

# CHAPTER 10: PATHS AND THE PEN TOOLS

## OVERVIEW

Chapters Ten and Eleven concentrate on the vector area of Photoshop. Vector tools allow for more precision in creating lines, shapes and precise, complex vector-based selections. As Photoshop is primarily a raster application, we have spent most of this course selecting and changing pixels. But Photoshop also has powerful vector tools that allow you to create objects that are mathematical descriptions of lines and curves. These vector elements print with crisper lines and curves than bitmapped graphics—and they do not increase your file size like stacks of pixel layers do; each path adds only 1-2 KB to a document.

Drawing with the Pen tool is very different than drawing in traditional ways; it's a whole new language to learn. The rewards of learning how to master drawing with the pen are many. In these notes you will see examples of effective Pen tool usage. Because even "advanced" Photoshop users have trouble with the Pen tool, we will start at the beginning for this topic.

## ACE PREPARATION TOPICS

### WORKING WITH VECTOR TOOLS

- Create shape layers and paths by using the Pen and Shape tools.
- Explain the advantages of using vector drawing tools versus using raster drawing tools.
- Given a scenario, alter the properties of type.
- Create and edit paths by using the Paths palette.

## BITMAPS & VECTORS TOGETHER

BITMAPS are collections of pixels (square dots) laid out in a big grid called a RASTER. They permit the representation of fine detail and subtle gradations of color and tone found in photorealistic images. Bitmaps lose quality when resized, particularly when enlarged. High-resolution bitmap images require large files to store the tone and color of each pixel.

VECTORS are mathematical directions for drawing lines, curves, and shapes. Each line, curve, or shape is an object, so vector graphics are also called object-oriented graphics. Vector graphics are resolution-independent; they can be scaled larger or smaller without sacrificing image quality or enlarging file size. They typically rely on the PostScript language to do their shape magic, and to print.

An individual Photoshop document can have both bitmap and vector components. In a layered PSD document, these elements are independent. Bitmap components include the Background, standard layers, layer masks, adjustment layers, and color and alpha channels. Vector components include fill layers, clipping paths, work and saved paths, vector masks, and type layers.

RASTERIZATION is the conversion of vector objects into bitmaps. Within Photoshop, when bitmap and vector layers are merged or an image is flattened, rasterization occurs at the Image Size resolution.

- Only Photoshop native or PSD, Photoshop PDF, and Advanced TIFF files with layers will preserve their vector

elements without rasterization when opened in Photoshop.

- When vector graphics are opened in Photoshop, you choose the image resolution for rasterization. Once the image opens, it is no longer scalable.

## FILE FORMAT ISSUES

These file formats can preserve vector elements when imported or placed into other applications.

- Photoshop native or PSD, Photoshop PDF, and Advanced TIFF files permits maximum scalability and editability of vector elements. These formats are good for placing into InDesign, but not QuarkXPress.
- EPS and its subsets DCS and DCS2 preserve the scalability of vector elements when imported or placed into page layout programs.
- Generic PDF preserves the scalability of vector elements if vector data is saved. Avoid layered Photoshop PDF for placing into page layout programs—these huge files take too long to print.
- Standard TIFF and JPEG files preserve clipping paths, but no other vector elements.

These file formats convert the file into a flattened bitmap when saving: GIF, JPG, BMP, PNG.

## TYPES OF PATHS

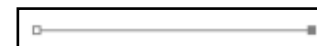
PATHS are non-printing, on-screen vector representations of lines or shapes. You can use paths to:

- Create precise, intricate selections.
- Draw smooth, anti-aliased shapes and lines.

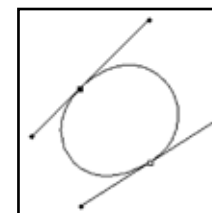
- Create shapes and shape layers.
- Make vector masks and clipping paths.

Mathematically defined, paths consist of straight line and/or Bezier curved SEGMENTS. Each segment has a control point called an ANCHOR POINT at either end.

OPEN PATHS are not joined at the beginning and end. The simplest path is an open straight path segment.

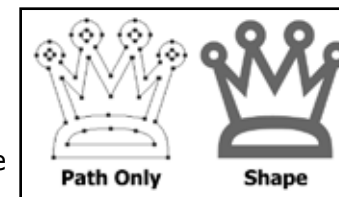


CLOSED PATHS are made when the last anchor point is in the same location as the beginning. This closed line path has two curved segments and two anchor points.



COMPLEX PATHS consist of a series of smaller paths called SUBPATHS.

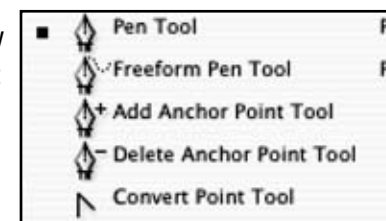
This crown-shaped path is one of the custom shapes that ships with Photoshop. The white areas inside the shape have sub-paths to define them. Notice the closed subpaths in the Path example.



## CREATING PATHS

The Pen tools are used to draw paths from scratch, and to edit them.

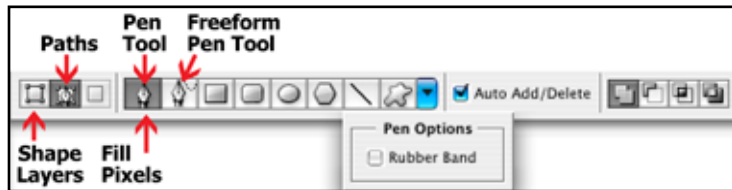
In the Toolbox, either the Pen tool or the Freeform Pen tool can draw a path.



The Add Anchor Point, Delete Anchor Point and the Convert Point Tool can be used to edit paths, so these tools are also hidden

under the Pen tool.

The Pen tools have so many options that you can become very confused if you do not pay close attention to these settings.



Before starting a path, the first thing you should do is choose which type of path you will draw. The Pen tools let you draw three kinds of paths, determined by which of the three buttons are clicked on the left side of the options bar.

- **Shape Layer:** makes a new shape layer, or edits an existing one. A new layer will be created, your path will be filled with color with a vector mask defining the shape. Bypass this setting for now.
- **Path:** makes a new work path, or adds a subpath to an active path. This setting is the one we will use first.
- **Fill pixels:** uses a temporary path to paint on a pixel layer with the path outline, and then deletes the path. Using this setting is akin to creating a selection and filling the selection with color pixels.

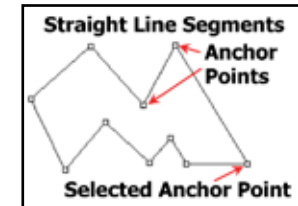
The next 2 buttons in the options bar let you choose the Pen tool or the Freeform tool. The following 6 buttons allow you to choose one of the Shape tools, which we will discuss in the next chapter. The downward arrow at the end of this set of icons displays the chosen tool's **Geometry Options**. In the example above, the Pen tool is chosen which gives you Pen Options. The Pen tool's Rubber Band option provides a preview of how the curve will flow as you move your cursor. When this option is chosen, the Pen tool indicates the line or curve the next segment will take, and helps beginners visualize which direction to pull direction lines.

The **Auto Add/Delete** check box is on by default. This allows you to add anchor points with the Pen tool when putting the cursor over a path segment and delete anchor points when placing the cursor over an anchor point. This option avoids using the Add Anchor Point and Delete Anchor Point tools.

The last set of icons in the options bar set whether you will add to a path, subtract from a path and intersect or overlap path areas. These settings should be familiar to you from working with the selection tools.

