zoom vertically, Alt-drag (Windows) or Option-drag (Mac OS) with the Zoom or Hand tool up to zoom in or down to zoom out.

Note: You cannot pan or zoom vertically when Auto Zoom Height is selected.

Auto Zoom Height and Fit

The Auto Zoom Height, Fit Selection, and Fit All buttons help you adjust the Graph Editor's view to focus on relevant portions of your animations.

Auto Zoom Height toggles Auto Zoom Height mode, which automatically scales the height of the graph so that it fits the height of the Graph Editor. The horizontal zoom must still be adjusted manually.

Fit Selection adjusts the value (vertical) and time (horizontal) scale of the graph to fit the selected keyframes in the Graph Editor.

Fit All adjusts the value (vertical) and time (horizontal) scale of the graph to fit all of the graphs in the Graph Editor.

Lesson 6: Working with Masks

Lesson 6 introduces students to the concept of masks and teaches them to create masks in After Effects using the Pen tool. Students can also use Illustrator to help them create and use masks in After Effects.

Enhance animation

In a video production workflow, Illustrator CS2 has much more to offer than a role as a specialized application for still graphics. The pen tool and bezier paths that are fundamental to drawing in Illustrator CS2 are also used in video production applications to control motion paths and timelines. You can use Illustrator CS2 paths not just as source graphics, but also as motion paths in After Effects. You can also use the warping, blending, and layer features in Illustrator CS2 to prepare shapes for morphing and tweening.

Create motion paths in Illustrator CS2

The path-drawing features in Illustrator CS2 are well-suited to any task that involves drawing a path. Motion graphics typically depend on motion paths, and you can draw motion paths more quickly and precisely in Illustrator CS2 than you can in After Effects.

In After Effects, you create a motion path by animating the Position property and setting a different position for each keyframe. You then refine the path by dragging handles on the path. This method works well for freeform paths, but it can be time-consuming to edit a motion path into a regular shape such as a perfect circle. Instead of building a motion path from two original points as in After Effects, you can draw a path in Illustrator CS2 using the tool that most efficiently creates the shape you want.

For example, let's look at animating a layer along a perfect semicircular arc. In After Effects, you establish the layer position at the beginning and ending keyframes, and then drag control handles to form the arc; it isn't easy to form a perfect semicircle in this way. And while it's possible to animate along an arc using a mathematical expression, not every motion graphics designer is a mathematician. For a quick alternative, draw the shape you want in Illustrator CS2 and copy and paste it into After Effects.

To create an arc in Illustrator CS2 and use the arc as a motion path in After Effects:

1. In Illustrator CS2, draw the arc you need using the Arc tool or by cutting an ellipse with the Scissors or Knife tools.

2. Use the Selection or Direct Selection tool to select the remaining part of the arc, and choose Edit > Copy.

3. Switch to After Effects.

4. In the Timeline panel, select the layer you want to animate.

5. Press P to reveal the Position property, and click the Position property name to highlight it.

6. In the Timeline panel, set the current-time indicator to the time where you want motion to start.

7. Choose Edit > Paste. The path becomes a motion path, and After Effects adds start and end keyframes to the layer in the Timeline panel. (If a motion path was already present, pasting a path replaces the previous motion path.) To change the duration of the animation, drag either keyframe.

8. Preview and edit the composition as needed.

Lesson 7: Keying

Lesson 7 is about keying. A common task in video production, keying removes the background of a clip so that you can place the subject in another environment. Keying allows the weather anchor to appear in front of a map, a superhero to fly across the night sky, and more prosaically, production artists to prepare video files for compositing in other applications.

You create a key by isolating the background pixels; After Effects uses the keyed pixels to create an alpha channel that defines the transparent background. The alpha channel can be included in certain video formats, such as Flash Video (FLV), for use in other applications. After Effects offers a comprehensive set of keying controls that lets you create seamless compositions.

In this tutorial, which you can use in class to supplement the keying exercises in Lesson 7, you'll key live-motion footage of a DJ shot against a green screen. Not only will you remove the green background, you'll also explore ways to finesse the key to minimize spill (or halo effects) and clean up the edges of the subject.

The files used in this tutorial are on Disc 2 of the Total Training Video Workshop (included with After Effects). Depending on the television standard for your region, copy either the NTSC or PAL folder from the After Effects 7.0 folder to your desktop. Alternatively, you can follow along using your own files. You'll need footage shot against a green screen.

Prepare the project

First, you'll need to create a project and import the footage. Then you'll create a composition and prepare it for keying. When keying, you'll find it helpful to change the composition's background color to something other than black or white. A different color helps you to see problems as you create your key. Rather than changing the background color, you can click the Toggle Transparency Grid button at the bottom of the Composition panel to view the key as you create it.

