

# COLOR MODELS

## RGB vs. RYB/CMYK: what's the difference?

RGB and RYB/CMYK are two of many color spaces. These two engross folks who work in web and print.

RGB (Red, Green, Blue) is used for computer screens, scanners, digital cameras and other devices that give out light. RYB/CMYK (Red, Yellow, Blue and/or Cyan, Magenta, Yellow, Black) is used for paintings, magazines, fabrics, cars, and actually all materials around us that reflect light rather than emit light. "Red, Yellow, Blue" is the traditional painter's palette. ColorJack uses the acronym RYB to also represent CMYK. Let's delve deeper into these color models.

## HOW DOES IT WORK?

Our eyes see the visible world by light. The colors we see are made of merging red, green, and blue light. So, our eyes see in RGB? Yeah—you could say that—but CMYK comes into play too. Color is visible due to the RGB light that our eye sees, but that light is mainly reflected light—light reflected off our world of CMYK colored objects.

## Subtractive Color—RYB/CMYK

Imagine some light shining on an object. The pigment—i.e., colorants like ink, paint, dye, etc.—on the surface of the object determines which colors are reflected and which are absorbed. Pigment acts as a filter that absorbs (subtracts) different amounts of red, green, and blue light, and that bounces back the remaining colors for us to view. So, our eyes see the pigments—RYB/CMYK—that reflect off an object, and we do not see those that absorb light into the object. This is why RYB/CMYK is referred to as a "subtractive" color system. Like, when white light shines on red paint, the pigment absorbs—or "subtracts"—the blue and green light and reflects the red. As a painter, I tend to think of RYB/CMYK as "adding" colors, because we start with a white surface and add colored pigment to build up colors. But the term "subtractive" refers to the light waves rather than the pigment/colorants.



CMYK—"subtractive color"

## Additive Color—RGB

"Additive" color systems create color with light. Visualize a black screen, then add varying amounts of red, green, and blue lights. Colors "mixed" together create the appearance of more colors. For instance, red and green light shine together to create yellow.



RGB—"additive color"

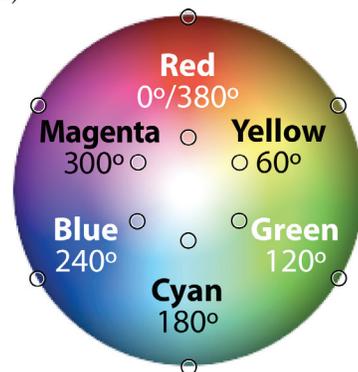
Add more colors of light, and the color becomes lighter. When red, green, and blue are added in equal intensity, they combine to make white light. The previous three sentences seem strange to those of us who grew up mixing paints, where adding colors usually

creates darker colors! Those with hands-on painting experience may feel more natural using RYB/CMYK for adjusting and mixing colors.

## Converting RGB to CMYK and vice-versa

The human eye perceives more colors than possible on either RGB screens or in RYB/CMYK colorants. And the gamut (range of colors) in RGB and RYB/CMYK varies slightly from one to the other. When converting digital files from one color space to another, RGB/CMYK translators make as close a match as possible. Color info can be lost if it's not present in the other color space, so, it's best to switch back and forth as little as possible. Try to stay in RGB for a final destination that is digital; and CMYK has traditionally been the choice for the destination of professional printing (ask your printer).

This article got kinda deep for me—hey, my degree's in fine arts, not physics—but I've enjoyed researching color modes in hopes of clearer understanding for artists /designers... it is really quite wonderful to think about.



ColorJack sphere

That's it, for colorful spaces, until next time,

— Boni