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# The Complete Photography Manual

OVER  
**985**  
GUIDES  
& TIPS

*Master your camera and improve  
your photographic skills*

# The Complete **Photography** Manual

At its simplest level, taking a picture is done to record an event or capture a memory; taking a selfie, or a snap of loved ones on holiday, perhaps. This is how most of us have been introduced to photography. Our camera phones have become our first point of contact with the world of photography and, for many, it can lead on to more creative pastures with the purchase of a more advanced device such as a Compact System Camera or a DSLR. At this point, photography can seem quite daunting; especially for beginners. There appears to be a lot of technical knowledge that must be learnt, terms that need to be understood, even mathematics that have to be worked out. The more you uncover about it, the less you seem to know. Don't worry, photography is not nearly as complex and intimidating as you might think. Sure there are technical aspects, but with the help of this guide we hope to give you a solid grounding in all you need to know to use your camera with confidence and use it creatively.





# Contents



## Getting started

- 8 Know your camera
- 12 The right camera for you
- 16 What lenses do I need?
- 20 Why do I need a tripod?
- 22 Flashes and lighting
- 24 Types of light modifiers
- 26 Filters and filter systems
- 28 Photography software
- 30 Digital storage



Choosing a new camera can be difficult these days but our guides will help you make the right choice.



## Using your camera

- 36 Aperture and depth of field explained
- 38 How does shutter speed affect photos?
- 40 How ISO works on a digital camera
- 42 Methods for getting good focus
- 44 Be the master of metering
- 46 Lenses and focal length
- 48 Explore your camera's scene modes
- 50 Camera shooting modes
- 52 The rules of composition
- 56 White balance and colour
- 58 Hyperfocal distance
- 60 What is Jpeg and Raw?
- 62 Light it up with flash
- 64 Using external flash
- 66 From screen to paper
- 68 Organising your pictures
- 70 Sharing your photos online
- 72 Taking care of your equipment



Learn how to get your flash off your camera and open up a new world of creativity and lighting options.





## Take better photographs

78 Choose the right camera

78 Choose the right lens

78 Buy a tripod

78 Early bird

79 Visual interest

79 Pick a prime

79 The holy trinity

79 Stop the shakes

80 Depth cueing

80 Enhance your photos

80 Are you compensating?

80 Don't fear the histogram

81 Learn from others

81 Further afield

81 Out of the shadows

81 Batteries

82 A sense of perspective

82 Maximum exposure

82 Lock it up

82 Filter systems

83 There's an app for that

83 Take control

83 Stay sharp

83 Persistence pays off



We have some great hints and tips that we want to pass on, so you can evolve as a photographer.

## Creative projects

86 How to photograph women

88 Night photography

92 How to photograph men

94 Shallow depth of field portraits

96 Black and white photography

98 Master metering outdoors

100 Action and sports

104 Natural light portraits

106 Shallow depth of field and bokeh

114 Master landscape photography

116 Pet photography

120 Shooting amazing sunsets

122 The power of silhouettes

126 How to capture macro images

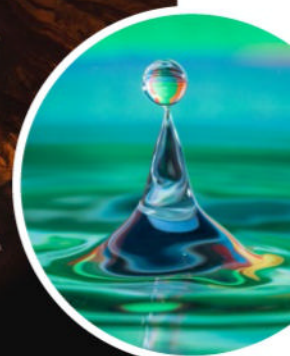
128 High speed photography

132 Long exposure photography

138 The stand-in safari

144 Glossary

There are plenty of guides to inspire you creatively and get you shooting with confidence like a pro.





# GETTING STARTED

Choose the right camera and accessories for you

**A**re you looking for a camera? Are you a little unsure about the various kinds of camera that are available and which ones might be more suitable than others? For any newcomer to photography, many questions need to be answered in order to have a clearer picture of what kind of camera, lenses and accessories will be needed to set you up ready to start enjoying the hobby. Then you may turn your thoughts to flash lighting and light modification, software and filters. There is a whole world to explore and we can show you where to start. ■

8 Know your camera

---

12 The right camera for you

---

16 What lenses do I need?

---

20 Why do I need a tripod?

---

22 Flashes and lighting

---

24 Types of light modifiers

---

26 Filters and filter systems

---

28 Photography software

---


30 Digital storage

---









“Cameras come in many shapes, sizes and prices. At their heart though, they all do the same thing: capture light on a sensor and turn it into a digital image.”

# Know your camera

A quick guide to all the major dials and buttons

**C**ameras come in many shapes, sizes and prices. At their heart though, they all do the same thing: capture light on a sensor and turn it into a digital image. That’s a gross oversimplification but you get the general idea. Modern cameras also come with many features and functions. Although it would be difficult to

list them all, here are the main dials and buttons that you can expect to find on many cameras. Different brands and models vary in their button and dial layouts as well as certain naming conventions but we’ve put together a little guide to the main controls and displays. ■



## THE FRONT OF THE CAMERA



### 1 AF-Assist illuminator

If your subject is poorly lit, the AF-Assist illuminator lights up to help with focusing.

### 2 Power switch

A simple lever you can rotate to turn the camera on and off.

### 3 Shutter release button

This is a typical two-stage button. Press halfway to focus, then fully depress to take a photo.

### 4 Aperture/Exposure Compensation

Pressing this button lets you alter either the aperture or exposure compensation value.

### 5 Movie record button

This button is pressed to begin video recording and pressed again to stop recording.

### 6 Live view switch

Click the live view switch in order to display the view through the lens on the camera's LCD screen.

### 7 Mode dial

Rotate this dial to choose which shooting mode to use such as Aperture, Priority or Manual mode.

### 8 Pop-up flash

A small built in flash. They are quite low power, but they can be used to help illuminate poorly lit or backlit subjects.

### 9 Flash modes and flash compensation

This button allows the choice of different flash modes such as Red-eye reduction and control of output power.

### 10 Function button

You can assign a preferred function to this button that activates when you hold it.

### 11 Lens release button

Push this button in order to release an attached lens from the camera's lens mount.

### 12 Infrared receiver (front)

You can activate your camera remotely by using a controller pointed at this receiver.



## THE REAR OF THE CAMERA



### 1 Stereo microphone

Many cameras have a small stereo microphone built in to capture audio whilst shooting video.

### 2 Accessory shoe

This mounting plate lets you attach optional flashguns to use instead of the built in flash.

### 3 Eye sensor

When you place your eye to the viewfinder, the LCD display will automatically turn off.

### 4 Info button

Press the info button to activate the LCD screen and view the current information display.

### 5 Command dial

The command dial lets you alter the values of the main camera settings by rotating it to the left or right.

### 6 Menu button

Pressing the menu button will give you access to most of the shooting options on the camera.

### 7 Infrared receiver (rear)

You can activate your camera remotely by using a controller pointed at this receiver.

### 8 Speaker

A small speaker unit to let you listen to any audio that you have captured.

### 9 Viewfinder eyepiece

Through the viewfinder you will see the main framing grid and the camera settings displayed.

### 10 Dioptre adjustment

Here you can adjust the focus of the viewfinder to suit your eyesight.

### 11 Play button

Pressing this button will display pictures on the LCD monitor.

### 12 Information button

When you press this button you can change settings such as image quality and metering.

### 13 Multi selector

The multi selector acts like a cursor to let you navigate menu screens.

### 14 OK button

Used in conjunction with the multi selector, it lets you select highlighted items.

### 15 Trash button

If you want to delete a currently displayed image, press this button to remove it.

### 16 Vari-angle monitor

All information about camera settings and image playback can be viewed on the screen.

### 17 Playback zoom

With an image displayed on the screen, you can zoom in up to 33x magnification.



## THE LEFT SIDE

### 1 Accessory terminal

Wireless controllers and GPS units can be plugged in to this terminal.

### 2 Microphone socket

Optional external stereo microphones can be connected to this port.

### 3 USB and A/V connector

You can directly connect your camera to a computer or printer from this port.

### 4 Flash and FEC button

Activate your camera's built-in flash when required. You can also activate the flash exposure compensation.

### 5 Function button

Pressing this button in conjunction with other buttons allows you to access more features.



## THE RIGHT SIDE

### 1 HDMI connector

Allows the camera to be connected to a high-definition HDMI device like a TV.

### 2 Memory card slot

This is where you insert the digital storage media such as an SD card.

### 3 Power connector

A terminal allowing a mains electrical source to be plugged in.

### 4 Battery compartment cover

The battery is inserted here.

### 5 Infrared receiver

For a remote control device.

### 6 Mains power slot

Mains power adapter/powerpack lead access slot.





# The right camera for you

We highlight the main types of digital camera

The number of camera models available to the budding photographer is vast. All the main manufacturers have a large number of different models and types of camera to suit every taste and also every pocket. A wide variety of choice is fine but it can be somewhat overwhelming when it comes to choosing a camera for yourself. It isn't helped by the fact that the distinctions between various types of camera system have become quite blurred as the quality and the capabilities of these devices keep expanding. With that in mind, we have put together a little guide to the main types of camera out there. Hopefully it will help point you in the right direction so you get the right camera for the job. ■

“A wide variety of choice is fine but it can be somewhat overwhelming when it comes to choosing a camera for yourself.”







## Compact and Point and Shoot

A large number of entry-level cameras fall into this category. They tend to be fairly small and light, measuring about 100 x 50 x 25mm and weighing around 120-130g. Modern compacts are normally fully automatic, although some may offer basic manual exposure options. They usually have a zoom lens of up to 12x which folds flush with the camera body and an LCD monitor of about 7cm diagonal size. Unlike larger camera systems, they don't have an optical viewfinder, relying instead on the LCD screen to be used as a live view monitor. Extra features may include HD video recording, image stabilisation and Wi-Fi connectivity, and they often come in a range of colours. As sensor technology has improved, it has also given rise to a range of compact cameras for the more advanced photographer. Sporting larger sensors, these offer greater image quality as well as superior versatility, manual controls and better low light capability. As you would imagine, these more advanced compact cameras can be significantly more expensive but they will give you much greater creative control than the standard models. These models typically offer 16MP - 24MP sensor sizes.

## Superzoom

Superzoom cameras are a fixed-lens design of camera that are built to offer both wide angle capability and very large levels of magnification without the need to invest in additional lenses, as you would with a DSLR. In this case, the amount of magnification can be anywhere up to 60x or more. That is equivalent to a 1400mm super telephoto lens. This immense magnification means it can do the job of much more expensive DSLR cameras, that would require the purchase of telephoto lenses that could cost thousands, all in a relatively compact body. The downside to having a model of this kind is that although you can cover a huge zoom range from medium wide angle to super telephoto, that is all you can do. If you wanted to shoot a very shallow depth of field macro shot, for instance, you would not be able to do so; nor could you use a fast prime lens for low light shooting. That said, these superzooms offer image stabilisation, manual control, electronic viewfinders and HD video recording capability too. You can view these types of cameras as a great stepping stone for people who want to move up from compact cameras but don't want the extra expense of DSLRs and multiple lenses to worry about.





## Mirrorless Cameras

This area of the camera system world has seen quite an increase in popularity in recent times. Essentially a mirrorless camera, as the name suggests, does not have the movable mirror seen in larger DSLR formats. Although you get a viewfinder as well as a rear mounted LCD screen, the image that you see is an electronic representation provided by the image sensor. Like the larger DSLR cameras, these devices have an interchangeable lens system, giving you greater creative control over any shooting conditions you might face. A mirrorless interchangeable lens camera (MILC) is smaller, lighter and less complex to build than most DSLRs. MILC systems usually offer around 20MP sensor sizes and although the quality of the images may not be up to full-frame DSLR standards, it is shown to be improving with each new camera that comes out. The price point and compact nature of this MILC system makes it a popular choice but be aware that lens choices are not as varied as those you would get with a standard DSLR. However, they do have a growing range of accessories such as flashguns. They have also become increasingly popular with filmmakers who love them for their good autofocus ability with HD and even Ultra HD video resolutions.



## Adventure Cameras

This is another growth area in the camera market. Adventure cameras are compact cameras that are tougher than the average camera. If adventuring is your thing, then perhaps a large, heavy, expensive and relatively brittle DSLR might not be the most apt choice. Although DSLRs are touted as 'weather sealed' that won't protect them from a dunking in a muddy river or being dropped on some granite outcropping. This is where the adventure camera shines. A good adventure camera is fully waterproof and capable of going on a scuba dive down to 50ft. They are also shockproof, being able to shrug off a small drop onto a hard surface. Their sensors usually offer about 16MP resolution and plenty of shooting modes to make them useful as day-to-day cameras too. An offshoot of this area of photography has given rise to mini action cameras such as the GoPro range. They are the darlings of surfers, snowboarders and the like who want to be able to mount very small, very light cameras to their boards, or to themselves. Their ability to shoot 4K video also makes them very useful in the videography arena.





## Camera Phones

There is no getting away from it, the smartphone has turned the idea of a point-and-shoot camera on its head. Smartphone imaging technology has come a long way and your average smartphone is now capable of shooting 16 megapixels with impressive low-light capability for such a compact device. Moreover, many smartphones now have the main camera backed up with a front-facing, lower resolution, 'selfie' cam as well. Typically, the camera built into a mobile phone is around 16MP with a small f/2.0 main lens and an 8MP front camera. They also have LEDs built in to act as a small flash unit to light your subjects at night as well as electronic image stabilisation. Camera phones are much simpler in design and use than standard DSLRs. Their smaller sensors and tiny lenses put an upper limit on image quality, although a few current models now allow the capture of images in Raw format as well as the more usual Jpeg format. Some models do boast larger 1" sensors that can rival the quality of some compact cameras. The main advantage of the camera phone is that it is built into a mobile phone; wherever you go, the camera goes too.



## Digital SLRs

Digital SLRs, or DSLRs as they are commonly referred to, are cameras that use a mirror mechanism to reflect light from the lens up into a viewfinder. The viewfinder is optical, meaning that you are actually seeing what the lens sees, not an electronic representation like the LCD screens on compact cameras. When you take a photo, the mirror is flipped up out of the way and the light entering through the lens is allowed to fall onto the camera sensor and an image is recorded. DSLRs are generally heavier and more complex than mirrorless and compact cameras. DSLRs have interchangeable lenses and most can use the same lenses as their older film-based predecessors, giving you plenty of creative scope and lens choice. With specialist lenses available for particular tasks, DSLR systems are the choice of most serious amateur and professional photographers, offering superb image quality. Most DSLRs use a sensor size called APS-C but a few top-end cameras use the larger full-frame sensors that are the size of a 35mm film frame. The range of available lenses is vast, particularly with the main manufacturers. The downside is that DSLR bodies, lenses and accessories can be quite expensive.





# What lenses do I need?

We take a look at the main lens types available for your camera

It's no surprise that if you purchase a new camera with an interchangeable lens system, one of the first questions you might ask yourself is 'which lens should I buy for my camera?'. That is not quite as easy a question to answer as you would hope. Manufacturers offer increasingly varied lenses to suit different photographers' requirements. To add to the confusion, there is also quite a varied range in price and quality to take into consideration. On top of that there is also the cropped sensor and full-frame issue to consider. Certain lenses will only work with certain camera bodies because of the mounting system used, and so on and on it goes. Everyone shoots differently, with a different style and preference and the type of shot you are trying to capture will also greatly influence the kind of lens you need. If you are a diehard landscape photographer, then lenses with a greater angle of view are what you will want to capture the environment in all its sweeping glory. If however, you are a portrait photographer, then your lens requirements will be quite different. It's a bit of a minefield but we'll try to break down the main types of lenses available as you look deeper into your next choice of lens. ■

**"If you are a diehard landscape photographer, then lenses with a greater angle of view are what you will want to capture the environment in all its sweeping glory."**



## Prime lens

A prime lens is a lens that is a fixed focal length. That means that it cannot zoom in or out, so you have to buy a prime lens with a focal length that suits your needs. Prime lenses are light and usually of better optical quality; but you will have to carry more of them to around cover a range of focal lengths. Although people might prefer the convenience of a zoom lens that covers a wide focal length range, the main factor in considering getting a couple of prime lenses in your gear bag, is that they offer models that have a very wide maximum aperture. Primes can be purchased with apertures of  $f/2.8$  to  $f/1.4$ . This allows greater flexibility in low light conditions and also allows you to shoot images with very shallow depth of field for those lovely out of focus backgrounds.



## Zoom lens

Zoom lenses have the advantage that they are more versatile than prime lenses. So much so that just a couple of lenses can cover a very wide range of focal lengths. You could for instance have a 16-35mm wide angle lens, a 24-105mm lens and a 100-400mm super telephoto and not need another lens for most of your shooting requirements. From a framing and composition standpoint, you do not have to physically move, you can simply zoom the lens to achieve the framing you are after. There are even certain zoom lenses that cover a focal length range of 18-300mm. For most practical requirements, you could use that one lens for every shoot you do. The main downside is that optical quality is often not as good as a prime lens and you will need to be aware of camera shake when using the longer focal lengths as any small amount of unwanted camera movement will be magnified and potentially ruin your shots.





## Pancake lens (prices range from £80 - £400)

Typical focal length:  
Wide, Normal, Telephoto

Simply put, a pancake lens is a very flat prime lens. It is shorter than it is wide and very small and light. Photographers use them primarily when they are after a small, compact camera and lens system and are used with DSLR and Micro Four Thirds cameras. Relative to their diminutive size, they can produce very good images. Despite being a prime lens, they generally have a maximum aperture of no greater than f/2.8, although there are a couple of exceptions.



## Standard zoom (prices range from £100 - £800+)

Typical focal length:  
24-105mm (full-frame equivalent)

This is the most common focal length, suitable for general photography and useful for everything from landscapes to portraits. Most systems will include a couple of lenses in this focal length range: usually a cheaper, slower version often included as a kit lens with a new camera, with a maximum aperture that is usually around f/3.5-f/4; and a premium quality lens often costing a lot more that may offer a maximum aperture of f/2.8-f3.5.



## Ultra-wide zoom (prices range from £200 - £1500)

Typical focal length:  
16-35mm (full-frame equivalent)

Ultra-wide zoom lenses are primarily used for landscape photography. They are more specialised than standard zooms, and consequently are usually more expensive, although some systems include both standard and premium types. A good quality wide-angle zoom can have a maximum aperture of f/2.8 but will be very expensive, whereas a lens with a similar focal length but with a maximum aperture of f/4 will be much cheaper.



## Macro lens (prices range from £90 - £1500)

Typical focal length:  
50-100mm (full-frame equivalent)

A true macro lens by definition should be able to record an image at 1:1 scale on the sensor or medium it was shot on at its closest focusing distance. This magnification factor means that a macro lens is able to fill the frame and reveal amazing detail on very small objects. Some of the more recent models have image stabilisation built in, to assist with camera shake that can potentially ruin a shot.





**Medium zoom** (prices range from £80- £1000)

Typical focal length:  
70-300mm (full-frame equivalent)

The medium telephoto zoom is useful for amateur wildlife or sports photography and portraits at the shorter end of its focal length range. Telephoto zooms have a smaller effective aperture than standard zooms, usually ranging from f/3.5 to f/5.6. A decent 70-300mm lens can be purchased quite cheaply.

**Super telephoto** (prices range from £800- £6000+)

Typical focal length:  
400-1200mm (full-frame equivalent)

Specialist lenses are used mainly by professionals and advanced enthusiasts. These include both zoom and prime ultra-fast telephoto lenses used by sports and wildlife photographers. They are very expensive but essential when it comes to capturing action at some great distance.

**Tilt-shift** (prices range from £100- £2500)

Typical focal length:  
17mm 24mm 35mm (full-frame equivalent)

A tilt-shift lens is quite a rare breed and not many of its type are available. It is the modern equivalent of an old bellows film camera. The lens can be rotated relative to the sensor to control the position of the area of sharpest focus, as well as moved parallel to the sensor to move the image area.





# Why do I need a tripod?

An essential piece of equipment

**C**amera ownership goes through a number of phases. First is the decision about which camera to actually buy, then comes the choice of lenses. Then come the choices with accessories. It may sound like an exaggeration, but one of the best accessories you can get to improve your photography, is a good tripod. In fact, it might be safer to upgrade it from the status of 'accessory' to 'essential purchase'. You might wonder why a tripod would be considered one of the top key factors in taking better photographs.

Well, have you ever wanted to take photos in challenging low light conditions and wondered why your images are coming out blurry? Have you ever taken photos of some distant subject with your superzoom camera at its maximum magnification and wondered the same thing? This is because one of the primary causes of unsatisfactory photos is camera shake. Camera shake is the unwanted movement of the camera during the capture of the

shot. This translates as blurry photos, often blurry enough to ruin the shot completely. The tripod is instrumental in eliminating camera shake. It provides a very stable platform onto which you can mount your camera, preventing it from moving and spoiling your shots.

Tripods come in various makes, models and materials. They are either made from plastic, in the cheaper models, to metal alloys in the mid-range versions, all the way up to light but rigid carbon fibre in the professional models. As the name suggests, the tripod consists of a three legged arrangement upon which your camera sits in a tripod mount. The legs come in 2 or three sections and can be telescoped out to different heights. The tripod mount can be tilted, rotated and flipped so you can shoot at a wide variety of angles as well as in landscape or portrait orientation. Key factors when choosing a tripod are rigidity and carrying weight. The tripod you choose has to be able to support the weight of your camera and hold it perfectly still. Some cheaper tripods with plastic heads and thin aluminium legs are too 'bouncy' to be used with anything heavier than a compact or light superzoom. Set the tripod up and press down on the top of it. If it flexes by more than a few millimetres it's not going to be stiff enough to support the weight of a heavy camera. ■



**TOP TIP!**  
Hanging your camera bag full of equipment under your tripod is a great way of adding extra stability to it. This is particularly useful with cheaper tripods that are made of lighter materials and plastic.

## Pocket tripods (prices range from £20- £40)

These are miniature tripods designed for small compact cameras and are ideal for tabletop use, or for positioning your camera for a self-timer group shot. They're small enough to slip into a jacket pocket or into your camera pouch. There are several different types, including ones with telescopic legs, ball or pan-tilt heads, and even flexible legs. One unique and extremely versatile design is the GorillaPod, which can grip onto almost any object or work as a tripod. If you want something even smaller to support your light compact camera, then the XShot mini travel tripod is the one for you.



“Tripods come in various makes, models and materials. They are either made from plastic in the cheaper models, to metal alloys in the mid-range versions.”



## Entry level tripods

(prices range from £10- £50)

There are many cheap tripods on the market, made not only by brand name manufacturers but many third party manufacturers too. It's fair to say that the cheap tripods are cheap for a reason. If you are serious about your photography, particularly if you are shooting outdoors with a heavier DSLR, then you may find these a bit of a false economy. If they are made primarily from plastic, then they are not going to be rigid enough for any kind of long exposure photography, particularly when telescoped out to their full height. You would be better off spending a little more on a metal frame tripod.



## Mid-range tripods

(prices range from £50- £250)

Often referred to as travel tripods, these are designed for general use where low weight and portability are important factors. It is a good compromise to use a mid-range metal tripod when you need to be mobile. They are made of lightweight materials, usually aluminium or carbon fibre and are suitable for most types of camera from compacts up to mid-range DSLRs, although not with large telephoto lenses. If you can, get one with a quick release plate that makes mounting and demounting your camera a much quicker process. The ability to lock the legs at different angles and fold in reverse for greater compactness and portability is important too.



## Professional tripods

(prices range from £250 - £800+)

Top quality tripods are made from high-tech materials like carbon or basalt fibre, with magnesium alloy fittings and superior workmanship. They offer the best rigidity and support for even the heaviest cameras and lenses. They are going to be heavier than entry level or mid-range tripods but they offer quick release plates, different types of mounting platforms, variable angle legs and even the centre column can pivot in a wide arc. Although they are very expensive, you do get a lot of tripod for your money.



## Monopods

(prices range from £40- £200)

If you want support for your camera but don't want the weight or bulk of a tripod, then a monopod is a good alternative. As the name implies, it is basically a one-legged tripod. Although not as stable as its three-legged cousin, the monopod can dramatically reduce camera shake. They can also be quite handy when shooting from a cramped space where the larger footprint of a normal tripod might inhibit your ability to shoot. Typically made from aluminium or carbon fibre, they provide helpful stability and also a good measure of portability.





# Flashes and lighting

Add light and boost your creativity

Once you get beyond the basics of photography and you find yourself wanting to add a little creativity and take more control of how the light affects your shots, then that is when you need to take a look at additional lighting in the form of flashes. Your first experience of flash might be the tiny pop up flash you find on the top of a lot of compact cameras and a number of DSLR models. They are useful to light a subject when all else fails, but to be honest, if you want your shots to appear more than just selfies, then you need to look further afield. We are referring to the dedicated flashguns that can be mounted in your camera's hot shoe, or for even greater flexibility, used off-camera and fired remotely by a wireless trigger.

They are known by various names such as flash, strobe, speedlight (or Speedlite) and monobloc. They are usually battery powered, which makes them very portable. They emit a powerful and brief flash of light that can illuminate your scene. Monoblocs, or studio lights as they are known, are larger, more powerful and less portable lights that are usually powered by mains electricity. Some studio lights can be used outdoors with the help of large lithium batteries. ■



## Pop up flash

Most compact cameras and entry level DSLRs will have a small flash built in. Most are designed to pop up when light levels are deemed too low to get a usable exposure. Pop up flashes by their nature are very small and produce a very harsh direct light that is not flattering for your subjects. Because the little flash tube is front-facing, you don't have a lot of scope to get creative. You can use it to fill in dark shadows but beyond that you're probably going to struggle. Some people will put a small piece of white card bent at an angle in front of the flash to direct the light upwards in order to bounce the light off the ceiling but this can be a bit hit and miss. Add to that the fact that they are not particularly powerful, then you can see why you need to step up your game a little to the next level.

### TOP TIP!

When using flash, it is good form to learn and understand how sync speed works. Your camera has a maximum sync speed that means it can fire the flash and synchronise with the opening of your camera's shutter.



### Continuous light (prices range from £50- £10000+)

An alternative to the various forms of flash lighting we've mentioned here is to use continuous lighting instead. Sometimes also referred to as hot lights or photofloods. Rather than emitting a powerful but brief flash of light, continuous lights are always on. They are not as powerful as flashes but you do have the benefit of always seeing how the light is falling on your subject without needing to do a test shot as you would with flash. At their simplest, they are either an incandescent bulb housed inside a large reflector, or powerful daylight balanced fluorescent lights that are more energy efficient. For more powerful options, you are going to be looking at arc lights; these were developed for the film industry and are insanely expensive.



### Third party flash (prices range from £25- £150)

Just like cameras, there is a bewildering choice. Not just from the major brands like Canon and Nikon but from 3rd party manufacturers like Nissin, Yongnuo and Godox. With big name brands costing hundreds for top of the range equipment, the temptation may be to trawl the pages on eBay looking for a bargain flash unit. It is fair to point out that the phrase 'you get what you pay for' has never been more relevant. You may find yourself some unknown brand for a quarter of the price of one of the major brand names that seems too good to be true, and it probably is. Take the advice of those who found out to their cost, stick with a major brand or well-regarded 3rd party manufacturer. Check out user reviews wherever you can. Make the best informed choice you are able within your budget.



### Brand name flashes (prices range from £100- £600)

All the manufacturers make a variety of flash models for their cameras. They range from simple front facing small flashes, right up to their professional-level flashes with wireless control, powerful flash tubes with variable power control, tilt and swivel flash heads and a host of customisable features and accessories to create your own portable studio setup. These models are not cheap but they are the choice of professionals for a reason. They also have the added bonus of letting you shoot high-speed photography because, when used at lower power settings, the pulse of light from the flash is so brief that you could use it to illuminate a scene for a fraction of a second and catch a bullet in flight, freezing the action dead in its tracks.



### Studio lights (prices range from £150- £4000+)

Studio lights can actually be broken down into two categories. First is the flash head kit. Flash heads are just the light emitters. A separate power pack supplies the required voltage and the controls are actually on the power unit itself. The other variety of studio light is the monobloc, or monolight. These are either mains powered or lithium battery powered flash units but all the controls are built into each unit. This limits their power but it does make them more portable and more easily used outdoors. Flash heads tend to be more powerful and you have the advantage of being able to control multiple flash head setups directly from the power pack.





# Types of light modifiers

Make light yours to command



**W**hen you use flash lighting, especially if using it to directly light your subject, you will be aware of how harsh the shadows it casts can be. You can't always be near a large picture window on an overcast day, where the softness of the light coming through that window makes it difficult to take a bad photo. You have to work with what you have, so that means you need to go back to your flash. However, there are some techniques that allow you to modify and shape light to suit your needs. This is where light modifiers come in.

A lighting modifier is just what the name suggests. It is an object, surface, or material that alters the way the light travels from its source to the subject. If you shoot with an unmodified flashgun, the light that is emitted is traveling in a concentrated beam from a very small light source. If this light passes through a modifier, such as a softbox, the light is diffused, scattered and less concentrated. A modifier can also turn a small light source into a large one. A flash, fired from several feet away onto a large translucent material, for instance, creates an illuminated hot spot that is much larger than its source. This is the basis of light modification. Here are a few of the types of light modifier you could be working with. ■

“A lighting modifier is just what the name suggests. It is an object, surface, or material that alters the way the light travels from its source to the subject.”



## Omni-Bounce

In effect, this is a tiny softbox that covers the head of your flash. It enables light not only to emit forwards but also around the sides. This gives a closer approximation of a bare bulb and allows for wider lighting coverage at the expense of reduced flash power because not all the light is thrown forward. Even from a relatively short distance, there would be a visible difference in shadow softness compared to a bare flash.

(prices from £10)



## Snoot (prices from £15)

A snoot is a tube that concentrates the light output of your flash. It gives the resulting beam a searchlight quality that creates a tight pool of light, ideal for highlighting a small part of your scene. Moving the flash further away will enable you to define a larger spotlight. Because the beam of light is so narrow, the rest of your scene would be in relative darkness. Since the light is effectively reduced in size, the shadows it creates will be fairly sharp.



## Dome diffuser (prices from £50)

The dome diffuser takes the idea of the omni-bounce and expands upon it. The larger physical size of the dome allows you to use it like a true, large, bare bulb. With it, you can illuminate larger areas with a more even light source. Bear in mind that, like the omni-bounce, light is spread in all directions so your subject illumination will appear diminished.



## Shoot through umbrella

The shoot through umbrella or 'brolly' is regarded as one of the best types of light modifier for those new to flash photography. It is a white translucent material stretched over an umbrella wire frame through which the flash is fired. It is a great way to spread out light from a very small original source. The downside is that shoot through umbrellas can be quite easily broken.



(prices from £15)

## Reflector umbrella

A reflector umbrella works in the opposite manner to a shoot through. The flash is fired into the umbrella which uses its inner silver lining to reflect the light back out onto the subject. This method allows you to light large areas within a 180° radius. The wide, even light pattern it creates is ideal for lighting large groups from a distance of around 6m to 7m.



(prices from £25)

## The softbox

A softbox is used to soften and diffuse the output of your flash into a visually pleasing even light with no harsh shadows. The closer the softbox is to the subject, or indeed the larger the softbox, the softer the light appears. In fact, many use softboxes to emulate window light when shooting portraits or even product photography. If used as a key light in portraiture, the large rectangular surface creates some lovely catchlights in the subject's eyes as if they were looking out of a window.



(prices from £35)



# Filters and filter systems

Some must-have filters for creative photography

“Let’s take a look at some of the different types of filter and how they can help to improve your photos.”

**F**ilters have been an essential part of photography since its very beginnings. Used creatively they can improve a hard-to-capture scene, add an extra artistic element to an image or just provide a bit of fun. Modern digital photo editing has provided an, almost too easy, method to add filter effects to an image after it has been captured; some effects are better when applied by actual physical filters fitted to the camera when the photo is taken and this is particularly true with black and white photography. Let’s take a look at some of the different types of filter and how they can help to improve your photos. ■

## TOP TIP!

If you are buying a filter system that uses a filter holder, always remember to get the correct system for your widest lens. A very wide lens may be able to see the edges of your filter holder if it is too small for your current setup.



### 1. UV filter (prices from £15)

This screw-on filter was used originally to block UV light from hitting the film in old cameras. Modern digital cameras have UV and infrared protection on their sensors now, so a UV filter is employed as a method of defence against scratches and dust getting on the front lens element. Optionally you can just use a good quality clear glass filter instead. The higher the quality of glass the better, so as to avoid ghosting and flare in your shots.

### 2. Circular polarizing filter (prices from £25)

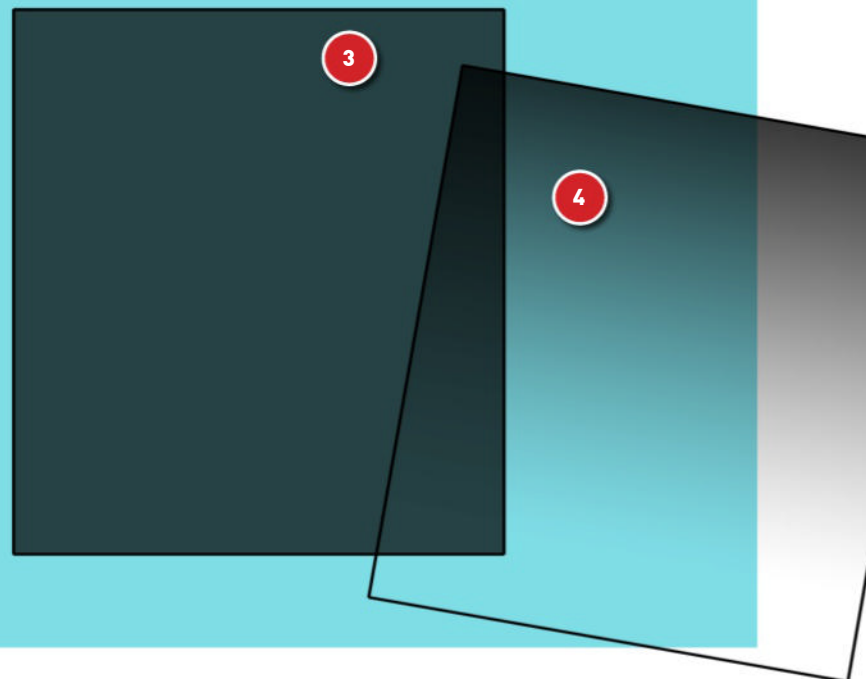
Circular polarizers are ideal for digital cameras. When correctly aligned, the filter can render blue skies darker with brighter, white clouds. They can also increase saturation and reduce reflections on shiny surfaces and water as well as reduce haze. Polariser work best when the camera is about 90° either side of the sun. The polariser has to be rotated until the maximum effect is achieved, blocking certain light waves. These filters come in both screw-on and filter holder varieties.

### 3. Neutral density filter (prices from £35)

ND filters limit the amount of light that is able to fall on the sensor and therefore require much longer shutter duration. They are made from darkened materials that are designed to be optically neutral in order not to create a colour cast. The darker the filter the longer your exposures can be. ND filters can range from a 2-stop filter to 10-stops of light reduction. They are excellent for use in daytime to create motion blur in moving objects like water and clouds.

### 4. Graduated ND filter (prices from £40)

ND grads work similar to standard ND filters but instead of being one solid dark material, the filter fades from dark to clear. They are useful in high contrast situations such as a bright sky versus a dark foreground where you can use the filter to darken the sky enough to balance the overall exposure in the scene.



Screw on filter



Rectangular filter



Filter holder

## Filter types

1. Circular screw on filters are the most common type that fits directly on your lens filter thread. They come in different thicknesses, the thickest of which can potentially cause vignetting to your shots. Ultra thin filters get around this but can be more expensive.

2. Square filters are popular with landscape photographers. A holder designed to house the filters directly attaches to the lens filter thread and can hold several filters. Generally they range in size from around 75mm to 150mm

3. Rectangular filters are another popular choice among landscape photographers. These are mounted in the same fashion as their square counterparts, the main difference is because they are rectangular; they have more scope to move up and down within the holder.

4. Filter holders are plastic and metal mounting devices that screw onto the filter thread of your lens. They have several slots moulded into them to accommodate several filters at once. The most popular filter system manufacturers are Cokin and Lee and Hitech.



# Photography software

How to bring your photos to life

**B**ack in the days of analogue film cameras, the process of taking photographs used to be the key part of the creative workflow. Producing prints or negatives in the darkroom did not allow for much scope when it came to maximising the quality of the images that had been taken. These days, in the world of digital photography, it can be argued that the capture of the images is only half the workflow. Indeed, some regard the post-process workflow as the overriding factor in producing great images.

We have always extolled the virtues of shooting your images in the uncompressed and unprocessed Raw format. Raw files are so named because they only contain the raw data straight from your camera's sensor; there has been no processing of the image as you would get with a Jpeg file. However it does mean that you have to put in a little work to extract the very best from the Raw format. This is where you need some software that can process your photos. Using Raw processing software is the first step in the

workflow. Here you can make all the necessary basic edits to your images such as distortion correction, saturation, tonal adjustments, sharpening, noise reduction and so on. Once you have made all the main edits to your photo, you can save it out to your preferred image format such as Jpeg or Tiff and call it done. However, if you want to do some additional photo manipulation, then you will also need to invest in software that can let you apply extensive photo retouching, layers, masks and effects.

When it comes to software, you have a large number of options from which to choose. In fact, there is so much choice, it can be nothing short of confusing. If you are new to photography or even an experienced photographer looking for some new applications to take your images to the next level, we've produced a small overview of some of the software options currently available. Note, that from the list, Adobe products feature quite prominently. That is no accident as their popularity cannot be denied, but there are also more options to discover. ■

“These days, in the world of digital photography, it can be argued that the capture of the images is only half the workflow.”

