

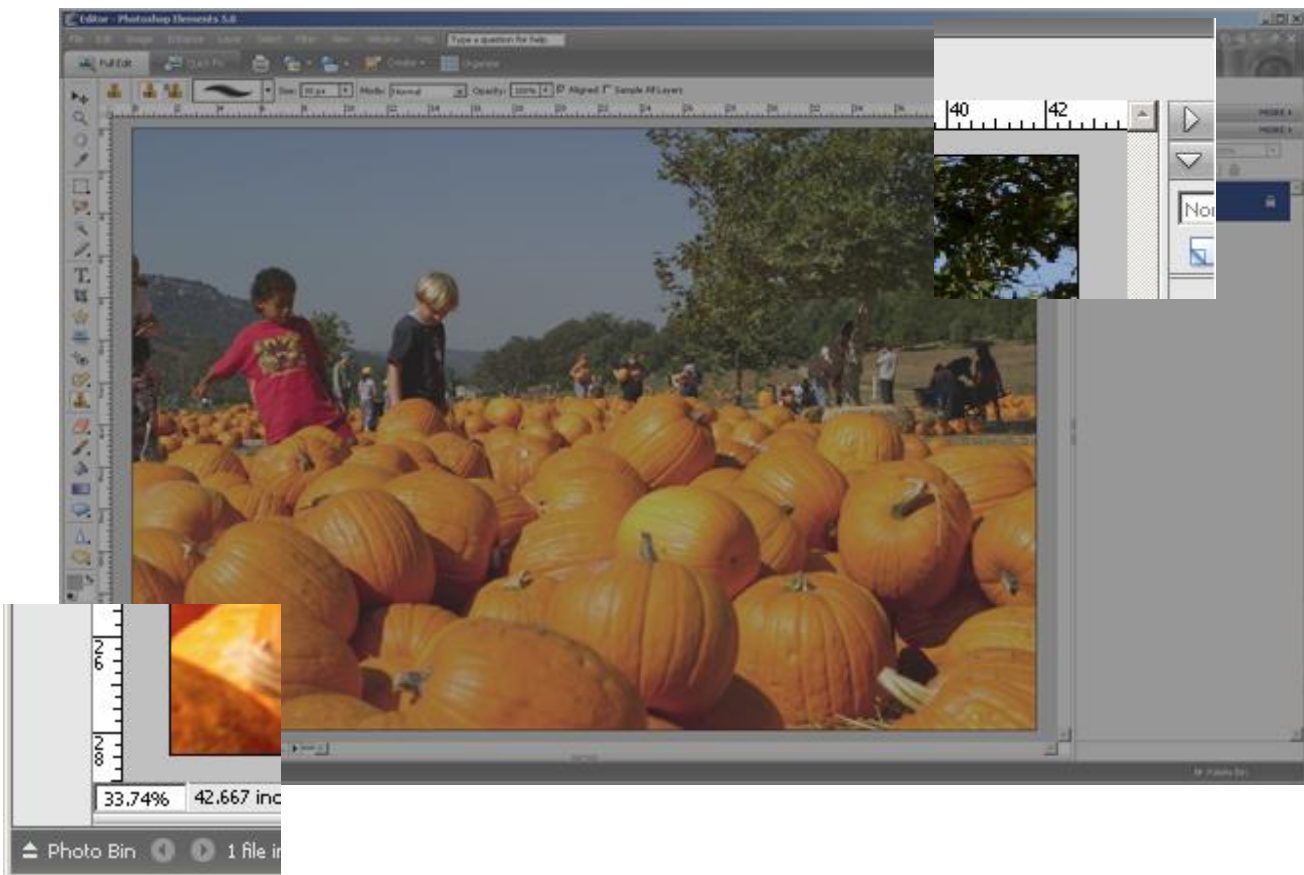
Megapixels, Resolution and Size

Monday Morning Tip

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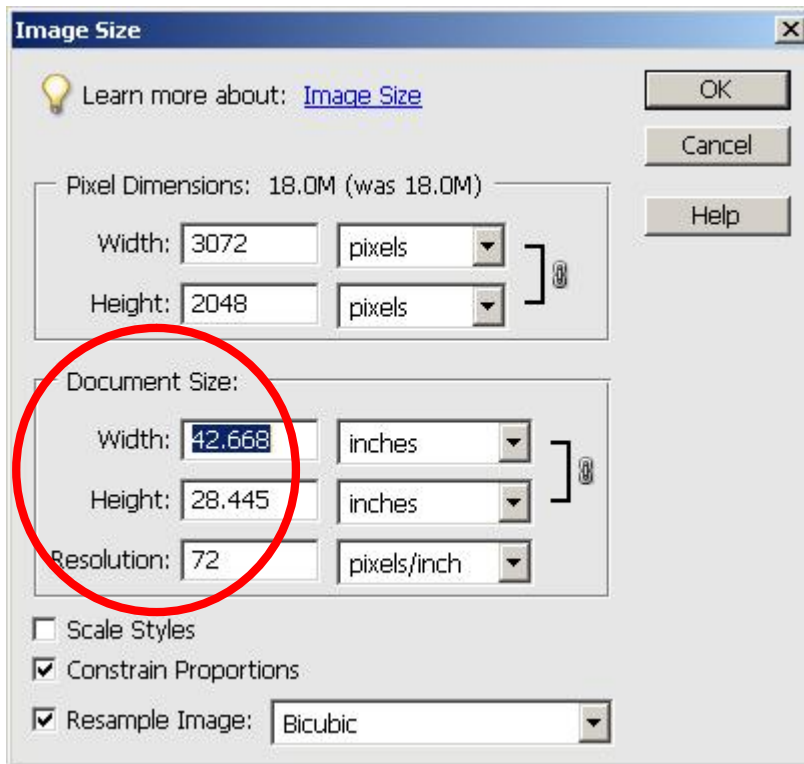
Something that consistently confuses new digital photographers and even some experienced photogs is the relationship between megapixels, resolution and image size. It wouldn't be such a big deal except that many photo editing programs like Photoshop Elements and Photoshop will instantly damage your file if you're not aware of these terms. Let's quickly review the basics so you can avoid damaging image files before you even learn how to fix them.

First, let's get our minds around some basic concepts about changing image size and resolution. Image size is meaningless until we actually print an image. I'm sure everyone has noticed that images can be displayed at any size on the screen. The photo below shows that it launches as a 42.668" x 28.445" image based on the rulers. This, obviously, is a tad large for most uses.



The first thing most people do is click **Image** ® **Resize Image** ® **Image Size** which brings up the **Image Size** dialog box (next page).

Because it seems straightforward and simple, most people simply plug in the desired **Document Size, Width** and **Height** in inches and click **OK**. At that moment, your photo is in imminent danger of being irreparably damaged. You still have one last chance to avoid this by immediately clicking **File** ® **Save As** and saving the file with a new name. If you click **Save**, the file will be saved with the same name over the original file and your original file will be forever lost.



So, what happened and why? Notice the box titled **Document Size**. In it there are three fields labeled **Width**, **Height** and **Resolution** with **Resolution** currently set to 72 pixels/inch. Above, there's a box titled **Pixel Dimensions** that currently displays **18.0M (was 18.0M)** with fields **Width 3072** and **Height 2048**. If you divide 3072 by 72, you'll arrive at 42.668" (rounded up). If you divide 2048 by 72, you'll get 28.444" (rounded up).

At the bottom of the dialog box, you'll see a **Resample Image** is checked and **Bicubic** is in the drop down menu.



