

**FIELD
GUIDE**

USING YOUR Lenses

FREE WITH
Practical
Photography

JESSOPS
YOUR PICTURES. OUR PASSION

Advice for every SLR enthusiast

- ✓ Technique help
- ✓ DIY lens care
- ✓ Wide-angle to telephoto
- ✓ How to judge optical quality



**EXPERT TIPS FOR
BETTER PICTURES**

Choose the right lens for great results



A macro lens, a sheet of white card in the background and gentle window light helped create this pet portrait.



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Welcome

from Practical Photography editor Andrew James



IF I HAD A £1 FOR every time someone asked me a question about lenses I'd have saved up enough cash to buy that expensive 300mm f/2.8 telephoto I've always hankered after. But this isn't a buying guide, just a simple, down-to-earth explanation of what lenses are, what they do and how you can get the best out of them. There's no question

that lens choice and know-how is one of the most confusing subjects, especially when you're just starting out in creative SLR photography. Wide-angle, macro, zoom, telephoto, fast, slow... just what does it all mean and how does having a better understanding of it all make you a better photographer? You're about to find out...

"This isn't a buying guide, just a simple, down-to-earth explanation of what lenses are, what they do & how you can get the best out of them."

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USING YOUR LENSES

Lens basics

To get the very best from your optics you need to know which to use, when and how. Let's start by taking a look at lens types, focal length and sharpness.

Anatomy of a lens

Familiarise yourself with your lenses' basic layout and get to grips with every ring, number and removable component.

LENS HOOD

This helps prevent flare and ghosting and generally protects the lens elements. It's usually removable for storage and fitting filters.

FOCUS RING

When focusing manually turn this ring while looking through the viewfinder to set the focus. Avoid using this ring on most lenses while the autofocus (AF) mode is selected.

DISTANCE SCALE

Indicates how far away you are from your chosen point of focus (in both metric and imperial measurements), from the nearest possible focusing distance through to infinity, indicated by ∞.

ZOOM RING

All zoom lenses, from the widest fisheyes to the longest telephotos, have zoom rings that allow you to move through the lens' entire focal range. Modern zooms have rubberised zoom rings.



LENS MOUNT

Most mounts are made from various types of metal (cheaper models sometimes opt for plastic) and feature corresponding dots that indicate how to line up lens and camera body. Treat the mount with care.

APERTURE RING

A throwback to manual-everything days with the traditional scale reading from f/2.8 through to f/22, though this will vary. Many modern lenses don't have this function as aperture is controlled via the camera body.

ALSO LOOK OUT FOR...

You'll also find the filter thread size marked either on the side of the lens or on the front of the filter thread itself. Look out for the Ø symbol followed by a number. If, for example, your lens is marked with Ø77 then you know that is the filter size you need to quote if you buy a skylight filter to protect the front element. Also on the side of most lenses is a button that allows you to switch between autofocus (AF) and manual focus (MF), which is when you would use the focus ring.

GUY EDWARDS

How lenses can improve your photos

From the broad view of a wide-angle lens to picking out far away objects with a telephoto lens, one of the main advantages of an SLR camera is the ability to choose from a massive range of lenses. Changing lenses can

give a completely different view to your photography, but with all the choices available how do you know what they all do? Here are some simple hints and tips on what the three main types of lenses offer.



Wide-angle

The standard zoom lens that comes with most digital or film SLRs will usually offer a 28mm focal length or equivalent wide-angle setting. Although this is wide enough for many shots you can expand your view by going even wider, especially for landscapes and architecture. The shorter the focal length, the more of the scene you'll get in your shot. Using an ultra wide-angle lens gives you so much more than just a wider view. As objects appear very small in the frame you can get really close to foreground objects to make them stand out.

Telephoto

Like telescopes, telephoto lenses simply make things appear closer than they really are. They fall into two main groups – those with focal lengths from 70-300mm, and the more specialised models above 300mm. If you're new to using telephoto lenses stick to the shorter focal lengths, as they're more affordable, lighter and much easier to use. The high magnification offered by the longer focal lengths is ideal for getting shots when you can't get close to your subject. They're expensive, heavy and can be tricky to use though.

Macro

You'll find the word macro tagged onto a huge range of lenses, especially zooms, to indicate a close focus capability. This can be a bit of a marketing ploy though, as it should really only be used on lenses that offer the option of getting in ultra close to your subject. Dedicated macro lenses are available from most manufacturers, and most are able to focus close enough to fill the frame with an object the same size as the film or sensor that you are using. For digital SLR users this means you can fill the frame with a subject measuring just 22x15mm! This capability is known as life-size reproduction or 1:1, and it's something to look for if you're serious about macro photography.

Common terms

Lenses come in a massive range of focal lengths and zoom ranges, but they all fall roughly into five categories. This chart shows the most common names given to the focal lengths for both APS-C sized cameras and full-frame models.

	Ultra-wide	Wide	Standard	Short telephoto	Long telephoto
Film 35mm Full-frame	8mm	24mm	40mm	60mm	200mm+
APS-C sensor	6mm	15mm	25mm	38mm	125mm+

tip You'll often hear people say that different lenses alter the perspective of the image. They don't – perspective is purely down to your viewpoint, not the lens that you are using. The focal length of the lens just affects the magnification of your image, so if you stand in the same place you'll get the same perspective from any lens. Try it for yourself. Take a picture on the widest setting of your zoom and another at the longest from the same spot. It will be exactly the same, just cropped.

What is focal length?

Every lens has a different focal length or lengths expressed in millimetres. A scientific explanation of how this is measured needs more space than is available here, but what you really need to know is how focal length affects your angle-of-view. For example, a 50mm lens gives roughly the same magnification as the human eye, so it's called a standard lens. Any lens with a focal length smaller than 50mm makes objects appear smaller and gives a wider angle-of-view. A focal length longer than 50mm magnifies objects and gives a narrower view.

➤ Angle-of-view

The image below shows how the focal length of the lens affects the amount of the scene you can include. The whole image is the view you'd get using a 28mm wide-angle lens on a full-frame or 35mm camera.



WIDE
This image was shot with a 28mm lens to include a wide view. A shorter focal length would give an even wider view, but the beach huts would become much smaller in the frame.

STANDARD
The magnification of a 50mm lens is similar to your eyes, hence the name 'standard'. It's not a common focal length, although it's available in the mid-range of most standard zoom lenses.

TELEPHOTO
The extra magnification of a telephoto lens is ideal for picking out small parts of the scene. The view indicated is the image you'd get if you used a 200mm lens to shoot this scene.

➤ Digital-only lenses

The enormous rise in popularity of digital SLRs with APS-C sized sensors has led to many manufacturers producing lenses designed specifically for this format. As the name implies, these lenses can only be used on these digital cameras as the image they produce isn't big enough to cover the larger sensor or 35mm film. If

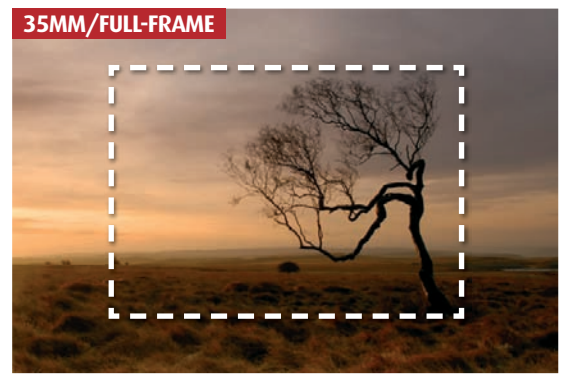
you try to use them on a full-frame or 35mm camera either the edge of the frame will be very dark or you'll only see a circular image in the middle of the frame. Each manufacturer uses letters or numbers to differentiate these from their general lenses. Go to page 41 for an explanation of these abbreviations.

