



Adobe®
After Effects® CC

CLASSROOM IN A BOOK®

The official training workbook from Adobe Systems

Instructor Notes

Adobe® After Effects® CC Classroom in a Book®

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INSTRUCTOR NOTES

Getting Started

The Adobe After Effects CC Classroom in a Book course presents students with tips, techniques, and solutions for using the Adobe After Effects CC software. The Instructor Notes are intended to complement the information in *Adobe After Effects CC Classroom in a Book*.

The information is organized to follow the sequence of instruction in each lesson.

Course strategy

If you're teaching a 15-session class, you can teach approximately one chapter of this book per class. The book contains 14 lessons, some of which may take a while to complete. If you are teaching a 10-session class, you may want to combine some of the lessons in a single class. For example, Lessons 1 and 2 cover the basic workflow and most fundamental tasks in After Effects.

Managing student projects

One way to simplify file storage and retrieval in classroom situations is to ask students to create a folder on their hard disks, name it *Student's* [for the student's name] Lessons, and then copy each project folder into the main Lessons folder. Having students keep all their working files in their own Lessons folder makes it easier for you to clean up files when a class is over.

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 elements of the After Effects work area, which they'll need to understand as they proceed with the lessons in this book.

About the 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. 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—into 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 in front of the application window. As you rearrange panels, the other panels resize automatically to fit the window. You can use floating windows to create a customized workspace, and can place panels on multiple monitors.

Finding missing dependencies

After Effects CC provides a new way to quickly find missing fonts, effects, or footage files. Talk with students about what might cause footage to be missing; for example, if you move files to a different folder, After Effects won't find the footage automatically.

Emphasize that After Effects does not store the original footage files within your project file; it links to the files it needs. Point out that you can choose File > Dependencies > Find Missing Footage, or you can type **Missing Footage** into the Search box in the Project panel.

You can use the same method to find missing fonts and effects, too.

Using a scroll-wheel mouse

If your mouse has a wheel for scrolling, you can use it to 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, press Alt (Windows) or Option (Mac OS) as you roll the mouse wheel forward.
- To zoom out of the area under the pointer, press 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, press 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.

Viewing a RAM preview

Remind your students to have patience when they create a RAM preview. The status bar appears as After Effects renders the frames, and then the RAM preview plays. The time it takes to render the preview depends on how many frames are included, the complexity of applied effects, and the computer's processor and RAM. Remember that you can create a RAM preview for a small portion of the project by adjusting the work area in the Timeline panel.

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.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 How do you add footage items to a composition?
- 2 How can you modify effect settings?
- 3 Where can you learn more about an After Effects feature or effect?

Answers

- 1 To add a footage item to a composition, drag it from the Project panel to the Timeline panel, positioning it where you want it to appear in the layer stack.
- 2 To modify effect settings, change the values in the Effect Controls panel or in the affected layer's properties in the Timeline panel.
- 3 To learn more about an After Effects feature or effect, enter a search term in the Search Help box in the upper right corner of the application window, or choose Help > After Effects Help.

Lesson 2: Creating a Basic Animation Using Effects and Presets

After Effects 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 presets. These notes provide additional background about animation presets.

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.

Many animation presets don't actually 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, see After Effects Help.

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 shows 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.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 How can you preview files more clearly in Adobe Bridge?
- 2 Name two ways to create a new composition.

Answers

- 1 To see files more clearly, drag the thumbnail slider at the bottom of the Adobe Bridge window to enlarge thumbnail previews in the Content panel.
- 2 To create a new composition, click the Create A New Composition button at the bottom of the Project panel, choose Composition > New Composition, or press Ctrl+N (Windows) or Command+N (Mac OS).

Lesson 3: Animating Text

Lesson 3 explores the many text options and text animation features in After Effects. 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 onscreen 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. Most of the projects in Classroom in a Book use fonts included with the After Effects CC installation, but you can substitute other fonts if you prefer, or if the suggested font is not available on the system. Remind students, however, that if they use a different font, their project's appearance will differ from the images in the book.

Using 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.

Editing 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. When the Type tool is selected, move the pointer (an I-beam) directly over a text

layer and click to edit the existing text. Click in another area in the Composition panel to create a new text layer. Shift-clicking 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 the text.

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

Blending overlapping characters in a text layer

For a different effect, you can blend overlapping characters:

- 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.

Changing the direction of text

The Vertical Type and Horizontal Type tools create 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, *paragraph text* (justifiable text that wraps within a bounding box) behaves differently from *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.

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 offscreen may start onscreen. 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.

Animating 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 value (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 characters are 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.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 What is the difference between point text and paragraph text?
- 2 Which panels do you use to format text?
- 3 How can you display a grid to help you position objects?
- 4 What does Easy Ease do?