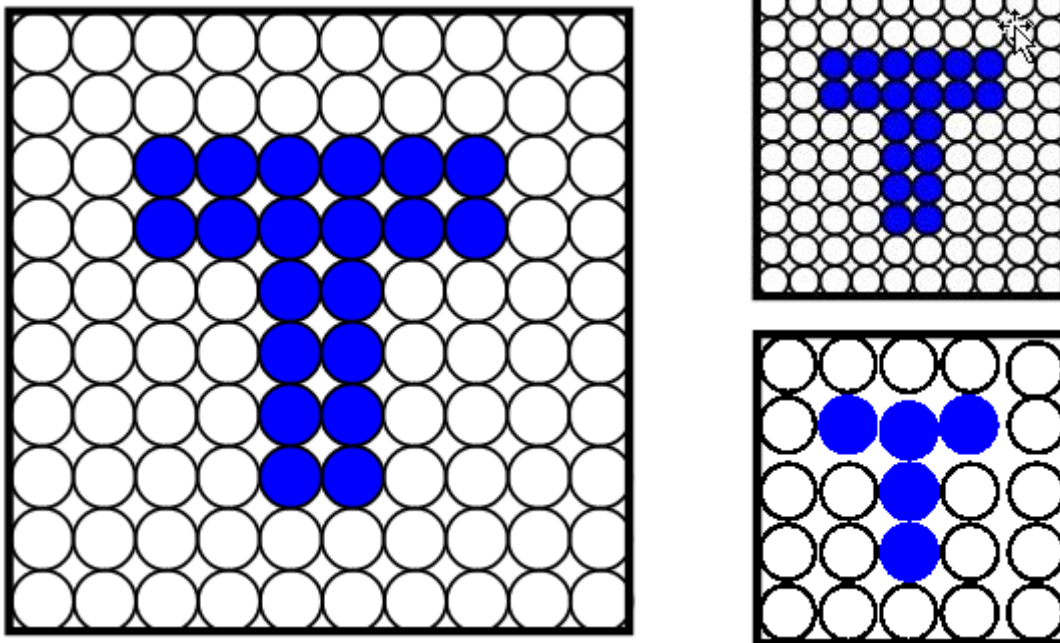
If I enter **Width 6"** and **Height 4"**, **Pixel Dimensions** drops to **Width 432** and **Height 288** because **Resample** tells the program to discard extra pixels. Now, instead of 3072 pixels by 2048 pixels (18MB of data), the image only has 373,248 bytes (124K pixels) of data, not enough for a high quality photo.

If you later decide to print an 8" x 10" photo, you'll be limited to the same 124K pixels which means you'll only have 4.32 pixels per inch. Considering that a high quality print requires about 240-300 pixels per inch, you can see how the image will not be acceptable.

Bottom line, uncheck the **Resample Image** box before you enter a new **Document Size** and click **OK**. This will prevent the program from throwing away extra pixels. The only time you use resampling is when a photo is being prepared for Web use where 72PPI is perfectly acceptable.

OK, I know there are still some of you scratching your heads and wondering, “What did this fool just say?” It’s not a particularly simple concept when you first hear it and it can get even more confusing as you think about it so here’s an analogy that I hope will help you.

For simplicity, think of 100 ping-pong balls that are 1” in diameter (I know, real ping-pong balls are 1.5748” but humor me). These are magic ping-pong balls (hereafter mPPBs) that can be any color you want. You want to make an image using these 100 mPPBs in a frame exactly 10” x 10”. Therefore, you arrange 10 rows of 10 mPPBs per row, a total of 100 mPPBs. Suddenly, your psychotic boss wants you to use 5”x5” frames. You can only fit 25 mPPBs into each frame. You can resample the image by throwing away 3 out of every 4 mPPBs. As you can imagine, the results will be ugly and your psychotic boss will go ballistic. However, what he doesn’t know is that these mPPBs that can change size as well as colors. You quickly chant the magic incantation and voila, the mPPBs are now just ½” in diameter and you can fit all 100 mPPBs into the 5”x5” frames. In fact, the images look even better because the small mPPBs create smoother transitions between colors and edges.



The next day, your psychotic boss wants you to use 20” x 20” frames. You again wave the magic wand and now the mPPBs are 2” in diameter. Again, all 100 fit into the new frame but this time it doesn’t look quite as good. When each mPPB (aka pixel) is made larger, the transitions and edges aren’t as smooth so the photo starts looking ragged instead of having smooth lines. In order to make the photo look better, you go back to 1” mPPBs and fill in the extra space with standard PPBs (sPPB) that have been painted to look like the mPPBs next to it. So, an sPPB next to a black mPPB would be painted black but an sPPB next to a purple mPPB might be mauve or lavender or just plain ugly. Things don’t look quite right but it’s better than 2” mPPBs.

Moral of the story: it’s easier to make a photo smaller than it is to make it bigger but anytime you resample, it’s going to lose something.