Digital Image Guide

BOOKSURGE

Digital Image Guide

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Images,

from the one on your book's cover to the charts and graphs that make facts and figures visible, make a significant impact on your readers and potential readers. Your images portray the ideas and concepts in the way you as an author or artist wish for them to. It's one of the many beauties of self-publishing - you decide what images to use and where to place them in your book. For us at BookSurge to represent your ideas with the best quality possible, your images must be submitted in a manner that allows us to do so. We've created this Digital Image Guide to help you understand why your images are so important and how to submit them in order to produce the best looking book possible.

I. Digital Images Overview

Images can exist in many forms. They can be drawn, painted, printed, viewed on a television or computer screen, or projected in a movie theater. For our purposes, we will focus on two-dimensional (flat) digital images that can be transferred electronically via the Internet, email, or other file transfer methods and then printed at a high resolution (more on this later).

In order for BookSurge to work with your images, they need to be in a digital format rather than a hard copy form (a printed copy). Digital images may be illustrations or charts created in a graphic design program* or they may be bitmap images (photographic images made of bits of color) created, acquired or "captured" in several ways. Bitmap images can be created in a paint application, captured with a scanner, taken with a digital camera, downloaded from the World Wide Web (WWW), or transferred from an image source such as a clip art or stock image CD-ROM. They can be stored as various file format types, including JPEG, TIFF, BMP and GIF. **Please note that graphics, clip art, word art and graphs created in desktop publishing program suites do not meet our printing specifications (see example image below).**

In order to create, manipulate or edit high-resolution digital images or illustrations, you will need image manipulation software. This document covers the manipulation of bitmapped (made of pixels) digital images. If you do not have the necessary software to create these graphics yourself, you can do one of the following:

1. Purchase your own image editing software.
2. Go to your local copy shop and use their computers and image editing software to create and format your images (this will usually involve an hourly fee).
3. Hire a graphic designer (you will need to provide them with our exact specifications, trim size of the book, etc.).

**This document DOES NOT cover the creation or alteration of vector images such as charts, graphs, or other non-photographic digital images (if you are interested in learning more about the difference between bitmap or pixel-based images and vector images please see Appendix A). To create or edit vector-based images, you will need a vector-based image manipulation tool.*

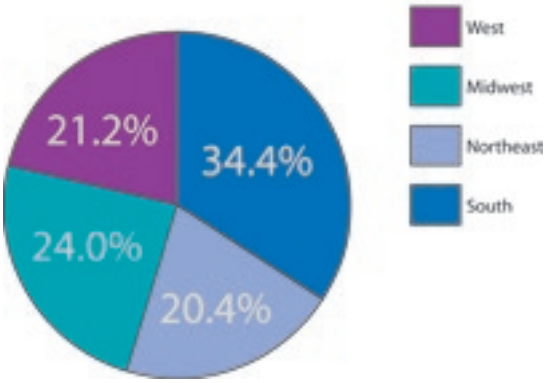
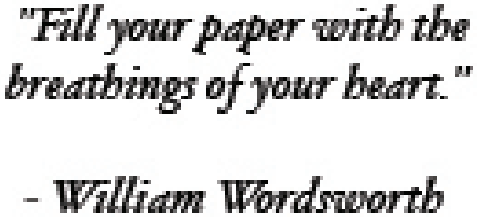


Chart printed from a desktop publishing application



Word Art printed from a desktop publishing application

II. Digital Image Editing

Bitmap Images
As stated previously, this document covers bitmap image editing. Bitmap images are composed of tiny, square building blocks of color known as pixels ("picture elements"), that lie in a grid formation (also known as a bitmap). Bitmap images are the most common electronic medium for photographs and other images. Bitmap images contain a fixed number of pixels. As a result, they can lose detail and appear jagged (sometimes called "aliased" or "pixelated" - see images below) if they are enlarged on-screen or if they are printed at a higher resolution than they were created for.

Image Resolution
Image resolution refers to picture detail or the actual number of pixels that are packed into a digital image. For screen purposes, resolution is defined as the number of pixels per square inch (ppi); for print purposes, resolution is defined as the number of dots per square inch (dpi). For all practical purposes, pixels and dots are essentially interchangeable.