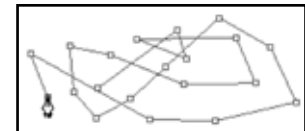
## DRAWING STRAIGHT LINE SEGMENTS

Drawing straight line paths or path segments is as easy as clicking with the mouse. Each time you click, a new anchor point is created and you add a segment to the path.



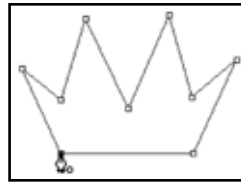
## TO DRAW A STRAIGHT OPEN PATH

1. Choose the Pen tool.
2. Click in the image window to set the first anchor point. Note the x in the pointer that indicates the start of a new path.
3. Click again to set each subsequent point. The Shift key constrains to 45 degree angles.
4. Since each path segment is recorded as a History state, you can use Ctrl/Command-Z or the History palette to undo anchor points.
5. To end the path, click the Pen tool in the toolbox or Ctrl/Command click in the document window.
6. Note: if you don't end an open path, you could add unwanted sections to the path, and get caught in a "web."



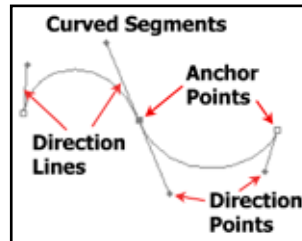
## TO CLOSE A PATH

Click the anchor point that started the path. Photoshop will show an "o" in the pointer when you are within closing range.



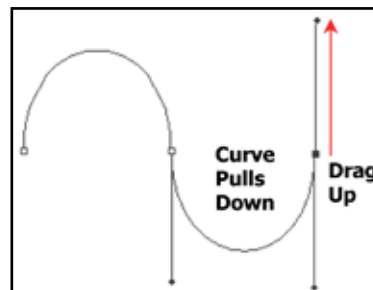
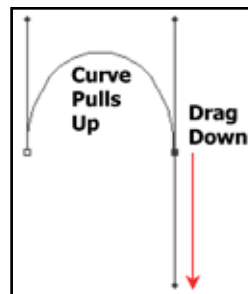
## DRAWING CURVES

When you click and drag with the pen tool, you make a curved segment. DIRECTION POINTS and DIRECTION LINES will be created that control which way the curve flows. As you click and drag you will get a direction line that pulls out in both directions from the anchor point. The arc of the curve will pull out to the opposite side of the direction you drag.



## TO DRAW A CURVED PATH SEGMENT

1. Select the Pen tool.
2. Press the mouse, and drag upwards, the opposite direction you want the curve to appear. Release the mouse button. This creates the first anchor point (square dot), and its associated direction lines and points.
3. Move the mouse to where you want the next anchor point, click and drag downward. As you drag, the curve appears moving upwards. Release the mouse button when you have a curve you like (you can edit it later).
4. Move the cursor to the right, press the mouse and drag upwards. The curve will pull downward.

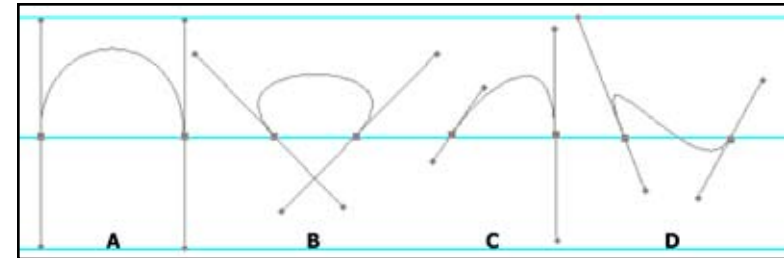


If you hold down the shift key when

you draw a curve, your direction lines will be constrained to a perfect vertical, horizontal or 45 degree line.

## DIRECTION LINES

This diagram may help you understand the relationship between a curved path segment and its directional lines. All the anchor points have been selected to show all the directional lines at once.



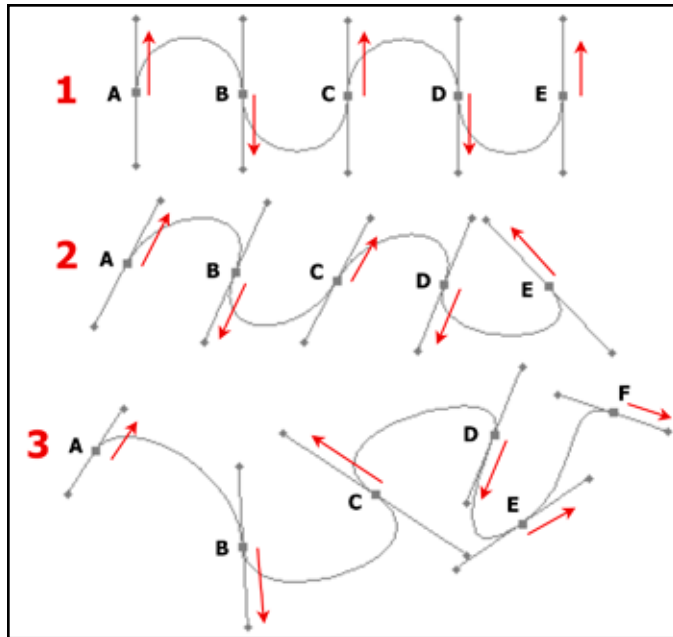
Notice that the length of the direction lines affects how large the arc of the curve is. Example A has the longest direction lines and the largest curve. Curves with direction lines of the same length and pointed in similar or exact opposite ways will have symmetrical curves such as example A and B. Example C shows a curve with differing lengths of direction lines. Because the left direction line is pointed to the right, the left side of the curve arcs that way. In example D, the right direction line was initially pulled downward and then rotated upward, skewing the curve.


## GUIDED EXERCISE 10.1: DRAWING CURVES

In this guided exercise, you will trace over a template file with three open paths of various different curves to gain practice at drawing curves and using direction lines to control the shape and direction of the curves.

1. Open **curves\_practice.psd**. It is inside the Ch10 folder

inside the student\_files\_3 folder.



2. Choose the pen tool and make sure you are set to draw a path by clicking on the second of the three icons on the left side of the Options bar. 
3. For **Figure 1**, all of the direction lines need to be perfect verticals, use the Shift key for drawing each curve.
  - a. Hold down the Shift key and click on point A of Figure 1 and drag up to match the direction lines of the diagram.
  - b. Hold down the Shift key and click on point B and drag down to match the direction lines of the diagram.
  - c. Hold down the Shift key and click on point C and drag up to match the direction lines of the diagram.
  - d. Hold down the Shift key and click on point D and drag down to match the direction lines of the diagram.

- e. Hold down the Shift key and click on point E and drag up to match the direction lines of the diagram.
  - f. End the open path by clicking on the pen tool in the tool bar.
4. Move on to **Figure 2**, click and drag to make anchor points and direction lines that follow the direction of the arrows as you did for Figure 1. End the open path by clicking on the pen tool in the tool bar.
5. Move on to **Figure 3**, click and drag to make anchor points and direction lines that follow the direction of the arrows as you did for Figure 1 and Figure 2. End the open path by clicking on the pen tool in the tool bar.

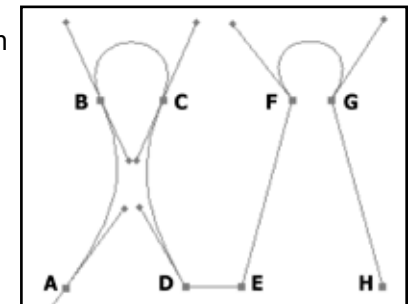
For more practice, turn off the Arrows layer and try it again.

