Bitmap and vector images

Bitmap images (also called *raster* images) use a rectangular grid of picture elements (pixels) to represent images. Each pixel is assigned a specific location and color value to make the image. When you create bitmaps, you (using your graphics program) essentially decide the color for each pixel. Graphics and photographs saved as GIFs or JPEGs are bitmapped formats. Because bitmaps assign colors pixel by pixel, they are very good at representing gradations of shade and color. If you import a GIF or JPEG, it will remain bitmapped in Adobe Photoshop.

Bitmap images are *resolution-dependent*. This means the size and quality of the image depends on the number of pixels per inch in the image. Images saved for on-screen display have a resolution of 72 pixels per inch because that's all most monitors can handle. Images saved for print should have at least 300 pixels per inch.

In contrast to bitmaps, *vector* images are not created pixel by pixel. Instead, vector graphics maintain crisp edges and lose no detail when resized, because they make use of mathematical equations to calculate a line's shape. These equations are stored in the image and determine the image's dimensions, color, shape, and thickness. The actual shape is rendered (or drawn) on the screen at view time.

Because they use equations and not pixels, vector images are not resolution-dependent. As a result, vector images are great for visual elements, such as logos, that will be used at various sizes. When you import images from Adobe Illustrator, these are generally vector images. You also create vector images in Photoshop when you draw shapes on shape layers.

Scaled bitmap and vector images

Because bitmaps are composed of individual pixels, they tend to scale poorly. That is, when you try to increase their size, their edges become blurry (**Figure 1**).

Figure 1 Example of a bitmap image at different levels of magnification

Vector images, on the other hand, scale well, because they rely on mathematical equations to determine their appearance (**Figure 2**).

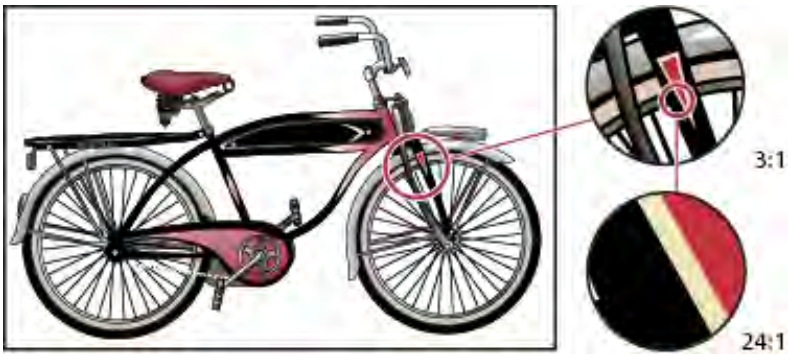

Figure 2 Example of a vector graphic at different levels of magnification

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