1. Start After Effects and choose File > New > New Project.

2. Choose File > Save As. Navigate to the location where you
want to save the file, name the project Keying.aep, and then click Save.

3. Choose File > Import > File. Select Green_Raul.avi from the folder you copied to your desktop, and click Open.

4. Drag Green_Raul.avi onto the Create A New Composition button at the bottom of the Project panel. After Effects creates a new composition based on the settings of the footage.

5. Choose Composition > Background Color. Click the color swatch and then select a bright orange color. Click OK twice.

6. Choose File > Save to save the project.

Create a garbage mask

A garbage mask (or garbage matte) helps to define the subject area of the key, masking out the unnecessary areas.

1. Press the spacebar to preview Green_Raul.avi. Notice that the DJ's arms move, but otherwise there is very little movement in the clip. When you're done, press the Home key twice—the first time stops the playback, and the second time returns the current-time indicator to the beginning of the composition.

2. Select the Pen tool from the Tools panel.

3. In the Composition panel, use the Pen tool to create a path around the DJ and his equipment. Try to create a path that encompasses all of the DJ's movement.

4. After closing the path, scrub through the clip to make sure that all of the DJ's movements are within the path. If necessary, use the Pen or Selection tool to adjust the path.

5. Choose File > Save to save the project.

Apply the Color Key effect

Now that you've created the garbage mask, you can get down to the actual keying. You'll use the Color Key effect to remove the green pixels of the background.

1. Press the Home key to return the current-time indicator to the beginning of the clip, and then select Green_Raul.avi in the Timeline panel.

2. Choose Effect > Keying > Color Key. The Effect Controls

panel appears and displays the properties for the Color Key effect.

3. Click the eyedropper to the right of the Key Color property, and then move the cursor around the green area in the Composition panel. Notice that as you move the cursor, the Info panel displays the RGB values for each pixel. Click a green pixel to the right of Raul's head. A sprinkling of the green pixels are keyed out and the orange background shows through. The number of pixels keyed out depends on the color values of the pixel you clicked.

4. In the Effect Controls panel, set Color Tolerance to 16. By default, Color Tolerance is set to zero, so the pixels that are keyed out are those that exactly match the selected color. Increasing the value to 16 causes the majority of the green pixels to be keyed out.

5. Set Edge Thin to 3 to smooth the edges and tighten the key, and set Edge Feather to 4 to soften the transition.

6. Increase Color Tolerance to 32. Though not necessarily a high setting, it's too high for this footage, making Raul's green headband disappear. Just as in the real world, the initial key goes a long way toward the desired results, but you almost always need to tweak the composition further. Reset Color Tolerance to 16.

Apply a second Color Key effect

Although there are many ways to remove the remaining green pixels, for this footage, applying a second instance of the Color Key effect is the quickest. If you use the Eyedropper tool to examine the remaining green pixels, you'll see that their green values are close to one another (and somewhat darker than the green used in the original key.)

1. With Green_Raul.avi selected in the Timeline panel, choose Effect > Color Key to apply a second instance of the effect. The most recent effect applied appears at the top of the Effect menu.

2. In the Effect Controls panel, click the color swatch for Color Key 2, enter values of R=62, G=108, B=67, and then click OK. Set Color Tolerance to 10, Edge Thin to 2, and Edge Feather to 2. These settings remove the majority of the green pixels. If you zoom in, however, you'll notice a slight green halo around the DJ. Next you'll remove that.

Remove light spill

The green halo results from light spill, or the light reflected from the background onto the subject. You can use the Hue/Saturation effect to correct this problem.

After Effects 7.0 Professional includes the Spill Suppressor effect, which makes quick work of removing spill.

1. Select Green_Raul.avi in the Timeline panel, and then choose Effect > Color Correction > Hue/Saturation.

2. In the Effect Controls panel, set Channel Control to Greens, since you want to change green pixels. Drag the Green Saturation slider to the left, to somewhere around -40. This setting desaturates the green and removes the halo. (It also dulls the green in the DJ's headband, a perfect example of the compromises often required when keying.)

3. Save the project.

View the alpha channel

Now that you've completely removed the background, view the resulting alpha channel you created.

1. At the bottom of the Composition panel, click the Show Channel button and select Alpha.

Add a new background

You can now either add a new background or render the composition in a format that retains the alpha channel. Many formats can retain alpha channels, including Flash Video, QuickTime, and a host of others. See After Effects Help for more information.

1. Choose Layer > New > Solid. Type New Background in the Name text box, and click OK.

2. In the Timeline panel, drag New Background below Green_Raul.avi.

3. Choose Animation > Browse Presets. Bridge opens and displays the available presets. In the Backgrounds folder within Bridge, double-click Cosmic Powers.ffx to apply it to the solid layer. Close Bridge. At first glance, the new cosmic background seems a bit dark—the preset you applied is essentially a collection of predesigned animations, so you need to render the frames before you experience the crackling energies.