## COMBINING CURVES AND STRAIGHT LINES

Straight line segments can be combined with curved segments. You can change from a curve to a straight line or visa versa while you are drawing.

While drawing with the Pen tool, to end a straight segment and begin a curve, Alt/Option-click on the last created point and drag out a direction line before releasing the Alt/Option key. To end a curve and begin a straight line segment, Alt/Option-click on the last created point to retract the second direction line so the next segment can be a straight line. The Option/Alt key temporarily changes the Pen tool to the Convert Point tool (covered later in the chapter).

This next example shows an open path with two similar figures, the first with all curve segments, the second combining straight lines with curve segments. Again, all



the anchor points have been selected to show all the directional lines at once.

The open path starts with Point A, a curve point. Points B and C were added by clicking and dragging to make curve segments.

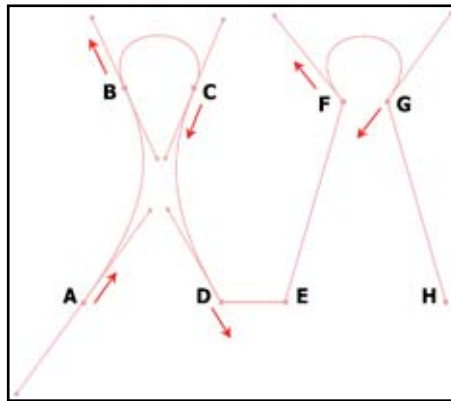
Smooth curves are connected by anchor points called SMOOTH POINTS. Points B and C are smooth points with directional lines flowing in opposite directions on both sides of the points, creating smooth curves in either direction of the points.

Sharply curved or straight path segments are connected by CORNER POINTS. Points D, E, F and G are corner points. Point E is a corner point connecting two straight line segments. Points D, F, and G are corner points connecting straight line segments to curve segments. The open path was ended with a straight line at point H.

## GUIDED EXERCISE 10.2: SMOOTH POINTS AND CORNER POINTS

In this guided exercise, you will trace over the example file used in the previous section to get the feeling of direction lines and changing smooth points to corner points and visa versa.

1. Open **curves\_corners.psd**. It is inside the Ch10 folder inside the student\_files\_3 folder.
2. Choose the pen tool and make sure you are set to draw a path by clicking on the second of the three



icons on the left side of the Options bar.

3. Click on the A point and drag up and to the right so that the direction lines matches the diagram.
4. Click on the B point and drag up and to the left, so that both direction lines match the diagram.
5. Click on the C point and drag down and to the left, so that both direction lines match the diagram.
6. Click on the D point and drag down and to the right, so that the top direction line matches the diagram. You have created four curved segments. Now you will create a corner point to start a straight segment.
7. Hold down the Option/Alt key and click on point D.
8. Hold down the Shift key (for drawing a perfectly horizontal line) and click on point E.
9. Click on point F.
10. To make a corner point and switch from a line to a curve, hold down the Option/Alt key, click on point F and drag up and to the left, so that the top direction line matches the diagram.
11. Click on the G point and drag down and to the left so that the upper direction line matches the diagram.
12. Now, you will create another corner point and switch back to a straight segment. Hold down the Option/Alt key and click on point G.
13. Click on point H. End the open path by clicking on the pen tool in the tool bar.

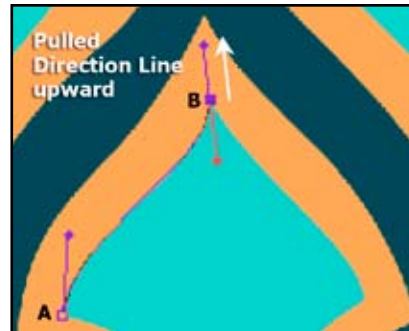
## CHANGING DIRECTIONS

Sometimes you may need to change the direction of a curve. To do this, use the same method of pressing the Option/Alt key

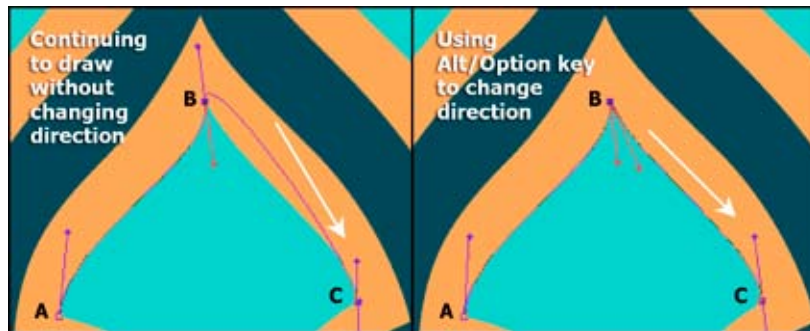


while pulling out the direction line in a different direction.

In the following example, a path is being drawn to follow the inside of the shape. The curve was started at point A by dragging up and slightly to the right. At point B, the mouse was clicked down and dragged up and slightly to the left. The path now needs to change direction.



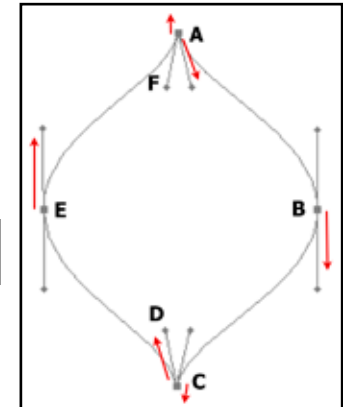
If the next anchor point was made without changing direction, you would see the result in the second example, below. The final example shows the results of holding down the Option/Alt key and dragging the direction point down and to the right. Point C was added by clicking and dragging down and to the right.



## GUIDED EXERCISE 10.3: CHANGING DIRECTIONS

In this guided exercise, you will trace over an example file, making a closed path with a change of direction. Don't worry about following the diagram exactly, concentrate on understanding how the curves and directional lines work.

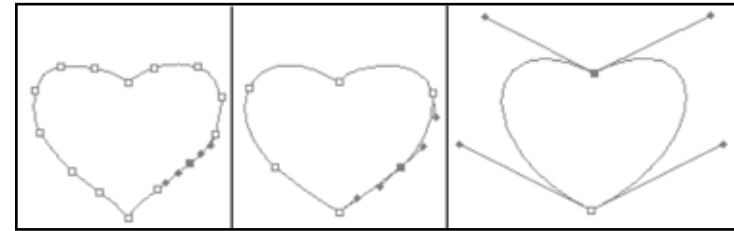
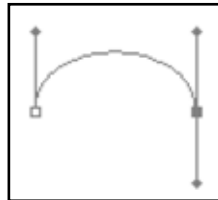
1. Open **change\_direction.psd**. It is inside the Ch10 folder inside the student\_files\_3 folder. Position the document at the top of the monitor screen.
2. Choose the pen tool and make sure you are set to draw a path by clicking on the second of the three icons on the left side of the Options bar.
3. Click on the A point and drag down and to the right so that the lower direction line matches the diagram.
4. Click on the B point and drag down. Before letting go of the mouse, hold down the Shift key to constrain the direction line to a true vertical line, drag further until the direction lines match up with the diagram, let go of the mouse and then let go of the Shift key. (If you hold down the Shift key first before clicking on the B point, the anchor point will be placed in a 45 or 90 degree angle from the previous point.)
5. Click on the C point and drag down. The bottom direction line will go beyond the document. That is OK. Keep dragging down until the upper direction line matches up with the diagram. If you reach the end of the monitor screen, undo (Command/Control Z) and move the document up as far as you can or change the zoom level (Command/Control minus) and continue drawing.
6. Hold down the Option/Alt key, click on the C point and drag up to match the D direction line.
7. Click on the E point and start to drag up, hold down the Shift key and drag up until the direction lines match the diagram. Let go of the mouse before you let go of the Shift key.



