

Lenses - which ones do you Need?

You Have a DSLR, you're getting the hang of it and now you want another Lens (you think).

Where do you go from here..... what extras do you want (or need)? The answer, as is often the case, is "What kind of photographs do you want to make?"

Many people don't really know what they're looking for in a lens.... many will think that a zoom lens can cover all their needs. But there are more important things to consider.

What do all the numbers and letters mean on the description of the lens?

The advantage of having a **DSLR** is the ability to use different lenses specific to the different types of photography that one does. We have to read reviews of people who have tested out what we're interested in. **Still, it is important to have some basic knowledge of lenses in order to be an informed consumer.**

Lenses can be either a single focal length (**prime**) lens or a **zoom** lens which has a range of many focal lengths. Prime lenses tend to be of better quality than zoom lenses because there are compromises when designing lenses with many different focal lengths as opposed to designing a lens with a single focal length. It is difficult to maintain sharpness throughout the lenses full zoom range. Usually image quality degrades in zooms as they are extended to the longer focal lengths. Recent computer designing of zoom lenses has improved their quality. Though zoom lenses are very popular, the prime lens will usually assure you of a sharp image and will have a wider maximum aperture (and you know the benefits of that because you've read the article on the Learning page about Apertures and Shutter Speeds, eh? (No? OK, well do that as soon as you can).

It's important to note that most lenses are sharpest in the middle of their aperture range. The exceptions to this are lenses with large maximum apertures (any number smaller than $f/2.8$). This is because these lenses are designed to be used at these maximum apertures. Though your first DSLR probably came with a zoom 'kit lens' - take a look at the maximum apertures - they're usually around $f/4$, or $f/3.5$ at best. It's actually better for beginners to use a prime lens because it forces them to think more about how to use just one view to compose their photographs. But nobody tells beginners that! Those kit lenses are actually sharpest in the middle of their aperture range - so that kit lens is now suddenly $f/5.6$ at best, and doesn't do very well above $f/16$.

Lenses are also classified as wide angle, normal and telephoto. You can have wide angle, telephoto, or mid-range zooms too. How they are classified has to do with the sensor size. What is considered a normal lens for a 35mm film camera is a telephoto to a camera with a smaller APS-C size sensor or a wide angle to a larger medium format camera. Since there are many different sensor formats (sizes) many times focal lengths are talked about as 35mm equivalents, (what the focal length would be for a 35mm camera) and, generally, you can multiply the focal length of a lens on a APS-C sensor camera (i.e. most of ours) by a factor of 1.5 or 1.6. (Canon sensors on most of their cameras are slightly smaller and you multiply the given focal length of the lens by 1.6. Lenses are measured in focal lengths by millimeters. A normal lens is one where the angle of view is close to what we normally see with our eyes (50mm). A wide angle lens is one that encompasses a wider angle of view

than we normally observe (<50mm) and a telephoto is one with a narrower angle of view than we normally see (>50mm).

All lenses are made to gather and focus light onto a specific point. They also have an iris that controls the amount of light allowed to pass through the lens. The iris is made up of thin blades that are put together and adjust to form different sized openings. The iris in our eyes is round but the iris in the lens is really a polygon because it is made of hard edged blades. **The more blades that make up the lenses iris the smoother the circle of the iris will be and the smoother the out-of-focus areas will appear.** This out-of-focus smoothness is called the lenses bokeh. Points of light in the bokeh of a high-quality lens will be round - in poorer lenses it will show its straight edges..... because higher quality lenses will have more blades in their irises.

So what different kinds of lenses are there? Talking in 35mm camera equivalents here, wide angle lenses are those with focal lengths under 50mm. A 28mm lens is a moderate wide angle whereas a 14mm is a fish eye with an extreme angle of view. With a fish eye lens you have to make sure your feet aren't in the photograph when shooting. Telephoto lenses are ones with focal lengths longer than 50mm. Portrait lenses fall in this category. Somewhere around a 90mm lens is good for a ¾ portrait, where a 180mm is nice for a head and shoulders portrait. If you want to get not so close but still personal with wildlife you should start with something like a 300mm and go for a 600mm if you really want to stay incognito to the grizzly grazing on the side of the hill. Quality telephotos are very expensive because there is a lot of big glass in them and they are as long as your arm. Now consider that those focal lengths are on an APS-C camera..... if you get a 50mm lens it will work at the equivalent of a 75-80mm lens on a 35mm film camera, quite ordinary telephoto lengths, like 200 or 300mm suddenly become 300mm or 450mm respectively.

So what do all the letters and numbers mean on a lens? In catalogues the focal length is mentioned first with the maximum aperture next and then usually some trade jargon pertaining to the maker - those would need careful study, so either ask the salesman or read any technical descriptions. Sometime you'll also see the filter size in parentheses. So you have **50/1.8 (some letters) (52)**, meaning it is a 50mm (normal) prime lens with a f1.8 maximum aperture and a 52mm filter size. If it was 28-200/3.8-5.6 macro (62), it would mean that the lens was a zoom with a focal length covering wide-angle to telephoto with a maximum aperture of f3.8 @28mm and f5.6 when zoomed out to 200mm and the screw in filter size would be 62mm. It is also designed for close focusing making it a macro. One thing you will notice is that when the maximum aperture is greater (the f number is lower) the price of the lens goes up. A 50mm 1.8 might be \$100, a 50mm 1.4 lens jumps to \$300 and a 50mm 1.2 is well over \$500. The reason for this is that in order to get more light through the lens the glass needs to be bigger and the design more complex. If you often need to photograph at f1.2 with your 50mm lens because of low light or you like the narrow depth of field then it's worth the money. On the other hand if you very seldom open up to the maximum aperture you are wasting your money. As with most tools, those that are designed for one specific task are better than those that are made to do many tasks.

