



Adobe Flash CS4 Part 3: Animation

Fall 2010, Version 1.0

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Introduction

Adobe Flash CS4 is the industry standard software for creating rich, interactive content ranging from simple animations to full-featured web applications. Flash includes many features that make it powerful but easy to use. In addition, Flash includes a scripting language that can be used to add interactivity and complex functionality to Flash projects. This handout covers the fundamentals of animation. It includes tweened animation which is an effective and efficient way to create movement and changes over time while minimizing file size.

Downloading the Data Files

This handout includes sample data files that can be used for hands-on practice. The data files are stored in a self-extracting archive. The archive must be downloaded and executed in order to extract the data files.

- The data files used with this handout are available for download at <http://www.calstatela.edu/its/training/datafiles/flashcs4p3.exe>.
- Instructions on how to download and extract the data files are available at <http://www.calstatela.edu/its/docs/download.php>.

Understanding Animation

Animation is the movement, or change, of objects through time. Animation can be as simple as moving a shape across the Stage or as complex as a shape moving, transforming, and changing color all at the same time. Flash CS4 provides several ways to create animations and special effects. Each method provides users with different possibilities for creating engaging animated content.

Basics of Animation

One of the easiest ways to create animation with Flash CS4 is through the use of motion tweens. Motion tweening allows users to apply smooth motion and transformation effects, such as scale, position, rotation, and skew, to symbol instances (movie clip, graphic, and button) and text fields. When creating a motion tween, users define properties for a symbol instance or text field in the beginning and ending frames, and Flash automatically creates all of the frames in between.

To create a motion tween:

1. Click the **Start** button, point to **All Programs**, point to **Adobe Design Premium CS4**, and select **Adobe Flash CS4 Professional**. The program opens and the **Welcome Screen** displays.
2. Click the **File** menu and select **Open**. The **Open** dialog box opens.
3. Navigate to the data files folder, select the **rocket_original fla** file, and then click the **Open** button.
4. Select the **Rocket** layer in the **Timeline**.
5. Drag the **Rocket_A** symbol from the **Library** panel to the **Stage**. The blank frame in frame **1** of the **Rocket** layer is replaced with a keyframe.
6. Right-click the **Rocket_A** symbol on the **Stage** and select **Create Motion Tween**. Flash converts the **Rocket** layer into a tween layer, inserts enough frames to create a one-second animation, and fills the span of frames with a blue background (see Figure 1).




Figure 1 – Motion Tween Span

7. In the **Timeline**, select frame **70** of the **Rocket** layer, and then press the **F6** key to insert a new keyframe.
8. Drag the **Rocket_A** symbol to the right side of the **Stage**. A green motion path appears on the **Stage**.

NOTE: After creating a motion tween, moving the playhead to the end of the tween span and then moving the symbol to a new location on the Stage will automatically place a new keyframe in the last frame of the tween span.

To modify the starting point of the motion path:

1. In the **Timeline**, select frame **1** of the **Rocket** layer. The playhead moves to the selected frame.
2. Select the **Selection** tool  in the **Tools** panel.
3. Drag the **Rocket_A** symbol to the upper-left corner of the **Stage**. The motion path updates to include the new location (see Figure 2).

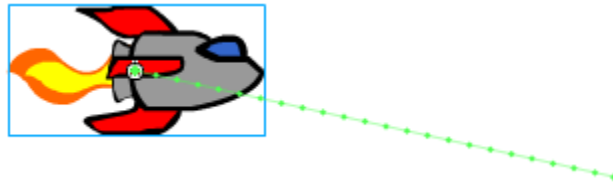



Figure 2 – Modified Motion Path

To modify the destination point of the motion path:

1. In the **Timeline**, select frame **70** of the **Rocket** layer. The playhead moves to the selected frame.
2. Select the **Selection** tool  in the **Tools** panel.
3. Drag the **Rocket_A** symbol to the lower-right corner of the **Stage**. The motion path updates to include the new location.

Previewing an Animation

There are multiple ways to preview an animation. Users can preview the animation from within Flash by playing the full animation on the Stage or by dragging the playhead back and forth along the Timeline header to preview a few frames of the animation. Users can also create an SWF file from the Flash document and play it using Flash Player or preview the animation using a web browser.

