

Lesson 2 Simple Animation

Animating can be done in several ways, whether you're using Flash or old-fashioned acetate cels. In all cases, something moves on the screen. For the approach taken in this lesson, you're not expected to have any artistic skill or talent. You will create two basic shapes and make them travel across the screen, independently of each other. This will involve all the fundamental elements of animation in Flash: symbols, the Timeline, frames, keyframes, layers, and tweening.

If you have ever made an animated GIF for the Web, you may have used frame-by-frame animation, which requires the creator to deliberately change the contents of each *frame*. A frame represents an instant in time. In Flash, you can change the duration of that instant. In Lesson 1, you learned how to change the *frame rate*: You can specify how many frames per second a Flash movie has.

For the sake of comparison, motion picture film plays at 24 frames per second, a *frame rate* that produces a pretty good illusion of reality. It was too much work to draw 24 separate frames for each section of an animated cartoon (back when the animators really had to *draw* them), so cartoons often repeated identical frames twice, or even three times. The film still ran at 24 fps, but in reality there were only 8 or 12 unique frames in each second. Those were duplicated to produce 24.

Don't worry about drawing individual frames, though—with Flash, you will draw something one time and use it over and over again.

Rarely is there a need to create an animation sequence frame-by-frame in Flash. That's where *tweening* comes in. Flash can move your object from Point A to Point B if you will just indicate where those two points lie on the Stage (or off the Stage, if you want the object to move out of sight). That part may surprise you with how easy it is—but first, you need to complete some preparatory steps.

Lesson 2

This lesson is divided into two parts. The first exercise deals with the creation of two objects and their conversion to *graphic symbols*. (If the objects have not been converted, they will not animate.) It also introduces the **Library**. The second exercise deals with animating the two symbols.

Exercise 2.1: Creating Graphic Symbols

1. Open Flash and make sure you can see the **Stage** and also the **Tools**, **Timeline**, and **Properties** panels, described in Lesson 1. If the Stage area is empty *and* there's no Timeline (nothing there but gray), open the File menu and select "New." If the Stage area is filled with a menu that includes the option "Create New," select "Flash Document" there.

2. In the **Properties** panel, select the *size* (in pixels) of your Flash movie. Select a *background color*. Select a *frame rate* (some additional details about frame rates appear at the end of this lesson). Keep the frame rate at 12 fps for this lesson. (These choices were explained in Lesson 1, Step 2.)
3. Use the drawing tools to create two separate objects. If you really hate to draw, make one rectangle and one oval, then move on to Step 4. If you're feeling creative, try to make one object that fits inside another. If you want to draw but you can't think of two good objects, try to draw these: an olive and a martini glass.

Insert Figure 2.01

Caption: Shapes drawn in Flash: You can draw an olive and a martini glass in Flash even if you are no good at drawing. First, make two separate ovals for the olive, and then select and drag the smaller one into position. Use the Line tool to make the glass. Select "Snap to Objects" from the View menu to make it easy to connect the lines neatly.

4. File menu > Save As. *Name* your file and *save* it. The file extension for your working Flash file (*.fla*) will be appended automatically. Like all filenames on the Web, the name you give to a Flash file should have only lowercase letters, no punctuation, and no spaces.

Note: On many Windows computers, the file extension has been hidden from you. If you would like to see file extensions when you view files, you can. In any window that displays folders and files, open the (Windows) Tools menu and select "Folder Options." Click the View tab in the Folder Options dialog. Beneath the top folder there ("Files and Folders"), find the line "Hide extensions for known file types" and remove the check mark on that line. Click the Apply to All Folders button. Click OK to close the dialog.