DIGITAL CONVERSION TABLE

Sensor/film size	Cropping factor	Extreme wide-angle	Wide-angle	Standard	Short telephoto	Long telephoto
35mm or full-frame sensor	1x	20mm	28mm	50mm	100mm	300mm
APS-C sized sensor	1.5x or 1.6x	12mm	18mm	30mm	60mm	180mm
FourThirds	2x	10mm	14mm	25mm	50mm	150mm

➤ Digital cropping

Focal lengths are a great way of describing lenses for a particular film or digital format, but the angle-of-view they give changes with different sized digital sensors or film. Most affordable digital SLRs have an APS-C sized sensor that's around 16x24mm, rather than the 24x36mm size of a 35mm frame or full-frame sensor. So with the same focal length lens attached the smaller sensor only 'sees' a portion of the image from a 35mm frame, giving a narrower angle-of-view. To get the same view on the smaller sensor camera you need a shorter focal length lens, for example an 18mm lens on an APS-C sized camera gives the same view as a 28mm lens on a full-frame model. See table above for more information.



Shooting on a 28mm lens on a full-frame sensor gives a wide angle of view. You'd need to use an 18mm lens on a digital SLR with an APS-C sized sensor to get the same view.



The same 28mm on a digital SLR with an APS-C sized sensor gives a much narrower view. It gives the same view as a 45mm lens on a full-frame model.

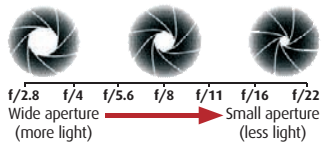
Lens aperture explained



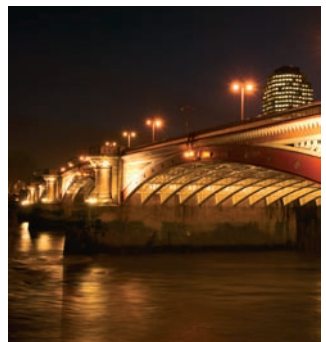
A wide aperture of f/3.5 was used to shoot this portrait of a folk singer in low light conditions.

The aperture of the lens is like the iris in your eye. It opens and closes to control the amount of light that is let through to the film or sensor.

Apertures are calculated by a mathematical formula and are expressed as a number, such as f/4, f/5.6 and so on. Although these numbers don't really make a lot of sense at first, there is a sequence that is commonly used:



Each step in this sequence increases (doubles) or decreases (halves) the amount of light passing through the lens. Each step is known as one stop. For most general shots you can happily use the middle f/8 to f/11 apertures, but for lowlight you need the widest f/2.8 to f/4 setting available if you're trying to handhold the camera. For special effects such as blurring movement, when you want to use a very long shutter speed, you want to use a small f/16 to f/22 aperture to let as little light through as possible.



Right: Although shot at f/8, the bright viewfinder image of a wide aperture lens also helped when composing this lowlight Thames bridge image.

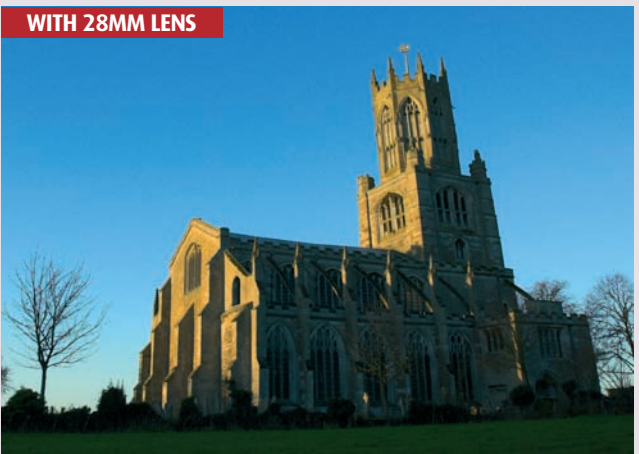
tip Lenses with very wide maximum apertures (otherwise known as fast lenses) can be expensive and heavy. If you want to shoot the occasional picture in lowlight you can simply increase the ISO setting on your digital camera (or load a faster film) to get around this. Changing from ISO 200 to 400 gives a one-stop increase in the sensitivity, the same as changing from f/4 to f/2.8, allowing you to use a faster shutter speed.

Specialist lenses

TILT/SHIFT

This lens is designed to solve the problem when you point your camera upwards to include the top of the building and it looks like it's falling over. This lens uses a mechanism to shift the lens on the camera to allow you to keep the camera level but include much more of the building.

Very few manufacturers produce these lenses and at around £900 you need to be pretty keen on architecture to make them worthwhile.



FISHEYE

You'll find fisheye lenses at the extremely short end of the focal length range. To get the widest view these lenses deliberately distort the image so that any straight lines curve outwards. At the shortest focal lengths such as 8-10mm on a full-frame or 35mm camera you'll end up with just a circular image in the middle of the frame. This is great for special effects, but used too often the novelty can soon wear off.



Too embarrassed to ask

What's a prime lens?

Any lens that has a fixed focal length rather than a zoom is called a prime lens. They have become much less common over the last ten years or so as the quality of zoom lenses has increased and the cost fallen. They do have one major advantage over most zoom lenses though - the maximum aperture of a prime lens is usually wide (f/4 or f/2.8) so they are great for lowlight and limited depth-of-field shots. They also tend to be smaller and lighter than many zoom lenses. However, a zoom will obviously prove more versatile than a prime.



Get the best from your lenses

As a general rule, the more expensive the lens you're using, the better the image quality tends to be. That's not the only answer, however, as even the most expensive lenses need to be used correctly to make sure you get the best results. Even if you can't afford a new, expensive lens, all is not necessarily lost – there are some simple tips and techniques that you can employ to help you get the most from your existing lenses.

Sharp results

For most people this is the most important factor when considering lens quality, and rightly so. If your results aren't sharp there's nothing you can really do to improve them.

Even the best quality lenses give their sharpest results at the centre of the frame. If you look closely at the detail at the edge of the frame you'll see that it's often slightly blurred, especially if you use the lens at the maximum aperture. The best way to minimize this is to shoot 2 or 3 stops down from the maximum aperture of the lens, usually f/8 or f/11. This is usually the setting that gives the sharpest results.

The other main cause of blur is

camera shake, so if you're in any doubt whether you can hold the camera still enough, try to use a tripod. If possible use the self-timer or a remote release to fire the shutter, as even pressing the button can cause camera shake. It's not always convenient, but the quality of the results, especially from long telephoto lenses, is worth it.

So what can you do if you've tried this and still can't get the results you want? It may sound obvious, but make sure your lenses are clean. A lens covered in fingerprints, dust and dirt won't produce the best results, so check out page 18 to find out how to clean your lens correctly.



WHAT INFLUENCES SHARPNESS?