Answers

- 1 In point text, each line of text is independent; in paragraph text, the text wraps within the bounding box as you form one or more paragraphs.
- 2 Use the Character panel to format character-level attributes, such as font and font style. Use the Paragraph panel to format paragraph-level attributes, such as indentation.
- 3 To display a grid, choose View > Show Grid.
- 4 Easy Ease softens animations so that objects ease into and out of starting and stopping places, instead of beginning and ending abruptly.

Lesson 4: Working with Shape Layers

Shape layers are separate layers that contain vector objects called shapes. By default, a shape consists of a path, a stroke, and a fill. Shape layers provide a straightforward way of creating filled shapes in a composition, without having to create a solid layer and then mask it. In Lesson 4, students use shape layers to create the background for the introduction of a reality series. These notes provide additional information about shapes and shape layers.

About shapes

You create a shape layer by drawing in the Composition panel with one of the shape tools (the Rectangle, Rounded Rectangle, Ellipse, Polygon, or Star tool) or the Pen

tool. Shape layers are not based on footage items. Layers that are not based on footage items are sometimes called *synthetic layers*. Text layers are also synthetic layers and are also composed of vector objects, so many of the rules and guidelines that apply to text layers also apply to shape layers. For example, you can't open a shape layer in a Layer panel, just as you can't open a text layer in a Layer panel.

There are two varieties of shape paths: parametric shape paths and Bezier shape paths. Parametric shape paths are defined numerically, by properties that you can modify and animate after drawing, in the Timeline panel. Bezier shape paths are defined by a collection of vertices (path points) and segments that you can modify in the Composition panel. When you create a shape by dragging with a shape tool in the Composition panel, you create a parametric shape path. To instead create a Bezier shape path, press Alt (Windows) or Option (Mac OS) before you click to begin dragging. You can release the key before you complete the drag operation. You work with Bezier shape paths in the same way that you work with mask paths. All mask paths are Bezier paths.

You can modify a shape path by applying path operations, such as Wiggle Paths and Pucker & Bloat. You apply a stroke to a path or fill the area defined by a path with color by applying paint operations.

Shape paths, paint operations, and path operations for shapes are collectively called shape attributes. You add shape attributes using the Add menu in the Tools panel or in the Timeline panel. Each shape attribute is represented as a property group in the Timeline panel, with properties that you can animate, just as you do with any other layer property.

You can save custom shapes as animation presets.

Creating shapes and shape layers

To create a shape layer, draw in the Composition panel with a shape tool or the Pen tool. By default, if you draw in the Composition panel when a shape layer is selected, you create a new shape within that shape layer, in front of the selected shapes or group of shapes. If you draw in the Composition panel using a shape tool or Pen tool when an image layer other than a shape layer is selected, you create a mask.

To create a new shape layer, first press F2 to deselect all layers, and then draw in the Composition panel. Or, choose Layer > New > Shape Layer. You can draw a shape with the Rectangle, Rounded Rectangle, Ellipse, Polygon, or Star tool. (A polygon is a star without an Inner Radius or Inner Roundness property, so when you create either a polygon or a star, After Effects calls the shape a polystar.)

A new shape's fill and stroke are determined by the Fill and Stroke settings in the Tools panel when the shape is drawn. To change the fill and stroke, select the shape, and change the Fill and Stroke settings in the Tools panel.

Each shape tool retains the settings of the most recent drawing operation performed with that tool. For example, if you draw a star and modify the number of points to be 10, the next star you draw will also have 10 points. To reset a tool's settings and create a shape with the default settings, double-click the tool in the Tools panel.

To draw a mask on a shape layer, select a shape or Pen tool, and then click the Tool Creates Mask button in the Tools panel. Then, draw the mask.

To reposition a shape or mask as you are drawing, hold the spacebar or the middle mouse button while dragging.

To scale a circle, ellipse, square, rounded square, rectangle, or rounded rectangle around its center while drawing, hold the Ctrl (Windows) or Command (Mac OS) key after you begin dragging. Don't release the key until you have released the mouse button to finish drawing.

To cancel the drawing operation, press Escape.

To create a shape the size of the layer, select an existing shape layer or deselect all layers to create a new layer, and then double-click a shape tool in the Tools panel.

Creating shapes from text characters

You can convert individual text characters into shapes. To create shapes for all the characters in a text layer, select the text layer in the Timeline panel or the Composition panel; to create shapes for specific characters, select only those characters in the Composition panel. Then, choose Layer > Create Shapes From Text.