The original resolution of a digital image is determined by the manner by which it was created, captured or acquired. As pixels are transferred to paper as dots when printed, image resolution, as shown below, is a very important consideration. For your image to print clearly with enough detail, the original file resolution needs to be at least 300 dpi. The greater number of squares or pixels per square inch of your image, the more detail or resolution your image has. Take a look at the examples below to see the difference in the print quality of high and low resolution images:

Image printed at 300 DPI

Image printed at 72 DPI

The image on the left's file resolution is at 300 dpi - the standard resolution for print-quality images. The same image is shown on the right at 72 dpi - the standard resolution for web-based images (largely so that they will load on web pages quickly).

What Determines an Image's Resolution?
Short answer - the way it was acquired. The long answer must consider the many ways you can acquire images and how you determine their resolutions.

When an image is saved on your computer, you will typically be able to hover over the file or view its details to see the pixel dimensions. An image from your digital camera might be 2048 pixels x 1536 pixels. To determine what size you can print this image at 300 dpi divide each side by 300 - this number will be the printable dimension (in inches) of your image at 300 dpi.

2048/300 = 6.826
1536/300 = 5.12

This means your image printed at 300 dpi will measure 6.826" x 5.12." You can print your image at this size and smaller without sacrificing its print quality. If you try to print it at a larger dimension, your image quality will most certainly go down.

Once you have determined if your image can be sized to the dimensions required by your book's template, you'll need to have them sized and saved to at least 300 dpi in a JPEG or TIFF format (see Saving Your Image File). This may be done in many ways and will require the use of sophisticated image editing software. Because these programs are complex and costly, you may not have these capabilities on your home computer. However, you can...

1. Contact your BookSurge Author Support Associate to obtain a custom quote for having BookSurge complete the work for you.
2. Go to your local copy shop and ask them to format your images for you (you will need to provide them with information on our specifications, trim size of the book, etc.).
3. Purchase your own image editing software.
4. Go to your local copy shop and use their computers and image editing software to format your images (this will usually involve an hourly fee).
5. Hire a graphic designer (you will need to provide them with information on our specifications, trim size of the book, etc.).

Basic Digital Image Manipulation

Using Image Editing Software

As previously mentioned, image editing software programs can be very complex, allowing you to edit images in a seemingly infinite number of ways. The information presented here is meant to provide you with the basic steps necessary to properly submit your image(s) to BookSurge. The steps below guide you through image manipulation using Adobe Photoshop, one of the many programs that may be used for this purpose.

Changing the Image Size

With Photoshop opened and the image you wish to size opened in Photoshop, choose Image > Image Size from the drop-down menu. A box like the one to the right will appear. This tells us the pixel dimensions and the document size. What is important to us is the document size. We see here that the image is 10.027" wide x 6.667" high at a resolution of 300 pixels per inch (ppi).

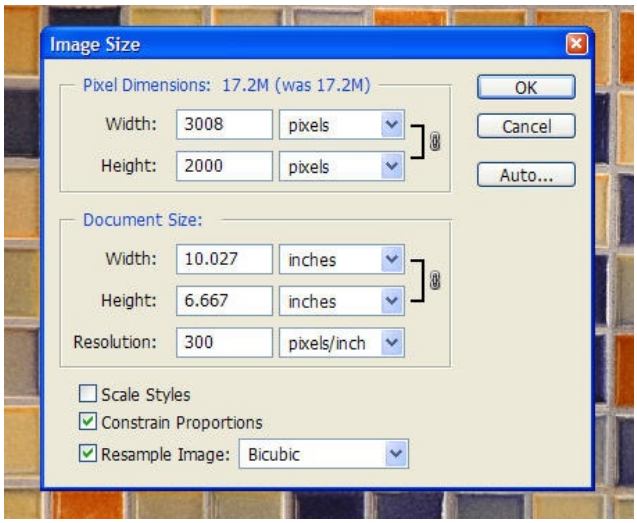


Figure 1

Let's say we want to use this image in the interior of a Size B (6" x 9") book, which accommodates images no larger than 4.75" wide x 7" high. Because this image is already at 300 dpi, we first want to ensure the Resample Image and Constrain Proportions options are checked (Figure 1, at right). We will then enter 4.75 in the width area and ensure inches is selected in the corresponding drop-down menu. The height will automatically be adjusted so that the image's proportions are not skewed. The result is a 4.75" x 3.158" image. When we click ok, the image will be resized to 4.75" x 3.158."