5. Now you will make each one of these shapes into reusable symbols. *Select* one of your shapes first.
 - Make sure you *select* the entire shape. Check that every part of the shape appears dotted, showing that it has been selected. You can use the (black) **Arrow/Selection** tool to select your shape (*click and drag* a selection box around the entire shape).
 - *Do not select both shapes* at the same time, or you would get one symbol instead of two.
6. From the Insert menu/Flash MX, select "Convert to Symbol." (In Flash MX 2004, it is on the Modify menu instead. You will quickly learn that pressing F8 does the same thing in either version, if your shape is selected.) A dialog box opens. In that dialog box, *select* "Graphic" and *name* your new symbol something obvious (such as "olive"). Click OK.
7. Follow the same procedure for your second shape. When a shape has been converted to a symbol, it will be surrounded by a "bounding box" (a thin blue line). If you don't see the box, select the **Arrow/Selection** tool and click *once* on the symbol.

Insert Figure 2.02

Caption: After you have converted a shape to a symbol, the new symbol belongs to the Library for this Flash movie. Symbols that are deleted from the Stage remain available in the Library.

Warning: If you *double-click* a symbol, you will go into Symbol Editing Mode, which removes you from the normal **Timeline**. There's no reason to get tangled up with that now, so if you can't get the bounding box to appear, or you discover you can alter the shapes, press Ctrl-E (or Cmd-E/Mac) to return to normal editing and the main Timeline. Be very conscious of how you are clicking the objects on the **Stage**, because a single click and a double click have *entirely different* results.

8. Now you're about to see the glory of symbols in Flash. Open the **Library** panel (Window menu > Library, or press F11). If you named and converted your two symbols successfully, you will see them in the Library panel with the names you gave them. Grab one of them in the Library and *drag* it to the **Stage**. Do it several times.

Note: This may seem like copying and pasting, but it's different: Each *instance* of a symbol in Flash requires almost no storage space in the final Flash movie file. If you had separate *copies* of an image, each copy would carry its full "weight" and increase the file size accordingly.

9. These multiples are called *instances* in Flash. Instances are *not* the same as copies, but they can be changed independently of one another. *Select* one of your symbols (click it *once*) and look at the **Properties** panel. You can experiment with *alpha* (transparency) for the selected symbol, or *tint*, or *brightness* (Figure 2.03). Changes you make to an instance in the Properties panel *do not* affect the symbol in the **Library**.

Insert Figure 2.03

Caption: Try out the effects you can apply to a symbol with the Color properties. Alpha is especially useful; use it to change the transparency of an instance. Brightness can be used to dim a button, for example.

10. Another common thing to do to an *instance* of a symbol is to change its size. You can *scale* it (keeping the proportions the same) or *skew* it (making it look stretched or squashed). To achieve those effects, select the **Free Transform** tool, or open the **Transform** panel (Figure 2.04). You can also *rotate* the instance using either the tool or the panel (Figure 2.05). Open the Modify menu and check out the Transform options there too.

Can you animate these effects? Of course you can! Just wait until you get to the second exercise in this lesson. (You're almost there.)

Insert Figure 2.04

Caption: Several instances of the olive symbol were scaled with the Transform panel, or changed with the options available in the Properties panel.

Insert Figure 2.05

Caption: The Free Transform tool was used to rotate the glass. To rotate the olive, open the Modify menu, move to Transform, and select Rotate 90° CW.

11. Finally, *delete* everything from the frame (as explained in Lesson 1, Step 4). The **Stage** should be empty. If you have any doubt that your symbols are safe in the **Library**, you can grab each one and drag it out to the Stage just to make sure.
12. File menu > Save.

Note: Another great benefit to the way symbols work in Flash: As you delete frames and objects in the normal course of editing a Flash movie, all the symbols you created stay intact in the **Library**. (Libraries can also be imported to other Flash movies, so you can use your best symbols again and again.)

Warning: Make sure you can see the bounding box (Step 7) before you delete a symbol on the **Stage**. If you do not see the box, you are *inside* the symbol, and you will permanently delete your shapes. If you clicked the symbol and you do not see the box, press Ctrl-E (or Cmd-E/Mac) to *exit* and return to normal editing.