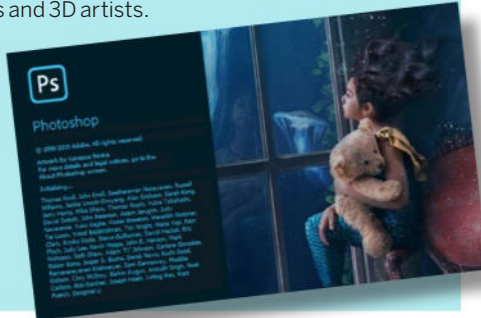


## Adobe Photoshop CC

(Windows and Mac - £120 annual subscription)

Photoshop is probably one of the best known editing programs out there; so much so that the name of the software has actually become a verb, as in 'that image has been Photoshopped'. The great thing about Photoshop is that it is relatively easy to use, if you only need to bring the simplest tools to bear on your images, but it is also hugely sophisticated if you require the most advanced editing tools available. It is the go-to application not only for photographers but digital artists, designers and even videographers and 3D artists.

It is probably the most popular layer-based image editing and photo retouching software currently available. Photoshop is now available as part of Adobe's Creative Cloud subscription service.



## ACDSee Photo Studio Ultimate 2020

(Windows - £70 one-time charge)

ACDSee has actually been around for some time now and can be considered a competent alternative to both Photoshop and Lightroom. From its humble beginnings, this high-end version of the software has developed into a fully featured image management tool, Raw processor and image manipulation program.

Anyone who has used Lightroom will note that ACDSee has a number of different workspace environments. Each workspace has a specific function and each can be activated and accessed easily, producing an efficient one-stop workflow experience. You can use the Manage mode to find and catalogue your photos, then jump into the Develop mode and process your images, before diving straight into Edit mode to manipulate your photo with some extensive editing tools.

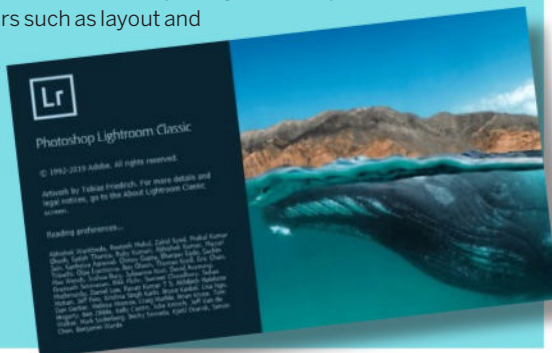


## Adobe Photoshop Lightroom Classic CC

(Windows and Mac - £120 annual subscription)

Lightroom Classic is an image processing and photo organiser that allows the organising, non-destructive enhancement and retouching of images in large numbers. It is a very powerful program that not only sets the standard for image enhancement but also for its ability to organise, catalogue and add keywords to all the images in your library. It also boasts the capability to create photobooks, print parameters such as layout and orientation and can

produce web galleries for websites with a number of display templates provided for easy styling.



## Luminar 4

(Windows and Mac - £65)

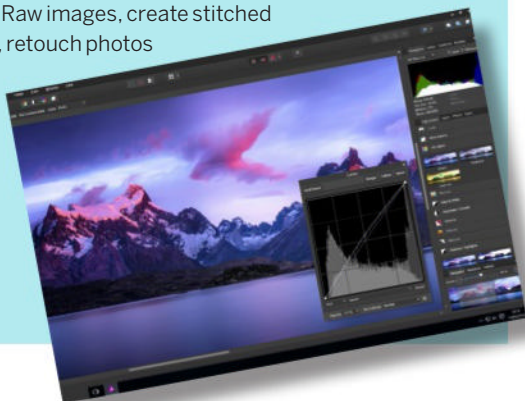
Another powerful all-in-one option for photographers and digital professionals is Luminar 3. This is another example of a hybrid Raw processing program, image management system and layer-based image editor. Luminar 3 is being touted as a strong contender in the growing list of applications trying to topple Photoshop and Lightroom from the top spot. Luminar 3 has a number of workspaces from which you can choose, or even create your own custom workspace to suit your workflow process. The benefits of this mean that, unlike Lightroom where you might make a series of global adjustments and then save the image and work on it in Photoshop for more targeted edits, Luminar 3 lets you do all of that under one roof.



## Affinity Photo

(Windows and Mac - £50)

Created by Serif, Affinity Photo is a raster image editor very much in the same vein as Photoshop. It allows the creation of multi-layered compositions and has a varied toolset for graphics professionals and photographers alike. Amongst its arsenal of tools and features is the ability to edit Raw images, create stitched panoramic photos, retouch photos and make other non-destructive adjustments. It can also import and export to the Photoshop PSD format, and is compatible across iOS and Windows.



## Corel Paint Shop Pro 2020

(Windows - £55)

Corel Paint Shop Pro pulls off a great trick by being several programs in one package. You are able to use its file management capabilities to tag, rate and keyword your images. Then, you can move to the edit suite and process your images and make all the main enhancements and image adjustments that your image needs; there are also a number of preset art filters, similar to those you find on apps for your mobile phone. Then you can move to the edit suite and use the layer-based editing that makes it a worthy alternative to Photoshop.







# Digital storage

Your precious holiday photos in safe hands

**A**s camera technology develops and the megapixel count increases with every new camera that is released, the file sizes that these cameras create when shooting in Raw format can be substantial. As an example, if you were to shoot a highly detailed landscape image with lots of trees, grass, clouds and mountains, an uncompressed 12-bit Raw file from something like a Nikon D810 could be as much as 55MB. Now imagine shooting an action scene of ponies running across the moorlands in burst mode and capturing twenty shots in just one sequence, you can imagine how quickly you would start filling up any digital storage. There's more to it than just

the amount of storage you have. A memory card of 64GB will let you store a lot of images, but if that card cannot write the data from the camera fast enough, that burst mode sequence of photos, that your camera should be able to shoot at 8 frames per second, is going to hit a digital log jam after a couple of shots because the buffer can't get the image data written to the card and therefore it all grinds to a halt while it finishes the task. Clearly, there is more to memory cards than meets the eye.

## Premium or Budget?

The popularity of SD cards has led to a large

number of budget brands springing up, and many supermarkets and chain stores sell their own-brand cards at often very low prices. However the best advice is to stick to the premium brands such as SanDisk, Lexar, Pretec, PNY or Kingston, or to camera brands such as Fujifilm or Panasonic. Although they may be more expensive, their higher standards of quality control mean that premium cards are usually much more reliable. If you've got a high-performance camera it's also worth spending a bit extra for faster data transfer rates to get the best out of it. ■

## SPEED RATINGS

Premium cards have higher data transfer speeds, which means they can store and retrieve data more quickly, an important factor when shooting video or a rapid sequence of still images. The speed of the memory card can have an effect on the overall performance of the camera, especially on high-end models. Unfortunately many manufacturers have their own ways of describing the speed of their cards, which can be very confusing for the consumer.

Some use the 'x' rating, comparing the read/write speed to that of a CD-ROM, approximately 150 kilobytes per second (150 KB/s), so a memory card rated at '40x' speed has a transfer rate of 6 megabytes per second (6MB/s).

The more widely accepted speed rating is the Class system, usually denoted by a number inside a letter C. Most budget cards are Class 2, with a minimum read/write speed of 2MB/s. Most mid-range high-capacity cards are Class 6, with a read/write speed of 6MB/s.

The fastest class currently available are Class 10 cards, which have a read/write speed of at least 10MB/s. The newer ultra-high speed UHS-I cards are rated at speeds of up to 45MB/s 90MB/s and the UDMA 7 Compact Flash cards can reach 160MB/s. Some cards offer storage capacity up to 256GB in size. All this from a card that is not much bigger than a postage stamp.



## MEMORY CARD USAGE



Kingston SDHC 8 GB  
Class 4  
£5/\$4/€6  
Best for: compact camera users and holiday shooters.



SanDisk Extreme Pro  
UHS-3 SDXC  
64GB, 95MB/s  
Class 10  
£37/\$35/€44  
Best for: pros shooting Raw files and 4K movies.



Lexar Multi-use 16GB  
Class 4  
£5/\$9/€6  
Best for: compact users and amateur DSLR users.



SanDisk Extreme Pro  
Compact Flash  
64GB, 160MB/s  
£75/\$85/€90  
Best for: high bit rate DSLR and HD video users.



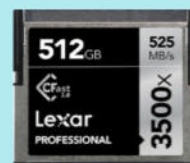
Lexar Premium SDHC  
32GB 200X  
Class 10  
£15/\$12/€18  
Best for: varied storage intensive DSLRs and devices.



SanDisk Extreme Pro  
256GB, 160MB/s.  
£275/\$300/€330  
Best for: extreme image and video performance.



Transcend SDXC Flash  
128 GB  
Class 10  
£35/\$44/€42  
Best for: serious DSLR and video enthusiasts.



Lexar Professional  
512GB, 525MB/s.  
£1043/\$1200/€1228  
Best for: the highest possible performance.

“The speed of the memory card can have an effect on the overall performance of the camera.”

## SO HOW MANY PICTURES CAN I TAKE?

The total number of pictures that can be stored on a memory card is a difficult thing to quantify for a couple of reasons. Digital cameras usually store images using the JPEG file format, which compresses image data to save storage space. Most cameras have a menu setting for image quality which varies the rate of compression, with high quality images taking up more space. The

compressed size of the image can also vary depending on the subject being shot, since more detailed images contain more data. For a typical modern 16-megapixel digital camera the file size can vary between about 4.5MB for a good quality jpeg and 30MB for an uncompressed Raw file, which means an average 8GB card will be enough for approximately 1400 jpegs or 260 Raw files.



### TOP TIP!

Although it may be tempting to buy a ridiculously large memory card for an extended shooting session, where you are going to take many images over a number of days, consider splitting the shots over a number of smaller cards in case disaster befalls your memory card.



# USING YOUR CAMERA

Learn how to get the most out of your camera

It is fairly common for us to rely on the automatic settings provided allowing us to simply point-and-shoot to take a photo. We feel that an automatic setting has its place but it does disconnect you from the actual process of taking a photograph. To be able to take your shots to the next level, you need to understand the main principles of photography such as: exposure, aperture, shutter speed and focusing. In this section, we show you how to take control of your camera and start taking the photos that you really want to capture. ■

36 Aperture and depth of field explained

38 How does shutter speed affect photos?

40 How ISO works on a digital camera

42 Methods for getting good focus

44 Be the master of metering

46 Lenses and focal length

48 Explore your camera's scene modes

50 Camera shooting modes

52 The rules of composition

56 White balance and colour

58 Hyperfocal distance

60 What is Jpeg and Raw?

62 Light it up with flash

64 Using external flash

66 From screen to paper

68 Organising your pictures

70 Sharing your photos online

72 Taking care of your equipment











As you develop your photography skills, you will realise the potential of different shutter speeds for different circumstances. The image on the left can be achieved with an amalgam of 30 shots or more of 30s each. The shots can be processed together and blended in Photoshop for a resulting star trail of many minutes. The shot on this page was taken from the same exact spot and is one 30s exposure of a granite tor on Dartmoor in the small hours of the morning.



# Aperture and depth of field explained

A key technique that controls how much of your photograph is in focus

**A**perture is one of the three main aspects of photography that help control the brightness of your photographs, and also how sharp your photos are throughout the scene. Aperture is responsible for how much of your scene is blurred or sharp; it is also known as an f-stop. This is a reference to the early days of photography when the aperture was actually adjusted by using cards with different sized holes in them. They were slotted into the camera behind the lens and were known as 'stops'. That terminology has stuck and it has been with us ever since.

## The f number

These days, cards have been replaced with mechanical diaphragms which use a series of curved blades that can expand or contract to alter the size of the aperture and allow varying amounts of light into the camera to alter the exposure of your image. A very small aperture will let only a very small amount of light into the camera, whereas a large aperture lets much more light fall onto the camera's sensor. The numbers used to indicate the size of the aperture can run from f/1.4, which is a very large aperture, all the way to f/32, which is a very small aperture. That's the thing to remember: a large f-number is equal to a small aperture and vice versa.

## Depth of field

Not only does the aperture help control the exposure of a photo, it also adds another quality to your photos, in the way it handles depth of field. Depth of field (DOF) is simply an area of a scene that is in sharp focus. When you hear someone refer to a deep depth of field they mean that, from the foreground of the shot out to the far distance, the image is acceptably sharp all the way through. Deep DOF is achieved by using very small apertures such as f/16 up to f/32. Conversely, shallow depth of field means that only a very small area of the shot is in focus. The near foreground and distant backgrounds will be out of focus. Shallow DOF is created by using very large apertures such as f/1.4 to f/2.8.

## Fast glass

Lenses that offer very large maximum apertures in the f/1.4 area usually tend to be fixed focal length prime lenses around the 50mm area. You can get zoom lenses that have f/2.8 maximum apertures but they tend to be quite expensive and are referred to as

**“Not only does the aperture help control the exposure of a photo, it also adds another quality to your photos...”**

'fast glass'. The minimum aperture of a lens tends to be less of an issue, as even basic kit lenses can achieve at least f/16 if you need much deeper DOF. Very large apertures let you shoot in lower light situations with higher shutter speeds, rather than if you were shooting with smaller apertures in the same conditions. Smaller apertures are often used by landscape photographers to get their shots as sharp as possible and capture as much detail as they can. ■



A good prime lens has fewer lens elements and they offer very large maximum apertures up to f/1.4, and some as much as f/1.2.



# Aperture and depth of field quick reference guide



Note: this guide is for illustrative purposes only.





# How does shutter speed affect photos?

Shutter speed is an important setting and worth taking time to master



The use of longer exposure times on scenes containing moving subjects, such as this dog running, is a beautiful example of the impact of shutter speed and its effect on the image.

**S**hutter speed is another of the three main pillars of photography. It is used in conjunction with the aperture and camera sensitivity settings on your camera to get a correct exposure of your subject. A camera's shutter is just a mechanical curtain that stays closed, covering your camera's sensor, until you press your shutter button. When the shutter button is pressed, the shutter opens and allows light to fall onto the camera's sensor. Based on the settings used, the shutter stays open for a certain amount of time until enough light has been collected for a correct exposure, and then closes again preventing any more light hitting the sensor. The amount of time the shutter allows light to hit the sensor is referred to as shutter speed. The slower the shutter speed, the longer it stays open and therefore more light is allowed to hit the sensor for longer. A faster shutter speed means that it stays open for a much shorter period of time and light only hits the sensor for a very brief

moment. Shutter speeds can vary over a large range, from many minutes all the way up to a very brief 1/8000th of a second.

## Motion and blur

Although shutter speed is one setting that helps control your exposure, it also has another quality that can dramatically enhance, or indeed ruin, your photos. For example, if you are photographing waves against rocks using a fast shutter speed of 1/640th of a second in bright conditions with a handheld DSLR, anything that is moving will appear to be frozen in place. Any movement of the camera whilst you are holding it will not be recorded either since the shutter was only open for such a brief period of time. However, if you are taking a similar shot but in lower light conditions with a shutter speed of around 1/4 of a second, to make sure you are capturing enough light for a good exposure, the movement of the waves will be noticeable since the shutter is open for a much longer period of time compared to the

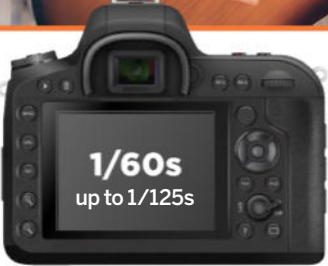
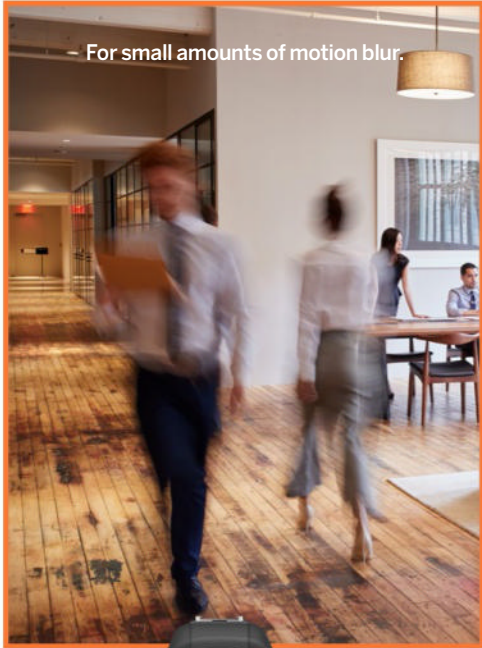
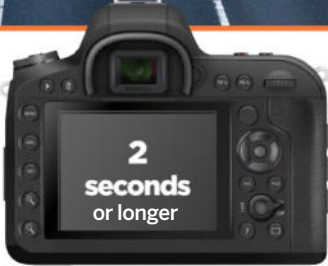
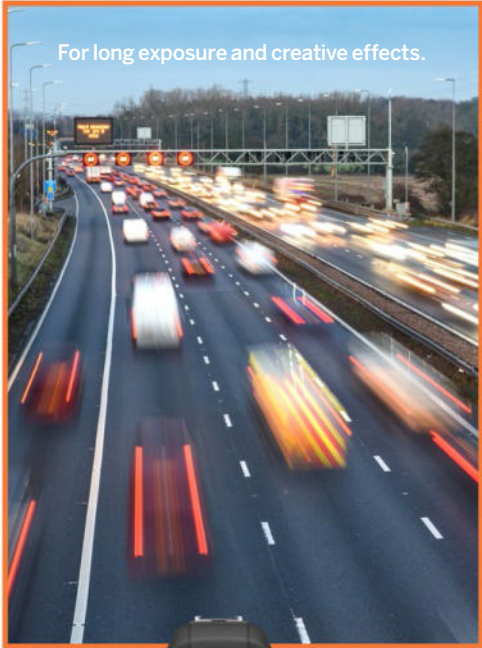
first example. Now the waves will be blurred in the direction they were moving. Again, since you are shooting handheld, any movement imparted by you to the camera during the exposure will create even more blur and possibly ruin the shot. Care needs to be taken when using slower shutter speeds where camera shake is a danger.

## Use a tripod

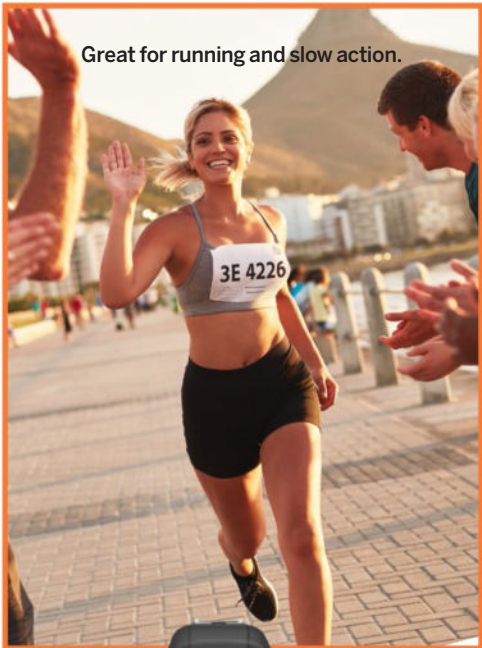
A tripod becomes essential if you want to take photos with long shutter durations. The problem also becomes magnified if you use longer focal length lenses. A wide angle lens of about 14mm is less of an issue when compared to a telephoto lens of 400mm, where even the slightest movement of the camera creates a large amount of movement in your subject - as seen in the viewfinder. Much faster shutter speeds are great for capturing and freezing fast action but do need plenty of light. Slower shutter speeds are perfect for turning moving water into mist but you will need a tripod. ■



# Typical uses of your camera's shutter speeds



Note: this guide is for illustrative purposes only.





# How ISO works on a digital camera

What impact does ISO have on your photography?

**B**ack in the old days of film photography, ISO, in its simplest sense, was a measure of how sensitive your camera's film stock was to light. On modern digital cameras, altering the ISO value does not technically make your sensor more sensitive to light. What, in fact, happens is that the resulting image has its tonal values amplified, to simulate greater light sensitivity. Low ISO values mean the image is amplified less to simulate less light sensitivity and high values mean it is amplified to a much greater degree to simulate more sensitivity. Lower ISO means that you require more light, over a longer duration, for a good exposure and high ISO means that you require less light, over a shorter duration, for the same conditions. This assumes your camera's settings are unchanged apart from the alteration of the ISO value. It sounds like a win-win situation: you're shooting in low light, but you need a faster shutter speed, so you just increase the ISO until you have the shutter speed you want. That's fine, but whilst you can easily employ your sensor's extremely high image amplification, be aware that it does come at a cost. As the ISO value increases, so does the amount of noise it generates as a by-product of the amplification applied to the photo.

## Avoid grain

Most DSLRs offer a base ISO of around 100, however you can, with some, use ISO settings around 64 to 50. This is the lowest setting available and also the one that produces the least noise for the cleanest images possible. Stepping from ISO 100 to ISO 200 amplifies the image by a factor of 2. An ISO setting of 6400 means it appears to be 64 times more sensitive to light. This means the camera requires 64 times less light to capture an image, at the cost of increased image noise. A lot of new cameras can now offer ISO sensitivities that range from base 50 all the way up to an expanded range of 204,800 and more. Those highest values should only be used as a last resort since the images will be very grainy. The rule of thumb is that you should always try to use the lowest ISO setting based on your current shooting conditions.

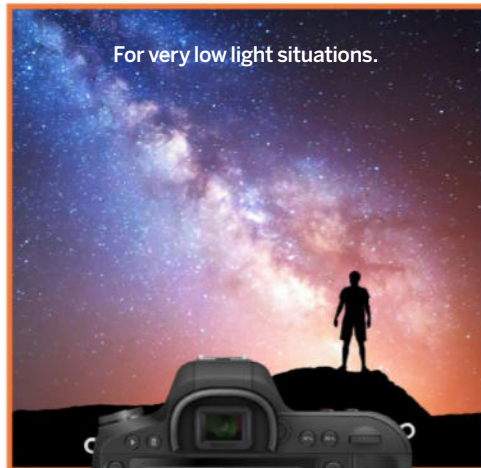
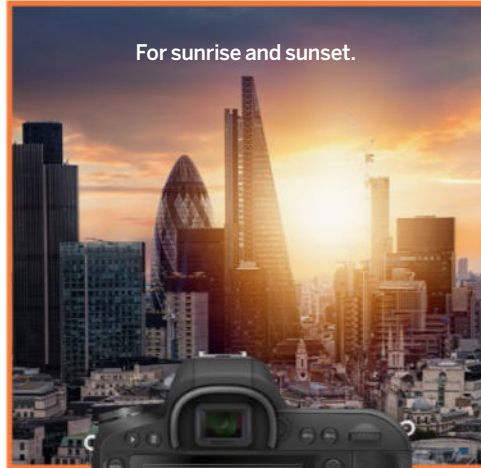
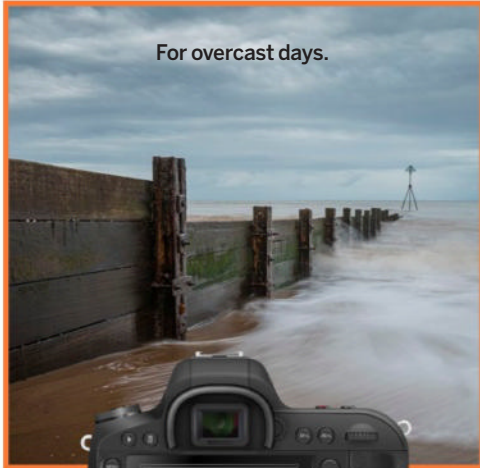
## Auto ISO

A lot of cameras have an auto ISO function that will dynamically alter the ISO based on the lighting conditions in which you are working; to always make sure you have a reliably fast shutter speed and therefore avoid camera shake. One effective remedy to image noise is to use larger, more sensitive photocells; digital SLRs have a major advantage in this area, since they have physically larger sensors. Compact camera sensor technology continues to improve, in image processing and sensor design, and we will undoubtedly see further advances in the future, but for now image noise is something we just have to accept. ■

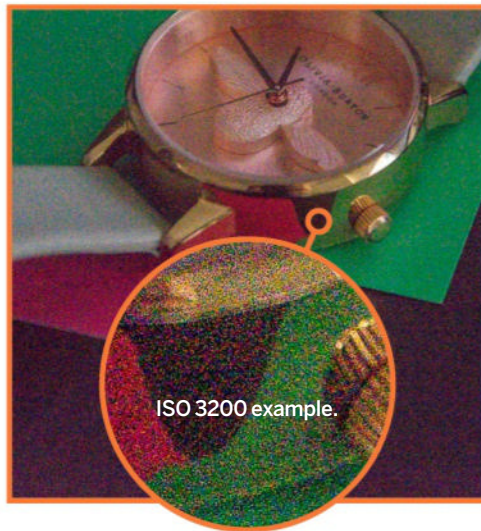
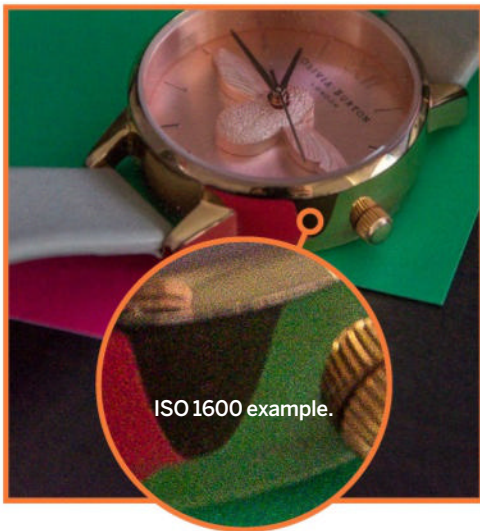
With each new model and make of camera, their high ISO ability improves every time. However, noise at high ISO is not yet a thing of the past.



# Typical uses of your camera's ISO settings



Note: this guide is for illustrative purposes only.





# Methods for getting good focus

Here's how to get the most out of your autofocus system

There are a couple of autofocus systems in use today that intelligently adjust the camera lens in order to obtain and hold focus on your subject. Compact system cameras use something called contrast-detection AF, which samples the image from the sensor and detects sharp high contrast edges in the details of the scene. Phase detection is a more complex system but is usually much faster, more accurate and works better in low light. However both systems require some detail in the scene to 'lock on' to. Try and point your camera at a plain wall or a sheet of white paper and see if it will focus on it. Even if you own a top-of-the-range DSLR it won't be able to focus on a featureless surface. Modern DSLRs have several autofocus modes available to make the process of getting good focus on your subject that much easier. If you look through your viewfinder, you will see that there are a number of points on the viewfinder screen which are called AF points. They vary in number from 9 up to 51 or more. These are what the camera uses to focus on the scene. Anything that falls beneath one of these points will be the ideal point of focus. You can select which one to use or even which groups of points can be used. If you leave the camera in its automatic mode (known as AF-A) you leave the choice of focusing method up to the camera. The more focusing points you have the better it is for this mode.

## Take control

For more control, you can use the AF-S mode, known as single-servo autofocus. If you half press the shutter button, you can lock and hold the focus on a particular part of the scene. A good example of this method is in stationary photos where you lock focus on a subject's eyes and then fully press the shutter button to take the shot. You can select a single AF point that falls over your subject's eye and achieve focus or you can use the default centre AF point, place it over your subject's eye, get focus lock and then recompose the shot how you want it before taking the shot. For moving subjects, things can be a little trickier. That's when you can select the AF-C mode. This stands for continuous-servo autofocus. Now, when you press the shutter button halfway, the camera will continuously track and lock focus on whatever falls beneath the selected AF point or group of points. It attempts to predict the subject's motion and distance from the camera.

### TOP TIP!

Although all aspects of camera craft are important to getting good exposure, there is no software in the world that can save an out of focus image. Precise focusing technique is worth working on and being honed as much as anything else.

## Go manual

Sometimes, it may be advantageous to use manual focusing methods instead of the automatic mode. Autofocus can be difficult to achieve if the scene is very low contrast or contains lots of overlapping fine detail. The camera may often focus on the wrong thing entirely in auto so watch out and switch to manual mode if required. ■

Getting your subject in focus is the key to a good shot but you may encounter more difficult shooting situations that require different focusing strategies.



## Get to know your autofocus modes

### AF-A

#### AUTO-SERVO AF

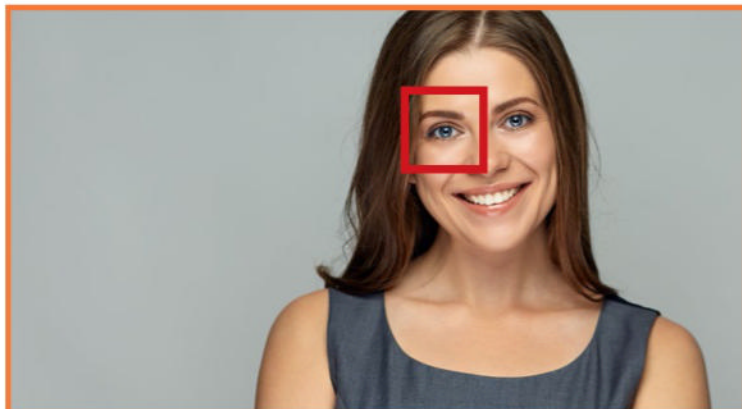
The camera decides which focusing mode to use and can work to best effect if your camera has a larger number of AF points. It will assess the scene based on its content and use all the AF points to focus the shot.



### AF-S

#### SINGLE-SERVO AF

You can lock the focus by half-pressing the shutter release button. This allows you to select a focus point and recompose the shot. It is good for simple static subjects where you can focus once and know your subject is not going to move.



### AF-C

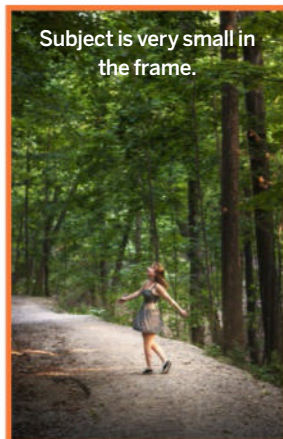
#### CONTINUOUS-SERVO AF

This time, when you press the shutter button halfway, it starts to track and continually focus on the subject beneath the selected AF point. This mode is good for tracking a moving subject such as in sports events.



## When autofocus fails

There are a few scenarios where your camera's autofocus may fail. In these situations, opting for manual focus may be the best solution.





# Be the master of metering

Know when to use the different types of metering modes

**N**early all digital cameras, from top-of-the-range DSLRs to the humblest budget point-and-shoot compacts, have multiple light metering options. Knowing how and when to use these different metering modes can make a dramatic difference to the quality of your photography; unfortunately most people don't understand what the different modes are for, how they work, or how to use them.

## Know your modes

Depending on your camera, you'll find metering options either in the menu or with their own separate control. In cameras with a fully-automatic setting, this will usually disable the metering options; automatically selecting multi-zone metering as the best option for day-to-day scenes and snapshots. The most common light metering modes are found on nearly all digital cameras. They are spot metering, centre-weighted metering and matrix

metering. The symbols used for these modes are just about universal. Multi-zone metering is shown by a rectangle filled with a centre spot surrounded by a pattern of shapes; centre-weighted metering is usually shown as a centre spot with shapes above and below it; whilst spot metering is usually a rectangle with just a centre spot.

## What they do

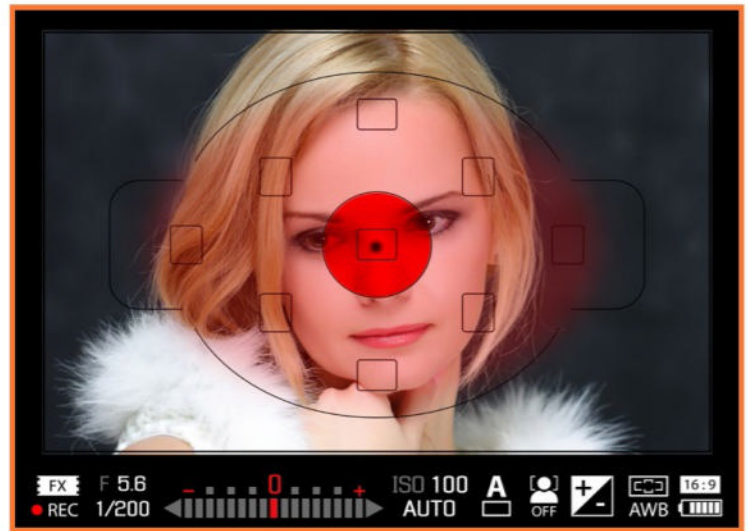
Matrix metering, also known as Evaluative metering, is usually the default setting and it is a great multi-purpose metering mode for evenly lit scenes and places emphasis around the AF point used while applying appropriate exposure compensation. Centre-weighted behaves a lot like Matrix metering but it places more emphasis on the centre of the

image and doesn't take the AF point into consideration. Spot metering is the most accurate by metering the scene over a very small circular area. Partial metering takes the precision of spot metering and expands the size of the circle used to measure the light. ■

Getting your exposure correct at the time of shooting means that you are retaining more detail in the file; this can be enhanced when it comes to post-processing.

“Knowing how and when to use these different metering modes can make a dramatic difference to the quality of your photography...”



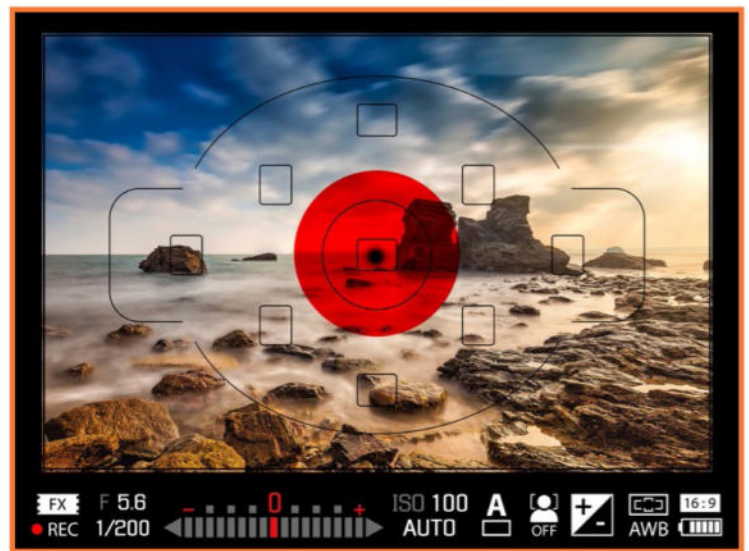
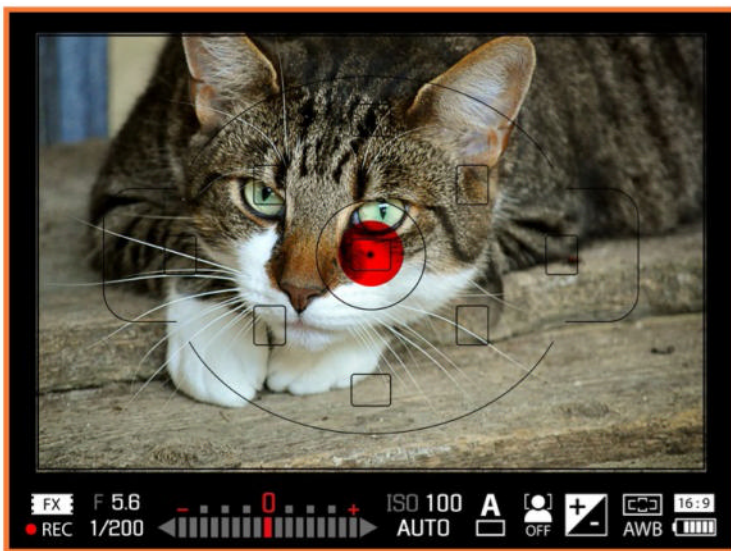


**Matrix or Evaluative metering**

This mode is great for evenly lit scenes where there are not a lot of tonal variations. It meters the whole scene and is usually the default metering mode on a camera.

**Centre-weighted average**

Since this mode concentrates on the central portion of the frame, it makes it perfect for portraits and head shots. Details around the edge of the frame are not metered.




**Spot metering**

When shooting scenes with large tonal variation, spot metering allows you to pick exactly which part of the scene you want to accurately meter for.

**Partial metering**

Essentially, partial metering is an expanded version of the spot metering mode. This makes it easier to use although the metering is not quite as precise as the spot meter mode.





“Knowing how focal length affects how much you see in a shot means you can control the composition of your shots in much more creative ways.”

# Lenses and focal length

How focal length affects your shots

Go wide angle to get more of the scene in your shot or choose telephoto to pick out a smaller detail and bring it closer. A lens' focal length lets you alter your compositions with ease.

**M**ost modern digital cameras have zoom lenses and it's likely that if you own a major brand DSLR, you will have a couple of zoom lenses in your kit bag. Zoom lenses let you alter the focal length of the lens. For example, a 24-105mm lens lets you change the focal length from 24mm up to 105mm, but what is focal length?

## Focal length explained

Focal length is usually represented in millimetres. A 100mm lens is not the actual length of the lens but rather the distance between the point at which rays of light from your scene enter the lens and create a sharp image on the camera's sensor. Altering the focal length has a dramatic impact on the scene you are photographing. A 20mm wide angle lens can see more of the scene than a 200mm lens can. This is because as the focal length increases the angle of view becomes smaller as the image is magnified. Zooming from 20mm to 200mm for example, means there has

been a 10x magnification of the scene, so small details at 20mm are suddenly made much larger and appear much closer at 200mm. A popular lens like the canon EF 70-200mm f/2.8 can zoom from 70mm to 200mm. At 70mm the angle of view of the scene is about 95°. At 200mm the angle of view is about 12°. A 15mm fisheye lens is designed to see as much as possible and has an angle of view of 180° which is comparable to the peripheral vision of the human eye.

