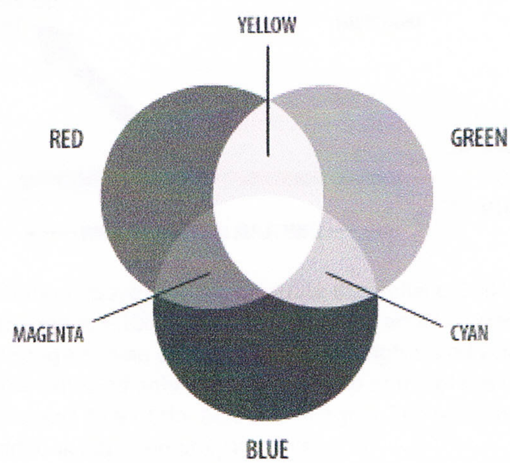
Subtractive Colors
Subtractive colors are seen when pigments in an object absorb certain wavelengths of white light while reflecting the rest. We see examples of this all around us. Any colored object, whether natural or man-made, absorbs some wavelengths of light and reflects or transmits others; the wavelengths left in the reflected/transmitted light make up the color we see.

This is the nature of color print production and cyan, magenta, and yellow, as used in four-color process printing, are considered to be the subtractive primaries. The subtractive color model in printing operates not only with CMY(K), but also with spot colors, that is, pre-mixed inks.

RGB
Red, green, and blue are the primary stimuli for human color perception and are the primary additive colors. The relationship between the colors can be seen in this illustration:

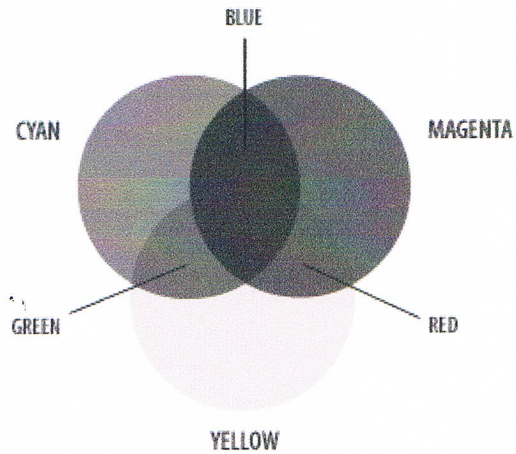


The secondary colors of RGB, cyan, magenta, and yellow, are formed by the mixture of two of the primaries and the exclusion of the third. Red and green combine to make yellow, green and blue make cyan, blue and red make magenta.

The combination of red, green, and blue in full intensity makes white. White light is created when all colors of the EM spectrum converge in full intensity.

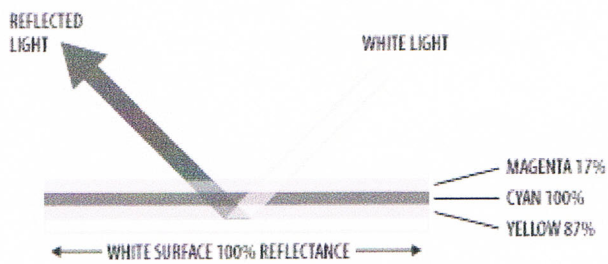
The importance of RGB as a color model is that it relates very closely to the way we perceive color with the $\rho\ \gamma\ \beta$ receptors in our retinas. RGB is the basic color model used in television or any other medium that projects the color. It is the basic color model on computers and is used for Web graphics, but it cannot be used for print production.

CMY(K)
Cyan, magenta, and yellow correspond roughly to the primary colors in art production: red, blue, and yellow. In the illustration below, you can see the CMY counterpart to the RGB model shown above:



Just as the primary colors of CMY are the secondary colors of RGB, the primary colors of RGB are the secondary colors of CMY. But as the illustrations show, the colors created by the subtractive model of CMY don't look exactly like the colors created in the additive model of RGB. Particularly, CMY cannot reproduce the brightness of RGB colors. In addition, the CMY gamut is much smaller than the RGB gamut (see below).

The CMY model used in printing lays down overlapping layers of varying percentages of transparent cyan, magenta, and yellow inks. Light is transmitted through the inks and reflects off the surface below them (called the substrate). The percentages of CMY ink (which are applied as screens of halftone dots), subtract inverse percentages of RGB from the reflected light so that we see a particular color:



In the illustration above, a white substrate that reflects 100% of the light is printed with a 17% screen of magenta, a 100% screen of cyan, and an 87% screen of yellow. Magenta subtracts green wavelengths, cyan subtracts red wavelengths, and yellow subtracts blue wavelengths from the light. The reflected light, then, is made up of 0% of the red wavelengths, 44% of the green wavelengths, and 29% of the blue wavelengths. The resulting spectral reflectance/transmittance curve would look approximately like this: