Chapter 5: Work with Shapes

Overview

Many complex illustrations start out with, and are built on, basic shapes. Experienced Illustrator artists stretch, fill, and add effects to simple shapes such as ovals, rectangles, and stars to create projects. This chapter will show you how to create and combine shapes.

In this chapter, you'll also explore Illustrator's powerful set of *Pathfinder tools*. These tools allow you to create any possible interaction between overlapping shapes. You'll see how you can combine, split apart, merge, or break up shapes using these tools.

How useful are the modest shape tools? The illustration in Figure 5-1 is 95 percent shapes, altered in some cases with rotating tools (covered in Chapter 7), and tweaked with just a bit of gradient fill (covered in Chapter 17).

Figure 5-1: Look closely—the bulk of this illustration is composed of stars and other shapes.

Draw Rectangles

The Rectangle, Rounded Rectangle, Ellipse, Polygon, and Star tools are found on the Rectangle tool tearoff. Joining them, but out of place on this tearoff, is the Flare tool. The easiest way to use these tools is to simply click and drag. Alternatively, you can generate shapes from a dialog box that opens when you click any of the shape tools and then click on the artboard.

Note The odd-duck Flare tool works differently. You double-click on the Flare tool to open the dialog box. Alternatively, you can select the tool and then click and drag or click on the artboard and then click again in the document window to generate a flare.

To draw a rectangle, select the Rectangle tool and then click and drag anywhere on the artboard. If you hold down SHIFT as you click and drag, you constrain the rectangle to a square. If you hold down OPTION (ALT) as you click and drag, the location from which you start to click and drag becomes the center point for the rectangle instead of a corner of the rectangle. Holding down SHIFT *plus* OPTION (ALT) as you draw creates a square with the initial point being the center of the square.

Holding down the tilde key (~) as you draw a rectangle generates multiple rectangles, as shown in Figure 5-2.
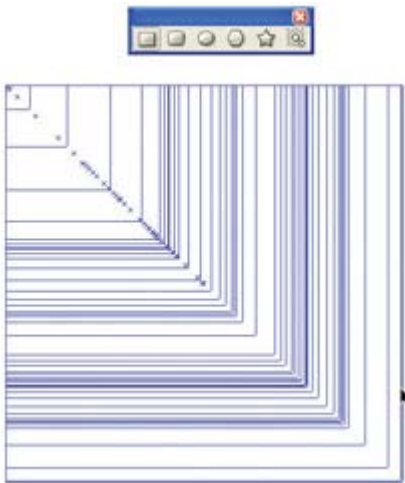

Figure 5-2: Drawing a square and generating many squares using shift and the tilde key

Size a Rectangle Precisely

The other way to define a rectangle is to select the Rectangle tool and click anywhere on the artboard without clicking and dragging. The point where you click becomes the upper-left corner of the rectangle. The Rectangle dialog box appears, as shown in Figure 5-3.
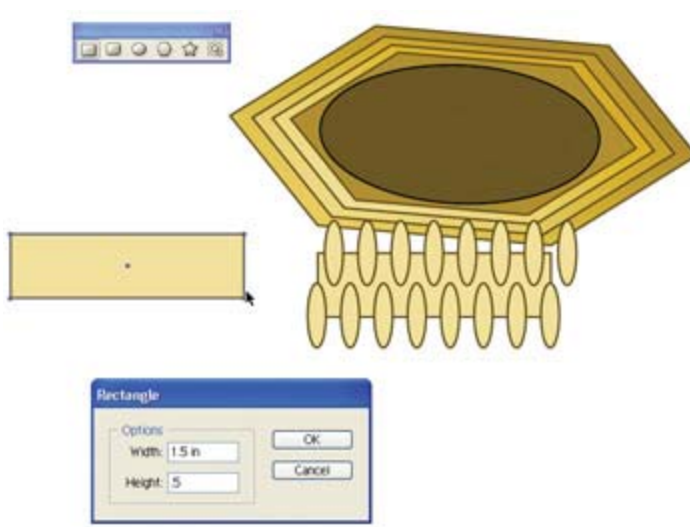
Figure 5-3: Defining a rectangle by entering width and height values

This technique of defining a shape size in a dialog box can be applied to all shapes (except, of course, the otherworldly Flare tool).