Using Resolution

Sometimes when you open an image in Photoshop, its size will be very large and its resolution very low (this is particularly common with images from a digital camera). We will learn this when we choose Image > Image Size from the drop-down menu. You will see that the image to the right is 23.611" x 15.681" but is only at a resolution of 72 (Figure 2, at right).

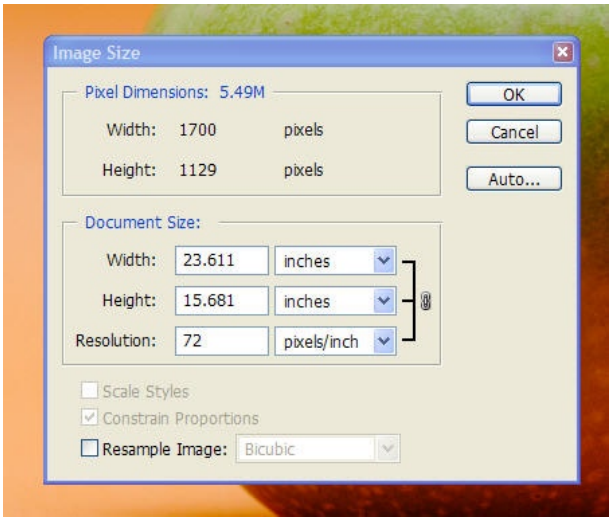


Figure 2

Before opening this image in Photoshop, we checked its pixel dimensions and learned, by dividing each side by 300, that the image can be printed at 300 dpi at a size of 5.667" x 3.763". To change the image's resolution, we want to ensure the Resample Image option is NOT checked - doing this will automatically lock the Constrain Proportions box to a checked state.

When we type 300 in the resolution field, (Figure 3, at right) the width and height in inches will automatically change to the numbers we came up with when dividing the corresponding pixel measurement by 300.

Now that this image is 300 dpi, we can can make it smaller if we wish to by checking the Resample Image option (*resampling* means changing the actual number of pixels used in the file) and following the process detailed above.

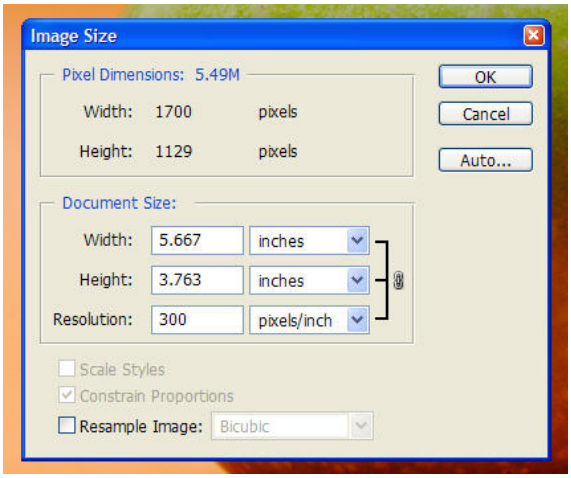


Figure 3

Cropping Images

Resizing the image (with Resample unchecked) keeps all of the pixel information intact. It doesn't, however, allow us to take advantage of the maximum area (4.75" x 7") in the book. This is fine because the resulting image size is perfectly acceptable (see Figure 4 below) and allows us to use the entire image. This image is considered to be in Landscape format, which means it is wider than it is tall. If you happen to have an image that is in a vertical format (often referred to as Portrait format - taller than it is wide), you can insert your image more easily as it more closely approximates the page format proportions.

If we want to use the maximum page area possible, have a Landscape format image and don't mind losing some of the image, we can crop (trim) our image. To be clear, cropping is like cutting off excess image area - it is NOT simply resizing.

