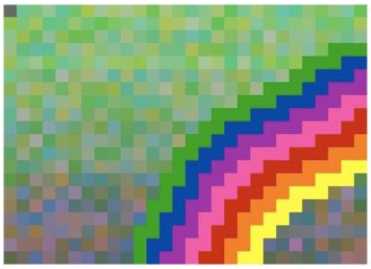
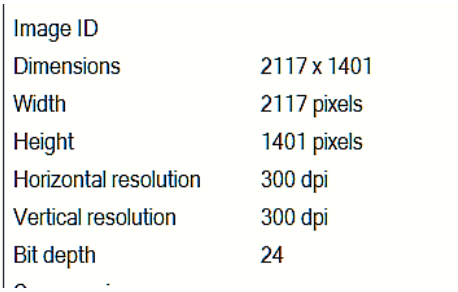
Pictures and Printing

Pictures

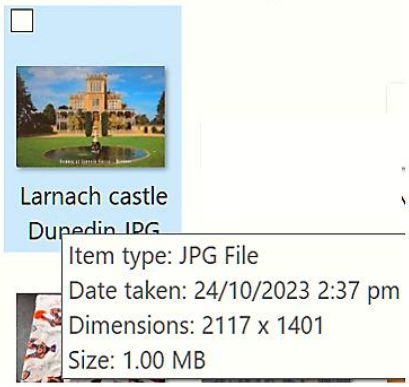
When you see a picture on a screen the structure and colours of the picture are made up of Pixels. Pixels are “Picture elements” and are tiny squares of colour, each containing the colour relevant to that part of the picture. Zoom in extremely close on the photo on your computer screen and you’ll see the pixels: rows and rows of tiny little squares. The old imperial designation of how many pixels there are in each picture is still used- **PPI**- Pixels per inch.



If you hover over a picture you will see how many Pixels there are associated with the picture.



You can see more details by right clicking on an image and select “**Properties**” and “**details**”.



You may have seen that Pictures have a size made up of Kilobytes (KB-Thousands) and Megabytes (MB-Millions).

This picture is made up of 2117 Pixels horizontally and 1401 Pixels vertically. The storage space (1 MB) this picture uses on your computer is measured in Kilobytes or Megabytes.

The larger the dimensions mean a larger, higher resolution picture that takes up more space. A good cell phone takes images of around 5 MB. You can change this on your phone. In a colour photo there are about 3 **Bytes** per pixel.

Structure: Each pixel consists of three sub-pixels- its **Colours:** The sub-pixels each are coloured **Red, Green, and Blue**, which are the primary colours of light, allowing them to mix and create a vast range of other colours. The adding all three colours at full intensity creates white, while no light (all colours are off) creates black.

Each sub-pixel can have 256 different brightness levels (0 to 255). That is 256 varying intensities of red, green and blue. An amazing range of total variations.

There are thee major secondary colours. Yellow: Produced by setting both the Red and Green sub-pixels to high intensity (255) and the Blue sub-pixel to off (0). **Purple/Magenta:** Produced by only activating Red and Blue sub-pixels (Green is off). **Cyan** is made by activating Green and Blue (Red is off). **White:** All three (R+G+B) are at maximum intensity.

In printing, the cartridges and tanks contain the three major secondary colours, cyan, magenta and yellow and black which is designated “K” (CMYK)

- Note. LCD screens are different. **LCD (Liquid Crystal Display).**These screens use a constant white backlight. The pixel itself doesn't glow, but rather acts as a gate. Liquid crystals rotate to allow more or less light through, which then passes through red, green, or blue filters in certain intensities to produce the colour.

  The better the quality of an image depends upon how many pixels you pack into an inch (PPI).

  Printing Inkjet Printers

  Inkjet printers create images and text by spraying thousands of microscopic, precise droplets of liquid ink onto paper. A moving print head uses either heat (thermal) or vibration (piezoelectric) to force ink through tiny nozzles. The printer combines CMYK (cyan, magenta, yellow, black) colours to create, high-quality, detailed prints. Key Components and Process: Print head: Moves back and forth across the paper on a carriage. Nozzles: Tiny holes (roughly 10 micrometres in diameter) that spray the ink. Ink Cartridges or ink tanks supply liquid ink to the nozzles. Stepper Motors feed the paper through the printer. **Drying:** The ink is formulated to dry quickly upon contact with the paper.

  The dots are extremely small (usually between 50 and 60 microns in diameter), so small that they are tinier than the diameter of a human hair (70 microns)! The dots are positioned very precisely, with resolutions of up to 1440 x 720 dots per inch **(Dpi).** The dots have different percentages of the colours from the inkjets combined together to create photo-quality images.

  The quality of the printing depends upon the number of dot of ink you can fit into an inch of paper**. (DPI).** Yes the old imperial measurement is still used.

  The higher the Dots of ink per inch (DPI), the better quality of the image, colours should look better and blends between colours should be smoother. You'll also use more ink and the print job will be slower. You can choose the number of DPI used by your printer.

  A 1200 DPI printer will use up to 1200 dots of ink in every inch (across and down) to make up the colours. If you were printing at 300 DPI then there would be only be 300 dots per inch. Actually this is a good level of printing which I use for photographs. For documents I would use a 100 DPI. This saves ink.