Draw a Rounded Rectangle

To draw a rounded rectangle, select the Rounded Rectangle tool from the Rectangle tool tearoff. As with the regular Rectangle tool, you can either click and drag to interactively define the rounded rectangle, or you can click once on the artboard to define the rounded rectangle in a dialog box.

The Rounded Rectangle dialog box differs from the regular Rectangle dialog box only in that you can also define the size of the corner radius. The size of the radius determines how much rounding to apply: larger values increase the rounding. Once you define a radius, it applies to each rounded rectangle you draw.

Note If you want to change the units that appear in the shape dialog boxes, select Illustrator (Edit) | Preferences | Units & Display Performance. In the Preferences dialog box, change the selected unit of measurement in the General drop-down list to pixels, points, inches, or one of the other measurement options.

Draw Ellipses and Circles

To draw an ellipse (oval), select the Ellipse tool and then click and drag anywhere on the artboard. If you hold down SHIFT as you click and drag, you constrain the ellipse to a perfect circle. If you hold down OPTION (ALT) as you click and drag, you define the circle from a center point.

As with other shapes, you can hold down the tilde key as you click and drag to generate multiple ellipses as you draw.

The other way to define an ellipse is to select the Ellipse tool and click anywhere on the artboard without clicking and dragging. The Ellipse dialog box appears, and you can enter an exact width and

height.

Draw Polygons and Stars

The Polygon and Star tools work like the other shape tools: you can interactively draw on the artboard, or you can click and define the polygon or star in a dialog box. Because polygons and stars can have anywhere from 3 to 1000 points or sides, you'll probably want to define the number of points and sides in a dialog box before you start drawing.

To define sides or points for a polygon or star, select the tool and click on the artboard. Use the dialog box to define the number of sides or points you want, and then click OK. If necessary, delete the just-created star or polygon by pressing DELETE or BACKSPACE. Then draw on the artboard. The stars or polygons will have the number of points or sides you just assigned in the dialog box.

When you draw a star or polygon, you can *rotate* the shape as you draw. First, draw the shape itself, at the size you want it to appear. Then, *without releasing your mouse button,* you can move your mouse clockwise or counterclockwise to tilt the shape, as shown in Figure 5-4.
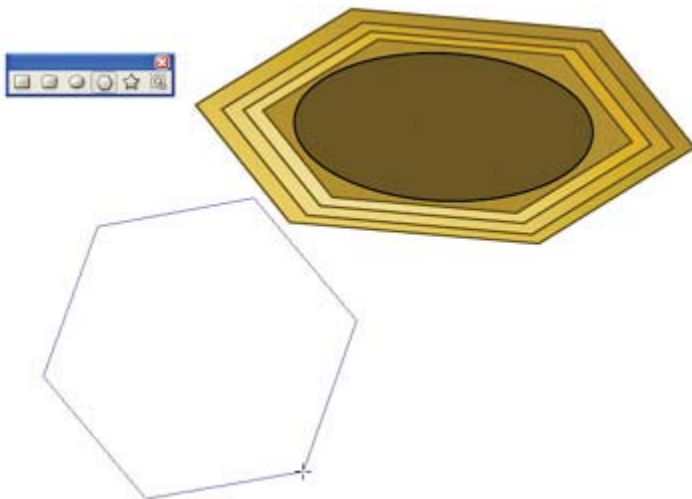

Figure 5-4: Rotating a polygon as you draw

Holding down the SHIFT key as you draw a star or polygon locks the alignment of the shape so that the base is parallel with the edge of the artboard. With the SHIFT key down, you cannot rotate stars or polygons as you draw.