## Composition

Knowing how focal length affects how much you see in a shot means you can control the composition of your shots in much more creative ways. If you are shooting a portrait and using a 24-105mm lens for example, it means you can quickly reframe your shots from very close-up shots to much wider angle images that include more background as well as your subject. If you are an avid landscape photographer, and you want to get as much of some wide panoramic vista in your

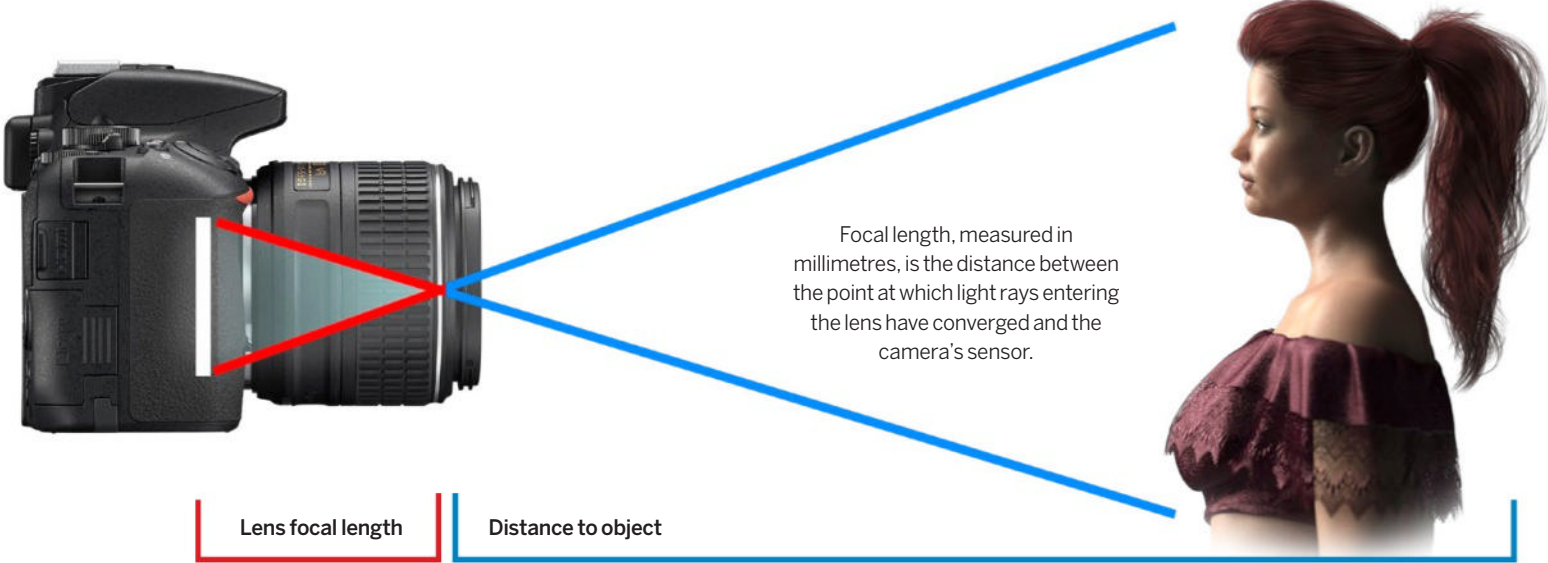
shot in one go, you'll need a lens with a focal length somewhere in the 14-16mm area for a very wide angle of view to capture the scene in its entirety.

## Best uses

As a rough guide, lenses that cover a 16mm to 35mm range are generally classed as wide angle zooms that are good for general landscape and architectural work. The range between 35mm and 70mm are classed as standard lenses that mostly capture the world with roughly the same magnification as the human eye sees it and are great for portrait work and general photography. The 70mm to 135mm focal length are medium telephoto lenses with greater magnification and narrower angles of view than the previous ones. These are still often used for portrait work as well as some wildlife photography. From 200mm up, they are telephoto and super telephoto lenses, capable of capturing distant wildlife and sports action with their greatly increased magnification and narrow angle of view. ■

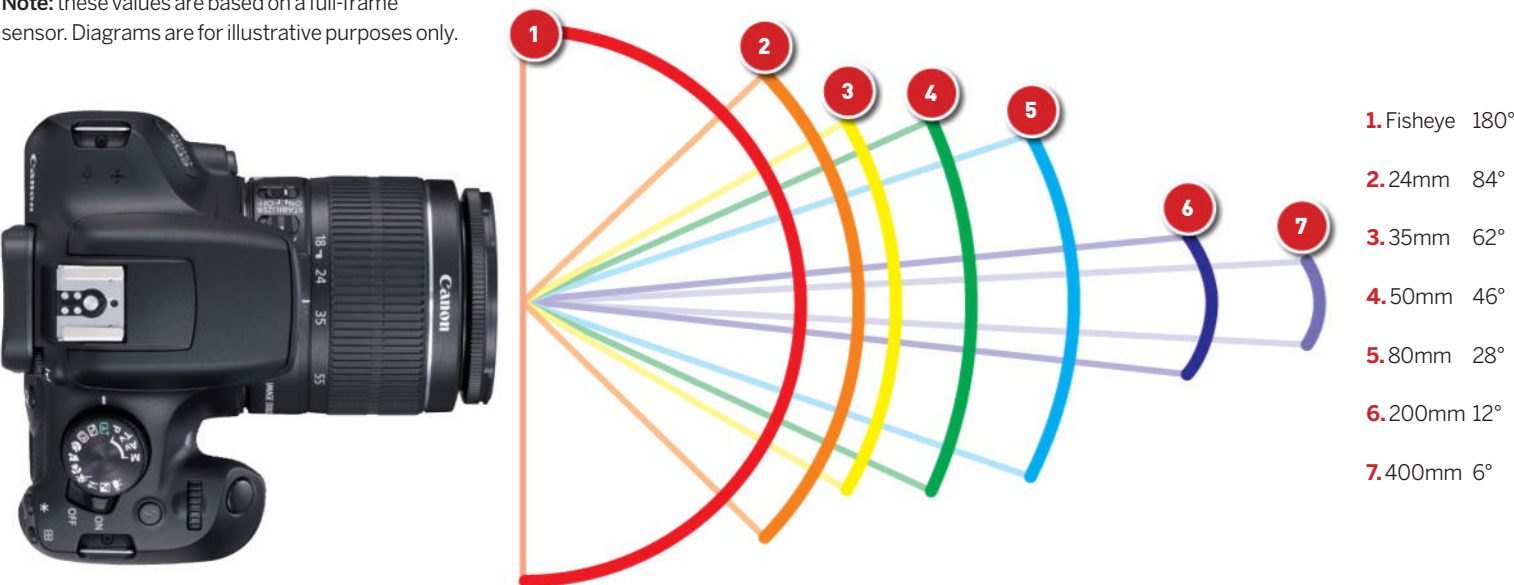


# What is focal length?



# How angle of view changes with focal length

Note: these values are based on a full-frame sensor. Diagrams are for illustrative purposes only.



Lower magnification.

Magnification increases as focal length increases.

Higher magnification.



25mm Wide angle



50mm Standard



100mm Telephoto



400mm Super Telephoto



# Explore your camera's scene modes

Let your camera help out with scene modes

**M**ost modern cameras have a selection of scene modes, usually chosen by a dial on the top or back of the camera via a menu. Easy-to-use, mainly automatic cameras in the range will only have a few scene modes, whilst the more sophisticated cameras such as the DSLR may have as many as a dozen, including manual exposure options and user-programmable special settings.

## What are scene modes?

Scene modes are provided on the majority of cameras to aid new photographers. They are a number of presets that set the camera up automatically to shoot in a variety of lighting conditions. You simply need to match the settings to the scene you are about to shoot and then you can take the photo safe in the knowledge that it should come out properly exposed. Whilst they do take control away from the photographer, they can ease the transition of a relatively inexperienced photographer who has just upgraded to a more advanced camera. Scene modes get them up and shooting quickly whilst they learn the ropes on a new system.

## Scene modes in action

If for example you want to shoot a close-up and would like the background to be as blurred as possible, then you either use the mode dial on the top of your camera if it has one, or use your camera's menu to pick the Close up or Macro setting. Your camera will then be automatically set up to shoot with a large aperture to blur the background and the ISO set at a value that keeps the shutter speeds from falling below a value that might create unwanted motion blur or camera shake.

## Capture the action

Another example is if you choose the Sports scene mode. This is intended to set up your camera so it can freeze fast action such as your dog running after a ball or a horse and rider galloping by. ISO sensitivity will be increased to drive up the shutter speeds so you can be assured of action stopping settings. When newer models appear in the range or older models are updated, the shooting modes available will be revised and possibly expanded. We have a few of the more popular ones listed here for your reference and the settings that are used to get the shots. ■

**TOP TIP!**  
Whenever you use a scene mode for a particular shooting scenario, take a look at the settings your camera adopts for that situation. If you can see what has changed, you can begin to understand how you can make your own shooting decisions and use the camera in manual mode with more confidence.

If you find you need a little help to get the right settings for a particular scene, then your camera can help you with scene modes. Good to get you started but try not to rely on them.



## Typical scene modes and what they do

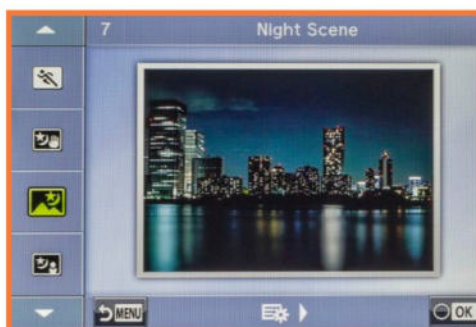
### Beach/Snow

If you encounter a scene with a lot of very bright surfaces and light colours, a camera would normally underexpose the scene. This mode ensures that the exposure compensation used gives an accurate representation of bright beach or snowy scenes.



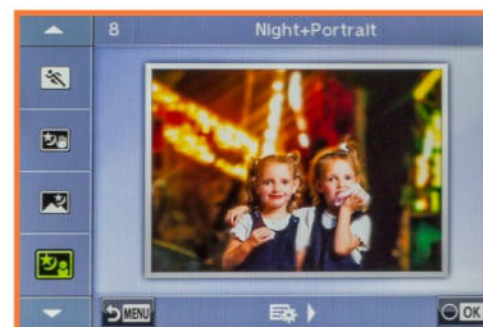
### Night Scene

Used primarily for general night time shots where there is no main subject that needs particularly special lighting. The camera will boost the ISO sensitivity and deactivate the flash. Slower shutter speeds will be used.



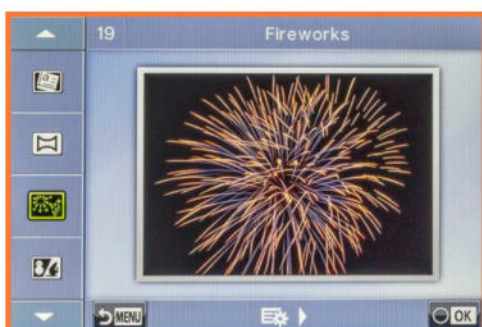
### Night Portrait

Uses similar settings to Night Scene but the flash is turned on with red-eye prevention active and also facial recognition is switched on if the camera has it. Settings allow for a well-lit flash portrait but also captures enough ambient light for the background.



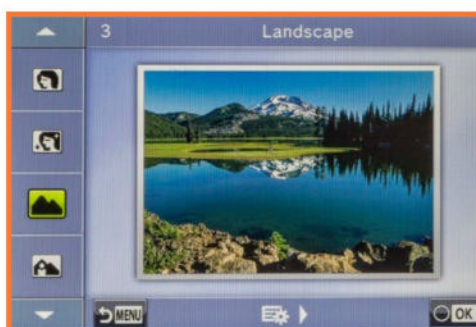
### Fireworks

This takes the settings that are used for the Night Scene mode and uses even slower shutter speeds to allow the capture of bright objects such as fireworks and other moving lights like traffic. Useful for lights against dark backgrounds.



### Landscape

For use in brightly lit landscapes or cities in full daylight. A narrow aperture is used to get a deep depth of field. If the camera has zoom control, the widest angle will be chosen and focus is set to infinity. It may also boost saturation.



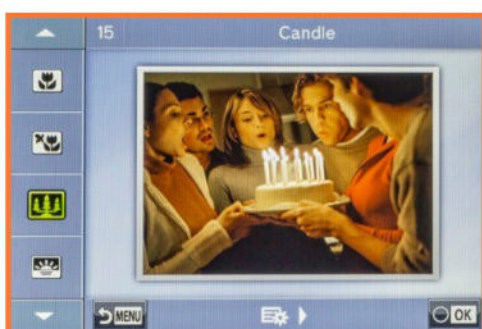
### Macro

This is ideal for close-up shots of objects or portraits where you want to isolate the foreground subject from the background. It allows close focusing and a wide aperture to blur the background. The ISO is adjusted automatically.



### Candlelight

Although similar to Night Scene, Candlelight is more focused on low light scenes that are lit with small nearby point lights rather than general ambient light. Flash is disabled and the colour temperature is pushed to the warm end of the spectrum.



### Sport

This requires strong lighting or full daylight in order to freeze fast action or sporting events. ISO sensitivity is boosted in order to push shutter speeds as high as possible. If it is supported, the camera may also enable continuous shooting and focus.





# Camera shooting modes

Which one should you use?

“Shooting modes are the main core of camera operation and can often be a source of confusion for new photographers.”

Canon shooting mode dial



Nikon shooting mode dial



Some manufacturers have slightly varying names for their shooting modes but their function remains the same for all cameras. For example, Canon refer to Shutter Priority as Tv and Aperture Priority as Av.

**S**hooting modes should not be confused with Scene modes that alter your camera's settings for specific lighting and scene conditions. Shooting modes are the main core of camera operation and can often be a source of confusion for new photographers, or those moving up from a simple compact camera or even camera phone. The main shooting modes on any DSLR are Auto, Programmed AE, Shutter Priority, Aperture Priority and Manual Exposure. There is also the Auto (flash off) feature and Bulb

mode for exposures longer than 30 seconds. Different models of DSLR have other modes available and they vary by manufacturers as well; but the main modes, often abbreviated to PASM, are the key ones that are worth getting to know in a little more detail. It is very useful to know what each mode actually controls, so you know what input is needed from you in order to get a well-balanced exposure. Not only that, each mode has certain advantages and disadvantages that are key to getting the shots you want. ■



## Your camera's shooting modes explained



### Full Auto

As the name suggests, this mode controls pretty much every aspect of the camera. It is often used so the photographer does not have to worry about any settings and they use the camera as if it were a less advanced point and shoot camera. Shutter speed, aperture, ISO, white balance and the metering mode are all controlled by the camera. Even the flash is under the control of the camera and will automatically pop up if it feels there isn't enough light to get a good exposure. Although easy to set up and get you shooting quickly, you have no control over the look of the shots. If you use it as if it were a point and shoot with built in flash, then that's the quality of the shots you can expect.



### Program Mode

Program Mode or Programmed Auto mode is similar to Full Auto but it does allow the photographer a measure of additional control. Settings such as ISO, White Balance, Focus Mode and Metering Modes are able to be altered. Bear in mind though that shutter speed and aperture are still in the hands of the camera. This mode, rather than Full Auto, is a good place to start out if you are new to DSLR photography and want a greater measure of control over the appearance of your photos, rather than the camera. However, you may still find that the guesses your camera makes about which main settings to use for the shot, are not giving you results that match your expectations.



### Shutter Priority

This mode starts to hand over control to you in a more meaningful way. In the case of Shutter Priority, you get to control the shutter speed as well as ISO, White Balance, Metering and Focus Mode etc., while the camera will take care of the aperture. This allows you to concentrate on taking shots where the shutter speed is important to you and under your direct control. The capture of fast moving objects with action-freezing shutter speeds is the popular usage of this mode. If however, you're shooting well-lit static objects, shutter priority is less of a concern. This is when you might want to consider switching to the next available mode that allows control of other factors.



### Aperture Priority

In this mode, you now have control over Aperture as well as ISO, White Balance, Metering and Focus Mode etc. The camera is now in charge of the shutter speed, which it will alter according to the values you use on the other settings under your control. Now you can alter the aperture for much greater creative effects. Shots with very shallow depth of field can now be set, if you have a lens that has large maximum apertures such as f/2.8 or even f/1.4. Alternatively, if you need much deeper depth of field, for a landscape photo for instance, then you can use much narrower apertures such as f/16. Be aware that shooting with very wide apertures in well-lit scenes may result in very fast shutter speeds in excess of your camera's maximum. You'll either have to reduce the ISO to its minimum or even use a filter to help reduce the ambient light.



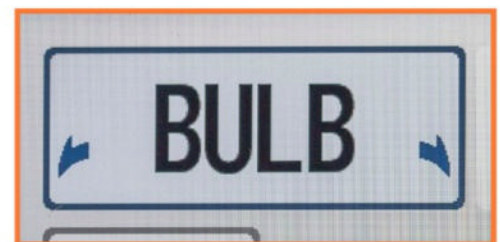
### Manual Mode

Now you are really flying solo! The control of the camera is all yours and it is up to you to produce settings that give you the shot you are after. You do need to be confident when it comes to shooting in full manual mode, especially if you are in situations where lighting changes or is inconsistent. That means you will really need to be on top of the settings and watching out for the exposure. Full manual mode is often used when you have plenty of time to consider your shot, such as shooting a landscape or setting up a night time shot. It's also a useful mode to employ when using flash as it allows you to control how much ambient light is also present in the scene. Manual mode is more difficult to master since you need to keep all settings balanced, but it can yield the best photos.



### Full Auto (no flash)

This one is fairly self-explanatory. It uses all the same settings as full auto but will not allow the flash to deploy and light the scene. This means you can capture scenes using ambient light only.



### Bulb Mode

In effect, Bulb Mode is a setting that is used in conjunction with either Full Manual Mode or Shutter Priority. It allows you to keep the shutter open for durations much longer than 30 seconds. In fact, when using Bulb Mode, you can keep it open as long as you want.



# The rules of composition

Improve your photos with these essential guides

**T**he difference between a good shot of your favourite view or subject and a truly awesome one is simply down to how you compose the shot and the elements within it. A tree here, a lake there, it all adds up to elevate a photo to a piece of photographic art. The first and most important thing to remember is to take your time. Look at the scene in the viewfinder or on your monitor and try to see it not as simply a view but instead to imagine it as a finished print hanging on your wall. Ask yourself whether there's any way

that it can be improved by maybe zooming in a little, by moving the camera, changing the orientation, or just making sure it is level. A tripod is a very useful tool for this, since it lets you view a completely static image without the need to hold the camera steady. There is a certain balance to a photo that is achieved by following some simple rules that will help you take better pictures. Like all things, it comes down to practice but here is an introduction to some of the most useful rules that can lift your photos instantly. ■

**TOP TIP!**  
Just keep in mind that the main elements of composition are: patterns, texture, symmetry, asymmetry, depth of field, lines, curves, frames, contrast, colour, viewpoint, depth, negative space, filled space, foreground, background, visual tension and shapes. Use one or more of these elements to create a composition that works for your image.

Composition is easy to learn but can be harder to master since you will be shooting in various locations with changing subjects. Once you've grasped the basics though, you will see how quickly your images improve.

“There is a certain balance to a photo that is achieved by following some simple rules that will help you take better pictures.”

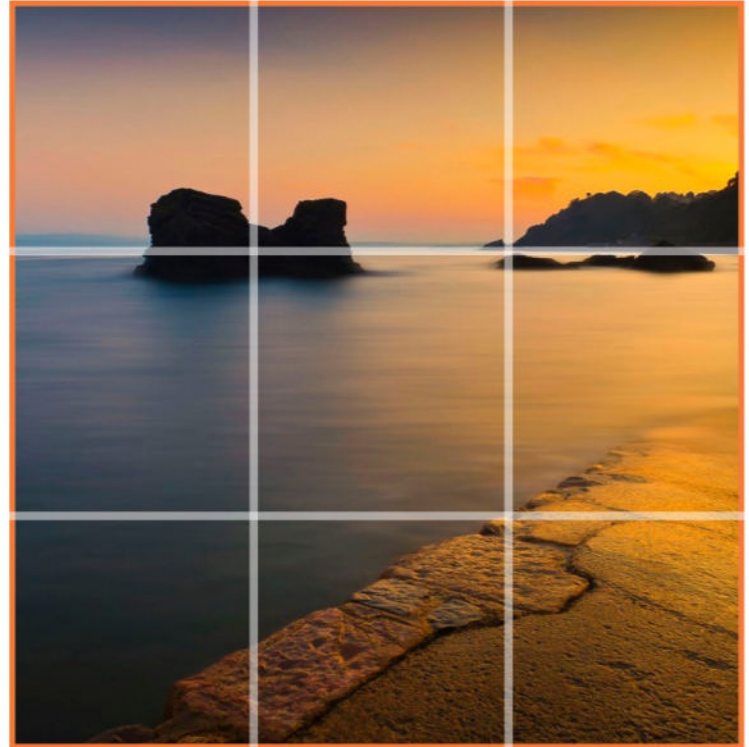


## Improve composition and improve your photos



### Object Movement

A moving object such as a boat, car or runner should look as if it is entering the frame, not leaving it. An object moving left to right should be placed more on the left side of the shot so they have space to move out of the frame. If not, it can make the shot 'feel' wrong.



### The Rule of Thirds

The classic rule for a quick and effective compositional improvement. Divide the frame equally with two vertical and two horizontal lines. Place your subject on any of the points where the lines intersect and you will create a more appealing composition than just placing it dead centre.



### Leading Lines

These are simple visual elements that can lead the viewer's eye through a photograph and point at the main subject of your shot. Things such as roads, railway lines or converging architectural elements can also create a sense of depth or indicate movement.



### Horizon Lines

One of the easiest things you can do to immediately improve your photos is to make sure that your horizons are level. Even the slightest tilt of the horizon or any strong horizontal line from level can just look wrong. Use a spirit level on your tripod or use the built in electronic level available on many modern cameras.



## Learn to frame a shot and guide your viewer's eye through the photo



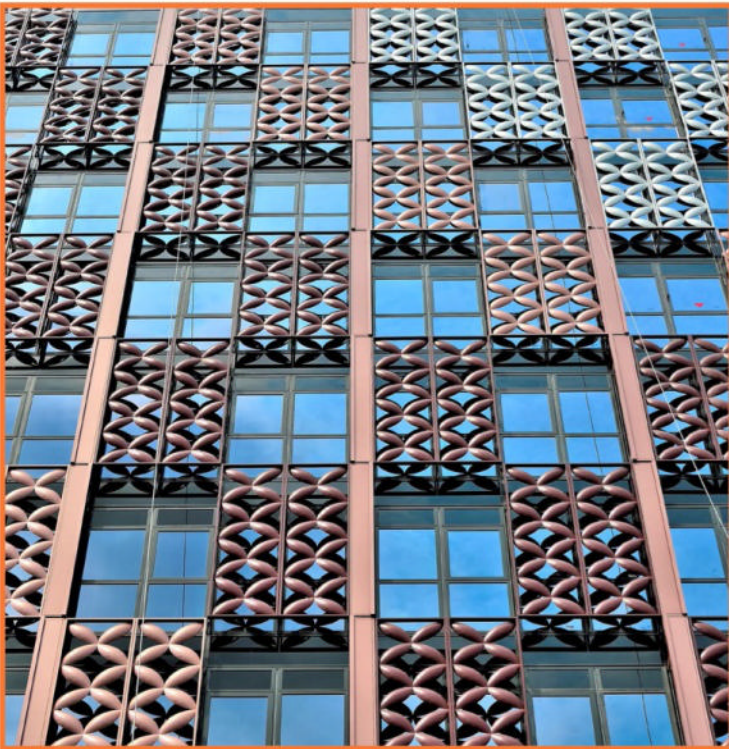
### Framing

Using elements in a scene to frame your subject can help you isolate them and make them the obvious point of interest in your photo. Placing elements around the edge of your composition creates a frame within the frame of the photo itself. They can be in sharp focus or blurred.



### Foreground Interest

This is a particular tip favoured by landscape photographers but works well for many compositions. By putting an element in the foreground of your shot, it creates a point of interest and becomes the visual starting point for your viewers journey through the shot.



### Repeat Patterns

Humans are good at pattern recognition and any shot with interesting patterns are immediately visually appealing to the viewer. Having repetition of elements can have the same effect as well. Add textures to the mix and you have an amazing shot on your hands.



### Simplify

Simplification is pretty easy to grasp as a concept. Fill your composition with your subject and suddenly you can concentrate on more subtle, smaller aspects of your subject. It can be as simple as the expression on your subject's face or the detail of an animal's skin or fur.



## Use colour, depth of field and visual flow to make your shots exciting



### Depth of Field

If you want to draw your viewer's eye to a particular aspect of your composition, then the use of depth of field is one of the easiest. A large aperture on your lens creates very shallow depth of field. The background melts away into soft focus whilst your subject remains sharp.



### Colour

The use of colour can bring a sense of mood to your photos and make them visually exciting. Two complementary colours can create huge contrast and make the photo 'pop'. Photos where the colour temperature has been boosted towards orange can help enhance a sunset and make it feel even warmer.



### Visual Flow

This is similar to leading lines. Most scenes have a flow that runs vertically or horizontally and it is useful for you to be aware of the flow in your shot. Composing a shot where the flow runs out of the frame and doesn't lead to something interesting can ruin the shot.



### Strike a Balance

This is an interesting addition to the rule of thirds mentioned before. Placing your subject off-centre can be visually pleasing but do watch out for the remainder of the shot looking empty. You can balance the shot with another object in the space created that is smaller or out of focus.



# White balance and colour

Control the colour temperature of your shots

If you look at a snow covered scene, your brain takes over and manipulates what you see, so that it matches your expectation of what white should look like. What you see, even under differing lighting conditions, is white. If you put a camera in the same scene, it does not make any such adjustments or adapt to a certain expectation. The camera will simply record the colours that are present in the scene.

'White' light visible to humans can actually vary in colour from reddish orange to greenish blue. This variation is usually described as a temperature range, with warm being the red end and cold the blue end, and is usually measured in degrees Kelvin using a colour meter. The higher the colour temperature, the cooler the tone and vice versa. The use of white balance on your camera can alter the colour in your photos. You can make shots appear warmer or cooler and adjust colour based on the prevailing lighting conditions. You can manually dial in a number to affect the outcome of the shot, or you can use one of the white balance presets available to most cameras. The white balance options are normally found in the menu system of your camera. By default, the white balance setting is usually set to auto and does a pretty good job on its own. If you do want to get into white balance adjustment based on some specific shooting conditions then here are the options available to you. ■

Kelvin is the unit of measurement for colour temperature. Any colour over 5000K is referred to as a cool colour. Any colour lower than 3000K is referred to as a warm colour. A sunny day has a temperature of about 5000K.

“You can make shots appear warmer or cooler and adjust colour based on the prevailing lighting conditions.”



## Automatic

Control of the white balance is controlled completely by the camera. It is great for down and dirty, quick fire shooting when you don't need to worry about the possible colour variations that may occur between shots when using this mode.



## Daylight

When shooting in normal sunny daylight, the images are slightly cooler in tone. Switch to the daylight white balance option and you will add a small amount of warmer tones to give you a natural looking and tonally balanced shot in direct sunlight.



## When to use white balance



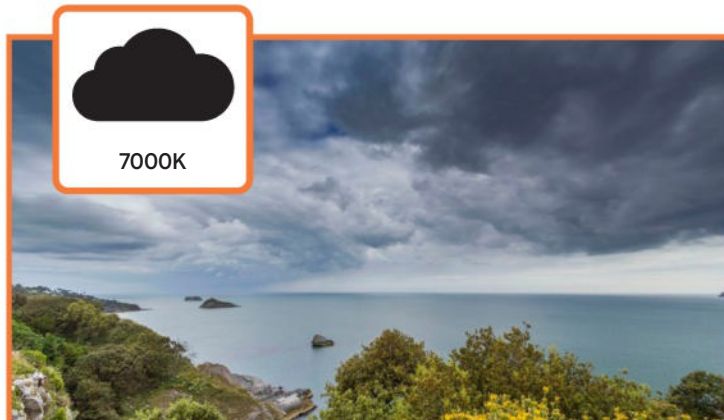
### Shade

Open shaded areas created by strong shadows from direct sunlight do produce stronger, cooler blue tones. The shade option applies more warm tones than you get with the cloudy setting and helps to prevent skin tones looking too cold in these conditions.



### Fluorescent

Standard fluorescent lights have an overall green cast, this can make uncorrected shots under these lighting conditions look quite lurid and unpleasant. By using the fluorescent option, it adds a small amount of red to counter the green cast and balance the image.



### Cloudy

Overcast and cloudy days tend to produce a much cooler tone. A photo that is not correctly colour balanced will take on a pronounced blue cast. When you switch the white balance to the cloudy option, it will add warm tones in the red-orange area to lessen the cold blue tones.



### Flash

The output of a flash unit is actually balanced to match the colour tones found in a normal daylight situation. This means that a portrait taken with a flash may make your subject look too blue and cold if not balanced. The flash option will add warm orange tones to prevent this.



### Tungsten

Normal household lightbulbs cast a very orange light as seen by a camera. The light from these incandescent tungsten bulbs needs to be offset by using the tungsten white balance option. This option adds cooler blue tones to the image to counter the yellow-orange of the lightbulb.



### Custom and Preset

Cameras also offer you the option to create your own custom white balance by manually dialling in a temperature setting that can range from 2,500K (warm) to 10,000K (cold). You can also use a preset where you match to a white colour target as shown above.



# Hyperfocal distance

Essential for sharp photos and it's not as scary as you think

**L**andscape photography is one of those genres where sharpness is everything. Wide angle shots of amazing vistas usually require front to back sharpness in your scene to maintain all the detail that was present. The viewer of the final photograph will appreciate the image more if their eye is able to take in all that detail. It will make the photograph 'live' for them. Nothing ruins a shot more than the image being fuzzy and blurry when you need it to be tack sharp. The problem, however, is that in many cases in landscape photography you have a foreground element as well as a distant object that you want to be in as sharp a focus as possible at the same time. Shooting with a wide angle lens and setting a very narrow aperture of f/22 or even f/32 will yield greater depth of field; you will also run into the optical phenomenon known as diffraction, which is a softening of the image due to the bending of light rays as it passes through the narrow aperture of your lens. This means you will normally be operating around the f8 - f/16 mark when setting aperture. You may find that the depth of field provided at these apertures is not enough to render everything you need in sharp focus.

## Sharp focus

This is where the hyperfocal distance comes into play. When you focus on an object, technically speaking, only that point of focus is sharp. Beyond that focus point, extending both in front and behind, is a plane of focus running parallel to the camera sensor. This area is known as the depth of field and

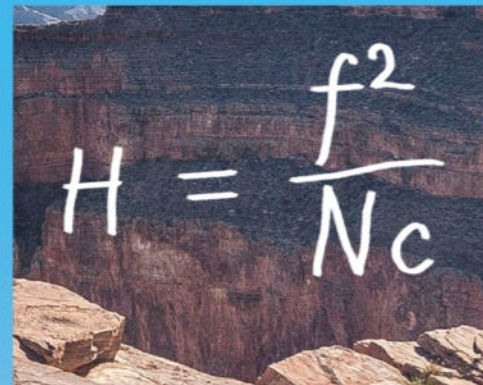
it is this region that is deemed to contain an area of acceptable sharpness. The key to hyperfocal distance is knowing the closest distance at which a lens can be focused whilst keeping objects at infinity as acceptably sharp as possible. Everything from half the hyperfocal distance out to infinity will be in focus.

## The maths

There is a bit of assumed knowledge when using the mathematical formula. You will need to provide the focal length of the lens you are using, the Circle of Confusion value for a given sensor size, which is the largest blurred spot that the human eye can detect (usually a value of around 0.03 - 0.02 will be fine) and the f-stop you are using. There are some great apps for your mobile device that will be able to do the calculations for you, such as Lens Lab and Digital DoF for iOS and Hyperfocal for Android. If you have a calculator, and you fancy having a go yourself, you can do the following:

**H** = Hyperfocal distance  
**f<sup>2</sup>** = focal length x focal length  
**N** = Aperture number (f-stop)  
**c** = Circle of confusion

The result, in millimetres, will be the distance at which you need to focus to attain greatest depth of field. We're using a full frame camera with a Circle of Confusion value of 0.029 as an average on a 16mm lens and a 50mm lens. Both are set at an aperture of f/16. Let's try some examples as shown on the page opposite just so we can demonstrate the theory. ■



Images like this can be taken using a precise hyperfocal distance calculation. For example, a 16mm wide angle lens and an aperture of f/16 means the point of focus is only 0.5m in front of the camera's position.

### TOP TIP!

You don't have to be able to carry around all the data required to work out hyperfocal distances in your head. There are plenty of apps for Android and iOS that can do it all for you.

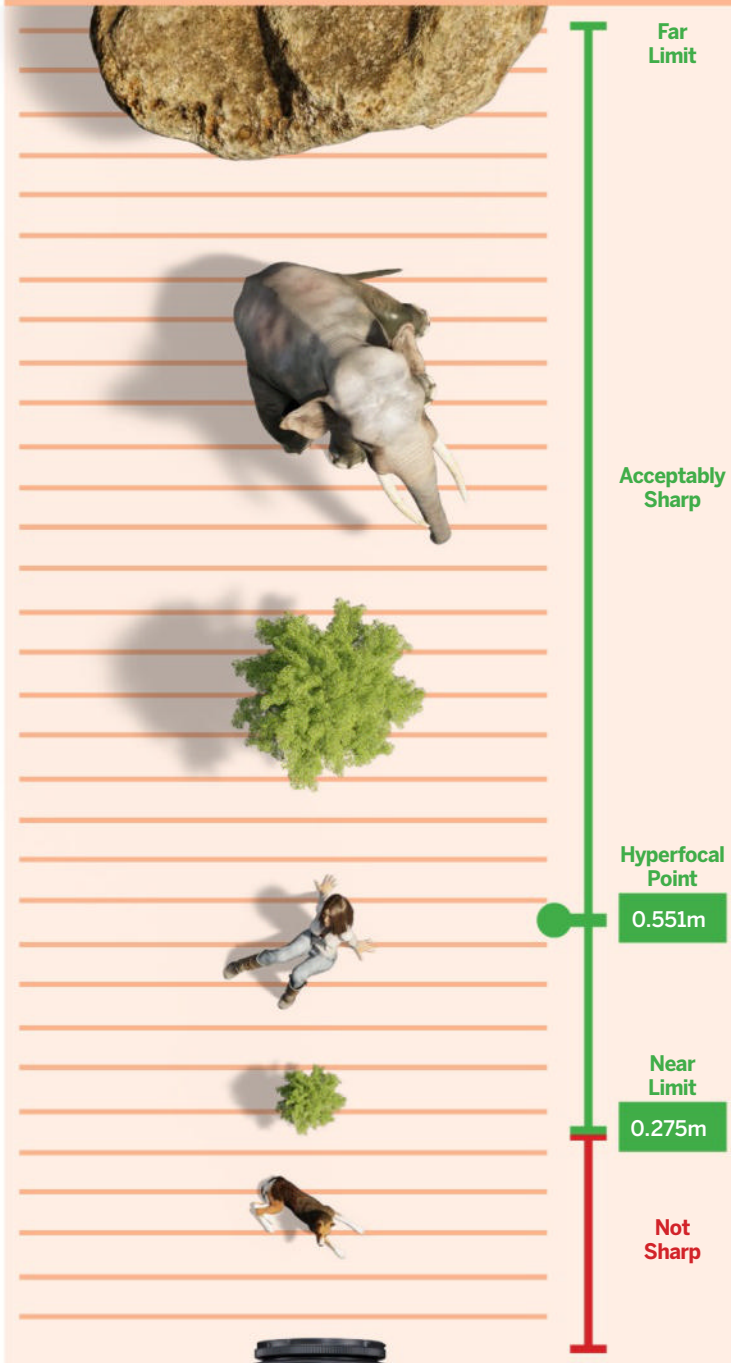




### Example 1: 16mm lens at f/16

$$H = \frac{16\text{mm} \times 16\text{mm}}{f/16 \times 0.029}$$

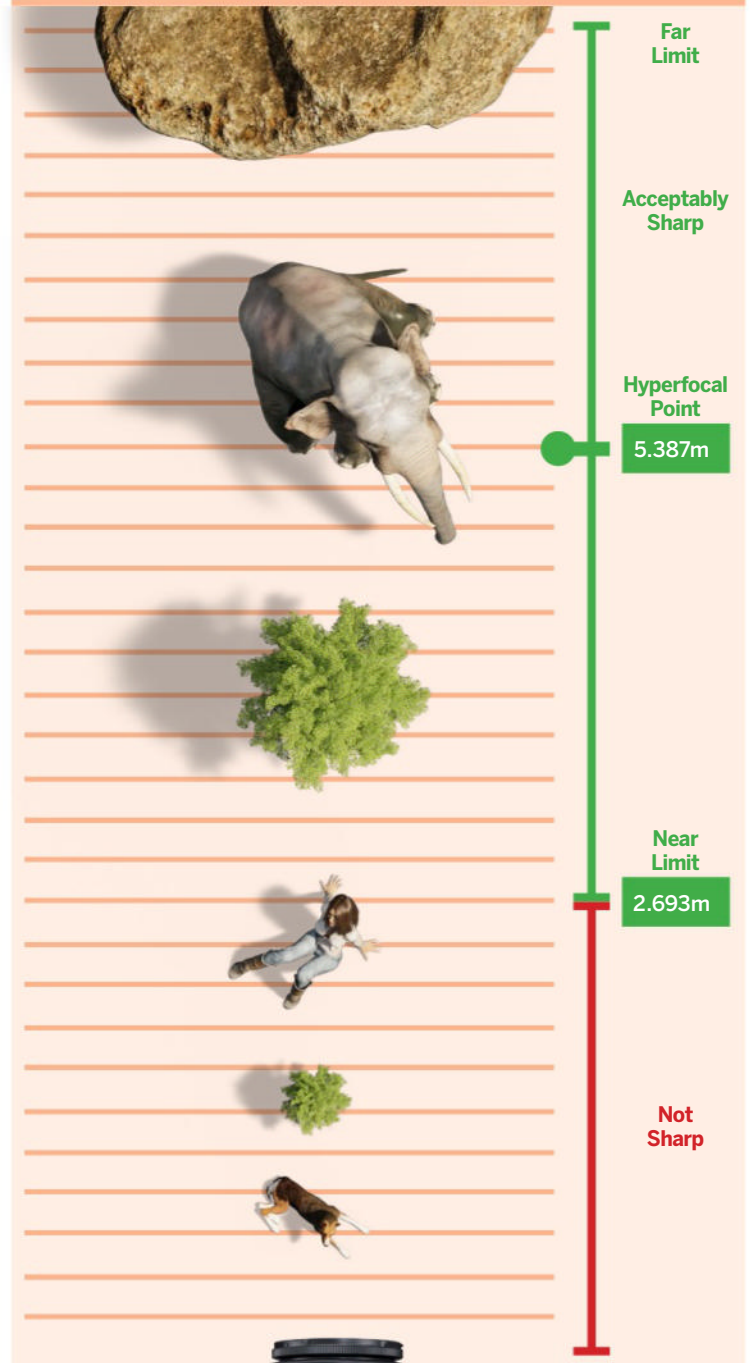
$$= 551\text{mm} (0.551\text{m})$$



### Example 2: 50mm lens at f/16

$$H = \frac{50\text{mm} \times 50\text{mm}}{f/16 \times 0.029}$$

$$= 5387\text{mm} (5.387\text{m})$$



Full frame  
16mm lens at an  
aperture of f/16



The near limit of acceptable sharpness is half of the hyperfocal value, stretching out to infinity.

