



Adobe

# Flash Professional CC

2014 release

**Bē**  
Nick Taylor

## **CLASSROOM IN A BOOK<sup>®</sup>**

The official training workbook from Adobe

**Russell Chun**



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Adobe® Flash® Professional CC Classroom in a Book® (2014 release)

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# CONTENTS

<b>GETTING STARTED</b>	<b>1</b>
About Classroom in a Book.....	1
What's New.....	2
Prerequisites.....	2
Installing Flash.....	3
Accessing the Classroom in a Book Files .....	4
How to Use the Lessons.....	5
Additional Resources .....	5
Adobe Authorized Training Centers.....	7

<b>1 GETTING ACQUAINTED</b>	<b>8</b>
-----------------------------	----------



Starting Flash and Opening a File.....	10
Understanding Document Types .....	12
Getting to Know the Workspace.....	13
Working with the Library Panel.....	17
Understanding the Timeline.....	18
Organizing Layers in a Timeline.....	25
Using the Properties Inspector .....	28
Using the Tools Panel .....	32
Undoing Steps in Flash.....	35
Previewing Your Movie.....	36
Modifying the Content and Stage .....	38
Saving Your Movie .....	39
Finding Resources for Using Flash .....	42
Checking for Updates .....	42

## 2 WORKING WITH GRAPHICS 44



Getting Started .....	46
Understanding Strokes and Fills .....	46
Creating Shapes .....	47
Making Selections .....	48
Editing Shapes .....	49
Using Gradient and Bitmap Fills .....	53
Using Variable-Width Strokes .....	57
Creating Curves .....	59
Creating Transparencies .....	62
Creating and Editing Text .....	64
Aligning and Distributing Objects .....	67
Converting and Exporting Art .....	69

## 3 CREATING AND EDITING SYMBOLS 74

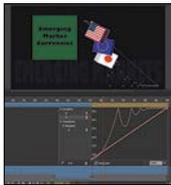


Getting Started .....	76
Importing Illustrator Files .....	76
About Symbols .....	79
Creating Symbols .....	80
Importing Photoshop Files .....	82
Editing and Managing Symbols .....	86
Changing the Size and Position of Instances .....	91
Changing the Color Effect of Instances .....	94
Understanding Display Options .....	96
Applying Filters for Special Effects .....	99
Positioning in 3D Space .....	101

## 4 ANIMATING SYMBOLS 108



Getting Started .....	110
About Animation .....	111
Understanding the Project File .....	111
Animating Position .....	112
Changing the Pacing and Timing .....	115

	Animating Transparency .....	118
	Animating Filters .....	120
	Animating Transformations .....	124
	Changing the Path of the Motion .....	128
	Swapping Tween Targets .....	131
	Creating Nested Animations .....	132
	Easing .....	135
	Frame-by-Frame Animation .....	138
	Animating 3D Motion .....	140
	Testing Your Movie .....	143
<b>5</b>	<b>ADVANCED MOTION TWEENING</b>	<b>146</b>
	Getting Started .....	148
	About the Motion Editor .....	149
	Understanding the Project File .....	150
	Adding Motion Tweens .....	150
	Editing Property Curves .....	152
	Viewing Options for the Motion Editor .....	159
	Copying and Pasting Curves .....	159
	Adding Complex Eases .....	163
<b>6</b>	<b>ANIMATING SHAPES AND USING MASKS</b>	<b>178</b>
	Getting Started .....	180
	Animating Shapes .....	180
	Understanding the Project File .....	181
	Creating a Shape Tween .....	181
	Changing the Pace .....	184
	Adding More Shape Tweens .....	184
	Creating a Looping Animation .....	187
	Using Shape Hints .....	191
	Animating Color .....	195
	Creating and Using Masks .....	198
	Animating the Mask and Masked Layers .....	200
	Easing a Shape Tween .....	204

<b>7</b>	<b>CREATING INTERACTIVE NAVIGATION</b>	<b>206</b>
	Getting Started .....	208
	About Interactive Movies .....	209
	Creating Buttons.....	209
	Understanding ActionScript 3.0 .....	220
	Preparing the Timeline.....	224
	Adding a Stop Action .....	225
	Creating Event Handlers for Buttons.....	226
	Creating Destination Keyframes .....	229
	Creating a Home Button with Code Snippets .....	233
	Code Snippets Options .....	236
	Playing Animation at the Destination.....	238
	Animated Buttons .....	243
<b>8</b>	<b>USING TEXT</b>	<b>248</b>
	Getting Started .....	250
	When and Where to Add Text .....	252
	Understanding Text Types.....	253
	Adding Simple Text .....	254
	Adding Paragraphs .....	257
	Hyperlinking Text.....	260
	Creating User-input Text .....	261
<b>9</b>	<b>WORKING WITH SOUND AND VIDEO</b>	<b>270</b>
	Getting Started .....	272
	Understanding the Project File .....	273
	Using Sounds.....	275
	Understanding Flash Video.....	287
	Using Adobe Media Encoder CC 2014 .....	287
	Understanding Encoding Options .....	291
	Playback of External Video .....	299
	Working with Video and Transparency.....	303
	Embedding Flash Video .....	306
	Exporting Video from Flash.....	311

**10 PUBLISHING 316**



Understanding Publishing .....318  
Publishing for Flash Player ..... 319  
Publishing for HTML5 ..... 327  
Using Classic Tweens.....328  
Exporting to HTML5 ..... 333  
Inserting JavaScript.....336  
Converting to HTML5 Canvas.....341  
Publishing a Desktop Application ..... 348  
Publishing for a Mobile Device ..... 356  
Next Steps.....363

**INDEX 366**

# GETTING STARTED

The 2014 release of Adobe Flash Professional CC provides a comprehensive authoring environment for creating interactive and media-rich applications that you can publish to a variety of platforms. Flash is widely used in the creative industry to develop engaging projects integrating video, sound, graphics, and animation. You can create original content in Flash or import assets from other Adobe applications such as Photoshop or Illustrator, quickly design animation and multimedia, and use ActionScript 3.0 to integrate sophisticated interactivity.

Use Flash Professional to generate graphics and animation assets, to build innovative and immersive websites, to create standalone applications for the desktop, or to create apps to distribute to mobile devices running on the Android or iOS system.

With extensive controls for animation, intuitive and flexible drawing tools, and a powerful, object-oriented coding language, Flash delivers one of the few robust multimedia authoring environments that let your imagination become reality.

## About Classroom in a Book

*Adobe Flash Professional CC Classroom in a Book (2014 release)* is part of the official training series for Adobe graphics and publishing software developed with the support of Adobe product experts. The lessons are designed so you can learn at your own pace. If you're new to Flash, you'll learn the fundamental concepts and features you'll need to use the program. Classroom in a Book also teaches many advanced features, including tips and techniques for using the latest version of this application.

# What's New

The 2014 release of Adobe Flash Professional CC provides more expressive tools, powerful controls for animation, and robust support for a wider variety of playback platforms.

The lessons in this book provide opportunities to use some of the updated features and improvements in Flash Professional, including:

- The new Motion Editor, an advanced panel for creating and managing complex motion tweens and eases
- The all-new Variable Width tool, which allows you to create more expressive lines with thick and thin variation for static or animated graphics
- Separate Flash document types that are specifically configured to publish to a variety of platforms: Flash Player, HTML5, WebGL, desktop applications, and mobile apps for iOS or Android
- Support for SVG (Scaleable Vector Graphics) export
- Cross-platform projectors for self-executable desktop applications
- JavaScript code snippets for HTML5 Canvas projects
- An object-level Undo command, which lets you undo an action on one object independently of other objects that may have been modified more recently
- Integration with the Kuler panel, a cloud-based application to create color themes

## Prerequisites

Before you begin using *Adobe Flash Professional CC Classroom in a Book (2014 release)*, make sure your system is set up correctly and that you've installed the required software. You should have a working knowledge of your computer and operating system. You should know how to use the mouse and standard menus and commands, and also how to open, save, and close files. If you need to review these techniques, see the printed or online documentation included with your Microsoft Windows or Apple Mac OS software.

If you're working on Microsoft Windows, you need to download Apple's QuickTime software, free from [www.apple.com/quicktime/download/](http://www.apple.com/quicktime/download/), in order to work with the videos in Lesson 9.

In addition, you need to download the free Adobe AIR runtime, available at [get.adobe.com/air/](http://get.adobe.com/air/), to publish desktop applications in Lesson 10.

# Installing Flash

You must purchase the Adobe Flash Professional application as part of Adobe Creative Cloud. The following specifications are the minimum required system configurations.

## Windows

- Intel® Pentium 4, Intel Centrino®, Intel Xeon®, or Intel Core™ Duo (or compatible) processor
- Microsoft® Windows® 7 (64 bit), Windows 8 (64 bit), or Windows 8.1 (64 bit)
- 4 GB of RAM
- 1024x900 display (1280x1024 recommended)
- Java Runtime Environment 1.7 (included)
- QuickTime 7.7x software recommended
- 4 GB of available hard-disk space for installation; additional free space required during installation (cannot install on removable flash storage devices)
- Broadband Internet connection and registration are necessary for required software activation, validation of subscriptions, and access to online services.

## Mac OS

- Multicore Intel® processor
- Mac OS X v10.9 64-bit, 10.8 64-bit, or 10.7 64-bit
- 4 GB of RAM
- 1024x900 display (1280x1024 recommended)
- Java™ Runtime Environment 1.7
- QuickTime 10.x software recommended
- 4 GB of available hard-disk space for installation; additional free space required during installation (cannot install on a volume that uses a case-sensitive file system or on removable flash storage devices)
- Broadband Internet connection and registration are necessary for required software activation, validation of subscriptions, and access to online services.

For updates on system requirements and complete instructions on installing the software, visit [www.adobe.com/products/flash/tech-specs.html](http://www.adobe.com/products/flash/tech-specs.html).

Install Flash from Adobe Creative Cloud at [creative.adobe.com/](http://creative.adobe.com/) and make sure that you have your login and password accessible.

# Accessing the Classroom in a Book Files

The lessons in *Adobe Flash Professional CC Classroom in a Book (2014 release)* use specific source files, such as image files created in Adobe Illustrator, video files created in Adobe After Effects, audio files, and prepared Flash documents. To access the Classroom in a Book files:

- 1 On a Mac or PC, go to [www.peachpit.com/redeem](http://www.peachpit.com/redeem) and enter the code found at the back of your book.
- 2 If you do not have a Peachpit.com account, you will be prompted to create one.
- 3 The downloadable files will be listed under the Lesson & Update Files tab on your Account page.
- 4 Click the lesson file links to download them to your computer.

The files are compressed into Zip archives to speed up download time and to protect the contents from damage during transfer. You must uncompress (or “unzip”) the files to restore them to their original size and format before you use them with the book. Modern Mac and Windows systems are set up to open Zip archives by simply double-clicking.

- 5 On your hard drive, create a new folder in a convenient location and name it **FlashProCC**, following the standard procedure for your operating system:
  - If you’re running Windows, right-click and choose New > Folder. Then enter the new name for your folder.
  - If you’re using Mac OS, in the Finder, choose File > New Folder. Type the new name and drag the folder to the location you want to use.
- 6 Drag the unzipped Lessons folder (which contains folders named Lesson01, Lesson02, and so on) that you downloaded onto your hard drive to your new FlashProCC folder.

When you begin each lesson, navigate to the folder with that lesson number to access all the assets, sample movies, and other project files you need to complete the lesson.

If you have limited storage space on your computer, you can copy each lesson folder as you need it, and then delete it after you’ve completed the lesson if desired. Some lessons build on preceding lessons; in those cases, a starting project file is provided for you for the second lesson or project. You do not have to save any finished project if you don’t want to or if you have limited hard drive space.

## Copying the sample movies and projects

You will create and publish final project files, such as SWF files, HTML files, videos, or AIR desktop applications, in some lessons in this book. The files in the End folders (01End, 02End, and so on) within the Lesson folders are samples of completed projects for each lesson. Use these files for reference if you want to compare your work in progress with the project files used to generate the sample projects. The end project files vary in size from relatively small to a couple of megabytes, so you can either copy them all now if you have ample storage space or copy just the end project file for each lesson as needed. Then you can delete it when you finish that lesson.

## How to Use the Lessons

Each lesson in this book provides step-by-step instructions for creating one or more specific elements of a real-world project. Some lessons build on projects created in preceding lessons; most stand alone. All the lessons build on one another in terms of concepts and skills, so the best way to learn from this book is to proceed through the lessons in sequential order. In this book, some techniques and processes are explained and described in detail only the first few times you perform them.

The organization of the lessons is also project-oriented rather than feature-oriented. That means, for example, that you'll work with symbols on real-world design projects over several lessons rather than in just one chapter.

## Additional Resources

*Adobe Flash Professional CC Classroom in a Book (2014 release)* is not meant to replace documentation that comes with the program or to be a comprehensive reference for every feature. Only the commands and options used in the lessons are explained in this book. For comprehensive information about program features and tutorials, refer to these resources:

**Adobe Flash Professional CC Help and Support:** [helpx.adobe.com/flash.html](http://helpx.adobe.com/flash.html) is where you can find and browse Help and Support content on Adobe.com. Adobe Flash Professional Help and Adobe Flash Professional Support Center are accessible from the Help menu in Flash Professional.

**Adobe Creative Cloud Learn:** For inspiration, key techniques, cross-product workflows, and updates on new features, go to the Creative Cloud Learn page, [helpx.adobe.com/creative-cloud/learn/tutorials.html](http://helpx.adobe.com/creative-cloud/learn/tutorials.html). Available to all.

**Adobe Forums:** [forums.adobe.com](http://forums.adobe.com) lets you tap into peer-to-peer discussions, questions, and answers on Adobe products. The Flash Professional forum is accessible from the Help menu in Flash Professional.

**Adobe TV:** [tv.adobe.com](http://tv.adobe.com) is an online video resource for expert instruction and inspiration about Adobe products, including a How To channel to get you started with your product.

**Adobe Inspire:** [www.adobe.com/inspire.html](http://www.adobe.com/inspire.html) offers thoughtful articles on design and design issues, a gallery showcasing the work of top-notch designers, tutorials, and more.

**Resources for educators:** [www.adobe.com/education](http://www.adobe.com/education) and [edex.adobe.com](http://edex.adobe.com) offer a treasure trove of information for instructors who teach classes on Adobe software. Find solutions for education at all levels, including free curricula that use an integrated approach to teaching Adobe software and can be used to prepare for the Adobe Certified Associate exams.

Also check out these useful links:

**Adobe Add-ons:** [creative.adobe.com/addons](http://creative.adobe.com/addons) is a central resource for finding tools, services, extensions, code samples, and more to supplement and extend your Adobe products.

**Adobe Flash Professional CC product home page:** [www.adobe.com/products/flash](http://www.adobe.com/products/flash)

# Adobe Authorized Training Centers

Adobe Authorized Training Centers offer instructor-led courses and training on Adobe products. A directory of AATCs is available at [partners.adobe.com](http://partners.adobe.com).