Normally, one dimension of a star is the outer dimension, defining the points of the star, and the second dimension is the inner radius, defining the inside circumference of the internal star points. By adjusting the ratio between Radius 1 (the first dimension of the star) and Radius 2 (the second dimension of the star), you can control the type of star you draw. To create a very pointed star, such as the one in Figure 5-5, use a Radius 2 value that is much smaller than the Radius 1 value. The star in the figure has a Radius 2 value that is 1/5 the value of the Radius 1 value.
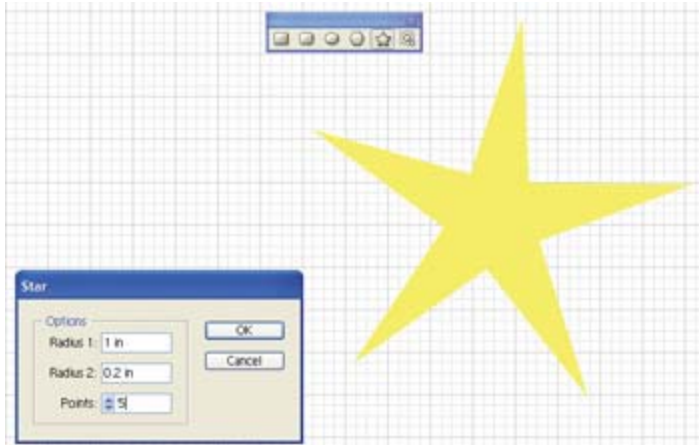
Figure 5-5: The Radius 2 value for this sharply pointed star is much smaller than the Radius 1 value.
Tip Alternatively, you could transpose the values in the above example—if the second dimension of the
star is five times the first dimension, you'll get a star with the same degree of pointiness. To generate
a shape instead of a star, set both dimensions to the same value. For instance, a "4-point" star with
both dimensions set at equal values will produce an octagon (an eight-sided shape).

Another useful technique is to create stars that look like they're twinkling by placing a smaller star on
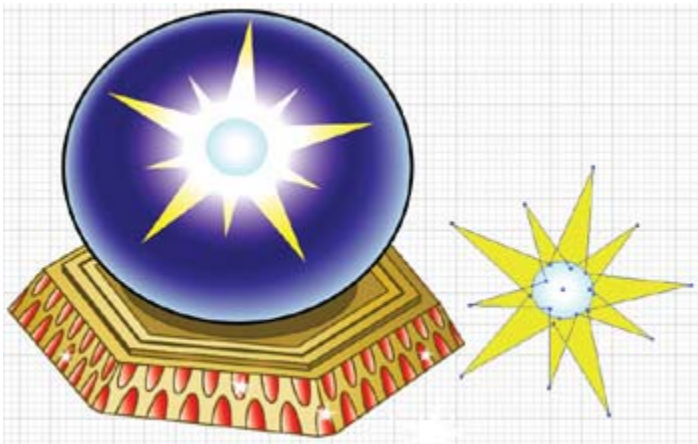top of a larger one. In Figure 5-6, two stars are combined to put a shine on the top of the ring jewel.

Figure 5-6: The glittering star is created by placing a smaller star (rotated) on top of a larger star. A
similar technique was used to provide gleam in the jewel setting. Other ring elements were created with
polygons and ellipses.

Space Out with the Flare Tool

The Flare tool might as well be from outer space—both because it doesn't really fit with the other tools
on the Rectangle tearoff, and because it generates effects that can be used in science-fiction-style
illustrations.

To draw a flare, start by selecting the Flare tool and then clicking and dragging to create the first part of
the flared object. During this *first* click and drag, you'll define the radius of the flare. To complete the
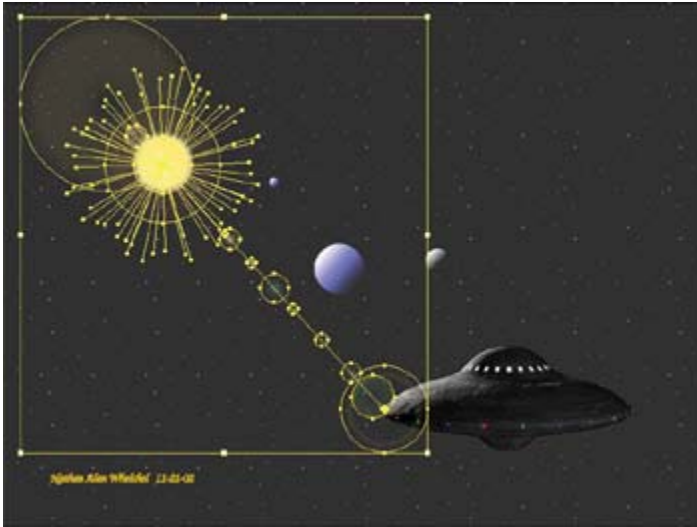flare object, click a second time on the artboard to create the second part of the flare, as shown in Figure

5-7.