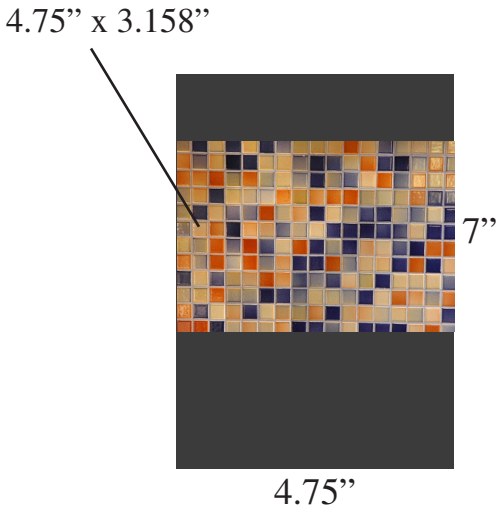


Figure 4

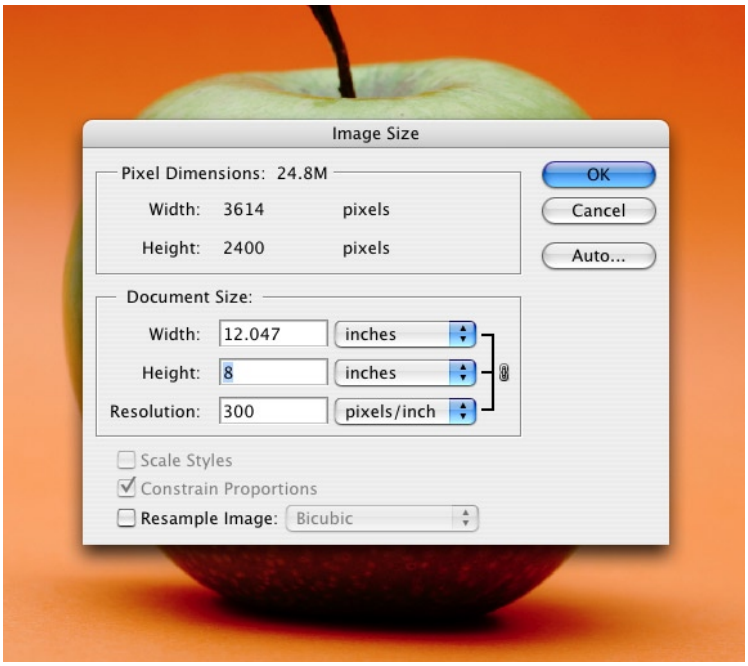


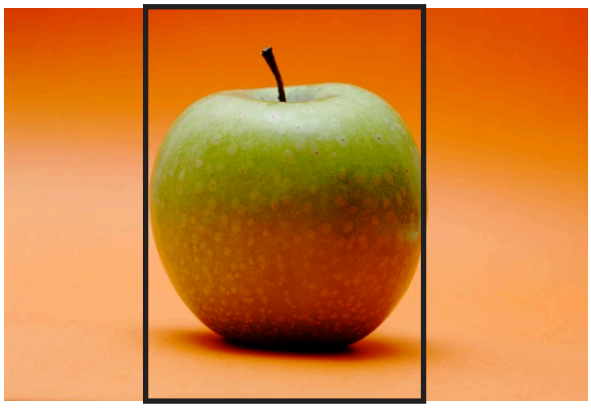
Figure 5

Suppose we have a photograph of an apple that is in Landscape format. We can resize it so that the entire image fits on the page (Figure 7, next page). Or, to use the entire page, we can crop the sides of the image off so that it fills the entire page area. When we open up our image in Photoshop and look at the Image Size, we notice that the size of the image is 12.047" wide by 8" high at 300ppi (Figure 5 above). With Resampling unchecked, we can change the height dimension to 7" and let the width change proportionally. All we have done is size the image down so that it's height matches the maximum page area available. We can now crop off the extra image areas to the left and right of the apple.

There are a couple different ways we can crop our image. The most straight-forward way involves the use of the rectangular marquee tool, which is used for selecting an area of your image.

Select the marquee tool fron the tool box (Figure 6, at right). Once you select the marquee tool your Tool Options Bar (appears at the top of your screen - check your Photoshop help menu if you do not see it) will give you some options. Next to "Style" choose "Fixed Size." In the width box, type "4.75 in" (for inches); type "7 in" into the height box. Now when you click onto your image you will have a fixed selection area that is exactly the size you want for your page. You can move the marquee around by bringing your cursor inside the box and clicking and dragging it around the image area (Figure 7, below). Once you are satisfied with the placement of your marquee, go up to the Image menu and choose "Crop." Your image is now at the exact size needed to fill your book page.