The Create Shapes From Text command extracts the outlines for each character, creates shapes from the outlines, and puts the shapes on a new shape layer. You can then use these shapes as you would any other shape.

The new shape layer is created at the top of the layer stacking order. The new layer contains one shape group for each selected character, plus fill and stroke properties that match those of the text. When characters consist of compound paths, such as "i" and "e," multiple paths are created and combined with the Merge Paths path operation. Effects, masks, layer styles, and keyframes and expressions for properties in the text layer's Transform property group are copied to the new shape layer. The Video switch for the text layer is turned off.

About groups and render order for shapes

Though by default a shape consists of a single path, a single stroke, and a single fill—arranged from top to bottom in the Timeline panel—much of the power and flexibility of shape layers arises from your ability to add and reorder shape attributes and create more complex compound shapes.

A group is a collection of shape attributes: paths, fills, strokes, path operations, and other groups. Each group has its own blending mode and its own set of transform

properties. By assembling shapes into groups, you can work with multiple shapes simultaneously—such as scaling all shapes in the group by the same amount or applying the same stroke to each shape. You can even place individual shapes or individual shape attributes within their own groups to isolate transformations.

For example, you can scale a path without scaling its stroke by grouping the path by itself.

When you add a shape attribute using the Add menu in the Tools panel or Timeline panel, the attribute is added within the group that is selected. You can drag groups and attributes to reorder them in the Timeline panel. By reordering and grouping shapes and shape attributes, you can affect their rendering order with respect to other shapes and shape attributes.

Snapping layers

The snapping feature is new in After Effects CC. When Snapping is selected in the Tools panel, snapping features guide you to position layers in relationship to each other. This is an incredibly handy feature for positioning layers, but make sure students understand that it does not work with shape layers. In the exercise, they duplicate and arrange solid layers to create a checkerboard background; because they are solid layers, the snapping feature is available.

The checkerboard exercise is to help students learn to use the snapping feature. However, if students want to create checkerboards for their own projects, point out the Checkerboard effect in After Effects.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 How can you add a gradient fill to a shape?
- 2 How can you alter the shape of a polygon?
- 3 How can you access blending modes in the Timeline panel?

Answers

- 1 To add a gradient fill to a shape, click the word *Fill* in the Tools panel to open the Fill Options dialog box, select either the Linear Gradient or Radial Gradient option, and click OK. Then click the Fill Color box to open the Gradient Editor, and assign colors to the color stops.
- 2 To alter the shape of a polygon, change its attributes in the Polystar Path section of the Timeline panel. You can change the number of points, Outer Roundness value, and other properties.
- 3 Click the Toggles Switches/Modes button at the bottom of the Timeline panel to display the Mode menu for each layer.

Lesson 5: Animating a Multimedia Presentation

Lesson 5 builds a complex animation involving multiple layers, several types of keyframes, audio, and more. It starts from a layered, imported Adobe Photoshop file. These notes provide additional background and teaching material on how After Effects works with Photoshop and Adobe Illustrator files.

Layered files

You can import Photoshop, 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, After Effects does not read embedded color profiles from Illustrator files. To ensure color fidelity, assign an input color profile to the Illustrator footage item that matches the color profile with which the Illustrator file was created.

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 - Retain Layer Sizes, makes it easier to manipulate layers and speeds their rendering time.
- As a new composition, with each layer in the Photoshop 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 alpha channels for each layer. 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, refer to After Effects Help.

Using 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.

Continuously rasterizing 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 more slowly 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. By default, nonrasterized layers are rendered in the following order: masks, effects, and then geometrics (transformations). 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.

Designing an Illustrator workflow for video production

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

- **Customize the new document profile**—You can customize the default settings for new files by editing the new document profile that Illustrator CC uses for video files. 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 graphic styles or symbols, you can save them into the new document profile, and they'll be available in every Illustrator 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 document that creates an untitled document when you open it. You can use templates to create frequently used documents that differ from your customized new document profile. 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 CC Template from the Format menu in the Save As dialog box. Open a template using the same methods you use to open a document.
- **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.
- **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 document.

Editing Illustrator CC files within After Effects projects

You can open Illustrator CC files in After Effects projects directly from After Effects. To open an Illustrator CC file, select it in the Project panel and choose Edit > Edit Original. When you save the file in Illustrator, the file is automatically updated in After Effects

Questions

The following questions are not in the student's Classroom in a Book.

- 1 Define a *parenting relationship*.
- 2 How can you display the anchor point in the Layer panel?
- 3 What does an alpha matte do?

Answers

- 1 A *parenting relationship* between layers synchronizes the changes in the parent layer with the corresponding transformation values of the child layers. That is, when you make changes to the parent layer, the child layers also change.
- 2 To display the anchor point, choose Anchor Point Path from the View menu at the bottom of the Layer panel.
- 3 An alpha matte uses the alpha channel of one layer to mask another layer.