4. In After Effects, press the spacebar to preview the composition. You may notice some of the orange background appears around the edges of the composition. The orange appears because the edges of the layer warp with the animation. Select New Background in the Timeline panel, and press the S key to reveal its Scale property. Set Scale to 125%, and then preview the composition again.

Lesson 8: Performing Color Correction

Lesson 8 covers color correction. To ensure that color appears on a viewers system as students see it on their computers, a complete understanding of color and color management is useful.

About color depth

Color depth is the number of bits per channel (bpc) used to represent the color of a pixel. Channels contain color information: RGB images have channels for red, green, and blue. The more bits per channel, the more colors can be represented.

In After Effects, you can work in 8-bpc, 16-bpc or 32-bpc color mode for each project; 16-bpc and 32-bpc color modes are available only in After Effects Professional. Many effects support 16 and 32 bits per channel (see Color depth and effects).

Even if your output is 8-bpc (Millions Of Colors), you can obtain better rendering quality by having the project (or render) color depth set at 16-bpc or 32-bpc because of the added precision achieved by calculating color values at higher bit depths.

32-bpc color mode (Pro only) is for working with HDR (high dynamic range) images. After Effects assumes that all HDR footage represents color linearly—in linear light. When you import HDR images, After Effects converts floating-point 32-bit values from linear light to the project's working color space. If you haven't chosen a working color space for your project, After Effects converts HDR footage from linear light using a gamma value of 2.2; this value represents the gamma for a typical monitor. Gamma is the exponent used in converting RGB levels. When you render to a 32-bpc output format, After Effects removes the gamma applied on import, converting 32-bit values back to linear light.

16-bpc color-mode (Pro only) frames require half the memory of 32-bpc frames and offer advantages in terms of speed and storage. Use 16-bpc mode when you work with high-resolution images that contain a narrow range of colors, such as when you're creating subtle gradients for film effects or HDTV output.

Transitions between colors are smoother with less visible banding, and more detail is preserved than with 8-bpc color (though less than with 32-bpc color). You can import 16-bpc images, including those from Adobe Photoshop, and composite and color-correct footage in 16-bpc mode. Take advantage of 16-bpc color when performing most After Effects tasks, including layer adjustment, frame blending, 3D compositing, and Cineon file import. The Info panel displays 16-bpc color values with exact precision.

When rendering to output module depths of Trillions Of Colors, set the project to 16-bpc color depth to take advantage of the output file's extra color precision.

To choose a project color depth

Do one of the following:

• Choose File > Project Settings, and choose a color depth from the Color Depth menu.

• In the Project panel, Alt-click (Windows) or Option-click (Mac OS) the Project Color Depth button.

To expand the range of luma levels

Some file format modules convert 8-bpc luma from certain hardware, such as cameras, to RGB levels within the range of 16 to 235. In 8-bpc mode, After Effects works with RGB levels from 0 to 255. If blacks or whites appear either crushed or faded, there may be a luma range mismatch that you can correct by expanding the range of luma levels. You can expand the range of the luma levels to 0 to 255 without having to apply a Levels effect. Luma expansion also works with 16-bpc footage and projects.

1. Select the footage in the Project panel and choose File > Interpret Footage > Main, and select Expand ITU-R 601 Luma Levels.

Note: In 32-bpc projects, After Effects can generate over-range values that let you work with whiter-than-white, or over-bright, values (for example, values above 235 in an 8-bpc file).

Color management

Color images can look different when viewed with different display devices and in different contexts. For example, an image displayed on a computer monitor may look different from the same image displayed on a video monitor or projected onto a movie screen. Colors shift because different devices use different methods to create color and produce different ranges of colors.

In After Effects, you can compensate for color output between different display devices by first calibrating and profiling your monitor and then selecting an RGB working color space, an intermediate color space used to define and edit color, which After Effects uses for all pixel color calculations. Each project can have its own working color space, which is saved with all other project settings in the project (.aep) file. When After Effects displays pixels, it converts from the working color space (which characterizes the space colors are in) to the monitor profile (which defines how the monitor reproduces color) to produce predictable, consistent color.

Because After Effects doesn't honor ICC profiles assigned to images such as those from Adobe Photoshop and doesn't assign profiles to files on output, it doesn't provide a complete color management system. However, if you calibrate and profile your monitor and set an RGB working color space for the project, colors in your images will look the same on any calibrated monitor.

To calibrate and profile your monitor

When you calibrate your monitor, you're adjusting it so that it conforms to a known specification. After your monitor is calibrated, the profiling utility lets you save a color profile. The profile describes the color behavior of the monitor—what colors can be reproduced on the monitor and how the color values in an image must be converted so that colors are displayed accurately.

