Chapter 4: Draw with the Pencil and Brush Tools

In Illustrator, you create and edit drawings by defining anchor points and the paths between them. Before you start drawing lines and curves, you'll find it helpful to have an introduction to the basic way paths and anchors work.

Understand Paths and Anchors

In this chapter, you'll learn to use the Pencil, Line Segment, Arc, Spiral, Rectangular Grid, and Polar Grid tools to generate a variety of paths and anchors. Figure 4-1 shows an illustration that depends on the Pencil tool.


Figure 4-1: A complex drawing based on Pencil-drawn objects

An *anchor* (or *anchor point*) is the end of a line segment, and it controls the curve and finish location of that line segment. The line that connects the start and end of a group of anchors is often called a *path*. OK, enough theory for now, time to start drawing!

Caution The Edit Selected Paths check box option can be a little disorienting because it's sometimes

hard to tell whether your Pencil tool is in a state where it will add to a drawing or edit it. Higher settings on the Edit Selected Paths slider make the Pencil tool less sensitive to nearby curves. If you find that you're often trying to draw new paths but the Pencil tool keeps editing nearby paths, increase the value of the slider. If you find that it's just too confusing to have one tool do two different things, you can turn off the editing feature of the Pencil tool by deselecting the Edit Selected Paths check box.
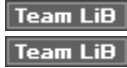
Draw with the Pencil Tool

The Pencil tool has a split personality. If you start from that understanding, then you won't get as disoriented when odd things happen when you use this tool.

The Pencil tool can be used as a quick-and-dirty way to draw lines. It's also a way to *redraw* existing lines to smooth out edges or tweak an illustration.

As a drawing tool, the Pencil tool has its limitations. Even experienced Illustrator artists, who use drawing tablets to facilitate more accurate drawing, usually start from a sketch created with an old-fashioned pencil, piece of charcoal, or paintbrush. When you want to create a complex illustration, you'll often want to create artwork on paper first, and scan your artwork into Illustrator. But the Pencil tool provides a flexible way to either draw with your mouse or drawing tablet or trace a scanned image.

The Pencil tool also has its limitations as a redraw tool. Artists who become comfortable with using the shape, line, and arc tools and the Pen tool generally stay away from the Pencil tool since it duplicates the features of those tools, but not as well. That said, many designers who are new to Illustrator find the Pencil tool more intuitive than its big brother, the Pen tool. You'll use the line and arc tools later in this chapter and the Pen tool in Chapter 6.

Set Stroke and Fill Color

Before you start drawing with any tool, you'll want to set a stroke and a fill color. To define a visible stroke color, click on the Stroke icon at the bottom of the Toolbox, and then choose a color in the Color palette that appears.

You can choose a fill color by clicking on the Fill icon in the Toolbox and then clicking on a color in the Color palette. Figure 4-2 shows a red stroke color and no fill color being assigned.

Figure 4-2: Stroke is set to red, and fill is set to None

Note To assign no fill to your drawings, click the Fill icon in the Toolbox and then click the None button below the Fill/Stroke icons in the Toolbox. It might be helpful to avoid color fill as you experiment with drawing tools.

Define Pencil Tool Preferences

Before you start sketching away with the Pencil tool, double-click the tool to open the Pencil Tool Preferences dialog box. Use the Fidelity slider to define how many anchor points to generate as you draw. The fidelity value tells the program how faithful it should be (in pixels) to the user's actual mouse movements.

A low fidelity value, for example, tells Illustrator to stay very close to your mouse (or drawing tablet) movements. Low fidelity values create more angular curves. A high fidelity value allows Illustrator more freedom to stray from the path you draw to create a smoother curve. A low value generates more anchor points, while a high fidelity value creates a smoother line. Figure 4-3 shows fidelity and smoothness settings in the Pencil tool dialog box.
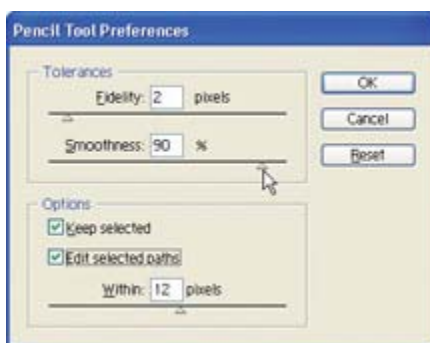

Figure 4-3: The low fidelity value and high smoothness settings mean that the Pencil tool will draw smooth curves that do not adhere closely to the path you draw with your mouse or drawing tablet.