*Please note: these images are not to scale and are for illustrative purposes only.*



Full frame  
50mm lens at an  
aperture of f/16



# What is Jpeg and Raw?

Our thoughts on the great image format debate

“Here’s an overview of the two formats. Take a look and see what is right for you.”



**S**hould you use Jpeg or Raw for your photography? This is a question that has been going back and forth for some time between photographers. Many champion the use of Jpeg, whilst others will extoll the virtues of the Raw format; so, should you shoot in Raw or Jpeg? Is the processing of Raw photos an overly complicated process? Can Jpegs give you all you need for a great final photograph? Here’s an overview of the two formats. Take a look and see what is right for you.

## Jpeg

Let’s start with the Jpeg format as it is probably the most commonly encountered image type. Jpeg is certainly the most popular image format in which photos can be saved, whilst being able to display millions of colours and be compressed to reduce their overall file size. Jpeg use what is known as a ‘lossy’ compression method. Essentially, this means that the more you compress the image, the more image data is removed from the photo. Higher levels of compression mean that more data is lost and the image will begin to degrade and detail will

be lost, but you will have a much smaller file size. Minimal amounts of compression will retain more data and the detail will be preserved at the expense of a larger file size. When you shoot in Jpeg format on your digital camera, the image file it produces is already fully processed according to settings you’ve used on your DSLR. Things like White Balance, Sharpening, Saturation and amount of compression used will be applied at the time of shooting. This will save you time later since you won’t need to do any post-processing. For normal shooting conditions, particularly where you might expect to take a lot of shots such as action sequences using burst mode, the use of Jpeg gives you a definite space-saving advantage when it comes to the capacity of your memory cards. A typical Jpeg from a modern DSLR is about 5MB, which is about 6 times smaller than its Raw counterpart. It also means you can shoot more Jpeg images in burst mode since the file size is smaller and there is less data to write to your memory card than Raw. The downside is that any errors in the use of the settings applied may be irreversible. An overexposed Jpeg with the wrong white balance and with too much sharpening applied

will be pretty much impossible to recover once you’re back on your computer. Jpegs contain less dynamic range between pure white and solid black than their Raw counterparts and up to 16 million colours, so you really need to make sure your exposures are as accurate as possible at the time of shooting.

## Raw

This is where the other side of the debate comes into play. A Raw file, as the name suggests, is essentially an unprocessed readout straight off the camera’s sensor. They are known as digital negatives and since they are Raw, they will need a lot of attention from you in order to fully realise their photographic potential. Raw gives you the ingredients, but you need to know how to cook! Jpegs can contain up to 16 million colours but Raw files can contain upwards of 68 billion colours. Their dynamic range

The benefits of shooting in Raw format cannot be denied. Landscape photographers in particular favour the format’s ability to allow the recovery of data from highlights and shadows for the best image quality possible.



is greater than Jpeg, meaning you can recover much more data from both underexposed and overexposed images. If you want the highest possible starting quality from your images, then Raw is the way to go. No sharpening is applied to these files, which means you can use much more powerful sharpening tools once you have the files on your computer, and since they use lossless compression, there is no image degradation and artefacts from the compression process. Another benefit of Raw is that if you happen to use the wrong white balance settings, it doesn't matter. Those settings and all the others can be removed or modified at the post-process stage since they do not directly affect the Raw file and are there just as a reference. As we've mentioned, to get the most

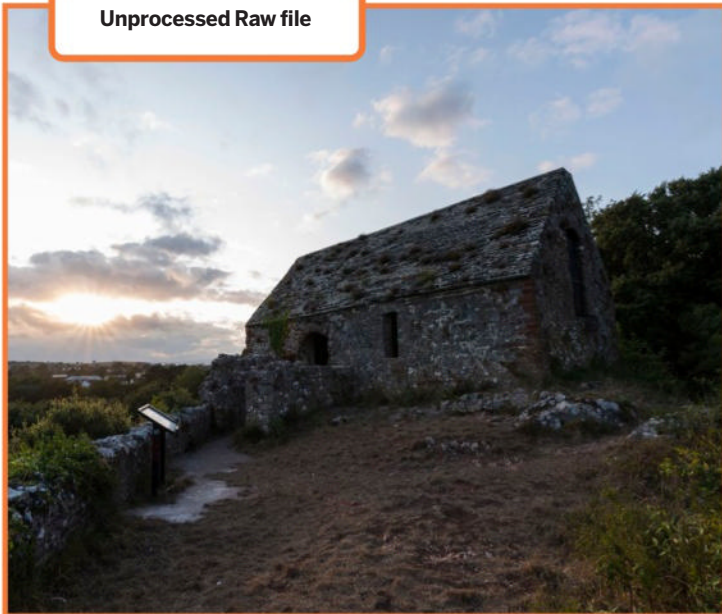
out of Raw files, you will need to know how to process them properly. This can be a time consuming process, particularly if you have a lot of images to get through. These files are also much larger than Jpegs. A typical Raw file from a 36MP Nikon D810 for instance, is about 72MB. With file sizes like this, your digital storage solutions will need to be quite robust and your computer will need to be fairly powerful to handle them too. Raw files are not a standardised format either, Canon cameras produce CR2 format images, whilst Nikon produce NEF files, so they are not cross compatible. You could not upload a Raw file to a social media site since it won't recognise the format. This means you will have to save your processed files out to another format like Jpeg or perhaps Tiff in order to share them.

### Summing up

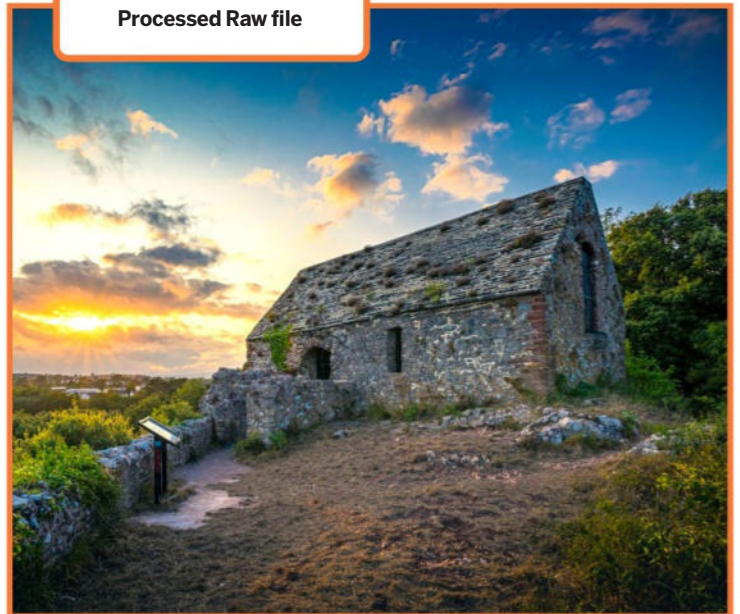
This is a tricky one to sum up. Hopefully, from the points raised, you may have a slightly better understanding of the two formats and may have decided which is best to use. It strikes us that since modern cameras have the option to let you change between formats, you can modify your format choices for the job in hand. If you are a landscape photographer and you need the best quality, then Raw is the best option. If you are out and about at a friend's party and recording the event for fun, then Jpeg is the better option for sharing. That's the beauty of the modern digital camera: you have the choice between image quality and file size, you just have to choose your image format wisely. ■

## Raw and Jpeg image comparisons

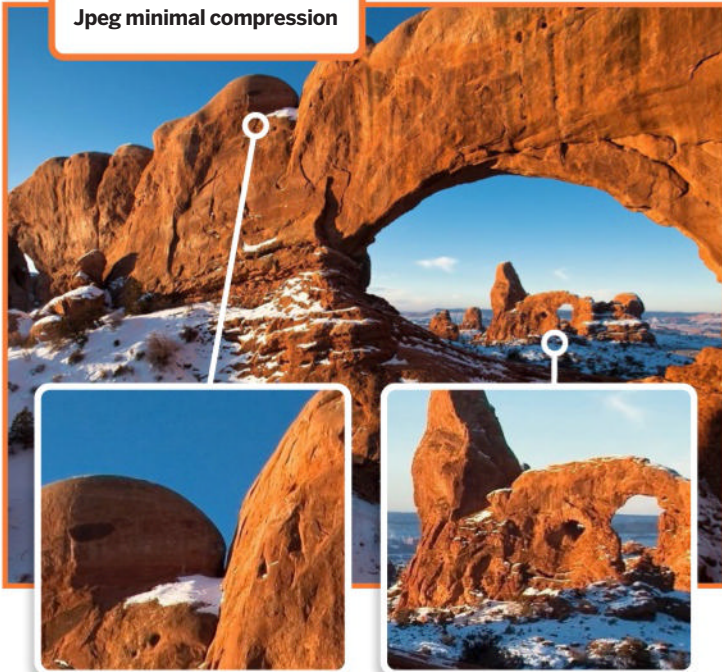
Unprocessed Raw file



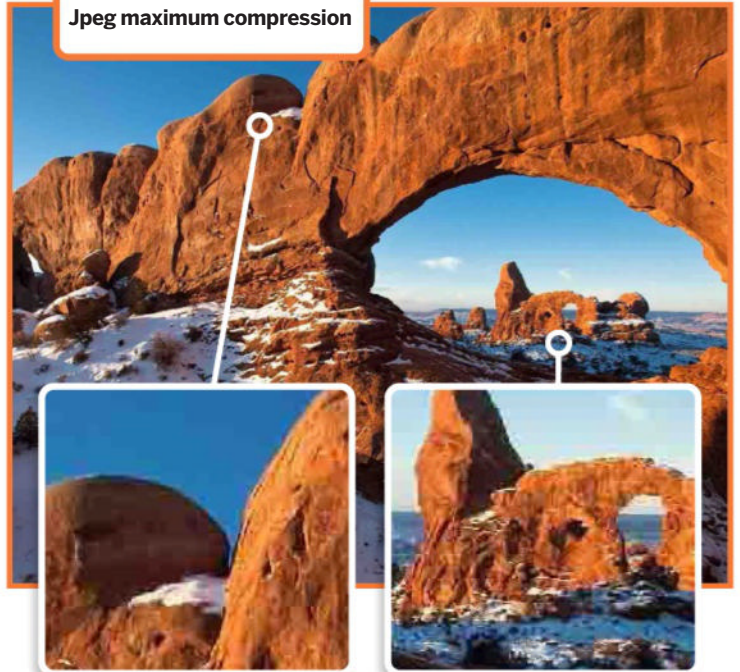
Processed Raw file



Jpeg minimal compression



Jpeg maximum compression



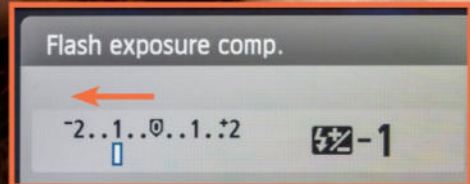
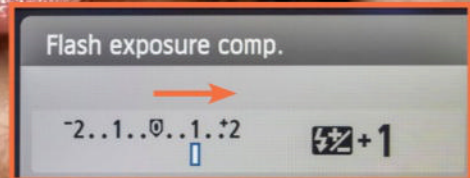


**TOP TIP!**  
For more information about flash photography, go to [strobist.blogspot.com](http://strobist.blogspot.com). This is a great website dedicated to passing on hints and tips about off-camera lighting.

“You can normally adjust the flash by 2 stops in either direction in order to fine tune the power output.”

# Light it up with flash

Some quick tips on using your camera's flash



Flash exposure compensation (FEC) allows you to increase or decrease the power output of your flash. Most cameras allow 2 stops of adjustment in both directions.

It is a fair bet that your camera has a pop up flash. This is a small flash unit that sits on the top of your camera and, if you are using it in automatic mode, you may have encountered situations where it has suddenly popped up as you were about to take a photo. This tiny flash draws its power from your camera's battery and as such it has limited power and range so as not to totally drain your battery. A pop up flash usually has a range of about .5m up to 5m. Anything further out and you will not be able to light your subject properly as you won't have the range or power.

## Full disclosure

Let's be honest at the outset and say that the pop up flash should be used as a last resort only. That tiny light source will give your photos a harsh look with sharp, dark shadows cast directly behind

them. They often tend to overexpose the subject too and give them bleached out faces and although there are systems that can reduce it, you run the risk of getting red-eye in your subjects since the flash is normally directly at eye level. Small light sources create hard edged shadows and there's not much you can do to offset this.

## Compensate

Since your camera may not always choose the most optimal power for the flash, you have the option to either increase or decrease the power output yourself, in order to get a better exposed shot. It is referred to as flash exposure compensation (FEC) and it lets you reduce the power if it is overexposing the shot or increasing it if the shot is too dark. You can usually find the FEC button on the camera, it is a small button with a lightning bolt icon next to a +/- symbol. If not, you

can find it in your camera's menu system under flash control. You can normally adjust the flash by 2 stops in either direction in order to fine tune the power output.

## Fill flash

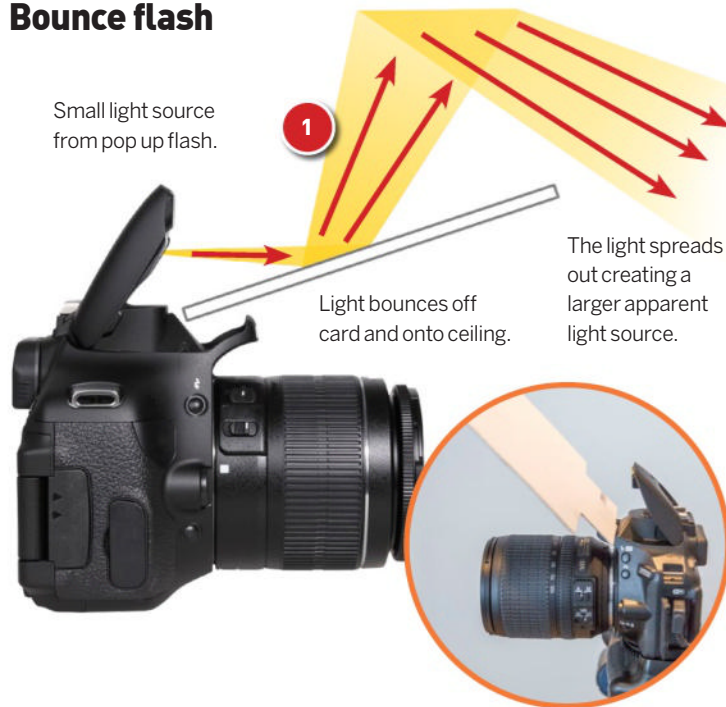
One area where the pop up flash can be quite useful is during daylight hours oddly enough. If you have a subject who is either backlit by strong light or has dark shadows on their face, you can use the pop up flash to add a fill light that reduces the depth of those shadows and gives a much better exposure. You can use the FEC setting to dial up the flash

The pop up flash is not the greatest lighting instrument you will ever encounter. Its tiny flash unit produces a harsh light with hard shadows that are somewhat unflattering, but there are some tips that can help.



## Some flash basics for better lighting

### Bounce flash



### Diffused flash



**1.** Bounce flash, as the name implies, is a method used to divert the light coming from the flash head upwards onto a ceiling using a piece of white card; as it bounces off the card and onto the ceiling, the patch of illumination becomes larger. A larger light source creates softer shadows and you will need more power since the light has to travel much further than before.

**2.** Diffused flash uses a piece of translucent material in front of the flash head. The larger the material, the better, since you are trying to make the tiny pop up flash unit's light source larger by illuminating the diffuser, which in turn illuminates your subject. You will need more power as some of the light output will be blocked by the diffuser material.

**3.** Fill flash requires a deft touch in order not to overdo it. If you are photographing a back lit or shadowed subject, you need to use camera settings that deliver a normal exposure for the background, with enough power from the flash to eliminate dark shadows from your subject.

power if needed or reduce its power so it is affecting just the shadows and not bleaching your subject's face out.

### What about those shadows?

A lot of photographers have quite an aversion to the pop up flash. They would much prefer to use an external flash mounted to the hot-shoe attachment of the camera. An external flash has the ability to rotate and angle its flash head, so you can achieve different effects that are not possible with the pop up since it is fixed in one position on the camera. With an external flash you can bounce the light off a wall or ceiling to increase the size of the light that hits your subject. A larger light source creates more diffused light that in turn gives you softer, less harsh shadows. The downside is that external flashes can be expensive and you may not be ready to step up to external lighting systems yet.

### Fill flash before



### Fill flash after



### Some options

Despite your pop up flash being in a fixed position, you can try a couple of techniques to alter the path of the light. As an example, if you are shooting a portrait indoors, take a sheet of white card or paper and hold it in front of the flash at an angle so the light from the unit is deflected upwards and bounces off the ceiling. Since the light has had to travel further it is now much weaker, so you will need to dial in more FEC power to correctly light your subject. You will need to experiment with flash power and the angle of the card in order to fine tune the technique. This is by no means a perfect solution but it is definitely worth a go.

### A diffuser

Yet another option for using softer direct flash is to use a diffuser. Diffusing material is usually a semi transparent white fabric, through which light can

pass. In so doing, the light is scattered and softens the light of the flash. The size of the material also creates a larger source of light which helps take the edge of the harsh shadows you're used to. Just like the bounce flash option, the power of the output is diminished by passing through the material, so you will need to use FEC again to add extra power to the flash. Remember that you will need to be working at close range to your subject to make the most of the small amount of power at your disposal.

### Use it well

The pop up flash does get a bit of a bad rap and it is not an ideal solution for better photos. However, with a little bit of experimentation and some cheap materials, you can at least improve the output you get from it a little. It's not the same as using dedicated off-camera flash units and big diffusers and soft boxes, but it is a place to start. ■





# Using external flash

Some useful info about getting more creative with your lighting

**W**hile almost all digital cameras have some sort of flashgun built in, these are usually relatively weak with a useful range of only a few metres. The more advanced cameras, including all DSLRs, most CSCs and several advanced compacts and super-zooms, have the ability to use an external accessory flashgun to provide more illumination over a much greater distance.

These cameras have a bracket known as a 'hot shoe' (see image above), into which the flashgun slots and includes electrical connections that allow the camera to trigger

the flash. Most camera manufacturers make flashguns designed for use with their own cameras, which have more connections to allow the camera's light metering system to control the output of the flash. These systems are known as 'dedicated' flash.

## Flashguns

While older and cheaper flashguns are fairly simple, providing a controllable flash of light regulated by a basic photocell light meter, more sophisticated and expensive dedicated guns can produce effects such as strobe lighting, red-eye reduction and multiple exposures. They usually





Hammerhead flashes are side-mounted units and are not attached to the hot shoe. The side-mounting means the flash output is far enough off axis to eliminate red-eye in your subjects.



You can make a simple home studio flash by combining a flashgun, a tripod and a few cheap accessories.

“More advanced cameras have the ability to use an external accessory flashgun to provide more illumination over a greater distance.”

have heads that can be twisted, or tilted, to bounce light off walls or ceilings and they may also have built-in diffusers and reflectors to produce softer light for portraits. They also tend to have much greater range and faster recharge times than cheaper models.

### Flash accessories

External flashguns are extremely versatile. They can be operated remotely from the camera by using an extension cable or a wireless flash trigger. Some more advanced DSLR cameras and dedicated flashguns have wireless remote control built-in. There are flash accessories, such as stands, tripod brackets and brollies, available that will turn a couple of external flashguns into a basic studio lighting system.

### Flashgun power

The power of a flashgun is usually expressed as a guide number (GN), which is calculated from the gun's range at 100 ISO, the higher the guide

number, the longer the range. Things to look out for when buying a flashgun are features such as: a bounce-and-tilt head, variable power and wireless control. Don't forget to check that any dedicated functions are compatible with your camera.

### Flash manufacturers

There are a number of third-party flash manufacturers, such as Nissin and Yongnuo, which make a wide variety of external flashes to suit all budgets and requirements. The older side-mounted flashguns, used by many press photographers, are usually the powerful 'hammerhead' units. Third-party flashes often have optional modules that will provide metering dedication for various makes of camera.

### Ring flash

A ring flash is a specialised type of flashgun intended for close-up and medical photography, but which has also become quite popular for fashion photography. It uses an arrangement of



flash tubes and reflectors mounted around the camera lens, providing shadow-free, even illumination especially at close range. There are similar devices, which place two normal flashguns either side of the lens to produce much the same effect. ■





# From screen to paper

Printing your photos on standard paper sizes

**T**here is a slight, but annoying, problem when it comes to printing photos from your digital camera on any of the standard photo paper sizes. The majority of digital cameras shoot pictures with a standard aspect ratio of 4:3, the proportions of a traditional domestic TV or computer monitor. There are also more and more cameras coming along that can shoot in 16:9 format, suitable for wide-screen TVs and monitors and some can even shoot in the 3:2 aspect ratio of 35mm film and 6 x 4in snapshot print paper, but if there's a camera out there that can shoot in the 1.4142:1

ratio of international paper sizes, then we've never seen it.

What this means is that if you print your digital photos on A5, A4, or A3 paper then you have to either crop the picture or trim the paper. Most printer utilities (the software that comes with the printer) have an option to squeeze, or stretch, the image so that it fits onto the page, but this is not a good solution since it alters the proportions of the image. The software may also have the option to automatically crop, or resize, the image to fit, but again this is best avoided, since you will often have no control over the process and the image re-sizing

algorithm in the printer software may not be very good. It's a far better idea to manually crop and resize the image yourself using image editing software, by doing this you get to decide exactly which bits get chopped off. There are several ways to do this.

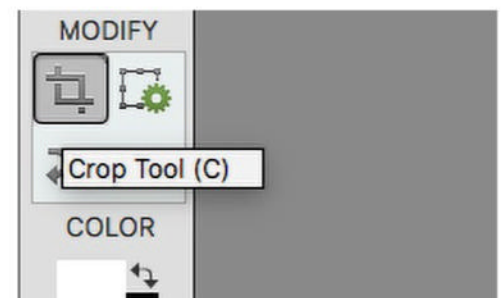
For this part we're using Adobe Photoshop Elements, however the same techniques will work in most other good quality image editing programs, including Corel Paint Shop Pro, the full version of Adobe Photoshop and GIMP, the free image editing program.

By far the quickest and easiest way to





“If there’s a camera that can shoot in the ratio of international paper sizes then we’ve never seen it.”



simultaneously crop and re-size your photos is to use the crop tool, which you’ll find in the tools palette. In Photoshop Elements, when you select a tool like this, several options will appear in the tool bar, across the bottom of the workspace. For the crop tool, these include the ability to pre-set the size and aspect ratio of the cropped image, so that when you perform the crop the resulting image will automatically be resized to the dimensions specified.

We want to print this picture out at A4 size and optimum photo quality, so we need to enter the dimensions of the photo paper. These dimensions are usually printed on the front of

the pack in which the paper came and for A4 they are 29.7cm x 21cm. For optimum photo quality, we’ll set the resolution to 120 pixels/cm. Note that if the starting image is less than 3564 x 2520 pixels (approximately 9MP) in size, then the final image will actually be an enlargement at this paper size. However, Photoshop Elements automatically uses its advanced bicubic, resampling algorithm when resizing images in this way, which will give much better results than letting the printer software do it.

Having set the parameters for the crop, simply click and drag a box around the area of the image you want to print. In this case, we want to print as much of the image as possible, so we’ll drag it out

full-width, but adjust the vertical position to make the best of the image. You can alter the size and position of the crop window by dragging the corner grab handles; the proportions of the crop window will remain constant. When you’re happy with the position, either press Enter, or click on the green tick in the bottom right of the crop box, to confirm.

For actual printing it’s best to use the printer utility software, since it will usually have special options for the types of paper used with your printer and will be optimised for your particular model. However, now it won’t have to re-size the photo and therefore will print it exactly as you see it on the screen. ■

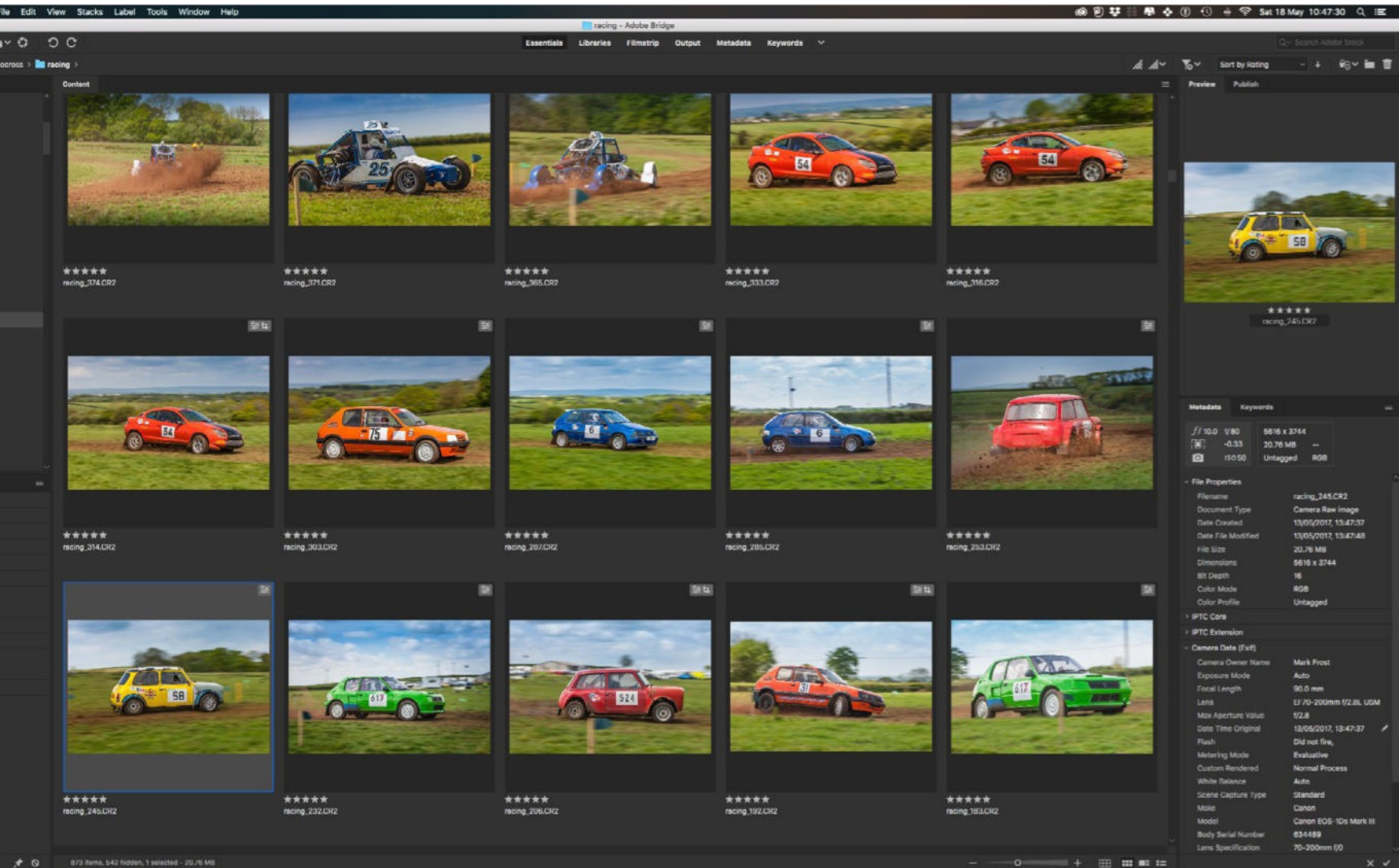
This picture shows the difference in aspect ratio between a 4:3 camera frame [photo] and the international paper size [outline].





# Organising your pictures

Keep track of your ever-expanding photo library



**W**ith digital cameras being so convenient to use, it's very easy to come home from a family day out with fifty or sixty photos in your camera and a two-week holiday can easily produce several hundred snapshots. If you're a keen photographer, who's had a digital camera for a few years, by now you've probably got several thousand photos on your hard drive, probably scattered between dozens of confusingly labelled folders. Unless you keep your collection well organised, finding any particular photo can be extremely difficult. Some people keep photos in named folders, with a folder for each

theme, but what if a photo fits into more than one theme? Some people prefer to sort their photos by date and indeed some photo handling programs do this by default, but that doesn't help you to find photos on a particular theme or featuring a particular person.

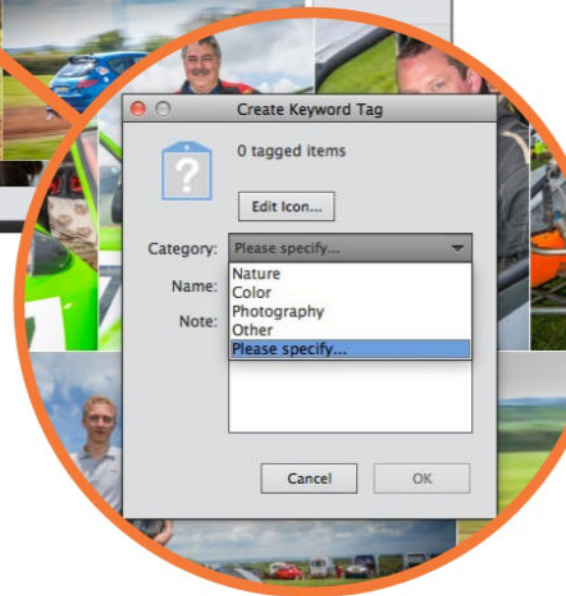
The best way to organise your photo collection is by using keywords or tags. Keywords are a common concept in computerised searching. They are a series of single words, or brief phrases, that describe the contents of a document or image. They are attached as labels to the files and are normally only seen by the computer on which the data is stored and are invisible to the user.

Your digital photos, which are stored as digital data files both in your camera and on your computer, contain more information than just the picture itself. Information about the date and time the picture was taken, the dimensions of the image, the type of camera and the camera settings used to take it, plus the thumbnail image displayed on your camera's monitor, are all stored along with the image in what is called the EXIF (Exchangeable image file format) data, although it is also often referred to as metadata. Using an image editing program, you can usually alter, or add to, some sections of this data and your additions are then also stored along with the photo.





**“There are several different types of user-editable metadata, including copyright information, GPS co-ordinates and of course keywords.”**



There are several different types of user-editable metadata, including copyright information, GPS co-ordinates and of course keywords. If you use Windows you can edit the metadata directly through folder options, but it's usually better to do it using an image editing program such as Lightroom Classic CC, Lightroom CC, or Photoshop Elements.

To start tagging your photo collection in Elements for example, launch the program and look for the Keywords tab on the right of the window, alongside the Metadata info tab.

You'll see a panel with some default sample keywords already in place. These are just there as an example and you can edit or delete any that you don't want. You can also add new keywords that suit your photo collection. To add a new keyword, either right-click in the keywords window or click on the '+' symbol at the bottom of the window. To edit an existing keyword, or to add a new sub-keyword or tag, right-click on the line you want to change.

One very useful feature of Adobe Bridge's keyword system is the ability to set up nested

keywords. This is a good way to organise photos, since you will often have broad categories with several sub-categories, for example 'Vehicles: Cars, Bikes, Boats, Planes, Trains', or 'Parties: Birthday, Eid, Halloween', or 'Children: Crying, Bawling, Sulking, Making a mess.' You can divide the sub-categories even further, adding as many nested keywords as you want, so you can have "Vehicles: Cars: Ford, Toyota, Citroen, Jaguar, Porsche" for example. That way if you search for "Vehicles", your search will find everything in all the sub-categories, but searching for "Jaguar" will just find pictures of Jags. It's a good idea to plan your keyword categories before you start labelling your pictures, although you can edit them later if you think of new ones.

You can move sub-keywords from one place to another simply by dragging and dropping them, so for instance if you think 'Racing' belongs under 'Sport' and not under 'Cars', you can simply drag it into the new category and all the nested sub-categories will move with it.

These keyword labels allow you to search through your images using filtered searching. In the Essential workspace, you'll see, over on the left of the screen, a

tag called Filter. If you open a folder of pictures, you'll see a list of all the keywords attached to files in that folder. If you click on any of those keywords, only the images so labelled will be displayed. This enables you to narrow your search by clicking on several different keywords.

The metadata keyword labels can be read not just by Adobe Elements, but also by other image sorting programs. In addition, if you upload your pictures to Flickr, or other photo-sharing sites, the metadata keywords are transferred along with the file and can be used to search for that image online.

Many online image libraries use the same keyword system as Adobe and if you sell your pictures to such a library, adding labels to your pictures before you upload them to the library's submission site can be a great time-saver.

If you've got a big photo collection, going through all of them and adding keywords could be a very time-consuming task, but it really is worth doing. Once you've got all your current collection labelled, just adding keywords to your new pictures, every time you download them, is a lot less hassle and it really does make searching your pictures so much easier. ■



# Sharing your photos online

Let the world see your work by posting it on the Internet



**B**efore the advent of digital photography, if you wanted to share your photos with your friends you either had to make expensive copies of your prints, invite your friends over to look through your photo album, or even set up the slide projector and subject them all to a couple of hours of upside-down and out-of-focus holiday snaps. However, in this modern age of wonders in which we live, you can share your photos with people from all over the world quickly and easily by using one of several services available on the Internet.

Rather than printing your photos out or emailing them to friends individually, you upload your photos to a website where they are displayed in an online gallery and can be viewed and downloaded by other

people. You then simply send your friends a link to the website gallery, which they can visit to see your photos. To use one of these sites you will normally have to register for an account, but in most cases, you will get the basic service free of charge, although most sites offer premium accounts with extra features on payment of a small fee.

## Picture sharing sites

More and more people are getting hooked up to high-speed broadband Internet connections and many websites have sprung up offering to store, display and share your photos, often for free or at minimal cost. One of the most popular of these is Flickr, first launched in 2004. Its popularity stems from being extremely easy to use, with a very simple interface

that lets users upload, sort and share photos with anyone else in the Flickr community, as well as hosting images for display on other websites. Uploaded photos can be grouped into sets and collections, and can be set to be private or publicly viewable. Text tags can be added to pictures; to make searching for them easier, and comments can be added, either by the person uploading the photo, or in the case of public photos, by any other user. A recent addition is the ability to place photos on a zoomable map of the world, in what is becoming known as 'geotagging'.

Users of Macintosh computers will be familiar with the Photo app, installed as standard (as part of the OS) on all new Mac computers. It shares many features with programs like Google Photos,



including basic image editing, the ability to organise photos into albums and slide shows, as well as the option to upload images to the web, where they can be shared with your friends and family.

If you're mainly looking for somewhere to upload your photos for inclusion on a message board, or Internet forum, there are many other photo-hosting sites available, some offering a basic stripped-down service, while others offer more features, including shareable albums and a range of copy-and-paste tags for showing your pictures on web pages. One popular image hosting site is Photobucket, which, like most, offers a basic free service with limited image sizes and storage capacity, as well as a premium account with unlimited uploads and larger file sizes. Sites of this type will often limit the length of time for which they will host images on free accounts and may also limit the bandwidth available for viewing each image, so if a lot of people view a particular photo it may suddenly disappear when the bandwidth limit is reached.