Before you calibrate and profile your monitor, make sure that your work environment provides a consistent light level and color temperature. For example, the color characteristics of sunlight change throughout the day and alter the way colors appear on your screen, so keep shades closed or work in a windowless room.

Make sure your monitor has been turned on for at least half an hour. This gives it sufficient time to warm up

and produce more consistent output.

Make sure your monitor is displaying millions of colors or 24-bits-per-pixel or higher.

Remove colorful background patterns on your monitor desktop and set your desktop to display neutral grays. Busy patterns or bright colors surrounding a document interfere with accurate color perception.

Do one of the following to calibrate and profile your monitor:

In Windows, use the Adobe Gamma utility, located in the Control Panel.

Note: Don't use Adobe Gamma to calibrate an LCD (flat panel) monitor—it doesn't produce reliable results. Instead, use a hardware calibrator.

In Mac OS, use the Calibrate utility, located in the System Preferences/Displays/Color tab.

For best results, use third-party software and measuring devices. In general, using a measuring device such as a colorimeter along with software can create more accurate profiles because an instrument can measure the colors displayed on a monitor far more accurately than the human eye can.

Note: Monitor performance changes and declines over time; recalibrate and profile your monitor every month or so. If you find it difficult or impossible to calibrate your monitor to a standard, it may be too old and faded.

Most profiling software automatically assigns the new profile as the default monitor profile. For instructions on how to manually assign the monitor profile, refer to the Help system for your operating system.

To choose a working color space

If you don't choose a working color space for a project, After Effects uses the color space of the monitor. For best results, choose a working color space that matches your output color space. For example, choose SDTV (Rec 601 NTSC) if you're preparing footage for broadcast video, or choose sRGB IEC61966-2.1 if you're preparing footage for the web. A good match between working and output color spaces not only lets you take advantage of the After Effects color manage-

ment feature but also gives more accurate previews and somewhat more accurate results when linear blending is used (see To enable linear blending). Setting a working color space, however, can significantly slow RAM previews.

The color spaces available in After Effects vary based on the color profiles installed on your computer.

1. Choose File > Project Settings.

2. Choose a working color space from the Working Space menu.

3. Use the Color Profile Converter effect to convert a layer from one color space to another. For example, apply the Color Profile Converter effect to an adjustment layer at the top of a composition to convert output to a different color space.

To proof colors

If you've chosen a working color space, you can choose to proof your colors as they'd appear without the working color space applied; that is, as raw color values in the color space of the monitor.

1. Choose View > Proof Setup > Unmanaged.

2. Choose View > Proof Colors to toggle the proof display on and off. When proofing is enabled, a check mark appears next to the Proof Colors command.

Lesson 9: Building and Animating a 3D Object

Lesson 9 is the first of a two-part project that covers all aspect of 3D animation in After Effects. Here is some additional useful information about 3D editing in After Effects.

Using third-party 3D files

Though After Effects can import some third-party files with depth information and interpret the z-axis information in those files, it cannot animate individual objects within those files. After Effects treats each composited third-party 3D file as a single layer. That layer, as a whole, can be given 3D attributes and treated like any After Effects 3D layer, but the objects contained within that 3D file cannot be manipulated individually. To access the 3D depth information in these files, use the 3D Channel effects.

About z scale

Usually, scaling a layer's z axis has no effect on the layer because the layer itself has no depth. To add depth, you can change the position of the layer's anchor point or establish a parenting relationship with other layers. Once you add depth, scaling the layer's z scale value appears to change the layer's position.

How After Effects works with 3D image files

After Effects can import 3D image files saved in Softimage PIC, RLA, RPF, and Electric Image EI format. These 3D image files contain red, green, blue, and alpha (RGBA) channels, as well as auxiliary channels with optional information, such as z depth, object IDs, texture coordinates, and more.

With RLA and RPF files, all of the auxiliary channels are included in a single file. Softimage PIC files have a corresponding ZPIC file that contains the z-depth channel information. Although you can't import a ZPIC file, you can access the additional channel information as long as the ZPIC file is stored in the same

folder as the imported PIC file.

Similarly, Electric Image (EI) files can now have associated EIZ files with z-depth channel data. Just as with ZPIC files, you cannot import EIZ files into After Effects; instead, you simply store them in the same folder as the EI files. For information about creating EIZ files, see your Electric Image documentation.

After Effects can also import baked camera data, including focal length, film size, and transformation data, from Maya project files as a single composition or two compositions.

To import RLA or RPF data into a camera layer (Pro only)

After Effects imports camera data saved with RLA or RPF sequence files. That data is incorporated into a camera layer that After Effects creates in the Timeline panel. You can access the camera data of an imported RLA or RPF sequence and create a camera layer containing that data.

1. Place the imported sequence in the Timeline panel, and then select the sequence.

2. Choose Animation > Keyframe Assistant > RPF Camera Import.

Note: To create an RLA or RPF file with the camera data in 3D Studio Max, save your rendering in RPF format with Coverage, Z Depth, and Alpha Channels enabled.