Exercise 2.2: Animating Two Symbols

Now you'll put those two graphic symbols to good use. Begin with an empty **Stage**, and check your *frame rate*. You need to know how many frames one second requires, so you can plan your animation. If your frame rate is 12 fps, you will need a sequence of 12 frames to get 1 second of motion.

1. Drag one symbol out onto the **Stage**. You must animate only one symbol at a time.
2. So far, your movie has only one frame in the **Timeline**. Select a "future" frame in the Timeline. Since you know the frame rate, you can calculate how many frames you need to make your motion complete in 1 second. Go to the frame in the Timeline that is 12 frames (or whatever your movie's *frame rate* is) to the *right* of Frame 1. Click that frame once. The frame will be shaded to show that it is selected.
3. With that later frame (e.g., Frame 12) selected, press F6. This inserts a new *keyframe*. Inserting a keyframe is a crucial part of animation in Flash! *Notice* how all the frames from Frame 1 (the first black dot) up to the new keyframe (second black dot) have filled in with gray shading. Those frames are no longer empty! (Empty frames are always white.) Every frame in the long gray block contains exactly the same image.

Note: On an iBook (and possibly some other laptops), the function keys (F keys) work as described here *only if* you press and hold Function (another key) *while* you press the F key. However, on most computers you can press the F key alone and get these results.

Insert Figure 2.06

Caption: Adding a keyframe at Frame 12 extends the Timeline.

Note: The difference between a keyframe and all other frames is that a *keyframe* signals *change*. In a keyframe, something can be set as a beginning or an end in a sequence of change. The Flash designer cannot make a change in a frame that is not a keyframe. In the **Timeline**, a keyframe *always* has a dot inside it. A *black* dot shows that there is at least one object in the keyframe. A *white* dot shows that the keyframe is empty of objects.

4. To see motion between Frame 1 and Frame 12, you must change the position of the object. Right now, it's in the same place in both *keyframes* in your **Timeline**. To make the object move in an animated sequence, you will put it into its starting position in the first keyframe, and into its ending position in the next keyframe. The keyframe containing the object is indicated by a black dot.

First, *select* either keyframe (click *once* directly on the keyframe to select it). Then move the object on the **Stage** by *selecting* it (make sure you have the **Arrow/Selection** tool, and click only *once* to select the symbol) and *dragging* it. Do not double click!

Insert Figure 2.07a

Caption: Olive positioned above the Stage, Frame 1.

Insert Figure 2.07b

Caption: Olive positioned lower, on the Stage, Frame 12. If you want an olive to drop into the scene from a point offstage, position the olive above the main Stage area in the first keyframe, and then, in the next keyframe, position the olive where you want it to land.

5. Add a *motion tween*: Click once on any frame *inside* in the long gray block between Frame 1 and Frame 12 in the **Timeline**. (These frames are not keyframes: They do not have a dot.) Then look in the **Properties** panel and find the menu labeled “Tween.” Change the menu choice from “None” to “Motion.” A *solid line* and an *arrow* pointing to the right appear inside the long block of frames, which is now pale blue instead of gray.

Note: If you ever see a *dotted* line in the sequence, that means the *tween* did not work. The most common reasons: (a) Your object is not a symbol; (b) you have more than one object on the layer; (c) you do not have a keyframe at the end; (d) one of your two keyframes does not contain the symbol you are trying to move.