To preview the animation from within Flash:

1. Select frame **1** in the **Timeline**. The playhead moves to the selected frame.
2. Press the **Enter** key. The animation plays on the **Stage** and the playhead automatically moves from frame to frame until it reaches the last frame.





To preview the animation in a Flash Player window:

1. Click the **File** menu, point to **Publish Preview**, and select **Flash**. Or, press **Ctrl+Enter**.


Changing the Scale and Rotation of a Motion Path

The Free Transform tool can be used to change the scale and rotation of a motion path (see Table 1). Changing the scale of the motion path not only changes the area covered by the animation, but can also slow down or speed up the animation. Changing the rotation of the motion path does not change the rotation of the symbol itself.

Table 1 – Free Transform/Selection Tool Mouse Pointers

Action	Icon	Description
Move		Moves an object or a motion path.
Curve		Curves a drawn line or a motion path.
Skew		Skews (changes the view angle) an image or a motion path.
Rotate		Rotates an image or a motion path.

To change the scale of the motion path:

1. Select the **Free Transform** tool  in the **Tools** panel.
2. Click the motion path on the **Stage**. Transformation handles appear around the path (see Figure 3).

NOTE: Make sure to select the motion path and not the symbol instance.

3. Drag the handles to change the scale of the motion path.

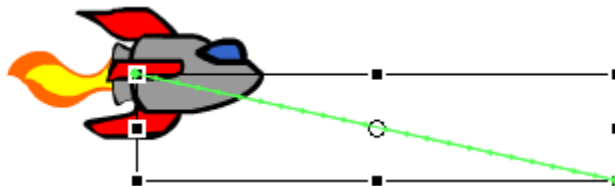




Figure 3 – Motion Path with Transformation Handles

To change the rotation of the motion path:

1. Select the **Free Transform** tool  in the **Tools** panel.
2. Click the motion path on the **Stage**. Transformation handles appear around the path.

NOTE: Make sure to select the motion path and not the symbol instance.

3. Position the mouse pointer slightly outside a corner handle until the pointer turns into a counter-clockwise arrow , and then drag the pointer to rotate the motion path.

Moving a Motion Path

Moving a motion path moves the entire animation and any associated symbols to a new location on the Stage. The start, end, and duration of the animation do not change.

To move the motion path:



1. Select the **Selection** tool  in the **Tools** panel.
2. Click the motion path on the **Stage** to select it.
3. Position the mouse pointer over the motion path until a cross with arrows appears next to the pointer , and then drag the path to the desired location on the **Stage** (see Figure 4).





Figure 4 – Moving the Motion Path

Editing the Path of Motion

When an object is tweened from one location on the Stage to another, it moves in a straight line. Users can alter the motion path and have the object move along a curve or other shapes.

To curve the motion path:

1. Select the **Selection** tool  in the **Tools** panel.
2. Deselect the motion path by clicking another part of the **Stage**.
3. Position the mouse pointer over of the motion path until a curved line appears under the pointer , and then drag to curve the path (see Figure 5).

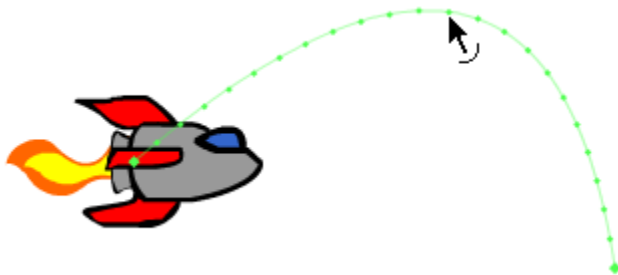




Figure 5 – Curving the Motion Path

To curve the motion path using anchor points:

1. In the **Tools** panel, click and hold the mouse button on the **Pen** tool , and then select the **Convert Anchor Point** tool  from the pop-up menu.
2. Click the motion path on the **Stage** to select it.
3. Drag either the starting or ending anchor point of the motion path to adjust the shape of the curve (see Figure 6).
4. Press **Ctrl+Enter** to preview the animation.