8. Hold down the Option/Alt key, move the cursor over point A until a small circle appears to show you that you are closing the path. Click and slowly drag up to match the diagram for direction line F. Again, you will need to drag beyond the document bounds. Your natural inclination will be to drag down, but you need to drag up. Let go of the mouse before you let go of the Option/Alt key.

### TIPS FOR DRAWING CURVES

- You can undo your latest anchor points in the path by using the shortcut keys, Control/Command Z to undo the last step and Control/Command plus Alt/Option Z to keep stepping backwards. You can also press the Escape key (Esc) to undo the last point and press it twice to delete the entire path.
- The length and angle of the direction lines affect the curves. The rule of thumb is to make the length of the direction lines be approximately one third of the length of the curve if it were straightened out.
- When creating a hump, place anchor points on either side, not in between.
- While drawing a path, press Command/Ctrl to temporarily switch to the Direct Selection tool to edit the path as you create it. When you release the Command/Ctrl key, the Path tool returns and you can continue to add anchor points to your path. See more about the Direct Selection tool and editing a path later in this chapter.
- If for some reason your path becomes deselected and you want to continue adding to it, simply click on the last anchor point and you can continue to add to the path.
- You will have cleaner curves if you use as few anchor points as you can.

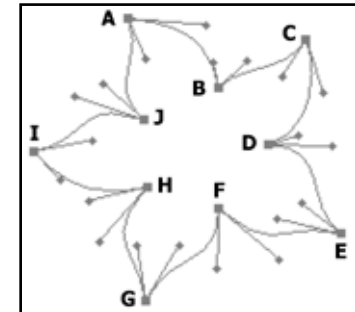


### PATHS TAKE PRACTICE

Getting comfortable drawing with the Pen tool can take quite a bit of practice. Practice drawing curves and mixing curved segments with straight segments. Getting paths to follow the shapes you want involves getting familiar with pulling out direction points and using the Option/Alt keys for changing directions.

To help you practice, complete the next two guided exercises.

### GUIDED EXERCISE 10.4: MORE CURVES AND DIRECTION CHANGES



In this guided exercise, you will trace over a flower path that is made of all curves and numerous direction changes. Take a moment to grasp the concept of this example. This is a five petal flower shape with direction changes at the top end and bottom end of each petal. The entire shape is made up of just curves, so you will not need to create straight line segments. Some sides of the petals bend inwards and some bend outwards. Every point is a corner point.

1. Open **flower.psd**. It is inside the Ch10 folder inside the student\_files\_3 folder. Position the document at the top of

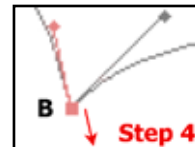
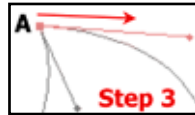


the monitor screen.

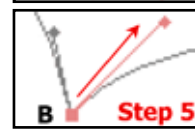
- Choose the pen tool and make sure you are set to draw a path by clicking on the second of the three icons on the left side of the Options bar.



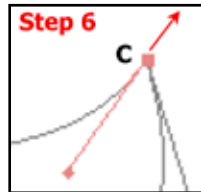
- Click on the A point and drag to right, matching up the right direction line with the diagram.
- Click on the B point and drag down so that the upper direction line matches up with the diagram.



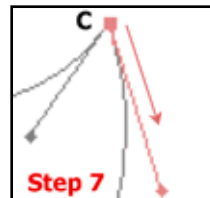
- Option/Alt-click on the B point and drag the second direction line up and to the right to match the diagram.



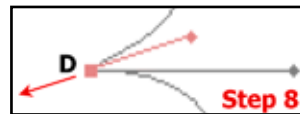
- Click on the C point and drag up and to the right so that the lower direction line matches up with the diagram.



- Option/Alt-click on the C point and drag the second direction line down and to the right to match the diagram.



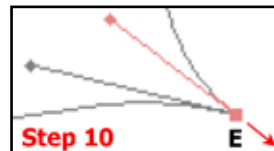
- Click on the D point and drag to the left and slightly down so that the right direction line matches the diagram.



- Option/Alt-click on the D point and drag the second direction line to the right to match the diagram.



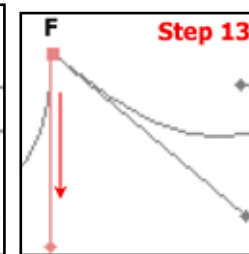
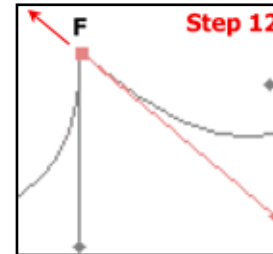
- Click on the E point and drag down and to the right, matching up the top, left direction line with the diagram.



- Option/Alt-click on the E point and drag the second direction

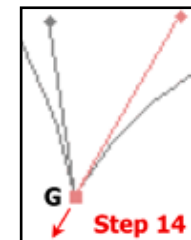
line up and to the left to match the diagram.

- Click on the F point and drag up and to the left so that the lower direction line matches up with the diagram.



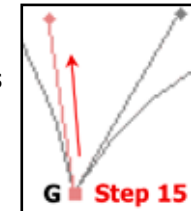
- Option/Alt-click on the F point and drag the second direction line down to match the diagram.

- Click on the G point and drag down so that the upper direction line matches up with the diagram.

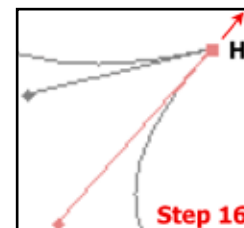


- Option/Alt-click on the G point and drag the second direction line up and to the left to match the diagram.

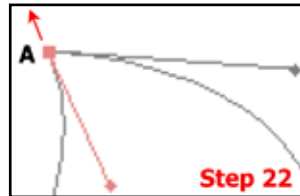
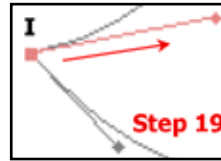
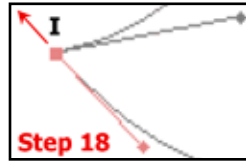
- Click on the H point and drag up and to the right so that the lower direction line matches up with the diagram.



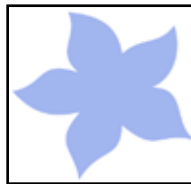
- Option/Alt-click on the H point and drag the second direction line to the left to match the diagram.



18. Click on the I point and drag up and to the left, matching up the bottom direction line with the diagram.
19. Option/Alt-click on the I point and drag the second direction line to the right to match the diagram.
20. Click on the J point and drag down and to the right so that the upper, left direction line matches up with the diagram.
21. Option/Alt-click on the J point and drag the second direction line up and to the left to match the diagram.
22. Move the cursor over point A until a small circle appears to show you that you are closing the path. Hold down the Option/Alt key, click on the A point and slowly drag up to match the diagram for the bottom direction line. Your natural inclination will be to drag down, but you need to drag up. Let go of the mouse before you let go of the Option/Alt key.