## Mobile uploads

As the gap between cameras and other mobile devices, such as phones and tablets, grows ever narrower, more and more cameras are featuring the capability to upload pictures to social networking and image sharing sites directly from the camera itself, by connecting to a Wi-Fi network. This is a great way to instantly share your pictures and offers the additional security that even if you are unfortunate enough to lose your camera, at least your pictures will be safe, backed up instantly and automatically via the web. It also

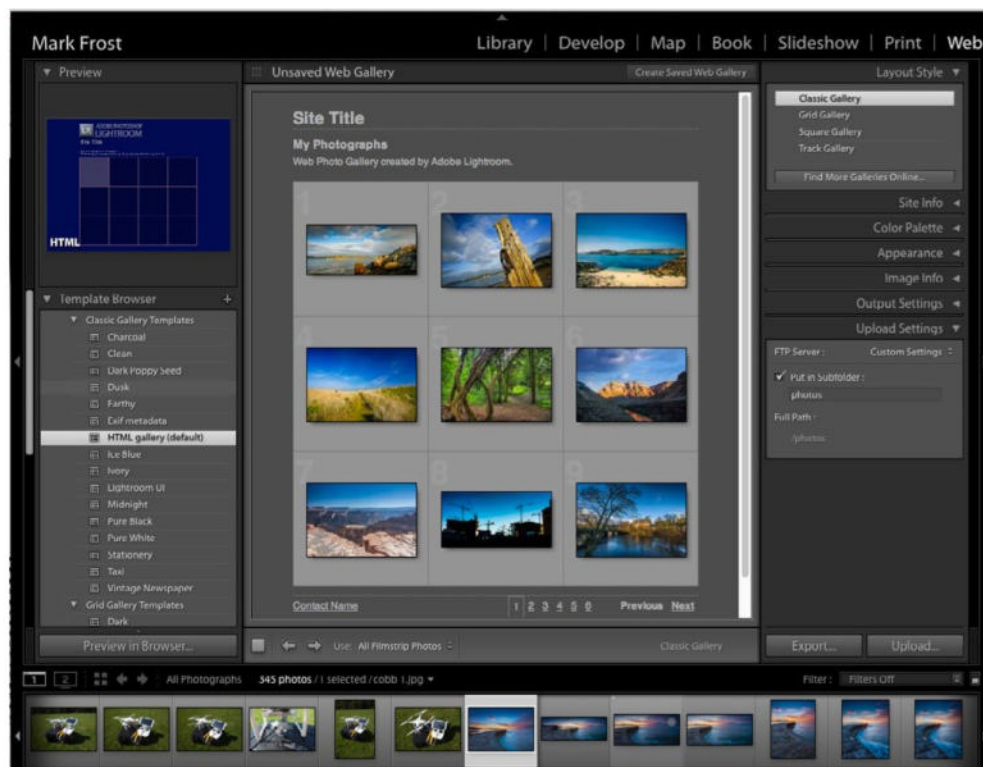
means that you never have to worry about running out of storage space on your memory card. Some manufacturers even provide a free image-sharing service as part of the package when you buy your camera. As free public Wi-Fi becomes widespread in city centres and other popular areas, this feature will become even more useful.

## Your own web gallery

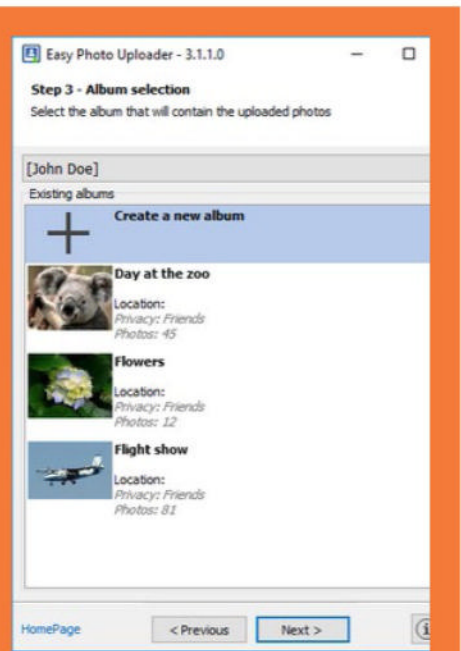
An increasing number of people are opting for a more permanent presence on the web, with their own personal website and photo gallery. Most Internet accounts come with an amount of free hosting space for a personal site and many also include basic tools to help get you started. As well as this there are a number of off-the-shelf programs available for home users, designed to take a lot of the hard work out of designing and uploading your own website.

Most popular photo-editing programs, including Photoshop Elements and Lightroom Classic CC have automated facilities for creating web albums, re-sizing and compressing images for faster uploading and viewing, and even creating interactive thumbnail galleries.

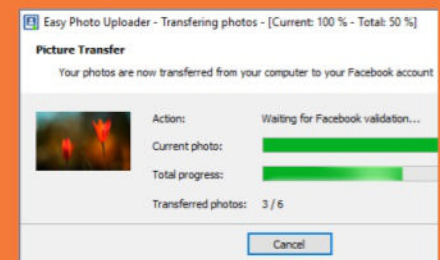
When finished, the programs can export the HTML code (the programming language used to create web pages) and images in a format that can be uploaded to your web space. While these programs aren't as easy to use as ready-made image sharing solutions, such as Facebook, if you're prepared to put in the effort to learn how to use them they do allow you to create a truly personal online gallery, which you can tailor to your own, needs, with results you can feel proud of. ■



The Web module of the desktop-focused version of Lightroom Classic CC enables you to quickly and easily create simple web pages for uploading to your service provider. This allows you to create an online presence and, therefore, to display and sell your images. You can choose from a number of different templates provided in the Template Browser. Input your FTP details and then automatically create and upload your web gallery.



The past few years has seen an explosive growth in the popularity of social networking sites, particularly the ubiquitous Facebook, which has a well-designed and easy-to-use photo gallery section with a fast, browser-friendly, Java-based file uploader. Photos on Facebook can be organised into albums and shared with your friends and other members of your social network, who can leave comments on them. Photos are automatically resized to approximately 600 x 450 and a file size of around 200KB for faster uploading and viewing, but prints can be ordered online via an optional Facebook app.



**“In this modern age of wonders you can share your photos with people from all over the world by using one of several services available on the Internet.”**





# Taking care of your equipment

Both dust and fingerprints can ruin your pictures

**L**ike any item of complex technology, your digital camera will only keep working at peak efficiency if you look after it. Of all the abuse that a camera can suffer, perhaps the most pernicious is dirt. From dust on the lens to grubby fingerprints all over the LCD monitor, dirt can seriously impair the operation of your camera. Of course, you can't chuck your camera in the sink with the washing up (you can, but don't expect it to work afterward), so just how should you keep it clean?

## Lens cleaning

The most vital part of your camera is also the most delicate. If your lens is damaged then all your pictures will suffer. The first rule of lens care is to never touch the surface of the lens with anything that can scratch glass, which includes some rather unexpected things. For example, soft tissue papers, or toilet paper, are among the worst things you can use. Even the softest paper contains hard grit that will leave tiny scratches on the surface of the lens, which builds up over time. Don't use your pocket-handkerchief either. Even a

clean one will contain dust and lint that can leave your lens dirtier than when you started.

Care should be taken when using cleaning fluids. The surface of your lens has a special coating, which can be damaged by spirit, or solvent-based cleaners and they can also seep around the edges of the lens and get in between the elements. It will then be impossible to remove without having the lens dismantled and professionally cleaned. Only use proper lens fluid and apply this sparingly to a lens cloth rather than directly to the lens.



“The most vital part of your camera is also the most delicate. If your lens is damaged then all your pictures will suffer.”

## Dust on; dust off

Don't wipe dust off with a tissue or cloth. Dust particles may include tiny grains of sand, which are extremely hard and will scratch your lens. The correct way to clean a lens is to remove any dust using a proper lens brush. You can also use a can of compressed air, or a blower. Don't blow on the lens with your mouth, because you'll inevitably get small droplets of saliva on it.

Only wipe the lens once the dust has been removed. You can get special lint-free lens-cleaning cloths from your local camera shop and these are the only things you should ever use for this. Wipe the lens from side to side, never in a circle. A circular motion merely moves dirt around the lens without removing it. A word of caution about compressed-air blower cans. Always direct the first blast away from your camera, since it may include a small spray of condensation.

## Monitor your LCD

Although scratches on your LCD monitor aren't as serious as scratches on your lens, they are still best avoided. You can get away with cleaning your monitor with a handkerchief or other soft dry cloth, but in general, anything that is good for your lens will also be good for your monitor. As with the lens, solvent or spirit-based cleaning fluids should be avoided. If the screen is particularly dirty, use a lens tissue with a little lens cleaning solution on it. Again, as with the lens, use a side-to-side motion rather than a circular one.

## Dirty pictures

General dirt on the body of your camera should be removed with a soft dry cloth. It is OK to use a slightly damp cloth for stubborn grime, but make sure you dry it off immediately afterward. Do not use cleaning sprays or abrasive scourers as these will damage the finish and may get onto the lens, with disastrous results.

## Moisture protection

Unless you have a weatherproof camera, moisture can get inside and mess with the electronics, or condense on the CCD or the inside of the lens and ruin your pictures. If, for example, rain splashes your camera, wipe it off at once

## Lens-Pen cleaning brush

This handy pen-sized gadget is available from all good camera shops and combines a soft brush with a special lens-cleaning pad.



## Micro-fibre lens cloth

These soft micro-fibre cloths are the best way to clean your lens and come in a handy pouch that clips to your camera strap.



## Camera cleaning kit

The perfect gift for any camera enthusiast, a good cleaning kit will include abrasive-free lens wipes, a blower brush, non-solvent cleaning fluid and more.



## Dust-off air can

Ideal for getting rid of dust in hard-to-reach places with a blast of compressed air, this latest version is ecologically safer.




with a soft dry cloth. It's also a good idea to keep a bag of silica gel in your camera bag. This substance absorbs moisture, sucking it out of the air. Keeping some with your camera will help keep it dry.

## Keep in contact

With digital cameras, it is vitally important that the electrical contacts between the camera and the memory card are clean. If you get any dirt on them,

it can prevent your pictures from being recorded. If you think that there may be dust on the contacts in your card slot, give it a quick blast with a compressed air can. If that doesn't work, it's probably best to have the camera professionally cleaned and serviced. Don't be tempted to try squeezing things like cotton buds or pipe cleaners into your card slot, since these stand a very good chance of permanently damaging your camera. ■





If you are new to photography and are looking for subject matter to try your camera skills out on, then pet portraits are a great way to learn. They can pose as many, if not more, challenges than an equivalent human portrait. If you want to stretch beyond standard snaps, think about using different lenses for wide or macro shots, as well as lighting options for more dramatic portraits.







# TAKE BETTER PHOTOGRAPHS

Some tips that can help you improve as a photographer

**H**ave you arrived at a point where you wonder why your photos look more like simple snaps and not professional level masterpieces? There are a number of hints and tips we can pass on that can help you evolve as a photographer. Many of those tips cover shooting techniques, others may simply be advice about equipment and understanding a little more about your camera. You don't have to use them all but pick out a few that work for you, develop them and make them a part of your creative photographic process and they will stand you in good stead as you progress your skills. ■

78 Choose the right camera

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78 Choose the right lens

---

78 Buy a tripod

---

78 Early bird

---

79 Visual interest

---

79 Pick a prime

---

79 The holy trinity

---

79 Stop the shakes

---

80 Depth cueing

---

80 Enhance your photos

---

80 Are you compensating?

---

80 Don't fear the histogram

---

81 Learn from others

---

81 Further afield

---

81 Out of the shadows

---

81 Batteries

---

82 A sense of perspective

---

82 Maximum exposure

---

82 Lock it up

---

82 Filter systems

---

83 There's an app for that

---

83 Take control

---

83 Stay sharp

---

83 Persistence pays off

---





“There are a number of hints and tips we can pass on that can help you evolve as a photographer.”



1

## Choose the right camera

When you're looking to buy a new camera for your photography, make a list of your requirements and set yourself a budget. Don't forget to allow for accessories such as lenses, a tripod and cleaning kit if you need them. Don't fall in to the trap of thinking that a more expensive camera will make you a better photographer. You're much more likely to improve your technique by overcoming the limitations of cheaper kit than by spending more money than you need to.



2

## Choose the right lens

If you're buying a compact system camera or DSLR, it will probably come with a standard telephoto lens that is ideal for general photography and snapshots but there is a wide variety of special lenses available for other types of photography. If you like to shoot landscapes, get a good wide-zoom lens but avoid super-wide lenses as these will distort the image. If you want to shoot wildlife, you'll need a high quality fast telephoto but this will be expensive.



3

## Buy a tripod

Improve your photography by investing in a decent tripod. For the best combination of strength, rigidity and portability, the ideal choice is carbon fibre. They start at around £120 (\$175, €165) and can cost ten times more, so if that's too expensive get a good quality aluminium one. Features to look for include a ratcheted centre column, portrait-format tilt and all-metal construction. Avoid ones with plastic heads, as they are seldom rigid enough to prevent camera shake on long exposures.



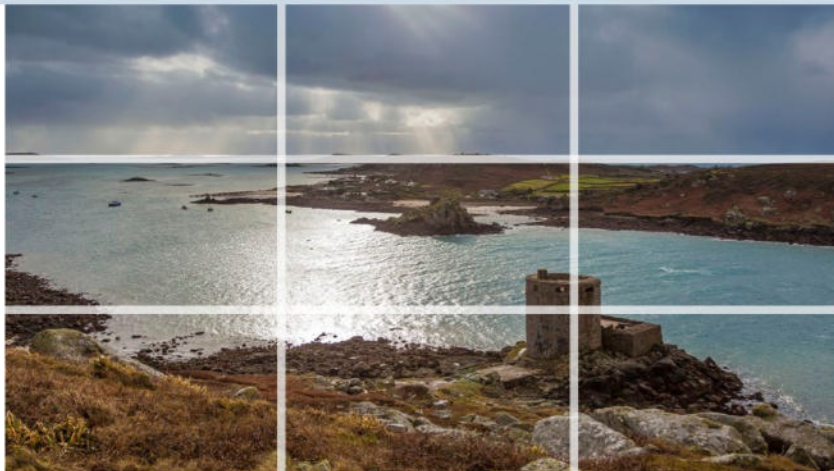
4

## Early bird

Shooting a landscape in bright midday sun is fine but if you really want your shots to shine, you'll need to get up early and catch the light available just before the sun rises. The shadows are long, giving definition to objects and the light has that special golden ethereal quality. The same is true at the opposite end of the day, at sunset. The period of time around sunrise and sunset is called the golden hour. Simply switching the time you take photos can have a dramatic improvement on your shots.







5

### Visual interest

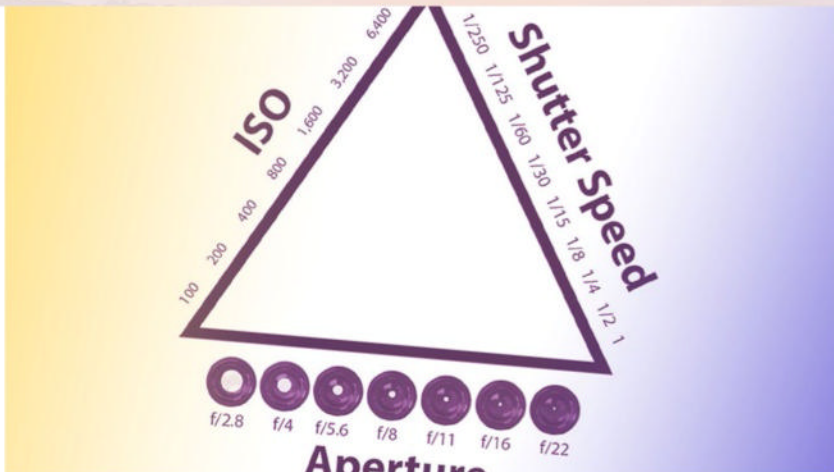
The rule of thirds is a simple guide that can help the composition of your shots and make them much more visually appealing. When framing a shot, you have to imagine that what you can see through the viewfinder of your camera is divided into thirds both vertically and horizontally with lines, just like a noughts and crosses game (or tic-tac-toe if you are in the US). Placing your main subject on an intersection where these lines meet is a simple and quick way to improve composition.



6

### Pick a prime

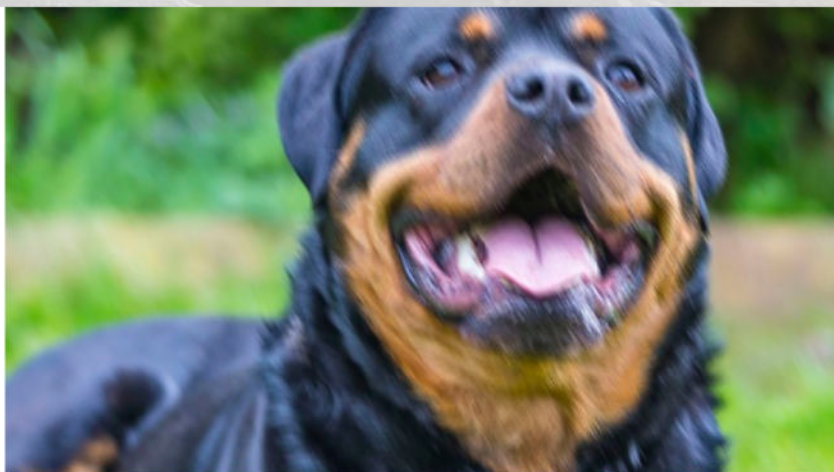
Fast glass has very large apertures, letting in more light and offering faster shutter speeds in low-light conditions. A good portrait lens that has a maximum aperture of f/2.8 - f/1.2 is fantastic at creating the background blur so sought after by photographers. The quality of defocused light this blurring produces is referred to as bokeh. The ability to shoot at f/1.2, for instance, means you can shoot more natural light portraits, without the reliance on strobes.



7

### The holy trinity

ISO, aperture and shutter speed are the three pillars of exposure. The main idea is that altering one of these three settings has an impact on exposure and therefore how your image looks. One or both of the other settings will have to be altered to maintain a balanced exposure. As you develop as a photographer, you will realise that once you are in control, you can create images that look more as you want, rather than what the camera thinks is right when in full auto mode.



8

### Stop the shakes

Camera shake is the unwanted movement of the camera during an exposure. Modern cameras offer image stabilisation and it can work well up to a point but the lower the light, the more the likelihood is that your shots will be blurry as you need longer shutter speeds to gather enough light for a balanced exposure. If you buy one thing to go with your new camera, make it a tripod. Use a robust tripod and your images will be rock steady in all manner of challenging shooting situations.



9

## Depth cueing

A photograph only has two dimensions and any indication of depth in a photograph is purely optical. One of the simplest ways to add depth is to use leading lines like the curve of sand on a beach image or railway lines converging towards the horizon. Another method is atmospheric perspective where mist and fog shroud distant objects making them lighter and with less tonal contrast compared to darker foreground objects. This creates more depth in the image as darker foreground fades to lighter background.



10

## Enhance your photos

If your camera has the option to let you shoot Raw images, use it. A Raw image is the key to much greater post-processing possibilities. Raw images, as the name suggests, are just unprocessed raw data straight from the camera sensor with all the information you need to bring out a beautiful photograph. The act of cropping the shot into a more pleasing aspect ratio can save an image, as can turning it to black and white. The choices are endless, even if it's just contrast, saturation, brightness and sharpness.



11

## Are you compensating?

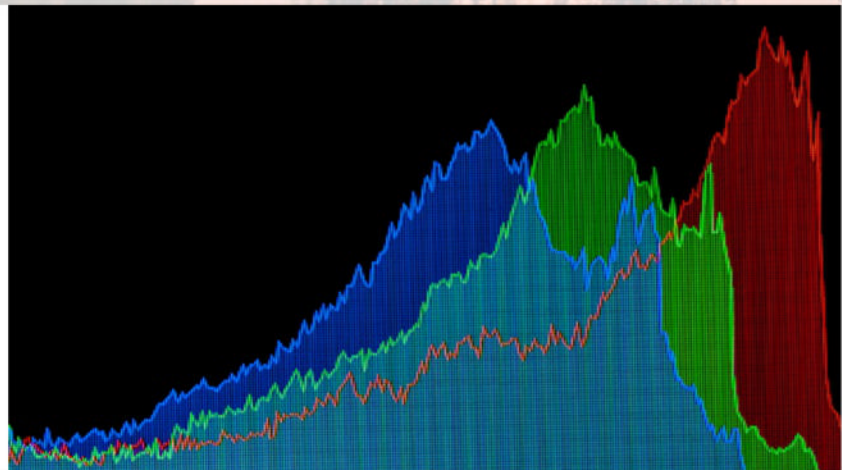
As good as cameras are, they will often overexpose and underexpose your photos in challenging lighting situations. That's where exposure compensation comes in. It's a common setting found on digital cameras and it lets you override the camera by making the image lighter or darker based on how much positive or negative exposure compensation you dial in. A lot of cameras will let you preview the result on your LCD screen and once you are happy with how it looks, you can take the shot.



12

## Don't fear the histogram

Available on many modern cameras, a histogram is a graphic representation of the tonal values in your shot and how they are distributed. If the graph is bunched at the far left, then your shot is very underexposed and you risk the loss of a lot of detail to shadow areas. If it is sliding off the right hand side, then it will be overexposed and detail will be lost in the highlight areas. A good exposure will have all the major tones in the middle of the histogram.





13

### Learn from others

Even the best pros had to pick up a camera for the first time. There are any number of photography forums that you can join and then get advice from other photographers. Why not join a local photography club? It's a great way to meet fellow like-minded photographers of varying skill levels. It's also a good way of getting motivated to get out and take more photos. You're also more likely to be able to chat with those who are well versed in using software to post-process their images.



14

### Further afield

Find a lovely location that you want to photograph and get yourself out there. Plan to arrive before dawn and get some amazing shots of the golden hour. Explore the area and experiment with composition and camera settings. In fact, just go crazy and enjoy the experience. That's the key to photography. It's there to be enjoyed. Don't worry about making mistakes; keep those shots and review them when you get home and figure out why they didn't work, it's all part of the process.



15

### Out of the shadows

While a bright summer day may seem like the perfect time to take photos, at midday every scene will appear flat and featureless with shadows sitting directly beneath every object. The perfect weather for outdoor photography is a bright day with a few white clouds to help diffuse the light and take the edge off the shadows. The perfect time is around sunrise and sunset with long shadows defining the contours of the land.



16

### Batteries

Your digital camera can't operate without power, so make sure you fully charge the battery before taking it out for the day. If you're going away for a holiday remember to take your battery charger and an adaptor for foreign mains sockets; and maybe consider investing in a spare battery or external battery pack in case you can't charge it for a while. There are also several devices available that can charge your battery using solar energy or from a hand cranked mini-generator.





17

## A sense of perspective

An average human is viewing the world from their eye level of about 5 feet. Simply changing that viewing angle can radically alter the shot. As a simple rule of thumb, shoot from low down, shoot from high up. Getting above or below your subject alters how you present your subject and how they fit in the world that's around them. You can play with wide angle shots or telephoto shots. You have an amazing amount of choice. Anything to break away from the eye level world that we are used to.



18

## Maximum exposure

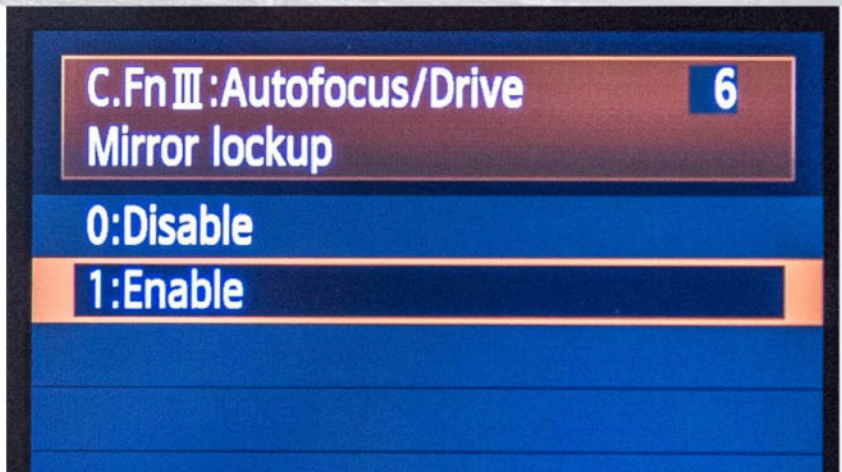
For some extra creative clout, consider using longer exposures in your landscape shots. Photographers often employ exposures that last seconds or even tens of seconds, to show clouds streaking across the sky rather than looking static and puffy. Scenes shot with a much longer exposure will turn the water to a misty, milky fog. It is safe to say that your tripod is the key to the success of these shots.



19

## Lock it up

For extra tripod stability, a lot of photographers hang their camera bags underneath the head of the tripod to act as a counterweight, helping to immobilise the tripod. In addition, even the movement of your camera's mirror flipping up and down with each shot can create vibrations that affect a shot's sharpness. If you set your camera for mirror lock-up, it will flip the mirror out of the way long before the shutter opens to take the shot, giving time for any vibrations to cease.



20

## Filter systems

Think about investing in some filters. A circular polariser is very useful. It can boost the contrast in blue skies and is very useful for reducing or even eliminating reflections in water; just be aware that polarisers work best when the sun is at 90° to you. If you are shooting a scene where there is a large difference in the tonal values between your land and a bright sky, an ND grad will help stop those skies from burning out.

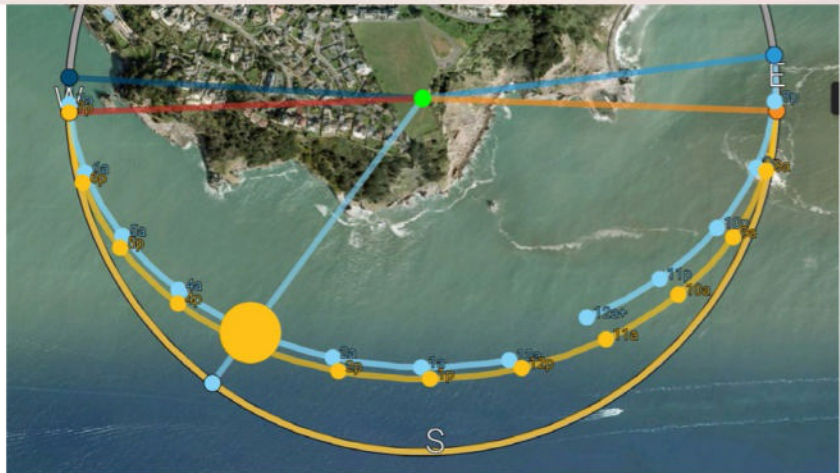




21

### There's an app for that

There are apps available that can tell you where the sun will be at any point on any given day. These apps can overlay information on a map of your given destination, showing where the sun will rise and fall and where it will track through the sky on whichever day you choose. This is great for working out what time is best for you to shoot in the location you are researching. Sunseeker for iOS and Sun Surveyor for Android are two great examples of these types of app.



22

### Take control

If you are relatively new to DSLR photography, you may still be using your camera's auto or semi-auto functions where it will decide on the best settings to use in either Shutter Priority or Aperture Priority. As long as it is in auto, it will keep making decisions for you and you will end up with shots that don't match your expectations. In manual mode you can decide on how the scene is exposed. Make the creative decisions; don't leave it to your camera.



23

### Stay sharp

Photographers will want their scene to be as sharp as possible from front to back. This is where depth of field comes into play. At large apertures such as f/2.8, the area of sharp focus in front and behind the point of focus will be relatively small. Using a much smaller aperture such as f/11 that 'zone' of sharp focus is much greater. As a rough guide, focus on a point about one third of the distance into your scene to give yourself the best chance of maximising the depth of field available.



24

### Persistence pays off

The great outdoors is unpredictable to say the least. The weather has a habit of doing exactly the opposite of what you want, when you least want it to. This can be a big turn off for many new to photography. Don't let below par weather put you off. Sometimes you have to be brave and get out there and be prepared to sit and wait. You could be rewarded by a break in the weather that reveals some sublime lighting that makes it all worthwhile.





# CREATIVE PROJECTS

It's time to unleash your creative side

**P**art of the enjoyment of photography is learning new skills and techniques that push your creativity even further. Step up from being a skilled technician and become a true photographer. Let us show you some interesting projects that we hope will inspire you to learn more and develop the skills to bring your visions to life. ■

**86** How to photograph women

**88** Night photography

**92** How to photograph men

**94** Shallow depth of field portraits

**96** Black and white photography

**98** Master metering outdoors

**100** Action and sports

**104** Natural light portraits

**106** Shallow depth of field and bokeh

**114** Master landscape photography

**116** Pet photography

**120** Shooting amazing sunsets

**122** The power of silhouettes

**126** How to capture macro images

**128** High speed photography

**132** Long exposure photography

**138** The stand-in safari

**144** Glossary







# HOW TO...

## Photograph Women



*We share some handy tips to bear in mind when shooting a female portrait*

As a photographer, if you are ever required to create portraits of women, there are a number of key factors that are worth bearing in mind that can make or break a successful outcome. If both you, as the photographer and your subject, as the model are not experienced professionals, then knowing how to pose for a photo is the thing that will ensure a successful outcome. All the best lighting, exposure and composition in the world will not save the image if your model looks awkward and unhappy. Here then are a few helpful hints to get your female portraits looking truly professional.

### **The curve**

It is considered flattering for a subject to angle their body away from the camera, rather than square on to it. It creates more visual curves and shapes, complementing the model. It certainly helps the subject to look less stiff and awkward and less like they're posing for a police mug-shot. Try and avoid any part of the body creating a straight line; straight lines will make your model look rigid and uncomfortable.

### **Relax**

Posing arms and hands can be a tricky one for an inexperienced model. Basically, arms and hands need to be kept relaxed. No fists, as this can create tension in the hands and arms. The arms themselves should be kept slightly away from the body to try and avoid the 'soldier at attention' stance, as well as keeping the pose relaxed and natural. Pushing hands forward towards the camera can make them appear larger in relation to the rest of the body, so watch out for that.

*"All the best lighting, exposure and composition in the world will not save the image if your model looks awkward and unhappy."*





### Framing

If the model's face is the subject of a close-up photo, they can place their hands around their face to frame it. The model can use one, or both, hands and rest them on the face, softly touching it. The hand can also be used as a means of propping up the face if they actually rest their head in their hands.



### The neck

The neck of your subject is a key body part that can affect the shot quite considerably. If they don't stretch out their neck slightly and draw their head forward, there are chances you will create unwanted shadows and unsightly creases in the neck. Be aware of asking your model to turn their necks in such a way that generate too many of these wrinkles from neck to shoulder.



### Look back

The over the shoulder look is another classic pose that is quite easy for an inexperienced model to achieve. These images are very flattering and can also look quite enigmatic and classy. They can engage the camera with eye contact, or look away in different directions. Just watch out for neck wrinkles again.



### Lying down

For a little more intimacy in your female portraits, you can ask the model to lie down. They can choose either to look directly at camera, for more confident looking photos, or perhaps look away or close their eyes for more wistful images. If you get them to lie with their body angling away from the camera, then that also has a flattering effect.



### Stand up

In a standing pose, legs should generally not be held straight. For a woman, the classic standing pose is to place more weight on the back leg, while bending the front leg and pointing the toe at the camera. Crossing one leg in front of the other can also create some visual lines that are flattering and pleasing to the eye.





# Night photography

Some tips for quality night shots



A good quality, stable tripod, is essential for long exposure photography.



**W**hether it's the lure of bright city lights, barren moorland bathed in moonlight or a tumbledown barn in the country under a starry sky, night-time photography is a big draw for many photographers. It can be challenging, it can be very frustrating and time-consuming, but once you get the bug for it and get those first few 'wow!' images under your belt, it's a hard habit to break. There are a lot of photographers who find the whole process very relaxing.

As you are normally dealing with much longer exposures than usual and having to carefully compose and focus your shots, it forces you to slow it all down and take a much more considered

approach. After all, if you set up a ten-minute exposure and the end result is disappointing, you could angrily pack up your gear, set off home, and miss out on a very rewarding aspect of photography. To make sure you get the most out of your photos, here are a few tips that should see you well on your way to capturing amazing night shots.

## Use a tripod

This may sound a bit obvious, but if you want to take photographs where exposure times can sometimes be in the tens of minutes, you're going to need something sturdy to put your camera on. You can of course set your camera to its highest ISO setting, open the aperture as wide as it will



go and shoot handheld, but to really do the image justice you're going to need a solid tripod. One thing is worth mentioning; pay particular attention to the surface on which you're setting your tripod. Shooting at the water's edge on a beach is a good example. The tripod may be pushed firmly into the sand and your long exposure is under way. One larger-than-usual wave and the feet of your tripod are swamped. Not a big deal, but the water can soak into the sand, which becomes soft, and the tripod can start to list over to one side ruining the shot. An attempt higher up the shoreline away from the waves might be in order.

## Keep the ISO low

Because you have your tripod keeping things steady for the camera, you can use the lowest ISO setting your camera will allow. This is a big advantage from the point of view of image quality. High ISO settings create a lot of image noise, and can affect the sharpness of the shot, detracting from the overall quality of the image. Many modern cameras can produce fairly clean shots at high ISO, and it may well be that you can work in the 800-1000 ISO range if the situation demands it, but generally the lower the ISO setting, the better the result will be.

A lot of cameras also offer Long Exposure Noise Reduction (LENR). This works by taking a second exposure of just the sensor noise which is then used to subtract the noise from your original shot.

What this means is that if you take a five-minute exposure, it will then take another five-minute LENR exposure. For any exposure longer than a couple of minutes, the sensor may start to heat up and this introduces noise artefacts. This is what LENR is trying to remove. It's just a personal preference but many don't use LENR. Like a lot of recent DSLRs most cameras use a CMOS sensor which isn't as prone to overheating, and you could take ten-minute exposures without any noise issues. If you want to try very long night-time images like star trails, consider taking multiple exposures of 30 seconds each and stacking them in Photoshop. For example, 30 exposures of 30 seconds each is equivalent to one 15 minute exposure.

## Shoot raw

Shooting in raw mode is a method that allows you to extract the absolute last pixel of quality from your image and process it any number of creative ways non-destructively. You can happily alter white balance settings, cross-process, split raw and any number of effects without losing your original image. Like using low ISO, it's another way of keeping the image quality as high as possible.

## Lenses: zoom or prime?

When you're shooting at night there are any number of light sources, such as street lights, headlights, the moon, bright windows, neon

signs, all of which are capable of introducing unwanted lens-flare that can ruin an otherwise excellent shot. Lens flare is caused by unwanted light scattered by the optical elements inside your lens. Zoom lenses particularly suffer from flare as they contain many more optical elements. Your best chance of reducing lens flare is to use a prime lens. A prime is a lens that only has one set focal distance and therefore uses fewer internal optical elements. Whether you use a zoom or a prime, a lens hood is recommended for both. Also, wherever possible, use a lens with as wide a maximum aperture as possible, such as f/2.8. You may well be shooting at smaller apertures than this but the image in the viewfinder will be brighter with a faster lens, helping you to see and set up your composition.

## Bulb mode

With most current DSLRs the longest shutter speed you can use in normal operation is 30 seconds. However if you switch to Bulb mode ("B") on your camera, you can keep the shutter open for much longer periods. "Bulb" in this case is a reference to the old squeeze-bulb, pneumatically activated shutter release systems from the earliest days of photography. What you don't want to be doing though is standing there with your finger on the shutter release button for five minutes. Your finger is going to ache and you are going to move the camera and spoil the shot. Attaching a cable release instead is the answer.

A good quality lens, whether prime or zoom, is expensive, but it is expensive for a reason.



The cable release makes the process of shooting long exposures much easier.





This means you can activate the shutter and lock it open for as long as you need. These vary from the simplest 'press to activate' types to fully programmable interval timers that can take multiple shots with durations and intervals between shots set by the user.

### **Take test shots at high ISO**

Since most modern cameras offer very high ISO settings, it makes sense, before committing to a long exposure or a sequence of long exposures, to ramp up the ISO to the max, take a shot and have a look at the composition, framing and exposure. However if you've just done your test shot at 2000 ISO and it looks great, how does that translate to shooting the same scene but at a lower ISO setting to get the quality?

There is some maths involved but it's not





complicated, especially if you have your mobile phone with you.

### The mathematical bit

At 2000 ISO your camera meter tells you that for the aperture you have set, a shutter speed of five seconds gives you a good exposure. Now you need to know how that exposure will change when you dial your ISO down to 100. Divide your high ISO number by the target low ISO number (2000/100 = 20), take your answer (20) and multiply it by the high ISO exposure value five seconds - this gets you a final answer of 100 seconds (1.6 minutes). Still with us? If you prefer, there are apps for iOS and Android that can do the heavy lifting for you. A popular one called Expositor, has a nice user-interface that can quickly calculate

any combination of EV, ISO, F-stop and exposure time you care to dial in. It's great for quickly and accurately working out the arithmetic without the need to do the sums in your head.

### Earth, sky and water

Use this to your advantage. It may have been done to death, but a coastline shot taken with a long exposure reduces the sea to that wonderful misty blanket. If there are patches of clouds in the shot, they appear to streak across the sky when your exposures get up beyond 30 seconds or more. Of course, who can forget traffic trails? They are the staple of long exposure photography. The key word here is experimentation.

### Light painting

Seen in the photograph at the top of this page,

Expositor is a great app for helping you calculate those tricky exposure times.

this refers to the technique of illuminating parts of your scene with additional light sources other than those in the shot. Light painting has become very popular and ranges from simply using a flashlight to illuminate a dark foreground subject, to using all manner of light sources, such as strobes, sparklers, coloured LED lights and even steel wool set alight to create huge showers of sparks, all of which create bizarre and abstract "light art". It's worth looking into if you're thinking of taking night photography to a whole new place.

It's dark out there. Go take some photographs. What are you waiting for? ■



# HOW TO...

## Photograph Men



*Male portraits have their own special kind of language when it comes to posing and we have a number of key guides to pass on to you*

Since we have just discussed how to photograph women, it seems only right to pass on a few tips about how you can photograph men and produce great portraits in a few simple steps. The general rules for men are slightly different in approach than those of women. As with women, if your male subject is not an experienced model, then they are likely to turn to you for guidance and you can help them out by knowing some of the basics and hopefully give them some confidence in front of the camera to get your shots looking next-level awesome.

### Angles and lines

The first major difference to be aware of when photographing the fellas is that you actually want to be able to emphasise lines, angles and strong, rigid, shapes. Curves on men are not considered flattering. You are looking for masculine poses that work to produce strong form in the jaw, back, arms and legs.

### Square shoulders

You really want your male subjects to stand tall and proud in their photos. Squaring the shoulders and pushing their frame up a little works really well, also ask them to lean in slightly towards the camera. Just make sure they keep their frame tight and don't slump their ribcage down onto their belly. In some cases, breathing in slowly and holding a lungful of air helps to keep the core nice and tight. Unlike women, there is no real issue with men standing square to the camera with a strong pose. As with everything though, experiment with the poses in which both you and your subject are keen.