Figure 6



Landscape image cropped
to use maximum image area

Figure 7

Grayscale Image

Figure 8

Further Manipulation

Converting Images to Black and White

Digital Images captured in color from most scanners or taken with a digital camera are in RGB color mode. This means the image is made up of Red, Green, and Blue color information. Each color pixel is a mix of varying amounts (like when mixing different color paints) of Red, Green, and Blue. When you convert from RGB to Grayscale you are discarding the color information and are left with an image that is made up of a range of white to black values (Figure 8, above).

Before converting images, it's best to do the following:
Do as much editing as possible in the image's original mode. Save a backup copy before converting. Be sure to save a copy of your image that includes all layers in order to edit the original version of the image after the conversion. Flatten the file before converting it (ignore this if you are not working with layers). The interaction of colors between layer blending modes will change when the mode changes.

To convert an image to another mode:
Choose Image > Mode and choose the mode you want from the submenu. Modes not available for the active image appear dimmed in the menu. To convert to Grayscale (Black and White), choose Image menu > Mode > Grayscale. If you don't like the way your image has changed you can go to Image > Adjustments > Auto Levels. This will automatically adjust the tonal range of your image.

Converting Images from RGB to CMYK
In order for images to print correctly they must be in a color mode that is best suited for the printing process. The CMYK color mode is used as it's components represent each of the four printing colors: Cyan, Magenta, Yellow, and Black (K).

In Photoshop's CMYK mode, each pixel is assigned a percentage value for each of the printing colors (C, M, Y and K). For example, a bright red might contain 2% cyan, 93% magenta, 90% yellow, and 0% black. In CMYK images, pure white is generated when all four components have values of 0%.

If you start with an RGB image, it's best to edit first in RGB and then convert to CMYK at the end of your process as color values are rounded (to percentages) and some color data is lost with each conversion.

To convert your image's color mode from RGB to CMYK, choose Image > Mode > CMYK. When you convert your image the look of it may change.

III. Saving Your Images

Once you have made any changes to your file - it is in the correct color mode, the resolution is 300 ppi at the correct print dimensions - you will need to save your file. BookSurge accepts two file types: JPEG and TIFF. JPEG images are generally smaller in file size so they don't take up much room on a disk. They are compressed (shrunk) when saved so they do not take up much space, and can therefore can be transferred faster electronically. TIFF files are larger but work well as backup files because they keep all of the original resolution and color data of your original image. If you are saving a layered file in Photoshop you will save it as a .psd file, but if your file does not require individual layers you should save the file as a TIFF for safekeeping.

Once your file is the correct size and color mode for printing you can **save the file as a JPEG**:
1) From the File menu choose "Save As." From within the box that appears, you will navigate to a place on your hard drive or disk where you will save the image.
2) Select the JPEG file format, type in a name for your file (leave the .jpg file extension).
3) Click OK. You will then have another box come up. This is where you choose the quality of your file (see Figure 11, below right). A higher quality JPEG setting (larger file size, less compression) will make the file size larger, but it will print much better.
NOTE: YOU MUST USE THE HIGHEST QUALITY SETTING IF YOU INTEND TO SEND THE FILE TO US!!!
4) Choose the highest Quality setting and click OK.

To save your file as a TIFF:
1) Choose File > Save As
2) Select TIFF as the file format. Enter a file name (leave the .tif file extension). Leave the default TIFF settings.
3) Click OK

Congratulations! You now have a print-ready image file you can send to us!

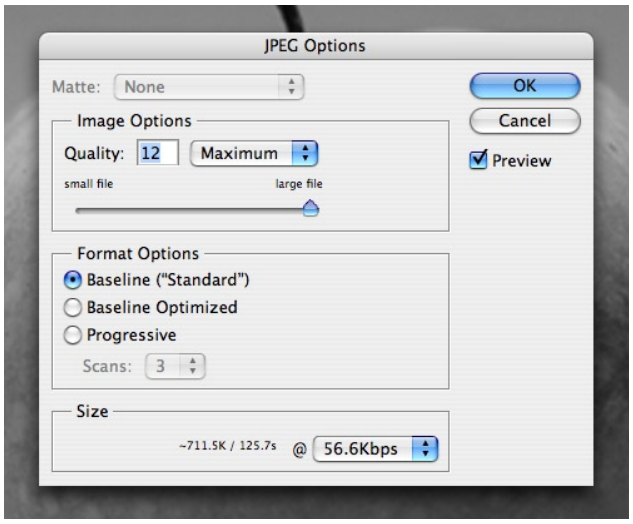


Figure 11

APPENDIX A

Bitmap Images Vs. Vector Images

Computer graphics fall into two main categories--vector graphics and bitmap images (see Figures 1 and 2 below).