Figure 4-4 shows the same drawing, done twice. The drawing on the left was done with a low fidelity value, while the smoother drawing on the right was done with a high fidelity value.

Figure 4-4: The drawing on the left, produced with a low fidelity value, is more jagged than the one on the right, produced with a higher value.

The Smoothness slider in the Pencil dialog box works in a similar fashion: a high setting evens out your drawing.

If the Keep Selected check box is checked, after you draw a curve with the Pencil tool the anchor points will all be selected. This feature is useful if you expect to edit your anchor points after you draw with the Pencil tool. Selecting the Edit Selected Paths check box enables the Pencil tool to function like an editing tool, changing the size and direction of selected paths.

Draw with the Pencil Tool

Draw with the Pencil tool as if you were holding a pencil. Hold down your mouse button or use your drawing tablet tool and, with the Pencil tool selected, simply start drawing, as shown in Figure 4-5.
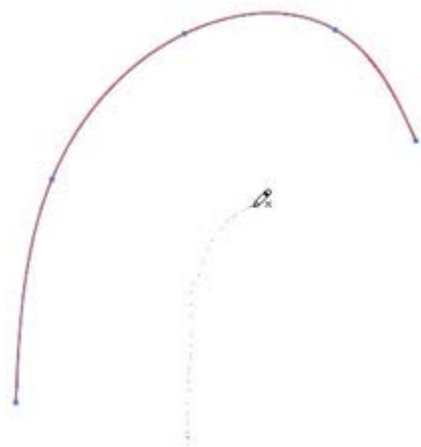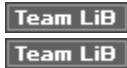

Figure 4-5: Drawing with the Pencil tool

If you enabled the Keep Selected check box in the Pencil Tool Preferences dialog box, the object that you draw will automatically be selected as if you had clicked on it with the Selection or Direct Selection tool. This makes it easier to *edit* the drawing by redrawing the generated path.

As you draw with the Pencil tool, Illustrator generates paths. You can ask Illustrator to smooth those curves out (to varying degrees) as you draw. Or you can use a special tool on the Pencil tear-off, the Smooth tool, to soften your curves after you draw with the Pencil tool.

However you generate paths with the Pencil tool, if you examine them you'll see they are made up of anchor points and line segments. Try it. Select a curve you've drawn with the Pencil tool, and take a close look at the anchor points you generated. You'll want to be aware of these anchor points as you

begin to edit your line.

Edit Drawings with the Pencil Tool

All three of the tools in the Pencil tool tearoff can be used to edit curves. You can use the Pencil tool itself to not only draw curves but to modify existing curves. The Smooth tool irons out zigs and zags, making your curves flow more smoothly. And the Erase tool works like a pencil eraser to eliminate part of a curve.

To use the Pencil tool to edit a curve, first select that path (line) with a selection tool. Select the Pencil tool again, and then click and drag on a curve to change that curve, as shown in Figure 4-6.

Figure 4-6: Redrawing a selected line segment using the Pencil tool

Smooth a Line

The Smooth Tool Preferences dialog box works much like the Pencil Tool Preferences dialog box does. You open it by double-clicking the Smooth tool.

Fidelity as applied to the Smooth tool defines how closely Illustrator adheres to the smoothing line you draw over an existing curve. Higher fidelity values remove more anchor points as you "sweep" over a curve. A fidelity value that is too high removes all nuance and detail from the drawing. A high smoothness setting smoothes out more rough edges in your drawing.