LENS QUALITY This is one area that is going to cost money. To get the best results you need to buy the best lenses you can afford. Don't expect miracles from the standard zoom supplied with most cameras either.

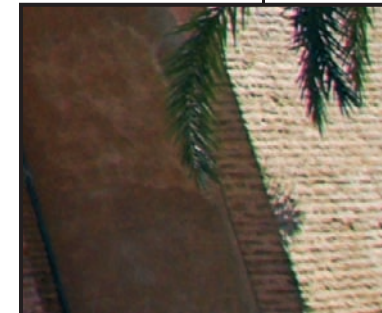
APERTURE All lenses produce better results when using the mid-range apertures, usually f/8 to f/11.

CAMERA SHAKE It's pointless spending a fortune on the best quality lenses if you don't hold the camera steady when you fire the shutter. Use a tripod for slow shutter speed shots. Buying the sturdiest tripod you can afford will always pay dividends, but make sure it's one you'll be willing to carry, as a tripod is only useful if you've got it with you.



MIDDLE OF FRAME

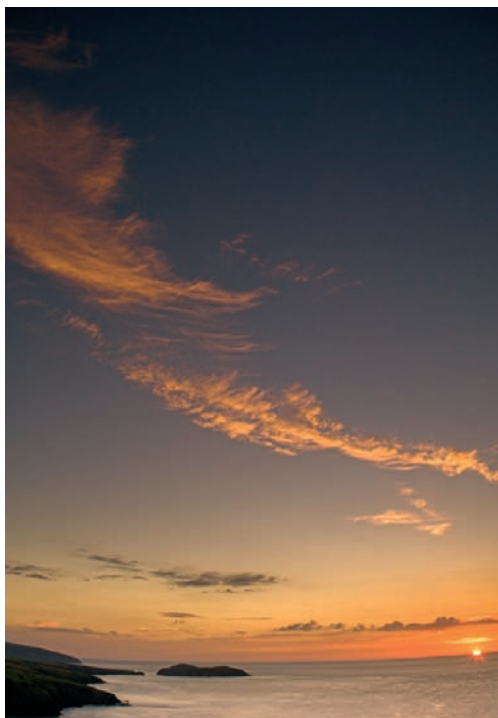
The centre of the frame will always be the sharpest point – no matter how expensive your lens actually is. Obviously on professional lenses the difference between centre and frame edge is less obvious. It will be more noticeable on cheaper lenses.



EDGE OF FRAME

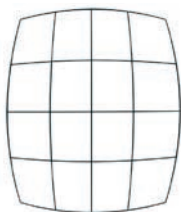
At the edge of the frame you may notice a discernable reduction in image sharpness. If you match a poor lens with a very high quality full-frame professional digital SLR, such as the Canon EOS-1Ds Mark II, this degradation of image quality will be quite noticeable. It is less obvious on a D-SLR with a smaller sensor but can still be an issue.

Common lens problems

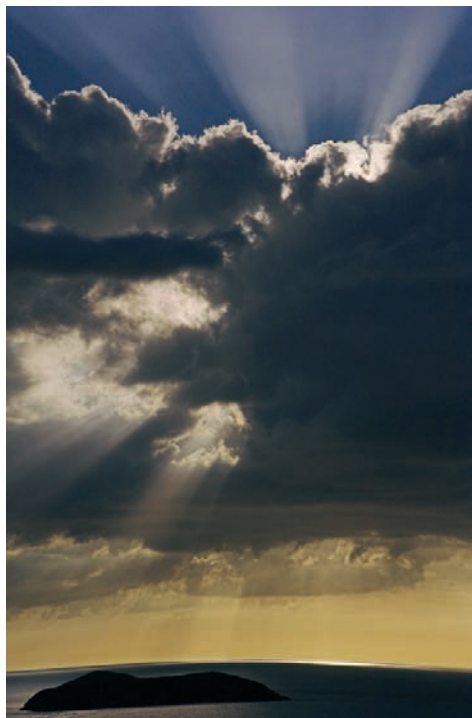


Barrel distortion

Distortion is when straight lines in the subject end up as curves. This type of distortion is most common with wide-angle lenses, and the lines near the edge of the frame curve out in the middle, like the shape of a barrel (hence the name). It's most visible when you shoot subjects with straight lines such as architecture, although on landscapes positioning the horizon near the frame's edge can result in an obvious curve.

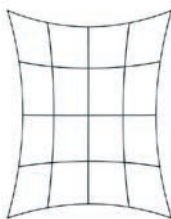


Barrel distortion causes straight lines at the edge of the frame to bulge outwards, like the shape of a barrel.

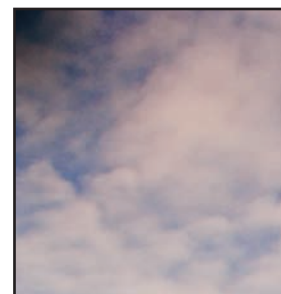


Pincushion distortion

This is the opposite of barrel distortion, as the lines at the edge of the frame curve inwards rather than out at the centre. It mainly affects telephoto lenses, especially cheaper 70-300mm zooms. In the real world, pincushion distortion is rarely visible on images, as most subjects you shoot with telephoto lenses don't contain many straight lines at the edge of the frame.

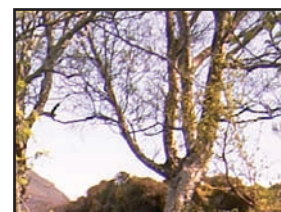


Most commonly a problem with telephoto lenses, pincushion distortion is when lines at the edge curve inwards.



Vignetting

If you've ever noticed that the corners of your pictures are darker than the centre, that's vignetting or corner shading. This problem tends to affect wide-angle lenses most of all, although it can be visible on other lenses, especially zooms. Using a lens hood or filter system that is too long for the angle of view of your lens, so the edge is visible in the frame, can cause it. So make sure this isn't the reason before blaming your lens. If it's still a problem try shooting at a smaller aperture, as it's more apparent at wide apertures. It's more noticeable on digital SLRs, especially full-frame models, than on film SLRs, because of the way the sensor is constructed.



Colour fringing

Do you remember using a glass prism to create a 'rainbow' of colours from white light at school? Well, that same principal is what causes colour fringing. When white light passes through the lens the glass elements inside act like that prism and split the light into different colours. These end up focused at slightly different points on your image. On digital cameras the most common sign is a visible coloured (usually purple) edge to dark lines against a bright area. It's usually only a problem at the corners of the frame, and affects wide-angle lenses more than telephotos.



HOW TO TEST YOUR LENS

We're not talking about a full-on laboratory test, but here's a simple procedure you can try to see how your own lenses perform. Unless you've got plenty of space and time, setting up an indoor test with a chart can be tricky, so find yourself a suitable outdoor subject. Buildings are perfect, as they don't move and won't complain while you take your test shots. Look for one with plenty of detail to test the sharpness of your lens, and choose a bright overcast day. Once you've found a suitable subject put your camera on a sturdy tripod and, ideally, use a hotshoe spirit level to ensure the camera is level. Set the camera to the lowest ISO available, or load a slow film (ISO 100). To ensure the results aren't affected by camera shake fire the shutter using a remote release or use the camera's self-timer if you don't have one.