Lesson 10: Using 3D Effects

Lesson 10 is the second of a two-part project on using 3D animation in After Effects. It covers 3D effects and using lights and cameras.

Camera settings

You can set up cameras in After Effects to simulate the capabilities of real-world cameras. Use camera settings to configure the camera view to match the settings you use to record video footage or to look at the footage from a new perspective. You can change camera settings at any time by selecting the camera layer and choosing Layer > Camera Settings.

Name—Specifies the name of the camera. By default, After Effects assigns the name Camera 1 to the first camera you create in a composition, and all subsequent cameras are numbered in ascending order. If you delete a camera, and are still using the After Effects default naming convention, After Effects names the next camera you create with the lowest available number. You should choose distinctive names for multiple cameras to make it easier to distinguish them.

Preset—Specifies the type of camera settings you want to use. Cameras come with several presets. The presets are named according to focal lengths. Each preset is meant to represent the behavior of a 35mm camera with a lens of a certain focal length. Therefore, the preset also sets the Angle Of View, Zoom, Focus Distance, Focal Length, and Aperture values. The default preset is 50mm. You can also create a custom camera by specifying new values for any of the settings.

Zoom—Specifies the distance from the position of the camera to the image plane.

Angle Of View—Specifies the width of the scene captured in the image. The Focal Length, Film Size, and Zoom values determine the angle of view. A wider angle of view creates the same effect as a wide-angle lens.

Enable Depth Of Field—Applies custom variables to the Focus Distance, Aperture, F-Stop, and Blur Level settings. Using these variables, you can manipulate the depth of field to create more realistic camera-focus-

ing effects. (The depth of field is the distance range within which the image is in focus. Images outside the distance range are blurred.)

Focus Distance—Specifies the distance from the camera's position to the plane that is in perfect focus.

Lock To Zoom—Makes the Focus Distance value match the Zoom value.

Note: If you change the settings of the Zoom or Focus Distance options in the Timeline panel, the Focus Distance value becomes unlocked from the Zoom value. If you need to change the values and want the values to remain locked, then use the Camera Settings dialog box instead of the Timeline panel. Alternatively, you can add an expression to the Focus Distance property in the Timeline panel: Select the Focus Distance property, and choose Animation > Add Expression; then drag the expression pick whip to the Zoom property.

Aperture—Specifies the size of the lens opening. The Aperture setting also affects the depth of field; increasing the aperture increases the depth of field blur. When you specify new values for Aperture, the values for F-Stop change dynamically to match it.

F-Stop—Represents the ratio of the focal length to aperture. Most cameras specify aperture size using the f-stop measurement; thus, many photographers prefer to set the aperture size in f-stop units. When you specify new values for F-stop, the values for Aperture change dynamically to match it.

Blur Level—Controls the amount of depth-of-field blur in an image. A setting of 100% creates a natural blur as dictated by the camera settings. Lower values reduce the blur.

Film Size—Specifies the size of the exposed area of film, which is directly related to the composition size. When you specify new values for Film Size, the Zoom value changes to match the perspective of a real camera.

Focal Length—Specifies the distance from the film plane to the camera lens. In After Effects, the camera's

position represents the center of the lens. When you specify new values for Focal Length, the Zoom value changes to match the perspective of a real camera. In addition, the Preset, Angle of View, and Aperture values change accordingly.

Units—Specifies the units of measurement in which the camera setting values are expressed.

Measure Film Size Specifies the dimensions used to depict the film size. About 3D previews

You can speed up preview time for 3D layers by enabling Wireframe mode on the Fast Previews menu or by using Draft 3D mode. These preview modes reduce the amount of data displayed in a 3D layer, so the screen redraws faster. You can also use OpenGL for faster previews of 3D layers.

About 3D rendering

After Effects provides three 3D rendering plug-ins: Advanced 3D, Standard 3D, and OpenGL Hardware. These plug-ins compute the motion blur, lighting, shadow, and depth-of-field information unique to 3D. OpenGL also provides rendering support for a number of other 2D effects. After Effects can also use OpenGL—if the appropriate hardware is available—during interactions like moving and rotating layers. After Effects can use the Advanced 3D rendering plug-in to create both RAM previews and output files. The 3D rendering plug-in you specify becomes the default for future compositions.

Lesson 11: Advanced Editing Techniques

Lesson 11 looks at some of the advanced editing techniques available in the Professional version of After Effects 7.0. However, it only touches on one new and important feature: support for HDR color. Here is some additional information about HDR, as well as a tutorial, to supplement the lesson.