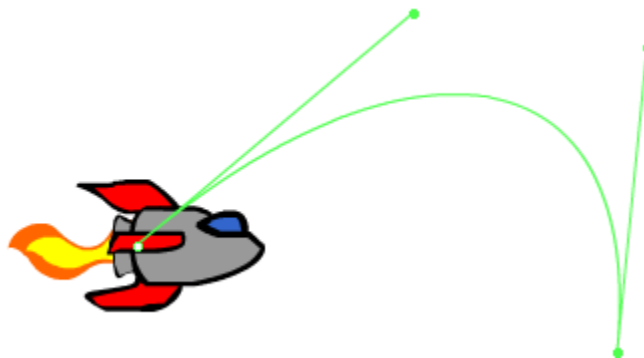



Figure 6 – Motion Path Anchor Points

Orienting Objects to a Path

When users create a non-linear motion path such as a circle, they can have the tweened object rotate as it moves along the path. The *Orient to path* option in Flash can be used to maintain a constant orientation relative to the path.

To orient the object to the path:

1. Select the **Selection** tool  in the **Tools** panel.
2. Click the motion path on the **Stage** to select it.
3. In the **Property inspector**, under **Rotation**, select the **Orient to path** check box (see Figure 7). The **Rocket_A** symbol orients itself to the path.

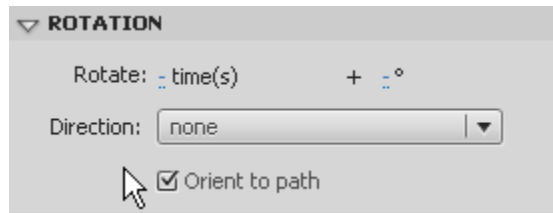





Figure 7 – Rotation Section of the Property Inspector

4. Select frame **1** in the **Timeline**.
5. Select the **Free Transform** tool  in the **Tools** panel.
6. Select the **Rocket_A** symbol on the **Stage**. Transformation handles appear around the symbol.
7. Position the mouse pointer slightly outside a corner handle until the pointer turns into a counter-clockwise arrow , and then drag the pointer to rotate the **Rocket_A** symbol in the appropriate direction.
8. Press **Ctrl+Enter** to preview the animation.

Swapping Objects

In Flash CS4, symbols and motion paths are handled independently from each other. This makes it possible to swap symbols without losing the motion path.

To swap an object:

1. Select the **Selection** tool  in the **Tools** panel.
2. Select the **Rocket_A** symbol on the **Stage**.
3. Drag the **Rocket_B** symbol from the **Library** panel to the **Stage**. The **Replace current tween target** dialog box opens (see Figure 8).

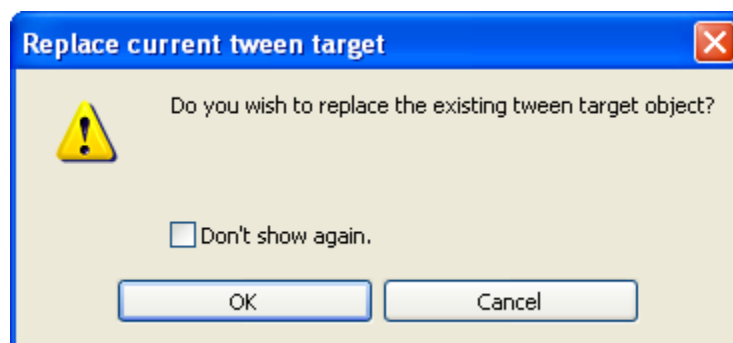


Figure 8 – Replace Current Tween Dialog Box

4. Click the **OK** button. The **Rocket_A** symbol on the **Stage** is replaced with the **Rocket_B** symbol.
5. If necessary, select the motion path on the **Stage** and drag it to adjust the position of the path for the **Rocket_B** symbol.

Changing the Frame Rate

Every Flash movie has a *frame rate*, a measurement of how quickly the playhead moves through the Timeline. Frame rates are expressed in frames per second, usually abbreviated as *fps*. Frame rates can range from 0.01 fps (the slowest) to 120 fps (the fastest). Changing the frame rate can be useful to achieve certain animation effects or to minimize the file size. Keep in mind that increasing or decreasing the frame rate will affect the overall length (duration) of the animation.