You need to test zoom lenses at the widest and longest setting, as well as at least one point mid-way in the zoom range. Take a series of images using a range of different apertures, starting at the widest, then at every whole stop after that down to the minimum. If your lens starts at f/3.5 use the sequence f/3.5, f/4, f/5.6, f/8, f/11 and so on. Remember to take notes on the settings you use, although you can find them in the EXIF data of digital files. Once you've got your results you'll have to look closely to spot any differences, so enlarge the image to 100% and compare results from the different images.



It's not the most interesting subject, but the humble brick wall makes an excellent lens test.

We've exaggerated these examples to make the problems clear. If you're getting results as bad as these there's something seriously wrong with your lens!



Digital editor Ben Turner reveals what lenses he takes out to make sure he never misses a photo opportunity.

What do you need in your bag?

I'm quite literally addicted to photography. I can't stop thinking about taking pictures and it almost hurts when I see an opportunity to capture a great image but can't take a photo, either because I don't have time or, even worse, don't have the right kit. I've got fairly broad tastes when it comes to subject matter and the sort of photographers I take inspiration from. If there are good results

to be had, I'll shoot it. Because of this, I need to be prepared for just about anything, from close-up flowers to wide, sweeping landscapes, but as I like to have my kit with me most of the time, weight and size is an issue – if it's too heavy it'll put me off carrying it. To maximise the potential of my days out, no matter where I'm off to, these are the types of lenses I always carry in my camera bag.

STANDARD ZOOM

I leave this fitted to my camera all the time as it's the most flexible lens. If I need to take a shot in a hurry, my camera is ready to go. But if I've got time, for some shots I'll switch to a different lens.



WIDE-ANGLE LENS

I love landscapes with really big skies, so a super wide-angle lens is a must-have. I also love to experiment with wide-angle portraits too, for something a bit different.



TELEPHOTO ZOOM

Not the most popular lens in my kit bag but it's essential for candid, sports and wildlife shots, from a distance. I like to shoot the sun at sunset with one too.



MACRO

Probably my favourite lens. It's perfect for close-ups and portraits. The wide aperture of f/2.8 is excellent for shallow depth-of-field effects and it's really sharp too.



RECOMMENDED KIT: Beginner D-SLR lenses (1.5/1.6x) – from £465

STANDARD LENS

Many kits come with a basic 18-55mm zoom. The 18mm end takes care of most wide-angle needs too.
From £90

TELEPHOTO LENS

At this price, you can't expect fast apertures or top quality pictures, but a 70-300mm is an essential tool.
From £180

MACRO LENS

The sigma 50mm macro is a high quality, versatile lens for D-SLRs. It also boasts a fast aperture of f/2.8.
From £195

RECOMMENDED KIT:

Beginner film SLR lenses – from £565

STANDARD LENS

A basic 28-80mm is all you need for most landscapes and portraits.

From £95

TELEPHOTO ZOOM

Buy the best lens you can afford in the 70-300mm range – as a general rule, the more you spend the better the quality you'll get.

From £180

MACRO LENS

You'll need to get a macro with a focal length of around 100mm. Look at the Sigma and Tamron ranges.

From £290

Intermediate D-SLR lenses (1.5/1.6x) – from £1590

STANDARD LENS

A lens with a fast max. aperture (f/2.8) and better build quality is a handy tool. From £300

TELEPHOTO ZOOM

If you want superior quality over quantity, take a look at the 70-200mm f/2.8 and f/4 lenses.

From £600

MACRO LENS

If you want a slightly longer working distance, get a macro with a focal length of around 100mm.

From £290

WIDE-ANGLE ZOOM

For really dramatic wide-angle effects get a good quality lens that zooms right out to around 10mm.

From £400

Caring for your lens

Although the front of your lens is made from glass, you can't treat them the same as you do your windows at home. Just a little bit of dust or grime on your optics can cause all sorts of nasty problems. Strong light will show up dust and dirt, while general grime on your optics will affect the sharpness of your images so it's essential that you look after your lenses. Here we look at how to care for your lenses to get the best out of them...

It has cost you lots of money, so take care of it. Before wiping gently with a soft lens cloth, make sure you have brushed or blown any grit from the front or you could scratch the glass as you clean it. Keep your camera bag clean too, or every time you store a lens it will just gather dirt.



Cleaning tips

- Before you wipe the front of your lens, get rid of any dust or grit that will scratch the glass. A quality soft brush (a hard brush will damage the lens) or air blower is perfect.
- Buy a quality microfibre lens cloth and keep it clean (which means not keeping it loose in your lint-filled pockets). And never use your T-shirt to give your lenses a wipe.
- When you take a lens off your camera always try to replace the front and rear lens caps immediately, so as to prevent extra dust from getting on the optics.
- Don't forget to make sure you regularly clean the whole of the lens, ensuring that the external moving parts are free from dust and dirt, particularly sand which will cause lots of problems.
- If you have a lens hood, use it! While it obviously helps prevent lens glare, it can also protect the front element against impact damage.

CHECKLIST

- ✓ Invest in a quality cleaning kit. You will need a soft brush, a microfibre cloth and a cleaning spray (designed for coated lenses).
- ✓ Get rid of dust and grit before you use the lens cloth or you risk scratching the lens as you try to clean it.
- ✓ Just as you set aside time to clean your car regularly, you need to take some time every now and then to clean your lenses.

tip Invest in a skylight filter for each of your lenses. They're much cheaper to replace than a whole lens if you accidentally scratch it.



➔ See page 38 for more lens accessories

OUTDOOR PROTECTION

Like your dentist always says, prevention is better than a cure, and the same is true for lenses...

DIY masterclass

This is the classic do-it-yourself solution - just rip a hole in the bottom of a plastic bag and slip it over the lens and camera. Hey presto, instant rain cover. If you really want to be extravagant, hold it in place with a couple of elastic bands!

Microfibre towel

A useful addition to your kit is a microfibre towel, which is basically a

super high quality duster. It's great for wiping moisture and muck off your kit and if you sling it over the top of your lens it can even keep your gear dry in light rain. Bike and car photographers often throw a chamois leather over camera and lens to protect them from flying dirt.

Hot and cold

Be careful of rushing straight out of the cold into a warm place, as it could cause the internal lens elements to fog. Try to slowly acclimatise your kit, at the very least open your camera bag, and don't place it near a heat source.



USING YOUR LENSES

Lens techniques

If you think that wide-angle lenses are just for landscapes, telephotos just for wildlife and macro lenses just for close-ups, you'd only be half right. Here's the full story...

Understanding depth-of-field

Lenses and how you use them play an important part in how much of your image is sharp. The distance in front of and behind the subject that is in focus is known as the depth-of-field, and is controlled by your distance from the subject, the focal length of your lens and the aperture used. Let's deal with these three key factors in turn:

Subject distance

Although not strictly down to the lens that you choose, your distance from your subject plays a massive part in the depth-of-field you get. The closer you are to the subject the smaller the depth-of-field, which is particularly noticeable if shooting close-ups.

Aperture

As well as controlling the amount of light, the aperture you use also affects depth-of-field. The smaller the aperture you set on your lens the greater the depth-of-field and vice versa. So if you want only a limited part of your scene to be sharp, set a wide aperture such as $f/4$ or $f/2.8$. For maximum depth-of-field use a small aperture such as $f/11$ or $f/16$. Turn to page 10 for more on lens aperture.