Lesson 6: Animating Layers

Lesson 6 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 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.

Selecting which properties are shown in the Graph Editor

Click the Choose Which Properties Are Shown 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 Choose Graph Type And 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 you to place 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.

Panning and zooming 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.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 What does the Solo switch do?
- 2 What is a *traveling matte*?
- 3 How does the Corner Pin effect work?

Answers

- 1 The Solo switch isolates the layer or layers, making other layers inactive. Soloing layers can speed animating, previewing, and rendering, as well as make it easier to focus on particular layers.
- 2 A *traveling matte* is an animated track matte.
- 3 The Corner Pin effect marks four corners of an object, and then animates those points over time. You can use it to stretch, shrink, skew, or twist an image, or to simulate perspective or movement that pivots from the edge of a layer, such as a door opening.

Lesson 7: Working with Masks

Lesson 7 introduces students to the concept of masks. They learn 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.

Enhancing animation

In a video production workflow, Illustrator 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 are also used in video production applications to control motion paths and timelines. You can use Illustrator 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 to prepare shapes for morphing and tweening.

Creating motion paths in Illustrator

The path-drawing features in Illustrator 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 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, in Illustrator, you can draw a path using the tool that most efficiently creates the shape you want.

For example, consider 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 and copy and paste it into After Effects.

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

- 1** In Illustrator, 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

Questions

The following questions are not in the student's Classroom in a Book.

- 1** What is the default mask mode and how does it affect masks?
- 2** How can you change the mask mode for a layer?
- 3** How can you draw a perfect square or circle?

Answers

- 1 Add is the default mask mode. It combines the transparency values of any masks that overlap on the same layer.
- 2 To change the mask mode for a layer, select a different mode from the Mask Mode pop-up menu for the layer in the Timeline panel.
- 3 To draw a perfect square or circle, press the Shift key as you drag the Rectangle tool or Ellipse tool, respectively.

Lesson 8: Distorting Objects with the Puppet Tools

The Puppet tools let you pull, push, stretch, twist, and otherwise distort objects in a composition. There are four Puppet tools: You use three of the tools to place pins that determine how and where distortion occurs; the remaining tool makes it easier to record the pins' animation.

In Lesson 8, students use the Puppet tools to animate a character slipping on a banana peel. These notes give you additional information about the Puppet tools and other distortion effects.

About the Puppet tools

Use the Puppet tools to quickly add natural motion to raster images and vector graphics, including still images, shapes, and text characters. The Puppet tools actually work within the Puppet effect, but unlike other effects, you don't need to apply it using the Effect menu or the Effects & Presets panel. Instead, use the Puppet tools in the Tools panel to directly apply and work with the effect in the Layer or Composition panel.

The Puppet effect works by deforming part of an image according to the positions of Deform, Overlap, and Starch pins that you place and move.

About the Puppet Pin tool

With the Puppet Pin tool, you place and move Deform pins, which determine how much deformation takes place in particular areas of an image.

About the Puppet Overlap tool

With the Puppet Overlap tool, you place Overlap pins, which determine which parts of an image appear in front of others when distortion causes parts of the image to overlap each other. You apply Overlap pins to the original outline, not to the deformed image.

Each Overlap pin has the following properties:

In Front—The apparent proximity to the viewer. The influence of Overlap pins is cumulative, meaning that the In Front values are added together for places on the mesh where extents overlap.

Extent—How far from the Overlap pin its influence extends. The influence ends abruptly; it does not decrease gradually.

About the Puppet Starch tool

With the Puppet Starch tool, you place Starch pins, which stiffen parts of the image to reduce the distortion of that area. Apply Starch pins to the original outline, not to the deformed image.

Each Starch pin has the following properties:

Amount—The strength of the stiffening agent. The influence of Starch pins is cumulative, meaning that the Amount values are added together for places on the mesh where extents overlap. If you notice image tearing near a Deform pin, use a Starch pin with a very small Amount value (less than 0.1) near the Deform pin to maintain the image's integrity.

Extent—How far from the Starch pin its influence extends. The influence ends abruptly; it does not decrease gradually with distance from the pin.

About the Puppet Sketch tool

The Puppet Sketch tool is unlike the other Puppet tools. You do not use it to place pins; instead, you use the Puppet Sketch tool to sketch the motion path of Deform pins in real time, or at a speed that you specify. In fact, if your composition contains audio, you can sketch the motion path of the pins in time with the audio.