To use the Smooth tool, first double-click the Smooth tool and define the degree of fidelity and smoothing you want to use, and click OK. Then use the Selection (or Direct Selection or Lasso) tool to select the curve to be smoothed. Finally, click and drag with the Smooth tool along the path you want to apply smoothing to, as shown in Figure 4-7.

Figure 4-7: Smoothing out rough edges in a drawing with the Smooth tool

Erase a Line

The Erase tool deletes selected sections of a path. There are no preference settings for the Erase tool; it simply does its thing and deletes anchor points and the line segments between them. The concept to keep in mind is that you are deleting *anchor points,* not bunches of pixels (as you would with an eraser tool in a program such as Photoshop).

Tip In addition to deleting points, you can use the Erase tool to remove sections of a path between two points. Illustrator then adds new end points to the new path segments.

To erase a section of a drawing, follow these steps:

1. Select an object using the Selection tool or Lasso tool.

2. With the object selected, click the Erase tool (in the Pencil tool pop-out).

3. Click and drag with the Erase tool along the outline of the selected object to erase a section of the path, as shown in Figure 4-8.
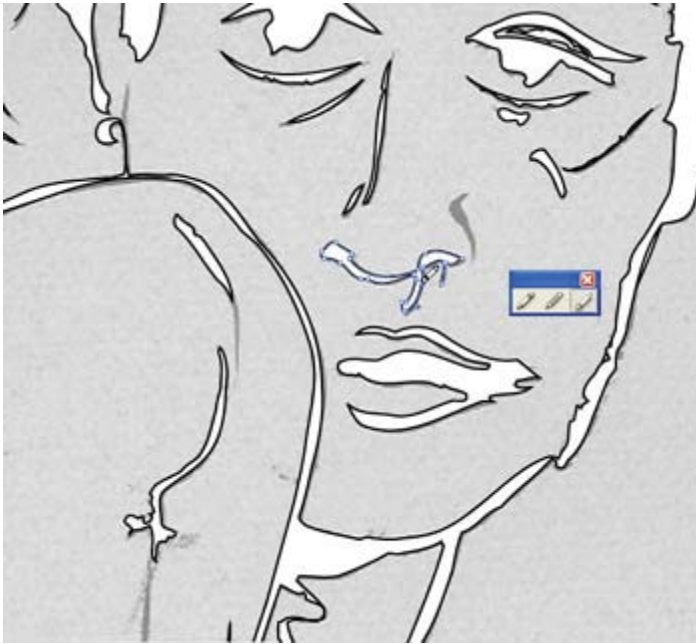
Figure 4-8: Touching up a scanned and traced drawing by deleting a section of the curve with the Erase tool

Note To make a line *less smooth*, you can choose Effect | Distort And Transform, and then experiment with using the Roughen, Twist, or Zig Zag effects to add wrinkles and twists.

The Erase tool is versatile. You can use it on any path and in any place within a line. If you want to make a clean cut in a line, click and drag across the line (as if cutting with a knife).

Caution If you just point and click on a path with the Erase tool, you'll delete the entire line segment. If you need help zeroing in on anchor points with the Erase tool, you can convert the display from the Erase icon to cross hairs by pressing CAPS LOCK on your Mac or PC keyboard. This approach sometimes makes it easier to identify exactly where you are erasing.

Edit Anchor Points with the Direct Selection Tool

You can edit objects by selecting and moving anchor points with the Direct Selection tool. If the anchor selected with the Direct Selection tool is associated with a curved line, that *smooth anchor* will have control handles that allow you to manipulate the curve of the line.

Editing smooth anchors can be quite complex. In later chapters of this book, you'll be introduced to various ways of tweaking anchor points. But the short story is that by clicking and dragging anchor points, you can change the angle of the curve, and by lengthening or shortening the handle, you can alter the size of the curve.

As mentioned earlier, clicking on the Direct Selection tool on a path between smooth anchor points, *handles* appear connected to each anchor. Clicking and dragging on these handles changes the angle of the curve, as shown in Figure 4-9.