Working with natural light in HDR

It's a common yet mistaken assumption that the only After Effects Professional users who have any business using 32-bit mode are artists working on big-budget blockbuster films. The reality is that anyone using the Professional edition can benefit from the 32-bit HDR pipeline. Not only does 32-bit mode mean more colors and more accuracy than the 8-bit or 16-bit modes, it also means that the behavior of light and color in After Effects is remarkably similar to the behavior in the natural world. In this tutorial, you'll explore how 32-pbc images preserve the full range of light data, and how the same principals apply whether or not you're starting with a 32-bit source.

The files used in this tutorial are on Disc 2 of the Total Training Video Workshop (included with After Effects). Depending on the television standard for your region, copy either the NTSC or PAL folder from the After Effects 7.0 folder to your desktop. Alternatively, you can follow along using your own files. You'll need an After Effects project file and a layered 32 bpc PSD file.

Work with 32-bit input

The most obvious advantage for 32-bit support is that it allows you to work with 32-bit source images. Such images can store light values beyond what your monitor displays as full white. These light values are useful when you want to manipulate the light, such as bringing the light values of your scene down. In 8-bit and 16-bit images, really bright white values are clipped to the color space's highest value; bringing these clipped colors down turns them gray. However, 32-bit images, which retain the original (non-clipped) values, behave

much more like natural light, even through several color corrections.

Adjust the exposure of an HDR image

1. Open the After Effects project HDR_1.aep. Select the PSD file. Its thumbnail, labeled Floating Point, appears at the top of the Project panel. The bottom of the Project panel indicates that the file is in 32 bpc mode.

2. From the Workspace menu, choose Standard to ensure that the Info panel is clearly visible. Select Auto Color Display from the Info panel menu.

3. Move the pointer around the image in the Composition panel, noting the R, G, and B values in the Info panel. Most of the image's pixel values are in the normal Decimal range of 0.0 to 1.0. (In 8-bit terms, this range is 0 to 255.) Now move the pointer over the brightest areas of the image, and note that the values are greater than 1.0. These areas contain whiter-than-white values.

4. Select the HDR.psd layer in the Timeline panel, and choose Effect > Color Correction > Levels. Move the pointer over the brightest areas again, and note that the values are 1.00. In the Effect Controls panel, deselect Clip To Output White. Note that the values are again greater than 1.0. Set Output White to 0.5. The result is similar to stopping down a camera's lens aperture, reducing the amount of light entering the camera.

5. Select Clip To Output White, and notice that the bright values turn gray. If the brightest possible white is limited to 1.0 (with clipping on), setting Output White to 0.5 turns it medium gray. But if the brightest possible white is limited to 2.0 (with clipping off), setting Output White to 0.5 turns it back to full white, or 1.0 (with clipping on). Darker values in the visible range also change proportionally.

6. Apply a second Levels effect just as you did in step 3. This time, set Output White to 2.0. Look familiar? Essentially, you restored the levels to their original values with the second occurrence of the effect. Toggle the effects off for this layer by clicking the Effect switch in the Timeline panel. Note that no loss of image quality occurs, even though you made two drastic Levels adjustments. The image quality is retained because the HDR pipeline provides space to store and retrieve the value changes.

Take advantage of HDR without 32-bit source

Even if you don't have HDR source material available, the ability to work with values that fall outside the range of your monitor can still transform your work.

1. Open the project HDR_2.aep. The Main composition consists of three layers: a precomposed Source Text 3D layer, a Camera 1 layer, and a Light 1 layer. In the Timeline panel, reveal the properties for the Camera 1 layer. Notice that Depth Of Field is on, and Focus Distance is at the center of the text layer. Reveal the properties for the Light 1 layer. Notice that at frame 0 Intensity is set to 100%, and at the end frame it's set to 1000%, ten times greater.

2. In the lower right corner of the Composition panel, adjust the Exposure control by dragging across the value beside it. Dragging to the right increases the exposure; dragging to the left decreases exposure. Increasing the value by 1.0 is equivalent to increasing exposure by one stop.

3. Alt-click (Windows) or Option-click (Mac OS) the 32 bpc button at the bottom of the Project panel, toggling the mode to 8 bpc. Not only do the lighting effects disappear, but so does the Exposure control, which is available only in 32 bpc mode.

Note: The Exposure control is for previewing purposes only. To achieve similar results that show up in your final render, increase the Intensity of the light or apply the Exposure effect. (Keep reading for more information.)

Go further with HDR

• Several effects have been upgraded to work in 32 bpc, and new effects have been added to take advantage of HDR. In the Effects & Presets panel, choose Show 32 bpc Effects Only from the panel menu to see these effects. Many are ideal for blurs and color correction.

• A separate, somewhat more complicated benefit of HDR is the Linear Blending option. To set this option, choose File > Project Settings. Linear Blending changes the way that After Effects works internally with gamma; it combines light levels in a way that's similar to how they're combined in the real world. However, to use this option properly, the source images and the working space of your project must be converted to support an altered gamma. For more information, see After Effects Help.