# 4

## ANIMATING SYMBOLS

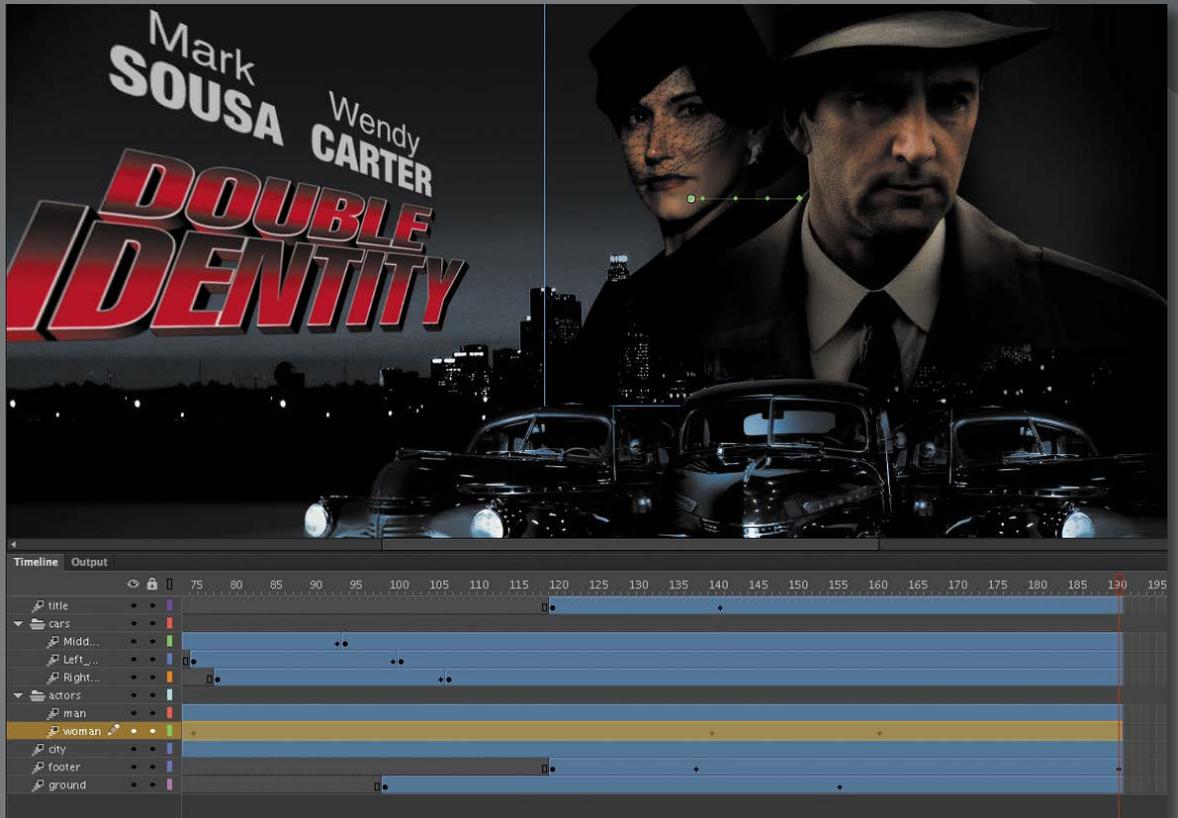
### Lesson Overview

In this lesson, you'll learn how to do the following:

- Animate the position, scale, and rotation of objects
- Adjust the pacing and timing of your animation
- Animate transparency and special effects
- Change the path of an object's motion
- Create animation inside symbols
- Split a motion tween
- Change the easing of an object's motion
- Animate in 3D space



This lesson will take approximately 2 hours to complete. If needed, remove the previous lesson folder from your hard drive and copy the Lesson04 folder onto it. Download the project files for this lesson from the Lesson & Update Files tab on your Account page at [www.peachpit.com](http://www.peachpit.com) and store them on your computer in a convenient location, as described in the Getting Started section of this book. Your Account page is also where you'll find any updates to the lessons or to the lesson files. Look on the Lesson & Update Files tab to access the most current content.



Use Flash Professional to change almost any aspect of an object—position, color, transparency, size, rotation, and more—over time. Motion tweening is the basic technique of creating animation with symbol instances.

# Getting Started

● **Note:** If you have not already downloaded the project files for this lesson to your computer from your Account page, make sure to do so now. See Getting Started at the beginning of the book.

Start by viewing the finished movie file to see the animated title page that you'll create in this lesson.

- 1 Double-click the 04End.html file in the Lesson04/04End folder to play the animation in a browser.



The project is an animated splash page for an imaginary soon-to-be-released motion picture. In this lesson, you'll use motion tweens to animate several components on the page: the cityscape, the main actors, several old-fashioned cars, and the main title.

- 2 Close the 04End.html file.
- 3 Double-click the 04Start.fla file in the Lesson04/04Start folder to open the initial project file in Flash. This file is an ActionScript 3.0 document that is partially completed and already contains many of the graphic elements imported into the Library for you to use.
- 4 From the view options above the Stage, choose Fit in Window, or View > Magnification > Fit in Window, so that you can see the entire Stage on your computer screen.
- 5 Choose File > Save As. Name the file **04\_workingcopy.fla**, and save it in the 04Start folder.

Saving a working copy ensures that the original start file will be available if you want to start over.

## About Animation

*Animation* is the movement, or change, of objects through time. Animation can be as simple as moving a box across the Stage from one frame to the next. It can also be much more complex. As you'll see in this lesson, you can animate many different aspects of a single object. You can change an object's position on the Stage, change its color or transparency, change its size or rotation, or animate the special filters that you saw in the previous lesson. You also have control over an object's path of motion, and even its *easing*, which is the way an object accelerates or decelerates.

In Flash, the basic workflow for animation goes like this: Select an object on the Stage, right-click/Ctrl-click, and choose Create Motion Tween. Move the red playhead to a different point in time and move the object to a new position or change one of its properties. Flash takes care of the rest.

*Motion tweens* create animation for changes in position on the Stage and for changes in size, color, or other attributes. Motion tweens require you to use a symbol instance. If the object you've selected is not a symbol instance, Flash will automatically ask to convert the selection to a symbol.

Flash also automatically separates motion tweens on their own layers, which are called Tween layers. There can be only one motion tween per layer without any other element in the layer. Tween layers allow you to change various attributes of your instance at different key points over time. For example, a spaceship could be on the left side of the Stage at the beginning keyframe and at the far-right side of the Stage at an ending keyframe, and the resulting tween would make the spaceship fly across the Stage.

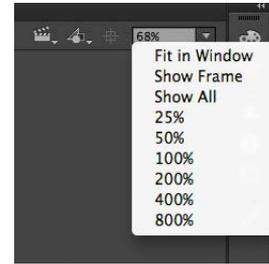
The term “tween” comes from the world of classic animation. Senior animators would be responsible for drawing the beginning and ending poses for their characters. The beginning and ending poses were the keyframes of the animation. Junior animators would then come in and draw the “in-between” frames, or do the “in-betweening.” Hence, “tweening” refers to the smooth transitions between keyframes.

## Understanding the Project File

The 04Start.fla file contains a few of the animated elements already or partially completed. Each of the six layers—man, woman, Middle\_car, Right\_car, footer, and ground—contains an animation. The man and woman layers are in a folder called actors, and the Middle\_car and Right\_car layers are in a folder called cars.



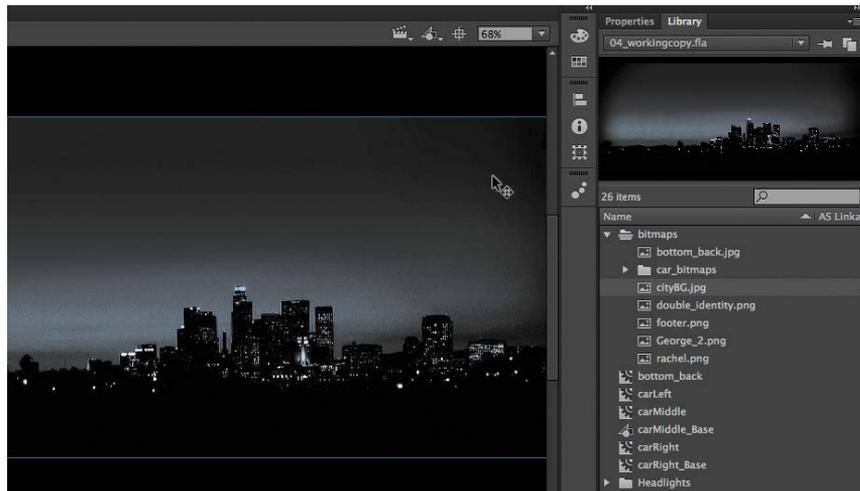
You'll be adding more layers to create an animated cityscape, refining the animation of one of the actors, as well as adding a third car and a 3D title. All the necessary graphic elements have been imported into the Library panel. The Stage is set at a generous 1280 pixels by 787 pixels, and the Stage color is black. You might need to choose a different view option to see the entire Stage. Choose View > Magnification > Fit in Window, or choose Fit in Window from the view options at the upper-right corner of the Stage, to view the Stage at a magnification percentage that fits your screen.



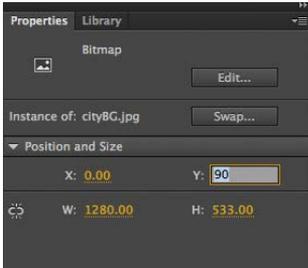
## Animating Position

You'll start this project by animating the cityscape. It will begin slightly lower than the top edge of the Stage, and then rise slowly until its top is aligned with the top of the Stage.

- 1 Lock all the existing layers so you don't accidentally modify them. Create a new layer above the footer layer and rename it **city**.
- 2 Drag the bitmap image called **cityBG.jpg** from the bitmaps folder in the Library panel to the Stage.

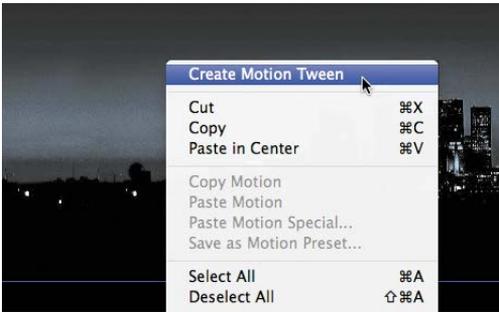


- 3 In the Properties inspector, set the value of X to **0** and the value of Y to **90**.



This positions the cityscape image just slightly below the top edge of the Stage.

- 4 Right-click/Ctrl-click on the cityscape image and choose Create Motion Tween. From the top menu, you can also select Insert > Motion Tween.



- 5 A dialog box appears warning you that your selected object is not a symbol. Motion tweens require symbols. Flash asks if you want to convert the selection to a symbol so it can proceed with the motion tween. Click OK.



Flash automatically converts your selection to a symbol, and stores it in your Library panel. Flash also converts the current layer to a Tween layer so you can begin to animate the instance. Tween layers are distinguished by a special icon in front of the layer name, and the frames are tinted blue. Tween layers are reserved for motion tweens, and hence, no drawing is allowed on a Tween layer.



- 6 Move the red playhead to the end of the tween span at frame 190.

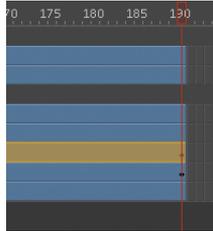
- 7 Select the instance of the cityscape on the Stage, and while holding down the Shift key, move the instance up the Stage.

Holding down the Shift key constrains the movement to right angles.

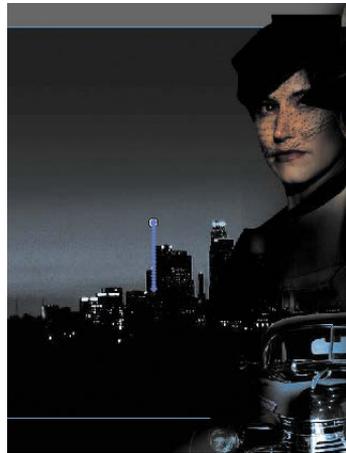
- 8 For more precision, set the value of Y to 0 in the Properties inspector.

A small black diamond appears in frame 190 at the end of the tween span.

This indicates a keyframe at the end of the tween.



Flash smoothly interpolates the change in position from frame 1 to frame 190 and represents that motion with a motion path.



● **Note:** Hide all the other layers to isolate the cityscape and to better see the results of the motion tween.

● **Note:** Remove a motion tween by right-clicking/Ctrl-clicking the motion tween on the Timeline or the Stage and choosing Remove Tween.

- 9 Drag the red playhead back and forth at the top of the Timeline to see the smooth motion. You can also choose Control > Play (Enter) to make Flash play the animation.

Animating changes in position is simple, because Flash automatically creates keyframes at the points where you move your instance to new positions. If you want to have an object move to many different points, simply move the red playhead to the desired frame, and then move the object to its new position. Flash takes care of the rest.

## Using the Controller to preview the animation

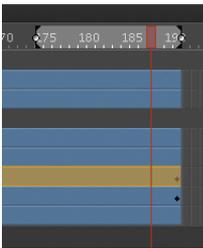
The Controller panel allows you to play, rewind, or go step-by-step backward or forward through your Timeline to review your animation in a controlled manner.

Use the playback controls that are integrated at the bottom of the Timeline, or choose the playback commands from the Control menu.

- 1 Click any of the playback buttons on the Controller below the Timeline to go to the first frame, go to the last frame, play, stop, or move forward or backward one frame.



- 2 Choose the loop option at the bottom of the Timeline and click the play button. The playhead loops, allowing you to see the animation over and over for careful analysis.
- 3 Move the front or rear brackets on the Timeline to define the range of frames that you want to see looped.



The playhead loops within the bracketed frames. Click the loop option again to turn it off.

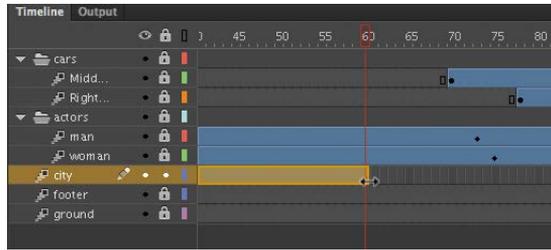
## Changing the Pacing and Timing

You can change the duration of the entire tween span or change the timing of the animation by clicking and dragging keyframes on the Timeline.

### Changing the animation duration

If you want the animation to proceed at a slower pace (and thus take up a much longer period of time), you need to lengthen the entire tween span between the beginning and end keyframes. If you want to shorten the animation, you need to decrease the tween span. Lengthen or shorten a motion tween by dragging the ends on the Timeline.

- 1 Move your mouse cursor close to the end of the tween span in the city layer.  
Your cursor changes to a double-headed arrow, indicating that you can lengthen or shorten the tween span.
- 2 Click and drag the end of the tween span back toward frame 60.  
Your motion tween shortens to 60 frames, reducing the time it takes the cityscape to move.

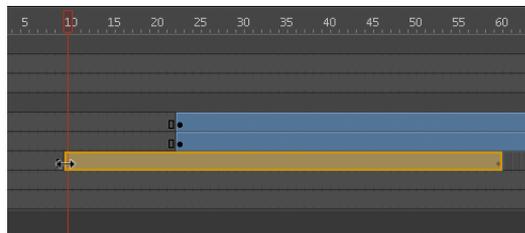


- 3 Move your mouse cursor close to the beginning of the tween span (at frame 1).



● **Note:** If you have multiple keyframes in a tween, dragging out your tween spans will distribute all your keyframes uniformly. The timing of your entire animation remains the same; only the length changes.

- 4 Click and drag the beginning of the frame span forward to frame 10.  
Your motion tween begins at an earlier time, so it now plays only from frame 10 to frame 60.

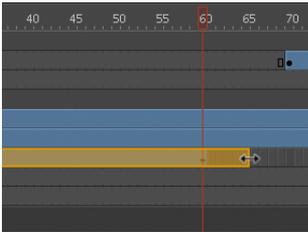


## Adding frames

You'll want the last keyframe of your motion tween to hold for the remainder of the animation. Add frames by Shift-dragging the end of a tween span.

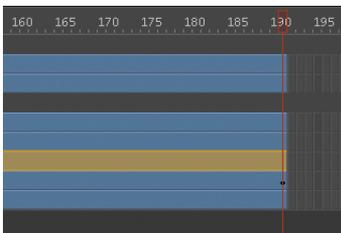
- 1 Move your mouse cursor close to the end of the tween span.

- 2 Hold down the Shift key, and click and drag the end of the tween span forward to frame 190.



**Note:** You can also add individual frames by choosing Insert > Timeline > Frame (F5), or remove individual frames by choosing Edit > Timeline > Remove Frames (Shift+F5).