Bitmap images, also called raster images, are composed of small squares, known as pixels, that lie on grids (also known as bitmaps or rasters). Bitmap images are the most common electronic medium for such continuous-tone images as photographs or images created in painting programs like Adobe Photoshop. Bitmap images are resolution-dependent--that is, they represent a fixed number of pixels. As a result, they can lose detail and appear jagged (sometimes called "aliased" or "pixelated" - see Figure 1) if they are enlarged on-screen or if they are printed at a higher resolution than they were created for.

Bitmap images often require large amounts of storage space, and often need to be compressed to keep file sizes down (see Saving Your Image File).

Vector graphics are made of lines and curves defined by mathematical objects called vectors. You can freely resize or magnify vector graphics without losing sharpness, because they are resolution-independent--the number of pixels used to display a vector graphic is determined by the resolution of the monitor or printer, not by the graphic itself. This is because a vector graphic is not converted to pixels until it is displayed or printed. The shape objects you create in programs such as Adobe Illustrator or InDesign are vector images.

Examples of bitmap and vector images at different levels of magnification:

Figure 1

Bitmap Image
(made of pixels)

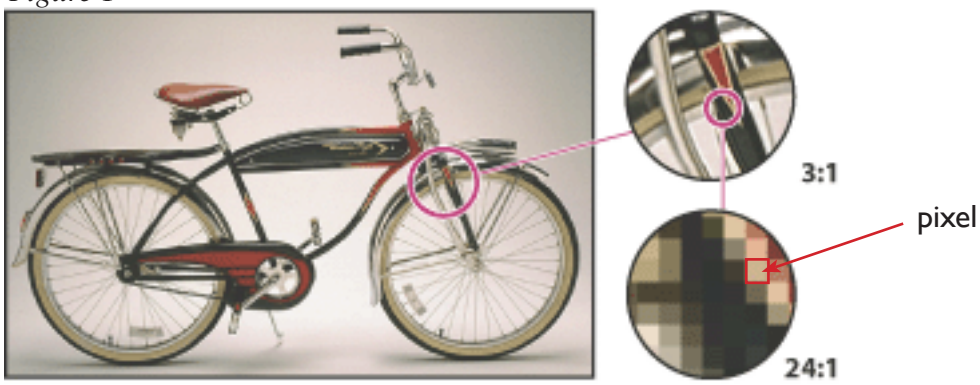
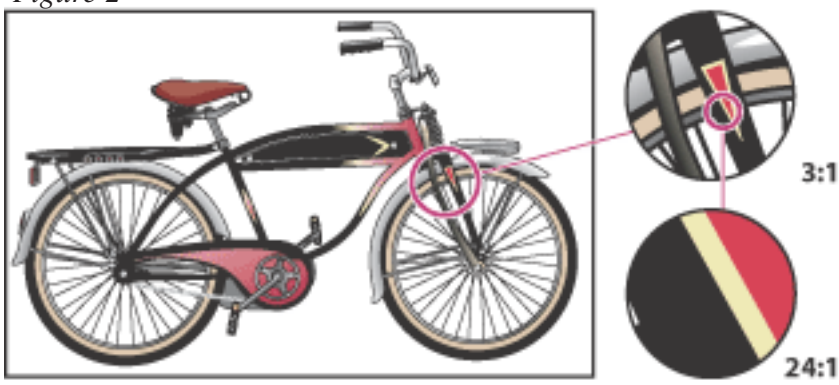


Figure 2

Vector Image
(made of lines and curves)



Note: Because computer monitors can display images only on a grid, both vector graphics and bitmap images are displayed as pixels on-screen