To decrease the frame rate:

1. Deselect all objects by clicking in the gray area surrounding the **Stage**.
2. In the **Property inspector**, under **Properties**, click the hot text next to **FPS** and type **6** in the box (see Figure 9).
3. Press **Ctrl+Enter** to preview the animation.



Figure 9 – Changing the Frame Rate in the Property Inspector


To increase the frame rate:

1. Deselect all objects by clicking in the gray area surrounding the **Stage**.
2. In the **Property inspector**, under **Properties**, click the hot text next to **FPS** and type **24** in the box (see Figure 9).
3. Press **Ctrl+Enter** to preview the animation.

Easing

Easing allows users to speed up or slow down the beginning or end of an animation which can make the animation appear more realistic. Users can apply easing in the Property inspector or, for a more precise control, the Motion Editor. A negative value slows down the animation at the beginning and is known as *easing in*. A positive value slows down the animation at the end and is known as *easing out*.

To apply an easing effect:

1. Select the **Rocket** layer in the **Timeline**.
2. Select the **Selection** tool  in the **Tools** panel.
3. Click the motion path on the **Stage**.
4. In the **Property inspector**, click the hot text next to **Ease** and type **-100** in the box (see Figure 10).

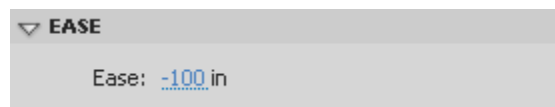


Figure 10 – Ease Section of the Property Inspector

5. Press **Ctrl+Enter** to preview the animation. Notice how the rocket accelerates slowly at first before resuming its normal speed.

NOTE: To examine, fine-tune, or create custom eases, click the **Motion Editor** tab located next to the **Timeline** tab. The **Motion Editor** allows users to see a visual representation of the X and Y positions and transformations of the symbol relative to the time frame via graphs (see Figure 11).

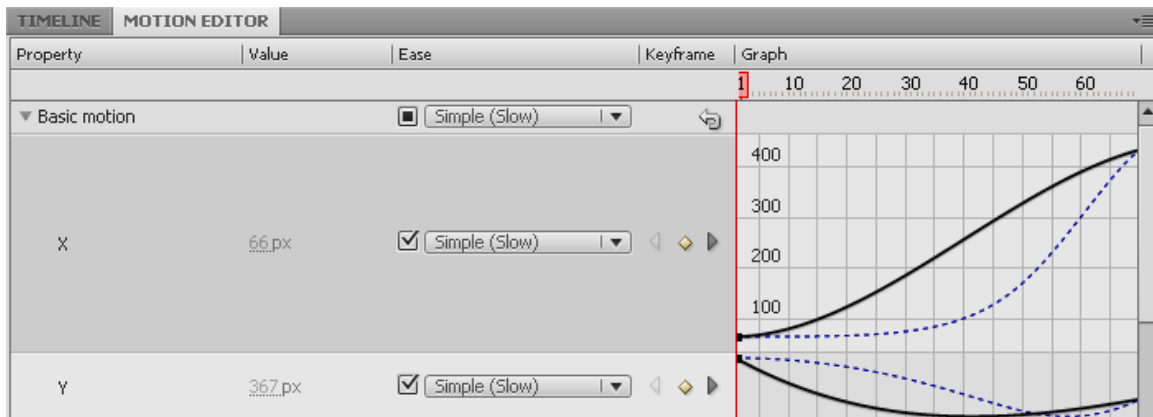


Figure 11 – The Motion Editor

Advanced Animation

Flash CS4 can be used to create realistic visual effects. In addition to tweening the position and rotation of an object, Flash can be used to animate size transformations as well as color effects, such as changing the transparency of an object to create a fade-in or fade-out effect.

Changing the Animation Duration

The duration is the amount of time that an animation runs. Users can change the duration of the animation by simply adjusting the length of the tween span in the Timeline. Shortening the tween span will shorten the animation and make it appear faster. Making the tween span longer means the animation will take up a longer period of time and will appear to play at a slower pace.