The last keyframe in the motion tween remains at frame 60, but Flash adds frames to frame 190.



## Moving keyframes

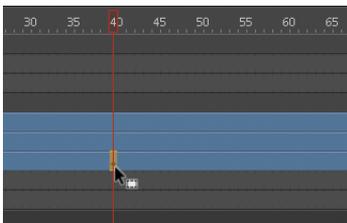
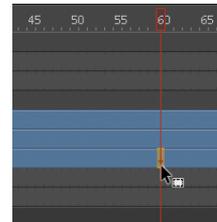
If you want to change the pacing of an animation, you can select individual keyframes, then click and drag the keyframes to new positions.

- 1 Click the keyframe at frame 60.

The keyframe at frame 60 is selected. A tiny box appears next to your mouse cursor, indicating that you can move the keyframe.

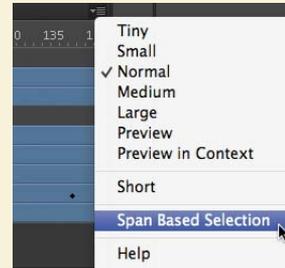
- 2 Click and drag the keyframe to frame 40.

The last keyframe in the motion tween moves to frame 40, so the motion of the cityscape proceeds quicker.



## Span-Based vs. Frame-Based Selections

By default, Flash does not use span-based selection, which means you can select individual keyframes within a motion tween. However, if you prefer to click on a motion tween and have the entire span (the beginning and end keyframes, and all the frames in between) be selected, you can enable Span Based Selection from the Options menu on the upper-right corner of the Timeline (or you can Shift-click to select the entire span).



With Span Based Selection enabled, you can click anywhere within the motion tween to select it, and move the whole animation backward or forward along the Timeline as a single unit.

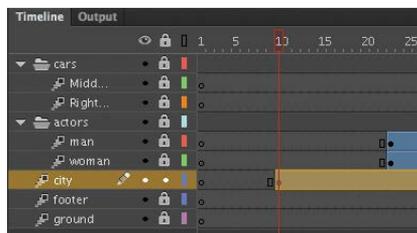
If you want to select individual keyframes while Span Based Selection is enabled, hold down the Command/Ctrl key and click a keyframe.

## Animating Transparency

In the previous lesson, you learned how to change the color effect of any symbol instance to change the transparency, tint, or brightness. You can change the color effect of an instance in one keyframe and change the value of the color effect in another keyframe, and Flash will automatically display a smooth change, just as it does with changes in position.

You'll change the cityscape in the beginning keyframe to be totally transparent but keep the cityscape in the ending keyframe opaque. Flash will create a smooth fade-in effect.

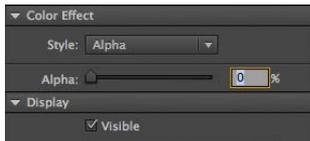
- 1 Move the red playhead to the first keyframe of the motion tween (frame 10).



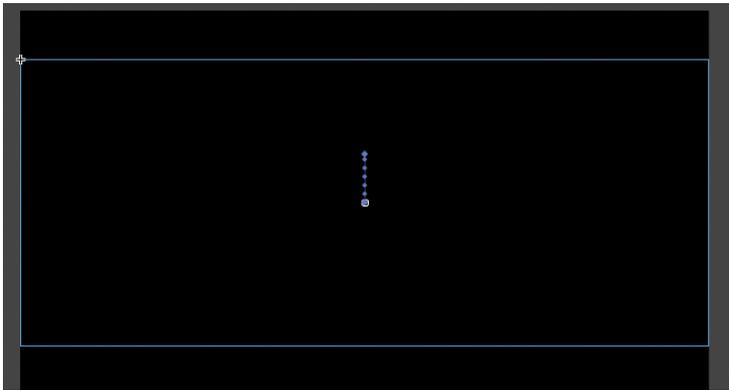
- 2 Select the cityscape instance on the Stage.
- 3 In the Properties inspector, choose the Alpha option for Color Effect.



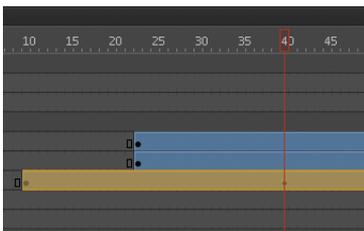
- 4 Set the Alpha value to 0%.



The cityscape instance on the Stage becomes totally transparent.

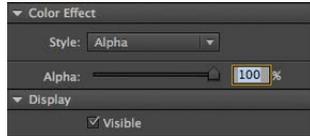


- 5 Move the red playhead to the last keyframe of the motion tween (frame 40).



- 6 Select the cityscape instance on the Stage.

- 7 In the Properties inspector, under Color Effect, set the Alpha value to **100%**.



The cityscape instance on the Stage becomes totally opaque.



- 8 Preview the effect by choosing Control > Play (Enter).

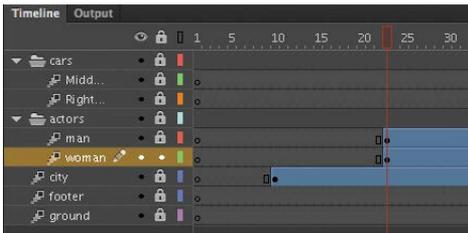
Flash interpolates the changes in both position and transparency between the two keyframes.

## Animating Filters

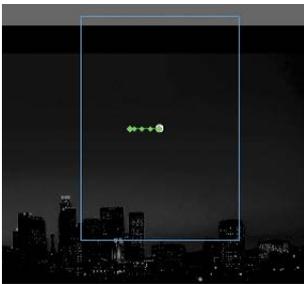
Filters, which give instances special effects such as blurs and drop shadows, can also be animated. You'll refine the motion tween of the actors next by applying a blur filter to one of them to make it appear as if the camera changes focus. Animating filters is no different from animating changes in position or changes in color effect. You simply set the values for a filter at one keyframe and set different values for the filter at another keyframe, and Flash creates a smooth transition.

- 1 Make the actors layer folder on the Timeline visible.
- 2 Lock all the layers on the Timeline except the woman layer.

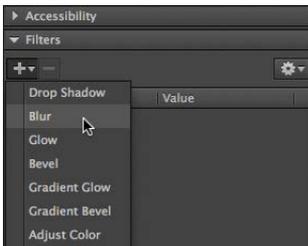
- 3 Move the red playhead to the beginning keyframe of the motion tween in the woman layer—at frame 23.



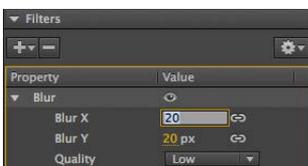
- 4 Select the instance of the woman on the Stage. You won't be able to see her because she has an alpha value of 0% (totally transparent). Click on the upper-right side of the Stage to select the transparent instance.



- 5 In the Properties inspector, expand the Filters section.
- 6 Click the Add filter button at the top of the Filters section and select Blur. Flash applies the Blur filter to the instance.



- 7 In the Filters section of the Properties inspector, make sure that the link icons are intact to constrain the blur values to both the *x* and *y* directions equally. Set the X and Y Blur values to 20 pixels.

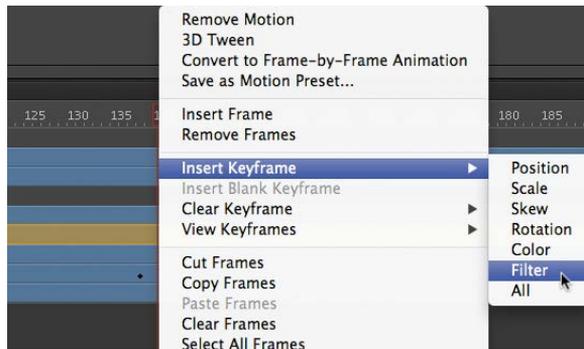


- 8 Move the red playhead across the entire Timeline to preview the animation.

The 20-pixel Blur filter is applied to the woman instance throughout the motion tween.



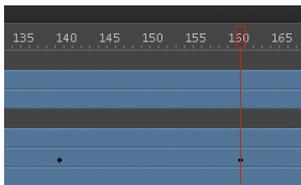
- 9 Right-click/Ctrl-click on the woman layer at frame 140, and choose Insert Keyframe > Filter.



Flash establishes a keyframe for filters at frame 140.

- 10 Move the red playhead to frame 160, and right-click/Ctrl-click on the woman layer and choose Insert Keyframe > Filter.

Flash establishes another keyframe for filters at frame 160.



- 11 Select the instance of the woman on the Stage at frame 160.
- 12 In the Properties inspector, change the value of the Blur filter to X=0 and Y=0.

The Blur filter changes from the keyframe at frame 140 to the keyframe at 160. Flash creates a smooth transition from a blurry instance to an in-focus instance.

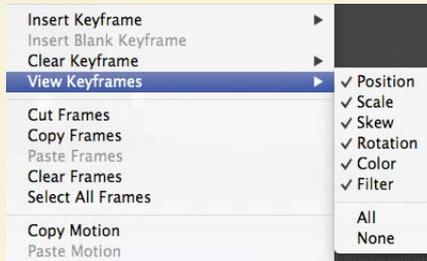


## Understanding Property Keyframes

Changes in properties are independent of one another and do not need to be tied to the same keyframes. That is, you can have a keyframe for position, a different keyframe for the color effect, and yet another keyframe for a filter. Managing many different kinds of keyframes can become overwhelming, especially if you want different properties to change at different times during the motion tween. Fortunately, Flash Professional provides a few helpful tools for keyframe management.

When viewing the tween span, you can choose to view the keyframes of only certain properties. For example, you can choose to view only the Position keyframes to see when your object moves. Or, you can choose to view only the Filter keyframes to see when a filter changes.

Right-click/Ctrl-click on a motion tween in the Timeline, choose View Keyframes, and then select the desired property among the list. You can also choose All or None to see all the properties or none of the properties.



When inserting a keyframe, you can also insert a keyframe specific to the property you want to change. Right-click/Ctrl-click on a motion tween in the Timeline, choose Insert Keyframes, and then select the desired property.

You can also view an advanced panel, called the Motion Editor, to see and edit how the different properties of your object change over the course of the motion tween. You'll learn more about the Motion Editor in the next lesson.

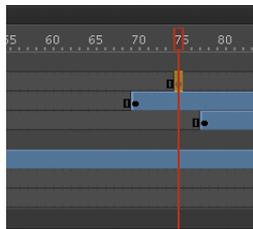
# Animating Transformations

Now you'll learn how to animate changes in scale or rotation. These kinds of changes are made with the Free Transform tool or with the Transform panel. You'll add a third car to the project. The car will start small, and then become larger as it appears to move forward toward the viewer.

- 1 Lock all the layers on the Timeline.
- 2 Insert a new layer inside the cars folder and rename it **Left\_car**.

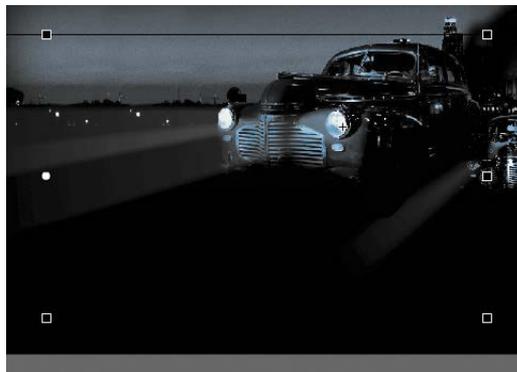


- 3 Select frame 75 and insert a new keyframe (F6).



- 4 Drag the movie clip symbol called carLeft from the Library panel to the Stage at frame 75.
- 5 Select the Free Transform tool.

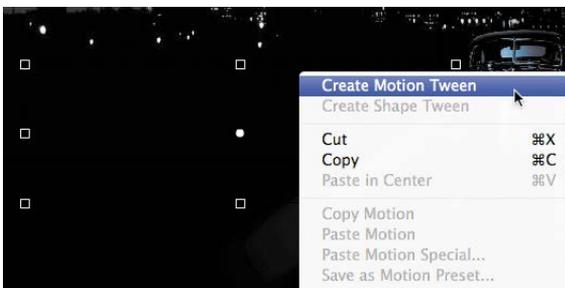
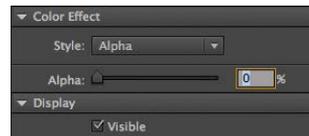
The transformation handles appear around the instance on the Stage.



- 6 While holding down the Shift key, click and drag a corner handle inward to make the car smaller.
- 7 In the Properties inspector, make sure that the width of the car is about 400 pixels.
- 8 Alternatively, you can use the Transform panel (Window > Transform) and change the scale of the car to about 29.4%.
- 9 Move the car to its starting position at about X=710 and Y=488.

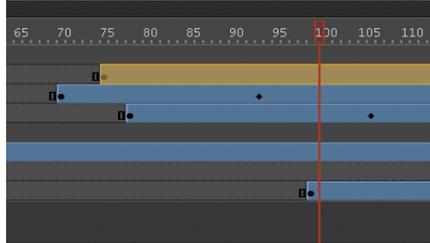


- 10 In the Properties inspector, select Alpha for the Color Effect.
- 11 Set the value of the Alpha to 0%.  
The car becomes totally transparent.
- 12 Right-click/Ctrl-click the car on the Stage and select Create Motion Tween.



The current layer becomes a Tween layer.

- 13** Move the red playhead on the Timeline to frame 100.



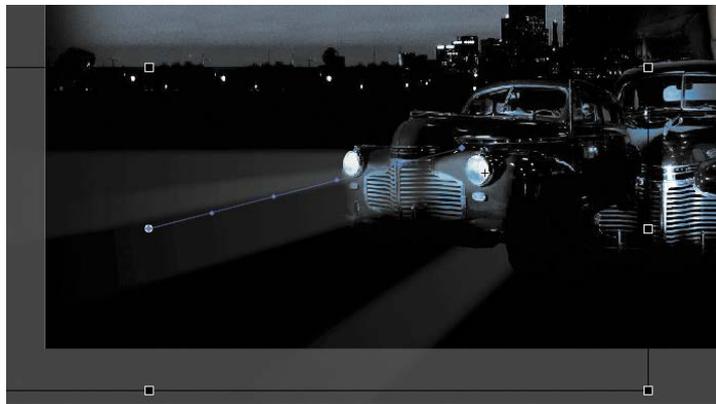
- 14** Select the transparent instance of the car on the Stage, and in the Properties inspector, change the Alpha value to **100%**.



A new keyframe is automatically inserted at frame 100 to indicate the change in transparency.

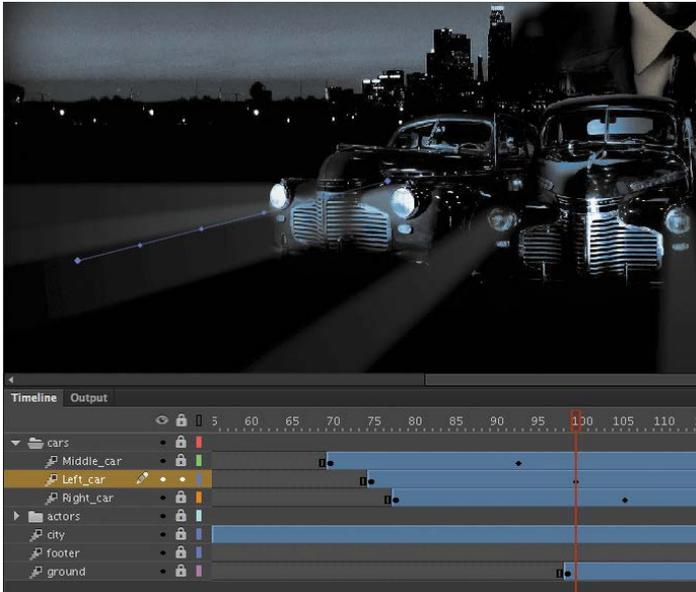
- 15** Select the Free Transform tool.
- 16** While holding down the Shift key, click and drag a corner handle outward to make the car larger. For more precision, use the Properties inspector and set the dimensions of the car to width=**1380** pixels and height=**445.05** pixels.
- 17** Position the car at X=**607** and Y=**545**.