Many lenses have macro (close focusing) features but there are lenses specially made for close-up work and their quality is better. The longer the focal length of a macro lens the greater working distance there is from what is being photographed.

Perspective control (PC or shift) lenses offer the ability to compensate for lens distortion when photographing buildings (converging verticals). Architectural photographers use these a lot.

There are **portrait lenses** that are soft focus or offer de-focus control for those who desire softness or nice bokeh to their images.

Mirror telephotos offer an inexpensive alternative to expensive long lenses. They are much shorter and lighter because they have less glass and a mirror in their design. Quality is marginal and they have a fixed aperture which is usually slow meaning you can't use them in low light. They had their best days around 25 years back. The lens' bokeh will also be rendered with circles because of the mirror.

Some other acronyms on lens descriptions are:

IF, internal focusing (the lens doesn't rotate and extend while focusing),

AF, auto focus,

VR or IS, vibration reduction or image stabilization feature built into the lens so it is possible to hand hold your camera using slower shutter speeds. Some cameras come with VR built in to the camera, which ought to make the lenses cheaper - but it doesn't!

LD, ED or APO glass, low dispersion, extra low dispersion glass or apochromatic glass (lens elements that are designed to focus the different wavelengths of coloured light onto the same plane).

You might also see mention of **aspherical lens** elements. Lenses are typically sections of a sphere. Lenses must focus light onto the flat plane of film or a digital sensor while our eyes must focus onto the back of our eye, which is also spherical. In order for light to be focused on to the flat plane of film or a digital sensor lens elements are made aspherical to compensate for the diffraction of light through the lens.

Many top of the line lenses have very quiet motors that run the auto focus. You may see **USM** (ultrasonic motor) on Canon lenses and other mentions of quiet focusing on other brands.

Some Practical Suggestions.....

Many kit lenses (which, as we've seen, are generally not brilliant) cover the range 18-55mm. It's a useful focal range, with the 18mm just about touching the wide-angle (around the 27mm *equivalent*) and the top, 55mm, (around 80mm *equivalent*) able to get in quite close for good portrait work. The drawback is that they're not all that good at the extremes of their aperture range so you'd be working around f/5.6 to f/16 most of the time - in fact because of the increased depth of field, creative photography becomes difficult - and you end up with pictures that really aren't much of an improvement on your last digital compact or even your old film compact camera from way back (many people still prefer the old Olympus Trip, with a good 35mm film, and there are aficionados of Leica that refuse to go digital).

If you like nature photography, you'll be needing (wanting) a longer lens. Obvious, eh? OK, but zoom or prime? You can pick up zooms of 70-200mm or 70-300mm at a reasonable price, but beware the usually 'slow' maximum aperture. When you're being forced to go with f/5.6 on a dull day you're going to need a slow shutter speed. Being club members, I'm sure you all have tripods now (don't you?) so the shutter speed won't matter.... but they can sometimes be a problem. So then all you can do is wind up the ISO - but anything past 400 will be quite 'noisy', so you stick with 400 - which is, after all, only two stops of an improvement! So instead of having to use 1/15th, you can use 1/60th but, hand-held, at 300mm? Sorry, but it won't cut it. Still, it may be all you can afford... so you just have to find ways of using it successfully. Or spend more money. A quality zoom, like the Canon (I'm picking on them because I know that many members have them) 70-200mm f/2.8 is a little under \$3000 (!). But that's just an amazing lens..... a more realistic long zoom would be the 70-200mm f/4, which could be had for around \$700. At the 70mm end, it's quite good for portraits, though it can be a small aperture and therefore give a slow shutter speed - and may need flash to 'freeze' the subject.

Alternatively, a long prime lens would work just as well - but of course you can't move around so much when you're out in nature trying to hide. So all the cropping will have to be done at home - if your subject 'overflows' your frame then you can't do much about it - if you just can't get close enough, you're stuck with whichever focal length the prime lens has, and then have to crop later. Maybe you'd like one that sports photographers use - a fast 400mm lens, f/2.8.... ok, you'd need to cough up a little under \$9000 for that. But a simple, prime lens with a decent length, might be a 200mm f/2.8 L II USM from Canon - that's about all they do for under \$1000. Probably still not quite getting you close enough to your subject in nature.

At the other end, how about a wider angle - this is well covered by zoom lenses - ranging from around 14mm up to 45mm..... covers a lot of ground, giving a real wide-angle (21mm *equivalent*) up to something approaching a portrait lens. They're not a bad price at all.

Most people get by with two main lenses - something for wide-angle, something for the longer range things - and leave their kit lens at home!

Have a look at pictures that you like - decide if it's the field of view that appeals to you and, if it is, perhaps that's the direction you should take on your next lens.