Figure 4-9: Dragging on an anchor point with the Direct Selection tool to alter a path

Draw Straight Lines and Curves

Illustrator's Line Segment tool pop-out provides a set of tools for drawing lines, arcs, spirals, rectangular grids, and polar grids.

Each of the tools in the Line Segment tool pop-out can be used two ways: you can interactively click and drag to create an object; or you can select the tool, click once on the artboard, and then define the parameters of the object in a dialog box such as the one shown in Figure 4-10 (for spirals).
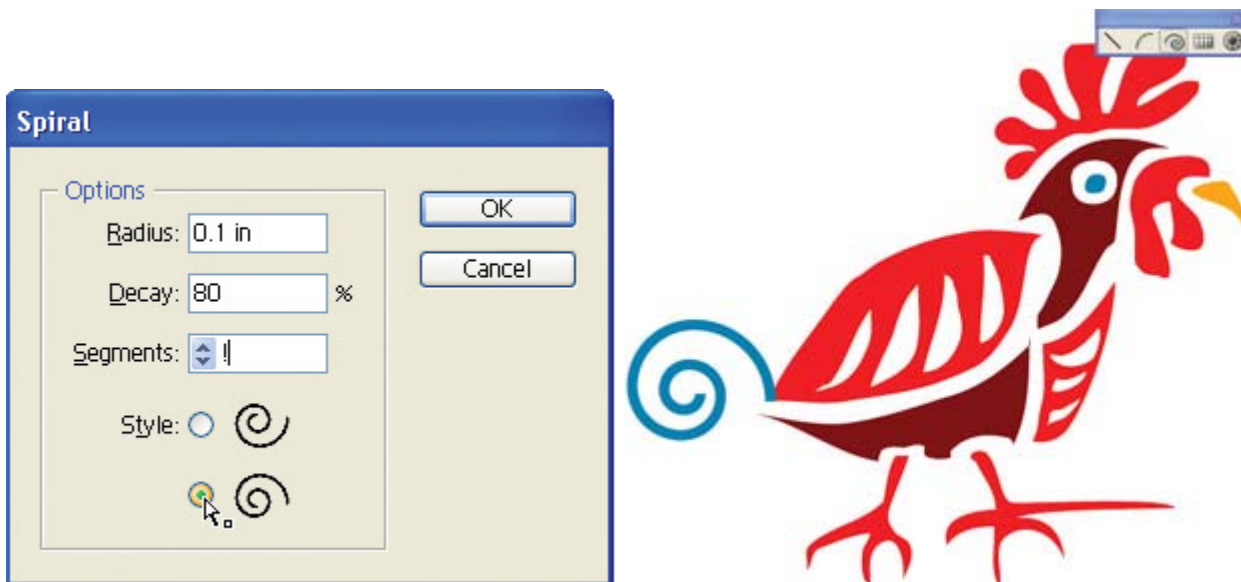

Figure 4-10: Generating a spiral from the Spiral dialog box

The Arc, Rectangular Grid, and Polar Grid tools include four clickable corner buttons in the upper-left

corners of their dialog boxes. You use these clickable corners to determine where you want to start your object. You can define the insertion to start the drawing at the top left, top right, bottom left, or bottom right of the object you generate.

Draw Straight Line Segments

To draw a line, select the Line Segment tool, then click and drag. Hold down SHIFT as you draw to constrain your line to 45-degree angles. If you hold down OPTION (ALT) as you click and drag, you will draw your line symmetrically, around a central radius. You can combine these features—holding down SHIFT-ALT as you draw—to create lines that expand from a center point and are at increments of 45 degrees.

Note If you're looking for tools to draw rectangles, ovals, stars, and polygons, you'll find those features discussed in Chapter 5.

Draw Arcs, Spirals, Rectangular Grids, and Polar Grids

You can draw a symmetrical arc, spiral, rectangular grid, or polar grid by simply selecting any of these tools and clicking and dragging. Most folks find that it's easier to draw an arc interactively on the artboard than it is to generate one from a dialog box. Just click and drag to approximate the length, direction, and curvature of your arc. When you release the mouse button, your arc is complete.