### Double chin

For men, the double chin can be a very unflattering look. When posing your subject, make sure they push their chin and jaw forward and lift the head slightly. As with the ladies, it helps avoid neck wrinkles. A head down pose with eyes looking up at camera will result in that extra chin if they bend their neck and collapse their jaw too far onto their chest.

### Legs

With legs, the rules are generally the same as with women. Try to avoid very straight legs. The leg furthest from camera is usually the one you would ask the model to put their weight on. The leg closest to camera can be more relaxed and he can bend it more. In the fashion industry, that rule for men and women is often broken with the models standing in almost superhero-type poses. For the rest of us mere mortals though, looking relaxed is the way to go.

*"The general rules for men are slightly different in approach than those of women."*





### At ease

For a lot of inexperienced models, knowing what to do with their hands is a skill best learned early on. For men, the correct placement of hands can show a sense of confidence. For example, asking a man to fold his arms over his chest or put his hands in his pockets is quite a natural thing. It looks great for men in a photo and will usually help relax your subject. The hands themselves need to be watched; stiff hands betray a nervous model. The odd prop, such as a jacket thrown over the shoulder, is also a useful device for more natural posing.



### The lean

For subjects that are a bit awkward and finding it hard to relax, getting them to lean on something can often help. A railing, wall, or counter top in a bar, it doesn't matter. Get them to lean on it and one leg will naturally want to bend a bit, or actually cross one leg over the other. The other hand can go in a pocket if needed, or rest over the top of the arm that's leaning on the available surface.

### Sit down

Sitting is another natural and relaxing pose for a man. Hands can rest in the lap if needed and you can cross their legs. If they are sitting on stairs, they can draw their legs up to a level where they can lean forward and place one or both arms on the tops of their legs. Hands can be folded together or one hand can rest in the lap. They can also lean in towards the camera. It looks a confident pose and is often seen in many lifestyle photos and clothing/fashion images.




### One up, one down

In addition to the sitting poses already mentioned, men can also do the one leg up and one leg down pose. Depending on how far up the bent leg is drawn, an arm can be draped on top of it. If you also have a man standing and leaning his back onto a wall, one leg can be drawn up into a bent position with his foot flat against the wall.







# Shallow depth of field portraits

Shooting with large apertures can make for some very striking portraits

Shallow depth of field portraits, when done well, are stunning to look at. The main focus of the subject is sharp, but everything else falls away into a lovely soft background that has no annoying distractions. When shooting a portrait with the idea of using a very shallow depth of field, there are a couple of things you need to bear in mind to make sure you achieve the desired end result.

The correct lens for the job is your first consideration. You will need to use a lens that has a maximum aperture anywhere in the range of  $f/2.8$  up to  $f/1.2$ . Fixed focal length prime lenses are much prized for portrait work as they are generally the





The Canon EF50mm f/1.4 lens. A very affordable prime lens that takes surprisingly crisp images and has the benefit of that very wide maximum aperture.

“It is generally held that a lens with a focal distance somewhere in the region of 50mm to 135mm is considered a good ‘portrait’ lens.”

ones that offer the much wider apertures and excellent image quality. It is these large apertures that deliver the soft effect you are after. Also, it is generally held that a lens with a focal distance somewhere in the region of 50mm to 135mm is considered a good ‘portrait’ lens. This is chiefly because lenses with shorter focal lengths, around the 16mm to 35mm range, have a tendency to distort facial features in a very unflattering way (imagine how you look when you see your reflection in the back of a spoon).

The immediate temptation may be to open your lens up to its maximum aperture and snap away. In most cases that is fine, as long as you are keeping the eyes of your subject in focus.

The downside is the possibility that the eyes may be the only thing in focus on your portrait. Also, if your subject is not completely square on to you as you take the shot, only one eye may be in focus. Now, if that is your intent, no problem. However, if you need more of the face and head in focus you need to reduce your aperture size to something in the order of f/2.8 - f/5.6. Take care to remember your background. If you still want it as out of focus as possible, f/5.6 may be too small an aperture and your background too sharp.

At this point you could move yourself and your subject further away from any background distractions, or you could even open up your aperture again but stand further away from your subject. Distance also affects depth of field so it becomes a bit of a balancing act to determine exactly the best mix of camera and lens settings, composition subject placement and background.

A good rule of thumb is always take time to stop and review your shots on your camera’s LCD screen. Zoom in close to the pertinent parts of the image to see if you are capturing the image you want.

With a little time and practice, you’ll be shooting like the pros. ■

The portrait on the left was taken using a 50mm prime lens with a max aperture of f/1.4. The shots were taken with the aperture at its maximum of f/1.4 using a flash with a beauty dish attached, which was placed directly above the camera pointing down at about a 30° angle. The depth of field is very narrow, as you’ll see by the fact the tip of the nose and the ears are blurred, but the focus is kept on the eyes.



**TOP TIP!**  
Never underestimate the power of cropping your portraits. A shot can be transformed if you crop in tight to make the image more personal. Also, converting to black and white and increasing the contrast adds drama, as we have done with the image shown opposite.



“Whichever way you look at it, colour distracts you from the heart of what should make a great photo...”

# Black and white photography

See the world in black and white as we introduce you to this timeless medium

**A**t the dawn of photography as we know it, when everything was fresh and new, your only choice back then was to shoot in black and white. Exposing images onto glass or metal plates gave way to the film and chemical process. It wasn't until 1936 that Kodak gave the world colour photography. However, black and white didn't die off like the black and white TV, in fact it flourished.

Whichever way you look at it, colour distracts you from the heart of what should make a great photo. Things like texture, composition, form, lighting and good old storytelling can be swamped and made inconsequential by colour. It's not to say colour is an invalid medium. Black and white photography can be seen as your interpretation of what is real, whereas colour can feel more like a record of reality. That may all sound a bit mystical, but in essence, many photographers would argue that black and white is probably the purest form of photography.

We could fill an entire book on its own with the intricacies of the black and white art, but there are some simple tips that can help you on your way to discovering why black and white photography is such a prized, creative, medium.

You would imagine that the starting point would be to grab your camera, set its functions to black and white mode and start shooting. Many photographers always shoot in colour, just so you maintain as much tonal variation in your Raw image as possible. It just gives you more

data to play with when it comes to the conversion process. A key word in the last sentence was 'Raw'. Always shoot in Raw format. You want to record as much scene data as you can without your camera trying to process the image for you.

Although it might sound odd, you need to develop the ability to 'see' in black and white. A great visual aid is to shoot Raw, as we've said, but also set your camera's picture style to black and white. It displays a black and image on your LCD screen, but all the colour data is still there.

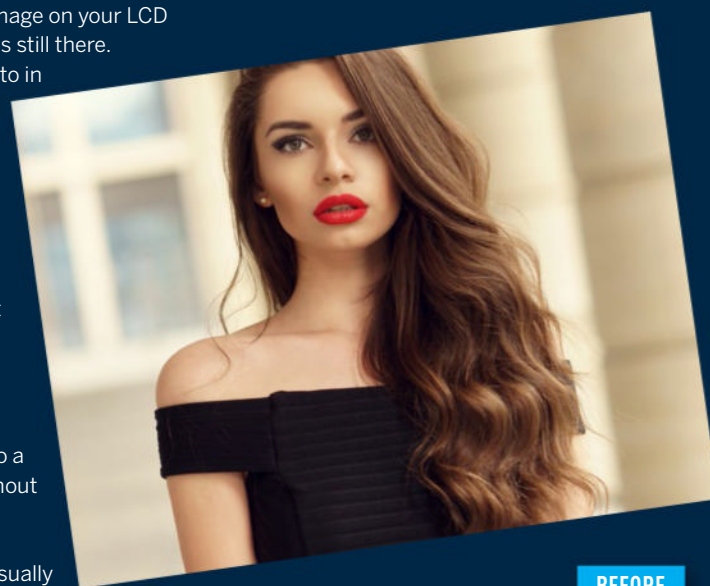
In its most basic form, a photo in black and white is made up of several components. Texture is a key ingredient, black and white loves texture. Harsh midday sun knocks everything flat, but the light glancing across a scene at sunrise or sunset makes texture 'pop' out of the image.

Tonal contrast is another important consideration. A flat image with very little contrast will not necessarily convert into a great black and white shot without some serious post-processing, although in some cases, low contrast images can be very visually appealing if done well.

Shape defines how an object looks in its simplest form, as an outline or silhouette

only. Images based on shape alone can be graphically intense. Form in a shot, shows how something has depth and dimension. How an object is lit and casts shadows within its environment is the key to showing its form.

As mentioned before, we could go on, but hopefully, this is a useful introduction to the black and white world. ■





AFTER

This male portrait was shot with a 24-105mm f/4 lens. It was shot in colour and in Raw format, but was converted to black and white using a basic mono conversion technique. It was sharpened and some contrast added to boost the texture of the model's skin.

AFTER

This image was shot with a 50mm f/1.8 lens with a wide aperture to make sure the background wasn't a distraction. This black and white conversion was done with heavy contrast. No sharpening was applied to keep the skin soft and grain added for a 60's retro feel.



# Camera skills

# Master metering outdoors

*Be in control of your exposure with our handy guide*

For many, stepping out from behind their cameraphone and shooting with a DSLR, can be a big deal. Make no mistake, cameraphones are amazing, for what they are, but for us, there is nothing to match working with a DSLR and getting immersed in the process of attaining the best exposure of your subject. If you love to shoot landscapes, but often find that the exposures never seem to give the

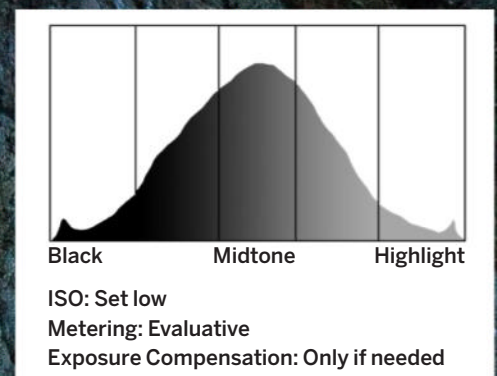
results you expect, don't worry. Landscapes can be a bit tricky to meter correctly and you will often fall prey to the behaviour of the camera's metering system in different lighting conditions. It is very likely that the scene you are photographing will have more tonal range than your camera can capture and therefore fall outside an average metered setting. Here are a few pointers that can help you with various lighting scenarios.

## **Bright, full range**

On a bright sunny day, you may find that the image captured is fairly accurate in its representation of the scene, since there is a full spread of tones from lightest to darkest.

The histogram should show an even spread throughout the midtone range with perhaps some small spikes at either end.

Depending on your creative approach, you may want to dial in a small amount of positive, or negative, exposure compensation.

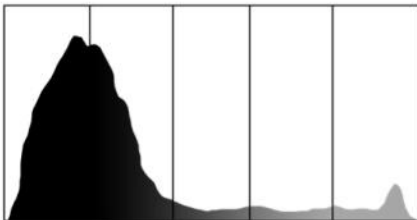






## Dark scene

A darker, low-key scene, such as an evening shot near dusk, will be metered in a different way. When a camera's meter averages a scene, it assumes that the average of all the tones will be equivalent to an 18% grey reflectance value. Since a darker scene, by its very nature, is darker than that, the camera will overexpose the scene to achieve that 18% value. You will need to dial in about -1 or -2 stops of negative exposure compensation to get the exposure back down to an acceptable level. Your histogram should show a greater distribution of tones in the shadow areas on the left of the histogram.



Black Midtone Highlight

ISO: Set low

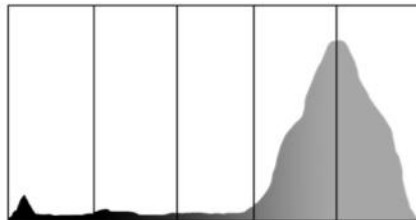
Metering: Evaluative

Exposure Compensation: -1 or -2 stops



## High-key scene

A high-key scene is bright with very little in terms of shadow areas. Winter scenes or bright beach environments are good examples of this. Whereas a dark scene is metered for 18% and overexposed, it stands to reason that very bright scenes will be underexposed, since the camera's meter is now trying to darken the overly bright scene to get it down to 18% reflectance. This can make images look dark and muddy. In this case, you will need to dial in anywhere between 1-3 stops of positive exposure compensation, in order to return the image to full brightness again with a high distribution of tones.



Black Midtone Highlight

ISO: Set low

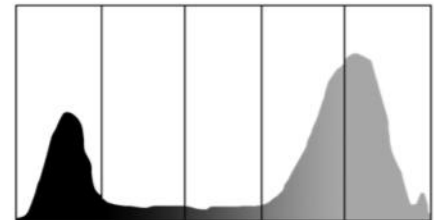
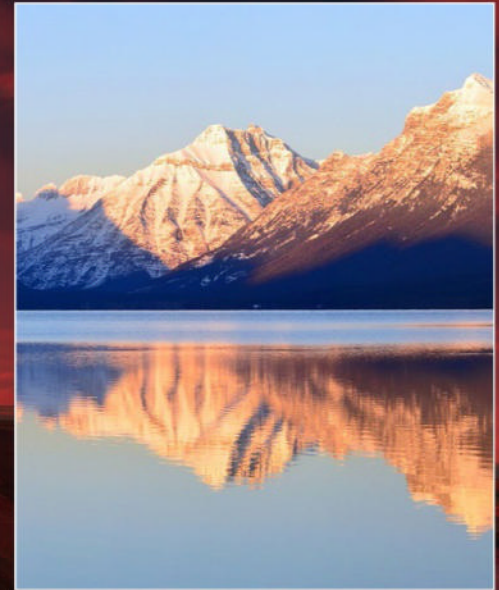
Metering: Evaluative

Exposure Compensation: up to +3 stops



## High contrast

Scenes of high contrast, such as landscape images consisting of bright skies with dark foregrounds, can be a little more confusing to the metering system on your camera. Depending on how much the highlights dominate the scene, it may underexpose. If there are far more shadows in the scene, it may overexpose. You can choose to take a test shot and simply adjust your exposure compensation accordingly, or you can use the spot meter and place it on a middle tone area of the scene to get a more accurate metering of that part of the shot.



Black Midtone Highlight

ISO: Set low

Metering: Spot

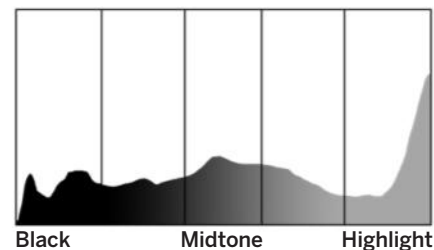
Exposure Compensation: Check in situ



## Backlit, low contrast

Low contrast scenes will probably require you to use spot metering, as you did with the high contrast scene.

You can place the spot meter on an area away from the brightest, or darkest, areas of the shot and meter from that. Be aware that it may produce extremes of metered adjustment. Again, depending on personal preference, you might want to add positive, or negative, exposure compensation, if you feel it is required.



Black Midtone Highlight

ISO: Set low

Metering: Spot

Exposure Compensation: Check in situ



# Action and sports

How to capture movement and excitement



**P**hotographing sports and action scenes is a challenging but rewarding part of the hobby. At almost any sporting event, from the company five-a-side team on a Saturday fixture, to international events like the Olympics or the World Cup, you'll find photographers on the sidelines capturing the action. Professional sports photographers make a good living from it, and use specialised equipment such as advanced high-speed cameras and ultra-fast telephoto lenses costing thousands of pounds, but even the average hobby photographer with basic equipment can capture good sports and action shots with a bit of patience and effort.

There are no hard-and-fast rules for sports photography, mainly because there are so many different types of sporting event. A technique that might work well for horse racing would be completely inappropriate for beach volleyball, for example. You have to learn to tailor your technique and the way you use your gear to the event you're trying to photograph. Many professional sports photographers will specialise in one particular type of event, becoming experts in one or two techniques that work well and can guarantee them the reliably good results they need.

Although there are as many techniques for sports photography as there are types of sport, there are some general tips that work well in most situations.



“Many professional sports shooters will specialise in one particular type of event, becoming experts in one or two techniques that work well.”

For up-close water-based action, a waterproof camera or camera housing is essential, but will yield results that cannot be captured any other way. The Nikon WP-N1, for example, is built for the Nikon 1 J series and provides ample protection for underwater shooting.





## Get close to the action

There's a reason why ringside or front-row seats are more expensive. If you want to see the excitement and passion of a close-fought contest, it's a lot harder to do that from 200 yards away over the heads of a crowd. Get as close as you can without putting yourself in danger or interfering with the event you're trying to photograph. For events where you can't get physically close, use a telephoto lens to zoom in.

## Capture the moment

Although most people seem to think that a fast continuous shooting speed is the key to action photography, in fact the professionals will tell you that good timing and fast reactions are much more important. It also helps enormously if you have an understanding of the sport you're photographing so that you can anticipate when the best moments are going to come along. A camera with a good fast autofocus system and quick shutter response is much better for action photography than one that can shoot at 10 frames a second. Being in the right place is also important. You're going to get more drama at the finish line of a race than halfway down the track.

## Control shutter speed

One of the keys to good action photography is appropriate use of shutter speed. Although



Sportsmen and women don't like to be distracted when competing. Using a long telephoto lens like this AF-S Nikkor 600mm f/4E will keep you a safe distance from your subject, who may be at a critical point in their sport.







the traditional approach to sports and action photography is to use the fastest shutter speed available, and the sports mode on your camera will try to do this automatically, it's not always the best approach. Using a very fast shutter speed freezes the action, which can rob the picture of any sense of movement. To capture fast-moving subjects, try using a slightly slower shutter speed and panning to follow the action. If you do it right you'll have your subject nice and sharp against a movement-blurred



For shooters with Nikon APS-C sensor cameras that use the DX range of lenses, you could consider the AF-S DX Nikkor 55-300mm f/4.5-5.6G ED VR image stabilised telephoto zoom lens. It is compact and lightweight and its focal length range is equivalent to 110-450mm in 35mm terms.

background. If you are using a normal telephoto or zoom lens, i.e. not one that cost £3,000, then the restricted aperture at longer focal lengths will limit your choice of shutter speeds; don't forget you can get faster speeds at higher ISO settings, although beware of image noise above about 1600 ISO.

### Compose your shot

Just because you're documenting a sporting event, it doesn't mean your shots can't be well-composed.

Try to find a viewpoint that provides an interesting angle, or at least an appealing backdrop to your shot. If you can compose your shot so that it both looks good and provides an accurate impression of the event, so much the better.

One of the most useful compositional tips for action photography is the concept of implied movement; always try to have your subject moving into the frame rather than out of it. ■





**“There are a few basics to be aware of, but it’s nothing that a photographer of any skill level can’t handle.”**

## Natural light portraits

# HOW IT'S DONE

Taking photos of landscapes is one thing, but when you decide it's time to get involved in portrait photography, it can seem quite a daunting prospect. You might imagine it requires armfuls of expensive equipment and lots of lighting gear. Don't worry; there are a few simple things that you can try to see if portrait work is for you. Indoor natural light is certainly a great and easy way to dip your toe into the portrait world. There are a few basics to be aware of, but it's nothing that a photographer of any skill level can't handle.



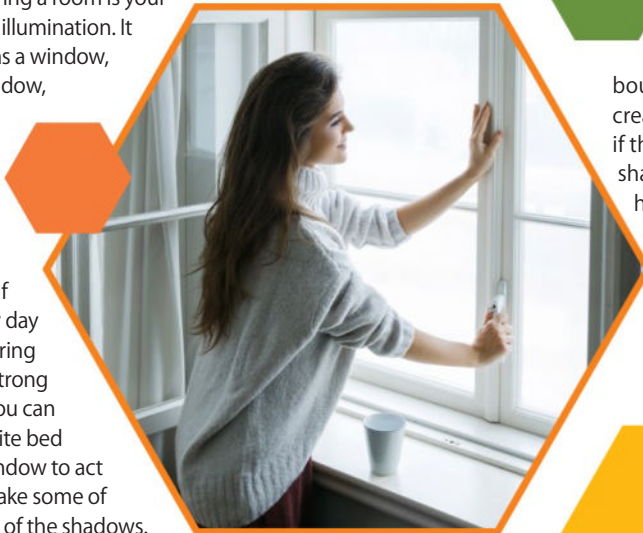
## The camera

For most applications, the camera can be anything from a simple point and shoot up to a pro level DSLR. One consideration, that elevates portrait shots from the ordinary, is lens choice. A lens that has a large maximum aperture will give you two major benefits: Firstly, since you are in an indoor, natural light environment, there may not be as much light as you would wish and your shutter speeds may be quite low. You can boost the ISO of course, but you want to retain as much quality in your shot as you can. A wider aperture allows more light to enter the camera, giving you the chance to use higher shutter speeds and therefore reduce the risk of camera shake. The second benefit is more of an aesthetic one. Large apertures also have very shallow depth of field. This fact may be beneficial, when shooting a portrait, if you have a subject with a distracting background. Once focused on your subject, the background will be blurry and less intrusive.



## The light

Natural light entering a room is your primary source of illumination. It can be as simple as a window, roof light, bay window, conservatory, or doorway. If the light source is near a plain wall then, if you need it, you instantly have a backdrop. If it is a harsh, sunny day and the light entering the room is very strong and directional, you can always hang a white bed sheet over the window to act as a diffuser and take some of the harshness out of the shadows.



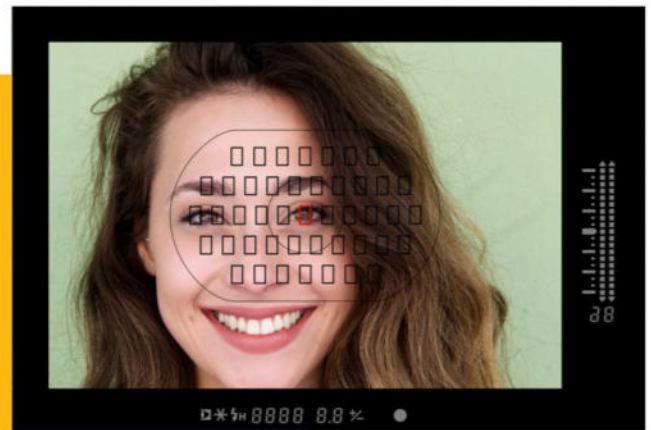
## Bounce

A large piece of white card is a very cheap method of creating a reflector. You can use defectors to bounce light onto your subject and create some extra fill light that can, if the light is too harsh, illuminate shadows. If you also happen to have some lamps in the room, you can employ them as simple secondary light sources. A bed sheet hung in front of them can soften their output if required.



## Settings

Longer focal lengths are more flattering for portraits. Using a wide-angle lens will distort their proportions and make them look like they are reflected in the back of a spoon. Try focal lengths around 50mm-100mm. It is best to begin by setting the camera to your lens' widest aperture. Focusing is key to a good portrait. Always make sure you have the eyes in sharp focus. If your subject is turned to you at an angle, make sure the closest eye is the one in focus. Aperture priority works well in this instance, although you can go to manual mode if you are feeling more confident.



## The shot

Placing your subject relative to the light source is a creative decision, but start by trying shots where the subject is square on to the light. This will provide even illumination that keeps harsh shadows away. Avoid the light source dropping below their head level. Lighting from below is best used only in horror films! If you pose your subject at an angle to the light, you will start to create shadows that fall across the face away from the light source. This can help make features more three-dimensional. If the shadows are too dark, get some extra light in there by using a white sheet, or card, to bounce light into the dark parts.



# Shallow depth of field and bokeh

Making blur beautiful

If you have ever shot a subject with a lens that has a very wide maximum aperture, you have no doubt noticed how the out-of-focus background has an aesthetic quality to it. Bright highlights are transformed into 'orbs' of light by this blurring effect. This blurred out quality is referred to as Bokeh, usually pronounced "boh-ka", but the jury seems to be out on a final definitive pronunciation. The bright, soft, orbs of light are a by-product of the out-of-focus light being shaped by the aperture blades within your lens. If your lens has an 8 blade aperture

configuration, then your bokeh shapes will be octagonal as well, although the shape will become less well defined as the aperture opens up to its maximum. It has been known for some photographers to choose a lens specifically for the shape the aperture blades make at different aperture settings. They will often opt for lenses where the diaphragm blades are curved to ensure the bokeh is a purely circular as possible. It is probably less well known that you can be in full control of your bokeh by following some simple techniques.

"It has been known for some photographers to choose a lens specifically for the shape the aperture blades make at different aperture settings."



## Bring out the bokeh

There are several techniques applicable to how you can create and improve the quality of your bokeh. First and foremost is the shallow depth of field required to generate it in the first place. Lens choices, as we've mentioned are key a factor as well as the techniques you use to actually create your own custom shapes and how they relate to your foreground subject matter. Bearing in mind that the out of focus area of your shot is the only place where bokeh can be generated, a wide maximum aperture increases the amount of your image that is out of focus and creates greater bokeh. Shorter focal lengths found on wide angle lenses for instance,

increase depth of field. Longer focal lengths develop shallower depth of field. If you have a lens with a very wide maximum aperture of f/1.4 for instance, you may be tempted to just open it up to f/1.4. Watch out though, as sometimes you can overdo the blur to a point where you cannot make out any detail in the background whatsoever. Allow a small amount of detail to show through. Remember that the closer both you and your subject are to the background, the less blur you will be able to achieve. Keeping a distance between subject and background is another way to control how much bokeh is present.







*f*/2.0 1/25  
☉ -1  
👤 ISO 100

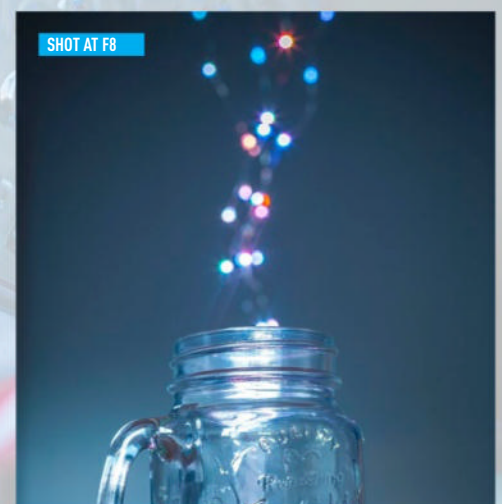
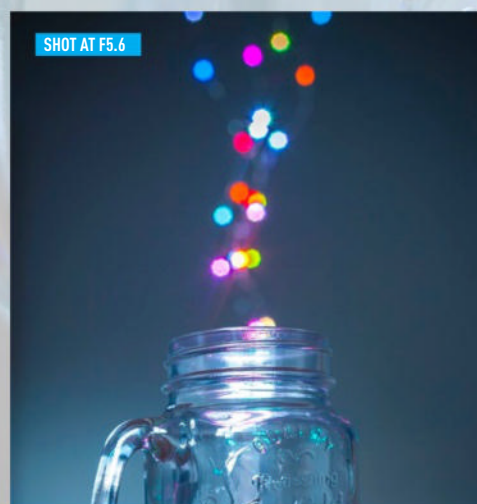






## Try interactions

Why not try using bokeh to your creative advantage. Normally, the background is just that, something that happens to be sitting behind your subject. However, it can be great fun to somehow get your foreground subject and the background bokeh to interact in interesting ways, rather than just being some random blurry background. Setting something up at home so you can control exactly how it all comes together is a great little desktop project worth having a go at. A darkened room, some cheap LED coloured lights and your foreground subject and you are ready to go. We have a camera on a tripod with a 50mm f/1.4 lens. Our subject is a glass container that the bokeh will appear to come out of. We have some light to illuminate our foreground subject, but the LED lights, strung from a light stand further back in the composition, will provide their own glow when switched on in the darkened room. The lights need to be strung in such a way that when you view them through the viewfinder of your camera, the framing shows them suspended in a tall but narrow group above the glass. Pre-focus your camera on the glass manually, since everything is static, you can safely leave it set where it is and nothing will change. The settings we started with were an aperture of f/1.4, shutter speed 1/25s, ISO100 and we were using -0.67 to -1 exposure compensation. We did a series of examples at f/1.4, f/2.8, f/4, f/5.6 and f/8. For our particular setup, with the lights about 1m behind the main subject, an aperture of f/2 delivered the most favourable results. At apertures above f/2.8, the wires that held the led lights together started to become visible.





## Custom bokeh

The aperture blades within your camera lens are responsible for creating the shapes of the bokeh you normally see in your shots. We can however, have our own say on what shape they will be. There is a very simple way to shape the bokeh to suit your creative requirements. You aren't limited to the the shape defined by your lens. In this guide, we will show you how you can quite literally customise the shape of the bokeh recorded by your camera's sensor. It's nothing more complicated than a piece of card with a hole cut in it! You will need: your camera and a prime lens with a wide maximum aperture (f/2.8 or wider is recommended to give the best results); an old UV filter to fit your lens, which helps keep the surface of your prime lens clear from dirt or fingerprints; some reasonably stiff black card; a pencil and ruler; a maths compass for drawing the circle to fit your lens; and a craft knife. Then, some led lights if you are going to be shooting indoors; if you are shooting outdoors, you'll need to find somewhere at dusk that has lots of external lights: maybe car headlights passing by on the road, even an amusement arcade or maybe a visiting fair.

First you need to inscribe a circle on your black card to match the diameter of your UV filter/lens [1]. It needs to be the same width as the inner edge of your UV filter/lens, so it will cover it and not have any gaps. Because we were using an old UV filter on the lens, the card can be cut to fit this.

You can simply trace around the circumference of the filter with a pencil onto the card. Alternatively you can measure the width of your lens and use a compass to describe a circle which you can then cut out with scissors or a craft knife.

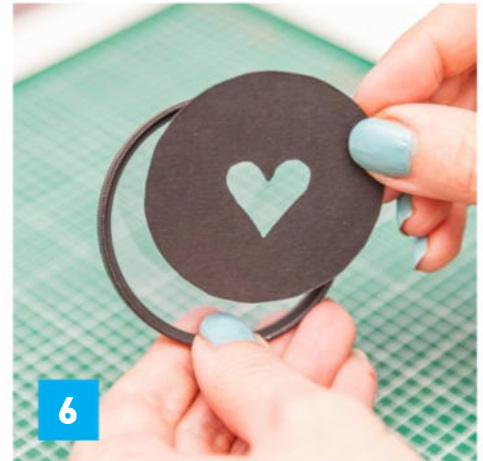
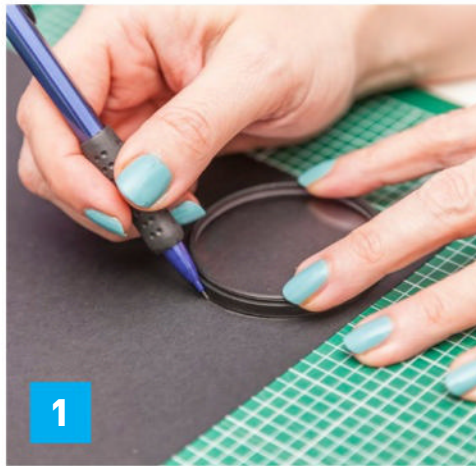
Now, in the centre of the circle, draw a shape that you want your bokeh to resemble [2]. Strong simple shapes are best to start with. Make the shape about 1/3 to 1/4 the width of the circle. Here, we have used a love-heart.

Carefully cut out your shape from the circle with a sharp craft knife [3]. Then you can cut out the main body of the circle [4].

You should be left with a card circle with your custom shape cut out from the centre [5]. Test fit the card circle in your UV filter or lens [6]. Trim if necessary but try to avoid any large gaps that might let light through.

Using small pieces of masking tape or tacky putty, secure your card circle in place on the filter. If securing directly to your lens, take care not to get the front element dirty [7].

Your new custom bokeh filter is in place. Just fit it to your lens and camera and you are ready to start shooting with your very own custom bokeh [8].











## Shooting your custom bokeh

It is best to start without your bokeh filter on your lens. Compose your shot and take a test image to confirm that the background is as out-of-focus as it needs to be. Be aware that adding your custom bokeh filter is going to act like a second aperture and will have an impact on the depth of field in the shot by increasing it by a small amount. The smaller you make the custom shape, the more depth of field you will have. A tripod may be a good idea if your shutter speeds are slow. Additional illumination on your subject with a flash is fine as long as it doesn't overpower your background lights.

In our example here, the test shot without the

bokeh filter on gave us settings of aperture  $f/1.4$ , shutter speed  $1/50$ s and ISO 100. It was at the lens's closest focusing distance to the subject (about 0.5m) and the lights were suspended 1m away. A quick look at the results showed the lights were nicely blurred.



Now it's time to attach your custom bokeh filter. You will probably notice a couple of things. First, your exposure settings will have changed and you may notice some dark vignetting around the perimeter of your shot. Both are by-products of adding what is essentially a second aperture to your camera. It is shaping the light certainly, but it will also reduce the amount of light getting to your

camera's sensor, requiring a longer exposure time or an increase in ISO sensitivity to compensate. The vignetting, depending on how strong it is, will be something you can correct at the processing stage or just simply crop it out. You will also see that your circular orbs of light have now become hearts, or whatever shape you chose.

Now, our settings are aperture  $f/1.4$ , shutter speed  $1/8$ s and ISO 100. As we are shooting what is basically a still life and we're using a tripod, those settings aren't an issue. Now you can take the new shot, et voila! The bokeh has been reshaped and is now yours to control. ■





$f/1.4$	1/30
	-0.67
	ISO 100



# Camera skills

# Master landscape photography

*Some great advice on capturing the perfect landscape shot*

Landscape photography is probably one of the most accessible forms of photography, since landscapes are all around you. They will happily sit still, allowing you get the best shot available during the varying hours of both daylight and night-time,

and they present an ever-changing subject. However, despite its accessibility, capturing those 'wow!' shots can be another matter. It takes a bit of dedication and perseverance to get the perfect landscape, so here are a few pointers to set you on your way.

*"It takes a bit of dedication and perseverance to get the perfect landscape, so here are a few pointers to set you on your way."*



## Light matters

The vast majority of photographers will agree that the best time to shoot is during the first 45 minutes before sunrise and about 5 - 10 minutes after it has risen. Before the sun rises, the land has very low contrast and the light is soft and almost mystical in its feel. As the sun gets over the horizon, it casts very long shadows that reveal detail and texture, giving a better three-dimensional quality to your photos. The last 20 minutes before the sun has set are also great, particularly for fiery red sunsets (if there is a lot of dust in the atmosphere). Then, in the first 45 minutes after the sun has set, the contrast drops again giving you deep shadows.







## A sense of scale

Sometimes it is difficult, when not viewed in person, to appreciate how vast a scene really is. To overcome this, try and include a foreground element that gives the scene a sense of scale. A boat on a lake is a good example, or an abandoned barn on some wild vista. Even people are useful props to add scale. A mountainous image is suddenly more powerful if you have a person standing in the near foreground, taking in the view and giving you that sense of how huge the environment is. It is not uncommon to try and keep the figure as a silhouette; therefore making them stand out from their surroundings.



## Longer exposures

Both pre-dawn and for about an hour after sunset, you can usefully start to employ longer exposures to get any moving objects, such as water or clouds, to take on an ethereal quality. This means even without ND filters, you can drive up exposure times and still reduce water to mist and clouds to mere wisps.



## Pause to reflect

Although it is often said that you should use the rule of thirds when composing your images, there is one time when you can break that rule. A landscape that incorporates a flat body of water is an ideal candidate for placing the horizon dead centre in the frame and using a long enough exposure to totally flatten the water, creating a glassy surface that flawlessly reflects the landscape above. A mountain range seems all the more impressive when it has its doppelgänger caught in the watery reflection.



## The weather

Try not to be a fair weather photographer. Clear blue skies do not necessarily make for the best landscape shots. Many photographers love clouds and how light plays upon them. Sometimes, the most dramatic cloud formations can be found just before, or after, a storm. Okay, it can result in you being caught in a deluge, but if you are prepared to get wet (needless to say, keep your kit dry), then you are likely to get some amazing views.



## Move it

This is something we've mentioned before and it's still a very valid point. Don't always presume to take photos of your landscapes from human eye level. Seek out new points of view and camera angles.

Dropping your camera to the floor is easy enough and a forest scene can be all the more imposing when viewed from a low angle. Shooting from high angles can also add that lovely creative difference to your images.





# Pet photography

Time to get our furry friends ready for their close up



**W**e love our pets. In fact for most people they are more than mere pets and become more like family members, the recipients of love, affection and lavish attention. It is likely then that their owners, at some point, are going to want photographs of their furry friends (or scaly, feathery or otherwise). We have a dog, and the number of photos that include him specifically outnumber those of all other family members put together. However, pet photography presents its own special problems. Animals, as we all know, can be unpredictable, lazy, aggressive, hyperactive and downright cute. If you're thinking of trying pet photography, here are a few pointers to get you started.

## Pet personality profile

You don't need to sit the pet in question on a psychiatrist's couch and ask it to tell you about its mother, but before you start snapping away, find out about your subject's personality and habits. Where does it snooze if the sun is out? What is its favourite toy? Is it lazy, sleepy, or does it like to perch on a garden fence or hide

in the grass? Take time to chat with the owner and observe your subject to gain some insight. It's also worth spending a little time getting to know the animal yourself. Cats, dogs, horses, they all have personality, and you need to ensure they are comfortable being around you, and you around them. Scaring a pet right at the outset is not going to make for a particularly happy or productive photo shoot.