If you want more practice, try this exercise again, but turn off the Arrows layer and try doing it without the notes. When you feel comfortable, try it a third time, turning off the Arrows and Template layers and turning on the Flower layer. Draw on your own without any guidance.

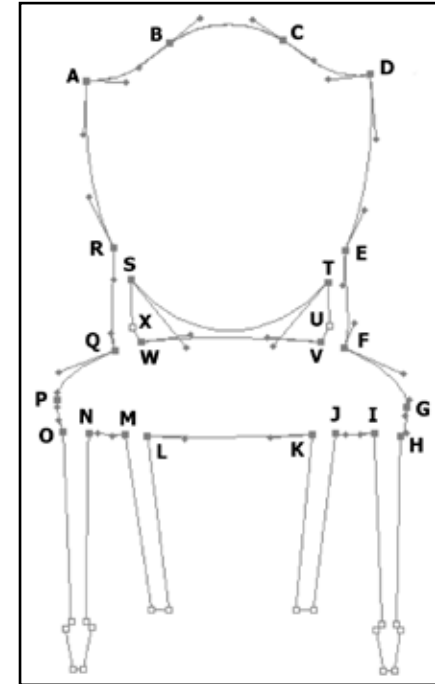


## GUIDED EXERCISE 10.5: COMBINING CURVES AND STRAIGHT

## SEGMENTS

In this guided exercise, you will trace over a path of a chair, combining curve and straight segments. You will subtract from the path with a sub path to create the cut out area of the chair.

In the example pictured here, the curve segment anchor points are selected to show the direction lines and the straight segment anchor points are not selected, so appear hollow.

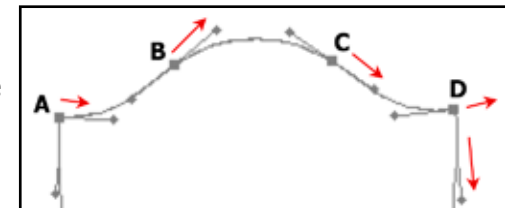


1. Open **chair.psd**. It is inside the Ch10 folder inside the student\_files\_3 folder.

2. Choose the pen tool and make sure you are set to draw a path by clicking on the second of the three icons on the left side of the Options bar.

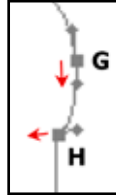
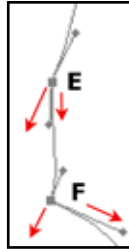


3. Start your path in the upper left corner. Click on the A point and drag to right, matching up the right direction line with the diagram.



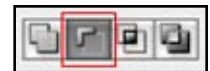
4. Click on the B point and drag up and to the right to make a smooth point.
5. Click on the C point and drag down and to the right to make another smooth point.

6. Click on the D point and drag to the right. Option/Alt click on the D point and drag down to make a corner point.
7. Click on the E point and drag down and to the left. Option/Alt click on the E point and drag down to make a corner point.
8. Click on the F point and drag down and to the left. Option/Alt click on the F point and drag down and to the right to make a corner point.
9. Click on the G point and drag down a small amount to make a small curve.
10. Click on the H point and drag a small amount to the left to create a subtle edge to the cushion. Option/Alt click on the H point, do not drag. The second part of the direction line will be deleted.
11. Click on all the anchor points for the right leg without dragging to create straight line segments.
12. Click on the I point, then Option/Alt click and drag a short distance to the left to create a corner point with a very shallow curve.
13. Click on the J point and drag out to the left a very short curve. Option/Alt click on the J point, do not drag. The second part of the direction line will be deleted.
14. Click on the two anchor points to make the second leg of the chair.
15. Click on the K point, then Option/Alt click and drag a short distance to the left to create a corner point with a very shallow curve.
16. Click on the L point and drag the same amount as the last curve to the left, then Option/Alt click on the L point to retract the left side of the direction line.

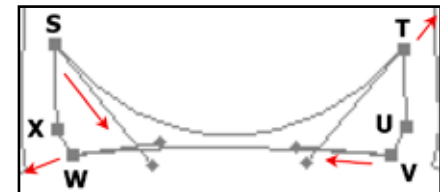


17. Click on the two anchor points to make the third leg of the chair.
18. Click on the M point, then Option/Alt click and drag a short distance to the left to create a corner point with a very shallow curve.
19. Click on the N point and drag a short distance to the left, then Option/Alt click on the N point to retract the left side of the direction line.
20. Click on all the anchor points for the left leg without dragging to create straight line segments.
21. Click on the O point and drag a small amount upwards.
22. Click on the P point and drag to make a very small curve.
23. Click on the Q point and drag diagonally to the right. Option/Alt click on the Q point and drag up and slightly to the left.
24. Click on the R point and drag up. Option/Alt click on the R point and drag the curve up and to the left.
25. Move the cursor over point A until a small circle appears to show you that you are closing the path. Hold down the Option/Alt key, click and slowly drag up to match the diagram for the direction line. Your natural inclination will be to drag down, but you need to drag up. Let go of the mouse before you let go of the Option/Alt key.

26. Next, you will make the sub path that creates a whole in the chair. In the Options bar, click on the **Subtract from path area** icon.



27. Start at the upper left side, click on the S point and pull a direction line down to follow the



bottom circular shape of the chair.

28. Click on the T point and drag up and to the left, creating a direction line about the same length and opposite angle as the last point.
29. Option/Alt click on the T point to retract the upper direction line.
30. Click on the U point to make a straight segment.
31. Click on the V point and drag a shallow curve to the left.
32. Click on the W point and drag a mirror image angle of the last point. Option/Alt click on the W point to retract the left direction line.
33. Move the cursor over point S until a small circle appears to show you that you are closing the path. Hold down the Option/Alt key, click on the S point. Let go of the mouse before you let go of the Option/Alt key. By just clicking and not dragging, you made a straight segment connected by a corner point to the curve segment of the S point.

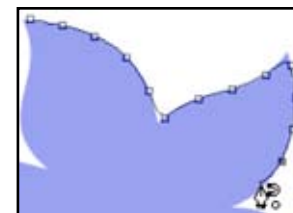
**WARNING:** when you use the **Subtract from path area** icon, Photoshop remembers your choice. The next time you go to draw a path, you could end up subtracting from your path when you did not intend to. Your path may look fine, but then will not behave as you want when you later fill a path. It is a good idea before drawing with the pen tool to always check this setting and the Path drawing setting on the left side of the Options bar.



## THE FREEFORM PEN TOOL

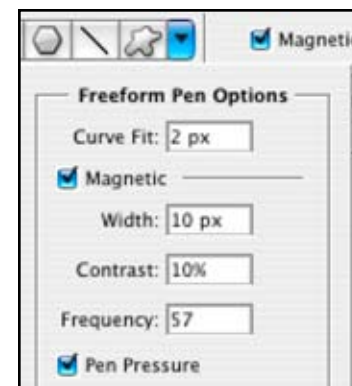
The Freeform Pen tool, with its **Magnetic** option is easier for beginners to control, but they typically make many more anchor points than ideal. The more anchor points, the less smooth your

curves will be, and the longer a document with vector elements will take to print. On a PostScript printer, too many total anchor points can cause PostScript errors, and prevent the document from printing at all.



The Freeform Pen tool works much like the Lasso tool drawing in a freeform way. When you release the mouse the path will be smoothed out. You can control how much smoothing is applied by adjusting the **Curve Fit** setting in the Options Bar under Pen Options. To draw straight line segments, Option/Alt click.

