

DIGITAL IMAGES

In the world of digital images, dots/pixels are the fundamental measure of file size.

“dpi” stands for “dots per inch,” and it refers to the dots of ink that a printer applies to paper. High-quality printed images are 300 dpi or higher—the dots are so close together that the naked eye can’t easily distinguish them. The lower the dpi, or print resolution, the more pixelated the printout will look, since you can see the space between the dots.

Your monitor screen is a gridded array of pixels—tiny squares of light. Most monitors display about 72 pixels per inch.

A digital image can be described as X pixels by Y pixels. **Resizing an image is not the same thing as changing its resolution;** the former process involves actual gain and loss of information, whereas the latter just involves expanding or compressing the information you have.

You can increase the resolution of an image by squeezing its pixels closer together, which makes the picture look better when printed out, although its physical dimensions on the page will be correspondingly smaller. You can also expand the pixels, putting more space between them and lowering the resolution, which makes the picture print out bigger. But as the resolution sinks below 300 dpi, your printed-out image will look more and more pixelated.

A file that is 300 x 300 pixels can be:
3 x 3 inches at 100 dpi
or
1 x 1 inch at 300 dpi

If you scan a 4 x 5 inch transparency at 300 dpi, you get a digital image that is 1200 x 1500 pixels.

If you scan a 1 x 1 1/2 inch slide at 1200 dpi, you get a file that is 1200 x 1500 pixels.

So, for instance, if you’ve scanned a slide at 1200 pixels and you want to print out the image at about half a page, you should decrease the resolution so that the image will print out bigger on the page (be sure the resampling box is *not* checked in the Photoshop image / Image Size dialog box, since you don’t want to downsize the image—you just want to decrease its resolution). If you decrease the resolution to 300 dpi, the quality of the printout will seem just as good as if you printed at 1200 dpi (since your eyes can’t tell the difference between 300 and 1200 dpi), but the image will be about 4 x 5 inches on the page, and thus much easier to see than it would be at the original scanned dimensions of 1 x 1 1/2 inches.

Resizing images

You can reduce the pixel dimensions of an image file (aka downsizing it) without changing its quality. But you can’t *increase* the pixel dimensions of an image file very much before the image starts to look pixelated. This is because photo editing programs such as Photoshop can interpolate only to a very limited degree; when you increase the pixel dimensions of an image, you’re basically trying to add information that isn’t there.

Since you can’t bring back information once you’ve thrown it away, one good safety practice is to save a copy of a new digital file (one you’ve just received or one you’ve just scanned) in a separate place before you begin manipulating its size and resolution. This way, if you accidentally hit “save” after downsizing the image, you still have the original, larger version.

All of these operations can be done in Photoshop via the Image / Image Size menu. Be attentive to how the numbers change according to whether the resampling box is checked.

File formats: JPG vs. TIF

JPG and TIF are different file formats. They are analogous to MP3 and WAV file formats. When you save a file as a JPG (as with an MP3), you compress the data, which results in some data loss. TIF files are not compressed. For print projects, TIF files are preferred because image quality is more important than file size. JPGs are used on the web, where file sizes need to be as small as possible for faster downloads.

When you save a file as a JPG in Photoshop, the last thing it asks you is to specify the quality of the JPG on a scale of 1 to 12. This determines the degree to which the file is compressed, and it is a totally separate question from the image's resolution or pixel dimensions.

Saving a file as a JPG always degrades the image quality, but when you save a JPG in the "high-quality" range (10–12) the degradation is generally not noticeable. The lower the quality, the smaller the file size, but the worse the appearance of the image. Again, this kind of quality loss cannot be regained because you are essentially throwing away information (in other words, you can't save an image as a low-quality JPG and then resave it as a high-quality JPG and expect to get back all of the digital information you discarded during that first save).

E-mailing image files

When you email an image file (unless it's for some specific purpose that requires a high-quality image), you should economize on file size. The first step is to save the file as a JPG if it isn't already. Then check the resolution: If the recipient is only ever going to look at the image on their computer screen (for instance for a Powerpoint demonstration or a website), then there's no reason for it to be at a higher resolution than 72 dpi. And since most people's screens are 12–22 inches across, an image that is 6 or 8 inches across is probably plenty big.

Providing images for print publications

When you are submitting a digital image for a print publication, you should provide the largest file you have. Do *not* downsize an image before submitting it, since we can always reduce an image, but we can never recover the information that was lost when it was downsized. TIF format is preferable to JPG format, but if all you have is JPG (for instance if the image was taken with a digital camera and never existed in anything but JPG format), then you should send the JPG, rather than converting to TIF. The idea is to keep the image in whatever form/format it was in originally, since manipulation and intervention often degrade an image's quality.

If you are hiring a photographer to shoot new digital files, they should ideally be 10 x 13 inches or larger, at 300 dpi. That way the image could theoretically fill up an entire page of a book. (If you plan to spread the image over two pages, then the file would need to be twice that big, or 10 x 26 inches.)