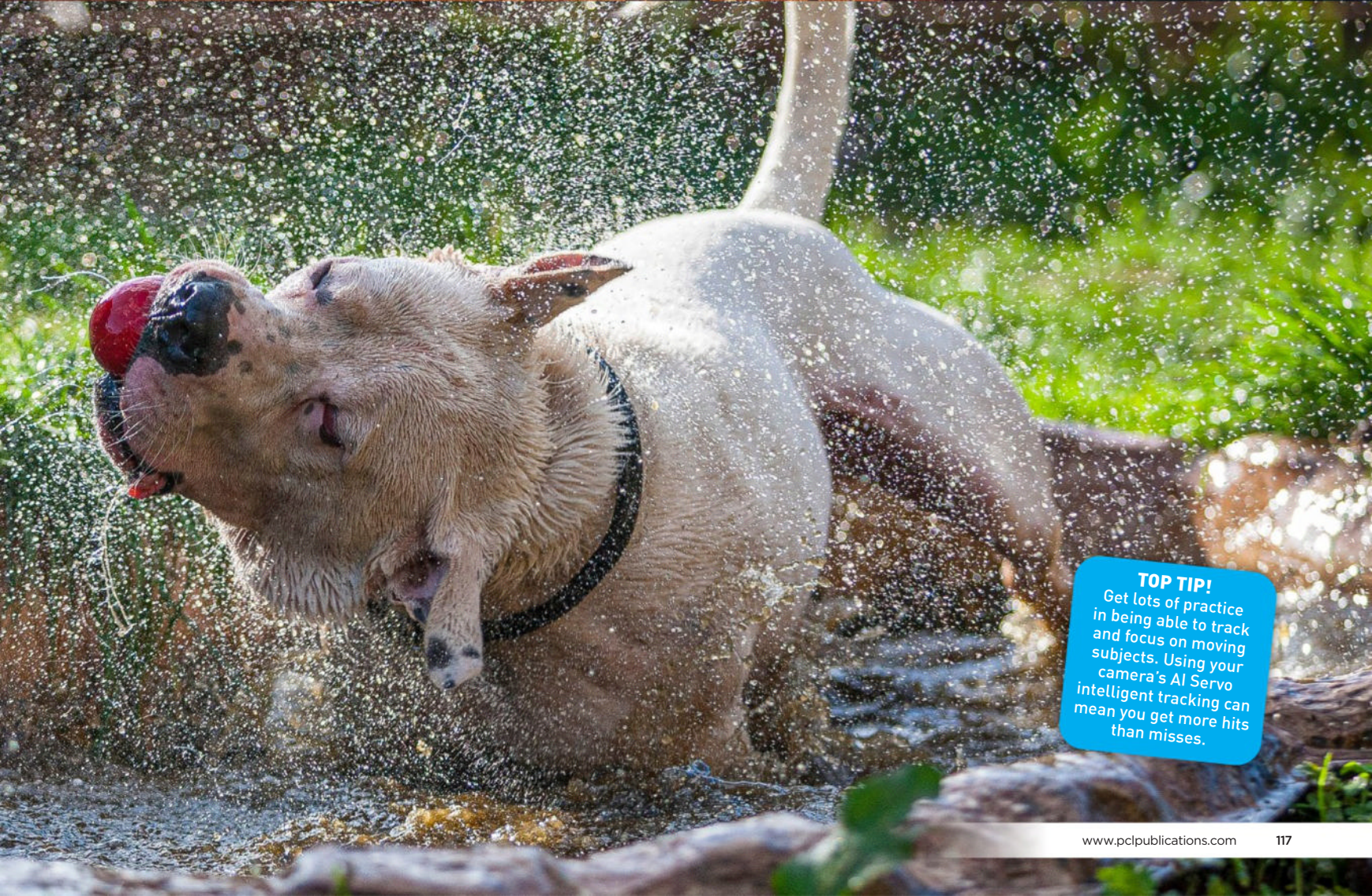
## Close quarters

Think about getting in close to your subject. If the pet is comfortable with you, and if it isn't too skittish, fill the frame with the pet's face. Get the eyes nice and sharp. Just like humans, this is a natural point of focus, although focusing on the snout of a dog or cat can also make for an interesting image in its own right. A good portrait focuses on the subject and not the background. Yes, there are times when shooting wide can create a great environmental portrait, but make sure you get a good selection of close-ups. A macro lens is perfect for capturing details of the pet, and shooting with a wide aperture keeps any background distractions out of focus.






“Get the eyes nice and sharp. Just like humans, this is a natural point of focus.”



**TOP TIP!**  
Get lots of practice in being able to track and focus on moving subjects. Using your camera's AI Servo intelligent tracking can mean you get more hits than misses.

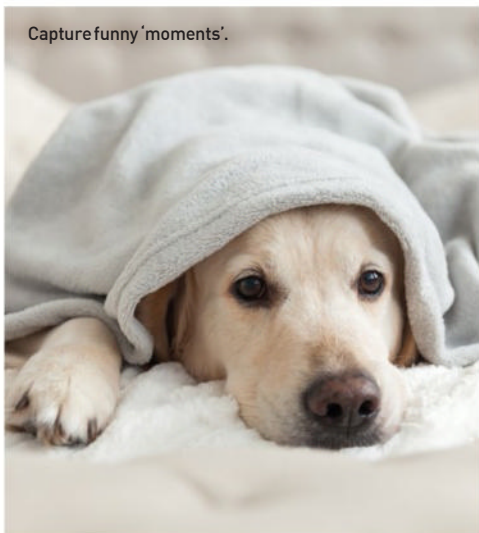


A photograph taken from inside a teal tent, looking out at two dogs sitting on a grey blanket. The dog on the left is a large, shaggy brown dog, and the dog on the right is a smaller, white dog with brown patches. They are both looking out towards a blurred forest of trees with warm, golden light filtering through. The text is centered in the upper half of the image, enclosed in blue brackets.

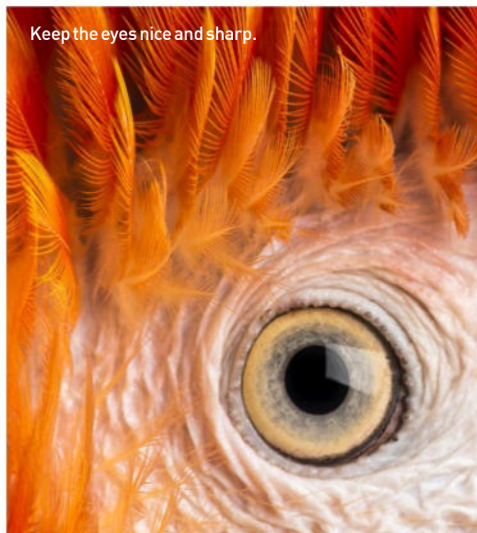
**“As they say, “memory is cheap, but memories are priceless”. Pets are challenging subjects so you’re just going to have to stay sharp and keep shooting.”**



Capture funny 'moments'.



Keep the eyes nice and sharp.



Get in close.



Keep an eye out for interactions or displays of behaviour.



Try to keep background distractions to a minimum.



Obviously if the animal is not content to keep still for more than a second, this can be a challenge. Keep snapping away; try using your camera's continuous autofocus to track the animal as it moves. If it's proving too difficult, let the animal play a while, and try again. Pets have very short attention spans, so keep it fun, break it up a bit if you have to and always reward and fuss them when they do well.

### On the level

Your average dog is a couple of feet tall, cats even smaller. The average adult human is about 5' 7". If you photograph a pet while you're standing up, all you're going to see is the top of their head and their backs, not what you want for a portrait. Get

down to their eye level, and see the world from their perspective. If you are able, get lower still. Try pre-focusing your camera and just holding it at ground level so you can look up at the pet. It's worth a try just for a new angle on things.

### Lighting

When meeting a new animal, bring a flash and, with the owner's permission, while greeting or playing with the pet, fire a couple of test flashes away from them to see their reaction. In daylight particularly, they never seem to mind the flash at all. If they do mind, then stick with natural light and use a white or silver reflector if you need to fill in any shadow areas. Indoors, a bright continuous light may be preferable. We have

a photoflood light that, rather than using old tungsten bulbs, uses three daylight-balanced energy saving bulbs. They are housed in a 22" reflector that you can cover with a diffuser to soften the light if need be. You can also try placing your subject near a window to use the natural light. If we are using flash with a willing subject then we invariably use cross-lighting, avoiding shooting a flash directly at them.

### Be patient and carry on!

As they say, "memory is cheap, but memories are priceless". Pets are challenging subjects so you're just going to have to stay sharp and keep shooting. The more you shoot, the greater your chances of hitting that perfect shot!





“Of course, good exposure control is paramount to ensure you capture as much of the tonal range of the scene as possible.”



## Shooting amazing sunsets

# HOW IT'S DONE

Surely, we all love a sunset? A blazing red sunset is lovely to behold and can make for some great photos, if you know how to get the most from the fiery scene in front of you. Of course, good exposure control is paramount to ensure you capture as much of the tonal range of the scene as possible. Moreover, the scene itself requires a couple of things to make it a success from the point of view of composition. A clear sky does not necessarily make for a good sunset. Clouds are the perfect addition to reflect the light and create visual interest in the sky. Now that the sky is sorted, you will need some foreground interest, more on that shortly.



## Metering

If you want, rather than setting your camera to manual exposure and experimenting with settings, you can opt to use the camera's spot meter mode. If you use this, you can meter a very small part of the image (not the sun), that is a middle tone area, for a decent averaged exposure of the scene. Alternatively, you can actually meter a right point nearer to the sun's brightness and drop a lot of your scene out to silhouette. Beyond that, you can also choose to meter a darker area and really push the bright areas out to overexposure, if that is your creative choice.



## Get the settings right

If you are feeling brave, why not take the camera out of automatic mode and go full manual? It's not at all scary to do and it gives you total control over your shot. Simply decide your preferred ISO and aperture and then just experiment with the shutter speed until you get a good balance of tones in the shot. It is always recommended to keep the ISO as low as possible in the first instance, for maximum image quality. A low ISO keeps your photo clear of noise and grain. If you are shooting hand held and the light levels are dropping, then you may have to consider a higher ISO to give you faster shutter speeds and thereby avoid camera shake.

## Stop the shake

Generally, a sunset scene, or any landscape image, is shot with narrow apertures to give you as much front to back sharpness as possible. Apertures such as f/11 and f/16 are the best starting points for this. As previously mentioned, while you're working on your preferred settings, make sure you are aware of your shutter speeds. If they drop too low for a handheld shot, camera shake is inevitable. Shutter speeds of 1/60s are a bare minimum to eliminate shake. Otherwise, get a tripod involved. We've probably recited this mantra way too many times, but getting a tripod is the single most important item to have, after the actual camera and lenses.



## Get the shot

So, we come to foreground interest. This is a key part of capturing a successful sunset image, or any landscape photo for that matter. Find something to put in the near foreground. A tree, a large rock formation, a boat on the water (if you're shooting near a body of water), it all helps to engage the viewer and give them a visual starting point when viewing the image.



## Filters

Another item of equipment we would always recommend for landscape photography is the use of certain filters; In this case a graduated neutral density (ND) filter. This is a square filter that sits in front of your lens and can darken the sky while leaving the ground at its normal brightness. These are great for overly bright skies that need to be toned down in order to create a balanced exposure.



## Go hyperfocal

The hyperfocal point is a point in the scene that yields the greatest depth of field for any aperture setting and focal length. It does require some mathematics, so for those of us in a bit of a hurry, focusing on a point roughly one third into the scene is generally good enough to begin with.





# The power of silhouettes

Strike the perfect balance of light and dark

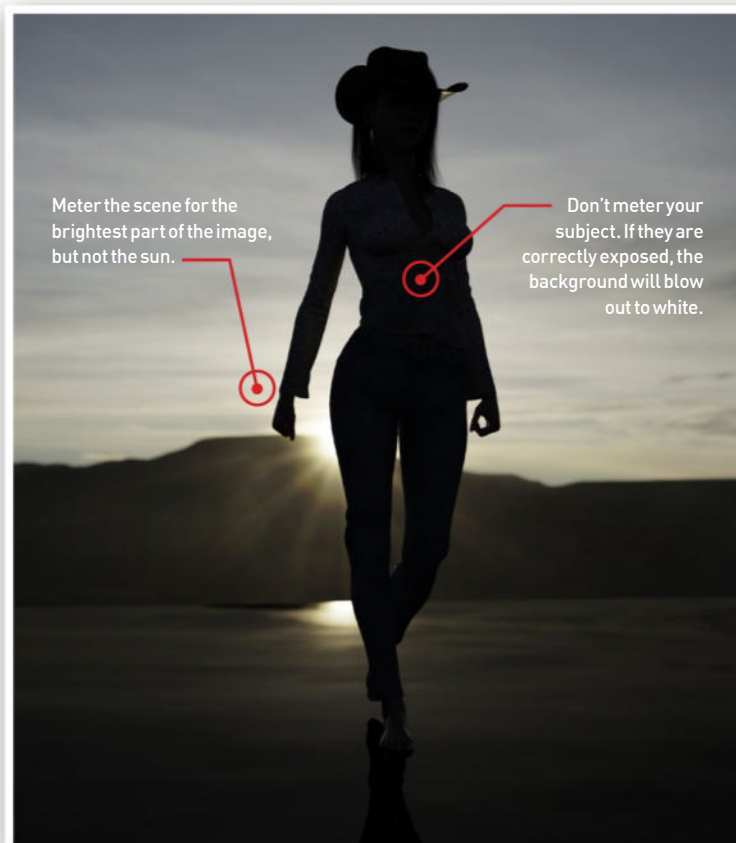
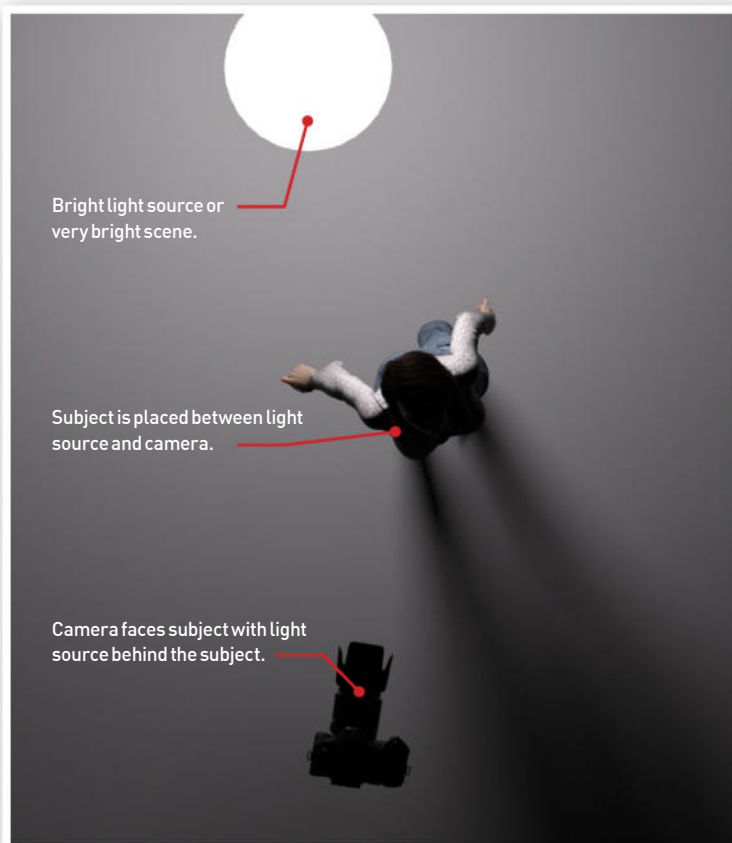
Let's get that word out of the way first. Silhouette, what does it mean? It came into being as a result of severe economic demands imposed upon the French people by their finance minister Étienne de Silhouette in 1759. His name became linked with anything that was thought to be done cheaply. In the days before photography, making a portrait cheaply and quickly from paper became known as a silhouette. It is a term used to describe the image of a person or object that is represented as a solid shape. The interior of the shape is totally black and featureless. Only the edge of the object describes what the object actually is. The term silhouette was originally thought to describe pieces of paper that were cut out and stuck to a contrasting coloured backing sheet, although the actual name 'silhouette' didn't become a well-used term until the early 19th century. Portraits cut from black card, became a very popular and quick alternative to the portrait painting or portrait miniature.

**“It is a term used to describe the image of a person or object that is represented as a solid shape. The interior of the shape is totally black and featureless.”**

Maintaining a good exposure for the brightest parts of the image can just about guarantee the rest will fall into dark shadow with little or no detail to be seen. A little nudge in the right direction with post-work will help.



## The basics of backlighting

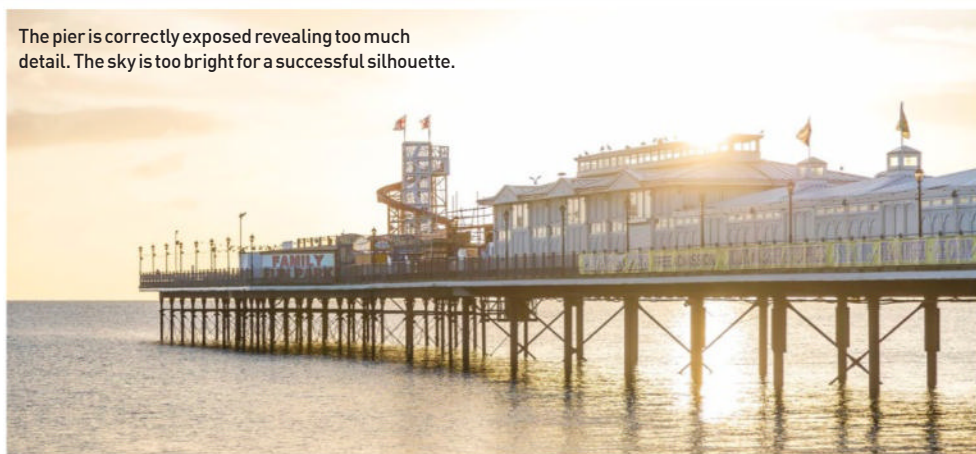


From that original meaning, it has now become a popular term to describe anything that appears as a shape dark against a much brighter background. The fields of architecture, moviemaking, fashion and photography all use the word silhouette as a descriptor for the form, shape and outline of an object, person, building and so on. In photographic terms at least, a silhouette is actually similar to a black and white shot. A black and white image relies on form, texture and composition since one of the key ingredients, colour, has been removed. Silhouettes are similar in the sense that they have had most of their detail and texture removed. The shot now relies on the composition, the form of the subject and being able to convey a mood, or story with the kind of presentation that is more akin to shadow puppet theatre.

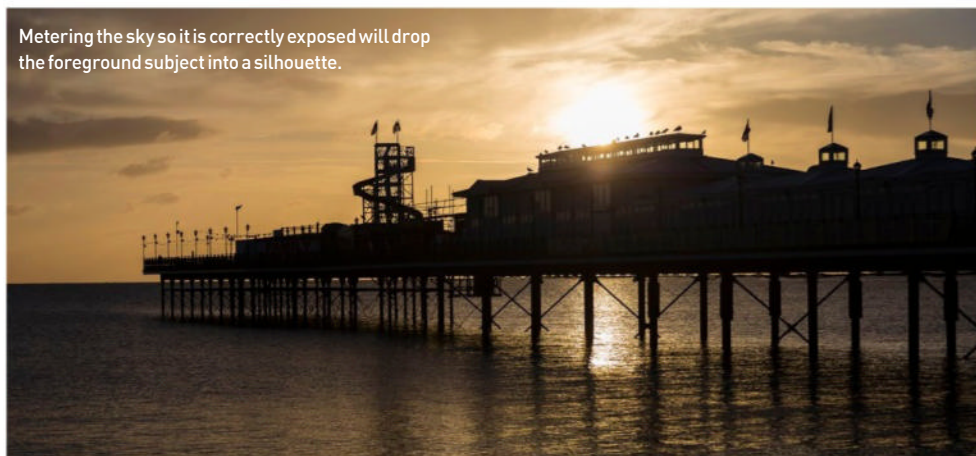
### Basic ingredients

So what do you need to make a silhouette happen? First, you'll need your subject to be backlit. Backlighting is the term used to describe a lighting technique whereby a strong light source such as the sun, flashgun or even just a bright window in a dark room is positioned in such a way that it is directly facing the camera, or is at a slight angle to it. The subject is then placed between the camera and the bright source of light. Because of the strength of the backlight, the subject is reduced to a dark shape since they are in shadow. Depending on the angle of the backlight, you can create a highlight on the edges of your subject which is known as rim-lighting or kick-lighting.

The pier is correctly exposed revealing too much detail. The sky is too bright for a successful silhouette.



Metering the sky so it is correctly exposed will drop the foreground subject into a silhouette.







Given the right conditions, even night time shots can create some cool silhouettes. With a long enough exposure, a night sky with stars and clouds can still be brighter than an unlit foreground object.

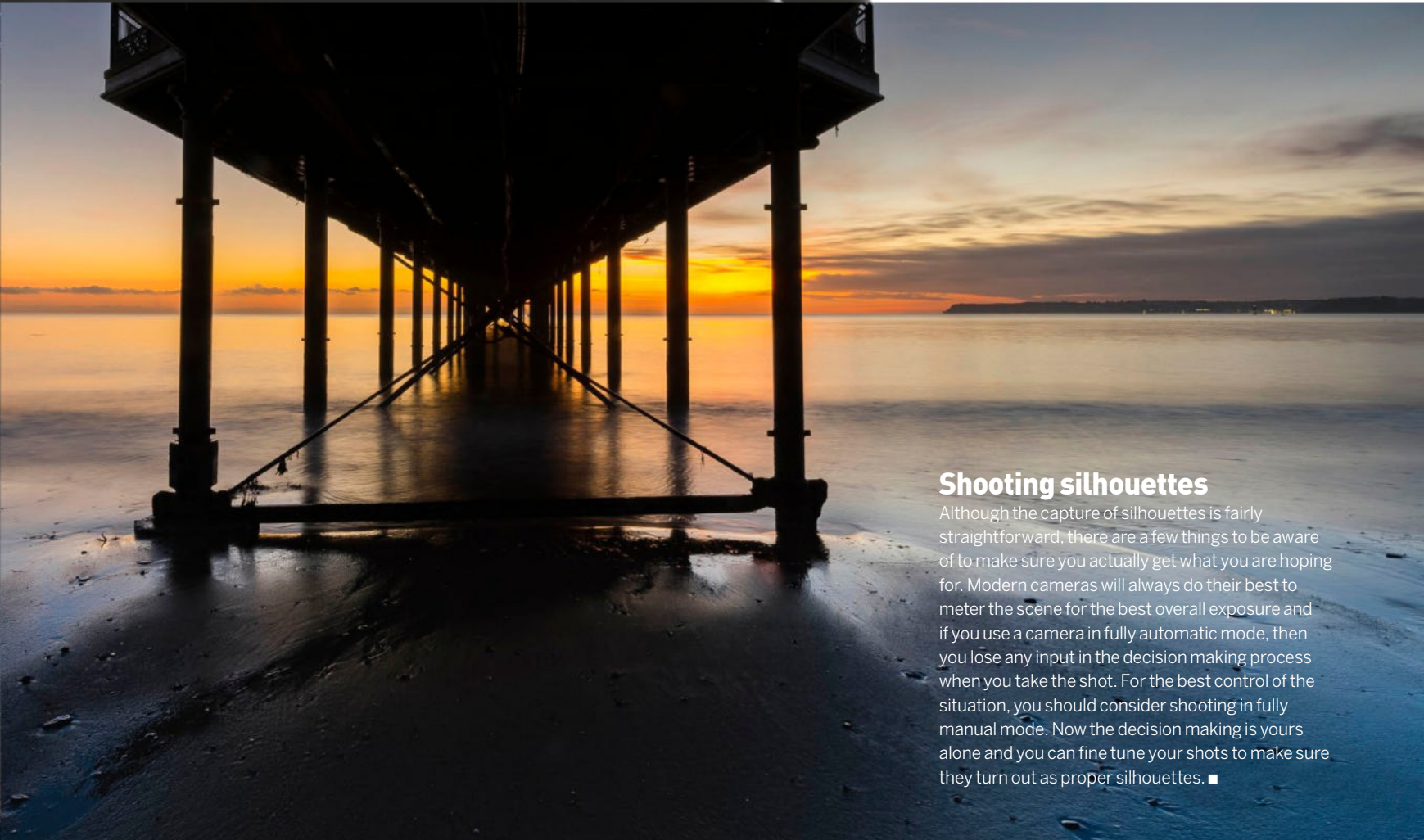




Partial silhouettes are also very effective. In this case, rather than the light source being directly behind the subject, it is slightly off to one side. This gives you what is known as a rim light.

## Embrace the dark

Shooting this technique requires you to throw away the rulebook in a sense, to achieve the very specific look that defines a silhouette. For a conventional backlit portrait, you would use some additional lighting from a flash or a reflector to make sure your subject didn't fall into completely dark shadow and make sure detail is preserved. Now though, you are going to reduce the subject to solid black or at least as close as we can get to it without ruining the rest of the shot. The basic premise here, is that you are deliberately going to underexpose the shots by a specific amount to correctly expose the very brightest parts of the scene, which should then render the subject totally dark.



## Shooting silhouettes

Although the capture of silhouettes is fairly straightforward, there are a few things to be aware of to make sure you actually get what you are hoping for. Modern cameras will always do their best to meter the scene for the best overall exposure and if you use a camera in fully automatic mode, then you lose any input in the decision making process when you take the shot. For the best control of the situation, you should consider shooting in fully manual mode. Now the decision making is yours alone and you can fine tune your shots to make sure they turn out as proper silhouettes. ■



# HOW TO...

## Capture macro images

*Are you ready for an extreme close up?*



*"Now, let's talk about the types of equipment you can try out to begin your first foray into the macro world."*



If you have never attempted macro photography before, you may be forgiven for thinking that it is a very specialised photographic subject. While that is true to a certain degree, there are plenty of ways you can dip your toe into the subject without having to spend large amounts of cash. Macro photography remains one of the more popular genres and if you take a look through any photo library or image sharing sites, like Flickr, you will find any number of groups dedicated to this fascinating subject. Now, let's talk about the types of equipment you can try out to begin your first foray into the macro world.

### **Gear choices**

First and foremost is going to be the macro lens. These prime lenses are constructed to enable you to shoot your subject from very close distances, as well as operating like normal lenses. They typically have very large maximum apertures of around f/2.8, which when working at its closest focusing distance to your subject, can give you extremely shallow depth of field. Macro lenses are rated by their ability to resolve an image on your sensor at 1:1 magnification. What this means is that if your sensor is 35mm x 24mm in size, you can fill the viewfinder with an object of the same size - hence 1:1 magnification. The longer the focal length of your lens, the greater distance you can put between yourself and the subject, whilst still maintaining 1:1 magnification. Macro lenses vary in price, but if you aren't sure whether you want to spend out on a lens just yet, there are other options available to you.





## Close-up lenses

In essence, these lenses behave like a magnifying glass added to your main lens. They screw on the front and optically reduce the minimum focusing distance, so you can get closer to your subject, thereby effectively increasing magnification. If you want greater magnification, you can put the close-up lens on the front of one of your longer focal length lenses, giving you the ability to fill more of the frame with your subject.



## The extension tube

As the name suggests, an extension tube is screwed on to your camera and then your main lens is screwed onto that. They increase the focal length of your lens by moving the lens further away from the sensor and much closer to the subject. The upshot is that you get more magnification and the ability to focus much closer. The extension tube offers greater close focusing than a close-up lens and turns your main lens into something that is almost behaving like a true macro lens. Extension tubes are also a cost-effective option if you are thinking about trying macro photography.



## Turn around

Another slightly more unusual approach to macro-work, is to try a reversed lens ring. One side of the ring attaches to your camera's lens mount and you attach your main lens to the other side. Meaning you can actually turn your lens around 180°, attach the front element to your camera and then use the rear element of the lens as the front element instead. Depending on the lens you use, you can actually magnify a subject by about 300%. This is another inexpensive option; the only drawback is that you need to be aware of not scratching, or contaminating, the rear element of your lens.





# High speed photography

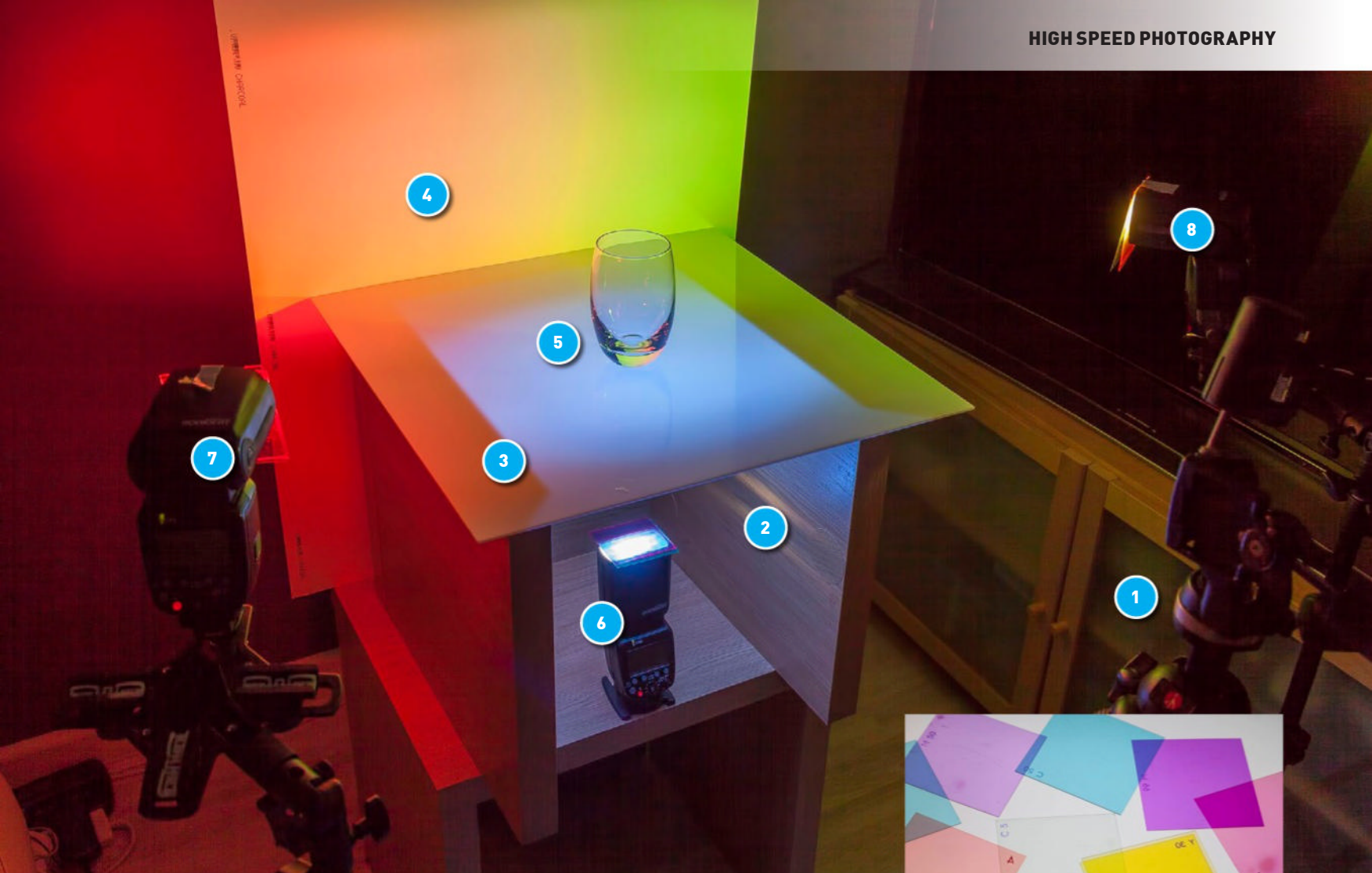
A great tabletop project for the artistically adventurous

**J**ust to clarify, when we say high speed, we don't mean that we are doing it very fast! In point of fact high speed, in this context, refers to being able to catch rapid movement in such a way that you effectively 'freeze' the action. There are two basic ways we can do this. First is to have enough light pouring on to your scene to give you the required shutter speeds (in excess of 1/2000th of a second) to have a hope of stopping an event dead in its tracks. The second method relies on the stopping power of flashguns and not the settings used on your camera. The camera, depending on how many flashes you are brining to bear on the scene, is normally set to ISO 100 or 200, the aperture somewhere around f/7.1 and the shutter is set at the max sync speed of your camera, in this case 1/160th of a second on my 5DMk2. It can sometimes be hard to wrap your head around the idea that the shutter speed is not really a factor when using this method. You only need to make sure that if you press the camera button without the flashes turned on, the shot should look totally black. The light will be provided by the flashes of course, but in a very short 'pulse' that stops the action. Here's how this is achieved:

The water droplet. Probably one of the most recognisable high speed images and a very popular one to try and capture. To catch one though you would need some clever equipment or a very accurate shutter button finger! This image does prove that it can be done, with a little luck and a lot of trial and error.







## The technical bit

Flashes (strobes or speedlights as they are also known) have an interesting operating characteristic. Their output brightness is not governed by the unit's power. The effective brightness of the flash is always the same. It is only the duration of the flash that changes, so less power means shorter flash duration. For instance, a Canon 580EX flash at full power has a duration of 1/1,000th of a second. Dial the flash down to 1/8th power and the flash duration becomes 1/9,000th of a second. Set it at 1/64th power as I have done here for my shoot, and you can achieve a flash duration of a mind-boggling 1/30,000th of a second!

Now imagine if this incredibly fast pulse of light was your only light source in a dark room. If you take a shot with your camera with the flash set as described, even though your shutter speed is 1/160th of a second as we mentioned above, your subject will only be lit for 1/30,000th of a second during the time your shutter is open. The trade-off with this method is that your flash is at a very low power setting and has to be very close to your subject. As this is a tabletop project, it's not an issue because you are going to be shooting at very close quarters anyway.

## The setup

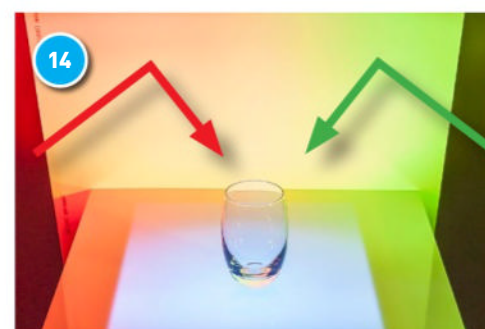
Our shot is going to be a very simple water droplet splashing down into the surface of a small body of water. It is quite a popular photo

to capture, and is easy enough to set up. The camera is set on a tripod [1] in front of a makeshift mini-studio. A table [2] is turned on its side and a piece of opaque Perspex [3] is set on top. A sheet of white card is placed at the rear of our 'set' [4] to create the background. Our water receptacle, a simple glass [5], is placed on the Perspex, in the middle, and filled to the brim with water.

This example has three flashes [6] [7] [8] that were originally set up, although after a few tests, it was only two that were finally used. Just for the sake of creativity, one was set underneath the Perspex, firing upwards, to create a nice pool of light at the base of the glass. Again, just to be a little creative, the flash underneath the Perspex and the flash to camera left had coloured gels [9] put over them. After some trial and error [10] [11] [12] it was decided to use blue underneath and red on the left [13].

## On reflection

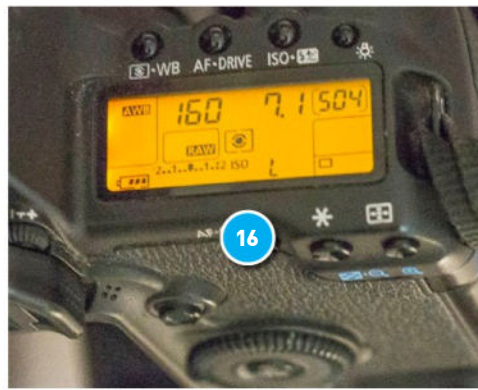
One aspect to consider is that when photographing clear liquids, it can be more effective if you cast your light on a surface that the liquid can reflect [14], rather than firing directly at the liquid itself. The flash on the left was aimed at the white card at the rear of this setup so that when it fires, it illuminates the white card and colours it red. Our water will reflect this colour as well as the blue light coming from below and this combination will hopefully create a nice dramatic effect.





## The shoot

The flashes are controlled by a wireless transmitter [15], but you can also use a camera mounted flash, bounced off coloured card on to your scene if needs be. You could also get your flash off-camera by using a hot-shoe cord. After a few test shots to get framing and flash power dialled in, the settings worked out as follows: the camera was set at ISO 50, aperture f/7.1, shutter 1/160th [16] and was shooting Raw. The lens is a 24-105mm f/4 zoom lens [17]. The flash firing up from below was set at 1/16 power [18] and the flash on the left was set at 1/32 power [19].



The area of focus was the point where we were attempting to get the water droplet to land. We could generate a reasonably consistent flow of drips by using a syringe filled with water [20] and slowly depressing the plunger and aiming our drops at the centre of the water surface. Trying to capture a single drop hitting the surface without the aid of specialist timing equipment could have you trying all day long with no success. This way at least, you can create a steady series of drops that will increase your chances of capturing the decisive moment of splashdown.

## Drip, drip, drip

The process was to gently drip water into the glass and shoot at the same time. It can be a bit random, but as mentioned before, without special equipment that can time the camera's firing down to milliseconds, you just have to persevere. The sample shots you see here were all done by one person with syringe in one hand and the other hand pressing the shutter release button. So, many frames later, a fairly decent



The shot of a droplet of milk dripping down into a small pool of the same liquid can create the ever popular and quite iconic image of the droplet splash. Even though the milk is white, it is reflecting the light cast by the flash with the blue gel on it.



**“The water drop images are very cool and do make for good abstract images...”**

number with usable droplet captures, it was time to go for the big one! The water drop images are very cool and do make for good abstract images, but it was time to end on a big splash. With the glass full to the brim, an ice cube was dropped in from a decent height to create a big splash. It took a couple of goes, but some great captures were in the bag. Finally, a quick experiment to see if another liquid could be used. The Perspex was cleaned and a pool of milk was dripped into place

by the syringe. Then more milk was dripped from above and captured in the same way as the water. Different coloured gels were tried on the flashes and another set of interesting images were captured.

