Pixels, Resolution and Quality
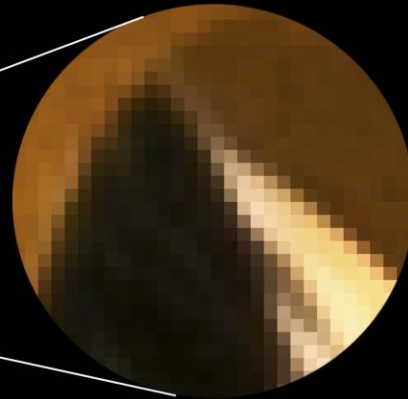
Chiltern U3A Digital Imaging Group

Pixels

- Pixel = Picture Element
- Properties:
  - A single solid colour
  - No detail

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Resolution

Defined by number of pixels in image

e.g. A 6 Mpixel image might be 3000 pixels wide by 2000 pixels high

Defines the amount of detail in the image

How many pixels do you need?

For Display (and everything else except printing)

Computer screens (projectors, TV, photoframes, etc) are typically 1280 x 960 pixels.

An image of 1280 x 960 can be displayed full size.

An image of 2560 x 1920 can only be displayed at 50%

Therefore, for display, you never need more than about 1.3 Mpixels!

How many pixels do you need?

For printing

Printers are capable of much finer detail.

The eye cannot see any finer detail than 300 pixels per inch.

For a 10" x 8" print you need 3000 x 2400 pixels = 7.2 Mpixels

(In practice, 200 ppi is adequate)

Confusion!

Resolution is measured in pixels per inch (ppi), NOT dots per inch (dpi).

(dpi is a measure of printer technology)

ppi alone is meaningless.

(ppi plus the image size in inches makes sense but just the number of pixels is best)

Resizing

If you reduce the resolution of an image the fine detail is lost.

You cannot get it back by increasing the resolution later.

Colour

The colour of a pixel is made by mixing Red, Green and Blue light in different proportions.

Intensity of each colour given by number between 0 and 255

e.g.:

Black	0,0,0.
White	255,255,255
Mid grey	128,128,128
Bright Red	255,0,0
Dark Blue	0,0,128
Yellow	255,255,0

Histogram

Even spread of values shows correct exposure

All bunched at left hand end shows under-exposure

All bunched at right hand end shows over-exposure