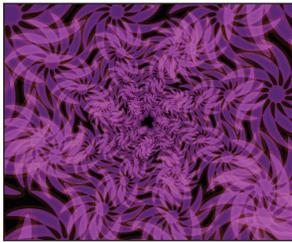
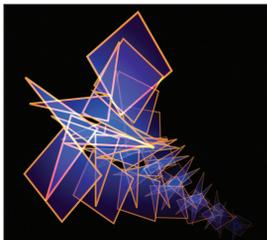
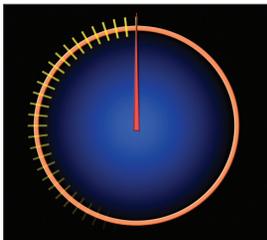


# Shape Layers

***These new vector-based layers open a multitude of graphic possibilities.***



Shape layers can create anything from simple lower thirds to full-blown cartoons. They are particularly strong at creating graphical elements and abstract backgrounds akin to the Shape Presets shown here.



## Example Project

Explore the 32-Example Project.aep file as you read this chapter; references to [Ex.##] refer to specific compositions within the project file.

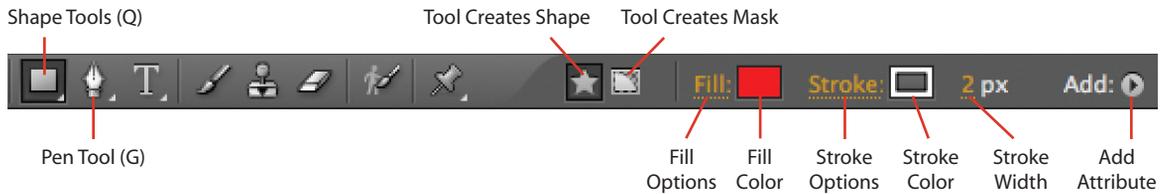
Shape layers are one of the most versatile graphic creation tools inside After Effects. Shapes may be created using simple primitives, the Pen tool, or copied from masks as well as other programs. They can be cleanly scaled to any size, as well as filled and stroked with solid, semi-transparent, or gradient colors. A single layer can contain multiple individual shapes which can be grouped, merged, and intersected in a number of ways. They can be modified using a large selection of shape effects, including the Repeater which quickly creates grids and constellations of shapes. And of course, shapes – including most of their parameters – may be animated; some shape effects auto-animate as well.

Explaining all that can be done with shapes is akin to describing what you can do with a pencil. In this chapter we aspire to acquaint you with the basics of creating, combining, and modifying shapes. Our focus will be on creating graphical elements; those who are familiar with Adobe Illustrator or have a cel animation background will quickly see that the possibilities go far beyond what we can cover in these few pages.

## Mask or Shape?

The same tools can be used to create shape layers as well as mask out portions of any layer. So how does After Effects know which it is you want to do? By following these rules:

- If no layer is selected, After Effects assumes you want to create a shape.
- If a non-shape layer is selected, After Effects assumes you want to create a mask.
- If a shape layer is selected, the Tool Creates switches determine whether the Shape and Pen tools will create a mask or a new shape path.



## Shape Tool Overview

Before we start creating shapes, first let's quickly review what the various Shape tools and options do. Open **32-Example Project.aep** followed by the comp [Ex.01\_starter] and make the following adjustments and explorations:

**Shape tools:** The former Rectangle and Ellipse mask tools were replaced in After Effects CS3 with a longer menu of core “parametric” shapes. You can edit and animate several aspects of these shapes. Choose the Star tool for now, as it has the most parameters to play with.

**Pen tool:** The same tool you used to draw mask, motion, and graph editor paths can also be used to draw shapes. We'll use it later; leave it unselected for now.

**Fill Options:** Here you decide if the fill is enabled or disabled and whether the fill is a solid color or a gradient. You can also set the blending mode and opacity for the fill. Click on the word Fill and choose a type of Solid Color, Normal mode, and 100% Opacity. To cycle through the Fill or Stroke type options without having to open their respective dialogs, press Option on Mac (Alt on Windows) and click on the Fill or Stroke color in the Tools panel.

**Shape Fill Color:** Click on this swatch to open a standard color picker; choose any color you like for now. If you set the fill type to gradient, a gradient editor will appear instead.