### **To finish**

The preferred shots were processed in a Raw editing package and then edited, rotated and cropped in Photoshop. Some colour values were altered even more to give an interesting surreal look to the pictures. So, with some initial trial and error, the end results could easily end up as a large format canvas print and be adorning the wall of some happy art lover! ■





# Long exposure photography

Take the time to see things in a whole new way

**T**he human eye is a wonderful thing. An organic marvel that is unparalleled in its complexity. We see the world as it happens in real-time but cameras allow us to compress time or expand it to show us things in whole new ways that our eyes cannot do. It has been determined that our eyes, although not governed in the same way as the moving parts of a digital camera, can detect flashes of light as short as 1/100s. Depending on the health and age of the viewer it can in some cases be as short as 1/200s.

Given the way our eyes and brain perceive and process the things we see then, we have a natural

'shutter speed' of about 1/200s. This means that we can turn to our cameras to create the kind of images that reveal the world of motion beyond what we see. The camera offers two options. Using special lighting, you can capture things that literally happen in the blink of an eye or you can go in the opposite direction and delve into the fascinating world of long exposure photography.

Long exposure photography is a very popular subject for photographers of all skill levels. Take a look on any image sharing site or in digital photography magazines and you'll see plenty of examples of the genre. What is long exposure photography all about?



“We see the world as it happens in real-time but cameras allow us to compress time or expand it to show us things in whole new ways that our eyes cannot do.”







f/16.0 13.0  
AWB ISO 31



f/5.6 30.0  
ISO 640

Just as a matter of interest, compare image 1, to image 2 on the left. You'll see that the exposure time of image 2 is almost three times longer than image 1. A 10-stop filter was added to drive up the exposure time but given the speed of the moving water, any exposure over a few seconds will generally look much the same as a photo where the exposure is 30s. There may be a little more smoothing of the water as it flows but this is a good example of knowing how to gear the exposure time to your subject matter. Sometimes less is more than enough!



Your first port of call when attempting to get exposure times as long as possible, is to use apertures of f/16 or narrower. Beware of diffraction when you use apertures around the f/22 - f/32 area. You might suffer from soft images even though everything is in focus. You can also use the lowest ISO values your camera allows. The Nikon D810 above, can use ISO 31 as its lowest value; this enabled long exposures of the waterfall image on the far left based on the ambient light available at the time.

### Night time

At night, you will be dealing with longer shutter durations as a matter of course since there is very little ambient light. In fact, you may find that you need to open up your aperture and even raise your camera's ISO sensitivity to stop the exposure durations from being too long if you are in extreme low-light conditions. A typical city street scene at night, with your camera set to an aperture of f/9 and ISO 100 would need a shutter speed of anywhere between 2s to about 30s, which is perfectly manageable. A scene lit only by the stars in the night sky could take many minutes; as an example, a clear starry night, with only the most minimal amount of light from a nearby town would require a shutter duration of about 60 minutes, if you were using the same settings mentioned previously.

### The technique

Although the name is self-explanatory, let's elaborate. A long exposure is usually defined as being several seconds in duration or longer. It is possible to have exposures that last many minutes, even hours in extreme cases. The camera is placed on a solid surface or mounted on a tripod so it doesn't move and then the shutter is opened, and kept open, for a predetermined period of time. Any static objects in the scene are still captured sharply since the camera is not moving but any object that is in motion through the camera's field of view, is blurred as it moves within the frame. The amount the object is blurred will depend on the length the shutter is kept open and the speed of the moving object in the shot. How you combine the two is a matter of artistic preference but experimenting is a lot of fun; but how do you get shutter speeds so long?

### Creating a long exposure

A long exposure relies on several important factors in order to get your shutter speed down to a duration that will yield the kind of blurred motion you were hoping for. Your aperture can be set to its minimum, which is around f/22. This reduces the amount of light that can fall on your sensor and requires the exposure to be longer to allow the camera to gather more light but apertures this narrow can lead to the optical phenomenon

known as diffraction. Normally, you would be better off using an aperture of about f/9 or f/11.

### The settings

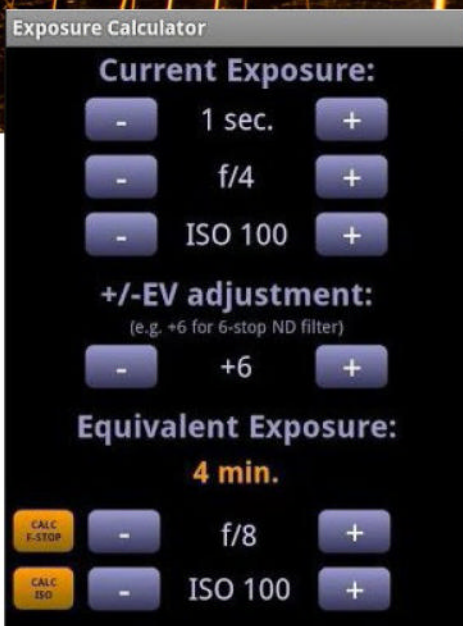
These kinds of shots would require you to set your camera in manual (M) mode or Aperture Priority (AV). This way, you have control over how the camera reacts as you alter the parameters. Since you don't want to focus accidentally on the wrong thing, we would also recommend you switch to manual focus. This way you can compose your shot, use live view to confirm you have the correct point of interest in focus and since it's in manual focus mode, it will maintain focus with no further input from you.

Next, you can set your camera's ISO sensitivity to its lowest value. The less sensitive your camera is to light, the longer it needs to gather light for a good exposure. Most camera's offer a minimum ISO of 100 but some will let you set ISO values down to about 31. In combination, the aperture and ISO values will affect your shutter speed durations, requiring it to be a longer duration in order to capture more light. The next factor you have to take into account though, is just how bright the scene is you are shooting.



This is an example of the popular photographic technique of shooting burning steel wool, which has been placed inside a steel whisk and spun around on a long tether, during the course of a long exposure. It can create some amazing light art.

There are no shortage of apps for both iOS and Android mobile devices that can calculate different exposure times for you if you need them. The apps can also allow for the use of ND filters and recalculate correct exposures once they are added.



Obviously, you need ensure that your exposure settings are correct, it would be very disheartening to spend an hour waiting for the exposure to complete, only to find it is either badly underexposed or overexposed. It is better to shoot at a much wider aperture of  $f/2.8$  and a higher ISO, just so the exposures are shorter. This lets you fine-tune your exposure, then you can calculate the exposure time required when you use lower ISO and narrower apertures. There are plenty of apps for your mobile devices that can calculate the alternative exposures needed without the need for mental arithmetic. Check your histogram too; if the histogram is bunched too far to the left of the screen, then

it is way too underexposed or if it's all bunched on the far right of the histogram, then it is too overexposed and you will lose detail in the burnt out highlights.

### Night time subjects

To be honest, anything is fair game when it comes down to what to shoot at night. The classic traffic trails are always a good place to start. Using an aperture of  $f/5.6$  and an ISO of 100 as a starting point, you should be able to get shutter durations of about 4s. From there, you can alter ISO and aperture to get shorter or longer shutter speeds. Fireworks are also a popular subject to shoot with similar settings. Then comes astrophotography. This is taking photos of the night sky with short enough exposures of about 20s so the stars show no recorded movement; or actually deliberately using much longer exposures of 60 minutes or more, that reveal the movement of the stars overhead. Another trick is to take a back-to-back sequence of about 15-30 shorter exposures and blend the resulting images in Photoshop to create a star trail effect. Another popular effect is to shoot flames or other pyrotechnics with longer shutter durations. The path of a ball of burning steel wool in a metal egg-whisk as it is spun around on a tether can create some intense and surreal images. Always take care with fire and pyrotechnics of any kind though. It's not worth getting burnt for a photo.



A sturdy tripod is a must for anyone serious about doing long exposure photography.

### Use a tripod

It goes without saying (but yes, we're going to say it anyway), that these kinds of shots demand the use of a tripod to stop camera shake from ruining the shots you have patiently waited minutes or even hours for. A good, sturdy tripod is essential and there are plenty to choose from to suit your pocket. Try to avoid cheaper, light travel tripods for this kind of work, since they may not be as sturdy as you would hope. Even a light breeze might be enough to cause it to flex or vibrate just enough to ruin the shot. If you are using a heavy DSLR, then the rule for these shots is to use a heavy tripod too.





The humble cable release has come a long way from its simple squeeze bulb arrangement. Now they are electronic devices that can be programmed in multiple ways to shoot sequences with user-controlled exposure times and intervals between shots.

## Cable release

Be aware that most cameras can handle exposures as long as 30s. For longer exposures, you will need to set the camera in bulb (B) mode. In bulb mode, the shutter remains open only as long as the shutter button is depressed. Once you let it go, the exposure will end. You could stand there for the duration of the shot with your finder on the button or you could use a cable release device that you can either lock during the exposure and unlock when the time is up, or use a programmable one with a timer that will do it all for you. These devices are called intervalometers and range from simple cabled devices with a single push-button activation to complex wireless versions that you can control from a distance.

## Too bright

During the day, the problem is much greater as you might imagine. On a bright sunny day, even with your camera at its lowest ISO and smallest aperture, you would struggle to get exposures any slower than about 1/125s. Even if you had a lens that could stop down to f/32, you would still be looking at a shutter speed of about 1/60s. By comparison, a daytime scene like a woodland waterfall shrouded by trees has a much lower amount of ambient light. Camera settings of aperture f/9 and ISO 100 would yield a shutter

speed around 1/10s. That's better but still not what we would call a long exposure. How do you overcome that problem?

## Going dark

To achieve long enough exposures during daylight hours, you will need to use a Neutral Density (ND) filter. It is referred to as 'Neutral' since it is optically neutral in colour and shouldn't create any colour cast in your final shot. Cheaper versions may not be as neutral as they claim, so beware of bad quality knock-offs. The filters also come in various densities. A 2-stop ND filter for instance will block enough light to make an example 1/500s exposure become a 1/125s exposure. A 10-stop filter would make the same example a 2s exposure. An ND filter is a bit like a welder's mask for your camera lens, in that it blocks a large amount of light entering the camera and requires the use of longer exposure times. ND filters come in two varieties depending on your preference or pocket. The first and cheapest method is to buy a screw-on type. The downside to these is that you need to buy a filter that matches the filter size diameter of the lens you



Whether it is the simple screw-on variety of ND filter or the filter holder system that you use, these different density filters are what you need to take your daytime shutter speeds from fractions of seconds down to seconds or even minutes.

are using. If you want to use more than one lens with different size diameters, you would need a filter for each size.

The alternative is to use a filter holder system that you can screw on the front of any lens you have provided you use an adaptor ring for each size of lens you want to use. The holder uses square or rectangular filters that simply slide into place and can hold two or even three filters in one go. Manufacturers such as Lee and Cokin make a number of filters and filter holders for various sized camera bodies and lens types.



Compare the two shots of the North coast of Tresco shown here. The inset image uses a normal exposure based on the ambient light settings for a fast shutter of 1/400s. Adding a 10-stop filter and narrowing the aperture allowed us to reach a 2 minute exposure time in the same lighting conditions.



### Daytime subjects

Just as with the night time alternatives, daytime subjects are down to creative choice. A popular subject for landscape photographers is to photograph streams, rivers and coastal scenes during the day with a 10-stop filter in place. This gives you shutter speeds of around 4s. If you are lucky enough to own a camera that offers lower ISO speeds down around the ISO 31 area, you can achieve shutter durations as long as 15s even on a sunny day. We have some examples taken on the moors as the sun was getting near the horizon. With the aperture set at f/22 and the ISO down to 50, when the 10-stop filter was

put in place, the exposure was almost 3 minutes long. The clouds that were visible became wispy trails in the sky thanks to the longer exposure. Even city street scenes captured during the day take on an unusual quality when pedestrians and moving cars are reduced to ghosts as they pass by. Even fairground rides become surreal objects and their apparent speed defies the sense of what is normal.

If you have never tried it, we can heartily recommend giving it a go. Even if you don't have ND filters, you can still venture out at dusk and at night and experience the fun of capturing long exposure images. ■



# The stand-in safari

A trip to the zoo can sharpen your photography skills

**T**he excitement of photographing wildlife in its natural habit on the plains of Africa, or in the Congo basin is beyond all but the most intrepid and experienced wildlife photographers. The images captured can be breathtaking and unlock the wonders of natural world when presented to us on the covers of prestigious magazines such as National Geographic. Experience, funding, and some very specialist equipment is the order of the day for the top-level wildlife photographer.

“How is it possible to begin to develop the skills required when lions and elephants aren’t exactly thick on the ground in the streets of your local town?”





How about the rest of us would-be wildlife photographers? How is it possible to begin to develop the skills required when lions and elephants aren't exactly thick on the ground in the streets of your local town? An excellent place to start, is at your local zoo. Agreed, it's not exactly the wilds of Borneo, but there will be a range of exotic creatures big and small that you can try your photographic skills out on.

### The animals

If you think about it, the zoo is a great place to practice. It is a safe environment, and the animals are easily accessible. Obviously some animals, such as the primates, can only be viewed from a distance. In some cases, all that separates you from a cheetah, for instance, could be a single sheet of clear polycarbonate. However, in other cases, certain animals can actually be petted or fed directly, which gives you choices for some interesting close-up work too. Also, if the animals aren't presenting themselves for the camera, there is also that most entertaining creature, the human being.

### The challenge

The zoo environment creates challenges that are not vastly different to capturing animals in the wild. You may have to shoot your subject from a distance. They may present a moving

target and may be moving from a well-lit open area to more densely foliated areas. The rules of composition are still in effect, as is general photographic technique to ensure sharp, blur-free shots. There is also the additional challenge of the zoo itself. You will be shooting through cages or from behind glass and plastic, and you'll have to bear this in mind when composing your shots to make them look as natural as possible.







For our 'safari' we went to Paignton Zoo in Devon. We tried to keep our gear choice fairly minimal. We had an old 18MP Canon EOS 550D to which we attached a 100-400mm EF f/4 lens for an effective focal length of 160-640mm to give us a little more reach for shooting distant subjects. For the indoor low light enclosures such as the reptile house, we went with a Canon EOS 5DMK2 and a 100mm macro lens with a maximum aperture of f/2.8. This meant we could attempt to capture some nice close-ups of the creatures in their display cases. We would still have to shoot high ISO images but the wide aperture of f/2.8 gave us a fighting chance of getting some decent images at reasonable shutter speeds. We also had a sturdy tripod if needed for when slower shutter speeds no longer enabled hand held shooting. We also had a 24-105mm f/4 lens that we didn't use in the end. Topping it off was a good camera bag that could be slung over the shoulder and was not too intrusive while walking about.



## The equipment

You are planning a trip to the zoo. What should your gear choices be? This will depend on your shooting style, but in the same way a landscape photographer will always have a wide-angle lens in their bag, a wildlife photographer will have a zoom lens. It doesn't mean you have to go out and spend thousands on a dedicated super-telephoto lens such as the Canon EF 800mm f/5.6 at nearly £10,000 [1]. You can actually buy a Korean super-telephoto 650-1300mm f/8-f/16 lens for £150 [2]. You would have to be aware though, that at this price-point, it is not going to be exactly world-class quality. Happily, there are other options. The current crop of super-zoom digital cameras are very affordable and offer optical zoom in the order of 30x to 80x magnification. The Canon PowerShot SX60 HS [3] has a 16MP sensor and a huge 65x magnification, which is comparable to a full-frame camera with a 24-1560mm lens. If you don't have a super-telephoto, you can always choose to crop your shots in your image editing software. The higher the resolution of your sensor, the more cropping power you'll have.

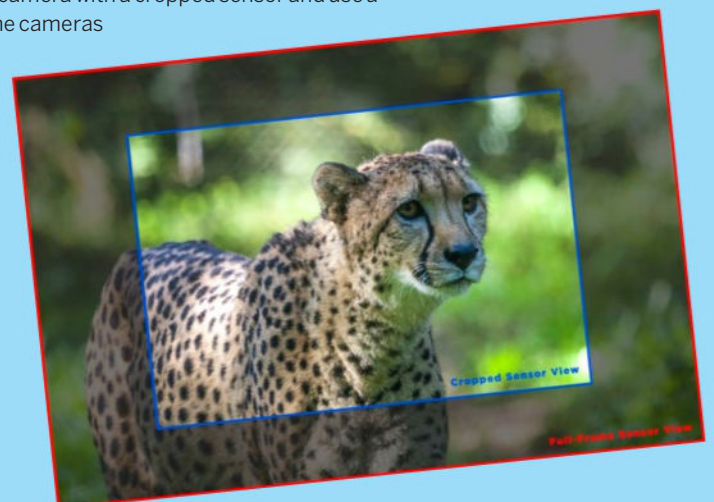
## Double up

If you already have a DSLR with a medium telephoto in the 70-300mm length range, you could buy a focal length extender [4] and double the lens to 140-600mm. The big names like



## The crop factor

Another option is to use a camera with a cropped sensor and use a lens designed for full-frame cameras on it instead. As an example, for some of the shots used in this article, a Canon EOS 550D was used with a Canon EF 100-400mm f/4 zoom lens. The lens is designed to project an image onto a sensor 1.6x larger than the one used in the 550D. The actual focal length of the lens does not change but the 100-400mm focal length range on the lens now appears as if it were 160-640mm.





Canon and Nikon offer these extenders for around £350, but you could always opt for third party brands like Yongnuo at up to half the price.

## Get close

Now we have some options for shooting at long range. What about close-up? If you have a macro lens or your camera has a macro setting, then remember places like the reptile house or butterfly enclosure might allow you to get some interesting macro shots. In both cases, whether shooting at long focal lengths outdoors or shooting macro indoors with low light conditions, a tripod will be essential to keep your images free from motion blur. Be aware when moving indoors to a simulated tropical environment from a cold outdoor setting, that you risk your camera and lens fogging up when the cold metal and plastic of your gear hits the humid air of the much warmer enclosure.



When cold camera equipment meets warm humid air, the result is fogging of the lens and viewfinder and the chance of condensation build-up on your gear. If you can, make the transition between the two as gradual as possible. Some photographers have been known to put a cold camera or lens under their own coat in an attempt to warm it up a little before going into a humid environment.

## Scout around

When you arrive at the zoo, it's generally a nice idea to walk around first and figure out where the best shooting angles might be for any given enclosure and when certain animal's feeding times might be. If you have to shoot through cages or bars, are there any apertures big enough to let you put the lens through so you do not capture any distracting zoo hardware in your shots? Failing that, shoot at your widest aperture for shallowest depth of field with the bars close to your lens and capture the animal at a point furthest from you and the cage you are shooting through. With a little luck, the cage will be out of focus enough not to distract too much. If you are shooting through glass, pick a spot where the glass is clean (or give it a wipe) and shoot square on through the glass, even pressing the lens hood against the glass to try and reduce as much unwanted reflection and glare as possible.



## Eyes open

When you photograph a person, a key consideration is to get the eyes in focus to connect the viewer to the subject in the shot. That holds true when photographing animals too. Make your focus point the eyes of your subject, or the eye closest to you if they are at an angle. If you are photographing a smaller creature, get down to their eye-level if the conditions and enclosure allow it.


Photographing a pot bellied pig whilst standing up means you only see it from a human perspective. Photograph it from its point of view for a more intimate shot.

## Wait for it

Animals are unpredictable to say the least. The best kind of wildlife photography shows animals displaying behaviour, rather than just sitting immobile. Be prepared to sit and wait, with your

eye glued to your viewfinder, for something to happen. It might sound odd, but keep both eyes open whilst looking through the viewfinder. Your peripheral vision in the eye not looking through the viewfinder helps you to spot something that might happen in the wider context and you may 'see' the shot coming. Be on your guard for two baboons to start squabbling or for lion cubs to start play-fighting whilst the lioness looks on. You just never know.

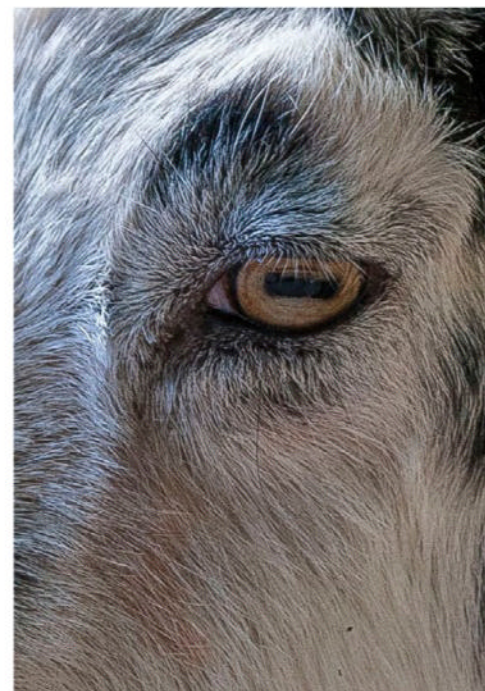
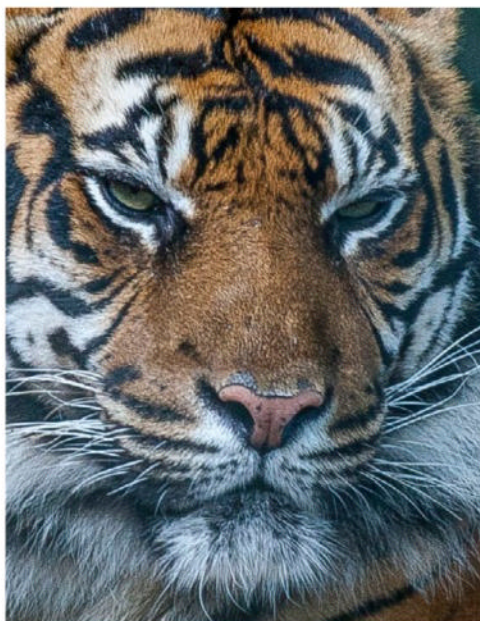




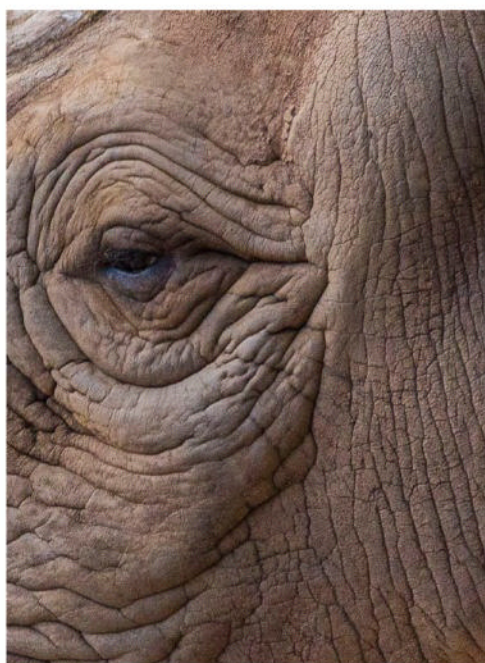
This lion was far too close to the fence to avoid the criss-cross pattern of the wire being visible. In cases like this, why not just make a feature of it? An image like this might have more impact and can be more of a statement.



A tripod can double up as a monopod at a pinch if you are in a tight spot as shown below. Although not as stable, it will help you keep your camera a little more solid as you go for those shots where shutter speeds are too slow to enable you to go hand held.



Sometimes, no matter what angle you shoot from, there may always be some man-made object that gives the zoo environment away. In cases like that, you can also crop images very tight for a more abstract feel to remove as much of those unwanted distractions as possible.



## Think fast

Most of your subjects will be moving targets. Keep your shutter speeds high and you'll eliminate camera shake. Shoot in Aperture Priority and dial up your camera ISO setting and keep your aperture at its maximum f/2.8-f/4 if you have it, and try and get your shutter speed to 1/500 or beyond. It's better to have a noisy but sharp image due to high ISO, than a completely unusable blurred image of a chimpanzee leaping from tree to tree. If your camera has a continuous

shooting mode, activate it. You can shoot a small sequence of shots and stand a better chance of getting the 'moment' you were after within that sequence.

## Lock on

For shooting animals in motion, focusing mode is down to your style of shooting, but a good place to start is with AI Servo mode. This mode allows you to lock an AF point on your subject, and while depressing your shutter button half way down, it will continue

to track the subject as long as you keep the AF point on the subject as it moves. It can take a bit of practice, and certain focus tracking systems may not be so sensitive in low light.

Above all else, abide by the rules of the zoo, always be courteous, do not attempt to put yourself or the animals in danger in any way and be mindful of using flash that might startle the animals. Take many shots, memory is cheap, you increase your chances of nabbing a cool shot if you shoot more. Finally... enjoy your day at the zoo. ■



# Glossary

A list of some general photographic terms

## Aperture

Behind the lens of your camera is a movable circular iris which opens and closes to control the amount of light falling on the sensor. This is usually controlled by the camera's light meter, although some cameras have a manual aperture control. Altering the aperture also changes the depth of field.

## Aperture priority

This is one of the semi-manual exposure options found on some cameras. The user sets the aperture according to the depth of field they require, and the metering system sets the shutter speed to obtain the correct exposure.

## Artefacts

When an image is stored in your camera's memory it has to be compressed to fit, usually into a JPEG file, and in the process some information is inevitably lost. When the image is uncompressed for viewing, noise creeps in and appears as angular blocks in the image, which are known as artefacts.

## Autofocus

Almost all digital cameras have automatic focusing. There are essentially two types; contrast detection, used in compact cameras and most CSCs, uses the camera's main sensor and works by detecting the borders between high-contrast areas and trying to make them as sharp as possible. Phase detection AF is used in digital SLRs and some CSCs, and uses a separate sensor. It is usually faster and works better in low light.

## AE lock

Stands for Auto-Exposure Lock, a function found on most advanced digital cameras. This enables you to take a light meter reading from a particular part of the image and then hold that setting while you compose the image.

## Back lighting

Backlighting occurs when your subject is brightly lit from behind, such as somebody standing in front of a sunlit window. Unless you adjust the exposure to compensate for this, your subject will appear as a dark silhouette against the bright background.

## Barrel distortion

Barrel distortion occurs when a lens, usually wide-angle, distorts an image so that it appears slightly spherical. If you take a seascape with a wide-angle setting and notice that the horizon seems to curve, this is barrel distortion. It's most noticeable when there are straight lines near the edge of the frame. In digital images barrel distortion can be corrected in image-editing software.

## Bokeh

Bokeh refers to the visual quality of the out-of-focus areas of a photographic image, especially as rendered by a particular lens.

## Bracketing

Bracketing shots is where a photographer takes the same shot three times or more, each at different exposures. This increases the chance of getting an ideally exposed image. Also, it's possible to combine the shots in software to increase the light and shade within the image, which is how HDR works.

## Burst mode

Many cameras offer a burst mode, which means they can take several images in rapid succession, just as you'd get with a motor-wind on a traditional film camera. The number of shots that can be taken is limited by the speed of the camera's image capture and processing systems, as well

as the size of the internal memory buffer. You'll typically get about three frames per second from a standard digital camera in burst mode.

## Centre-weighted metering

This is when the camera takes an average light reading from the whole frame, but pays more attention to the centre of the image where the subject normally is. This has been largely superseded by multi-pattern metering, which is better able to cope with unusual situations.

## CCD

Stands for Charge Coupled Device. This is the light sensor behind the lens of your camera that records the image when you take a photograph. It consists of a grid of millions of tiny light sensors, one for each pixel of the image. The size of a CCD is measured in megapixels, and the higher the megapixel rating, the better the image quality.

## Chromatic aberration

Coloured fringes that appear around objects, often toward the edges of the frame. Caused by light rays of different wavelengths coming to focus at different distances from the lens.

## Circular Polariser

A filter that is placed in front of the camera lens in order to darken blue skies, manage reflections, or suppress glare.

## CMOS

Stands for Complementary Metal-Oxide Semiconductor. A chip-manufacturing technology used to produce the sensors in an increasingly large proportion of digital cameras. They are cheaper but with better tolerance than other methods.

## Depth of field

When you focus your camera on a subject, some detail behind and in front of the chosen subject will also be in focus. The distance between the nearest and furthest in-focus objects is known as the depth of field. It is changed by altering the size of the aperture; the smaller the aperture, the larger the depth of field.

## Digital zoom

Some cameras give you the option of zooming in on the centre part of an image by expanding it in the camera. Although the zoomed area looks bigger, it still contains the same number of pixels as it did originally, so it will appear blocky and will lack resolution. Not to be confused with optical zoom, which is far superior.

## Dynamic range

The difference between the lightest and darkest areas of an image. If a camera can simultaneously capture shadow and highlight detail then it has good dynamic range. Few cameras can do both.

## DPI

Stands for Dots Per Inch. The sharpness of an image produced by a printer is defined by how many dots of ink per inch of printed paper its print head can produce. A figure of 1,200dpi or higher is usually required for photographic-quality results, although most modern printers are capable of this.

## Effective pixels

Although your digital camera may claim to have 13.6 million pixels on its CCD, some of that number will not be used for taking the picture. Usually, some pixels around the edge of the sensor are painted black to provide a colour balance, while others fall outside the range of the lens.

## Electronic viewfinder

Some cameras have a viewfinder containing a miniature LCD monitor showing you what the camera sees. This usually uses less battery power than the LCD screen on the back of the camera, but can be a strain on the eye and difficult to focus.

## Exposure

When you take a picture, the light meter in the camera determines how long the shutter should be open for and how wide the aperture should be, thus obtaining the correct exposure. If a picture is too dark, it is underexposed, whereas if it goes the other way and is too light, it is overexposed.

## External flash

This means that the camera has a connection, usually a hot shoe, that enables you to use a flashgun other than the one built into the camera. This allows a lot more creative freedom and control over lighting, because the flash can be positioned further away from the camera. This feature is only usually available on more expensive or professional-quality cameras.

## EXIF

The Exchangeable Image File (EXIF) format is used by nearly all digital cameras that output pictures as JPEGs. It enables information, such as the GPS co-ordinates, date and time the shot was taken, plus exposure and other camera information, to be stored in the image file alongside the normal picture information.

## Fixed focus

Cheaper cameras have fixed-focus lenses, which means they cannot be adjusted. Instead they rely on a very narrow aperture to make everything appear in focus, from a few feet in front of the camera out to infinity. They are fine for snapshots at average distance in good light, but are not so good for creative photographs where focus can be used to produce unusual effects.

## Focal length

In brief, this term describes the magnifying power of the camera's lens. The longer the focal length, the greater the magnification. Conversely, the smaller the focal length, the more wide-angle the lens. Most digital camera zoom lenses can vary between short and long focal lengths.

## f-number

This is the number which describes the ratio of the aperture of a camera's lens to its focal length. Generally, a higher quality lens will have a smaller f-number, which bizarrely means a wider maximum aperture, and thus more light entering the lens. See also 'Depth of field' for more information about focusing.

## Forced perspective

This is a technique which employs optical illusion to make an object appear farther away, closer, larger or smaller than it actually is.

## HDR

A rather over-used technique whereby several shots at different exposures are combined to produce one image capturing a very wide range of contrast, or dynamic range. Useful for high-contrast lighting and night-time shots, but can be over-used by art students who've just discovered it.

## Histogram

A histogram is a graph of brightness. It ranges from black through grey to white along the horizontal axis, while values in the vertical axis represent the number of pixels at the appropriate brightness. It



provides a means of checking the exposure of an image. If too many pixels are present at the left-hand side of the histogram, the image is underexposed, while if it's weighted to the right, then it's likely to be overexposed.

### Hyperfocal Distance

This is the distance between a camera lens and the closest object which is in focus when the lens is focused at infinity.

### Infrared

Infrared (IR) light is the part of the EM spectrum that people encounter most in everyday life. It is invisible to human eyes, but people can feel it as heat.

### Interpolation

Some cameras and image-editing software can increase the size of a digital image by adding extra pixels in between the original ones. They take an average of the pixels around the new one and attempt to match the colour and brightness to create a seamless image. Some systems give better results than others.

### ISO

Stands for International Standards Organisation. In conventional photography, the ISO number is a measure of the light sensitivity of photographic film, and this has been carried over into digital photography as a way of expressing the light sensitivity of the CCD.

### JPEG

This file type stands for Joint Photographic Expert Group, and is the most commonly used system of image compression. Using a sliding scale between file size and picture quality, it enables digital cameras and computers to squash a large picture into a small amount of memory. Be careful when compressing files, though, because too much compression will reduce the quality of your image.

### Landscape mode

A program exposure option found on many mid-priced cameras, this function automatically selects the best exposure settings for taking landscape photographs, usually a longer shutter speed and the narrowest possible aperture to maximise depth of field. It can also refer to holding the camera horizontally, which is usually preferred for landscape shots.

### LCD

Stands for Liquid Crystal Diode, a display technology first developed in the 1970s, and in widespread use today. Most cameras have an LCD monitor screen mounted on the back for viewing photographs. Some also have an LCD electronic viewfinder, and some DSLRs also have a separate LCD data display panel.

### L-ion

Stands for Lithium Ion. This is the latest kind of rechargeable battery, superior even to Ni-MH. It can hold more power, and does not suffer from 'memory effect', where a partially charged battery, when recharged, will only register the additional charge rather than its full capacity. However, L-ion batteries are quite expensive.

### Macro mode

Refers to a lens that can focus closer than its designated focal length, but these days it is used to describe any facility for taking extreme close-ups.

### Manual mode

Found on higher-end cameras, this is for experienced photographers only. It gives you full control over both aperture and shutter speed, enabling you to experiment

with exposure and depth of field. Essential for any kind of creative photography.

### Megapixel

Megapixels are a measure of the size and resolution of the pictures that a digital camera can produce. Mega means one million, and in this case a million pixels, or more accurately a million individual light sensors on the camera's CCD. The more megapixels, the better.

### Memory card

Most digital cameras store your pictures on removable cards full of computer memory. They come in a variety of sizes and there are several different types, including CompactFlash, SD and MicroSD cards as well as Sony's own Memory Stick format.

### Metering system

This is how the camera measures the amount of light being reflected by whatever you are trying to photograph, to determine the correct exposure for that particular scene. There are many different types, including spot metering, multi-pattern metering and centre-weighted metering.

### Monobloc

A monobloc is a self-contained flash unit usually found in a photographic studio.

### Multi-pattern metering

This is a sophisticated means of determining the correct exposure of a photograph. The camera takes light readings from several different areas of the frame and compares them to its pre-programmed data.

### Night-time mode

A program exposure mode that compensates for low light by setting the aperture to maximum. This lets the most available light into the camera and gives the fastest possible shutter speed under the circumstances.

### Optical zoom

With recent advances in lens manufacturing technology, many digital cameras now have small but powerful optical zoom lenses. This means they can be adjusted to magnify the image (zoom in) or to capture a wide-angle shot (zoom out). Because the image uses the full capabilities of the CCD this is preferable to digital zoom.

### Pixel

Short for Picture Element. If you enlarge a picture on your computer, you will see that it is made up of tiny squares of a particular colour and brightness called pixels. A pixel is the basic building block of a digital photograph, and there can be several million of them in an image. The higher the pixel count, the better the quality of the photograph.

### Portrait mode

This is a program exposure mode that optimises the camera for taking classical portrait shots, widening the aperture to minimise the depth of field. This ensures that only the subject is in focus, while the shutter speed is increased to minimise camera shake.

### Processor

All digital cameras have an image processor, which takes the data from the sensor and turns it into the finished JPEG image that you see on the screen. A faster processor means larger resolution images can be processed more quickly, improving the camera's performance.

### Program exposure

Found on most digital cameras, program exposure is an automatic setting where the camera's metering system

selects an appropriate aperture setting and shutter speed in an attempt to get the best exposure and performance out of the lens.

### Raw

Raw mode is found on most high-end digital cameras. It is an option which stores the uncompressed raw data from the sensor, which can then be processed on a computer using software such as Adobe Camera Raw, Bibble etc. Raw files contain more information than JPEGs, and take up more memory. Raw is actually not an acronym and so shouldn't be all capitals; it should really be written simply as "raw".

### Resolution

The more pixels there are in an image, the larger that image will be. This is the resolution of the picture, and is usually expressed as two numbers representing the height and width of the image in pixels, such as 3,872 x 2,592. Multiplying these two figures gives you the effective megapixels, in this case 10.03MP.

### Shutter

The shutter is a device behind the lens of the camera which is normally closed, but opens for an instant when a picture is taken to allow light into the camera and onto the CCD. The length of time the shutter is open for is determined by the metering system, and is known as the shutter speed.

### Shutter priority

This is a semi-manual mode that enables the photographer to specify a shutter speed while the camera's metering system sets the aperture for the correct exposure.

### SLR

Stands for Single-Lens Reflex. A mirror or prism reflects the light coming in through the lens to the viewfinder, so when you look through it you see exactly what the camera can see.

### Spot metering

Found on the more expensive cameras, this metering mode enables the photographer to take a light reading from a small area in the middle of the frame, usually marked in the viewfinder. This is the best way of dealing with difficult lighting conditions such as backlighting, and is normally used in conjunction with auto-exposure lock.

### Time lapse

We've all seen films of flowers opening at incredible speed, or the sun and clouds racing across the sky. This super-fast motion technique is called time-lapse photography, whereby a stationary camera takes several successive shots at time intervals of a few seconds, minutes or even hours. The images are then played back rapidly, giving the impression of continuous motion.

### VGA

Stands for Video Graphics Array, and refers to an image size of 640 x 480 pixels. This was once the standard size of a computer monitor output, but these days even mobile phones have larger displays. VGA is still sometimes found as an image size mode, particularly in the video recording modes of some cheaper cameras.

### White balance

Most modern digital cameras automatically adjust the colour balance of the picture to compensate for any tints that are created by ambient or artificial light, such as sunlight, fluorescent strip lights, flashguns or normal light bulbs. This is called a white balance adjustment, and means you can take a picture and the camera will adjust colour values to remove any unwanted tint.



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