**Note:** Hold down the Option/Alt key while you drag the corner handle of the Transformation tool to change the scale relative to the opposite corner point.



- 18** Move the Left\_car layer in between the Middle\_car and Right\_car layers so that the car in the center overlaps the cars on the side.

Flash tweens the change in position and the change in scale from frame 75 to frame 100. Flash also tweens the change in transparency from frame 75 to frame 100.

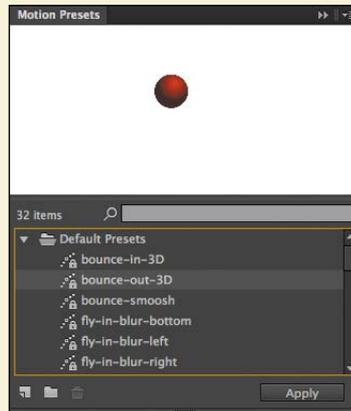


## Motion Presets

If your project involves creating identical motion tweens repeatedly, Flash provides a panel called Motion Presets that can help. The Motion Presets panel (Window > Motion Presets) can store any motion tween so you can apply it to different instances on the Stage.

For example, if you want to build a slide show where each image fades out in the same manner, you can save that transition to the Motion Presets panel.

- 1 Select the first motion tween on the Timeline or the instance on the Stage.
- 2 In the Motion Presets panel, click the Save selection as preset button at the bottom of the panel. Alternatively, right-click/Ctrl-click on the motion tween and choose Save as Motion Preset.
- 3 Name your motion preset, and it will be saved in the Motion Presets panel.
- 4 Select a new instance on the Stage and choose the motion preset.
- 5 Click Apply, and Flash will apply your saved motion preset to the new instance.

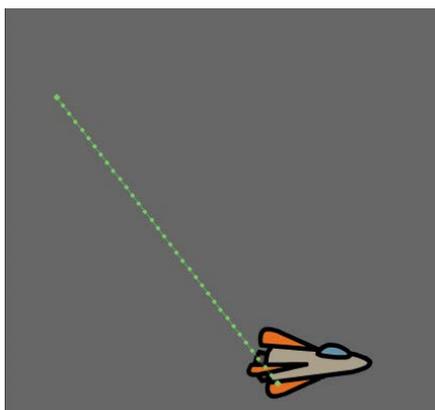


Flash provides a number of motion presets that you can use to quickly build sophisticated animations without much effort.

## Changing the Path of the Motion

The motion tween of the left car that you just animated shows a colored line with dots indicating the path of the motion. You can edit the path of the motion easily to make the car travel in a curve, or you can move, scale, or rotate the path just like any other object on the Stage.

To better demonstrate how you can edit the path of the motion, open the sample file 04MotionPath.fla in the Lesson04/04Start folder. The file contains a single Tween layer with a rocket ship moving from the top left of the Stage toward the bottom right.

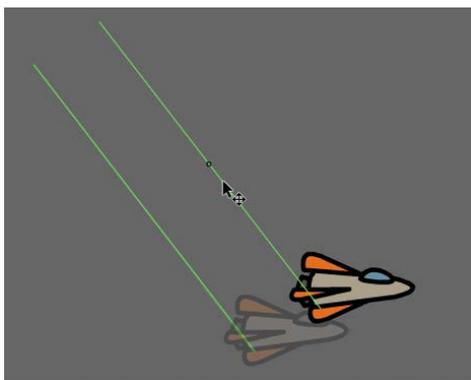
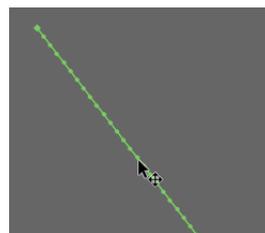


### Moving the path of the motion

You will move the path of the motion so the relative movement of the rocket ship remains the same, but its starting and ending positions change.

- 1 Choose the Selection tool.
- 2 Click on the path of the motion to select it.  
The path of the motion becomes highlighted.
- 3 Click and drag the motion path to move it to a different place on the Stage.

The relative motion and timing of the animation remain the same, but the starting and ending positions are relocated.

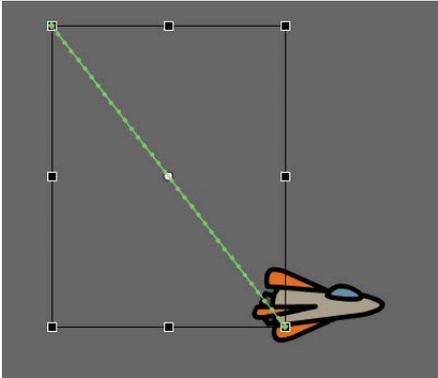


## Changing the scale or rotation of the path

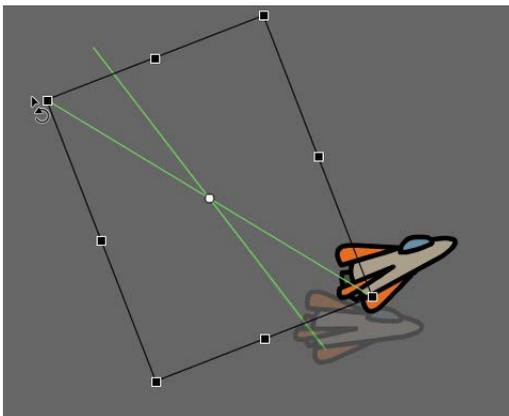
You can also manipulate the path of the object's motion using the Free Transform tool.

- 1 Select the path of the motion.
- 2 Choose the Free Transform tool.

Transformation handles appear around the path of the motion.



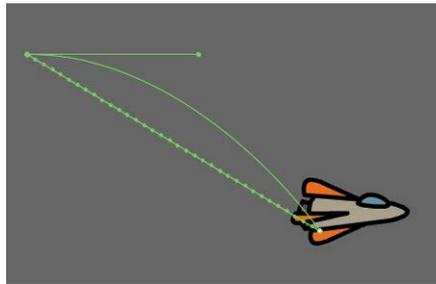
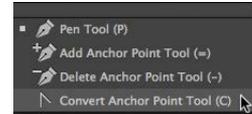
- 3 Scale or rotate the path of the motion as desired. You can make the path smaller or larger, or rotate the path so the rocket ship starts from the bottom left of the Stage and ends at the top right.



## Editing the path of the motion

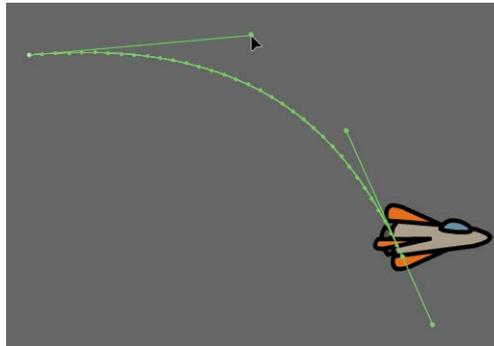
Making your objects travel on a curved path is a simple matter. You can either edit the path with Bezier precision using anchor point handles, or you can edit the path in a more intuitive manner with the Selection tool.

- 1 Choose the Convert Anchor Point tool, which is hidden under the Pen tool.
- 2 Click the starting point or the ending point of the motion path on the Stage and drag the control handle out from the anchor point.



The handle on the anchor point controls the curvature of the path.

- 3 Choose the Subselection tool.
- 4 Click and drag the handle to edit the curve of the path. Make the rocket ship travel in a wide curve.



**Note:** You can also directly manipulate the path of the motion with the Selection tool. Choose the Selection tool and move it close to the path of the motion. A curved icon appears next to your cursor, indicating that you can edit the path. Click and drag the path of the motion to change its curvature.



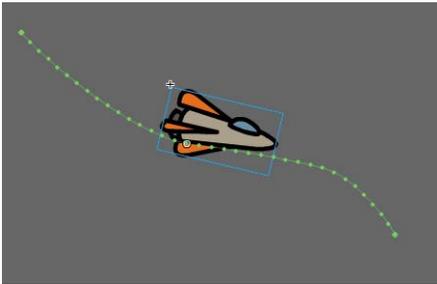
## Orienting objects to the path

Sometimes the orientation of the object traveling along the path is important. In the motion picture splash page project, the orientation of the car is constant as it rumbles forward. However, in the rocket ship example, the rocket ship should follow the path with its nose pointed in the direction in which it is heading. The Orient to path option in the Properties inspector gives you this option.

- 1 Select the motion tween on the Timeline.
- 2 In the Properties inspector, under Rotation, select the Orient to path option.



Flash inserts keyframes for rotation along the motion tween to orient the nose of the rocket ship to the path of the motion.

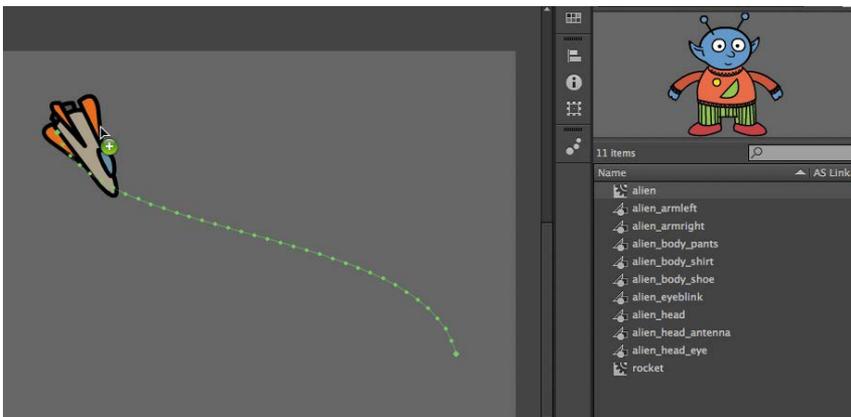


**Note:** To direct the nose of the rocket ship, or any other object, along the path of its motion, you must orient its position so that it is facing in the direction that you want it to travel. Use the Free Transform tool to rotate its initial position so that it is oriented correctly.

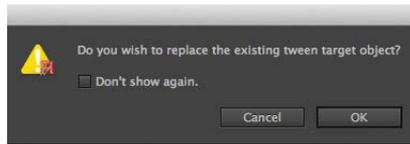
## Swapping Tween Targets

The motion tween model in Flash Professional is object-based. This means that an object and its motion are independent of each other, and you can easily swap out the target of a motion tween. If, for example, you'd rather see an alien moving around the Stage instead of a rocket ship, you can replace the target of the motion tween with an alien symbol from your Library panel and still preserve the animation.

- 1 Drag the movie clip symbol of the alien from the Library panel onto the rocket ship.

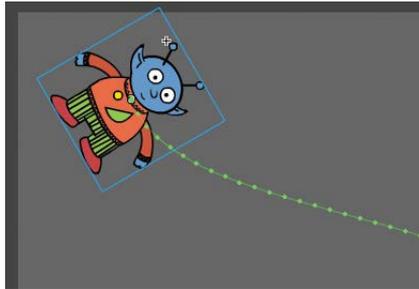


- Flash asks if you want to replace the existing tween target object with a new object.

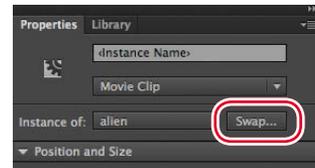


- Click OK.

Flash replaces the rocket ship with the alien. The motion remains the same, but the target of the motion tween has changed.



● **Note:** You can also swap instances in the Properties inspector. Select the object that you want to swap on the Stage. In the Properties inspector, click the Swap button. In the dialog box that appears, choose a new symbol and click OK. Flash will swap the target of the motion tween.



## Creating Nested Animations

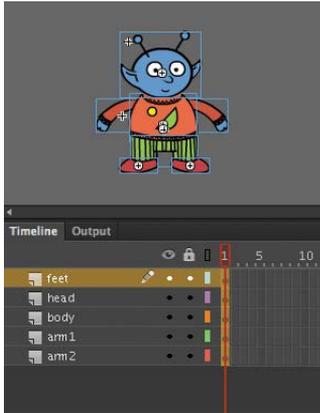
Often, an object that is animated on the Stage will have its own animation. For example, a butterfly moving across the Stage will have an animation of its wings flapping as it moves. Or the alien that you swapped with the rocket ship could be waving his arms. These kinds of animations are called *nested animations*, because they are contained inside the movie clip symbols. Movie clip symbols have their own Timeline that is independent of the main Timeline.

In this example, you'll make the alien wave his arms inside the movie clip symbol, so he'll be waving as he moves across the Stage.

## Creating animations inside movie clip symbols

- 1 In the Library panel, double-click the alien movie clip symbol icon.

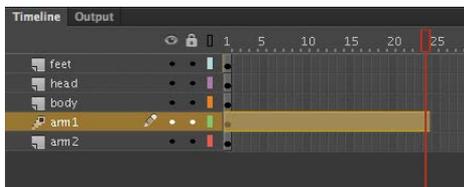
You are now in symbol-editing mode for the alien movie clip symbol. The alien appears in the middle of the Stage. In the Timeline, the parts of the alien are separated in layers.



- 2 Choose the Selection tool.
- 3 Right-click/Ctrl-click the alien's left arm and choose *Create Motion Tween*.



Flash converts the current layer to a Tween layer and inserts 1 second's worth of frames so you can begin to animate the instance.



**4** Choose the Free Transform tool.

**5** Drag the corner rotation control point near the hand to rotate the arm upward to the alien's shoulder height.

Flash inserts a keyframe at the end of the motion tween. The left arm rotates smoothly from the resting position to the outstretched position.



**6** Move the red playhead back to frame 1.

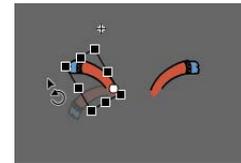
**7** Now create a motion tween for the alien's other arm. Right-click/Ctrl-click his right arm and choose Create Motion Tween.

Flash converts the current layer to a Tween layer and inserts 1 second's worth of frames so you can begin to animate the instance.

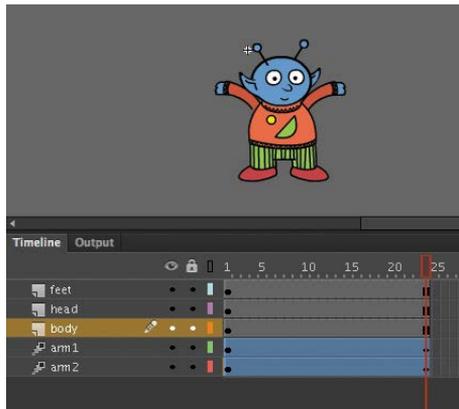
**8** Choose the Free Transform tool.

**9** Drag the corner rotation control point near the hand to rotate the arm upward to the alien's shoulder height.

Flash inserts a keyframe at the end of the motion tween. The arm rotates smoothly from the resting position to the outstretched position.



**10** Select the last frame in all the other layers and insert frames (F5) so that the head, body, and feet all remain on the Stage for the same amount of time as the moving arms.

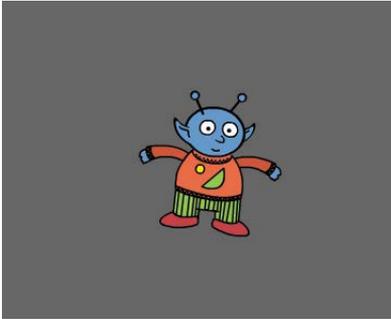


**11** Click the Scene 1 button in the Edit bar at the top of the Stage to exit symbol-editing mode.

Your animation of the alien raising his arms is complete. Wherever you use the movie clip symbol, the alien's nested animation will continue to play.