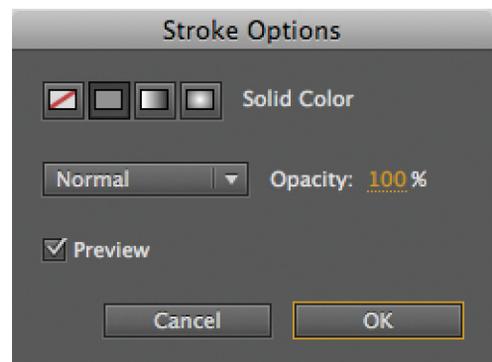
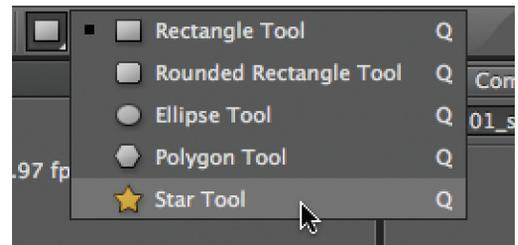
**Stroke Options:** You have the same options for strokes as you do for fills. We will discuss Stroke and Fill operators in much greater detail later in this chapter; for now select a Solid Color type, Normal mode, and 100% Opacity.

**Shape Stroke Color:** Click on this swatch to open a color picker, just as for Shape Fill Color. Change it to white for now.

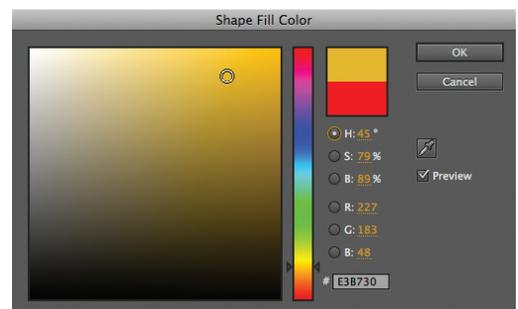
**Stroke Width:** You have great control over the appearance of strokes. For now, set the width to 2.0 pixels.

**Add:** This menu allows you to add attributes to a shape layer; it is grayed out if a shape layer is not currently selected. An identical menu appears for a shape layer's Contents in the Timeline panel.

When you select the Shape or Pen tool, additional options for Fill and Stroke appear to their right in the Tools panel (above). Click on the Shape tools icon to reveal the basic parametric shapes (below).

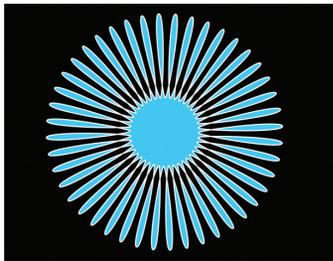


Both Fill and Stroke allow you to choose between solid colors and gradients (above). You can also use blending modes to mix together colors and shapes. Solid colors use the standard Adobe color picker (below); gradients employ an expanded dialog we'll discuss later.

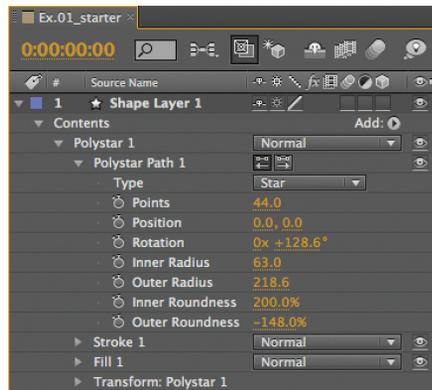




With any Shape tool selected (and no other layer currently selected), click and drag in the Comp panel to create a parametric shape.



Simple stars can quickly evolve into more complex shapes (above) by manipulating Polystar Path 1's parameters (right).

