Bitmaps and Vectors

Photoshop is an image-editing application, with a wealth of tools and commands for working on digital images or bitmaps. There are utilities for retouching, color correcting, compositing, and more. There are also over 100 functional and creative filters, which can be applied to entire images, selected areas, or specific layers.

A bitmap image consists of a rectangular grid, or raster, of pixels – very much like a mosaic in concept. When you edit a bitmap, you are editing the color values of individual pixels, or groups of pixels.

Image-editing applications differ fundamentally from vector-based applications, such as Adobe Illustrator. In these applications, you work with objects that can be moved, scaled, transformed, stacked, and deleted, as individual or grouped objects, but each exists as a complete, separate object all the time.

These applications are called vector drawing packages, as each object is defined by a mathematical formula. Because of this, they are resolution-independent – you can scale vector drawings up or down (either in the originating application or in a page layout application, such as QuarkXPress or Adobe InDesign) and they will still print smoothly and crisply.

Don't forget

You should always try to scan an image at, or slightly larger than, the size at which you intend to use it. This means you will avoid having to increase the size of the image, reducing its resolution and possibly its quality.

Scaled to 400%

Vector drawing at actual size

In contrast, bitmaps are created at a set resolution – a fixed number of pixels per inch. If you scan an image at a specific resolution, then double its size, you are effectively halving its resolution (unless you add more pixels). You are likely to end up with a blocky, jagged image, as you have increased the size of the individual pixels that make up the bitmap image.

Scaled to 400%
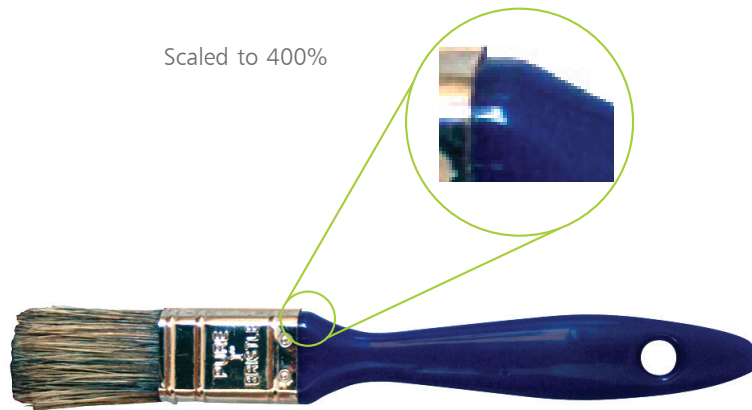
300 ppi bitmap at actual size

Bitmaps and bit-depth

An important factor when the digital data of an image is captured, typically using a digital camera or by scanning, is its bit-depth. Bit-depth refers to the amount of digital storage space used to record information about the color of a pixel. The more bits you use, the more color information you can store to describe the color of a pixel – but the larger the file size you end up with.

To output realistic images using PostScript technology, an image should be able to represent 256 gray levels. A 24-bit scan is sufficient for recording 256 gray levels for each of the Red, Green and Blue channels (8-bits for each channel), resulting in a possible combination of over 16 million colors.

Ideally, when you work on images in Photoshop, you will do so using a monitor capable of displaying over 16 million colors. This ensures that you can see all the color detail in the image. Although you can work on images using only thousands of colors, for best results, especially where color reproduction is important, you need to work with as many colors as possible.

Don't forget

For digital images, more rather than less color information is usually desirable, as this means the image can represent more shades of color. Finer transitions between colors, and greater density of color, leads to a more realistic image.

Hot tip

Photoshop can handle images that use 16-or 32-bits per channel, which originate from high-end digital cameras, scanners and microscopes. 16/32-bit per channel images contain a far greater range of colors than 8-bit per channel images. The disadvantage of working with such images is that their file sizes are also dramatically larger. The bit depth per channel of an image appears in the file name tab, or the title bar of the image window if you are working with floating windows:

_MG_8120.CR2 @ 12.5% (RGB/16*)

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