Focal length

You can control the depth-of-field by choosing a different focal length lens. If the aperture and subject distance remain constant, use a longer focal length lens for less depth-of-field and a shorter one for more.



f/4
Using a wide aperture such as $f/4$ and focusing on the flowers in the foreground throws the background out of focus.

f/8
Using a mid-range aperture such as $f/8$ is a good compromise between keeping plenty of the shot sharp and still being able to handhold the camera.

f/16
For maximum depth-of-field you need to set a small aperture like $f/16$. Even though we focused on the foreground, the trees in the background are sharp as well.



FOCUSING

The autofocus on most cameras these days is fast and reliable, but this doesn't mean that they're infallible. Most models default to focusing on the centre of the frame, but that's not always the point that you want to be in focus. Many cameras offer the option of selecting alternative focus points around the frame, so you can adjust the area that the camera focuses on. This is ideal when your subject is positioned on one of these points, but what if you want another point to be in focus?

You can switch to manual focus and then use the control on the lens to carefully adjust the focus to your desired point, or use the focus-lock facility offered by most cameras. The exact procedure varies slightly between different cameras, but for most models the camera needs to be set to single-shot autofocus mode to use this facility. You then position the active focusing point over the subject and half-press the shutter release until you get a confirmation light in the viewfinder. Keep the shutter half-pressed, re-frame your shot and press the release fully to take the picture.

HANDHOLDING

Choosing the right aperture for the depth-of-field will also affect the shutter speed you can use. Using a small aperture for maximum depth-of-field means you'll need a slow shutter speed, so how do you know if you can still hold the camera steady? A rule of thumb is to use $1/\text{focal length}$ as the slowest safe shutter speed without having to support the camera, so if you're shooting with a 200mm lens you'll need a shutter speed of at least $1/200\text{sec}$. With D-SLRs with APS-C sized sensors it's worth rounding this up by a stop to $1/400\text{sec}$ to account for the focal length conversion.

How to get limited depth-of-field:

- Use a wide aperture
- Use a telephoto lens
- Get closer to your subject

How to get larger depth-of-field

- Use a small aperture
- Use a wide-angle lens
- Get further away from your subject

Lenses for landscapes

Wide-angle

The wide angle-of-view offered by wide-angle lenses is the ideal choice for capturing landscapes. These allow you to include as much of the scene as possible in your frame for a broad view of the whole area. Because objects appear smaller in the frame when using wide-angle lenses, it's easy for everything in your shot to look distant and empty. The best way to combat this is to use foreground interest to add a sense of scale to your images. Rocks, plants or water make ideal subjects to use, but always look out for suitable objects. The wider the lens you use, the closer you'll need to be to the object for it to appear the same size in the frame. Also look for objects to use as lead-in lines to add a feeling of depth to your wide-angle images.

A wide-angle zoom is the most flexible for landscapes. How wide you go is up to you, but a lens such as Sigma's 17-35mm zoom is the sort of range to consider. Remember the digital conversion factor too. You may want to consider a lens wider than 17mm when using a D-SLR that's less than full-frame.



LEAD-IN LINES

The eroded rocks on the shore add a sense of depth to the image. With lines leading from the foreground, use a low viewpoint to maximise their effect.

FOREGROUND INTEREST

The seaweed on the foreground rocks adds interest and colour to the image. Shooting with a 28mm lens meant that the closest of these were only a couple of feet away from the lens.

WIDE ANGLE-OF-VIEW

Using a 28mm wide-angle lens means that the shoreline and the cliffs can be included in the image. We chose this focal length as a wider lens would have made the headland on the horizon appear much smaller in the frame.

tip Shooting landscapes into the sun can often cause problems with flare. This can be seen as an overall 'haziness' or lowering of contrast, or as visible spots of light (right). To minimise the effect make sure your lenses and filters are spotlessly clean, as even the tiniest bit of dirt or water droplet can cause this problem to occur. Even while you're out shooting check the lens periodically, especially if you're shooting in rainy conditions or by the sea.



Turn the page for more landscape ideas and lenses to use

More landscape ideas



Stunning skies

A wide-angle lens lets you make the most of dramatic skies. Position the landscape along the bottom of the frame so the sky takes up most of the image. You need the right conditions for this type of image to work, but it gives a sense of space and isolation to your landscapes.



Use an upright format

Using an upright rather than a horizontal format means you can use even more foreground interest or dramatic sky. For this picture the upright format allowed us to utilise more of the stream in the foreground as a lead-in line than a horizontal format would have allowed.



Try different viewpoints

To make the most of the wide-angle lens, look for different viewpoints for your shots. By pointing the camera upwards, objects such as trees take on a whole new look. You'll emphasise the towering height by getting in close to the base of the tree and using the widest setting on the lens. Okay, the trees may look like they're leaning, but that's part of the effect.

Now try these lenses...

Macro

Using a macro lens for landscapes is similar to using a telephoto lens. Look out for small plants or rocks to use as the main point of interest, and use the close focusing ability of the lens to fill most of the frame with this detail. Using a wide aperture, such as f/4 that we used for the image right, will throw the background out of focus, allowing you to use the colours and shapes to hint at the landscape beyond. To give a greater depth-of-field in order to make the background more recognisable, use a small aperture such as f/22.



Telephoto

Shooting landscapes with a telephoto lens is all about looking for interesting details. The magnification of the lens allows you to isolate these elements, and because you are shooting from a distance the perspective appears compressed. In the image above, the mountain behind the trees looks closer than it really was.



When shooting landscapes with wide-angle lenses it's easy for the sky to look washed out and uninteresting. You can darken blue skies and increase the colour saturation by fitting a polarising filter.

Lenses for portraits

Standard zoom

It's the versatility and speed of use that often makes this the lens of choice for pictures of people. The zoom ring allows you to quickly select different focal lengths to get the right crop on your subject before the moment has passed, and also to capture wider head and shoulders portraits and even full body shots. That said, you can't always use the most convenient focal length. In fact, focal length is probably the most important decision to make when setting up your camera.

Choosing the wrong focal length can result in your subject's facial features being distorted. Shooting from close to the subject with a wide-angle lens will enlarge and stretch a nose, which is rarely desirable. To avoid this, you should step back and use the longer focal length of the lens to flatten the perspective, resulting in a much more flattering picture.

As a rule of thumb, the closer you want to crop in on your subject, the more zoomed in you should be – use the table below to find out what focal length you should be using. Aperture is another important

A standard zoom covers off a range of focal lengths, from wide-angle through to short telephoto, making them very flexible.



A typical lens is 28-70mm for full-frame and film SLRs, and 18-50mm with digital SLRs with 1.5x/1.6x cropping factor. Zooms that extend all the way to 105mm and 135mm are also common.

consideration. Using a wide aperture, such as f/2.8 (as we have with the image on the right), will give a restricted depth-of-field that can be used to draw attention to the eyes, the key focal point in any traditional portrait. A smaller aperture, such as f/11, may be used to bring other areas of the face into sharp focus but you'll need good light to achieve this, as it's important to get a fast shutter speed of around 1/180sec to freeze subtle movements in your subject and get your picture pin-sharp. ➔

FOCUS ON THE EYES

The eyes are the most important part of any portrait, as this is where your attention is instinctively drawn. Experimenting with eye contact is one of the most powerful tools available to you, and you can choose to have direct contact for maximum impact, or have your model looking elsewhere for a more solemn or detached feel. Always focus on the eye nearest to the camera.