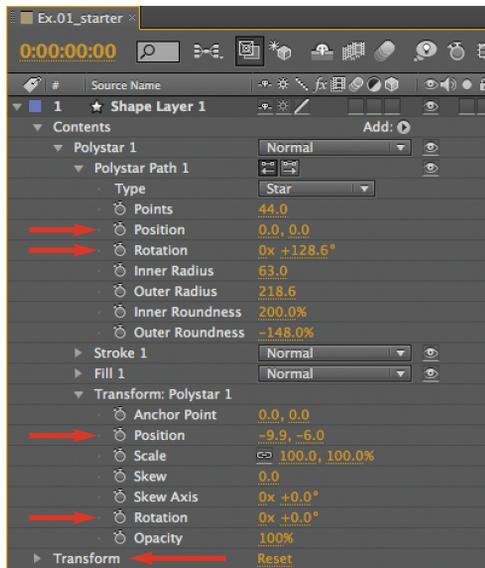


## Creating Parametric Shapes

Assuming you've opened [Ex.01\_starter] and selected the Star tool, click in the middle of the Comp panel and drag: A star shape will be drawn from the center out as you drag (see figure to the left). Release the mouse and turn your attention to the Timeline panel: **Shape Layer 1** will appear, twirled open to reveal the shape group Contents > Polystar 1. Contents is a master group that contains however many shape groups you may have added to a layer.

Twirl open Polystar 1 so we can study the hierarchy of a shape layer. (By the way, it's called a "polystar" because this same shape path operator can be used to create polygons or stars.) A basic shape group typically consists of a shape path, Stroke and Fill operators, and a set of Transform properties.

Now twirl open Polystar Path 1: A lot of flexibility is contained inside this deceptively simple shape. For example, scrub the Inner and Outer Roundness values to create some interesting pinched or looping shapes; you can create sunbursts by increasing the number of Points. Add Inner and Outer Radius to the mix to create shapes that resemble flowers with rayed petals.



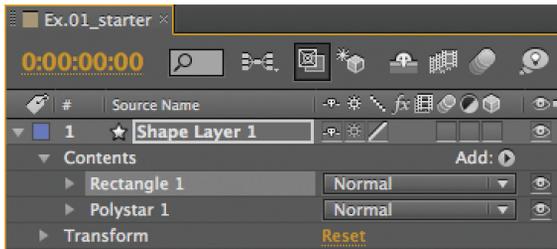
## Transformations

Each shape group has its own set of transform properties. It is important to understand the difference between the transform properties for a shape path, a shape group, and a shape layer:

- Parametric shapes have simple transform properties of their own. To reveal the transforms for this shape path, twirl open Polystar Path 1. The polystar path's initial Rotation reflects where your mouse was released when you dragged out the shape. Its local position defaults to 0,0. Note that it has no Scale property – just its parametric dimensions (Inner and Outer Radius). Editing a parametric shape's parameters will not change the thickness of its Stroke. Shape paths also do not have their own Opacity.

Parametric shape paths have their own Position and (optionally) Rotation parameters, which are separate from the shape group's Transform parameters below. The entire shape layer also has its own set of transforms (the last line for the layer in the Timeline panel).

- To reveal the transform properties for your initial shape group, twirl open Transform: Polystar 1. The group's initial Position equals the center of the shape path you created in relation to the center of the comp. To center your shape, set the group's transform (Transform: Polystar 1) to 0,0. Note that in addition to the normal transform properties such as Scale and Opacity, you also have Skew. If you add multiple shape paths to a group (we'll get to that shortly), the group's transform affects all of these paths as if they were a single complex shape.
- The shape layer's main Transform section (which exists outside of the shape layer's Contents) is just like the transform properties you're used to for any other layer.



When you drag out a new shape path for a layer, a new shape group is created for it (above). Each group has its own visibility switch, Transform properties, and Fill plus Stroke.

## Multiple Shapes

Twirl up Polystar 1 to simplify the Timeline panel.

With **Shape Layer 1** still selected, choose a different Shape tool such as the Rounded Rectangle (Q is the shortcut to cycle between these tools). Click and drag in the Comp panel to add your second shape to this layer. In the Timeline panel, note that a second shape group called Rectangle 1 has been added: *Whenever you add a new shape path by dragging or drawing in the Comp panel, a new shape group will be created – even if an existing shape group was already selected.*

Each shape group has its own visibility switch (the eyeball icon). (Other attributes inside the group – such as the Path, Stroke, and Fill – have their own switches as well.) You can also reorder which shapes draw on top of which by dragging one above the other in the Timeline panel.