To create a motion tween for the city background:

1. Click the **File** menu and select **Open**. The **Open** dialog box opens.
2. Locate and select the **MovieA.fla** file, and then click the **Open** button.
3. In the **Timeline**, right-click frame 1 of the **City** layer and select **Insert Frame**.
4. Drag the **Cityscape** symbol from the **Library** panel to the **Stage**.
5. In the **Property inspector**, under **Position and Size**, set the **X** value to **275.5** and the **Y** value to **208.0** (see Figure 12).

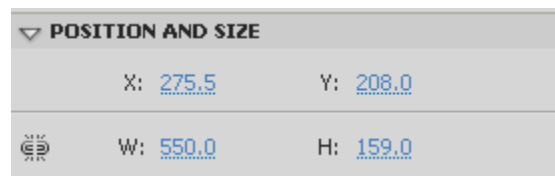


Figure 12 – Position and Size Section of the Property Inspector

6. Right-click the **Cityscape** symbol on the **Stage** and select **Create Motion Tween**. A tween span is created in the **Timeline** from frame 1 through frame 24 and the playhead moves to frame 24.
7. In the **Property inspector**, under **Position and Size**, change the **Y** value to **149.0**.

NOTE: A new keyframe is automatically inserted in frame 24.

To lengthen the animation duration:

1. In the **Timeline**, position the mouse pointer over the right edge of the **City** layer tween span until the pointer turns into a double-headed arrow \leftrightarrow , and then drag it to frame **50** (see Figure 13).



Figure 13 – Extended Tween Span

To shorten the animation duration:

1. In the **Timeline**, position the mouse pointer over the left edge of the **City** layer tween span until the pointer turns into a double-headed arrow \leftrightarrow , and then drag it to frame **10** (see Figure 14). The tween span now starts later in the animation and has been shortened to 40 frames.

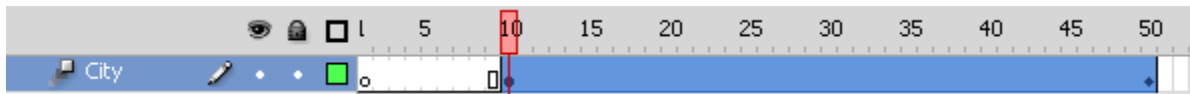


Figure 14 – Shortened Tween Span

NOTE: If a tween span containing multiple keyframes is adjusted, the keyframes are uniformly adjusted to the new duration.

Adding and Removing Frames

To have the last keyframe of a motion tween hold for the entire duration of the animation, users need to add frames to make the animation last that long. Conversely, removing frames shortens the amount of time an animation holds.

To add additional frames:

1. In the **Timeline**, position the mouse pointer over the right edge of the **City** layer tween span until the pointer turns into a double-headed arrow \leftrightarrow .
2. Hold down the **Shift** key and drag the end of the tween span from frame **50** to frame **175**. The tween span length is extended (see Figure 15).

NOTE: Holding down the **Shift** key while dragging the ends of a tween span does not change the position of the keyframes.

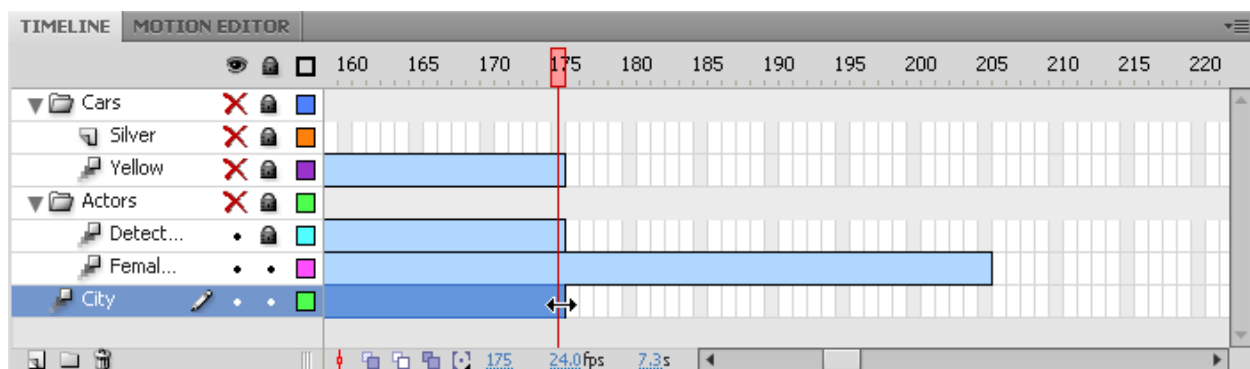




Figure 15 – Adding Frames to the City Layer

To remove frames:

