



Resolution, PPI & DPI

Objective: Members of the club have had some discussion and confusion regarding how to **resize** images for viewing on screen, projector and for creating prints. The aim of this document is to hopefully clarify this particular application.

Part 1 – Definitions; Part 2 - Précis; Part 3 - Prints; Part 4 - Projector, Screen etc.

Part 1: Definitions:

Pixel:

A **pixel**, (picture element), is the smallest digital unit of addressable information used to create an image on a screen.

Resolution: (of the photo image)

The Resolution relating to a digital image is the pixel dimensions from the **width** and **height**, also termed the 'pixel count'. This number can also be used as a single number, e.g. 30 megapixels, (approx. width x height).

*[When you obtain a camera, the manufacturers' specifications will state the maximum image resolution of the device, e.g. 30 megapixels, with a maximum resolution of:
6720 wide x 4480 high, (6720 x 4480 approx. 30 megapixels)].*

Pixels Per Inch, PPI:

Are the measurements of the pixel density of the image which determines its size **when printed**. It can be used to modify the print dimensions of a digital image **without resampling**, then the original image pixel count of the will not alter.

(**Resampling** Image - checkbox is only for changing the "Pixel Dimensions" when the image is to be used for screen, web or projected images).

Dots Per Inch, DPI:

DPI only refers to, and is a function of, **a printer**, where tiny dots of ink are put on to the medium. The printer internal software does not correlate directly with the PPI from the post processing software.

DPI should not be used to refer to any aspect of a photo digital file or processing.

Decide what the image is to be used for, e.g. print, web, screen, projector, email etc. and crop and size accordingly.

Part 2: Précis

Make copies of your original photos and only work on the copies.

For Prints:

- Decide Photo print size required.
- Crop image if required to ratio of the print size, e.g. '9 x 6' (3:2 ratio)
- Open Image Size Application.
- Ensure the "Resample Image" box is **unticked**.
- **Tick** "Constrain Proportions", (*retains the Aspect ratio*).
- **Don't change the "Resolution" - Pixels** per (inch or centimeters), just check it is 240 or more; if less your cropped photo is too small.
- Sharpen image
- **Select File>Print etc.**

Considering an Image for Projector, Screen, etc.:

- Decide on the destination and size of the finished photo.
- Crop to the required ratio, e.g. 4:3 (i.e. for 1400 x 1050)
- Open Image Size Application.
- **Tick** "Constrain Proportions", (*retains the Aspect ratio*).
- **Tick** the "Resample Image" check box
- **Ignore** the "Document Size" information, (only for print)
- **Adjust** "Pixel Dimensions" for Width & Height
- Sharpen image
- Save the document as a jpg in sRGB colour space.

Part 3: Detail, considering an image for printing:

It is generally agreed, to create a good **PRINTED image**, (amongst other considerations), the '**pixels per inch**', (**PPI**) of the printed image needs to be 240 ppi, or greater, when used with post processing to produce a **printed image**.

To get a ppi number for any digital photo **you need to know the intended print size**.