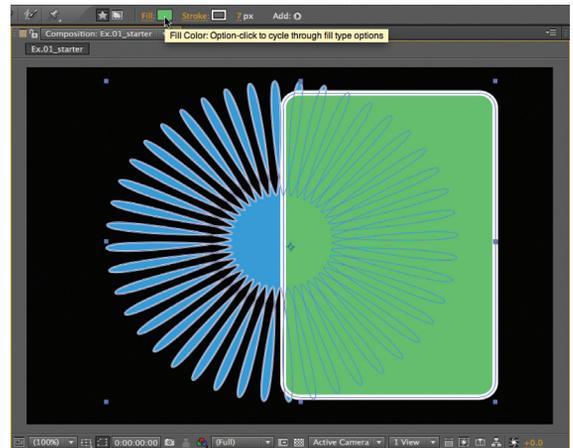
Twirl open Rectangle 1, and you will see that it has its own Path, Stroke, Fill, and Transform. Twirl open Rectangle Path 1: Note that as with your star, it defaults to a local Position of 0,0. It has no Rotation parameter of its own; to rotate it, use Transform: Rectangle 1 > Rotation.

With both shape paths visible in the Comp panel, select one of them by selecting its group in the Timeline panel. (You can also press V to return to the Selection tool and double-click its shape in the Comp panel.) Then change its Fill or Stroke Color: Note the other one keeps its original color. This is but a taste of the power behind individually grouping shape paths; we will discuss managing multiple shapes later.

**TIP**

## Centering Shapes

To center an existing shape in the comp, set the group's transform (Transform: Polystar 1 for example) to Position 0,0.



**TIP**

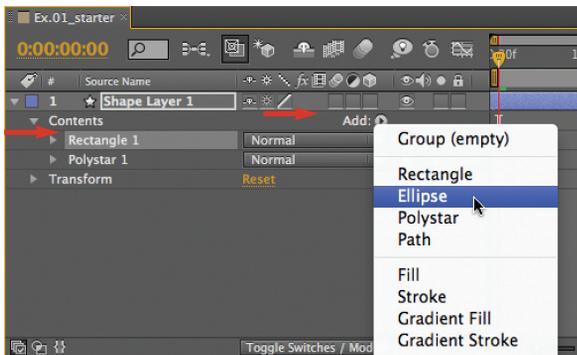
## Shape Presets

Select Browse Presets from the Effects & Presets Options menu; when Bridge opens, look inside the Shapes folder. Download hundreds more presets for free from [share.studio.adobe.com](http://share.studio.adobe.com).

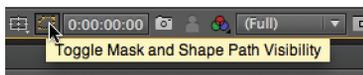
**TIP**

## Expressive Shapes

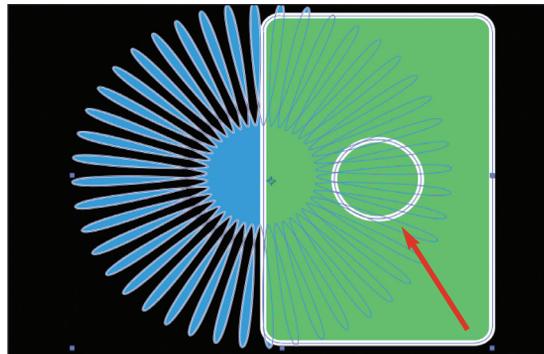
The expression pick whip (Chapter 37) may be used to link together mask paths, paint strokes, and shapes that were created with the Pen tool. Parametric shape paths cannot be pasted or expressed to other path types.



To add a path to an existing group, select the target group and use the Add menu (above). It will be added to the center of the existing shape group (above right).



If you find yourself distracted by the thin line outlining your shape, disable the Toggle Mask and Shape Path Visibility button along the bottom left of the Comp panel (above).



What if you want to have multiple paths take on the same color and transformations? First select the group (such as Rectangle 1), then click on the arrow next to Add in either the Timeline or Tools panels, selecting a new parametric shape such as Ellipse. A circle will be added to the center (as defined by the group's Transform > Position) of the selected shape group. It will have the same fill and stroke color as the original path in this group, although it may be smaller and therefore enclosed by the original shape (see figure above).

Note that if you select the word Content or the overall layer instead of an existing shape group, you will create a new shape group (not add a path to an existing group) when you click the Add arrow.

Have fun creating multiple shape paths, groups, and layers; feel free to delete or turn off the visibility of previously created shapes. Be sure to twirl open the parameters for the different parametric shape path types such as Rectangle and Ellipse and play with these values as well.