The Magnetic option lets the Freeform Pen tool work much like the Magnetic Lasso tool by snapping to areas bordered by high contrast. Only choose this option if you have a shape with high contrast edges. You can click to set anchor points or let the tool set them for you.



Under the Pen Options drop down menu in the Options Bar, Width, Contrast and Frequency settings help control the results.

**Width** sets the amount of pixels under the cursor that the tool will look at when placing points. You can use values from 1-40 pixels.

**Contrast** sets the amount of contrast that is needed for the pen tool to recognize an edge. Set values between 0-100.

**Frequency** sets how quickly the points will be created as you draw the path. Set values between 5-40 with the lower number creating more points.

## THE PATHS PALETTE

The **Paths palette**, grouped with the Layers and Channels palettes by default, lets you activate paths, duplicate paths, delete paths, add paths, save paths, turn paths into selections, stroke paths and fill paths. It displays thumbnail previews of each document path and permits paths to be saved, named, and manipulated.



An unsaved path, called a WORK PATH, appears in the Paths palette when you start using any of the pen tools. A document can only have one work path. You can name and save a work path by double-clicking and renaming it. Each NAMED PATH becomes a document component, like an alpha channel. When you click on the New Path icon to the left of the Trash icon at the bottom of the palette, you will get a new path named Path 1, Path 2, etc. These paths are named paths and will be saved with the document.

Only one path in the Paths palette can be highlighted at a time. If you draw another path, it will be added to the highlighted path. If no path is highlighted, Photoshop will create a new work path and the previous work path will be discarded. For this reason, you will want to be careful to save your paths. Work paths can easily be lost.

Notice the buttons at the bottom of the Paths palette. You can access the same commands from the Path Palette pop-out menu. Using the icons will bypass a dialog box giving you options for the command unless you hold down the Option/Alt key when clicking on them.

A path will not show in the document window unless it is active. Click on it in the Paths Palette to make it active, click in a blank

area under the paths to deactivate it. Delete a path from the Paths Palette by activating it and clicking on the Trash icon or dragging it to the Trash.

## EDITING PATHS

After you have drawn your path, you can edit it with the **Path Selection** tool and **Direct Selection** tool.



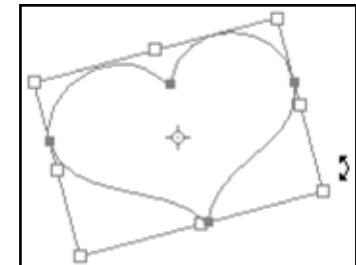
These tools are the black and white arrow icons located above the Pen tool in the Tool Bar.

**Note:** A common mistake is to try to use the Move tool to move a path. The Move tool is for moving layers or pixel selections; it will not move a path.

### PATH SELECTION TOOL

The **Path Selection tool** (black arrow) will select an entire path. Use this tool to move or transform the whole path as one unit. When its Show bounding Box option is checked, a selected path will display a bounding box to rotate or resize the path by clicking and moving the handles.

You can also transform a path by going to **Edit > Transform Path** and choosing among Scale, Rotate, Skew, Distort, or Perspective. **Edit > Free Transform Path** (Control/Command T) also works.



### DIRECT SELECTION TOOL

The **Direct Selection tool** (white arrow), lets click on an anchor point, a path segment, or a direction point and reposition it. It works best if you begin with a path that is deselected (has no highlighted anchor points). You can select numerous anchor



points and move them at once by dragging a marquee around them. You can add and delete points with the Add Anchor Point tool and delete anchor points with the Delete Anchor Point tool, but as mentioned earlier, if you have Auto Add/Delete checked on, you can access these tools temporarily by moving your cursor over an anchor point to delete an anchor point or over a path segment to add an anchor point.

Using the Direct Selection Tool, you can select any number of anchor points and transform them in the usual manner by going to **Edit > Transform Points** and choosing among Scale, Rotate, or Skew. **Edit > Free Transform Points** (Control/Command T) also works.

## CONVERT POINT TOOL

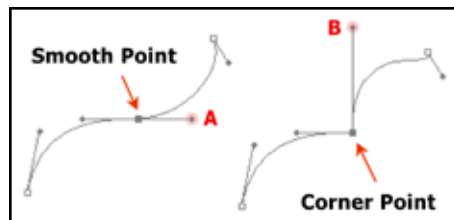
The Convert Point tool will change smooth points to corner points and visa versa.



Click on a smooth point to change it to a corner point.

Click and drag on a corner point to change it to a smooth point. This tool can also manipulate direction lines.

This example shows a direction line that has been converted from a smooth point into a corner point. With the Convert Point tool, Direction Point A was clicked on and moved up (B). The two Direction Lines can now be moved independent of each other.



## WORKING WITH AN ENTIRE PATH

- To select an entire path, click the path with the Path Selection tool or Option/Alt-click the path with the Direct Selection tool. All of the anchor points become solid.

- Multiple paths can be selected by pressing the Shift key.
- Drag the entire path to a new location, including another image.
- Press the Delete key to remove an entire selected path.
- Use **Edit > Free Transform Path** or **Edit > Transform Path** to scale, rotate, flip, skew, or distort the path.

## TO MOVE PATH SEGMENTS AND ANCHOR POINTS

- Choose the Direct Selection tool or Ctrl/Command + the Pen tool.
- Click the path to activate the entire path (can see clear anchor points).
- Drag a path segment to move the segment and its anchor point(s).
- Drag an anchor point to move the anchor point and the segment(s) attached to it.

## ADDING AND SUBTRACTING ANCHOR POINTS

With the **Add Anchor Point tool** or with the Pen tool on an active path with the Auto Add/Delete Option checked, click on any existing segment to add an anchor point.

Each added point will be a smooth point. When the Add Anchor Point tool is over an anchor point it becomes the Direct Selection Tool so that the anchor point can be manipulated.

With the **Delete Anchor Point tool** or with the Pen tool on an anchor point with the Auto Add/Delete Option checked, click on an anchor point to remove it.

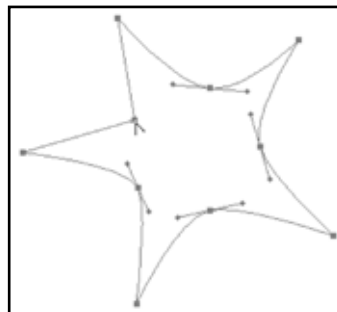
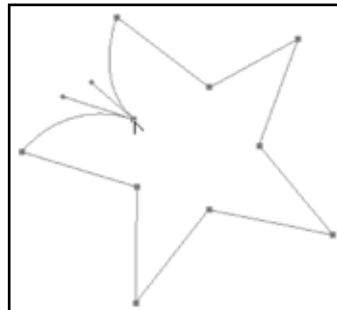
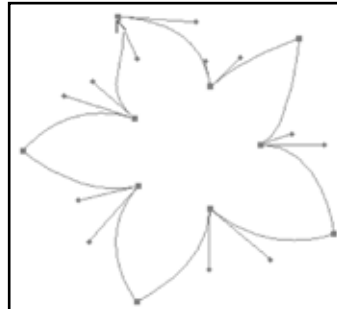
The path will reshape. When the Delete Anchor Point Tool is over an Anchor point it also becomes a Direct Selection Tool. You can also right-click or Ctrl + click an anchor point with any pen tool and select Delete Anchor Point from the context menu.