What is happening in 32-bit HDR mode?

As you've just seen, 32 bpc can calculate and hold values even above the brightest value that your monitor can display. (Monitors display brightness at 1.0 on a decimal scale, or at 255 in 8 bpc color.) But what use are these color values if your monitor can't display them? Because the bright values aren't clipped, they're more realistic. The real world contains brightness values far beyond what your monitor can display. And now you can capture a little bit of that reality in After Effects.

Lesson 12: Rendering and Outputting

Lesson 12 covers the topics rendering and outputting. Here is some addition information about DV and HD output.

Getting video out of your computer

Once you have finished assembling and editing clips, it's time to get your final production out of your computer and on its way to distribution. These days, creative professionals are expected to deliver video that can be used in multiple media. Broadcast and film professionals alike are now creating web-based work, while web designers may need to create animations that are output in video formats. DVDs have also become an extremely popular way to combine high-quality video and audio content with menu-driven interactivity. To address this growing need for flexibility, After Effects offers a wide range of options that enable you to produce high-quality deliverables for any medium.

The project you edited in the Timeline does not actually contain the material from which it was pieced together. Rather, it references your source files. Before export, make sure that the Timeline is ready to output at the quality you require. For example, replace any offline files with high-resolution files suitable for final export. To get your edited program out of your computer in one piece, you can:

• Record the timeline to physical media including videotape or motion picture film, assuming that you have the proper hardware for video or film transfer, or have access to a service provider that offers the appropriate equipment and services.

• Export a video file for viewing from a hard disk, removable cartridge, CD, DVD, or the web.

• Export portions of your timeline as clips.

• Capture stills or sequences of stills.

Good housekeeping

In professional production environments, after a video project has been completed, it is typically cleared from the editing system to make room for new work.

Because the multigigabyte storage media that would be needed is costly, and the process of uploading can be very time-consuming, projects and source files are not usually saved in their entirety. If you do want to save your entire project, you can trim unused frames from some or all of your source clips and remove unused clips in their entirety from Project Bins.

Typically, however, a digital master file is exported and archived, the original raw footage is stored on tapes, and an Edit Decision List (EDL) is saved. If the project needs to be revised later, the master file can often be edited. For more extensive repurposing, the EDL can be used to recapture the necessary clips from the original tapes. Files used to develop titles, graphics, and animations, as well as portions of the project that have undergone extreme manipulation to achieve special effects can also be archived.

Today, more and more production professionals are exporting Advanced Authoring Format (AAF) files rather than EDLs to archive or exchange projects. AAF is a widely supported industry standard for high-end exchange of data, such as the information necessary to transfer a video project from one platform to another. An AAF file helps you preserve as much of the project's integrity as possible when you transfer it to another system. However, not all elements of a project can be successfully transferred using AAF. Also, the application you use to open the AAF file may not support all features. In general, an AAF file dependably translates editing data and commonly used transitions, such as cross-dissolves and wipes, but does not support effects (filters) or audio fade and pan information, including audio transitions.

Exporting to videotape

You can record your edited program onto videotape directly from your computer. This process can be as simple as playing the Timeline and recording on a connected device. When you record standard DV video back to standard DV tape, all that is required is an IEEE 1394 connection. However, if you plan to record DV audio and video to an analog format, such as VHS

tape, you'll need a device that can convert DV to analog using the connectors supported by your analog video recorder. Most DV cameras and all DV video tape recorders are capable of this conversion; some DV cameras require you to record the video to DV tape, then copy the DV tape to the analog video recorder.

Exporting to digital files

You can prepare variations of a program or clip for a variety of different uses. For example, you can create separate versions for DVD distribution and web viewing. Adobe Premiere Pro and After Effects both offer built-in support for exporting the following digital video file formats: Microsoft AVI, Animated GIF, Quick-Time, MPEG-1 and -2, as well RealMedia and Windows Media files for the web. After Effects also exports Adobe Flash (SWF) files. Several audio-only formats and a variety of still-image and sequence formats are also supported by both applications. Additional file formats may be available if provided with your video capture card or if you add third-party plug-in software.

To start the export process, you enter settings that determine the properties of the final file. These settings may include the data rate for playback, the color depth, the frame size and frame rate, the quality, and what type of compression method, or codec, to use. Choosing compression settings is a balancing act that varies depending on the type of video material, the target delivery format, and the intended audience. Often, you discover the optimal compression settings through trial and error. Prior to distribution, you should always test the files you export on the type of platform or equipment you expect your audience to use.

Web video

The web is rapidly gaining importance as a vehicle for distributing video content. From training programs, to sharing the experience of personal events such as weddings, to full-length feature films, video delivered via the Internet or a corporate intranet is big business.