## 12 Preview the animation by choosing Control > Test.

Flash opens a window showing the exported animation. The alien moves along the motion path while the nested animation of his arms moving plays and loops.



● **Note:** Animations inside of movie clip symbols won't play on the main Timeline. Choose Control > Test to preview nested animations.

● **Note:** Animations inside movie clip symbols will loop automatically. To prevent the looping, you need to add code to tell the movie clip Timeline to stop on its last frame. You'll learn to control the Timeline with ActionScript or JavaScript in later lessons.

## Easing

*Easing* refers to the way in which a motion tween proceeds. You can think of easing as acceleration or deceleration. An object that moves from one side of the Stage to the other side can start off slowly, then build up speed, and then stop suddenly. Or, the object can start off quickly, and then gradually slow to a halt. Your keyframes indicate the beginning and end points of the motion, but the easing determines how your object gets from one keyframe to the next.

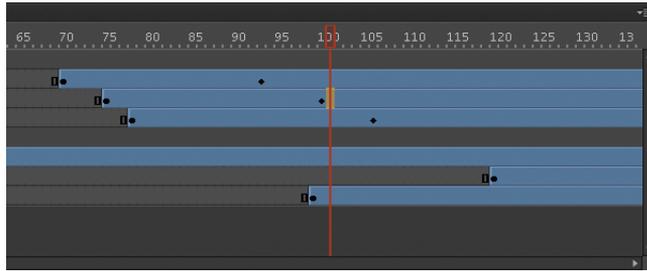
A simple way to apply easing to a motion tween is from the Properties inspector. Easing values range from -100 to 100. A negative value creates a more gradual change from the starting position (known as an ease-in). A positive value creates a gradual slowdown (known as an ease-out).

A more advanced way of applying easing is to use the new Motion Editor, which you'll learn about in the next lesson.

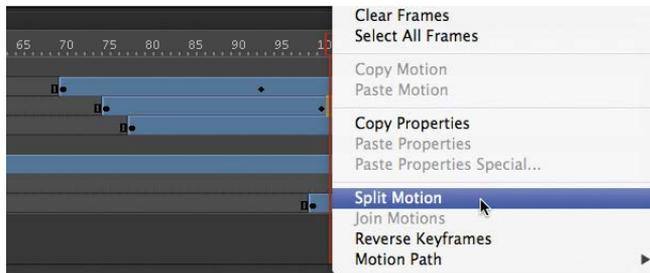
## Splitting a motion tween

Easing affects the entire span of a motion tween. If you want the easing to affect only frames between keyframes of a longer motion tween, you should split the motion tween. For example, return to the 04\_workingcopy.fla file of the cinematic animation. The motion tween of the car in the Left\_car layer begins at frame 75 and ends at frame 190, at the very end of the Timeline. However, the actual movement of the car starts at frame 75 and ends at frame 100. You'll split the motion tween so you can apply an ease to the tween just from frames 75 to 100.

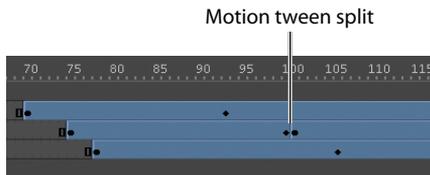
- 1 In the Left\_car layer, select frame 101, which is the frame just after the second keyframe where the car ends its movement.



- 2 Right-click/Ctrl-click on frame 101 and choose Split Motion.



Flash cuts the motion tween into two separate tween spans. The end of the first tween is identical to the beginning of the second tween.

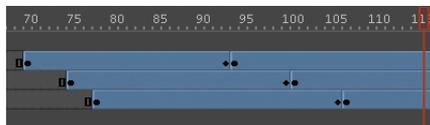


- 3 In the Middle\_car layer, select frame 94, right-click/Ctrl-click, and choose Split Motion.

Flash cuts the motion tween into two separate tween spans.

- 4 In the Right\_car layer, select frame 107, right-click/Ctrl-click, and choose Split Motion.

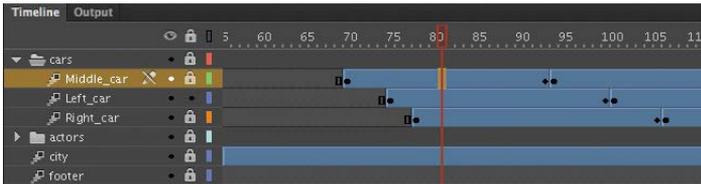
Flash cuts the motion tween into two separate tween spans. The motion tweens of all three cars are split.



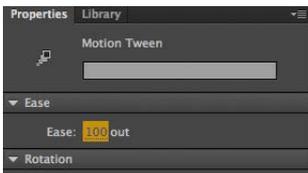
## Setting eases of a motion tween

You'll apply an ease-in to the motion tweens of the approaching cars to give them a sense of weight and decelerate as real cars would.

- 1 In the Middle\_car layer, select any frame between the first and second keyframes of the first motion tween (frame 70 to frame 93).

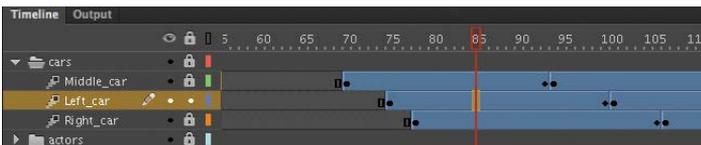


- 2 In the Properties inspector, enter **100** for the Ease value.



Flash applies an ease-out effect to the motion tween.

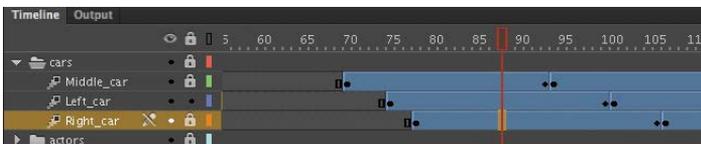
- 3 In the Left\_car layer, select any frame between the first and second keyframes of the first motion tween (frame 75 to frame 100).



- 4 In the Properties inspector, enter **100** for the Ease value.

Flash applies an ease-out effect to the motion tween.

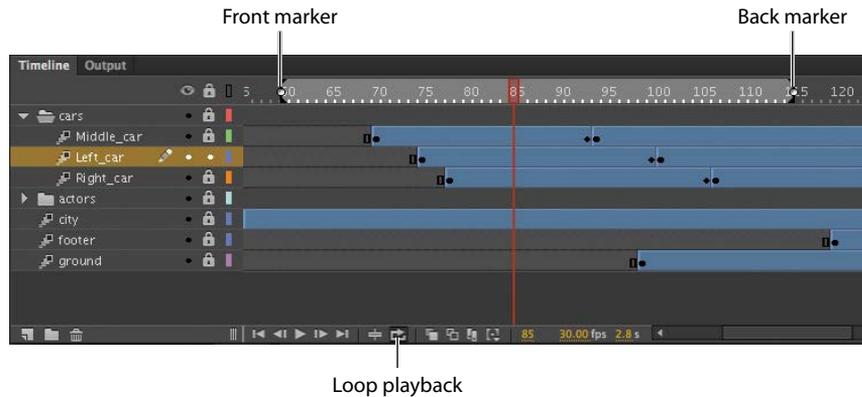
- 5 In the Right\_car layer, select any frame between the first and second keyframes of the first motion tween (frame 78 to frame 106).



- 6 In the Properties inspector, enter **100** for the Ease value.

Flash applies an ease-out effect to the motion tween.

- 7 Enable the Loop Playback option at the bottom of the Timeline, and move the front and rear markers to bracket frames 60 to 115.



- 8 Click Play (Return/Enter).  
Flash plays the Timeline in a loop between frames 60 and 115 so you can examine the ease-out motion of the three cars.

## Frame-by-Frame Animation

Frame-by-frame animation refers to the illusion of movement created by seeing the incremental changes between every keyframe. It's the closest to traditional hand-drawn cel animation, and it's just as tedious. In Flash, you can change a drawing in every keyframe, and create a frame-by-frame animation.

Frame-by-frame animations increase your file size rapidly because Flash has to store the contents for each keyframe. Use frame-by-frame animation sparingly.

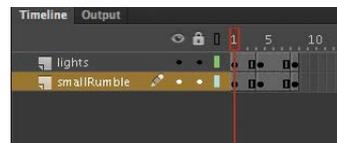
In the next section, you'll insert a frame-by-frame animation inside the carLeft movie clip symbol to make it move up and down in a jittery fashion. When the movie clip loops, the car will rumble slightly to simulate the idle of the motor.

### Inserting a new keyframe

The frame-by-frame animations inside the carMiddle and carRight movie clip symbols have already been done. You'll finish the animation for the carLeft symbol.

- 1 In the Library panel, double-click the carRight movie clip symbol to examine its completed frame-by-frame animation.

Inside the carRight movie clip, three keyframes establish three different positions for the car and its headlights. The keyframes are spaced unevenly to provide the unpredictable up and down motion.

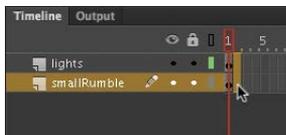


- 2 In the Library panel, double-click the carLeft move clip symbol.

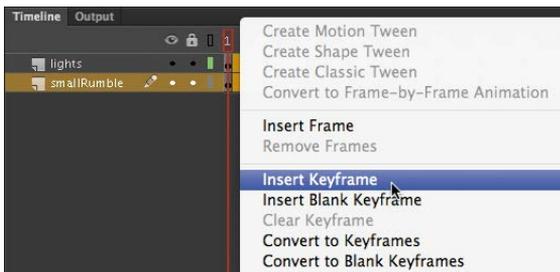
You enter symbol-editing mode for the carLeft symbol.



- 3 Select frame 2 in both the lights layer and the smallRumble layer.



- 4 Right-click/Ctrl-click and choose Insert Keyframe (F6).



Flash inserts a keyframe in frame 2 of the lights layer and the smallRumble layer. The contents of the previous keyframes are copied into the new keyframes.



## Changing the graphics

In the new keyframe, change the appearance of the contents to create the animation.

- 1 In frame 2, select all three graphics on Stage (Edit > Select All, or Command/Ctrl+A) and move them down the Stage 1 pixel. You can use the Properties inspector or press the Down Arrow key to nudge the graphics by 1 pixel.

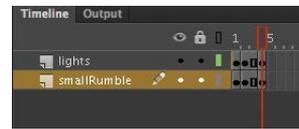
The car and its headlights move down slightly.

- 2 Next, repeat the process of inserting keyframes and changing the graphics. For a random motion like an idling car, at least three keyframes are ideal.

- 3 Select frame 4 in both the lights layer and the smallRumble layer.

- 4 Right-click/Ctrl-click and choose Insert Keyframe (F6).

Flash inserts a keyframe in frame 4 of the lights layer and the smallRumble layer. The contents of the previous keyframes are copied into the new keyframes.



- 5 Select all three graphics on Stage (Edit > Select All, or Command/Ctrl+A) and move them up the Stage 2 pixels. You can use the Properties inspector or press the Up Arrow key twice to nudge the graphics by 2 pixels.

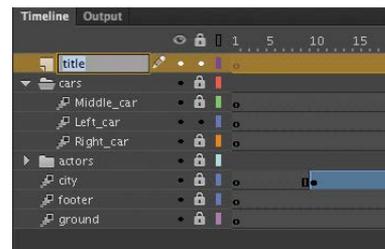
The car and its headlights move up slightly.

- 6 Test the idling motion by enabling the Loop Playback option at the bottom of the Timeline and click Play (Return/Enter).

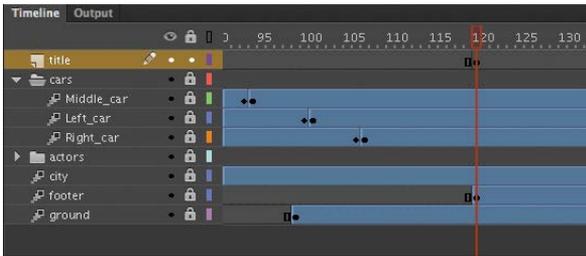
## Animating 3D Motion

Finally, you'll add a title and animate it in 3D space. Animating in 3D presents the added complication of a third (z) axis. When you choose the 3D Rotation or 3D Translation tool, you need to be aware of the Global Transform option at the bottom of the Tools panel. The Global Transform option toggles between a global option (button depressed) and a local option (button raised). Moving an object with the global option on makes the transformations relative to the global coordinate system, whereas moving an object with the local option on makes the transformations relative to itself.

- 1 Click on Scene 1 in the Edit bar to return to the main Timeline. Insert a new layer at the top of the layer stack and rename it **title**.
- 2 Lock all the other layers.



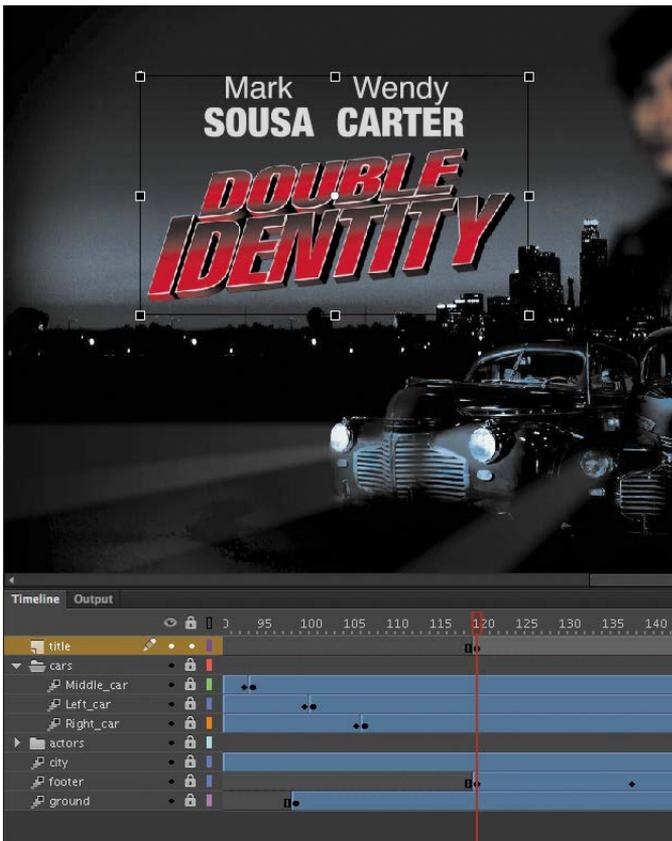
- 3 Insert a new keyframe at frame 120.



- 4 Drag the movie clip symbol called movietitle from the Library panel onto the Stage.

The movietitle instance appears in your new layer in the keyframe at frame 120.

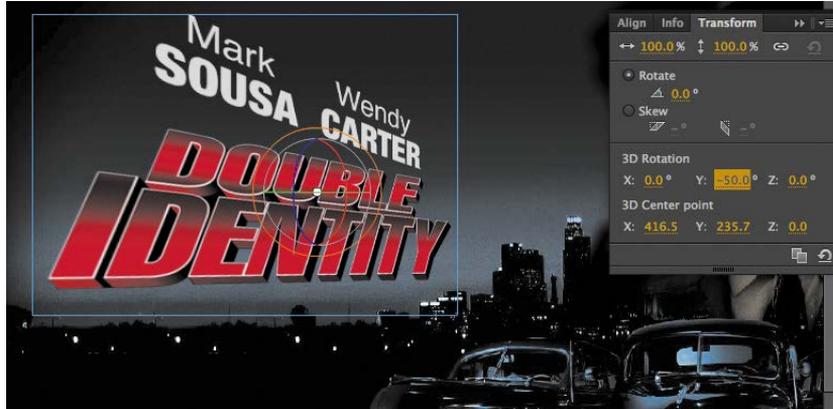
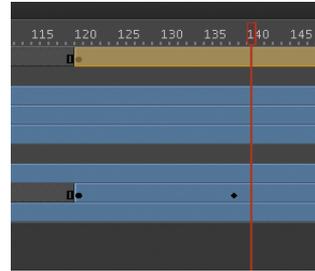
- 5 Position the title at x=180 and y=90.