Figure 5-7: Adding flare to space

Alternatively, you can click once and use the Flare Tool Options dialog box to define the details of your flared object.

Combine Objects with the Pathfinder Tools

The ten tools in the Pathfinder palette basically allow you to combine and divide two or more intersecting paths. These tools provide a quick way to apply some complex anchor point and path changes that would be tedious if you did them with tools such as the Pen tool or the Direct Selection tool.

When the tools in the Pathfinder palette combine two objects, the object on the bottom usually assumes the fill and stroke attributes of the object on top. So before you apply a Pathfinder effect, select Object | Arrange, and move objects in front of or behind other objects to define how fill and stroke attributes will be handled.

Note There are a couple of Pathfinder tools that are exceptions to this rule: the use of these tools will cause the top shape to assume the properties of the bottom shape instead. Those odd tools are the Subtract From Shape Area and the Crop tools.

You'll explore how to move objects in front of or behind each other in detail in Chapter 11, but here it will be helpful to have a quick preview of how to do that. To move an object in front of other objects, select the object and choose Object | Arrange from the menu. You'll have the option of moving a selected object in front of or behind other objects, or all the way to the front or all the way to the back of other objects on the artboard.

Figure 5-8 shows an example of a typical Pathfinder technique. One ellipse has been placed on top of another oval. The Trim tool on the Pathfinder palette will use the top ellipse to "trim away" a section of

the bottom ellipse. This new shape will then help create the perspective at the base of the ring.
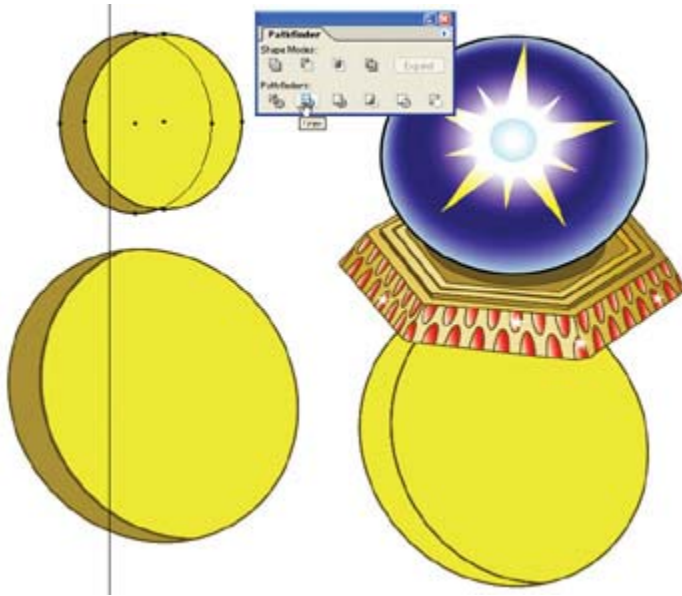

Figure 5-8: Using one shape to trim another with the Pathfinder palette
Caution Pathfinder tools work with vector objects, including gradient fills. However, they don't work with bitmaps.

Identify the Pathfinder Tools

To access the tools in the Pathfinder palette, choose Window | Pathfinder. Figure 5-9 identifies each of the tools and shows how they work.
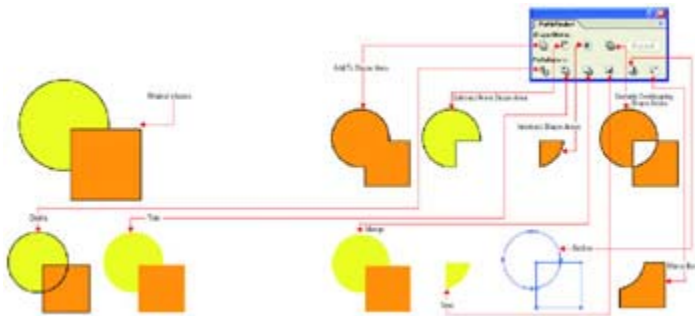

Figure 5-9: A quick tour of the Pathfinder tools

Change Pathfinder Options

To access the Pathfinder palette options, open the Pathfinder palette menu and choose Pathfinder Options.