DVD

Adobe Encore DVD adds creative authoring for professional DVD production to the Adobe Production Stu-

dio solution set. To learn more about DVD production and Adobe Encore DVD, take a look at the Adobe DVD Primer on the Adobe website at www.adobe.com/motion/primers.html.

What is high definition?

After years of anticipation, high definition (HD) video production has become widespread. Over-the-air HDTV is rapidly building an audience, and high definition DVD development is proceeding quickly. Even people not producing for an HD audience are using HD formats during production and post-production. For example, the pioneering DVD company Criterion uses HD on D5 tape for digital intermediates from their telecine captures. Suddenly, companies are finding that they have HD content to distribute and are looking for ways to distribute it.

The myth is that HD is very expensive and difficult to author. The reality is that HD has become cheaper and easier to use than standard definition (SD) was only a few years ago. Today, you can build a complete entry-level HD production system, including storage, software, and camera, for under U.S.$10,000. Higher-end and uncompressed HD editing systems can be much more expensive, but they are also declining in price as more options enter the market.

Types of HD

High definition simply means more than standard definition (SD). The highest resolution SD format is PAL, with 576 lines. Thus, almost any video frame with a vertical size greater than 576 lines is considered HD. If a final video is destined for playback on a computer monitor or a custom device, you can create your own frame dimensions. However, most HD video is either 1920 x 1080 or 1280 x 720, with a 16:9 aspect ratio.

Post-production for HD content

In the Adobe production workflow, post-production is the domain of Adobe Premiere Pro for editing, Adobe Audition for sound mixing and sweetening, and After Effects for compositing and finishing.

Post-production for HD is similar to post-production for SD. One difference is that with HD you're dealing

with significantly more data and consequently increasing the load on the CPU and video card. However, if you have worked in Adobe Premiere Pro and After Effects for SD, you can use the same tools and enjoy the same workflow in HD.

A complete HD post-production suite can include a workstation for acquisition and editing, and another for scene-by-scene color correction and effects. With two workstations, an Editor and Colorist can work on different parts of the production at the same time. One or more videotape playback decks may be located near the editing workstation for acquisition, depending on the formats used in production. To ensure that high quality is maintained throughout the process, a suite should include at least one high-resolution monitor. High performance computers and a RAID array are used for fast processing, and reliable mass storage.

Choosing an HD monitor

HD video monitors can be quite expensive, especially models with an HD-SDI input. However, a true professional-grade HD video monitor is essential for any producer working with HD destined for broadcast.

For some tasks, a computer monitor is a less expensive way to view the actual HD output, especially for projects that use progressive scanning. However, computer monitors use a different color temperature from true video monitors, so it's beneficial to use a video monitor to ensure that you see the true representation of the video as it will be delivered. A number of vendors offer HD-SDI to Digital Video Interface (DVI) converters to drive computer monitors. High-quality 1920 x 1200 LCD monitors are now available for around US$2000, so this converter is cost effective. Because computer monitors are natively progressive, these converters are not a good solution for natively interlaced projects in Adobe Premiere Pro. (Conversion isn't an issue with After Effects because the preview is progressive.)

Another advantage of using broadcast monitors is calibration. These monitors provide features that easily set them to the canonical 709 color space of HD. While this setting is possible with a computer monitor as well, correctly setting the calibration can be difficult or inaccurate. Even systems with a colorimeter for automatic color configuration don't always include 709 presets.

HD can be slow!

The additional throughout and processing power required for HD production often exceeds the capabilities of even the fastest computers. A computer that handles SD video simply cannot be expected to provide the same performance with HD, without a little help. The good news is that modern tools give you a number of techniques to get around these limitations.

Specifying rendering quality and compression

After Effects has several rendering modes. For final output, you should always use the highest quality mode, especially when your final product is to be compressed. High-quality mode can increase compression efficiency, resulting in fewer image artifacts.

Rendering in After Effects

16-bit per channel (bpc) rendering was introduced in the After Effects Production Bundle and is now available in both After Effects Standard and After Effects Professional. The 16-bpc rendering process doubles the number of bits available for each channel, which greatly increases the precision of the video rendering. That extra precision is quite useful, especially in reducing the appearance of banding in an image with subtle gradients. This precision has a cost. 16-bpc rendering takes twice the time and requires twice as much RAM as 8-bpc rendering.

16-bit per channel rendering is adequate for most video, and After Effects also features 32-bit rendering for high dynamic range (HDR) footage. Floating-point numeric values allow the same number of bits to describe a much wider range of values than fixed-point values; 32-bits per channel allow for much greater precision than do 8- or 16-bits per channel. This flexibility enables you to work with images that have a very wide range of brightness levels, more like the range of levels found in the real world.

Rendering in 16 or 32 bpc isn't necessary when encoding to an 8-bpc delivery format like Windows Media or MPEG-2. It does, however, provide a very welcome quality boost when going back out to 10-bpc formats like D5.