Note You can rotate, resize, or reshape a curve using the Free Transform tool.

You can help yourself draw symmetrical curves by holding down SHIFT to constrain arcs to increments of 45 degrees, or holding down OPTION (ALT) to draw an arc starting from a center point.

Since spirals, rectangular grids, and polar grids can be rather complex sets of paths, it's often easier to use the click-and-define technique for generating these shapes. First select a tool, and then click on the artboard. An associated dialog box appears, allowing you to define the exact configuration of the resulting object.

The Spiral tool options allow you to define the radius (distance from the center to the edge), the decay (degree of spiraling), and the number of segments. A decay angle of anything less than 50 produces something more like a curve than a spiral. A decay angle close to 100 percent creates a very tight spiral.

The number of segments defines how many times the spiral winds around, with each wind containing four segments. As you increase the segment number, it creates more winds in the center of the spiral. A small number of segments creates a choppy-looking curve, while a large number creates a smoother curve.

Note The highest possible setting for a decay value is 150 percent.

Rectangular grids are defined by their size, the number of horizontal dividers, and the number of vertical dividers. The Polar Grid dialog box defines the number of concentric dividers (rings) and radial dividers (pie slices). The Rectangular Grid and Polar Grid definition dialog boxes both have Skew sliders. These sliders warp your grid to make it asymmetrical—with dividers grouped more closely on the left or right, outside or inside, or top or bottom of an object, as shown in Figure 4-11.

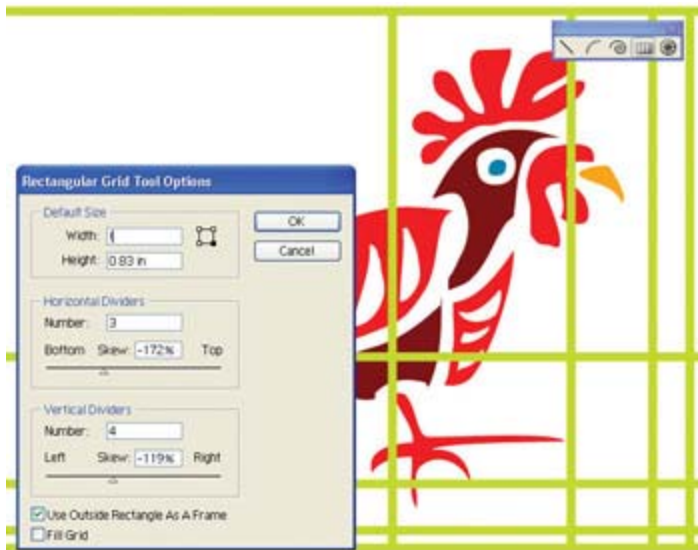Figure 4-11: Generating a grid with irregularly spaced rows and columns

Draw with Paintbrushes

The Paintbrush tool draws using a defined shape as the brush. Simply select the Paintbrush tool and draw as you would with the Pencil tool to create a curve. The default (plain) setting creates flowing, ribbon-like curves.

You can also use the Paintbrush tool to "paint" curved lines using all kinds of symbols and images. You can choose from a wide variety of brush types that come with Illustrator, or you can even create your own brush shapes.

Note Chapter 18 explains how to define custom brushes.

Change Brush Stroke Symbols

To choose from Illustrator's gallery of available brushes, choose Window | Brushes (or press F5 on your Mac or PC keyboard) to display the Brushes palette. The Brushes palette is shown in Figure 4-12.
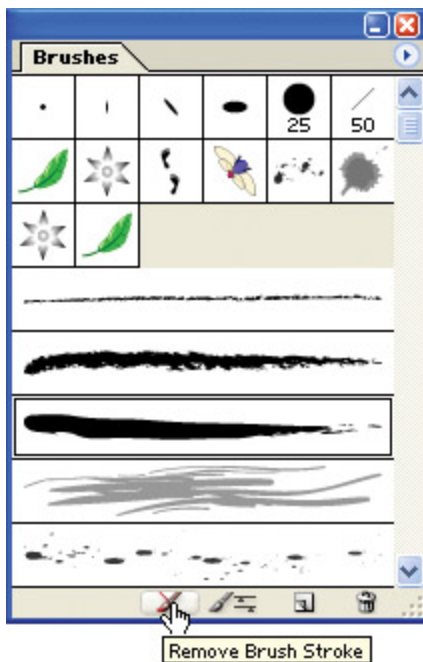
Figure 4-12: Viewing the Brushes palette

Scroll down the Brushes palette and click a symbol you wish to use as a brush shape. With a brush selected from the palette, you can use the Paintbrush tool to paint curves using the selected symbol.