6. File menu > Save.
7. Test your animation (Method 1): Press Enter/Return. If nothing happens, press it again.
8. Test your animation (Method 2): The *playhead* is a small red rectangle at the top of the **Timeline**, in the bar with the numerals. You can *grab* it and *drag* it left and right to test the motion in your movie; this is called “scrubbing.” It will not show you the real speed of the movie, but it can help you diagnose problems in the motion sequence. (You can also move the playhead to any frame and then press Enter/Return to play the movie from that point onward.)
9. Make the motion longer and slower: Click once anywhere inside the *motion tween* block in the **Timeline**. Press F5 several times. Each time you press F5, you *increase* the motion sequence by one frame. (In other words, F5 adds frames. Regular frames, *not* keyframes. These are frames with no dot.)
10. Make the motion shorter and faster: Click once anywhere inside the *motion tween* block in the **Timeline**. Press Shift-F5 several times. Each time you press Shift-F5,

you *decrease* the motion sequence by one frame. (In other words, Shift-F5 removes frames.)

11. Move the starting point of a sequence: Click *once* on the first keyframe (the frame with a dot in it is the starting frame in a sequence) to *select* it. *Release* the mouse button (this is very necessary). Then *click, hold,* and *drag* to the right (or left) to change the starting frame's position in time. Frames in the sequence will be removed (when you drag to the right) or added (when you move to the left) automatically as you do this. Try this, and test your animation (Steps 7 and 8) to learn how it works.
12. Now it's time to name the **Timeline** layer, because you'll be adding *a second layer* in the next step. Here's how to name (or rename) a layer: On the left side of the Timeline, you'll see one layer (named *Layer 1*). Double-click the *layer name* and type to change it. To make the new name "stick," click anywhere off the layer name, or press Enter/Return. Use a name that makes it easy to remember what's *in* that layer.
13. Create a *new layer*: Find the tiny icon (a page with a plus sign) on the left at the bottom of the **Timeline**, under the layer name(s). This icon pops up a label "Insert Layer" when you roll over it. Click that icon once to make a new layer. (The new layer will always be added *above* the selected layer. Layers can be *moved* up or down at any time by dragging them.)

Insert Figure 2.08

Caption: When you create a new layer in the Timeline, it is automatically the same length as the existing layer(s). A new layer always has one keyframe, at the beginning. Empty frames are always white.

Note: It is essential that you place *each object that will move* in a separate layer by itself. If *any other object* is in the layer, the motion tween will not work.

14. Name the new layer (see Step 12).

15. File menu > Save.

Note: The pencil icon (to the right of the layer name) indicates the *active* layer in the **Timeline**. When you draw or put something on the **Stage**, it will be on the layer marked by the pencil icon. Pay attention to which layer you're on *before* you drag any new object to the Stage!

16. Drag your other object from the **Library** to the **Stage**. Make *certain* it has landed in the second layer! Remember: Frames that are white are empty. When frames contain objects, they are a color other than white.

17. Animate your second object by repeating Steps 2–5 on the new layer.

18. File menu > Save.

Insert Web site icon

19. Test your movie: Ctrl-Enter (Win) or Cmd-Return (Mac). This is *different* from testing the animation by pressing Enter/Return alone, as you will see.

Note: When you test your movie by pressing Ctrl-Enter (Win) or Cmd-Return (Mac), you spawn a second window within the Flash application. If it is “maximized” (full size), it will hide your normal editing window. New Flash users sometimes close the whole application by accident when they try to close the testing window and return to the editing environment. Don’t make that mistake.

Insert Figure 2.09

Caption: The Timeline, with two layers. Each layer contains a motion tween.

Insert Figure 2.10

Caption: Three frames from a two-layer animation; the frames shown are 1, 4, and 12. Compare with Figure 2.09: You should soon be able to “read” a Timeline like this one and visualize what is in each keyframe. In Frame 12, the olive is behind the glass. An object in a lower layer in the Timeline is always “underneath” objects in higher layers.

Note: When you test the movie by pressing Ctrl-Enter (Win) or Cmd-Return (Mac) for the first time, Flash generates a new file, with the file extension *.swf*—this is the file that will be played on the Web. Each time you test the movie again, this file is overwritten with the newest version. You’ll learn more about this in Lesson 3.