## Shaping as You Drag

While dragging out a parametric shape in the Comp panel, you can press the following keys *before releasing the mouse* to alter some of the shape paths:

Shape type	up/down cursor keys	left/right cursor keys	page up/down
<b>rounded rectangle</b>	corner roundness	toggle rectangle/ellipse	
<b>polygon</b>	number of sides	outer roundness	
<b>star</b>	number of points	outer roundness	inner roundness

You can also change the outer radius of the Star by pressing Command on Mac (Control on Windows) when dragging to create a shape.

If you have a mouse with a scroll wheel, it will have the same action as the up and down cursor keys. You can also reposition any parametric shape before releasing the mouse by holding the spacebar and dragging. These helpers can be used while drawing mask paths as well.

## Pen Path Shapes

The weaknesses of the parametric shape paths you've been playing with so far is that there is a limited number of them, and they're always symmetrical. If you want to create freeform shapes and paths, you're better off using the Pen tool. Fortunately, virtually everything you've learned in other chapters about using the Pen tool to create masks and motion paths can be applied to shape layers as well.

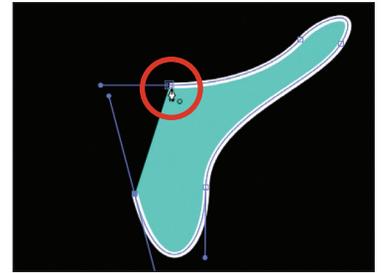
Open [Ex.02\_starter] and select the Pen tool. Set the Stroke and Fill Options and Colors as you like; uncheck the RotoBezier option for your initial experiments. Click and drag in the Comp panel to pull out a Bezier handle for your first point. As you click and drag your second point, the line between these vertices will be stroked, and the area "enclosed" by this still-open path will be filled with your chosen color. When you want to close off the path, hover the pen cursor over your first point; a circle will appear next to the base of the cursor. Click (and optionally drag, to control the Bezier handles) on this last point to seal the deal.

Twirl open **Shape Layer 1**, then Contents, then Shape 1 to reveal the contents of this group. Path 1 is the Bezier path you just drew, followed by the same Stroke, Fill, and group Transform attributes you're now familiar with from parametric shapes. If you twirl open Transform: Shape 1, you will note that its default Position is 0,0; the position of a pen-based shape path relative to its group and layer are determined by the location of its vertices in the Comp panel. Indeed, twirl open Path 1 and you will see no parameters other than an animation stopwatch for Path.

## Editing Pen Shapes

To edit your shape, press V to switch to the Selection tool and make sure the Toggle Mask and Shape Path Visibility button is enabled along the bottom left of the Comp panel. If Path 1 (but not Path) is selected in the Timeline panel, you should see vertex squares along the path. Click on one to select it (the hollow square turns solid when selected); this also reveals the Bezier handles for that vertex as well as the adjacent vertices. Editing individual points is simple:

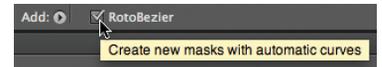
- To move a vertex, drag it or use the cursor keys.
- To alter the path between vertices, drag the Bezier handles or click on the line segment and drag to reshape.
- To toggle between a "corner" point (no handles) and a Bezier point, hold Command+Option (Control+Alt) to get the Convert Vertex tool and click on a vertex.
- To break the Bezier handles and move them independently, hold Command+Option (Control+Alt) and drag a handle.
- To delete a vertex, press and hold down G (to temporarily switch to the Pen tool) and click on the vertex.
- To add a vertex, hold down G and click on the path between vertices.



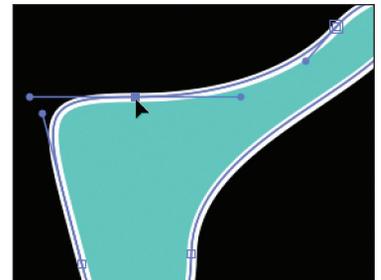
Click and drag to create vertices and extend the Bezier handles for these corners. To close a shape, click on the first point you drew – a special cursor with an "O" at its base will confirm you're about to close a path.