To configure settings for recording, click Record Options in the Tools panel. The following options are available:

Speed—The ratio of the speed of the recorded motion to playback speed. If Speed is 100%, the motion is played back at the speed at which it was recorded. If speed is greater than 100%, the motion plays back more slowly than it was recorded.

Smoothness—Determines how smooth the motion is. Set this value higher to remove extraneous keyframes from the motion path as it's drawn. Creating fewer keyframes makes the motion smoother.

Use Draft Deformation—Ignores Starch pins in the draft distortion displayed during recording. This can improve performance for a complex mesh.

To use the Puppet Sketch tool to record animation, select the Deform pin or pins you want to animate and go to the time at which to begin recording motion. Then, in the Composition or Layer panel, press Ctrl (Windows) or Command (Mac OS) to

activate the Puppet Sketch tool, and Ctrl-drag (Windows) or Command-drag (Mac OS) the pins to animate them.

Recording begins when you click to begin dragging, and it ends when you release the mouse button. The color of the outline for the mesh for which motion is being sketched is the same as the color of the pin. Reference outlines for other meshes on the same layer are the colors of the layer's label.

When you finish recording, the current-time indicator returns to the time at which recording began so that you can deform other pins for the same time period.

Using the Puppet mesh

When you place the first pin, the area within an outline is automatically divided into a mesh of triangles. Each part of the mesh is associated with the pixels of the image, so the image's pixels move with the mesh. (To show the mesh, select Show in the Tools panel.)

When you move one or more Deform pins, the mesh changes shape to accommodate this movement, while keeping the overall mesh as rigid as possible. The result is that a movement in one part of the image causes natural, life-like movement in other parts of the image.

For example, if you place Deform pins in a person's feet and hands, and then move one of the hands to make it wave, the motion in the attached arm will be large, but the motion in the waist will be small, just as in the real world.

You can have multiple meshes on one layer. This is useful for deforming several parts of an image individually—such as text characters—as well as for deforming multiple instances of the same part of an image, each with a different deformation.

The original, undistorted mesh is calculated at the current frame at the time at which you apply the effect. The mesh does not change to accommodate motion in a layer based on motion footage, nor does the mesh update if you replace a layer's source footage item.

When a Puppet mesh is created, its boundaries are determined by an outline, which can be defined by an unlocked mask path, a shape path on a shape layer, or a text character's outline. If a layer has none of these things, the Puppet effect uses Auto-trace to create paths from the alpha channel. These paths are used by the Puppet effect only to determine outlines and do not appear as masks on the layer. If the layer is a raster layer with no alpha channel, the resulting outline is a single rectangular path around the layer's bounds. For a complex image, or to configure Auto-trace settings, use Auto-trace before using the Puppet tools.

A text character that consists of multiple disjointed closed paths (such as the letter "i") is treated as multiple separate paths.

A shape or character's stroke is not used in the determination of outlines; only the path is used. To encompass a stroke within a mesh, increase the Expansion value. The default value of 3 pixels encompasses a stroke that extends 3 pixels or less from its path.

If multiple masks, shapes, or characters overlap on the same layer, an outline is created from the union of the overlapping shapes, overlapping characters, or overlapping masks. If a mask overlaps a text character or shape, outlines are created for the entire character or shape, for the portion that is inside the mask, and for the mask itself.

Other distortion effects

In addition to the Puppet effect, After Effects provides several other distortion effects. Invite students to experiment with some of the following effects:

Bezier Warp—The Bezier Warp effect shapes an image using a closed Bezier curve along the boundary of a layer. The curve consists of four segments. Each segment has three points (a vertex and two tangents).

Bulge—The Bulge effect distorts an image around a specified point, making the image appear to bulge toward or away from the viewer, depending on the options you select.

Displacement Map—The Displacement Map effect distorts a layer by displacing pixels horizontally and vertically based on the color values of pixels in the control layer specified by the Displacement Map Layer property.

Liquify—The Liquify effect lets you push, pull, rotate, enlarge and shrink areas in a layer. Several Liquify tools distort the brush area when you hold down the mouse button or drag. The distortion is concentrated at the center of the brush area, and the effect intensifies as you hold down the mouse button or repeatedly drag over an area.

Magnify—The Magnify effect enlarges all or part of an image. This effect can act like a magnifying glass placed over an area of the image, or you can use it to scale the entire image far beyond 100% while maintaining resolution.

Mesh Warp—The Mesh Warp effect applies a grid of Bezier patches over a layer, which you can manipulate to distort areas of an image. Each corner of a patch includes a vertex and two to four tangents (points that control the curvature of the line segment that makes up the edge of the patch). By moving the vertices and tangents, you can manipulate the shape of the curved line segment.

