I like the technical side of photography and its post production work. But I still wish that somebody had explained how my camera worked when I first started taking photos within the Camera Club. This is not to say that the club let me down but rather that it took a while for me to full grasp the workings of my camera.

So what I would suggest for new members with limited or no experience is something along the following lines:-

Aperture:-

Aperture (and shutter speed) are one of the most important concepts in photography and they can do a lot to change the look of your photo.
How do you identify them? Now that you have a camera with aperture (A or Av) and shutter speed (T {for time} or Tv {for time value}) controls (a mode dial with PASM or P/Tv/Av/M) and you take it outside and half-press the shutter, two numbers should pop up: One might have an *f* in front of it (ie. f3.5) or it will be a decimal of sorts (i.e.. 4.0). That number is the aperture. The other number (if you're outside) should be larger, say around 200-4,000. That's the shutter speed.
In this case one two hundredth of a second or one 4000 thousandth of a second.

The aperture is the size of the lens opening. It controls the amount of light let in: a larger aperture lets in more light, while a smaller aperture lets in less light.

Open aperture (f/1.8)

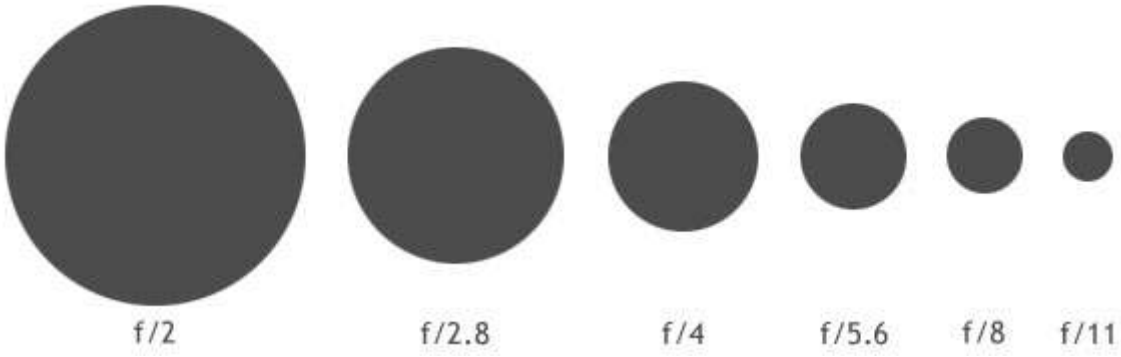
Small aperture (f/16)

An aperture is made out of aperture blades (usually five to nine) that form a rough circle to control the size of the opening, and therefore the amount of light let in. The size of the opening is that *f*/ number that I described earlier. Basically, that *f*/number is a ratio of focal length to aperture diameter. *Do you need to know this? Not really*, except you should keep in mind that the aperture is a ratio.

Simply put, the smaller the *f*/number, the larger the opening (f/2 = 1/2; f/16 = 1/16).

That's all I'm going to explain here because it's an extremely complicated topic. There's plenty of places on the web that explain it in great detail.

On the next page is a diagram of *f*-stops. Each *f*-stop (or just a *stop*) lets in half the amount of light of the previous *f*-stop.



Now, lets get on to why this matters and how it can change what your picture looks like.

Basically, a larger aperture (lower *f*/number) will have your subject (say a person) in focus, and everything in front of and behind it blurry.

A smaller aperture will have ALL your subject in focus and everything in front of and behind it quite focused as well.


f/2, background is blurred


f/11, background is in focus

Summary: Large aperture, background out of focus; small aperture, everything in focus. (Large aperture = smaller f-number, small aperture = larger f-number).

Shutter Speed:-

Shutter speed is a much simpler concept to understand. It's basically how long the sensor in your camera is exposed to light. How long the shutter stays open depends on how much light there is. *For pictures with the same aperture setting*, if the is shutter open too long, the picture will be too bright, and if it's not open long enough, the scene will be too dark. Therefore, you control the overall exposure (lightness and darkness) of the scene with both the aperture and shutter speed control.


Shutter speed too short


Just right


Shutter speed too long

Your camera usually judges this for you, but you can manually set it as well. The shutter speed is the other (usually larger) number that isn't the aperture value. This number is actually a fraction, so if you see a shutter speed of 4000, it's actually 1/4000th of a second, while a value of 200 is 1/200th of a second. Now, remember how I mentioned stops in the aperture section? Well, they also apply to shutter speed, but in a slightly different way. By halving the time of exposure, you're letting in half the amount of light (so if you go from 1/2000 sec to 1/4000 sec, then you're letting in half the light). The opposite is true for doubling the exposure time.

What you can do with shutter speed is freeze motion with a fast shutter speed or capture movement with a slow shutter speed. Flowing water looks silky smooth at speeds slower than 1/8th of a second (with a tripod), while you can freeze water in time with fast shutter speeds. The same thing goes for hip hop dancers.

Slow shutter speed (1/15th sec)

Faster shutter speed (1/160th sec)

Summary: Fast shutter speed = freeze action.
Slow shutter speed (with tripod) = silky flowing water.

This picture was taken on a Bendigo Camera Club outing to Port Campbell. I used a Tripod with the Aperture set at f22 with a shutter Speed of 30 seconds. Note the silky effect of the water.