To turn off a brush stroke (so that it won't be used when you use other drawing tools), click the Remove Brush Stroke button at the bottom of the Brushes palette (as shown in Figure 4-12). Each time you select the Paintbrush tool in the Toolbox, you'll turn the selected brush stroke back on, and it will apply to any drawing tool.

Use Additional Brush Strokes

You can add brushes to the Brushes palette by choosing Window | Brush Libraries and choosing from one of the available sets of brushes. A new palette with brush symbols appears.

Clicking a symbol in the new Brush Library palette adds a symbol to your working Brushes palette, as shown in Figure 4-13.
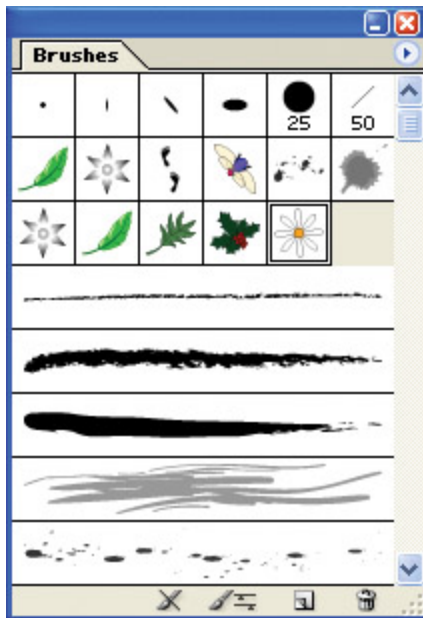
Figure 4-13: Adding a floral brush to the Brushes palette

Once you add brush symbols to your regular Brush palette, you can use them like any other brush shape. Figure 4-14 shows a drawing using a brush loaded with a fill from the Brushes palette.

Figure 4-14: A leaf brush was used for this drawing.

Define Strokes and Fills

The most basic way to assign a stroke (outline) or fill color to an object is to select the object, click the Fill or Stroke icon at the bottom of the Toolbox, and then click a color in the Color palette.

There are many other options for assigning colors to strokes or fills. And there are other stroke and fill attributes that you can define. In this section, you'll learn to define thickness and different styles (such as dashes) for strokes.

You can also pick up a color from anywhere on your screen and apply it to selected objects using the Eyedropper tool. You'll explore that technique in this section as well.

Define Stroke Attributes

You define stroke thickness and style by using the Stroke palette. You can also use the Stroke palette to define how lines end and how they join (connect) with each other. Choose Window | Stroke (or press F10) to view the Stroke palette.

To define the weight (thickness) of a selected line, choose a dimension from the Weight drop-down list, as shown in Figure 4-15.
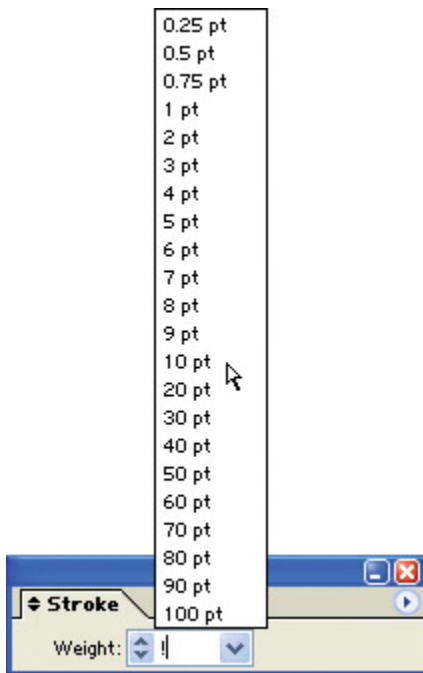
Figure 4-15: Setting stroke at 10 points

The units of measurement in the list are defined in the Preferences dialog box. (Choose Illustrator (Edit) | Preferences | Units & Display Performance, and select a unit of measurement from the Stroke drop-down list in the Preferences dialog box.)