Mirror—The Mirror effect splits the image along a line and reflects one side onto the other.

Offset—The Offset effect pans the image within a layer. Visual information pushed off one side of the image appears on the opposite side. At Best quality, the offset is performed with subpixel precision.

Polar Coordinates—The Polar Coordinates effect distorts a layer by transposing each pixel in the layer's (x,y) coordinate system to the corresponding position in the polar coordinate system, or the reverse. This effect produces unusual and surprising distortions that can vary greatly depending on the image and the controls you select.

Reshape—The Reshape effect transforms one shape into another shape on the same layer, dragging the underlying image with it. The image is distorted to fit the shape of the new area.

Ripple—The Ripple effect creates the appearance of ripples in a specified layer, moving away from a center point in concentric circles. The effect is similar to dropping a stone in a pond. You can also specify that ripples move toward the center point.

Smear—Using the Smear effect, you define an area within an image and then move that area to a new location, stretching, or smearing, the surrounding part of the image with it. Use masks to define the area you want to distort.

Spherize—The Spherize effect distorts a layer by wrapping a region of the image onto a sphere. The layer's quality setting influences the Spherize effect. Best quality samples the displaced pixels to subpixel precision; Draft quality samples to the nearest whole pixel.

Turbulent Displace—The Turbulent Displace effect uses fractal noise to create turbulent distortions in an image. For example, use it to create flowing water, funhouse mirrors, and waving flags.

Twirl—The Twirl effect distorts an image by rotating a layer around its center. The image is distorted more sharply in its center than at the edges, causing a whirlpool result at extreme settings.

Warp—Use Warp to distort or deform layers. The warp styles work much like the Warp effects in Adobe Illustrator and Warp Text in Adobe Photoshop.

Wave Warp—The Wave Warp effect produces the appearance of a wave traveling across an image. You can produce a variety of different wave shapes, including square, circular, and sine waves.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 How can you display or hide the Puppet mesh?
- 2 What does the Triangles value determine?
- 3 What is the squash and stretch animation technique?

Answers

- 1 To display or hide the mesh, click Show in the Tools panel.
- 2 The Triangles value determines how many triangles are included in the mesh. More triangles results in smoother animation, but can also increase rendering time.
- 3 Squash and stretch is a traditional animation technique that adds realism and weight to objects. It's an exaggeration of the effect that occurs in real life when a moving object comes into contact with a stationary object, such as the ground. When squashing and stretching are applied correctly, the volume of the character doesn't change.

Lesson 9: Using the Roto Brush Tool

Lesson 9 introduces students to the process of rotoscoping, which is commonly used in video production to remove the background of a clip so that you can place the subject in another environment. The Roto Brush tool makes rotoscoping much faster than the method of manually drawing Bezier masks on most frames individually. In most cases, the Roto Brush tool is also a more efficient alternative to traditional keying methods. After students use the Roto Brush tool, you may want to show students other methods for removing the background and compare them to the Roto Brush tool.

The Roto Brush tool isolates the foreground pixels from the background pixels and creates an alpha channel that defines the transparent background. The alpha channel can be included in certain video formats, such as FLV, for use in other applications.

Tips for working with the Roto Brush tool

- To define a foreground object with the Roto Brush tool, start by drawing strokes along the center of the object's features. For example, draw a stroke through the middle of the boy, rather than along the edges. The Roto Brush tool defines representative regions; After Effects extrapolates from those regions to determine the boundaries.
- If After Effects misinterprets a stroke, don't undo it. Instead, draw additional strokes to teach Roto Brush how to recognize the region.
- Use the Roto Brush tool in a composition with a frame rate set to match the frame rate of the layer's source footage item. A warning banner appears at the bottom of the frame in the Composition panel if the frame rate of the composition doesn't match the frame rate of the layer's source footage item.

- Use the Roto Brush effect first, and then touch up the matte using the Refine Edge effect. You can also use adjust the matte using other features in After Effects, such as by painting on the alpha channel.

Freezing Roto Brush segmentation

Click the Freeze button in the lower right corner of the Layer panel to cache and lock segmentation for all Roto Brush spans for the layer within the composition work area. Freezing the segmentation preserves the matte and saves it with the project, so the Roto Brush effect doesn't need to recalculate the segmentation when you open the project again or make changes.

Frames with frozen segmentation information are represented by blue bars in the Roto Brush span view in the Layer panel.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 Why would you freeze Roto Brush segmentation?
- 2 What does it mean to freeze a frame's properties, and how do you do it?

