

An Introduction to Curves

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In [Digital Imaging Part 1](#), we learned how to use Photoshop's Levels dialog to perform basic tone and color corrections. If all your images are perfectly exposed and your scanner well profiled, Levels might be the only tool you'll ever need. However, it's likely that you will encounter many images that will need more complex corrections that can't be made with Levels. For these images, you must turn to Curves.

It Begins with Levels

The Curves tool is really just Levels with the training wheels removed. Levels allows you to adjust the highlights, shadows and midtones of an image. Curves can do exactly the same thing, but it's not limited to three fixed tonal ranges. You can adjust any point along the 0-255 scale. By adding control points along the curve, you can keep selected tonal ranges fixed while adjusting other values.

The first time you look at the Curves dialog, you may not have any idea how to use it. It doesn't even look like a curve; it's a simple diagonal line on a graph, starting in the lower left and rising to the upper right. But within this apparent simplicity lies a great deal of power.

To begin to understand Curves, we'll look at the similarity to Levels. The Levels dialog contains a depiction of the image's histogram, with the black point on the left side of the scale and the white point on the right. Input and output sliders are along the horizontal axis below. Moving the black or white input sliders will map the darkest and lightest pixels in each channel to black and white (or 0 and 255), expanding the tonal range and increasing contrast. Moving the output sliders does the opposite; they will compress the tonal range of the image, decreasing contrast. (See [Figure 1a](#).)

In Curves, the black point is on the lower left point of the curve and the white point is on the upper right. (The midpoint is – you guessed it – in the middle!) The input values are mapped along the horizontal axis and the output values along the vertical axis. To increase contrast with Curves, drag the lower left point of the curve to the right, and the upper right point of the curve to the left. (See [Figure 1b](#).) Doing so produces the *exact* same effect as moving the black and white input sliders in Levels.

Finally, by moving the midpoint slider in Levels, you can redistribute the number of tones that are above and below the midpoint (level 127). Moving it to the left will cause more levels to shift above the midpoint and fewer below it, thus the image gets lighter. Moving the slider to the right causes more levels to shift below the midpoint, producing a darker image.

In Curves, you can adjust the midpoint in the same way by clicking on the middle of the curve (clicking anywhere along the curve creates a control point) and dragging it left or right along the horizontal axis. But you're not limited to the midpoint; you can add up to 16 control points anywhere along the curve.

Color Correction with Curves

Now that we've seen how Curves is similar to Levels, let's look at an example using the by-the-numbers approach to color correction. (If you're not familiar with this method, see [Digital Imaging Part 1](#).) [Figure 2](#) shows an image of a Piping Plover photographed on an overcast day with a Canon EOS-1D and fill flash. I intentionally converted the raw image to TIFF using a daylight white balance to show how the image might look if captured on transparency film and then scanned. A blue cast is obvious, and the image is a bit dark and lacks contrast.

To remove the color cast, we're going to use Photoshop's Info palette as our guide to make the neutral areas in our image truly neutral. That is, shadows, midtones and highlights that should be neutral will have equal values for the red, green and blue

channels.

First, make sure the Info palette is displayed by selecting Window > Show Info. The Info palette shows the RGB numeric values of the pixels under your cursor. Next, select the Color Sampler tool by clicking and holding the Eyedropper in the Tool palette until a fly-out menu appears. By placing color samplers in your image, the Info palette will show you the RGB values for up to four locations at one time. I like to place one sampler on my darkest shadow, one on the lightest highlight and one on a midtone that should be neutral (if there is one). (See [Figure 3](#).)

The Info palette shows that my darkest shadow area (the plover's eye) reads 11, 14, 14 for red, green and blue. I generally want my darkest shadows with detail to be around 10, so these levels are just about right. All that's needed is a small correction to the green and blue channels to bring them down to match the red.

The highlight point (the area under the plover's neck) needs a much larger correction. This area should be a neutral white, but the Info palette shows the values for the green and blue channels are much higher than red, with RGB values of 155, 175 and 182, respectively. The values are also quite low for what should be a near-white, giving the image its overall dark tone. Viewing the image's histogram by selecting Image > Histogram confirms that there is virtually no data above level 182 (always check the histogram to see the distribution of tones in your image). On a sunny day, I'd probably want my whites to fall around 245, but since this image was taken on an overcast day, I'll be a little more conservative. I don't want to ruin the look of the soft light by giving the image too much contrast.

Now that we've analyzed the highlights and shadows and placed some color samplers, we're ready to make our corrections. Open the Curves dialog by selecting Image > Adjust > Curves, or press Ctrl-M. I usually make global corrections to tone first by working with the composite RGB channel, then focus on correcting color with the individual RGB channels.

The first thing I want to do is make my whites brighter. To do so, I click on the highlight point on the upper-right of the curve and drag it to the left while watching the Info palette until the highest value of any of the three channels in my highlight is around 230 (remember, I'm being conservative with my highlights). By adjusting the composite RGB channel, I'm adjusting all three color channels at the same time. My highlight point now reads 197, 222, 230. (While the Curves dialog is open, the Info palette will actually show the before and after values for each channel.)

My image is now brighter overall, but I want to lighten the sand a little further. By moving the cursor over the sand and holding down the mouse button, a hollow circle will be displayed on the curve indicating where that point of the image falls. Now I know the area of the curve I want to work on; the sand ranges just below the midpoint. I'll bring up the three-quarter point of the curve slightly, but I don't want to lose detail in the whites, so first I'll add a control point in quarter tones to keep them anchored. The final RGB curve looks like [Figure 4a](#).

Next, I'll select each of the individual color channels and adjust them as needed. For the red channel, I'll click the highlight point in the upper-right and drag it to the left, again watching the Info palette until the red channel is at 230 to match the blue. The adjustments I made to the composite RGB channel also raised my shadow values slightly, so I'll click the shadow point on the red channel and drag it to the right until the value is back down to 11. The red curve is shown in [Figure 4b](#).

For the green channel, I'll drag the highlight point to the left until the Info palette reads 230 for green and click the shadow point and drag it to the right to bring the green shadow value down to 11. The green curve is shown in [Figure 4c](#).

Finally, the only adjustment needed for the blue channel is to correct the shadow value. I'll click the shadow point on the lower-left of the curve and drag it to the right, watching the Info palette until the blue channel shadow value reads 11. The blue curve is shown in [Figure 4d](#).

I now have an image with good tone, contrast, and perfect color balance. Once I'm happy with my curves, I can apply them to the image by clicking OK, or continue to make more adjustments. Pressing and holding the Alt key changes the Cancel button to a Reset button, which will reset the curves to their initial state if you want to start over. I have no further adjustments to make, so I'll click OK. The final image with the Info palette readings is shown in [Figure 5](#).

Just the Beginning

I've only shown the most basic corrections with curves, but these simple adjustments are all that is needed on a surprising number of images. Even with basic corrections like these, I find Curves faster and more intuitive to work with than Levels. Soon, with a little

practice, you will too.

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