- 6 Right-click/Ctrl-click on the movie title and choose Create Motion Tween.

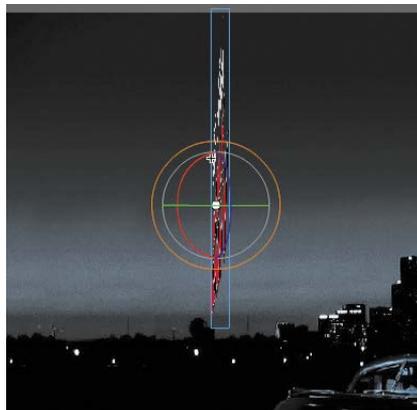
Flash converts the current layer to a Tween layer so you can begin to animate the instance.

- 7 Move the red playhead to frame 140.
- 8 Select the 3D Rotation tool.
- 9 Deselect the Global Transform option at the bottom of the Tools panel.
- 10 Click and drag the title to rotate it around the *y*-axis (green) so that its angle is at about  $-50$  degrees. You can check the rotation values in the Transform panel (Window > Transform).



- 11 Move the red playhead to the first keyframe at frame 120.
- 12 Click and drag the title to rotate it around the *y*-axis in the opposite direction so that the instance looks like just a sliver.

● **Note:** Animating the 3D rotation or translation of a symbol is currently not supported in HTML5 Canvas documents or in WebGL documents.



Flash motion-tweens the change in the 3D rotation, so the title appears to swing in three dimensions.

## Testing Your Movie

You can quickly preview your animation by “scrubbing” the red playhead back and forth on the Timeline or by choosing Control > Play. You can also use the integrated Controller at the bottom of the Timeline.

However, to preview your animation as your audience will see it and to preview any nested animations within movie clip symbols, you should test your movie. Choose Control > Test.

Flash exports the published files—in this case, a SWF file—and saves it in the same location as your FLA file. The SWF file is the compressed, final Flash media that you would embed in an HTML page to play in a browser with the Flash Player. Flash displays the SWF file in a new window with the exact Stage dimensions and plays your animation.

**Note:** The exported SWF in Test Movie mode will loop automatically. To prevent the looping in Test Movie mode, choose Control > Loop to deselect the loop option.



To exit Test Movie mode, click the Close window button.

You can also preview your animation by choosing Control > Test Movie > in Browser, and Flash will export a SWF file and open it automatically in your default browser.

**Note:** If you’ve targeted a different publishing platform with a different document type (such as Adobe AIR), those playback options will be available for you in the Control > Test Movie menu.

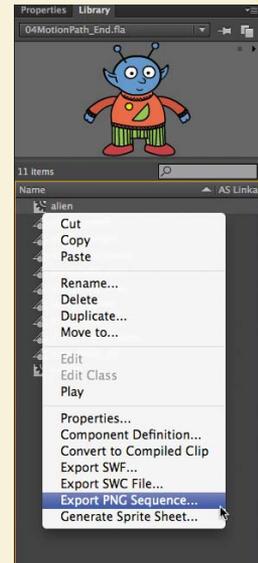
# Generating PNG Sequences and Sprite Sheets

While you can create sophisticated animations to play as a SWF file with the Flash Player, you can also use Flash's powerful tools to create your animation and export it as a series of images for use in other environments. For example, animations with HTML5 or on mobile devices often rely on sequential PNG files or a single file that packs all the images organized in rows and columns, known as a sprite sheet. The sprite sheet is accompanied by a data file that describes the position of each image, or sprite, in the file.

Generating either PNG sequences or a sprite sheet of your animation is easy. First, your animation must be within a movie clip symbol. In the Library panel, right-click/Ctrl-click the symbol and choose Export PNG Sequence.

In the next steps, you select the destination on your hard drive for your images and the dimensions of your images.

For a sprite sheet, right-click/Ctrl-click the symbol and choose Generate Sprite Sheet. The Generate Sprite Sheet dialog box that appears provides different options, such as sizing, background color, and the particular data format.



Click Export to output the sprite sheet and data file. The data file determines what kind of development environment you'll use your sprite sheet in. For example, JSON, Starling, cocos2D, and Adobe's Edge Animate are some of the data formats available.

## Review Questions

- 1 What are two requirements of a motion tween?
- 2 What kinds of properties can a motion tween change in an ActionScript 3.0 document?
- 3 What are property keyframes, and why are they important?
- 4 How can you edit the path of an object's motion?
- 5 What does easing do to a motion tween?

## Review Answers

- 1 A motion tween requires a symbol instance on the Stage and its own layer, which is called a Tween layer. No other tween or drawing object can exist on the Tween layer.
- 2 A motion tween creates smooth transitions between different keyframes of an object's location, scale, rotation, transparency, brightness, tint, filter values, or 3D rotation or translation.
- 3 A keyframe marks a change in one or more properties of an object. Keyframes are specific to each property, so that a motion tween can have keyframes for position that are different from keyframes for transparency.
- 4 To edit the path of an object's motion, choose the Selection tool and click and drag directly on the path to bend it. You can also choose the Convert Anchor Point tool and Subselection tool to pull out handles at the anchor points. The handles control the curvature of the path.
- 5 Easing changes the rate of change in a motion tween. Without easing, a motion tween proceeds linearly, where the same amount of change happens over time. An ease-in makes an object begin its animation slowly, and an ease-out makes an object end its animation slowly.

# INDEX

## NUMBERS

3D coordinate space  
  about, 101  
  animating in, 140–142  
  changing object rotation in,  
    101–102  
  editing 3D rotation in HTML5  
    Canvas file, 343–345  
  perspective angle in, 105–106  
  repositioning object in, 104  
3D Rotation tool, 101–102, 104, 140,  
  142, 319  
3D Translation tool, 103, 104  
Symbols  
\* (asterisk), 39  
[ ] (brackets), 222  
, (comma), 268  
{ } (curly brackets), 222, 226, 228  
" " (curly quotes), 233  
. (dot operator), 222  
// (comments), 223, 336  
/\* \*/ (multiline comments), 223  
( ) (parentheses), 221, 222  
" " (quotation marks), 222, 233, 290  
; (semicolon), 222

## A

about this book, 1  
Action layer, 236  
Actions panel  
  adding JavaScript to, 327, 336  
  color-coding JavaScript code, 340  
  formatting code in, 228, 341  
  inserting JavaScript code from, 338  
  making multiple replacements in,  
    241  
  using, 223–224  
ActionScript 3.0 code. *See also*  
  ActionScript 3.0 documents;  
  Code Snippets panel  
  about, 220–221  
  adding from Code Snippets panel,  
    234–236  
  attaching to keyframes, 224, 247  
  code hints for, 223  
  converting String to Number data  
    in, 268  
  creating your own code snippets,  
    236–237  
  debugging, 229  
  event listeners using, 226–227  
  Flash Professional support for, 220  
  interactivity using, 209  
  making math calculations with,  
    266–267  
  multiple replacements for, 241  
  naming instances, 220  
  navigating to video cue points, 296  
  proper scripting syntax for,  
    222–223  
  referencing frame labels in, 247  
  scripting terminology for, 221–222  
  sharing snippets, 237–238  
  Timeline navigation with, 228  
  tips for writing, 228  
  unconverted in transfer to HTML5  
    Canvas, 341  
  void in, 227  
ActionScript 3.0 documents  
  about, 11, 12  
  conversions supported for, 13  
  converting to HTML5 Canvas, 341  
  loops in, 188  
  masks in, 198  
  playing projector in, 318  
  SWF files published from, 37  
  when and where to add text in, 252  
Adobe  
  certification programs by, 6–7  
  forums and resources, 5–6, 42  
Adobe Creative Cloud, 5  
Adobe Flash. *See* Flash  
Adobe Flash Player. *See* Flash Player  
Adobe Flash Professional CC. *See* Flash  
  Professional CC  
Adobe Illustrator. *See* Illustrator  
Adobe Integrated Runtime. *See* AIR

Adobe Media Encoder  
  adding files to, 287–289  
  adjusting video length, 295–296  
  alpha channels encoded with, 303  
  changing queue status of, 290  
  choosing target device for encoded  
    video, 312–314, 315  
  converting video files in, 289–290  
  cropping video, 292–295  
  displaying Export Settings dialog  
    box, 291–292  
  encoding video with, 315  
  illustrated, 288  
  starting Queue automatically,  
    289, 315  
Adobe Photoshop, 82–84  
AIFF file support, 275  
AIR (Adobe Integrated Runtime).  
  *See also* AIR documents  
  creating applications with, 348–353  
  downloading, 348  
  installing application for, 353–354  
  running content with, 319  
Air Debug Launcher, 357, 358, 365  
AIR documents  
  about, 11, 12–13  
  adding text in, 253  
  project files for sound/video lesson,  
    273–274  
AIR for iOS Settings dialog box, 36,  
  362, 363  
AIR Settings dialog box, 349–353  
aligning objects  
  spacing button instances, 217–218  
  using Align panel, 67–68, 73  
alpha channel encoding, 303  
Alpha values  
  changing for fills, 62–63  
  touch layer, 359  
anchor points  
  adding or deleting, 61  
  adjusting stroke by dragging, 73  
  asymmetric edits to, 156  
  deleting, 59, 158

- handles for, 60
- moving, 157
- using on non-linear paths, 154–155
- Android devices, 356, 360, 365
- animated buttons. *See* buttons
- animation, 108–145. *See also*
  - converting animation to HTML5 Canvas
- about, 111
- adjusting tweening keyframe timing, 184
- animated buttons, 243–245, 247
- animating transparency, 118–120
- bounces using, 170–172
- changes in position using, 112–115
- changing path of motion, 128–131
- converting from Flash to HTML5 Canvas, 341–348
- creating infographic with, 148–149
- duration of, 115–116
- exporting to HTML5, 333–336
- filters with, 120–122
- frame-by-frame, 138–140
- looping, 187–189
- modifying color of gradient fills, 195–197
- Motion Editor for, 149–150
- nested, 132–135
- pacing, 117
- previewing, 115
- shape tweens for, 180
- sprite sheets of, 144
- stopping, 241–243
- symbols for, 79
- testing movie, 143
- 3D spaces, 140–142
- transformations using, 124–126
- transition, 238–240

Apple

- publishing Flash content for iOS, 356
- publishing iOS mobile apps, 360–363
- publishing Macintosh AIR desktop projector, 355
- testing published projects for iOS, 357, 365

applications

- installing AIR, 353–354
- playing with projectors, 318
- publishing mobile, 360–363
- simulating mobile, 357–360, 365

arguments, 221

audio. *See* sound

author-time, runtime vs., 364

Auto-Recovery feature, 39–40

## B

bitmap art

- converting vector to, 69–70, 85
- exporting movie clip symbols as, 98
- shape tweens unavailable for, 180
- swapping symbols with, 215–216

bitmap fills, 56

Blending options, 97

blending shape tweens, 183

Blur filter, 99–100

bounces

- animating, 163, 170–172
- using BounceIn ease with, 173–175

brackets ([ ]), 222

breaking apart

- symbols, 90–91
- text, 254

brightness, 94–95

broken shape tweens, 187

button symbols

- about, 79, 80, 209
- creating, 210–213
- displaying animated button keyframes, 247
- duplicating, 214–215
- invisible, 214
- naming instances for, 219–220, 247
- placing instances of, 217–218
- starting interactivity with, 209
- states of, 210

buttons. *See also* button symbols

- adding sounds to, 285–289
- animating, 243–245, 247
- event handlers for, 226
- home, 233, 234

## C

captive runtime, 39

case-sensitivity of variables, 221

characters, text, 256, 264

circles, 73

classic tweens, 328, 330–332

clearing Publish cache, 319

click event code, 227

code-signing certificate, 351, 365

Code Snippets panel

- adding ActionScript code in, 234–236
- creating code for, 236–237
- making home button from, 233–236
- sharing snippets, 237–238
- stopping animations from, 242
- using HTML5 Canvas code snippets, 336–339, 365

codecs (compression-decompression), 287

color. *See also* color-coding

- animating gradient fills, 195–197
- blending instance, 97
- changing Stage background, 16
- choosing light gray for user interface, 15
- editing stroke and fill, 51
- hexadecimal values of, 47
- matching existing object's, 65–66
- meanings of shape hint, 193

color-coding

- ActionScript code, 228
- JavaScript code, 340

Color Effect option (Properties inspector), 94–96

color pointers, 54, 55

commas in numeric entries, 268

comments (//), 223, 336

Compiler Errors panel, 229

complex eases, 163–176

compressing

- sound files, 283–285
- video files, 287

constraints on anchor points, 157

content

- author-time, 364
- copying/pasting into HTML5 Canvas, 346–348
- inserting in keyframes, 229–231
- publishing for mobile devices, 356–363
- resizing and scaling, 38–39
- running with AIR, 319

Controller panel, 115

Convert to Symbol command, 80–81

converting animation to HTML5 Canvas, 341–348. *See also* HTML5 Canvas

copying/pasting content into HTML5 Canvas, 346–348

editing, 343–345

publishing image assets when, 346

unconverted feature warnings when, 342–343

copying

- layers, 27
- lesson files, 4, 8
- sample movies and projects, 4–5
- shapes, 49–50

copying/pasting

- content into HTML5 Canvas, 346–348
- curves, 159–161
- Illustrator artwork in Flash, 78

- Create New Symbol dialog box, 210
- CreateJS libraries
  - about, 327–328, 364, 365
  - frame numbers for, 340, 365
  - referencing for published files, 336
- cropping video, 292–295
- cue points, 296
- curly brackets ({}), 222, 226, 228
- curly quotes (“ ”), 233
- curves
  - adding with Pen tool, 59–61
  - copying and pasting curves, 159–161
  - duplicating motion tween, 162–163
  - editing X- and Y-properties for, 152–153
  - property vs. ease, 169, 177
- cutting layers, 27

**D**

- debugging ActionScript code, 229
- declaring variables, 221
- deleting
  - anchor points, 61, 158
  - color pointers, 55
  - property curves, 158
  - sound files, 283
  - vs. moving keyframes, 24
- desktop applications, 348–356
- destination keyframes
  - creating, 229–233
  - moving playhead to, 238–242
- device fonts, 265
- digital signature, 351, 365
- distributing objects, 67–68
- docking/undocking panels, 31
- documents. *See also* ActionScript 3.0 documents; AIR documents
  - adding layers in, 19–20
  - conversions supported in Flash Pro, 319
  - creating, 1–12
  - features supported by types of, 13
  - inserting paragraph text, 257–260
  - integrating text in, 269
  - modifying .xml, 40–41
  - saving, 12
  - selecting for playback environment, 12–13
  - SVG, 72
  - types of, 12–13, 318
  - when and where to add text, 252–253

- dot operator (.), 222
- Down keyframes, 212–213, 237
- Down state, 210, 286
- downloading AIR, 348
- duplicating
  - button symbols, 214–215
  - keyframes, 188
  - layers, 27
  - motion tween curves, 162–163
  - stop action keyframes, 242
  - symbols, 88
- dynamic text
  - defined, 253, 269
  - selecting, 263
  - showing field border for, 264

**E**

- easing
  - adding multiple complex, 170–172
  - defined, 111, 135
  - Motion Editor options for tween, 166–168
  - property curves vs. ease curves, 169, 177
  - rates of change, 145
  - removing, 169
  - setting, 137–138, 177
  - shape tweens, 204
  - splitting motion tween, 135–136
  - using BounceIn ease, 173–175
- Edit Envelope dialog box, 279–280, 315
- editing
  - curves, 61
  - motion paths, 130
  - object’s motion paths, 145
  - Photoshop files in Flash, 84
  - property curves, 152–153
  - shapes, 49–51
  - sound clips, 279–280, 315
  - symbols, 87–90, 107
  - 3D rotation in HTML5 Canvas, 343–345
  - variable-width strokes, 57–58
  - volume of sound files, 281–282
- embedding
  - Flash video, 306–311
  - fonts, 264, 265, 268, 269
- encoding video
  - Adobe Media Encoder for, 315
  - choosing target device when, 312–314, 315
  - displaying options for, 291
  - encoding alpha channels, 303
- event handlers, 226