Answers

- 1 Freezing the segmentation preserves the matte and saves it with the project, so the Roto Brush effect doesn't need to recalculate the segmentation when you open the project again or make changes.
- 2 When you freeze a frame's properties, the frame remains unchanged throughout the rest of the composition. To freeze a frame, move the current-time indicator to the point at which you want the movement to stop, select the layer you want to freeze, and then choose Layer > Time > Freeze Frame. The rest of the time bar for the layer disappears in the Timeline panel. All that remains for the layer is the freeze frame icon at the point you froze the frame.

● **Note:** If you click Stop in the Freezing Roto Brush dialog box, After Effects stops adding frames to the cache, but Roto Brush segmentation is still locked with the segmentation information cached up until the point that you clicked Stop. When Roto Brush segmentation is frozen, the pointer for the Roto Brush tool has a slash through it.

Lesson 10: Performing Color Correction

Lesson 10 covers color correction. A strong understanding of color and color management is useful to ensure that color appears on a viewer's system as video editors see it on theirs.

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. Many effects support 16 and 32 bits per channel.

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 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 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.

Setting a project color depth

To specify a project color depth, do one of the following:

- Choose File > Project Settings, and choose a color depth from the Depth menu.
- In the Project panel, Alt-click (Windows) or Option-click (Mac OS) the Project Color Depth button.

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 specifying color profiles for use with the project. For in-depth information about color management, refer to After Effects Help.

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

● **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.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 Why should you preview your project on a video monitor, if possible?
- 2 When would you use the Color Range effect?

Answers

- 1 The gamma values between a computer monitor and a broadcast monitor vary greatly. What may look good on a computer screen may appear too bright and washed out on a broadcast monitor.
- 2 The Color Range effect keys out a specific range of colors. It's especially useful when you need to key an area that was unevenly lit, where the color you need to key varies.

Lesson 11: Using 3D Features

Lesson 11 is the first of two lessons that covers many aspects of 3D animation in After Effects. This lesson covers using the 3D features in general and working with Cinema 4D; in Lesson 12, students use the 3D Camera Tracker to add 3D elements to a video.

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.

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 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.

Some 3D applications, such as Cinema 4D, can export an After Effects composition directly.

To import RLA or RPF data into a camera layer

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.

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-focusing 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.

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 fstop 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

● **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.

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.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 What do the Material Options properties determine?
- 2 How can you export an After Effects composition to edit it in Cinema 4D?

Answers

- 1 The Material Options properties determine how 3D layers interact with lights and shadows.
- 2 To export a composition, select it in the Project panel, and then choose File > Export > Maxon Cinema 4D Exporter.

Lesson 12: Working with the 3D Camera Tracker

The 3D Camera Tracker analyzes video sequences to extract camera motion and 3D scene data so you can accurately composite 3D elements over 2D footage.

Tracking the footage

Depending on the system you're using and the project footage, the tracking analysis may take several minutes. If you want the effect to perform more precise tracking, you can save time by selecting Detailed Analysis in the Effect Controls panel before After Effects completes its initial analysis.

Attaching content to track points

Invite students to explore the track points and the planes they can attach to before they settle on the plane that is parallel to the record. Note that there are several subtle possibilities for the plane over the record, and ask students to identify the plane that most closely mirrors the flat plane of the record on the desk.

As you right-click or Control-click to create the camera, the selected plane may shift. Advise students to be alert in case they need to abandon the context menu and reset the plane before trying again.

As students work through the lesson, point out that you must select the 3D Camera Tracker effect for the layer (either in the Timeline panel or the Effect Controls panel) before the track points are available. Note that the 3D Camera Tracker effect for the initial layer is different from the 3D Tracker Camera layer that also exists in the Timeline panel.

If the targets are too small or too large to work with comfortably, resize them by adjusting the Target Size property or by pressing Alt (Windows) or Option (Mac OS) as you drag from the center of the target. (As you drag from the center, horizontal arrows appear to indicate that you can resize the target.)

In addition to affecting how easily you can see the target, the target size also controls the default size of text and solid layers you create using the context menu.

Working with more complicated footage

The project in this lesson intentionally contains only stationary objects; the camera is the only thing that moves in the original footage. If you're tracking footage that includes moving objects, the solver may become confused; it can interpret points for stationary objects close to the camera as moving.

To help solve the camera, delete inaccurate or unwanted track points:

- 1 Select the track points you want to delete.
- 2 Press Delete, or choose Delete Selected Points from the context menu.

The camera is solved again. You can delete additional points while the 3D Camera Tracker effect is working, even while the semi-transparent banner appears.

3D Camera Tracker effect controls

You can change the way the camera is solved using the controls in the Effect Controls panel: If you have time, encourage students to solve the project footage or their own footage using different settings to see how they affect the results.

Analyze/Cancel—Starts or stops the background analysis of the footage.