The Pathfinder Options dialog box appears, as shown in Figure 5-10. The options define how intersecting objects will be combined. The Precision value determines how accurately intersecting objects will be combined or divided. The default setting works fine.
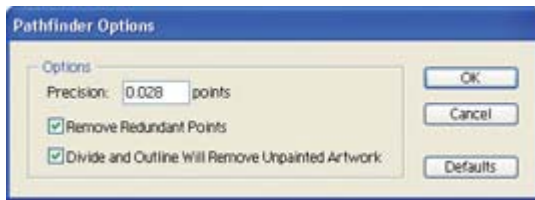
Figure 5-10: Choosing Pathfinder options

The Remove Redundant Points and the Divide and Outline Will Remove Unpainted Artwork check boxes are useful. Each of them removes elements of a combined (or divided) object that aren't functional, simplifying the resulting paths.

It's a good idea to activate the Remove Redundant Points and Divide and Outline Will Remove Unpainted Artwork options. Usually you'll want to invoke these helpful features to clean up the result of your crop, trim, and so on.

Caution Pathfinder palette options are retained during your Illustrator session, even if you close the palette and re-open it. However, if you quit the application and restart, the options are reset to the default values.

Use Shape Modes

The Pathfinder tools are divided into two rows: the Shape Modes and the Pathfinders. The Shape Mode tools generate *new* shapes from intersecting shapes.

The Add To Shape Area tool combines selected objects into a single shape. The Subtract From Shape Area tool deletes the top shape from the bottom shape. The Intersect Shape Areas tool removes everything but overlapping areas of selected shapes. The Exclude Overlapping Shape Areas deletes shared areas of two overlapping selected objects.

Note The Add To Shape Area Pathfinder tool was called the Unite button in Illustrator 9 and earlier versions.

After you apply a Shape Modes tool, the resulting path is a compound shape. Compound shapes are kind of like grouped shapes (explored in detail in Chapter 11), but Shape Mode tools more thoroughly combine the selected objects.

Tip To break a compound shape back up into its components, choose Release Compound Shape from the Pathfinder palette menu.

Expand Compound Shapes

To convert a compound shape created with a Shape Modes tool into a completely editable, single object, click the Expand button in the Pathfinder palette. Expanding a compound shape completely removes all remnants of the original shapes and results in a single, new shape.

Figure 5-11 shows the differences in paths once generated shapes have been expanded. Note the missing anchors and paths in the expanded objects.
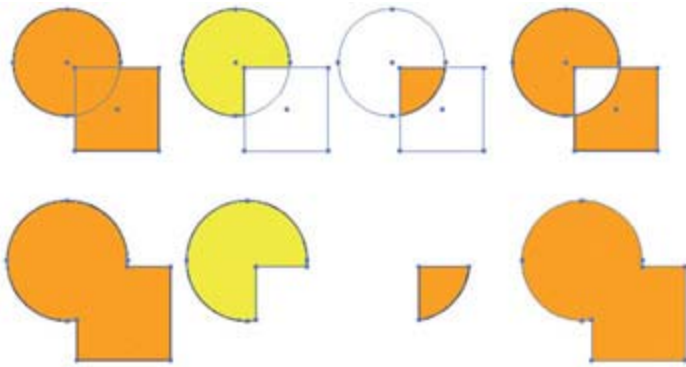
Figure 5-11: Generated vs. expanded shapes—note the missing and changed anchors in the expanded versions.

Clip, Crop, and Split with the Pathfinder Tools

The Pathfinders—the second row of tools in the Pathfinder palette—perform more complex transformations to overlapping objects than the Shape Modes tools do.

Note In early versions of Illustrator, these Pathfinders were referred to as divide tools, which give a little hint as to what they are used for.

One basic function of Pathfinders is to combine overlapping objects and then break them into a variety of new objects that can be ungrouped and moved, deleted, or edited individually.

