

Working with images & Photoshop

Types of Computer Graphics

Vector graphics – line and grid based graphing. It is resolution independent; meaning it doesn't matter how many ppi it has. It consists of an outline and a fill.

Bitmap graphics – (raster graphics) – “quilt of pixels” that make up an image. It is resolution dependent; meaning the lower the ppi, the blockier it looks. Photoshop is Bitmap Based.

Image Resolution & Quality

Pixel – This word comes from the words picture & element. It is the smallest whole unit of bitmap graphics. It is measured in bits.

Resolution – is measured by pixels per inch. A monitor & websites are 72 ppi. For print, 300 ppi is used. 8 or 16 ppi is too low for our eyes and looks blocky.

Progressive Changes – As you resample (resize) you build change upon change and there is no real path back to your original design. You will notice the most deterioration when you resample small pictures.

Acquiring an Image - Make sure your input resolution approximately equals your output resolution. For example, scan an image at a high dpi (dots per inch - higher than 1000 dpi) so quality is not lost when it is used for print or web. If a scan is created at a low dpi and resized or edited, quality will be lost.

3 Ways to describe the size of a bitmap image

1. Resolution & Dimensions – example: 2”x3” @ 266 ppi 532 pix x 798 pix
2. Pixel Count of image – example: 424,536 total pixels
3. File Size in KB or MB

Dealing with bitmap edges

Aliasing - False presentation of visual data - fuzzy blocky edges (Bad)

Anti-Aliasing - Accurately represents data - clean edges. Diagonal lines and curves in geometric shapes appear smooth because of anti-aliasing. (Good)

Color Mode & Color Channels

Color Depth – the maximum amount of color a pixel can store.

Grayscale – They can contain only 256 different brightness levels. A grayscale image has a single “color” channel called Black, and all the tones you see in the image are represented by 256 different intensities of black.

CMYK – (Cyan, Magenta, Yellow, and Black) are the printing inks used to make high-quality color publications. It has 4 color channels and is not as rich as the RGB. When all colors are mixed in CMYK, it results in black.

RGB – (Red, Green, Blue) should be used when creating websites. It has 3 color channels. When there is full intensity of RGB white is the result. Each channel is capable of showing 256 brightness levels of any given pixel.

LAB – has 3 color channels, Lightness Channel, and 2 Chromacity Channels - A and B. It is slightly larger in its color space than RGB color. No color is lost when colors are converted through LAB mode.

Color Space

Color Space represents color in terms of values that can be measured, such as the amount of red, green, or blue in an image.

Color Gamut

The full range of colors that can be produced by any color reproduction system (ex: computer monitor) is called the color "gamut" of that system. For example, RGB uses light to produce color, so its gamut includes neon colors. In contrast, printing inks do well at reproducing certain colors that can go outside the RGB gamut such as some pastels.

ICC Profiles

This allows color working spaces to be exchanged between devices. They are data files that record all the relevant information for a particular device, including its color space, capabilities, and limitations. Ex: Digital Camera has a ICC Profile and it is compared to settings in Photoshop to see if they are the same. If they are not, the viewer will be alerted with options for color management of the image.

Optimizing images for the web

Optimizing

The "Save For Web" command in Photoshop allows you to optimize your images for use on the web. Broadband may be allowing us to use larger images online, but it's still important to remember the visitors who aren't on broadband and optimize all images on a web site.

Optimized images for the web at 72 ppi will lose some of the original image quality and information to meet download speed requirements.

Image Compression for Optimization – Lossy vs. Lossless Compression

Lossy compression is the discarding of non-essential visual elements in a digital image to make the image smaller in file size.

- The file type **.jpg** is a **lossy** compression. It is able to discard tones that would go unnoticed. It can create artifacts (pixelly & quality loss) in areas of sudden value changes if over compressed. .jpg files are used for photographs and cannot be used for transparency.

Lossless compression looks for patterns in the image that it can use to compress file size. The compression is exactly reversible, so the image is recovered exactly. It replaces commonly occurring patterns (especially large areas of uniform color) with a short abbreviation: instead of storing "white, white, white, white, white," it stores "5 white."

- The file type **.gif is a lossless** compression. It is used for images that have fewer than 256 colors and contain large areas of uniform color. It optimizes without creating artifacts in areas of sudden value changes. .gif files are used for cartoons, transparency, animation.
- The file type **.png is a lossless** compression. It is similar to a .gif, but it supports 16 million colors, not just 256. It can display a photograph exactly without loss on the web.

3 Methods of Interpolation and Color Averaging

Interpolation - Color Averaging occurs when resizing or compressing a bitmap image.

Nearest Neighbor – poor choice

- No anti-aliasing occurs – Very pixilated image.
- The program chooses the same color value for neighboring pixels in an enlarged image as the original color at any given pixel.
- Creates no new color values – **uses existing pixels next to it.**

Bilinear Interpolation – ok choice

- A pixel that is enlarged **gets its destination color from the top, left, right and bottom of its original position.**
- These color readings of neighboring pixels are added together and divided by 4.
- It produces anti-aliased pixels within the new enlarged image. The new pixels represent blends of neighboring pixels.

Bicubic Interpolation – best choice

- New pixels are **calculated in horizontal, vertical, and diagonal directions** – weighted average is taken from the dominant tones. The best results are achieved with this process.