Shot Type—Specifies whether the footage was captured with a fixed horizontal angle of view, variable zoom, or a specific horizontal angle of view.

Horizontal Angle of View—Specifies the horizontal angle of view the solver should use. Enabled only when Shot Type is set to Specify Angle of View.

Show Track Points—Identifies detected features as 3D points with perspective hinting (3D Solved) or 2D points captured by the feature track (2D Source).

Render Track Points—Controls whether the track points are rendered as part of the effect.

Track Point Size—Changes the size of the track points.

Target Size—Changes the size of the red orientation target indicators.

● **Note:** When the effect is selected, track points are always shown, even if Render Track Points is not selected. When Render Track Points is enabled, the points are displayed in the image so you can see them during RAM preview.

Create Camera—Creates the 3D camera. This happens automatically when you create a solid/null/text layer from the context menu, if it hasn't happened already.

Advanced section:

Solve Method—Provides hints about the scene to help in solving the camera. You can have it try to automatically detect the scene type, or specify the scene as typical movement (those not purely rotational or mostly flat), mostly flat (planar), or purely rotational (tripod or nodal pan).

Method Used—When Solve Method is set to Auto Detect, this displays the actual solve method used.

Average Error—Displays the average distance (in pixels) between the original 2D source points and a reprojection of the 3D solved points onto the 2D plane of the source footage. If a track/solve was perfect, this error would be 0 and there would be no visible difference if you toggled between 2D Source and 3D Solved track points. You can use this value to tell if deleting points, changing the solve method, or making other changes is lowering this value, and thus improving the track.

Detailed Analysis—When enabled, makes the next analysis phase do extra work to find elements to track. The resulting data (stored in the project as part of the effect) is much larger and slower with this option enabled.

Hide Warning Banner—Use when you don't want to re-analyze footage even though there is a warning banner indicating that it needs to be re-analyzed.

● **Note:** It is possible that lowering the average error produces a worse track, such as when you delete some track points that were actually very good. The value is based only on the available track points, not on ones that were removed.

Working with null objects

Null objects can be very useful in a variety of projects. Students worked with a null object in lesson 11 when they shifted the 0,0 point for the composition before exporting it for Cinema 4D. You may want to discuss other possible uses of null objects with students, and ask them to describe advantages and possible disadvantages.

Questions

The following questions are not in the student's Classroom in a Book.

- 1 Why would you use a null object to move a Photoshop layer in this project?
- 2 How can you change the depth of field for a 3D camera?
- 3 How can you copy animation from one layer to another?

Answers

- 1 You cannot easily attach a Photoshop layer directly to the plane. However, you can attach a null object to the plane, and then use parenting to ensure the text layer travels with the plane.
- 2 To change the depth of field (or other attributes) for a 3D camera, select the camera layer, and choose Layer > Camera Settings.
- 3 To copy animation from one layer to another, select all the keyframes you want to copy, and choose Edit > Copy. Then select the layer you want to copy the animation to, move the current-time indicator to the point where the animation should take place, and choose Edit > Paste.

Lesson 13: Advanced Editing Techniques

Lesson 13 covers some of the advanced editing techniques available in After Effects. However, it only touches on support for HDR color. Here is some additional information to supplement the lesson.

Working with natural light in HDR

It's a common yet mistaken assumption that the only After Effects users who have any business using 32-bit mode are artists working on big-budget blockbuster films. The reality is that anyone using After Effects 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. 32-bit images preserve the full range of light data, and the same principles apply whether or not you're starting with a 32-bit source.

Working 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.

Taking 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.

Going further with HDR

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?

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. You can capture a little bit of that reality in After Effects.

Questions

The following question is not in the student's Classroom in a Book.

- 1 In the motion tracker, what are the feature and search regions?

Answers

- 1 The feature region identifies the distinctive feature you're tracking. The search region defines the area within the tracker looks for the feature.

Lesson 14: Rendering and Outputting

Lesson 14 covers the topics of rendering and outputting. Following is some additional information about DV 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 After Effects does not actually contain the material from which it was pieced together. Rather, it references your source files. Before export, make sure that the project 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 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, QuickTime, MPEG-1 and -2, as well RealMedia and Windows Media files for the web. 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, 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.

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 is available in After Effects . 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. However, such 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.

Questions

The following question is not in the student's Classroom in a Book.

- 1 Why would you need pixel aspect ratio correction?

Answers

- 1 If you're viewing a composition with a nonsquare pixel aspect ratio on a computer monitor, which displays images using square pixels, the image may appear stretched. Pixel aspect ratio correction squeezes the view slightly to display the image as it will appear on a video monitor.