FLATTERING FOCAL LENGTH

Using a focal length of around 100mm means you're far enough away from the subject to flatten the features on the face – distant and near features appear closer together. This has helped keep the nose in good proportion to the mouth and eyes. There is also no discernable distortion.

CLEVER USE OF APERTURE

To give this shot maximum impact, we've gone for maximum eye contact. A wide aperture of f/2.8-f/4 and focusing on the eyes has ensured the features towards the bottom of the image are blurred, and so more recessive in the frame



➔ Choosing the right focal length

To ensure that your model's face and limbs aren't distorted from being too close to your subject, use this table to find the typical settings for the type of shot you're after. Ensure you read the correct column depending on the cropping factor of your camera – read all about digital cropping on page 9.

IDEAL FOCAL LENGTHS

Type of shot	Full-frame (film)	1.5 or 1.6x cropping factor	2x cropping factor
Close headshot	90-200mm	60-135mm	50-105mm
Head and shoulders	70-135mm	50-90mm	35-70mm
Half-length	50-70mm	35-50mm	24-35mm
Full-length	35-50mm	24-35mm	17-24mm



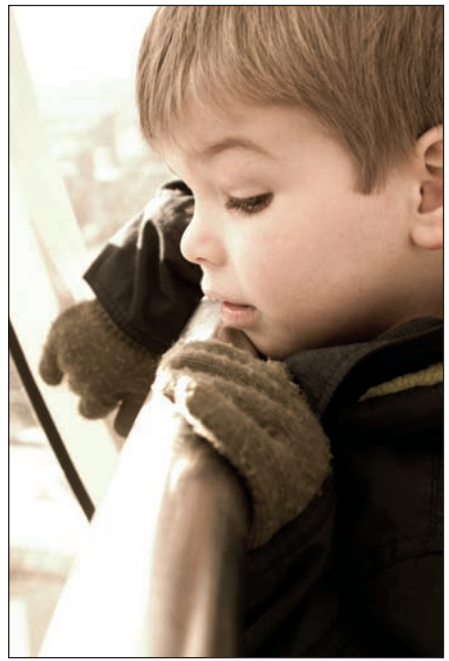
More portrait ideas

📍 You don't have to shoot upright

Just because traditional portraits are shot with the frame upright, this doesn't mean that it's always the best thing to do. It all depends on your subject, their pose and the surrounding environment. Shooting upright allows you to get in close and fill the frame for really intimate images, but it is restricting. Shooting in landscape format frees up space and allows you to experiment with the position of your subject. The best practice is to shoot both and experiment - think about where your model is looking and frame up accordingly.

📍 Environmental portraits

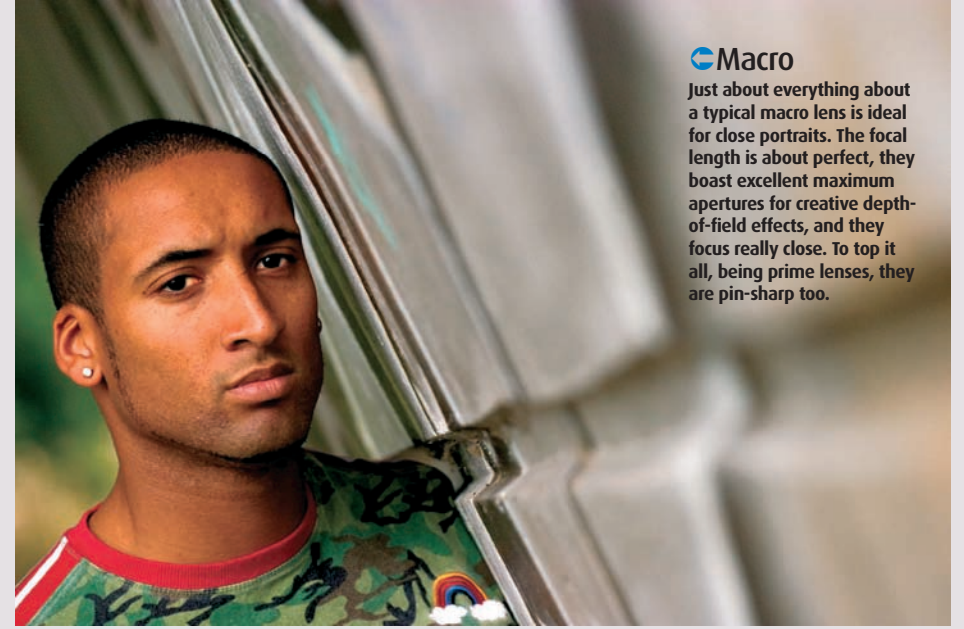
To tell a story, set a scene or reveal the personality of your subject, you may need to include more than just their face. Try taking a step back to include more of the environment around them - this may give the viewer a better insight into the shot. A word of warning though - backgrounds can be cluttered, messy and distracting. Be selective about what you include in the shot and be prepared to move around your subject to avoid certain objects, or even move to a better location.



Now try these lenses...

📍 Wide-angle

Getting too close to your subject and using a short focal length between 10mm and 24mm is not normally desirable for close shots, as it distorts the face and looks unnatural, but with a bit of experimentation - and the right model - it can look great. Often the best approach is to get slightly above eyelevel and shoot down to make the eyes even bigger in the shot. Be prepared to experiment and don't be put off if many of the shots look terrible - it takes time to find an angle that really works.



📍 Macro

Just about everything about a typical macro lens is ideal for close portraits. The focal length is about perfect, they boast excellent maximum apertures for creative depth-of-field effects, and they focus really close. To top it all, being prime lenses, they are pin-sharp too.

Lenses for close-ups

Macro

If you want to take good pictures of small subjects, such as flowers and insects, then a true macro lens should be in your kit. You can adapt other lenses by use of filters and tubes, but for ultimate flexibility and ease-of-use invest in a macro lens. You'll be able to focus on your subject at life-size. In other words, it gives you 1:1 magnification. Typically, prime macro lenses start at 50mm and go up to around 180mm. A good focal length is around 100mm, and if buying for a D-SLR, remember to factor in the extension effect of your sensor.

Using a macro lens often comes as a revelation to a new owner. Looking at small details at life-size reveals a whole world of new potential that has been previously hidden. But because of the small scale of the subject your technique must be spot-on. Focusing is certainly one of the most difficult aspects due to the limited depth-of-field you get even at narrow apertures (f/11 onwards). Switch off the autofocus and focus manually or your lens will spend most of the time hunting for a point of focus and this is irritating beyond belief. Where possible use a tripod too. But while this is often okay for a fixed subject, if you are shooting insects that move, you may find it impossible. In such cases, a beanbag or your elbows are an excellent compromise.

Macro photography is tough at the best of times but on very windy days it is virtually impossible to achieve sharp results unless you are photographing unmovable objects, so pick your days and subjects carefully. Vary your aperture on each subject too, as the difference between the maximum front-to-back sharpness you can get or, indeed, the most limited, can make a difference. Neither one is right or wrong, so experiment and review your results carefully.



A prime macro lens, like this 105mm optic from Sigma, is a lovely lens. This focal length is almost perfect, allowing you stand a reasonable distance back from your subject. Being a prime lens, it offers a fast maximum aperture too – which is great for portraiture.