How Aperture and Shutter Speed are Related:-

Aperture and shutter speed are permanently bound together like an old married couple. For the same scene, if you open the aperture, you increase the shutter speed, and if you close down the aperture, you decrease the shutter speed.

Megapixels Explained:-

A pixel (a shortening of picture element) is the smallest component of an image. Put simply, a pixel is a small coloured dot, which combined, make up an image. A megapixel, is a million pixels. Your camera may be 10 or 20 megapixels for example.

On the left is the full image of a deer, while on the right the area in the red square magnified to show individual pixels.

The more pixels your camera is capable of capturing, the better the detail and quality of your image or picture. Think of a pixel as a tile in a mosaic; the smaller the tile, the more detail can be represented by increasing the number of smaller tiles used. The amount of megapixels required by you is dependant on how much you would like to enlarge the image, or how much you will crop from an image. Small megapixel cameras (say 3 or 5) are not able to be enlarged very much more than a standard photograph size (say 6" X 4"); and cropping a small image will decrease the image quality further. An image that has been cropped or enlarged past its resolution is characterised by a low quality blocky appearance. Therefore, the more megapixels, the better your images will fare when being cropped or enlarged.

White Balance:-

With film you can buy "daylight balanced film" for shooting outdoors or "tungsten balanced film" for shooting indoors under normal domestic lighting (not fluorescents!). If you use daylight film under tungsten light the images will be very yellow. If you use tungsten film in daylight the images will be very blue. With film you have to correct for the "color temperature" of the light using filters or by the right choice of film.

With digital cameras you can pick your *white balance* to suit your light source, so that white looks white, not yellow or blue. Normally there is an automatic setting and the camera decides what white balance setting to use. However if you know what your light source is you can usually set the camera to it and this may give better results. Most digital cameras have settings for *sunlight, shade, electronic flash, fluorescent lighting* and *tungsten lighting*. Some have a *manual* or *custom* setting where you point the camera at a white card and let the camera figure out what setting to use to make it white.

Sensitivity:-

Sensitivity settings on digital cameras are the equivalent of ISO ratings on film. Just about every digital camera will have settings with a sensitivity equivalent to ISO 100 film and ISO 200 film.

Many will have an ISO 400 setting, but above that the images from cameras with small sensors gets pretty noisy.

The more expensive digital SLRs with much larger sensors have much higher sensitivity settings. At ISO 400 they are virtually noise free and some can go as high as ISO 3200 or even ISO 6400.

Very few cameras have ISO setting lower than ISO 100 because noise levels are so low at ISO 100 there would be no real advantage in a slower setting. Quite a few digital cameras have an "auto" ISO setting, where the camera will pick from ISO 100, ISO 200 and sometimes ISO 400, depending on the light level and the mode in which the camera is operating.

Canon released a camera in 2015 with an ISO of 4,000,000. So this camera can basically see in the dark. It'll cost a whopping $30,000.

Zoom:-

Zoom is the amount of magnification that the lens is capable of. There are two types of zoom that are associated with digital cameras.

Optical Zoom

As the name would suggest, this is achieved optically. The inner lens is moved inwards and outwards to achieve the magnification. This type of zoom does not affect the quality or size of the resulting image, as the process is performed mechanically.

Digital Zoom

Digital zoom works by cropping the resulting image, therefore reducing the amount of pixels from which an image is composed by the amount that was discarded in the cropping procedure.

When purchasing a camera, be careful of one potential trap. Some manufacturers multiply the optical zoom by the digital zoom, and advertise the camera as having a very high zoom capability. For example, if a camera has 5x optical zoom and 3x digital zoom, some manufacturers, and retailers will actually sell it as a 15x zoom camera. This, is however, very misleading and something you really need to be aware of.

Generally, disregard digital zoom, and purchase a camera with at least 3-4 x optical zoom.

This camera is called a "Bridge Camera" as it sits between a "pocket camera" and the traditional Digital Single Lens Reflex Camera (DSLR for short).
This camera has a 22x zoom lens, which is approximately equal to a 400mm lens.

Traditional DSLR Camera (right) fitted with a zoom lens.

Comparison of optical zoom and digital zoom. Note the distortion with the "**DIGITAL**" zoom.

JPEG and RAW files:-

If you want to get serious about photography then always shoot (take pictures) using the RAW (Canon terminology or NEF used by Nikon) option available in your camera. Free software can always convert images back to jpeg files.

Image files are pretty big and they can be compressed quite a lot without a significant drop in quality. This is where JPEG (Joint Photo Experts Group) comes in. JPEG is an algorithm designed to work with continuous tone photographic images which takes image data and compresses it in a lossy manner (this means you do lose some information). The more you compress, the smaller the file but the more information you lose. However, you can reduce file size by a factor of 10 or so and still get a very high quality image, just about as good as the uncompressed image for most purposes. You can reduce the file size by a factor of 40 - or even more - but the image starts to look *really* bad! I.E. - Blocky as in the above image of the rabbits eye using 10X digital zoom.

So basically a JPEG file is compressed while a RAW/NEF file is NOT.
This then means that you can use computer software such as Adobe's Photoshop or Lightroom to process your images.