



# INTRODUCTION TO GRAPHICS

# Adding Contrast with Color Compliments

Information Sheet No. PS714

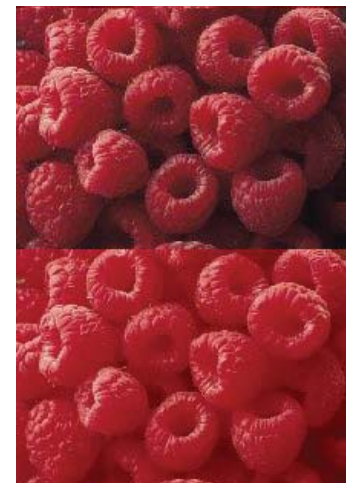


Contrast is one of the most important factors in color quality, and optimizing contrast is one of the first steps in color correction. But first, it's important to distinguish between two kinds of contrast – bright-

ness contrast, such as the overall contrast between the highlights and shadows in an image and color contrast, the sometimes significant difference between adjacent hues, especially complementary hues.

Most Photo-shop users understand that establishing proper highlight and shadow points in an image goes a long way toward optimizing its contrast – at least its brightness contrast. To get even better quality, however, it's important to take an extra step and exploit each image's unique color contrast.

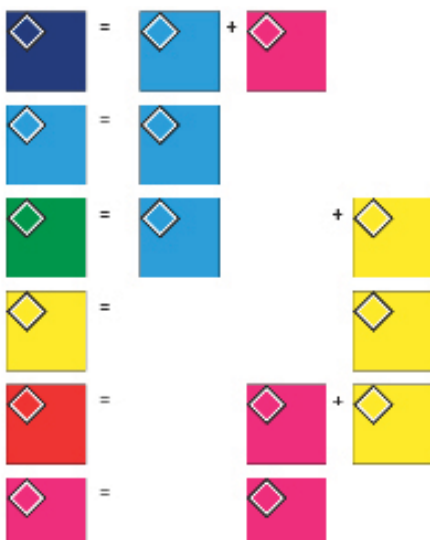
To begin, keep in mind the color wheel, which illustrates the key complementary color pairs – red/cyan, green/magenta, and blue/yellow (left). Note that each of the red, green, and blue primaries lies opposite its cyan, magenta, or yellow complementary color. Complementary colors are very useful in color correction – a green color cast in an image, for instance, can often be neutralized by adding magenta (its complementary color), and vice versa. Way back in the twentieth century, the complementary color was sometimes referred to as the "unwanted color," for archaic but interesting reasons.



In those days, color separations were created photographically inside a special camera in a multi-step procedure that required careful attention to apertures and exposure times. If the color separation process properly converted RGB to CMY, the separations conformed to what was called the Rule of Three. In each of the cyan, magenta, and yellow separations, three of the six colors were "wanted," and the other three were "unwanted" – that is, if the separations were properly made, each reproduced three of the six basic colors as solids, while the other three were absent. For instance, the yellow separation contained only objects that would print as yellow, red, or green, not those that would print as cyan, magenta, or blue. Similarly, the wanted colors in the cyan separation were cyan, blue, and green, and in the magenta separation were magenta, blue, and red.

The Rule of Three is shown in the illustration at the right. The yellow column at far

ness contrast, such as the overall contrast between the highlights and shadows in an image and color contrast, the sometimes significant difference between adjacent hues, especially complementary hues.



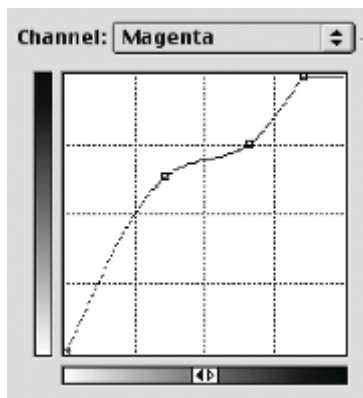
Most Photo-shop users understand that establishing proper highlight and shadow points in an image goes a long way toward optimizing its contrast – at least its brightness contrast. To get even better quality, however, it's important to take an extra step and exploit each image's unique color contrast.

To begin, keep in mind the color wheel, which illustrates the key complementary color pairs – red/cyan, green/magenta, and blue/yellow (left). Note that each of the red, green, and blue primaries lies opposite its cyan, magenta, or yellow complementary

right shows that yellow ink will print in green, yellow, and red objects, but will not print in magenta, blue, or cyan objects. Therefore, in the yellow separation, the “wanted” colors are green, yellow, and red, and the “unwanted” colors are blue, cyan, and magenta. The unwanted color is more than a historical oddity—it often can be exploited to increase contrast, because a strong color always produces at least one weak color channel, and the weak channel holds crucial image detail.

For example, consider the original image of the raspberries (left, top) and the much flatter version (left, bottom). The only difference between the two is that the lower one is missing its cyan channel. That’s right, the cyan channel, not the black. Because cyan opposes and neutralizes red, the strong cyan channel adds significant detail and depth to this image.

Color contrast is often most apparent in an image dominated by a single primary color, such as the first forest scene, in which most of the detail originates in the green channel in RGB and is converted to the magenta channel in CMYK. In a CMYK image, anything that’s green is made up of cyan and yellow inks in more or less equal proportions. If there’s a little more cyan than yellow, the result is bluish green, and if there’s a little more yellow than cyan, the result is a little closer to lime green. The greens found in nature tend to contain a little more yellow than cyan, though the proportions can vary significantly.



An object that’s mostly green will contain very little of green’s complementary color – magenta – so the magenta channel will be weak, especially in comparison with the cyan and yellow channels. However, the magenta channel is crucial, because every pixel represents some part of the image that isn’t

green, which means that it holds essential detail about the structure of the image.

In this image, for instance, the objective is to increase detail in the leaves, to make them stand out more from the branches. When you’re correcting an RGB primary color, the corresponding CMY unwanted color is so powerful that, in this case, it’s the only channel that will be edited. In Photoshop, first use Apply Image to blend the magenta channel into itself in Multiply mode, which emphasizes existing detail in the leaves.



Then apply a curve to the channel (left) that’s flat in the shadows, because there’s no magenta shadow detail in this image. The curve is steep in the three-quarter tones to increase contrast in the trees, flat in the midtones where there’s almost no detail, and very steep in the quartertone area to boost contrast in the green leaves. Finish by sharpening the enhanced channel according to your intended output medium.

These changes have completely reshaped the image’s magenta channel, as see before (left) and after (middle). The final image has substantially improved detail and contrast (right), even though only one channel has been altered.



*This Info Sheet was adapted from Photoshop Color Correction, published by Peachpit Press, ISBN: 0-321-12401-4.*