New York Heritage (NYHeritage.org)
Digital Imaging Basics

Terminology

Pixels – the solid squares of color that make up a digital image

Image Resolution/Spatial Resolution – the exact number of pixels high and wide an image is, sometimes called "pixel dimensions"

Megapixel – one million pixels (used primarily for describing digital camera capability – a 3.1 megapixel camera, for instance, can take pictures with a resolution of 2048 x 1536, which equals 3,145,728 pixels)

File format – the digital file type, identified with file extensions such as JPG, GIF, TIFF etc.

File size – the amount of disk space an image takes up, typically measured in megabytes (mbs) or kilobytes (kbs)

File compression – reducing the number of pixels in an image file to decrease its overall file size

Print Resolution – Dots Per Inch (DPI) or Pixels Per Inch (PPI), a measurement that determines an image's printed quality. This measurement can be calculated: Pixels ÷ Inches = DPI.

Print Dimensions/ Spatial Dimensions – the height and width of an image in inches, measurements that indicate an image's printed size

Capturing Images

DIGITAL CAMERA

- Most cameras have image resolution settings (this option may be labeled "image quality," names for image resolution will vary) while others actually offer pixel dimensions, such as 640x480 or 1600x1200.
- Some digital cameras will let you choose which file format you want your images saved in, and how much compression to use.
- Set bit depth to 24 bits or above for full color. Higher bit depth gives a broader range of distinct colors. Higher bit depth also increases file size.
- The bigger the file size for each image, the fewer total number of images you can fit on the memory card or disk.
- Always set the white balance before taking your picture. Only files captured in RAW format can change white balance post-capture.
- Zooming in now instead of planning to crop later will help you maintain the largest print resolution.

SCANNER

- Always clean the scan bed before scanning.
- In the scanning menu, use the manual setting rather than the automatic for greater control.
- Scanners use DPI to determine pixel size. The higher the DPI while scanning, the greater the image resolution.
- To calculate image resolution: Inches X DPI = Pixels. If you put a 5 x 7 photo on the scanner and scan it at 300 DPI, the resulting digital image will be 1500 x 2100 pixels in size: (5 x 300 by 7 x 300).
- Scan at no less than 150 DPI for web use and 300 DPI for printing. Scan at 600 DPI or above for enlarging purposes.
- Set bit depth to 24 bits for color photographs. 8 bit color will yield a greyscale image, and 1 bit color is black and white.

File Formats

AI -Adobe Illustrator proprietary file format

BMP – uncompressed, huge file size, not recommended for archival or web use

GIF – supports only 256 colors, so it is better suited to clip art and diagrams than photographs

JPG – typically lossy, but good for web display, most common format used for image distribution today

JPG2000 – lossless form of JPG, must have a special paid program to create these files

PNG – designed for web browser display, supports truecolor (16 million colors)

PSD – Adobe Photoshop proprietary file format

RAW – lossless format used by digital cameras for creating large originals; different camera companies have different varieties of RAW formats and users mush have the camera's proprietary software program to open and edit RAW images

TIFF – many archivists prefer this format for long term file storage; low compression and medium file size; some popular OCR programs output in this file format

Find an image's . . .

❖ **file size and file format:**
   Right click on your file in Windows Explorer or Mac OSX Finder. Choose "Properties" or "Get Info," respectively, to see the file format and the file size. Alternately, while working in a photo editor, such as Adobe Photoshop, you can see the file format and file size information in either the bottom border of the application window, or the top and bottom borders of the document window.

❖ **image resolution:**
   Use a photo editor to see resolution. In Photoshop, choose the dropdown "Image" menu, then choose "Image Size." The pixel width and pixel height will be displayed under "Pixel Dimensions." In Gimp, choose "Image," then "Scale Image" to see pixel dimensions.

❖ **print resolution and print dimensions:**
   Use a photo editor to see print dimensions and resolution. In Photoshop, choose the dropdown "Image" menu, then choose "Image Size." The width and height in inches, as well as its DPI number will be displayed under "Document Size." In Gimp, choose "Image," then "Print Size" to see an image's height and width displayed in inches.

How To . . .

Make sure an image will fit on the viewer's screen: Find your file's image resolution (see directions above). The average email program opens images at actual size (1 pixel in image =1 pixel on monitor). The pixel dimensions of the average monitor are 1024x768 (width x height). For optimal viewing, an image sent via email or posted on a webpage should have an image resolution of less than 800x800. It is possible to code a webpage so it loads a larger file as a smaller image, but this is not best practice as it increases page loading time and arbitrarily re-sizes the image pixels.

Make a printed image smaller: Find your image's print dimensions (see directions above). Then, reduce the inches measurement to the desired smaller size (DPI is linked to print dimensions and will change automatically). Do not change the image's pixel dimensions when reducing its print dimensions. Resizing pixel dimensions will decrease the quality of your image and cause it to be blurry when printed. If you are using a program such as Word, you can drag the borders of an image to scale it smaller, but freehand scaling may decrease an image's printed quality.

Make a printed image bigger or clearer: Find your image's DPI (see directions above). If the DPI number is less than 100, the picture quality will be too poor to use. 200 DPI is recommended, and 300 DPI is standard for professional print jobs. If you are planning to enlarge an image, scan it at the corresponding DPI number (200 = 2x bigger, 300 = 3x bigger, 400 = 4x bigger etc.). Remember, start big, then go small. You can always make a picture smaller, but once it is saved as a smaller image, making it larger by increasing print dimensions, pixel dimensions, or DPI will only make the picture blurrier. This is why you should always edit copies and not original image files.

Make an archival image: Archival images should be scanned at 600 DPI or higher. They should be saved in a compressed but not lossy file format such as .tiff. Archival best practices also recommend using a consistent naming scheme and backing up your files in multiple places. Saving to CDs can also help keep your originals from being modified.

Recommended Reading

http://www.ischool.utexas.edu/technology/tutorials/graphics/digital/
http://www.library.cornell.edu/preservation/tutorial/contents.html