Here is an excellent step by step tutorial on using the Pen tools. It was written for Photoshop 6/7, but the Pen tool hasn't changed much since then: Basic Pen: Jay Arraich [http://www.arraich.com/ps6\\_tips\\_ppen1.htm](http://www.arraich.com/ps6_tips_ppen1.htm)

## GUIDED EXERCISE 10.6: CONVERTING POINTS

In this exercise, you will work with the same flower image you used in Guided Exercise 10.4 and test out converting points.

1. Open **flower\_convert.psd**. Just to make sure you are starting with a correct path, you will open this document that has the same path you drew earlier. The document will appear to be blank.
2. Open the Paths Palette from the Windows Menu. It usually lives with the Layers palette group.
3. Click on the **Path 1** path to make it active. You will see the path appear in the document.
4. Choose the Convert Point tool hidden under the Pen tool in the tool bar. Click on the path to make the anchor points appear.
5. Click on each of the five petals' outer anchor points. When you click on them, these corner points will lose



their direction points. The only curved segments left will emanate from the inner points.

6. Now click on the inner points. Notice that all the segments get converted to straight segments.
7. Click on the inner points again and drag out direction lines, adding curves to the inner petals.

## GUIDED EXERCISE 10.7: EDITING A PATH

In this exercise, you will open a file that has a layer with pixels in the shape of a safety pin and a path that follow the shape, but is not quite right. You will edit the path to match the colored layer.



1. Open **safety\_pin.psd**. It is inside the Ch10 folder inside the student\_files\_3 folder.
2. Open the Paths Palette from the Windows Menu. It usually lives with the Layers palette group.
3. Click on the **Practice** path to make it active. You will see the path appear in the document. You can see that it does not match the yellow safety pin shape.
4. The path anchor points and direction lines need adjusting. There are two anchor points that need to be added and the Convert Point tool needs to be used on two anchor points. There are three anchor points that are not needed and can be deleted. The circle sub path is the only part that does not need editing.  
HINT: The additional points need to be added to the first sub path on the left side and the end of the clasp on the top side



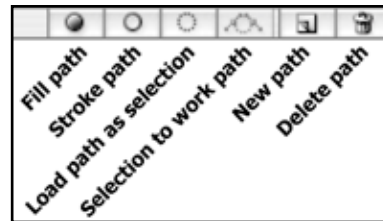
of the outside shape. The points that need deleting are on the left side of the middle sub path that surrounds the circle shape.

5. When you have finished editing the path, click on the Final path in the Paths palette and it compare to your path. You may have came up with a different solution, but if the path matches the shape well, yours is correct, too. Notice the economy of points used in this example. Always try to draw a path with as few points as possible for smoother curves.
6. Save the file and leave it open, you will use it in the next exercise.

## PAINTING PATHS

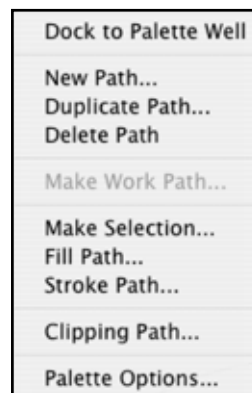
Paths by themselves are non-printing document objects. When a path is active, it can be stroked or filled.

**Stroke** paints pixels along the selection perimeter. **Fill** paints pixels inside the selection perimeter.



One way to fill or stroke a path is by clicking the appropriate button at the bottom of the Paths palette. Be careful—these buttons apply the last stroke or fill options used without giving a dialog box to change settings.

The Fill Path and Stroke Path dialog boxes accessed from the Paths palette pop-up menu provide much more control, and allow the painting of a variety of strokes. Paths can be stroked or filled with any of the painting tools that use a brush, including the Pencil, Brush, Eraser, dodge, Blur, etc. HINT: if you are unsure how the stroke will appear, paint it on its own



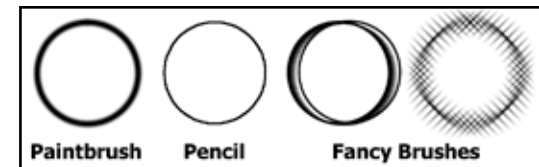
layer when possible.

## TO CUSTOM-STROKE A PATH

1. Choose the foreground color to become the stroke.
2. Set all the options for the tool you will stroke with, such as opacity, brush size, and painting mode.
3. Activate the path to stroke.
4. Choose **Stroke Path** from the Paths palette pop-up menu and pick the tool of your choice from the drop-down list.

Alternately, click the Stroke button at the bottom of the Paths palette, which strokes with the currently active tool and all its settings. If an appropriate tool is not selected, it strokes with the pencil.

5. Click OK to create the stroke.



## FILLING A PATH

The Fill Path dialog box accessed from the Paths palette pop-up menu has options for color, patterns, blending modes, opacity, feathering and anti-aliasing. The Fill button uses the last settings used in the **Edit**

> **Fill** dialog box or otherwise the foreground color with anti-



aliasing. In either case, if the path is an open path, it will fill to an imaginary line drawn between the starting point and the ending point.

## GUIDED EXERCISE 10.8: FILLING AND STROKING A PATH

In this exercise, you will open a file that has a layer with colored pixels in the shape of a safety pin and a path that somewhat follows the shape, but needs editing. You will edit the path to match the colored layer.

1. Open **safety\_pin.psd** (located in the Ch10 folder inside the student\_files\_3 folder) if it is not already open from the last exercise.
2. Open the Layers palette from the Windows menu.
3. Turn off the visibility of the **Yellow Safety Pin** layer. Create a new layer by clicking on the New Layer icon at the bottom of the Layers palette.
4. Click on the tab for the Paths palette. Make the Practice path the active path by clicking on it. This path is the path you edited earlier. The path should appear in the document window.
5. In the tool bar, choose a color. Make sure the path does not have any anchor points selected. You should just see the line, no anchor points or direction lines. If you do see them, with one of the path selection tools, click away from the path in the document window.
  - a. Click on the first icon at the bottom of the Paths palette, to fill path with the foreground color. This is the quick and easy way to fill a path.

b. **Command/Control Z** to undo.

6. Now, you will use the Fill Path dialog box.
  - a. Click on the pop-out menu to the Paths palette and choose **Fill Path**.
  - b. In the Fill Path dialog box, click on the drop down menu next to Use and choose Color.
  - c. The Color Picker opens up, choose a color.
  - d. Set the **Feather Radius** to 3 pixels.

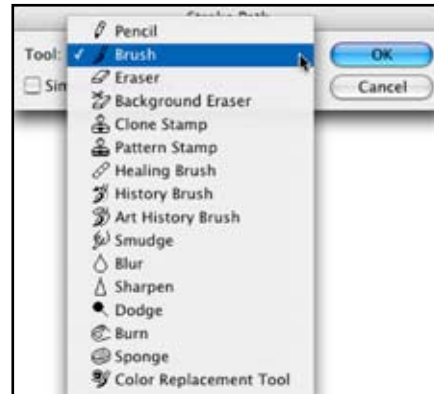
Notice all the choices you get when you use the Fill Path dialog box, you can choose a color, pattern, 50% gray or white to fill with, use a blending mode, set opacity, and feathering all at once.