20. You’ll notice that when you test the output Flash file, it loops, or repeats, forever. That is the default for Flash movies. To make the animation *stop*, you must use ActionScript. The standard way to handle ActionScript is to put it *in a layer by itself*; this makes it easy to find and edit your scripts. So, create a third layer now, and name it “actions” (without the quotes).
21. Within that new layer, click the *last* frame in your movie (Frame 12) and insert a *blank* keyframe there (press F7 once). ActionScript always needs a keyframe.
22. Open the **Actions** panel. (Find it on the Window menu if you don’t see it. In Flash MX 2004, it’s on the submenu “Development Panels.”) If you see the panel name but the panel is closed, then open the panel by clicking the small triangle widget to the left of the panel name.
23. In the **Actions** panel, click in the list on the left side to open “Actions”; then click “Movie Control”; then double-click “stop” (Figure 2.11). If nothing happens, check in the **Timeline** and make sure you have that blank *keyframe* selected.

Flash MX 2004 Note:

The **Actions** panel list in Flash MX 2004 has different sections. Instead of “Actions,” you’ll see “Global Functions.” Open that to find “Timeline Control.” Inside that section, you will see “stop” (Figure 2.12). Adding the script is the same: Just double-click “stop.”

Insert Figure 2.11

Caption: Actions panel, Flash MX.

Insert Figure 2.12

Caption: Actions panel, Flash MX 2004. Here’s what you should see in the **Actions** panel, depending whether you are using Flash MX (Figure 2.11) or Flash MX 2004

(Figure 2.12). In either case, you have now “written” an ActionScript command telling the movie to stop playing when the playhead reaches Frame 12.

Note: You should see a tiny letter “a” (for “ActionScript”) on the last keyframe in your “actions” layer. The “a” indicates that ActionScript is written on that frame.

24. File menu > Save.

Insert Web site icon

25. Test your movie: Ctrl-Enter (Win) or Cmd-Return (Mac).

What should happen: The movie plays one time and stops. If it does not stop, you did not write the ActionScript, or you wrote it on the wrong frame, so go back to Step 23 and try again. Don’t close the entire Flash application when you close the testing window!

Tips About Animation

Frame Rates

How smooth, or how true to life, the motion in your Flash movie appears will depend on the *frame rate* you select. Flash sets a default frame rate of 12 fps, as you learned in Lesson 1. If you want the most realistic motion, you might select 24 fps, based on the frame rate of motion picture film. That could increase the size of your Flash file, of course—not the most desirable result.

Macromedia recommends a frame rate of 15 to 18 fps for most Flash movies. However, some Flash developers have noticed that there can be significant differences in the actual playback frame rate on different operating systems. At least one developer recommends 21 fps as a frame rate that will run comparably on both Windows and Mac systems.

This will not matter much in cases where you have not created complex vector animations. If you use a high frame rate in a Flash movie where a lot of bitmaps (for example, photographs) are moving around, the frame rate may be forced down because of the higher demands a moving bitmap makes on the system. *Gradient fills* and *alpha* (transparency) also place a high demand on the user’s system when they are moving. The user’s computer might freeze up if your Flash movie demands too much processor activity. In other words, certain motion effects might *not* be speeded up by a higher frame rate.

The bottom line: Test your movie on various computers and platforms. For your first animations in Flash, you can’t go wrong with a frame rate of 15 fps.

Using Layers

Independent motion takes place on separate layers in Flash. (This is somewhat different from simple layer-based animations you may have learned to do in another program, such as Adobe ImageReady.) Put different animated objects into their own layers, alone. Then adjust each object's movements individually.

It helps a lot to name your layers intelligently, because it prevents mistakes. If you have placed all your non-moving background images on one layer, name that layer "background." When you start working with text, you might find that you prefer to put all non-moving text fields on one layer. Fine! Name that layer "text blocks."

The longer you work with Flash, the more complex your movies will become. Practice good layer management now to make your work easier later.

Masks and Motion Paths

These two advanced techniques will allow you to achieve some effects that would be very time consuming to animate without them.