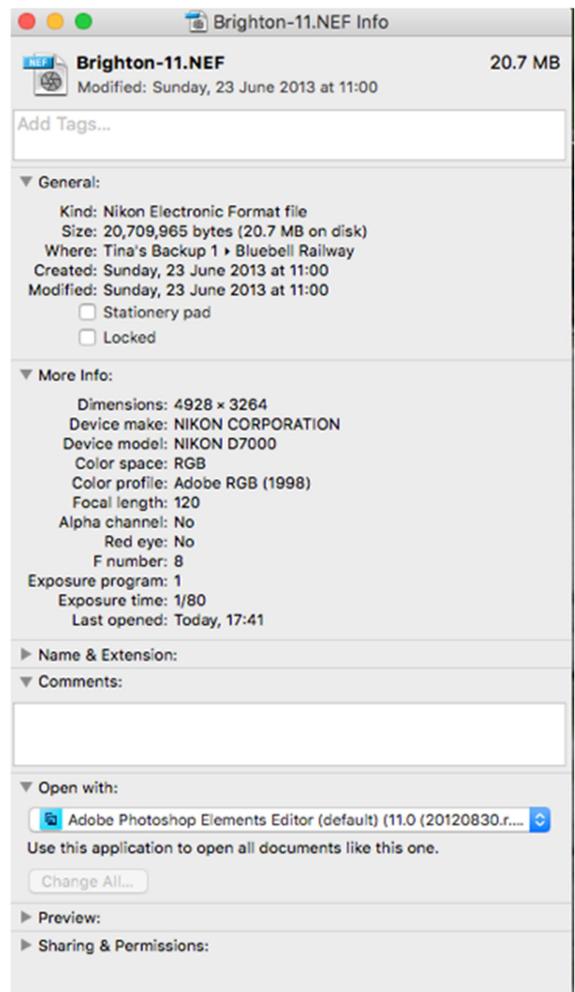
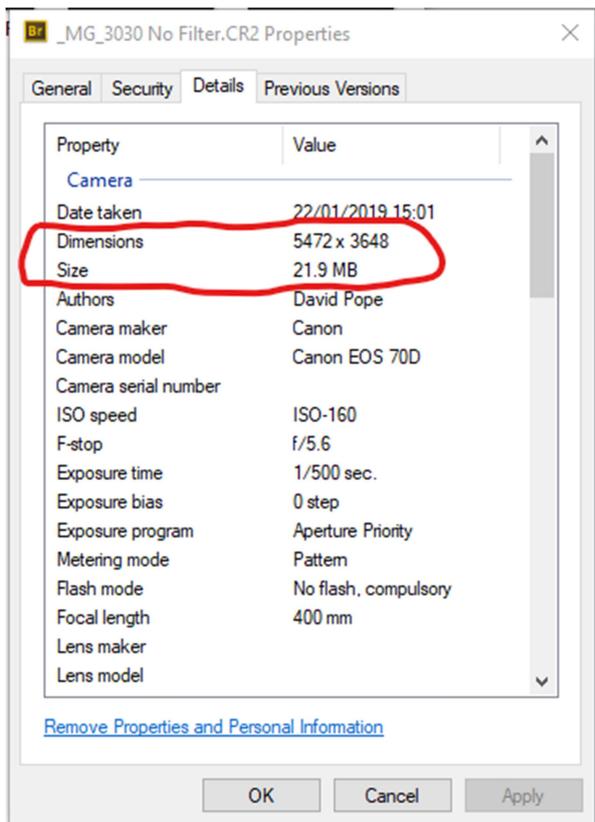
For example, a digital image that is desired to be 300 ppi when printed to 9" x 6".

9" x 6" photo is 2700 x 1800 pixels, (i.e. 9" x 300ppi, 6" x 300ppi).

When you **crop** your image you need to be aware that you need **sufficient pixels** for the **size of any intended print**, otherwise you will get jagged edges from the square shaped image pixels.

You can view the attributes of the image on your computer, [*but remember cropping will reduce these values*].

For example, on a MAC, to obtain information on an image, right mouse click on the thumbnail and select "get info" from the dropdown, (*see adjacent image on the right*).



To obtain information about an image on a PC, right mouse clicking on the image, select "Properties", then the "Details" tab, (see image above on the left).

Using the PC example of the 'properties>details' - dialogue box, the file size is 21.9MB. However, the **Pixel dimensions are 5472 x 3648**, i.e. the pixel count from the camera in this example is 5472 wide by 3648 high.

Therefore the **maximum** size for a printed image at 300 ppi resolution is:

5472 divided by 300 ppi = 18.24" wide.

3648 divided by 300 ppi = 12.16" high.

[In post processing the photo would likely be cropped to an 18" x 12", (3:2 ratio), to fit the nearest standard photo paper size, i.e. 18" x 12" photo paper; or sized smaller to fit whatever size of photo paper was desirable].