1. In the **Timeline**, click the padlock icon  next to the **Female_detective** layer to unlock it.
2. Position the mouse pointer over the right edge of the **Female_detective** layer tween span until the pointer turns into a double-headed arrow .
3. Drag the end of the tween span from frame **205** to frame **175**. The tween span length is shortened (see Figure 16).

NOTE: To remove a single frame from within a tween span, hold down the **CTRL** key and select the desired frame, and then right-click the frame and select **Remove Frames**. If you do not hold down the **CTRL** key, the entire tween span will be deleted instead.

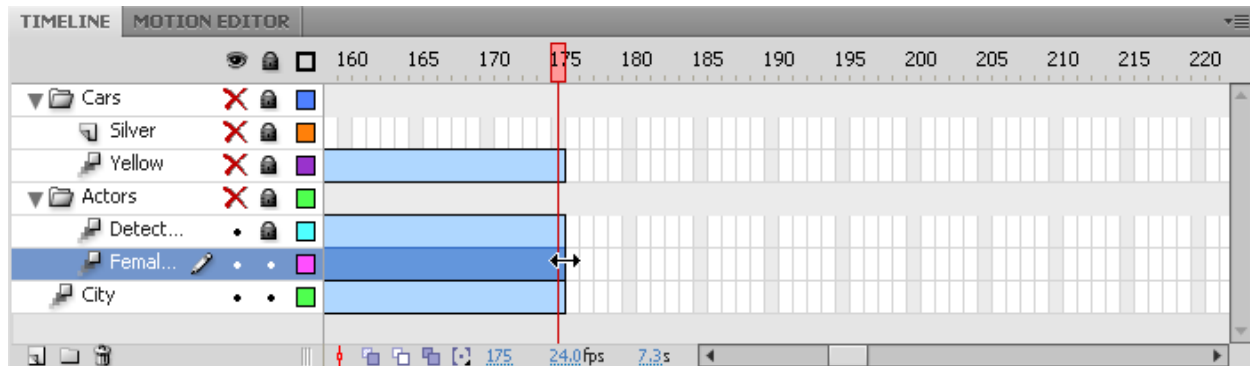



Figure 16 – Removing Frames from the Female_detective Layer

Moving Keyframes

When a motion tween is selected in the Timeline, the entire span can be moved to a new frame (a new start time). Users can also move individual keyframes within a motion tween to change the pacing of the animation.

To move a keyframe within the tween span:

1. In the **Timeline**, hold down the **Ctrl** key and select frame **83** of the **Female_detective** layer.
2. Position the mouse pointer over frame **83** until a rectangle appears under the pointer , and then drag the keyframe from frame **83** to frame **100** (see Figure 17).

NOTE: Moving individual keyframes does not change the length of the tween span.

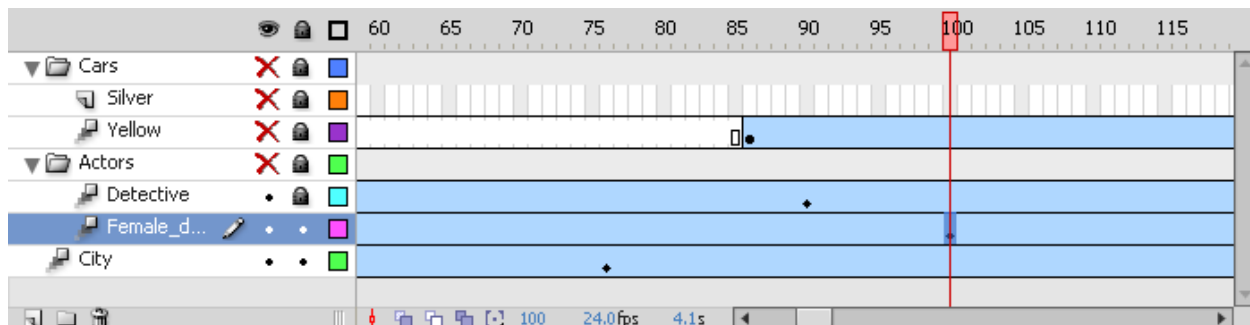


Figure 17 – Moving a Keyframe

3. Press **Ctrl+Enter** to preview the animation.

NOTE: The animation of the female detective changes pace and ends later than the animation of the male detective.

