

Digital Imaging Basics

Acquiring Digital Images:

- Digital Cameras
- Scanners
- Photo CDs
- Images from the Internet
- Stills from Video

Start with a good photo. Here are some tips for taking good photos:

- Hold it steady. There is nothing you can do to fix a blurred photo.
- Get up close and personal. You want to see the subject, not the background.
- When you're taking flash pictures, don't get too far away from your subject or your pictures will turn out dark.
- Keep people active. Posed shots can make people look stiff and uncomfortable.
- See the light. If the sun is behind you, it may cause the people to squint.

When you take a digital photo, or convert an existing photo into a digital file, there are several issues to consider when working with the file. They are *image resolution*, *file compression*, and *file format*.

What are Resolution and DPI?

Have you ever seen a digital image where you can see little squares in the image, or edges appear jagged? Then you have seen an image with low resolution.

Image resolution: The size of a photo is specified by its dimensions in pixels or by the total number of pixels it contains. Since pixels viewed together make an image, the more pixels you have in your image, the more detail, or resolution there is. For example, an image can be 1536 pixels wide x 1024 pixels high, or contain 1.57-million pixels (1536 multiplied by 1024).

Monitor resolution: The resolution of a display monitor is the screen's width and height in pixels. For example, a monitor may be specified as being 640 x 480, 800 x 600, 1024 x 768, and so on. The first number is the number of pixels across the screen. The second number is the number of rows of pixels down the screen. Most monitors are 72 dpi.



DPI: Printer resolutions are specified by the number of dots per inch (dpi) that they print. For example, most laser printers have a resolution of 300 dpi, most monitors 72 dpi, most PostScript imagesetters 1200 to 2450 dpi.

Higher pixel resolution gives you more detail in your images and more editing and printing options. While you are always able to shrink your digital image to a smaller size by discarding extra pixels you don't need, this process doesn't work in reverse.

Here's why: If you enlarge a lower resolution image, it will appear blurry and distorted. This is because the computer has to guess how many pixels - and of which color - to add to "fill in" the picture in order to make a lower pixel resolution image larger. This process is called "interpolation." The more pixels the computer has to guess at, the worse the enlarged image will appear. This issue of pixel resolution is similar to enlarging photos. If you enlarge them too much, the picture appears grainy.

With the exception of scanning, try to acquire digital images at the highest resolution possible. It gives you the greatest number of options and flexibility. You can always reduce your images in size later if you wish.

Scan a 4 x 6 photo at 200, 300 dpi max – anything beyond that is overkill. Scanning a photo higher than that only produces a larger file, not more detail.

Why does file compression matter?

When digital cameras or scanners capture an image, their saved file size can be large. This may make it difficult to work with the image or transfer it over the Internet. You can reduce images in size by file compression. Here is an example of file compression:

If you have a photograph with a large number of green leaves in it, the computer may try to reduce the size of the digital photograph by lowering the number of colors it has to keep track of. The computer does this by grouping various shades of a color under one heading.

Sometimes file compression is applied automatically by digital cameras and scanners according to what manufacturers consider the best tradeoff between quality and file size. When saving files, you may have the option to choose the level of file compression versus the level of image quality you prefer. Sometimes the only way to determine what quality level is acceptable to you is through trial and error. Most people are comfortable with a quality setting of 7 or 8 on a scale of 10.

TIP: If you are saving a file for the first time, save it at the highest quality setting, since the lower the quality setting you choose, the more information from the original image you will lose. You can always reduce file compression later in your editing software.

Photo CDs, Picture CDs and Picture Disks. What's the difference?

- A **Kodak PHOTO CD** holds 100 images stored in six levels of resolution, ranging from 128 x 192 to 2048 x 3072 pixels. You can add images any time.
- A **Kodak Picture CD** holds a single roll of film that is written when the roll is processed. Pictures are stored as JPEG images at 1024 x 1536 pixels resolution.
- **Kodak Picture Disks** are floppy disks with up to 28 digitized images stored at 400 x 600 pixels resolution. You can have these images scanned at your photo dealer when you have your film processed, or at any later time

What are the differences between file types?

File Format	Compressed?	Notes
.BMP	No	Bitmap. Represents each pixel individually, large file size.
.EPS	No	Used primarily for prepress graphics. Not widely used.
.GIF	Yes	Used primarily for non-photographic web graphics.
.JPG	Yes	Most common type of compressed image file. Widely accepted and used on the Internet and graphic world.
.PSD	Yes*	Photoshop File. Can only be opened in Adobe Photoshop.
.TIFF	Yes*	*Compressed file format, but doesn't "lose" information.