Print:

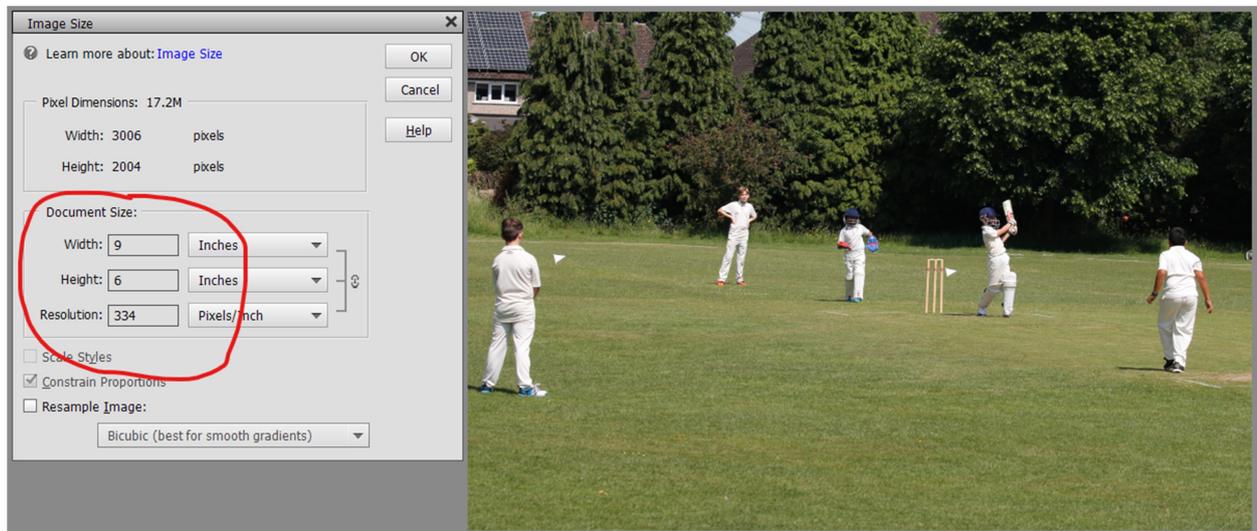
Decide the size of the photo paper you are going to use.

For instance 9" x 6", (3:2 ratio).

Open your post processing editor

Crop the photo image to the 3:2 ratio

Open the resize 'application/tab'



Notes:

Do not tick the "Resample Image" box.

Tick "Constrain Proportions", (retains the Aspect ratio).

"Scale Styles" box is only applicable if you have added effects into your layers.

Ensure the "Document Size" **units** are either Inches or Centimeters, your choice. However, if you are working to a photo size in inches, it is easier to keep this value in "inches".

Note the size of the above Image after cropping, i.e. "Pixel Dimensions" is 3006 x 2004.

As it has been cropped to 3:2 entering a 9 (inch) in the "Width" box will automatically put a 6 (inch) in the "Height" box.

Therefore the "Document Size" (i.e. print) will be 9" x 6"

As long as the value in the "Resolution" box is greater than 240 ppi, the print will be fine.

Do not change the "Resolution" value, it will alter the width & Height.

As long as the "Resample Image" box is not ticked the Resolution value will not affect the "Pixel Dimensions".

Click OK

Sharpen Image

Print by first checking the printer settings are correct for your photo.

Part 4: Considering an Image for Projector, Screen, etc.:

If the Image is for a club projector it will need to be to be cropped to a ratio of 4:3, (or 3:4, if in portrait). Then, (currently), sized to 1400 x 1050 pixels, (or 1050 height for a portrait). [*Web & Screen sizes will be different*].

(We are only interested in the "Pixel Dimensions"; therefore ignore the "Document Size", [*as this is for prints*]).

Once you have cropped your image to the desired size:

Open the image size application.

Tick the "Constrain Proportions" check box.

Tick the "Resample Image" check box (*as now we need to change the amount of pixels of the image*).

Using the cricket image example:

Crop the image to the 4:3 ratio, (or 3:4 if portrait).

Set the pixel dimensions after cropping to 1400 x 1050 (or 1050 height for a portrait).



Ignore the "Document Size" details

Click OK

Sharpen the image.

Rename & save the document as a jpg in sRGB colour space.

(David Pope 2019)