A *mask* prevents selected areas from being seen. The oddest thing about a mask: You create a solid shape that represents the area you intend to be *seen*, and you position it over the area that will be *visible*. (This temporarily hides the area, but that will change.) The mask shape must be alone on a layer. That layer becomes a *mask layer* when you right-click (Control-click/Mac) on it in the Timeline and select "Mask" from the pop-up menu. You can mask more than one layer beneath the same mask layer. You will learn to use a mask in Lesson 7.

A *motion guide layer* allows you to draw a curved or straight line and then "attach" objects on lower layers (as many layers as you like) to make them move along the line. You can make a plane fly along a visible dotted line or a bird follow an erratic invisible trail. For detailed instructions and examples, search for "Tweening motion along a path" in the Flash Help files: Open the Help menu and select "Using Flash"—or just press F1.

There and Not There

Objects in the Library that are never used in your movie do not exist in the final exported Flash file (with the file extension *.swf*) and thus they do not add to the file size. That is *not* the case for objects you have dragged out of the Library. If you did not delete them, they are adding to the file size, even if they never show up on the Stage. Objects with an *alpha* of 0 are invisible, but they are still *there*—and so they add to the file size.

This means you must remember to remove objects from the Stage when you've finished with them, or when you have decided not to use them.

Simple Animation Summary

For anyone who has not animated images before, the best approach is to keep it simple. Do not try to make human figures move naturally in your first week with Flash! Work

first with simple objects (*instances* of graphic symbols, in the language of Flash). Try to get them to move as you want them to. Experiment with transparency (alpha) and scaling. For example, you can use the Free Transform tool to make an object double size in Frame 1, half size in Frame 12, and then apply a *motion tween*. Does the object appear to shrink, or does it appear to move away from you? You can make an object fade to invisibility by starting at an alpha of 100 and ending with an alpha of 0.

If you learn how animation in Flash works by moving rectangles and ovals around, later it will be less complicated for you to move blocks of text, photographs, and objects made up of separate, movable pieces. You might use the drawing tools to trace over a photograph of an object such as a passenger train, and then animate the individual cars of the train during a derailment. (All the cars could be instances of just one symbol.) Remember that each animated object must be alone in its own separate layer. (In Lesson 6, you'll learn how to contain multiple layers for one complex animated object in a single symbol called a movie clip.)

By paying close attention to the Timeline, you will learn how to “read” it. Any confusion you have about frames and keyframes will decrease as you practice. Keep your eye on the dots (keyframes) and whether they are black or empty (white). Remember that a keyframe signifies a frame where a *change* begins or ends. Watch the frames and check whether they are gray, blue, or empty (white).

Conclusion

In this lesson, you have learned to:

1. Convert a shape to a graphic symbol.
2. Open the Library panel and drag symbols from it to the Stage.
3. Use *alpha*, *brightness*, and *tint* (in the Properties panel) to change an *instance* of a symbol without affecting the symbol as it is stored in the Library.
4. Use the Free Transform tool, Transform panel, and Modify menu > Transform options to *scale*, *skew*, or *rotate* an instance without affecting the symbol in the Library.
5. Recognize a *keyframe* and distinguish it from a regular frame.
6. Position an object in a starting keyframe and in an ending keyframe.
7. Apply a *motion tween* to cause an object to move.
8. Test an animation.
9. Add frames (F5) and keyframes (F6) to the Timeline.
10. Remove frames and keyframes from the Timeline (Shift-F5).
11. Lengthen or shorten a motion sequence in the Timeline.
12. Change the starting or ending point of a motion sequence by dragging a keyframe.
13. Add and name new *layers* in the Timeline.
14. Rename a layer.
15. Animate multiple objects in separate layers.
16. Test your movie (this generates an *.swf* file).
17. Insert ActionScript on a frame to make the movie stop looping (play only once).

(end)