Define Caps and Joins

A Line segment can end at its anchor point (butt style), be rounded (round style), or project past the anchor point (projecting). Line segment options for a selected line segment are visible if you choose Show Options from the Stroke palette menu.

Choose a line cap style for a selected line segment by clicking one of the three cap buttons. All three cap styles are shown in Figure 4-16.
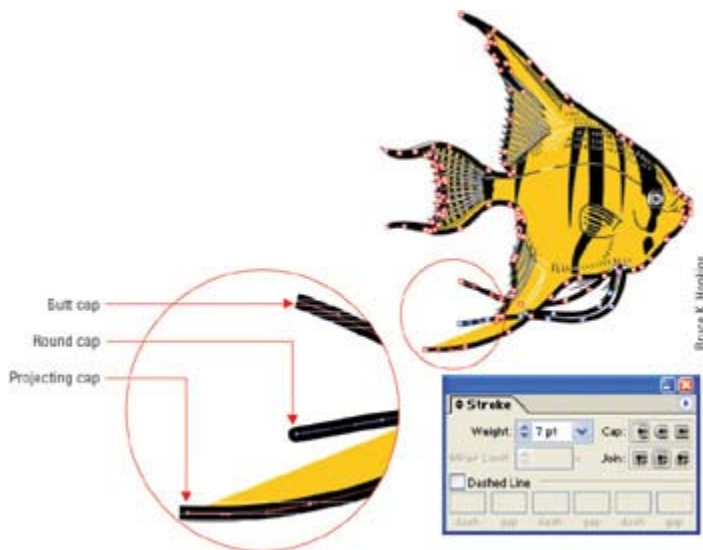
Figure 4-16: Butt, round, and projecting caps on strokes

The three join buttons (miter, round, and bevel) control how corner line segments connect. Rounded joins create curved corners, and beveled joins create cut-off corners instead of sharp corners. You can limit mitered joins by choosing a value in the Miter Limit spin box. A high enough value will prevent beveling.

You can assign dashed lines to selected line segments by clicking the Dashed Line check box. If you want to define custom dashed lines, you can use the gap area(s) to define spacing between dashes. The Dash boxes allow you to define a dash of a set length (like "12 pt" for a 12 point dash). The Gap areas can be defined in length as well.

Assign Stroke or Fill Colors with the Eyedropper or Paint Bucket Tool

You can "steal" colors from other strokes or fills by using the Eyedropper tool. Or you can easily apply the currently selected color for a fill or stroke using the Paint Bucket tool. Follow these steps to select a color using the Paint Bucket tool:

1. Using a selection tool (such as the Selection tool), select the object from which you want to copy stroke and fill settings.

2. Click the Paint Bucket tool in the Toolbox.

   Tip The Paint Bucket tool is on the Eyedropper tool tearoff.
3. Use the mouse to move the Paint Bucket tool cursor over a section of the illustration to which you want to assign the fill and stroke colors, and click. The color you point to will be assigned the fill of the selected object, as shown in Figure 4-17.

Figure 4-17: The stroke and fill colors of the object clicked on with the Paint Bucket will be assigned from the selected circle in the upper left corner.

The Eyedropper tool can grab stroke and fill colors from any object. First, select the object *to which* you want to apply a fill and stroke color. Then select the Eyedropper tool, and point and click on an object *from which* you will copy stroke and fill colors. In Figure 4-18, the stroke and fill of the ball are being used as a source for the sky color.

Figure 4-18: The sky was selected, then the Eyedropper was used to "borrow" the fill from the ball.

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