### TIP

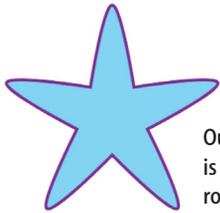
## RotoBezier Paths



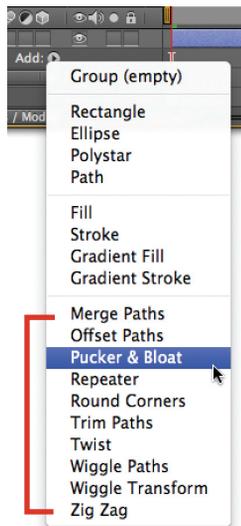
When the Pen tool is selected, the RotoBezier option appears to the right along the Tools panel. RotoBezier paths do not have Bezier handles – instead, After Effects automatically calculates a smooth path between vertices. Drawing RotoBezier paths was discussed in Chapter 10.



Click on an individual vertex to edit it. To enter this mode, either click on Path 1 in the Timeline panel (clicking on Path selects all points) or double-click the shape to select the group, then select an individual point.



Our initial shape is this slightly rounded starfish.



You can create more complex shapes by adding shape effect attributes.

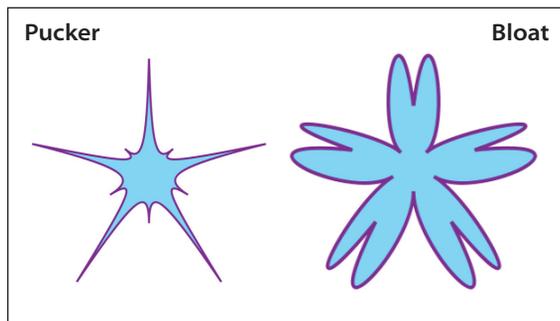
## Shape Effects

Next we'd like to introduce you to the set of shape layer attributes known as *path operators*; we personally refer to them as *shape effects*. These attributes alter parametric or pen-based shape paths to create new shapes. They can be keyframed to create anything from mechanical to organic animations. If you include several shape paths or groups inside of another group, and then apply a shape effect after these paths or subgroups, all of the shape paths will be effected as a group.

To experiment with these, open [Ex.12\_starter] and twirl open **Shape Layer 1** to reveal the shape group Polystar 1 which we've initially set up to resemble a starfish. As you move through these examples, select Polystar 1, open the Add menu, and select the suggested shape effect from the list. Twirl this shape effect open in the Timeline and explore its parameters. Then toggle its visibility switch (the eyeball icon) off before moving on to the next effect.

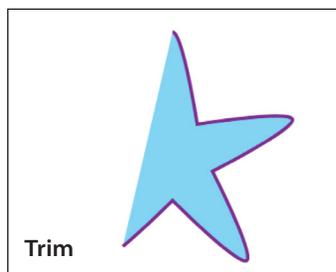
**Merge Paths:** This was discussed in detail in the Merge Paths section earlier in this chapter.

**Offset Paths:** This expands or contracts shape paths. Note that it does not work exactly the same as scaling a path: As you reduce Offset Paths > Amount for our rounded starfish, the shape will contract into a pointy star. Results can be unpredictable when combined with more complex shapes that have substantial rounding.



**Pucker & Bloat:** This effect is a great way to quickly make a simple shape become complex. It takes the line segments between the vertices of a shape path and either curves them inward (pucker) or bends them outward (bloat). At extreme positive or negative values, the shape path will cross over itself.

**Repeater:** The richest of the shape effects, Repeater takes the underlying shape and repeats it as many times as desired with each repeat offset by a series of transformations. The last few pages of this chapter are devoted to it; skip it for now.



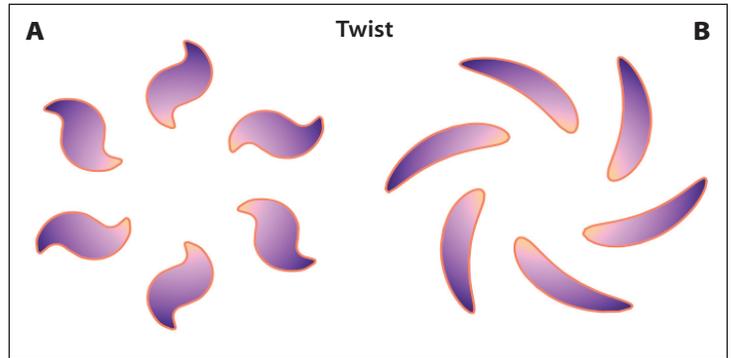
**Round Corners:** This effect adds rounding to the corners of a path. Use it after some of the more angular shape effects to soften up the results.