Source: www.shutterfly.com



Editing Digital Images – just the basics!

The first step: Make a copy of your original file before working with it!

When editing, use the highest possible resolution and color depth.

TIP: It may look great on *your* monitor, but how about someone else's low resolution monitor? Temporarily set your resolution to 640 x 480 and display the image.

Slightly out of focus? Sharpen those edges:

The Sharpen effects increase the contrast between pixels where there are significant color contrasts, usually at the edges of objects.

Use the Unsharp Mask option for more control and better results than preset sharpen effects.

Is your photo yellow? Too dark? No contrast? Enhance it!

Use photo enhancement tools to make color corrections, improve the results of faulty lighting, and create special effects. For example, perhaps the photograph has a yellowish cast. Use the Hue/Saturation/Luminance function to remove it. Perhaps the shadowed areas are too dark. Use the Highlight/Midtone/Shadow function to bring out the detail. Perhaps the image is too dark and lacks contrast. Use the Gamma Adjustment function to adjust these two features in unison.

Did you know that every time you perform an operation on your file that requires the software to interpolate your data, you are degrading the image information. For example, it is bad to:

- Convert a file from RGB to CMYK and then back to RGB
- Re-size a file down and then back up
- Change the contrast, brightness, or color balance more than once
- Rotate a file (other than 90°) more than once.

Source: www.pixelphoto.com/html/whacking.html

Save several versions of your image in a lossless format such as .tiff or your graphics software such as Photoshop or PaintShop Pro. .JPG is NOT a lossless format, which means that every time you save as .jpg, it degrades the image even more. Since it is so easy to make a mess of your photo when you are editing it, save your changes as you go in a format that can later be edited without losing quality.

Wasted space in your photo? Only want one face in the group? Crop it!

Use your graphics software cropping tool to remove unnecessary space or grab the parts of an image you want.



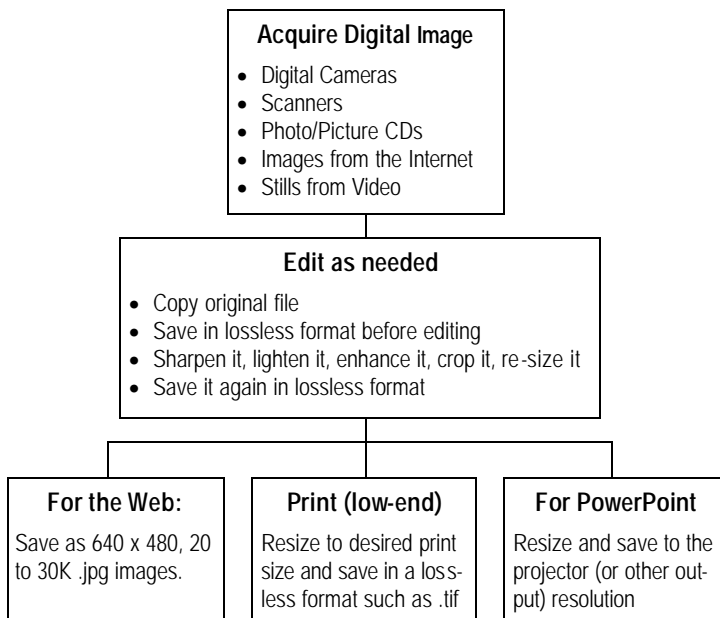
Last step: Resize your image, optimize the resolution and save:

For Print: Keep the resolution high and resize to your desired print size. Save to a new filename.

For Web: Set the resolution to 72 dpi and resize to how you want the image to appear on the screen. Recommend maximum of 640 x 480. Save as .jpg (new filename) and choose an appropriate compression level. Try to keep web images to 20-30K. Small thumbnails can be used to preview a larger file.

For PowerPoint: Resize the number of pixels to your projector resolution (eg. 1024 x 768) or other output display (monitor).

Summary:



Digital Imaging Resources:

Dennis Curtin's shortcourses:

www.shortcourses.com/

and his online textbook:

www.photocourse.com

Kodak's Digital Learning center:

www.kodak.com/US/en/digital/dlc/book1

Digital Photography For Dummies

Book by Julie Adair King

Online Photo Printing Sites:

Sony: www.imagestation.com

Shutterfly: www.shutterfly.com

Kodak: www.kodak.com

Scanning Tips:

www.scantips.com/

www.learn2.com/05/0551/0551.asp

Optimizing Images for the Web:

Analyze jpg images on your computer:

www.webreference.com/services/graphics/jw/

Analyze existing websites:

www.gifwizard.com

PowerPoint presentations:

idea.uwosh.edu/nick/Images.pdf