The Divide tool splits selected objects into individual shapes created by intersecting paths. The Trim tool deletes the covered portion of the bottom shape. The Merge tool is similar to the Trim tool, but it merges contiguous shapes if both have the same color fill.

The Crop tool uses the top object like a cookie cutter to cut away parts of the bottom object that do not fit within it. The Outline tool converts fills to outlines; the color of the fill becomes the color of the outline stroke.

The Minus Back Pathfinder tool uses the bottom object as a cookie cutter to strip away intersecting areas from the front object.

After you apply one of the Pathfinders, the result is a grouped object. You can split that group and edit the newly generated shapes by choosing the group and selecting Object | Ungroup from the menu.

Sometimes the results of the Merge and Trim Pathfinder tools are the same. The only time the results are different is if there is a contiguous, divided area with the same color fill.

<div align="center">

How to . . .
Examine Hard and Soft Mixes

</div>

Hard and Soft mix options are one way, but not the best way, to combine colors in overlapping shapes. Nowadays, Illustrator users take advantage of transparency to mix the colors of overlapping objects. You'll get your hands around transparency features in Chapter 17.

You can access these effects, and the rest of the Pathfinder tools, from the menu by choosing Effect |

Pathfinder and then selecting a Pathfinder effect.

Note Older versions of Illustrator (version 9 and older) displayed Hard and Soft mix options in the Pathfinder palette. In Illustrator CS, Hard and Soft mixes live on the Pathfinder menu.

Since the arrival of transparency back in Illustrator 9, you now have a more reliable way to combine colors in overlapping objects. Transparency produces color mixes that stand up better when sent to hardcopy or web output. Hard and Soft mixes remain on the Effect | Pathfinder menu, but they are no longer an important part of the Illustrator arsenal. That said, if you want to try them, group objects before applying a Hard or Soft mix. Hard mixes add the values of overlapping colors—as if you were overprinting hardcopy colors. Soft mixes are similar to transparency.

Cut with Knife and Scissors

The choice of tools for chopping up objects in Illustrator seems to be endless. The Pathfinder tools you just explored earlier in this chapter are some of the more powerful and useful. In Chapter 6, when you explore the Pen tool, you'll learn to select and edit individual anchors. That method provides very fine control over reshaping objects, but it is also the most tedious way to alter a shape.

Somewhere in between these techniques lie the Scissors and Knife tools. Because these tools are more tedious than the Pathfinders, and less powerful than the Pen tools, experienced designers don't use them much. But they're worth a quick look.

Drag the knife tool across any object or objects to cut them into separate sections, as shown in Figure 5-12.
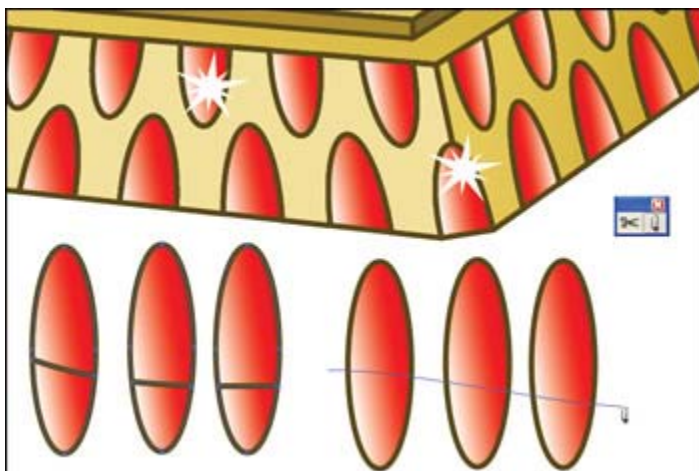

Figure 5-12: Cutting shapes with the Knife tool
Caution Objects have to be selected before you can slide through them with the Knife tool.

The Scissors tool is similar to the Knife tool in that it can dissect objects. However, with the Scissors tool, you click on a path to instantly sever that path. You can click at two points on a path to break an

object into two parts. Or just click once—converting a *closed* object (one with identical starting and ending points) into an *open* object (one with different starting and ending points).

Team LiB

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