Transparencies

Symbols can be modified to have different transparency values such as being completely opaque or transparent. Users can create a fade-in or fade-out effect using a combination of transparencies and motion tweens.

To create a fade-in effect:

1. In the **Timeline**, select frame **10** of the **City** layer.
2. Select the **Cityscape** symbol on the **Stage**.
3. In the **Property inspector**, under **Color Effect**, click the **Style** arrow and select **Alpha** from the list (see Figure 18).

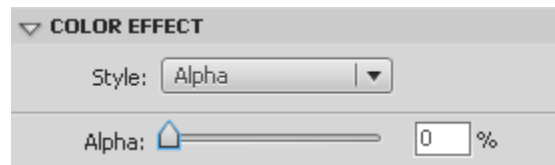


Figure 18 – Color Effect Section of the Property Inspector

4. Set the **Alpha** value to **0** by dragging the slider or entering the value in the box. The **Cityscape** symbol becomes transparent.
5. In the **Timeline**, select frame **50** of the **City** layer.
6. Select the **Cityscape** symbol on the **Stage**.
7. In the **Property inspector**, set the **Alpha** value to **80**.
8. Press **Ctrl+Enter** to preview the animation (see Figure 19).

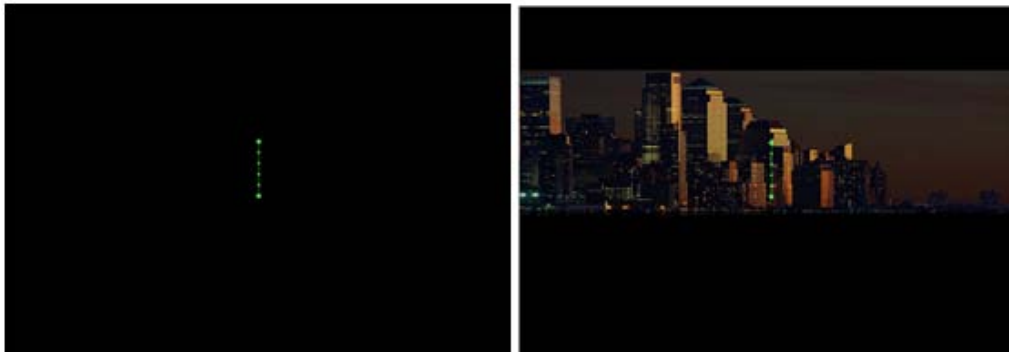


Figure 19 – Fade-in Effect

Transformations

The size of a symbol can be modified to make it either larger or smaller than the original. Similar to creating a transparency tween, Flash CS4 can animate a symbol from one size to another in a smooth fashion.

To create the illusion of a car driving up:

1. In the **Timeline**, click the red x icon **X** and the padlock icon **🔒** next to the **Cars** folder to unhide and unlock the layers in the folder.
2. Right-click frame **75** of the **Silver** layer and select **Insert Keyframe**.
3. Drag the **Lambo** symbol from the **Library** panel to the **Stage**.
4. In the **Property inspector**, under **Position and Size**, set the **X** value to **212** and the **Y** value to **193** (see Figure 20).
5. Under **Color Effect**, click the **Style** arrow and select **Alpha** from the list.

- Set the **Alpha** value to **30** (see Figure 20). The **Lambo** symbol becomes semi-transparent.

