# Understanding Digital Colour

Computer programs support a number of different ways of representing colour, or colour spaces. Each serves a different purpose, and has different strengths and weaknesses.

RGB

RGB colour specifies the amount of each of the three additive primaries: red, green and blue. Since video monitors, computer screens and any other devices that create colour with light use additive primaries, RGB is vital in video and multimedia work. Scanners and digital cameras all capture colour as RGB values, since they too deal with colour in the form of light.

CMYK
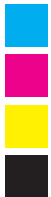
The CMYK colour space defines colour in terms of the amount of cyan, magenta, yellow and black in the colour. Colour printers, printing presses and other devices which create printed images using inks, dyes or pigments on paper or other substrates use the subtractive primaries—cyan, magenta, yellow—and virtually all add a fourth colour, black, for reasons of efficiency and cost.

HSB

HSB stands for hue, saturation and brightness. Hue refers to the attribute we often (although imprecisely) call simply colour: "orange" and "indigo" are expression of hue. Saturation refers to the purity or intensity of the colour, and brightness to how bright—light or dark—a colour appears.

Lab

Lab colour is designed to reflect not the way we create colours— like RGB and CMYK, nor how we think about colours— like HSB. Instead, it reflects the way we perceive colour. Lab colour has three components: (L),brightness, (a), a gradient from green to red and (b), a gradient from blue to yellow.

What distinguishes Lab colour from other means of representing colour is that it is **device independent**— it describes the appearance of the colour to a "standard observer" rather then the recipes of how to make a colour on a particular device. Lab is as close to a universal description of colour as is possible. Simply converting a file to Lab colour mode does not, however, improve the rendition of colour.

Web colours

On the World Wide Web, certain colour attributes like the colour of a web page's background and text are described with a special notation. The box at the bottom of Photoshop's colour picker beginning with # lists the web colour code for the selected colour. This is simply a translation of the base-10 RGB value into the base- 16 or hexadecimal notation favoured by computer programmers.

Printing colour

Most colour printing devices print using the CMYK colours, also known as process or 4-colour printing. However, on a printing press it is possible to print colours as **spot colours.**

Spot colours

Printing with spot colours simply means using, say, olive green ink in the places where olive green is required in the image. Spot colour printing is usually limited to 5 or 6 separate colours, making it inappropriate for printing full colour images. Often, a spot colour is used in addition to process colour where a design needs colours, such as fluorescent or metallic inks, not possible in process colour printing. Food packaging, in particular, often uses spot colours to reproduce colours such as the flesh of an orange, which are outside the gamut, or colour range, of 4 colour process.

The most common way of specifying spot colours is the Pantone Matching System, a series of over 1000 colours with standard names and ink formulations. However, Adobe has removed much support for the Pantone colour libraries from its applications, requiring the purchase of additional tools to easily work with Pantone colours.

What colour mode to use?

If you are using images exclusively for the Web, video, and multimedia, leave your image in RGB.

If you are having your images printed commercially, you may convert them to CMYK, but many modern workflows expect RGB colours. Check with your printer to make sure you have the right colour setup. Photoshop's colour settings will probably need to be changed to match your printer's requirements.

Most inkjet printers expect to receive RGB data and do the conversion to CMYK themselves. Despite the fact that they are CMYK devices, if you print a CMYK file to a personal inkjet printer, it will change the image to RGB and then back again to CMYK, creating unpredictable colour changes. Never expect that accurate colours will just happen without planning and effort.