In many cases, focusing approximately on the subject, then moving your body, camera and lens gently forwards or backwards until you bring your subject into sharp focus will often prove the best option for sharp images (if not using a tripod). This method certainly isn't foolproof, so shoot plenty of images to ensure you get absolute sharpness where you want it.

MAIN POINT OF FOCUS

The largest dewdrop on the leaf has engulfed a tiny yellow petal fallen from a nearby flower. This splash of colour has been used as the main point of focus.

SHALLOW FOCUS

Shot at this macro's widest aperture of f/2.8, this image has a very shallow focus for creative effect. The undulating surface of the leaf dips in and out of focus, depending on how close each part is to the central dewdrop.

Turn the page for information on using a macro lens



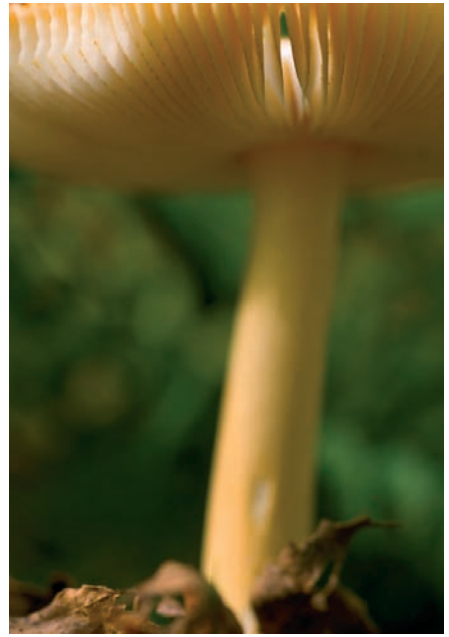
More close-up ideas

Insects

One of the most popular macro subjects are insects. Short focal length macro lenses of 50mm are best avoided as you will need to move in very close to your subject to photograph it at life-size. If you hadn't already noticed, insects move, so a lens held too close to them could just frighten them away! Also, when photographing long-bodied insects such as damselflies or maybe a spider sitting on its web, try to position your lens so that it is at right-angles to your subject, so that as much of it is in the plane of focus and therefore as sharp as possible.

Go abstract

A macro lens allows you to get so close to your subject that you can opt for a more abstract approach – isolating a part or parts of your subject to show its natural texture, pattern or just an unusual shape. Remember, altering the aperture will also have a big effect on your result so when you've found something interesting to shoot, explore its potential from wide-open (see right) all the way down to a narrow aperture such as f/22 that will increase the depth-of-field in the image.



Now try this lens...

Telephoto

You can get great close-up images, isolating your subject from its background in the process, with a telephoto lens such as the 200mm lens we used for this poppy image. Just as with macro lenses, think carefully about your point of focus and where it sits within the frame. Large out-of-focus areas can be used to draw the viewer's eye to the main subject but frame carefully. One simple technique to try when shooting flowers with a telephoto is to shoot 'through' foreground flora of the same colour to create diffused areas that surround your main subject. It pays to work with a wide aperture when trying this.

Lenses for wildlife

Telephoto zoom

Luckily, and despite what you may have seen on TV (pros with massive lenses tracking lions across the Masai Mara), you don't always need expensive 600mm f/4 telephotos to shoot all types of wildlife. Of course, if you're trying to shoot a deer that won't come within 400m of you then it certainly helps.

However, you should always opt for the longest and fastest lens that you can afford. If you're just starting out and don't want to break the bank you could do a lot worse than a reasonably priced 70-300mm f/4-5.6 zoom, the cheapest of which will only set you back around £100.

With a lens like this you can hone your skills on more accessible wildlife such as squirrels or zoo animals, before graduating to more illusive wild animals, like deer and fox.

A long lens not only pulls a distant subject closer to you, it also helps to separate the creature from the background, so it's clearly visible in the frame. You can see the effect on the right with our wolf image. A 300mm focal length and a wide aperture of f/5.6 has thrown all the attention on the animal itself.

If you're a serious enthusiast and low light or extreme conditions are a genuine concern, then you could always consider investing in an image stabilised model. Perfect for combating camera shake, Canon, Nikon and Sigma all offer models in the 80-400mm/100-400mm range, with prices starting around £900. They're expensive but make the task of shooting sharp images much easier.



BLURRED BACKGROUND

Working with a long lens gives you the opportunity to ensure your wildlife subject is clearly visible by rendering the background out of focus. In the case of this captive wolf, it also ensured that enclosure fences were not visible on the photo.

EYE FOCUS

As with any 'human' portrait, when photographing an animal like this, it's usually best to ensure that the main point of focus is on the eyes. In this case, the lens also benefitted from image stabilisation to help ensure the picture is sharp.



For anyone getting into wildlife photography where there really is no substitute for a long lens, a 70-300mm telephoto zoom is a good compromise to a whole range of expensive fast prime telephoto lenses.

Now try these lenses...

Macro

Other than the obvious insects (see page 32 for more), you might be forgiven for thinking that a macro lens has no place in photographing animals. Wrong! Where close access is possible – zoos, farm animals, domestic pets, etc – the close focus function of a macro lens can be used to concentrate on smaller details that reveal something about the character of the animals in question. Cats' eyes are an obvious example.



Wide-angle

Not just the sole preserve of landscape enthusiasts, wide-angle lenses are perfect for wildlife photos that include more of the animal's natural environment. The only catch is that you have to get close to your subject. In fact, the closer the better, so choose your subjects carefully. You're not going to fill the frame with a snarling lion, but inquisitive cows (beware the saliva!) and domestic pets make great subjects.



tip

A beanbag may seem an unlikely photographic accessory but many wildlife enthusiasts and professionals swear by them for certain situations. When handholding or setting up a tripod are impractical (if you're in a car or shooting really low, for example), then a beanbag can be slung over the window sill or plonked on the ground allowing you to rest your telephoto lens on it. It's actually amazing just how much extra stability this will give you. You can buy ready-made beanbags or alternatively you could try to make your own. Dry beans (pinto beans are often recommended) can be used to fill the bag itself.



USING YOUR LENSES

Lens extras

Filters, cleaning cloths, pouches... what else do you need for the perfect kit bag? And what do those strange letters and numbers on the side of your lenses mean? Let's take a look at those little extras...

Accessories

As with everything in this expensive hobby we love so much, lenses need a helping hand to make sure everything runs smoothly. Sure, they cost a bit of money but investing in a cost-effective skylight filter is nothing compared to having to replace a damaged lens. Here's a quick look at the most essential lens accessories you need...

**Some models may vary in price.*



Silica gel **£2.49**

These little sachets can be found in new shoe boxes and in other products you might buy – collect them and put a couple in with your kit when you intend to store it for a while, or you're in a damp location.



Skylight and UV filters from **£7.97 each**

In the interests of protecting your valuable lenses, always invest in a skylight or ultra violet (UV) filter for each one you own. Be warned that filters for lenses with larger filter threads – 77mm and above – can prove expensive.



Lowepro lens pouches from **£11.99**

Lens pouches can be attached to the side of your bag or onto your belt to give you great flexibility in the field while still protecting your precious (and expensive) optics.



Optical cleaning cloth from **£2.99**

One of the most essential accessories you can possibly buy is a decent cleaning cloth. Look for a high quality microfibre cloth.