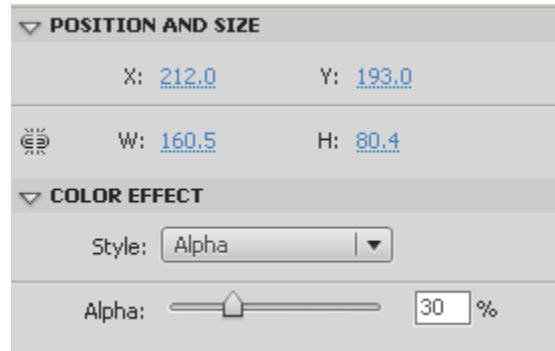


Figure 20 – Property Inspector

- Right-click the **Lambo** symbol on the **Stage** and select **Create Motion Tween**.
- In the **Timeline**, select frame **100** of the **Silver** layer, and then press the **F6** key to insert a new keyframe.
- Select the **Lambo** symbol on the **Stage**.
- In the **Property inspector**, under **Color Effect**, click the **Style** arrow and select **Alpha** from the list.
- Set the **Alpha** value to **100**. The **Lambo** symbol becomes fully visible.

To create the illusion of a car coming towards the screen:

- In the **Timeline**, select frame **75** of the **Silver** layer.
- Select the **Lambo** symbol on the **Stage**.
- In the **Property inspector**, under **Position and Size**, set the **X** value to **293**, the **Y** value to **214**, the **W** value to **57**, and the **H** value to **28**.
- In the **Timeline**, select frame **175** of the **Silver** layer, and then press the **F5** key to insert a new frame (see Figure 21).
- Press **Ctrl+Enter** to preview the animation.




Figure 21 – Transformation Effect

3D Animations

Flash CS4 allows users to create 3D effects by moving and rotating movie clips in 3D space. Flash represents 3D space by including a Z-axis in the properties of each movie clip instance. This gives greater depth to animations. Object can be three-dimensionally adjusted either relative to the Stage (global 3D space) or to the movie clip space (local 3D space).


To create a new layer:

1. Select the **Cars** folder in the **Timeline**.
2. Click the **New Layer** button  at the bottom of the **Timeline**. A new layer is created above the **Cars** folder.
3. Rename the layer to **Movie Title**.

To create a movie clip symbol:

1. In the **Timeline**, select frame **110** of the **Movie Title** layer, and then press the **F6** key to insert a new keyframe.
2. Drag the **Title.png** image from the **Library** panel to the **Stage**.
3. Right-click the **Title.png** image on the **Stage** and select **Convert to Symbol**. The **Convert to Symbol** dialog box opens.
4. Type **Space Chase** in the **Name** box.
5. Click the **Type** arrow and select **Movie Clip** from the list.
6. Click the **OK** button.

To create a 3D animation:

1. Drag the **Space Chase** movie clip symbol to the lower-left corner of the **Stage**.
2. Right-click the **Space Chase** symbol and select **Create Motion Tween**.
3. In the **Timeline**, select frame **155** of the **Movie Title** layer, and then press the **F6** key to insert a new keyframe.
4. Select frame **110** of the **Movie Title** layer.
5. Select the **3D Rotation** tool  in the **Tools** panel.
6. Select the **Space Chase** movie clip symbol on the **Stage**. The **3D Rotation** controls appear on top of symbol (see Figure 22).

NOTE: The X-axis control is red, the Y-axis control is green, and the Z-axis control is blue. Use the orange free rotate control to rotate around the X-axis and Y-axis at the same time.



Figure 22 – 3D Rotation Control

7. Position the mouse pointer over the Y-axis control (green horizontal line) and drag it clockwise or counter-clockwise approximately 100 degrees. The symbol rotates and almost disappears (see Figure 23).

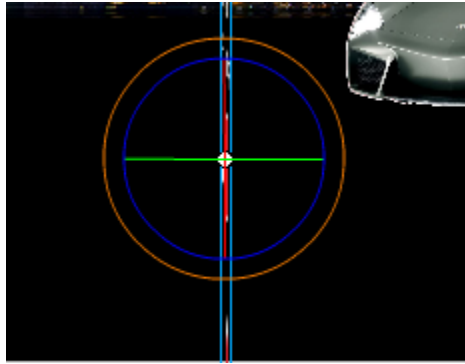


Figure 23 – Rotated Symbol

8. In the **Timeline**, select frame **155** of the **Movie Title** layer, and then rotate the symbol back into its original state.
9. Press **Ctrl+Enter** to preview the animation.

NOTE: 3D rotations can only be applied to movie clip instances.