

# Image Size:

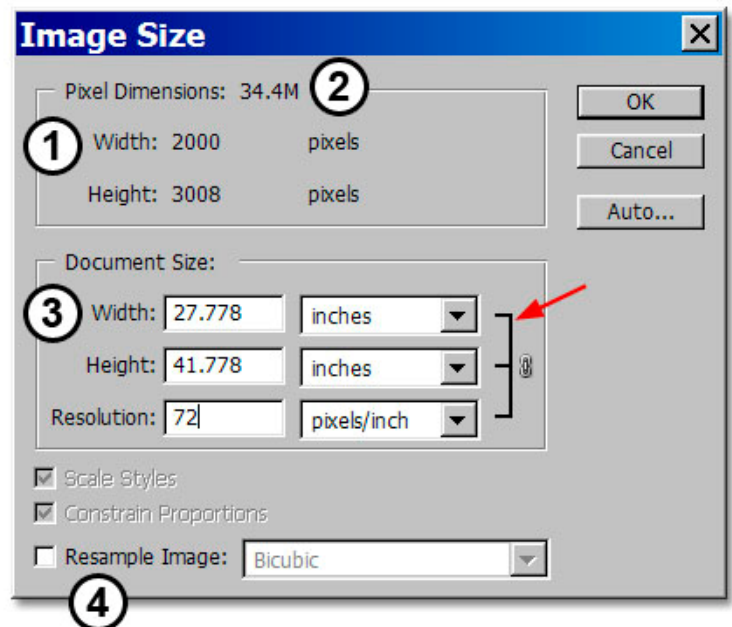
## Scaling and Resampling

The information captured by a digital camera is stored as numbers. These numbers are interpreted by computers and displayed as color and tonal values which we perceive as a photographic image. Digital photographic images are referred to as *Raster* graphics or *Bitmapped* graphics. They are based on a grid of pixels (each pixel represents a single color) which when viewed collectively produce the **illusion** of a continuously toned image. This perception relies on the inability of the eye to recognize the delineation of individual segments of this grid.


Pixels themselves have no intrinsic size value. They simply represent the basic unit of a given grid. It is up to the artist/technician to organize this numeric information in such a way that it is perceived by the human eye to be photographic. There is no one set rule that governs how information should be configured. The artist arranges the data based on the intended “output” or simply, how the image is going to be viewed, i.e. computer monitor, desktop printer, newspaper, television, etc.

### PHOTOSHOP’S IMAGE SIZE DIALOG

In Photoshop the user is able to adjust this image data via the **Image Size** dialog. To access this open an image in Photoshop, then go to the *Image* menu and select *Image Size*. An image’s “size” can be understood in more than one way. The truest definition of an image’s size is its **Pixel Dimensions** (1). *Scale* does not factor into these dimensions. “Pixel dimensions” describe the total number of separate units (pixels) which make up the grid - counted horizontally and vertically (i.e. 3300x2400). If you multiply these values you get the total number of pixels in the file. This section also displays the **File Size** for the image (2). “File size” refers to the amount of space, or *Memory* the file occupies on your computer’s hard drive.



“Image size” can also describe **Document Size** (3). Document size comes into play when the image is “outputted”. *Output* is the term used to describe how an image will be viewed: web, print, video. At this point **size matters!** Or rather, **RESOLUTION matters!!**

Whether for print or web, resolution is inextricably linked to quality, and ease of transmission. At this point you have three variables to consider: *Width*, *Height*, and *Resolution*. Resolution in this case refers to the number of pixels per unit of measure (inch, cm, mm, etc.). At the moment we will consider how all three relate to one another. In order make sure they are all linked check to the right of these values and confirm that all three are “linked” via a black bar and a link-of-chain icon . If they are not, uncheck the *Resample* checkbox (4) at the bottom of the dialog. With all three values linked together an adjustment to one affectively adjusts all. An increase in width/height produces a reduction in resolution, and vice-versa. Adjustments at this point reinterpret data, but do nothing to alter the pixel dimensions – nothing is being thrown away, nothing is being added. You aren’t altering the grid; you are only altering its **Scale**.

## PRINT

Width and height are particularly important when you plan to print an image as these values tell the printer what size you wish the image to be on the printed page. Resolution is important as well because it directly relates to the illusion of continuous tone. Pixels, or rather the drops of ink that represent them in the printed image, must be small enough that the naked eye can’t distinguish the individual from the mass. As long as this is so the illusion of continuous tone is maintained. There for, you are limited in your adjustments of width and height by the number of pixels existing in the image. You can only set the width/height of an image such that you maintain a resolution of **300ppi**. You are, of course, able to increase the “size” beyond this resolution threshold, however print quality will diminish.

## SCREEN

When processing images to be viewed on the web, TV, or other screen based display your resolution setting is every bit as important. Though you can still set the width and height values for an image, certain software programs disregard or otherwise don’t understand this information and instead look only at the image’s resolution setting, or the pixel dimensions of the image, and display this as it is preset to do. This explains why you may receive an attachment via email that is hopelessly huge when opened. Instead of Billy blowing out his birthday candles all you see is Billy’s flared right nostril. Your friend may well have set the image to a more reasonable size (width/height), but neglected to consider the fact that the image was set to a resolution of 400ppi and contained thousands of pixels which your computer automatically *scaled* to the current screen resolution of 100ppi. Thus the image is viewed at 400% its intended size! It is important to set an image, to be viewed on screen, to somewhere between **72ppi** (standard) and 120ppi. A problem arises however. If you are working on an image and you need to lower your resolution, doing so (with your setting set as they are) simply makes the image larger and larger as the width/height values are linked to resolution. To correctly prepare an image for web use it often becomes necessary to discard a considerable amount of data (resample the image). If done right this does not adversely affect the appearance of the image on screen and resolves the issue of oversized photos - in terms of *viewing*, the amount of *memory* these files take up on your computer, and the *time* necessary for transmission from one computer to another.

## RESAMPLING

The act of **Resampling** alters not just the scale of data but the data itself. If you discard existing information this is called **Downsampling**. In order to enlarge an image by actually creating new data this is called **Upsampling**. It is important to understand that when you upsample an image you can't really create any new detail, the best you can hope for is to reasonably maintain the clarity of the original detail. As a rule it is better to shoot at as high a resolution setting as your future plans for the image require then downsample the original image as needed. That said there are rather sophisticated upsampling options now available making it possible to up sample with very nice results.

In order to resample an image you must check the *Resample* check box () at the bottom of the *Image Size* dialog. Once you do this *Resolution* become independent of *Width* and *Height* and a drop down menu becomes active to the right of the *Resample* check box. Your resampling options are as follows:

Nearest Neighbor  
Bilinear  
Bicubic  
Bicubic Smoother  
Bicubic Sharper

To give you the straight dope on resampling it breaks down like this: When **Upsampling**: *Bicubic Smoother* should be used (followed by the application of a sharpening filter). When **Downsampling**: *Bicubic Sharper* should be your method of choice. This maintains the greatest clarity of detail when data is discarded. *Nearest Neighbor* should never be used as a resampling method for continuous toned images. It can work well for line art but does a poor job altering photographic detail. *Bilinear* and *Bicubic* do a decent job, but not as good as the newer *Bicubic Sharper*, and *Bicubic Smoother*.