- event listeners
  - adding code for, 226–227
  - adding JavaScript, 338
  - defined, 247
- events
  - defined, 226, 247
  - mouse, 227, 336–339
- Export Settings dialog box (Media Encoder)
  - advanced video/audio options for, 292, 297–298
  - cue points in, 296
  - displaying, 291–292
  - illustrated, 292
- Export to Projector window, 355
- exporting
  - animation to HTML5, 333–336
  - assets during publishing, 346
  - graphics to SVG, 70–72
  - movie clip symbols as bitmap art, 98
  - sprite sheets, 144
  - video from Flash, 311–312
- external video, 299
- Eyedropper tool, 65–66

**F**

- fade-in/fade-out effects, 282, 309–311
- files. *See also* lesson files; *and specific files*
  - adding to Media Encoder, 287–289
  - asterisk in name of, 39
  - backing up automatically, 39
  - compressing sound, 283–285
  - configuring Publish Settings for, 335–336
  - elements in project, 111–112
  - Flash support for sound, 275
  - HTML project output, 334–335
  - importing Photoshop, 82–84
  - MP3, 275
  - MP4, 306
  - opening, 10
  - required to play Flash movie in browser, 364
- fills
  - Alpha value of, 62–63
  - animating color of gradient, 195–197
  - bitmap, 56
  - changing properties for, 51
  - default, 48
  - defined, 46, 53
  - editing spillover from, 51

- effect of shape tweens on, 205
  - gradient, 53–55
  - morphing changes with shape tweens, 180, 205
  - sampling, 66
  - selecting, 48
  - transparent, 62–64
- filters
- animating, 120–122
  - applying Blur, 99–100
  - defined, 99
  - options for, 100
- .fla files
- documents saved as, 12
  - embedding on Timeline, 307–308
  - frame rate of FLV embedded video and, 307
  - opening, 10
  - published files saved with, 143, 318
- flag icon, 232
- Flash. *See also* Flash Professional CC
- ActionScript support for versions of, 12
  - additional resources for, 5–6
  - converting Illustrator layers to, 76–79, 107
  - creating document in, 11–12
  - creating self-signed certificate, 351, 365
  - detecting Flash Player version, 323, 364
  - drawing modes for, 52, 73
  - embedding video in, 306–307
  - further resources on, 42
  - installing, 3
  - new features of, 2
  - previewing movies in, 36–37
  - starting, 10
  - support for graphics tablets, 59
  - testing projects on mobile devices, 365
  - undoing steps in, 35–36, 43
  - updating, 42
  - uses for, 1
  - workspace for, 13–17
  - writing scripts in Action panel, 223
- Flash Player
- about, 318
  - detecting version of viewer's, 323, 364
  - errors porting content to HTML5, 342
  - publishing, 319–326
  - specifying publish settings for, 320–322
- Flash Professional CC
- ActionScript support for, 220
  - authoring content in, 318
  - document conversion supported in, 319
  - exporting animation as video, 315
  - features supported by HTML5 Canvas, 334
- Flash Support Center, 42, 43
- FLV files
- embedding in Flash, 287
  - frame rate of FLA and, 307
  - support by Adobe Media Encoder for, 303
- FLVPlayback component, 302–303
- folders
- contents of Library and images, 40
  - importing multiple sound files to sound, 276
  - layer, 25–26
  - organizing symbols in, 86
  - XFL documents, 40
- Font Embedding dialog box, 264
- fonts
- device vs. embedded, 265
  - embedding text, 264, 269
  - substituting missing, 76
  - using substitute, 208
- Format Code option (Action panel), 228, 341
- frame-based selection of keyframes, 118
- frame-by-frame animation, 138–140
- frames. *See also* keyframes
- adding in motion tweens, 116–117
  - adding on Timeline, 21–22, 224–225, 278
  - adjusting size of, 27
  - appearance on Timeline, 8
  - keyframes vs., 43
  - labeling, 231–233, 247, 365
  - loading URL in specific, 261
  - selecting multiple, 22
  - shortcuts for moving video, 296
- Free Transform tool, 49, 124
- functions
- adding to event handlers, 226–227
  - curly brackets and, 226, 228
  - defined, 221, 226, 247
- G**
- getting started
- about this book, 1
  - copying lesson files, 4
  - copying sample movies and projects, 4–5
- how to use lessons, 5
- installing Flash, 3
  - new Flash features, 2
  - prerequisites, 2
- GIF files, 85
- global vs. local transformations, 104, 140
- Google Android devices, 356, 360, 365
- gotoAndPlay() command, 238, 241, 340
- gotoAndStop() command, 238, 241, 340
- gradient fills
- about, 53
  - adjusting features of, 55
  - creating color transitions with, 53–55
- Gradient Transform tool, 55, 56, 196
- graphic symbols, 79, 80
- graphics, 44–73. *See also* fills; strokes
- adjusting fills for, 46, 48, 51, 53–56
  - adjusting in frame-by-frame animation, 140
  - bitmap fills in, 56
  - converting vector to bitmap, 69–70, 85
  - curves, 59–61
  - drawing circles, 73
  - editing strokes in, 48, 51, 57–58, 59, 73
  - exporting to SVG, 70–72
  - gradient fills in, 53–55
  - rendering in WebGL, 356
  - transparencies, 62–64
  - using text with, 64–67
  - working with shapes, 46–52
- graphics tablets, 59
- green screen, 303
- groups
- creating object, 56–57
  - panel, 31
  - shape tweens unavailable for, 180
- guides, 93–94
- H**
- handle bars, 156
- Help resources, 5, 42
- hexadecimal values of colors, 47
- History panel, 35–36, 43
- Hit keyframes, 214
- Hit state, 210, 285
- home button, 233–236
- hotspots, 213
- HTML5. *See also* HTML5 Canvas
- classic tweens in, 328
  - errors porting content from Flash Player, 342
  - exporting animation to, 333–336

## HTML5 (*continued*)

- HTML Wrapper format, 322, 323–324
- publishing, 327–328
- HTML5 Canvas
  - about, 12, 13, 327
  - adding text in, 253
  - converting Flash animations to, 341–348
  - copying/pasting content into, 346–348
  - creating document for, 11
  - Flash features supported by, 334
  - publishing project files in, 329
  - understanding output files for, 334–335
  - using code snippets for, 336–339, 365
  - using 3D rotation in, 319, 343–345
  - video playback unsupported for, 287
  - writing JavaScript code for, 209
- hyperlinks, 66–67, 260–262, 269

## I

- icons
  - flag, 232
  - movie clip symbol, 79
  - symbol, 79
- Illustrator
  - copying/pasting artwork in Flash, 78
  - importing files from, 76–79, 107
  - using with Flash, 78
- images
  - file formats supported by Flash, 85
  - importing to Library panel, 17
  - smoothing bitmap, 30
  - using imported, 18
- images folder, 40
- Import Video wizard
  - importing video clip with, 299–302, 304–306
  - selecting skin in, 300
- importing
  - code snippets, 238
  - Illustrator files, 76–77
  - item to Library panel, 17
  - Photoshop files, 82–84
  - sound files, 275–276
  - video clip with Import Video wizard, 299–302, 304–306
- In/Out point markers, 296
- Ink Bottle tool, 51
- input text
  - creating display fields with, 262–264
  - creating user input with, 261–268

- defined, 253, 269
- showing field border for, 264
- installing
  - AIR application, 353–354
  - Flash, 3
- instances
  - adding movie clip, 333
  - adjusting brightness of, 94–95
  - aligning to rulers and guides, 93–94
  - blending colors on, 97
  - Blur filter applied to, 99–100
  - breaking apart symbol, 90–91
  - changing, 330
  - defined, 107
  - effect of motion tweens on, 205
  - naming button, 219–220, 247
  - resizing and repositioning, 91–93
  - shape tweens unavailable for, 180
  - showing/hiding movie clip, 96–97
  - swapping as tween targets, 132
  - symbols vs., 79
  - transparency of, 95–96, 107
- interactive navigation, 206–247.
  - See also* ActionScript 3.0 code
  - about interactive movies, 209
  - ActionScript code for, 220–224
  - adding new Timeline frames, 224–225
  - aligning button symbols, 217–218
  - animated button in movie clip
    - symbol, 243–245, 247
  - button symbols for, 80, 210–213
  - creating destination keyframes, 229–233
  - duplicating button symbols, 214–215
  - event listener code in, 226–227
  - lesson files for, 208–209
  - naming button instances, 219–220, 247
  - sharing snippets, 237–238
  - stopping animations at specific frame, 241–243
  - swapping symbols, 215–216
  - transition animations, 238–240
  - transparent button instances and, 244–245
  - using ActionScript Timeline navigation, 228
  - working with ActionScript code snippets, 234–236
- invisible buttons, 214
- iOS devices. *See* Apple
- iOS Simulator, 357, 365
- .ipa files, 361

## J

- JavaScript. *See also* CreateJS libraries
  - adding in projects, 336–339
  - controlling Timeline with, 339–341
  - frame numbers beginning in Flash and CreateJS suite, 340, 365
  - inserting in Flash, 336, 365
  - saving video file size in, 365
  - writing HTML5 Canvas navigation in, 209
- JPEG files, 85
- .json files, 356

## K

- keyboard shortcuts
  - adjusting one side of variable-width lines, 59
  - constraining anchor points when moving, 157
  - inserting frames with, 21
  - making multiple stroke and fill selections, 48
  - moving anchor points with, 156
  - moving video frames, 296
  - selecting multiple frames with, 22
- keyframes, 22–24, 43
  - added automatically when animating position, 114
  - adjusting graphics in, 140
  - attaching ActionScript to, 224, 247
  - button appearance and, 209
  - classic tween between, 330–332
  - content added to, 229–231
  - creating, 22–24
  - displaying animated button, 247
  - distributing uniformly in tween, 116
  - duplicating, 188
  - editing sound clip in, 315
  - establishing different shapes in, 181–182
  - fixed broken shape tweens, 187
  - frames vs., 43
  - illustrated, 22
  - importing layers as, 107
  - inserting, 138–139, 330
  - labeling, 231–233, 247, 365
  - moving, 24, 117
  - placing sound file on Timeline, 277–278
  - property, 123, 145
  - refining animation timing of, 184
  - removing, 24
  - shape hints added to, 190–194, 205

- shape tweens between, 182–183, 184–186, 205
- span-based vs. frame-based
  - selection of, 118
- stopping animations at specified, 241–243

keywords, 221, 228

## L

- labeling keyframes, 231–233, 247, 365
- Lasso tool, 73
- layer folders, 25–26
- layer stack, 21
- layers. *See also* Masked layers; masks
  - about, 19
  - Action layer code snippets, 236
  - adding, 19–20
  - adding to layer folders, 26
  - converting Illustrator to Flash, 76–79, 107
  - cutting, copying, pasting, and duplicating, 27
  - illustrated, 13
  - importing Illustrator, 76–79, 107
  - locking/unlocking, 19, 68
  - organizing in Timeline, 25–27
  - renaming, 19
  - Timeline frames for, 224–225
  - Tween, 111
  - working with, 21
- lesson files
  - animated infographic, 148–149
  - animated logo, 180, 181
  - animating symbols, 110
  - banner ad, 46
  - cartoon frame, 76
  - copying, 4, 8
  - creating simple animations, 10
  - how to use, 5
  - interactive navigation, 208–209
  - opening, 10
  - prerequisites for using, 2
  - publishing HTML5 project files, 329
  - using text, 250–252
  - working with sound and video, 272–274
- Library folder, 40
- Library panel, 17–19
  - about, 17
  - editing symbols in, 87–88, 107
  - importing item to, 17
  - organizing symbols in, 86
  - original symbols stored in, 75, 79
  - sound files imported to, 276

- linear motion paths, 153
- lines, 58–59
- locking/unlocking
  - guides, 94
  - layers, 19, 68
- Loop Playback button, 188
- loops
  - controls for animation, 115
  - creating, 188
  - inserting in movie clip symbol, 189–190
  - movie previews, 37
  - previewing, 188–189

## M

- magnification levels, 159
- Masked layers
  - animating, 200–204
  - creating, 199, 205
  - using multiple, 200
- masks. *See also* Masked layers
  - about, 179, 198, 200
  - animating, 200–204
  - creating, 198–199, 205
  - strokes unrecognized in, 198
  - using transparencies in, 198
  - viewing effects of, 200, 205
- Merge Drawing mode, 52, 73
- methods
  - defined, 222
  - editing symbol, 87–90, 107
  - used to create symbols, 80–81, 107
- mobile devices
  - changing video output size to match, 295
  - choosing target device for encoded video, 312–314, 315
  - publishing Flash content for, 356–363
  - publishing for iOS, 360–363
  - resizing Stage and contents for, 38–39
  - simulating mobile apps, 357–360, 365
  - testing Flash projects on, 365
  - using different video formats for, 291
- mortgage calculator
  - adding static text to, 261–262
  - changing text box content for, 266–267, 269
  - embedding fonts for, 264
  - features of, 251
  - naming text boxes for, 265–266

- setting up display fields for, 262–264
- testing, 268

Motion Editor

- about, 147, 149–150
- accessing motion tweening in, 177
- adding anchor points on non-linear paths, 154–155
- adding ease-in, 166–168
- animating bounces, 170–172
- changing curvature of path, 156
- copying/pasting curves, 159–161
- editing property curves, 152–153
- moving anchor points, 157
- removing ease, 169
- unavailable for shape tweens, 204
- understanding property values in, 153
- viewing options in, 159

Motion Presets panel, 127, 240

motion tweens

- adding, 150–152
- adding frames in, 116–117
- applying to embedded video, 309–311
- classic tweens vs., 328
- defined, 111
- distributing keyframes uniformly in, 116
- easing rates of change in, 111, 145
- editing property curves, 152–158
- moving path of motion, 128
- presets for, 127
- removing, 114, 169
- selecting preset, 240
- shape tweens vs., 205
- splitting, 135–136
- swapping targets of, 131–132
- symbols required for, 113, 145
- transitions created by, 145

mouse events

- ActionScript code for, 227
- adding response to click, 336–339

movie clip symbols

- about, 79–80
- adding instance to project, 333
- animated button in, 243–245, 247
- changing 3D rotation of, 101–102
- converting embedded video to, 309–310
- creating for bird animation, 329
- exporting as bitmap art, 98
- looping animation from, 188, 189–190
- nested animations in, 132–135