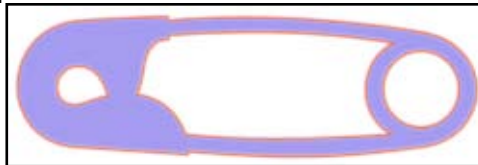
- e. Click OK.
7. In the tool bar, choose a color that contrasts with the color you used for the fill.
  - a. Click on the second icon at the bottom of the Paths palette, to stroke the path with the foreground color. This is the quick and easy way to stroke a path. Your result will depend on what tool was last chosen in the Stroke Path dialog box and the last chosen settings for that tool.
  - b. **Command/Control Z** to undo.
8. Click on the pop-out menu to the Paths palette and choose **Stroke Path**.
  - a. In the Stroke Path dialog box, set the **Tool** to Brush and click OK. You may get the same result as the last step.

- b. **Command/Control Z** to undo.

The advantage of using the Stroke Path command from the pop-out menu is that you can choose what tool to stroke with from all the painting tools. But, you will need to make your settings before using the command. If you want to stroke with certain brush settings, choose the Brush tool (or other painting tool), adjust the settings as desired, and then use the Stroke command.



- c. Select the Brush tool from the tool bar.
- d. In the Brush Preset Picker, choose a basic brush and set the hardness to 100% and the Master Diameter to 3 pixels.
- e. Click on the pop-out menu to the Paths palette and choose **Stroke Path**.
- f. In the Stroke Path dialog box, set the Tool to Brush and click OK.



Once you have used the Fill Path command, so you have a layer of pixels, and you want to stroke with a simple line (no need to use brush settings), you may want to use the Stroke command from the Edit menu or better yet, the Stroke layer style. You will be stroking the layer of pixels, not the path. Using a layer style will allow you to make changes to the stroke easily.

## CLIPPING PATHS

CLIPPING PATHS mask images in non-rectangular shapes for importation into other programs such as PageMaker, InDesign, Illustrator, or QuarkXPress. Microsoft products such as Word and Publisher do not support clipping paths. PSD, TIF, EPS, JPG, PDF, and DCS files all support clipping paths. An image clipping path does not mask image data within Photoshop.

To import a file into a page layout program that will print on a PostScript printer, save in EPS, DCS, or PDF. If your printer lacks PostScript, save in standard TIF format.



### TO ADD A CLIPPING PATH TO AN IMAGE:

1. Create a closed path around the part of the document you wish to display; anything outside the path will be clipped.
2. If desired, create closed subpaths to exclude additional document parts.
3. Name the path; you can't make a work path into a clipping path.
4. Choose **Clipping Path** from the Paths palette pop-up menu.
5. Choose the path you wish to define as the clipping path (there can only be one).
6. Choose File > Save As and save the document in EPS, DSC, PDF, or Tif format. If EPS or DCS, choose the appropriate EPS preview for your operating system— if you pick the wrong one, your image's screen preview will not appear

when you place the document into your desktop publishing program.

7. Remember, the clipped area will not be hidden when the document is open in Photoshop; but it will when you import the file into another program.

## TYPE AND PATHS

You can place type along a path—type on a path, or use type to fill a path—type in a path.

### TYPE ON A PATH



You can place type along a work path, a saved path, or around a shape. To do so, select the Type tool and position the cursor so that it changes to the Type on Path icon shown above. You can then enter your text, and it will follow the shape of the path. If you change the shape of the path, the type will re-flow along it.

To move the type along the path, choose either the Direct Selection or Path Selection tool. Position it over the type, and drag the type to its new location.

To flip type to the other side of a path, choose either the Direct Selection or Path Selection tool. Position the tool over the type, and drag the type across the path.

Here are a few type on a path QuickTime tutorials:

[www.photoshopper.com/photoshopcs.html](http://www.photoshopper.com/photoshopcs.html)

[www.planetphotoshop.com/tutorials\\_cs.html](http://www.planetphotoshop.com/tutorials_cs.html)

### TYPE IN A PATH



You can place type inside a closed path or shape. If you change the shape of the path, the type will re-flow

inside it. To place the type inside the path, select the Type tool and position it inside the path. The cursor will change to the Type in Path icon shown above. You may now enter your text.

## TYPE BEYOND TYPE LAYERS

Type layers can be converted to shape layers or work paths, in order to use the vector tools to modify their shapes. Once you do this, the type is no longer editable with the Type tool.

### TO CONVERT TYPE TO A SHAPE LAYER

- 1 Activate the type layer to convert.
- 2 Duplicate the layer. Be sure to convert a duplicate layer; editability of the original text will be lost when converted.
- 3 Choose **Layer > Type > Convert to Shape**.
- 4 Edit like any other shape layer.

### TO CREATE A WORK PATH FROM A TYPE LAYER

- 1 Activate the type layer to serve as a template.
- 2 Choose **Layer > Type > Create Work Path**.
- 3 Use like any other path.

Type can also be rasterized to convert from vector text to editable pixels.

### TO RASTERIZE A TYPE LAYER

- 1 Activate the type layer to rasterize.
- 2 Duplicate the layer. Editability of the original text will be lost when converted.
- 3 Choose **Layer > Rasterize > Type**.

Type imported from vector programs such as Illustrator or

Freehand will be rasterized when brought into Photoshop CS. One workaround is to save the type as outlines from within the vector programs, then import as paths into Photoshop. You can then use the path-related tools to modify these paths.

Another workaround is to use SmartObjects, which we will cover in another course.

## GUIDED ACTIVITY: WORKING WITH PATHS

In this guided activity, you will open an image of a birdbath, draw a path around the birdbath, create a selection and mask out the background of the image. This image shows the type of image that benefits from using the path tools. The object to isolate has very similar colors and tones with the background, making it difficult to select with the selection tools and commands. The edges of the object are crisp and so would look natural with the crisp edges that paths create.



1. Open **birdbath.psd**. It is inside the Ch10 folder inside the student\_files\_3 folder.
2. Open the Paths palette from the Windows menu.
3. Select the Pen tool from the tool bar.
4. Start drawing a path from the top of the post where it connects to the bowl.
5. As you follow around the outside of the birdbath, keep the following in mind:
  - a. Try to use an economy of anchor points.
  - b. Use the Option/Alt key to change direction where

needed.

- c. Use the Command/Control key to temporarily use the Direct Selection tool to edit the path as you are drawing it. You can click on an anchor point, direction point, or path segment to edit.
- d. You can edit the path after you have drawn it, to refine and correct it.
- e. The scallop-like curves around the bowl are a good challenge. Each scallop is a gentle curve, so creating change of directions at each inner curve is not the best.



Try this approach, place an anchor point on either side of the inner and outer curves. Drawing a curve will create 2 direction lines of equal length. You will need to lessen or lengthen one of the direction lines at each point. The short ends will face the inner scallop (a shallower curve) and the longer ends will face the outer curve. Use the Command/Control key to do adjust the direction lines after drawing each point.

6. When you get to the starting point, move the cursor over the point until you see the circle, hold down the Option/Alt key and click on the point, let go of the mouse and then let go of the Option/Alt key.
7. Double click on the Work Path in the Paths palette to turn it into a saved, named path.
8. Click on the third icon at the bottom of the Paths palette,



### Load path as a selection.

9. From the Select Menu, choose Feather. In the Feather Selection dialog box. Set the Feather Radius to 1 pixel.
10. Click on the Layers tab at the top of the palette group to view the Layers palette.
11. Double-click on the Background layer to turn it into a normal layer. Name is as you wish, or leave it as the default Layer 0 and click OK.
12. Hold down the Option/Alt key and click on the Add layer mask icon at the bottom of the Layers palette. You have successfully isolated the object from the background. This layer can now be brought into another image to give it a new background, or it can be used on a white or colored ground to feature the object.