  . This is how the calculation works

  Here is a one inch square with 1200 dots across from the printer and 1200 dots down. At 300ppi this same square has 300pixels across in 1 inch and 300pixels down.

  So 1200 dots across ÷ by 300 “pixels” = 4 colour dots in each “pixel” across

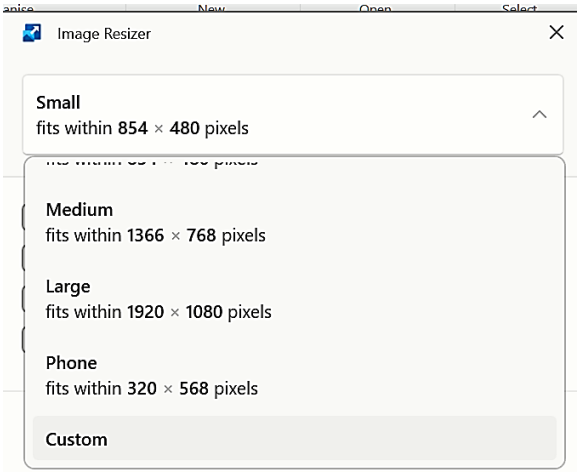
  With 4 dots per “pixel” down as well there will be 4 x 4 = 16 dots printed in each “pixel”

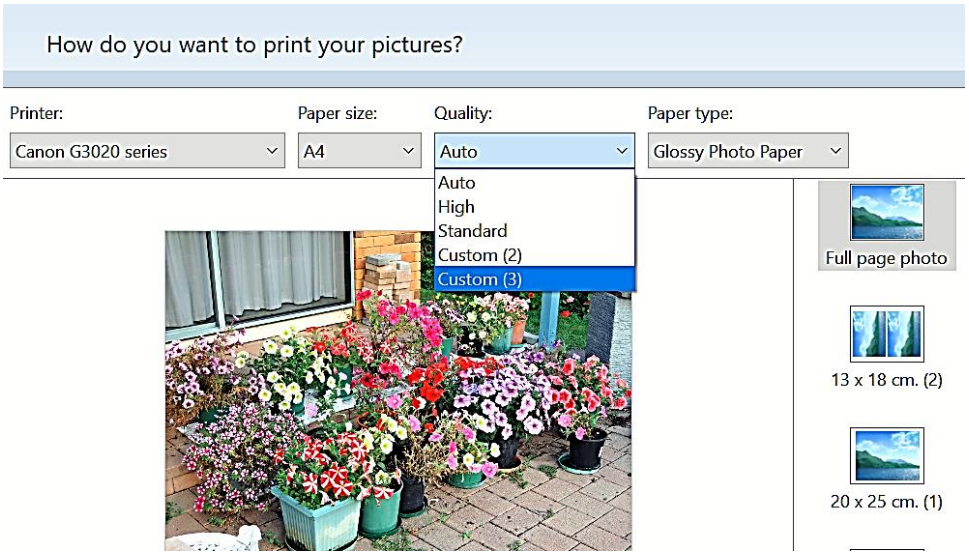
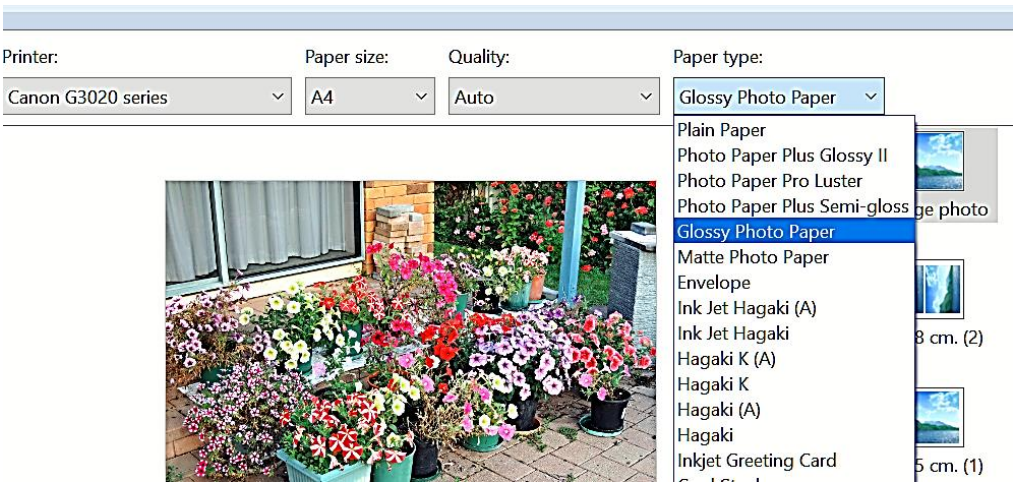
Notes

When you download an image chose a good file size. You can always reduce the fle size to a quality that you want. However to increase a file size will cause lack of quality.

I have written a tutorial on a good image free resizer, which I use, from the Microsoft Play store.

This is an example of the image resizer →



When you print, your printer will usually, in its printer properties, give you the option of different types of quality such as Photos, text, draft.

Microsoft's own Window printer app does a good job with many options.