Polariser from **£16.99**

If you're just getting started and love the great outdoors, the first filter you should buy is a polariser. Perfect for increased colour saturation, stronger blues and reduced reflections.



Lens cleaning pen **£8.99**

The LensPen is a nice addition to your basic kit as it features a retractable soft brush at one end and a unique soft cleaning tip at the other.

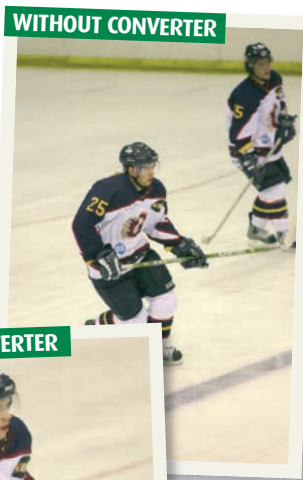
Frequently asked questions

Q Should I use a teleconverter?

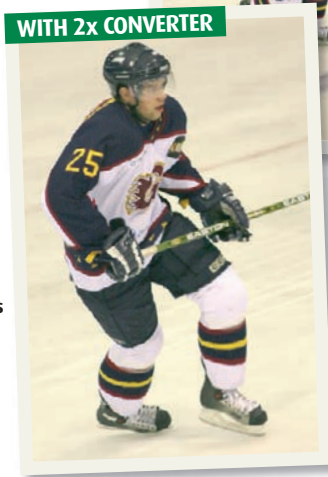
A Teleconverters are adapters that attach to the back of your lens and increase the focal length. Sounds simple doesn't it? Sadly, there are drawbacks. The converters made by the big lens manufacturers are matched to either a particular lens or range of lenses (usually the pro models) so you can't just buy any one and expect it to work with all of your lenses. There are a few cheaper third-party models available but even these are usually limited to lenses with maximum apertures wider than f/5.6. Part of the reason for this is that the teleconverter reduces the maximum aperture of the lens by one or two stops, depending on the magnification.

Pro lenses have larger maximum apertures so this doesn't matter quite as much as on slower cheaper lenses. For example, a 300mm f/2.8 telephoto lens with a 1.4x converter attached essentially becomes a 420mm f/4 lens, or a 600mm f/5.6 lens if you attach a 2x converter instead. However, if you can only afford a cheaper 300mm f/5.6 lens, a 2x converter will give you a maximum aperture of f/11, making the lens much harder to use in all but the brightest conditions. You win some, you lose some!

A 1.4x converter reduces the maximum aperture by one stop, and you lose two stops of light with a 2x converter.



WITHOUT CONVERTER



WITH 2x CONVERTER

With a 2x converter attached to his long lens, the photographer was able to get even closer to the action.

Q Are two lenses better than one?

A Superzoom lenses range from wide-angle to telephoto with typical focal lengths of 28-200mm (or 18-200mm digital-only). They offer an all-in-one solution for photographers on the move. The trouble is that there are technical issues with cramming wide and long focal lengths into one lens. Barrel and pincushion distortion (turn to page 14) are often noticeable at the extremes of the focal range, there is often a lack of sharpness around the edges of the frame and the maximum aperture suffers too. This rules them out for many photographers but superzooms are still particularly handy for days out or holidays when you don't want to have to change and carry extra lenses.

Superzooms are really handy as an all-in-one lens solution.



Q What is a pro lens?

A At around five times the cost of an average lens, a pro lens is a serious piece of kit. But do they really represent good value for the average photographer? Physically they are designed to take the kind of harsh treatment that an enthusiast would never dream of dishing out but pros take as part of their job. Pro lenses offer a wider maximum aperture (typically f/2.8) - great for sports and lowlight shooting - but again many users won't fully benefit from this feature. The autofocus performance and handling are improved, which will benefit all users, while the overall weight is increased too.

While it's true that pro lenses produce better results, these differences can only really be seen with the images greatly enlarged or heavily scrutinised. Overall, professional lenses are designed with professionals in mind and as the price suggests, they don't offer the average enthusiast as much as you may think. You'll find that the lenses in the middle of the overall price range offer the best value for money as they have many pro lens features while being more suitably priced.



Pro lenses are built to withstand greater use and tend to be faster. But they cost more.

Visit the Practical Photography website...

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LENS ABBREVIATIONS EXPLAINED

It's hard enough to choose which lens to buy without being baffled by the array of letters and numbers that seem to accompany the name of every lens that's sold. To make things easier to understand, we've put together a list of manufacturers' abbreviations so you can impress all your mates down at your photography club...

GENERIC

f/number - the widest available aperture on the lens e.g. f/2.8 written as 1:2.8. On many zooms it can also be quoted as a range e.g. 1:3.5-4.5 meaning the maximum aperture ranges from f/3.5-f/4.5 at each end of the zoom.

AP0 Apochromatic - the lens elements are shaped to combat colour aberration and improve image quality. Mostly found on telephoto lenses.

IF Internal (inner) focus - only internal parts of the lens are moved during autofocus so the focusing ring stays still.

Image stabiliser - Canon - Image Stabiliser (IS); Nikon - Vibration Reduction (VR); Sigma - Optical Stabiliser (OS). An optical mechanism within certain lenses used to combat camera shake.

NIKON

AF-D Distance information - the lens contains a CPU that supplies distance information to the camera to assist the 3D Matrix metering.

AF-G - newer model of D-series lens without the manual aperture ring. Not compatible with early Nikon AF cameras.

AF-S (SWM) Silent Wave motor - these lenses feature a smaller and quieter motor to allow quicker autofocus.

ED Extra low Dispersion glass - these lenses use a special type of glass to overcome problems with chromatic aberration.

DX Digital Exclusive - lenses designed to work only with Nikon's series of digital SLRs with APS-C sized sensors.

TAMRON

Di Digitally Integrated - this range of lenses have been designed to work with either 35mm or digital SLR cameras.

Di II Digital Only - the lens has been optimised for use on D-SLRs with APS-C sized sensors only. Not for full-frame D-SLRs or 35mm.

XR Extra Refractive - a type of glass that helps keep the lens size down and allows the lens to have wider maximum apertures.

SP Super Performance - Tamron's range of top performance lenses with higher quality specifications and a higher price.

ASL Aspherical - used in standard and super zooms, the aspherical lenses improve the quality and keep the overall size down.

SIGMA

EX Excellence - Sigma's professional range of lenses. They boast better performance and range of features but at a higher price.

DG Digital and film - wide-angle, fast lenses that have been optimised for digital cameras but can still be used on 35mm cameras

DC Digital Only - these lenses have been designed for use solely on D-SLRs with APS-sized sensors. Not full-frame or 35mm.

ASP Aspherical - the aspherical design of the lens elements reduces the number of components and overall size of the lens.

HSM Hyper-Sonic Motor - the autofocus is driven by a faster, quieter motor to provide a better handling experience.

CANON

EF Electronic Focus - these letters are used to denote Canon's range of autofocus lenses for easy classification.

EF-S Electronic Focus-Short - Digital Only autofocus lenses with a short back focus for Canon's D-SLRs with APS-C sized sensors.

USM Ultra Sonic Motor - Canon's legendary autofocus system is both super fast and ultra quiet. Sometimes listed simply as U.

DO Diffractive Optical Element - a combination of lens elements used to combat colour aberration and reduce the size of the lens.

L Luxury - denotes the professional series of lenses. They have a high cost but offer great performance and build quality.