**Trim Paths:** Use this effect to wipe shapes on and off. When applied to an open path shape, or if Fill is set to None, this effect can also be used to draw a stroke on and off (as we did in [Ex.07-final]). Use Offset to "chase" a stroke around its path. Note the Trim Multiple Shapes popup: If Trim Paths follows multiple shapes inside a group, this determines if all shapes are wiped and stroked together or in succession. To reverse the direction of a path, click on the Reverse Path Direction buttons that appear on the top line of a path in the Timeline panel.



When the shape group contains multiple paths, each path gets twisted individually (A). To twist the group as a whole, add Merge Paths before Twist (B). (These are in [Ex.13]).

**Twist:** Twirls each shape above it in the group around that shape's anchor point, which defaults to its center. The amount of rotation is more severe in the middle than at the outer reaches.

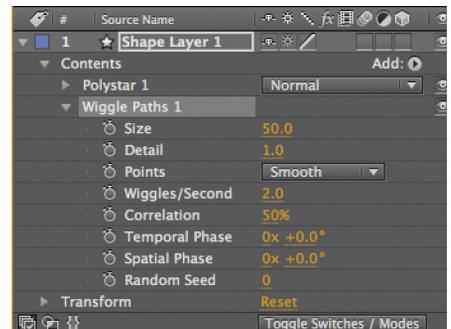
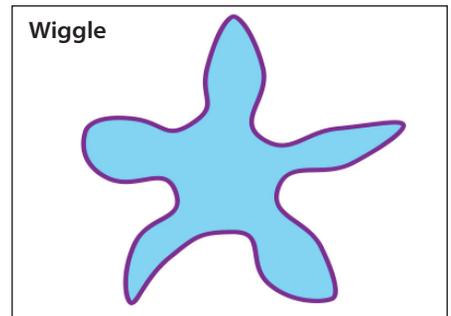
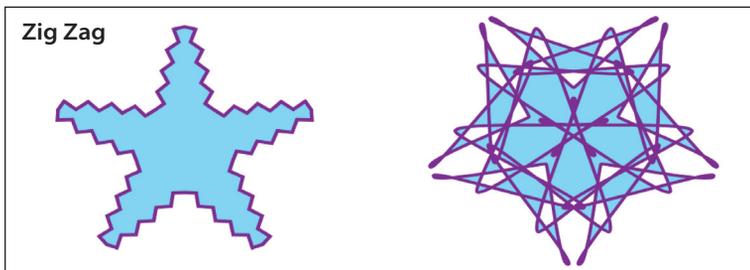


**Wiggle Paths:** This shape effect is related to the Wiggly Selector in text layers, and is the only shape effect that auto-animates (RAM Preview after you apply it; we also used it subtly in [Ex.12-final]). It is more complex than most of the shape effects:

- Size determines how far the path is bent; Detail sets how big or small the undulations are (higher values equal more closely spaced ripples). The Points popup decides if the deflections are smooth or if they add sharp corners to the shape.
- Wiggles/Second sets the animation speed; Correlation decides if all the sides do their own thing (low values) or if they inflate and deflate together (high values).
- Temporal Phase and Spatial Phase affect the pattern of the random waves that pass through the wiggled shapes. You can set Wiggles/Second to 0 to stop the auto-animation, then use these Phase controls to strike poses or otherwise manually animate the wiggles. Random Seed makes quick wholesale changes to the pattern of the wiggles; the seed is also affected by layer order.

To auto-animate other shape parameters and operators, you can use the Wiggle Transform effect (discussed later in this chapter), or the wiggle expression (Chapter 37).

**Zig Zag:** Adds jagged or rounded ripples to the shape path. As with Pucker & Bloat, you can crank Zig Zag's Size parameter to extremes to create complex overlapping shapes.



### TIP

#### First Vertex

When you create a new shape, the top-most vertex (denoted by a larger square) is the first vertex where strokes plus effects such as Trim Paths originate. To change the first vertex for a path created with the Pen tool, right-click on the desired vertex and choose Mask and Shape Path > Set First Vertex.