- movie clip symbols (*continued*)
    - Photoshop images converted into, 84
    - showing/hiding, 96–97
    - symbol icon for, 79
  - movies. *See also* movie clip symbols
    - changing playback settings for, 326
    - copying sample, 4–5
    - outputs as AIR file, 348
    - previewing, 36–37
    - saving, 39–41
    - sizing and scaling for browsers, 323–326
  - moving
    - anchor points, 157
    - keyframes, 24
    - motion paths, 128
    - panel groups, 31
  - MP3 files, 275
  - MP4 files, 306
  - multiline comments (*/\* \*/*), 223
- N**
- naming
    - button instances, 219–220, 247
    - code snippet instances, 236
    - text box instances, 269
    - text boxes, 265–266
    - variables, 221
    - workspaces, 15
  - nested animations, 132–135
  - New Symbol command, 80
  - non-linear motion paths, 154–155
  - Number data in ActionScript code, 268
- O**
- Object Drawing mode, 52, 73
  - objects. *See also* shapes
    - ActionScript, 222
    - aligning, 67–68, 73
    - changing path scale or rotation for, 129
    - converting to symbol, 113
    - editing motion paths of, 145
    - effect of drawing modes on, 52
    - grouping, 56–57
    - matching color of, 65–66
    - moving on linear and non-linear paths, 154
    - orienting to path, 130–131
    - positioning in 3D, 101–103
    - swapping motion tween targets for, 131–132
    - working with broken apart text, 254
  - onion skin outlines, 195
  - opening
    - panels, 31
    - Properties inspector, 28
    - XFL documents, 41
  - orienting objects to paths, 130–131
  - outlines
    - onion skin, 195
    - showing layer as, 19
  - Oval tool, 47–48, 73
  - Over keyframes, 216, 237
  - Over state
    - adding sound to, 286
    - defined, 210
    - organizing sounds for, 285
- P**
- pacing animation, 117
  - Paint Bucket tool, 51
  - panel groups, 31
  - panels. *See also specific panels*
    - preset arrangement of, 14
    - working with, 31
  - paragraph text
    - inserting, 257–260
    - line spacing in, 259
  - parentheses ( ), 221, 222
  - Paste in Place command, 62
  - Pasteboard, about, 15
  - pasting. *See also* copying/pasting
    - curves, 159–161
    - Illustrator artwork in Flash, 78
    - layers, 27
    - shapes, 49–50
  - paths, 128–131
    - adjusting curvature of, 156
    - changing motion, 128–131
    - changing scale or rotation for, 129
    - editing object's motion, 145
    - moving motion, 128
    - non-linear motion, 154–155
    - orienting objects to, 130–131
  - pausing movies, 225
  - Pen tool, 59–60
  - Pencil tool, 57–58
  - perspective angle, 105
  - Photoshop, 82–84
  - placing button symbols, 217–218
  - playback environment. *See also* Flash Player
    - changing movie playback settings, 326
    - selecting documents for, 12–13
  - playhead
    - ActionScript script moving, 209
    - appearance of, 18
    - frame labels for controlling, 238, 340
    - moving, 33, 274
    - previewing movie with, 143
    - scrubbing, 23
  - PNG files, 85, 144
  - positioning
    - animating changes in, 112–115
    - objects in 3D, 101–103
    - objects on Stage, 28–30
    - text on Stage, 255
  - Preferences dialog box, 15, 42
  - Preset Browser (Media Encoder), 288, 291
  - presets
    - Edit Envelope, 282
    - motion tween, 127
    - saving filter, 100
  - previewing
    - animation, 115
    - loops, 188–189
    - movies, 36–37
  - Primitive Drawing mode, 52, 73
  - projectors
    - creating, 355–356
    - defined, 355
    - loading dependent assets with, 356
    - playing stand-alone applications with, 318
  - projects
    - copying sample, 4–5
    - elements in project files, 111–112
    - exporting animation for publishing, 333–334
  - properties in ActionScript, 222
  - Properties inspector, 28–30
    - applying easing in, 135
    - changing stroke and fill color with, 51
    - deleting or changing sounds in, 283
    - editing color effects in, 94–96
    - illustrated, 13
    - making text selectable, 258
    - modifying shape tweens in, 183
    - modifying text characters in, 256
    - naming text box instances, 269
    - opening, 28
    - positioning object with, 28–30
    - positioning text on Stage, 255
    - resizing text boxes, 258–259
    - static text properties added in, 259–260
    - uses of, 28
  - property curves
    - applying BounceIn ease to, 174
    - changing curvature of, 156, 177
    - deleting, 158

- different eases for X- or Y-properties, 175–176
- ease vs., 169, 177
- editing, 152–153
- Motion Editor view options for, 159
- property keyframes, 123, 145
- .psd files, 82–84, 85
- Publish Settings dialog box
  - illustrated, 37
  - options for, 335–336
  - Playback settings in, 326
  - selecting asset export options, 346
  - settings saved with document in, 319
  - sound and compression settings in, 284
- publishing, 316–365
  - about, 318
  - adding JavaScript in projects, 336–339
  - clearing Publish cache, 319
  - desktop applications, 348–356
  - document types supported for, 318
  - Flash content for mobile devices, 356–363
  - Flash Player, 319–326
  - HTML5 Canvas files, 327–328, 329
  - mobile apps, 360–363
  - projectors, 355–356
  - Publish settings options, 335–336
  - types of playback environments, 318–319
  - using classic tweens, 328
  - WebGL animations, 356

## Q

- Queue panel (Media Encoder)
  - changing file status in, 290
  - illustrated, 288
  - quotation marks, 290
  - starting automatically, 289, 315
- QuickTime for Windows users, 287, 312
- quotation marks (“ ”), 222, 233, 290

## R

- Rectangle tool, 47
- removing
  - frames, 117
  - keyframes, 24
  - motion tween, 114, 158
- renaming layers, 19
- rendering vector art as bitmaps, 98
- repositioning
  - instances, 91–93
  - layers on stack, 21

- resetting
  - Color Effect options, 96
  - default workspace, 14
  - transformations, 104–105
- resizing
  - content, 38–39
  - instances, 91–93
  - movies for web browser, 323–326
  - Stage and contents, 38–39
  - text box, 258–259
- rotating
  - animating rotation changes, 124–126
  - movie symbol clips in 3D, 101–102
  - object’s path, 129
- rulers and guides, 93–94
- runtime. *See also* AIR
  - author-time vs., 364

## S

- sampling color, 65–66
- saving
  - advanced audio/video export options, 298
  - code snippets, 237
  - documents, 12
  - filter presets, 100
  - movies, 39–41
  - workspaces, 14–15
  - XFL documents, 40
- scaling
  - animating scale changes, 124–126
  - changing path scale, 129
  - movies for web browser, 323–326
  - options for video, 294–295
  - Stage for full-screen mode, 15
- scripting
  - terminology for, 221–222
  - writing in Actions panel, 223–224
- scrolling background, 329, 330–332
- selecting
  - different sound files, 283
  - selection tools used for, 73
  - static text, 258
  - strokes and fills, 48
  - tools, 33–34
- Selection tool
  - changing shape contours with, 50
  - editing curves with, 61, 73
- semicolon (;), 222
- shape hints
  - adding, 191–194
  - defined, 191, 205
  - placing, 192

- shape tweens
  - animating color of gradient fills, 195–197
  - animating masks and masked layers, 200–204
  - applying, 182–183, 205
  - broken, 187
  - changing shapes with, 179
  - changing variable width strokes with, 190
  - creating, 181–183
  - defined, 180, 205
  - extending, 186–187
  - inserting additional, 184–186
  - maximum shape hints per, 194
  - motion tweens vs., 205
  - moving keyframes of, 184
  - using ease-in or ease-out, 204
- shapes
  - adjusting transparency of, 62–63
  - animating, 180
  - changing contours of, 50
  - creating, 47–48
  - drawing mode effect on, 52
  - editing, 49–51
  - fills and strokes for, 46
  - placing in keyframes, 181–182
  - previewing animation of, 195
  - shortcuts. *See* keyboard shortcuts
  - showing/hiding
    - controller for FLVPlayback component, 303
    - layers, 19, 114
    - movie clips, 96–97
    - tools, 33, 43
- SimController, 357–360, 365
- skin
  - changing color of, 303
  - defined, 300, 315
  - selecting in Import Video wizard, 300
- smoothing bitmap images, 30
- snippets. *See* Code Snippets panel
- sound
  - about sound sync, 287
  - adding to button Down keyframe, 212–213
  - advanced export options for, 297–298
  - deleting or changing, 283
  - editing length of, 279–280, 315
  - importing, 275–276
  - lesson files for, 272–274
  - modifying volume of, 281–282
  - placing on Timeline, 277–278
  - preventing overlapping, 306

- sound (*continued*)
    - selecting compression quality of, 283–285
    - synchronizing with embedded video, 306
    - types compatible with Flash, 275
  - Sound Settings dialog box, 284
  - span-based selection of keyframes, 118
  - special effects
    - Blur filter, 99–100
    - positioning objects in 3D, 101–103
  - splitting motion tween, 135–136
  - sprite sheets, 144
  - Stage
    - about, 15, 43
    - adding item from Library panel to, 18
    - adding text field borders for, 264
    - changing properties of, 16
    - choosing dimensions for, 11
    - editing symbols in place, 88–90, 107
    - FLVPlayback component on, 301
    - illustrated, 9, 13
    - importing item to, 17
    - matching size to Photoshop canvas, 83
    - naming text boxes for, 265–266
    - object positioning on, 28–30
    - resizing and content scaling for, 38–39
    - text positioning on, 255
  - starting Flash, 10
  - static text
    - adding hyperlinks to, 66–67, 269
    - creating, 261–262
    - defined, 253, 269
    - properties for, 259–260
    - selecting, 258
  - stop action, 225
  - stopping
    - all sound before starting new, 306
    - animations at specific frame, 241–243
    - sound, 278
  - String data in ActionScript code, 268
  - strokes
    - adjusting width of, 73
    - changing width with shape tweening, 190
    - default, 48
    - defined, 46
    - editing properties for, 51
    - effect of shape tweens on, 205
    - graphics tablets and, 59
    - morphing changes with shape tweens, 180, 205
  - sampling, 66
  - selecting, 48
  - transparent, 62
  - unrecognized in Mask layer, 198
  - variable-width, 57–58
  - Subselection tool, 61, 73
  - substitute fonts, 208
  - SVG format, 70–72
  - Swap Symbol dialog box, 215–216
  - swapping
    - motion tween targets, 131–132
    - symbols, 215–216
  - SWF files
    - embedded fonts and size of, 264
    - published when testing movies, 37, 143
    - publishing and displaying, 319, 364
  - symbols, 74–107. *See also* buttons; instances; movie clip symbols
    - breaking apart symbol instances, 90–91
    - button, 80, 209, 214–215
    - defined, 75, 79, 107
    - editing methods for, 87–90, 107
    - graphic, 80
    - importing Illustrator, 78
    - instances vs., 79
    - methods for creating, 80–81, 107
    - movie clip, 79–80, 98
    - organizing in folders, 86
    - required for motion tween, 113, 145
    - swapping, 215–216
    - types of, 75
  - synchronizing sound, 287, 306
  - syntax for ActionScript, 222–223
  - system requirements, 3
- ## T
- tablets
    - support for graphics, 59
    - using different video formats for, 291
  - targets
    - adding hyperlink, 260–261
    - choosing device for encoded video, 312–314, 315
    - swapping motion tween, 131–132
  - Test Movie mode, 143
  - testing
    - ActionScript for compiler errors, 229
    - clearing publish cache before video, 319
    - Flash projects on mobile devices, 365
    - mobile devices, 357, 365
    - movies, 36–37, 205
    - nested animations, 135
  - scripted animations, 241–242
  - sound files on Timeline, 278
  - video in FLVPlayback component, 302
  - text, 64–67, 248–269. *See also* static text; text boxes
    - adding, 64–65
    - adjusting titles, 254–255
    - adjusting line spacing, 259
    - breaking apart, 254
    - creating user-input, 261–268
    - dynamic, 253, 263, 264, 269
    - embedding fonts for, 264, 269
    - hyperlinks to, 66–67, 260–262, 269
    - input, 253, 261–268, 269
    - inserting paragraphs, 257–260
    - integrating in documents, 269
    - lesson files about, 250–252
    - making selectable, 258
    - modifying characters of, 256
    - static, 253, 269
    - substituting fonts for, 76, 208
    - vertical, 255–256
    - when and where to add, 252–253
  - text boxes
    - adding text display fields in, 262–264
    - changing contents of, 248, 266–267, 269
    - defining dimensions of, 255
    - naming, 265–266
    - resizing, 258–259
  - Text tool, 64–65, 255
  - Timeline, 18–27. *See also* keyframes
    - about, 18–19
    - ActionScript code for navigating, 228
    - adding frames to, 21–22, 224–225, 278
    - appearance of, 27, 279
    - attaching ActionScript to keyframes on, 224, 247
    - contained in movie clip symbol, 80
    - converting or importing layers to, 107
    - extending shape tweens on, 186–187
    - found in sound and video lesson files, 273–274
    - home button for, 233–236
    - illustrated, 13, 18
    - inserting more keyframes on, 184–186
    - JavaScript code controlling, 339–341
    - keyframes on, 22–24

- layers on, 19–21
- moving keyframes on, 184
- moving playhead to destination frame, 238–242
- navigating using frame labels, 247, 274, 340
- Onion Skin Outlines option for, 195
- organizing layers in, 25–26
- placing sound files on, 277–278
- previewing animation on, 143
- selecting multiple frames, 22
- stop actions to pause movies on, 225
- using classic tween on, 330–332
- using Loop Playback option for, 188–189
- tools, 32–35
  - accessing hidden, 33, 43
  - selecting and using, 33–34
  - selection, 73
  - 3D, 101–104
  - unsupported by document types, 13
- Tools panel, 13, 32
- tooltips for ActionScript, 223
- Trace Bitmap command, 85
- Transformation tool, 126
- transformations
  - animating, 124–126
  - global vs. local, 104, 140
  - resetting, 104–105
- transition animations, 238–240
- transparencies, 62–64
  - about, 62
  - adjusting instance, 95–96, 107
  - animating, 118–120
  - changing Alpha value of fill, 62–63
  - making button instances, 244
  - using video, 303, 305–306
  - working with transparent button instances, 244–245
- Tween layers, 111, 113
- tweens. *See also* motion tweens; shape tweens
  - classic, 328, 330–332

## U

- undoing
  - bitmap conversions, 70
  - steps, 35–36, 43
- ungrouping objects, 57
- Up keyframes, 214, 237
- Up state, 210, 285
- updating Flash, 42

## V

- vanishing point, 105–106
- variable-width strokes, 57–58, 190
- variables, 221
- vector art, 69–70, 85
- vertical text, 255–256
- video. *See also* movies
  - adjusting length of, 295–296
  - advanced options for Export Settings dialog box, 297–298
  - choosing target device for encoding, 312–314, 315
  - controlling playback of, 302–303
  - converting file formats for, 289–290
  - cropping, 292–295
  - embedding Flash, 306–311
  - exporting from Flash, 311–312
  - external storage of, 299
  - files needed to play in web browsers, 364
  - importing clip with Import Video wizard, 304–306
  - lesson files for, 272–274
  - options for Flash, 287
  - playback of external, 299–302
  - playing in Flash, 315
  - preventing overlapping sounds, 306
  - setting cue points, 296
  - skin for, 300, 303, 315
  - ways to deliver Flash, 287
  - working with transparencies in, 303, 305–306
- void term, 227
- volume of sound files, 281–282

## W

- warnings messages, 342–343
- Watch Folders panel (Media Encoder), 288, 291
- WAV files, 275
- waveform
  - defined, 275
  - editing length of, 279–280, 315
  - fading in/out, 281–282
- web address URLs, 261
- web browsers
  - files needed to play Flash movie in, 364
  - Flash playback environments for, 318
  - sizing and scaling movies for, 323–326

## WebGL

- about, 11, 12, 13
- features unsupported in, 319
- publishing animations in, 356
- video playback unsupported for, 287
- when and where to add text in, 253

Welcome screen, 10

Width tool, 73

## Windows

- publishing AIR desktop projector for, 355
- QuickTime for, 287, 312
- warning messages using Air Debug Launcher, 358
- workspace, 13–17
  - choosing new, 14
  - illustrated, 13
  - Library panel, 17–19
  - Properties inspector, 28–30
  - saving, 14–15
  - Stage, 15–16
  - Timeline, 18–27
  - Tools panel, 32–35
  - working with panels, 31
- writing ActionScript code, 228

## X

- X-properties, 152–153, 175–176
- .xfl files
  - about, 12, 40
  - modifying documents, 40–41
  - opening, 10
  - publishing projects as, 318
  - saving, 40

## Y

- Y-properties
  - editing in curve, 152–153
  - setting vertical values, 153
  - using different ease for X- and, 175–176

## Z

- zoom levels, 159